



Wheelabrator North Broward Inc.

A Waste Management Company

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MAY 06 2011

BUREAU OF
AIR REGULATION

May 5, 2011

UPS# 1Z26X1500199044478

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

Re: Wheelabrator North 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 22-24 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) 971-8701.

Sincerely,

Jim Epsilantis
Plant Manager

cc: USEPA, Region IV, Pesticides and Toxics Management Division, Air & EPCRA Enforcement Branch, Air Enforcement Section (with) UPS#1Z26X1500196872463
FDEP, Tallahassee, Bureau of Air Regulation, New Source Review Section, (with) UPS#1Z26X1500198867680
Broward County Department of Planning and Environmental Protection, Air Quality Division (with) UPS#1Z26X15001954686096
Chuck Faller (with)
Ram Tewari – BCWRS (without)
Tim Porter (without)
Rob French – MPI (with)



Wheelabrator North Broward, Inc.
2600 NW 48th Street
Pompano Beach, FL 33073

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**ENVIRONMENTAL
AIR REGULATION**

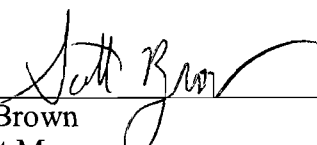
REPORT ON COMPLIANCE TESTING

Performed for:
WHEELABRATOR NORTH BROWARD, INC.
ASH HANDLING SYSTEM, LIME SILO VENT,
UNITS 1, 2 AND 3 SDA INLETS, FF OUTLETS AND STACKS
POMPANO BEACH, FL
VOLUME I OF II

Client Reference No: Service Agreement
CleanAir Project No: 11182-1
Revision 0: May 4, 2011

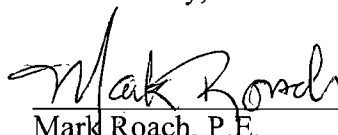
To the best of our knowledge, the data presented in this report are accurate, complete, error free, legible and representative of the actual emissions during the test program. Clean Air Engineering operates in conformance with the requirements of ASTM D7036-04 Standard Practice for Competence of Air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

Prepared and Submitted by,



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WHEELABRATOR NORTH BROWARD, INC.
POMPANO BEACH, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-1

REVISION HISTORY

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

Revision:	Date	Pages	Comments
D0a	04/22/11	All	Draft version of original document.

FINAL REPORT REVISION HISTORY

Revision:	Date	Pages	Comments
0	05/04/11	All	Final version of original document.

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PROJECT OVERVIEW**1-1****INTRODUCTION**

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

The Lime Silo Fabric Filter (FF) Vent was observed for visual emissions (VEs) and the Ash Handling System was observed for fugitive emissions. The VEs were determined by the facility's continuous opacity monitor system (COMS) data, as allowed under Title V Conditions A.36 (6), A.53 and A.54. 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. 0112120-009-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 FF Outlet from March 22 through 25, 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;
- filterable particulate matter (FPM);
- hydrogen chloride (HCl);
- total fluoride;
- fugitive emissions (FE);
- visual emissions (VE).

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POMPANO BEACH, FL

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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	03/22/11	06:57	09:10
1	Unit 1 FF Outlet/SDA Inlet	USEPA Method 26A	HCl	03/22/11	07:36	08:36
2	Unit 3 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/22/11	09:35	11:50
1	Unit 3 FF Outlet	USEPA Method 23	PCDD/F	03/22/11	09:37	13:58
2	Unit 1 FF Outlet/SDA Inlet	USEPA Method 26A	HCl	03/22/11	09:40	10:40
3	Unit 1 FF Outlet/SDA Inlet	USEPA Method 26A	HCl	03/22/11	11:02	12:02
3	Unit 3 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/22/11	12:16	14:30
1	Unit 1 FF Outlet	USEPA Method 13B	Total Fluorides	03/22/11	12:31	13:41
2	Unit 1 FF Outlet	USEPA Method 13B	Total Fluorides	03/22/11	14:08	15:17
3	Unit 1 FF Outlet	USEPA Method 13B	Total Fluorides	03/22/11	15:39	16:47
1	Unit 1 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/23/11	06:34	08:45
2	Unit 3 FF Outlet	USEPA Method 23	PCDD/F	03/23/11	06:40	11:05
1	Unit 2 FF Outlet/SDA Inlet	USEPA Method 26A	HCl	03/23/11	07:12	08:12
2	Unit 2 FF Outlet/SDA Inlet	USEPA Method 26A	HCl	03/23/11	08:38	09:38
2	Unit 1 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/23/11	09:05	11:17
3	Unit 2 FF Outlet/SDA Inlet	USEPA Method 26A	HCl	03/23/11	09:59	10:59
1	Unit 2 FF Outlet	USEPA Method 13B	Total Fluorides	03/23/11	11:32	12:45
3	Unit 3 FF Outlet	USEPA Method 23	PCDD/F	03/23/11	11:36	15:56
3	Unit 1 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/23/11	11:41	13:52
2	Unit 2 FF Outlet	USEPA Method 13B	Total Fluorides	03/23/11	13:07	14:17
3	Unit 2 FF Outlet	USEPA Method 13B	Total Fluorides	03/23/11	14:39	15:45
1	Unit 2 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/24/11	06:28	08:38
1	3 FF Outlet/SDA Inlet	USEPA Method 26A	HCl	03/24/11	06:57	07:57
2	3 FF Outlet/SDA Inlet	USEPA Method 26A	HCl	03/24/11	08:25	09:25
2	Unit 2 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/24/11	08:53	11:03
3	3 FF Outlet/SDA Inlet	USEPA Method 26A	HCl	03/24/11	10:24	11:24
3	Unit 2 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/24/11	11:19	14:30
1	Unit 3 FF Outlet	USEPA Method 13B	Total Fluorides	03/24/11	11:40	12:55
1	Ash Handling System	USEPA Method 22	Fugitive Emissions	03/24/11	11:39	15:20
2	Unit 3 FF Outlet	USEPA Method 13B	Total Fluorides	03/24/11	13:11	14:19
3	Unit 3 FF Outlet	USEPA Method 13B	Total Fluorides	03/24/11	14:38	15:46
1	Lime Silo	USEPA Method 9	Opacity	03/25/11	08:50	11:15

PROJECT OVERVIEW

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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)	0.21	0.72	1.3	25
Visual Emissions (% by COMS) ²	0	0	0	10
Fluoride (lb/MMBtu as HF) ³	<0.000049	<0.000046	<0.000039	0.0040
Total PCCD/PCDF (ng/dscm @ 7% O ₂)	NA	NA	1.3	30
Hydrogen Chloride (ppmdv @ 7% O ₂) <u>or</u>	18	6.4	11	29
Hydrogen Chloride Removal (%) ⁴	96%	99%	98%	>95
Beryllium (mg/dscm @ 7% O ₂)	<0.00003	<0.00003	<0.00003	0.001
Cadmium (mg/dscm @ 7% O ₂)	0.00014	<0.00014	<0.00011	0.035
Lead (mg/dscm @ 7% O ₂)	<0.00014	<0.00012	0.00029	0.40
Mercury (mg/dscm @ 7% O ₂)	0.0028	0.0038	0.0019	0.050
Average Steam Flow (Klbs/hr) ⁵	183.8	183.9	183.9	186
Average FF Inlet Temperature (°F) ⁵	301	295	310	NA

¹ Limits obtained from facilities Title V Permit 0112119-009-AV.

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 hydrogen chloride calculated in the unit of its standard (ppmdv @ 7% O₂). The hydrogen chloride limit is 29 ppmdv @ 7% O₂ or 95% removal, whichever is less stringent.

⁵ From all compliance test runs.

WHEELABRATOR NORTH BROWARD, INC.
POMPANO BEACH, FL

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PROJECT OVERVIEW

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Table 1-3:
Subpart Cb-required Operating Data

Process Condition

Unit 1 Maximum Demonstrated Combustor Load (Klbs/hr) ¹	184.5 ²
Unit 2 Maximum Demonstrated Combustor Load (Klbs/hr) ¹	184.3 ³
Unit 3 Maximum Demonstrated Combustor Load (Klbs/hr) ¹	184.2
Unit 1 Maximum Particulate Control Device Inlet Temperature (°F) ⁴	322 ²
Unit 2 Maximum Particulate Control Device Inlet Temperature (°F) ⁴	321 ³
Unit 3 Maximum Particulate Control Device Inlet Temperature (°F) ⁴	300

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 22, 2009 (Project 10735).

³ From CleanAir Cb test report dated April 23, 2010 (Project 10955).

⁴ From 40CFR60.58b (i) (9) the highest four hour average during PCDD/PCDF 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 (% of observation time)	EPA M22	0.19	5%
	Fugitive Emissions (minutes)		0.35	9 minutes
<u>Lime Silo³</u>				
	Visual Emissions (%) ⁴	EPA M9	5	5%
	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.

⁴ The results from the initial lime silo test that was stopped due to bin vent fabric filter baghouse problems.

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 the compliance testing, all three (3) boilers were operated within 10% of the 186,000 lb/hr maximum steam flow rating. 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 conducted 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 Methods 23 and 29 testing by assembling a used set of glassware, taking the complete train to the outlet location and performing a leak-check. These samples were treated exactly as the other samples. The results for the method and field blanks are presented in Table 2-18 on page 2-17, as well as Appendix 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 meet 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, as well as the EPA audit sample results, are presented in Appendix H.

The Method 23 results for all three (3) runs 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.

Methylene chloride was omitted in the Method 23 sample recovery, per approved Alternative Test Method 052 (ALT-052).

PROJECT OVERVIEW

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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 and Bailey Computer Time, which is approximately 60 minutes earlier than actual Eastern Standard Time (EST). The Lime Silo opacity start and stop times are based on CEM time; however, the initial and final truck weights were recorded using EST.

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 H.

Problems Encountered

Lime silo opacity readings by EPA Method 9 were started on March 24 but it became apparent that there were some issues with the bin vent fabric filter. The lime unloading was stopped and scheduled for the following day. After further inspection, holes were discovered in the fabric filter box structure as well as in a few of the fabric filters. The unit underwent maintenance and Method 9 was then performed on March 25 for an entire truck unloading. The Method 9 start and stop times are based on actual EST, rather than plant CEM time. The data sheet for the aborted test run is presented in Appendix F, along with the final Method 9 data sheets. At no point during the initial opacity test were the readings above the allowed 5% opacity.

The Runs 2 and 3 Method 23 solvent rinses were incorrectly combined by a Laboratory Technician at Analytical Perspectives. A full overview of what occurred and how the laboratory dealt with the error is presented in the Analytical Perspectives lab report in Appendix H. For the purposes of showing compliance with permit limit the worst-case scenario are used for the Run 2 and 3 results. It should be noted that it is well-documented that 95% or more of the PCDD/PCDF collected by the Method 23 sample train is collected in the XAD trap, which was uncompromised in this instance. Therefore, the incorrect mixing of the solvents should have minimal effect on the final results.

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".

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). Method 26A was modified to a single-point constant sampling rate at all test locations.

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 NORTH BROWARD, INC.
POMPANO BEACH, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-1

2-1

RESULTS

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

Run No.	1	2	3	Average
Date (2011)	Mar 23	Mar 23	Mar 23	
Start Time (approx.)	06:34	09:05	11:41	
Stop Time (approx.)	08:45	11:17	13:52	
Process Conditions				
R _P Steam Production Rate (Klbs/hr)	184.2	184.4	183.4	184.0
P ₁ Fabric Filter Inlet Temperature (°F)	300	299	300	300
Gas Conditions				
O ₂ Oxygen (dry volume %)	9.8	9.6	9.8	9.7
CO ₂ Carbon dioxide (dry volume %)	9.5	9.8	9.8	9.7
T _s Sample temperature (°F)	303	302	303	302
B _w Actual water vapor in gas (% by volume)	20.5	21.0	20.8	20.7
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	197,000	189,000	191,000	192,000
Q _{std} Volumetric flow rate, dry standard (dscfm)	106,000	101,000	102,000	103,000
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	81.60	77.61	77.85	79.02
%I Isokinetic sampling (%)	99.4	98.8	97.9	98.7
Particulate Laboratory Data				
m _n Total FPM (g)	0.00022	0.00050	0.00040	
FPM Results				
C _{sd} Particulate Concentration (mg/dscm)	0.095	0.23	0.18	0.17
C _{sd7} Particulate Concentration @7% O ₂ (mg/dscm)	0.12	0.28	0.23	0.21
Mercury Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	5.5135	4.6403	4.9369	
Mercury Results - Total				
C _{sd} Concentration (mg/dscm)	0.0024	0.0021	0.0022	0.0022
C _{sd7} Concentration @7% O ₂ (mg/dscm)	0.0030	0.0026	0.0028	0.0028
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)	<0.000022	<0.000023	<0.000023	<0.000022
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<0.000027	<0.000028	<0.000028	<0.000028
Cadmium Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	0.2435	0.2097	0.3090	
Cadmium Results - Total				
C _{sd} Concentration (mg/dscm)	0.00011	0.00010	0.00014	0.00011
C _{sd7} Concentration @7% O ₂ (mg/dscm)	0.00013	0.00012	0.00018	0.00014
Lead Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	0.3789	<0.2000	<0.2000	
Lead Results - Total				
C _{sd} Concentration (mg/dscm)	0.00016	<0.000091	<0.000091	<0.00012
C _{sd7} Concentration @7% O ₂ (mg/dscm)	0.00021	<0.00011	<0.00011	<0.00014

RESULTS

2-2

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

Run No.	1	2	3	Average
Date (2011)	Mar 22	Mar 22	Mar 22	
Start Time (approx.)	12:31	14:08	15:39	
Stop Time (approx.)	13:41	15:17	16:47	
Process Conditions				
R _P Steam Production Rate (Klbs/hr)	184.2	182.9	182.4	183.2
P ₁ Fabric Filter Inlet Temperature (°F)	299	299	305	301
Gas Conditions				
O ₂ Oxygen (dry volume %)	9.6	9.7	10.3	9.9
CO ₂ Carbon dioxide (dry volume %)	10.0	9.9	9.6	9.8
T _s Sample temperature (°F)	301	301	305	302
B _w Actual water vapor in gas (% by volume)	21.1	21.4	20.8	21.1
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	183,985	190,354	195,833	190,057
Q _{std} Volumetric flow rate, dry standard (dscfm)	98,857	102,037	105,058	101,984
Sampling Data				
V _{nstd} Volume metered, standard (dscf)	37.45	39.60	40.41	39.15
%I Isokinetic sampling (%)	96.9	99.3	98.4	98.2
Laboratory Data				
m _n Total HF collected (mg)	<0.0460	<0.0506	<0.0435	
Hydrogen Fluoride (HF) Results				
C _{sd} HF Concentration (ppmdv)	<0.052	<0.054	<0.046	<0.051
C _{sd7} HF Concentration @7% O ₂ (ppmdv)	<0.064	<0.067	<0.060	<0.064
C _{sd} HF Concentration (mg/dscm)	<0.043	<0.045	<0.038	<0.042
C _{sd7} HF Concentration @7% O ₂ (mg/dscm)	<0.053	<0.056	<0.050	<0.053
E _{lb/hr} HF Rate (lb/hr)	<0.016	<0.017	<0.015	<0.016
E _{Fd} HF Rate - Fd-based (lb/MMBtu)	<0.000049	<0.000051	<0.000045	<0.000049

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POMPANO BEACH, FL

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RESULTS

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

Run No.	1	2	3	Average
Date (2011)	Mar 22	Mar 22	Mar 22	
Start Time (approx.)	07:36	09:40	11:02	
Stop Time (approx.)	08:36	10:40	12:02	
Process Conditions				
R _P Steam Production Rate (Klbs/hr)	184.1	184.9	183.8	184.3
P ₁ Fabric Filter Inlet Temperature (°F)	304	303	303	303
SDA Inlet Gas Conditions				
O ₂ Oxygen (dry volume %)	9.8	9.0	8.8	9.2
CO ₂ Carbon dioxide (dry volume %)	9.7	10.4	10.6	10.3
T _s Sample temperature (°F)	503	497	495	498
B _w Actual water vapor in gas (% by volume)	17.7	17.0	16.6	17.1
SDA Inlet Sampling Data				
V _{mstd} Volume metered, standard (dscf)	35.19	35.06	35.03	35.09
SDA Inlet Laboratory Data				
m _n Total HCl collected (mg)	477.874	499.155	582.720	
Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (ppmdv)	317	332	388	345
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	395	387	447	410
FF Outlet Gas Conditions				
O ₂ Oxygen (dry volume %)	10.1	9.1	9.2	9.5
CO ₂ Carbon dioxide (dry volume %)	9.4	10.3	10.3	10.0
T _s Sample temperature (°F)	308	307	306	307
B _w Actual water vapor in gas (% by volume)	21.5	21.9	21.5	21.6
FF Outlet Sampling Data				
V _{mstd} Volume metered, standard (dscf)	40.96	40.61	40.15	40.58
FF Outlet Laboratory Data				
m _n Total HCl collected (mg)	23.322	29.114	24.040	
FF Outlet Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (ppmdv)	13	17	14	15
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	17	20	17	18
RE Reduction Efficiency (% Removal)	95.7%	94.9%	96.3%	95.6%

RESULTS

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

Run No.	1	2	3	Average
Date (2011)	Mar 24	Mar 24	Mar 24	
Start Time (approx.)	06:28	08:53	11:19	
Stop Time (approx.)	08:38	11:03	14:30	
Process Conditions				
R _P Steam Production Rate (Klbs/hr)	183.3	184.1	184.1	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	293	295	294	294
Gas Conditions				
O ₂ Oxygen (dry volume %)	8.1	8.3	7.6	8.0
CO ₂ Carbon dioxide (dry volume %)	11.1	11.0	11.6	11.2
T _s Sample temperature (°F)	305	306	306	306
B _w Actual water vapor in gas (% by volume)	21.6	21.8	22.2	21.9
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	152,000	163,000	156,000	157,000
Q _{std} Volumetric flow rate, dry standard (dscfm)	80,300	85,900	81,700	82,600
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	64.49	68.24	64.77	65.83
%I Isokinetic sampling (%)	103.5	102.4	102.1	102.7
Particulate Laboratory Data				
m _n Total FPM (g)	0.00160	<0.00020	0.00200	
FPM Results				
C _{sd} Particulate Concentration (mg/dscm)	0.88	<0.10	1.1	<0.69
C _{sd7} Particulate Concentration @7% O ₂ (mg/dscm)	0.95	<0.11	1.1	<0.74
Mercury Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	7.0725	6.3602	6.2891	
Mercury Results - Total				
C _{sd} Concentration (mg/dscm)	0.0039	0.0033	0.0034	0.0035
C _{sd7} Concentration @7% O ₂ (mg/dscm)	0.0042	0.0036	0.0036	0.0038
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)	<0.000027	<0.000026	<0.000027	<0.000027
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<0.000030	<0.000028	<0.000029	<0.000029
Cadmium Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	0.2318	<0.2000	0.2982	
Cadmium Results - Total				
C _{sd} Concentration (mg/dscm)	0.00013	<0.00010	0.00016	<0.00013
C _{sd7} Concentration @7% O ₂ (mg/dscm)	0.00014	<0.00011	0.00017	<0.00014
Lead Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	<0.2000	<0.2000	<0.2000	
Lead Results - Total				
C _{sd} Concentration (mg/dscm)	<0.00011	<0.00010	<0.00011	<0.00011
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<0.00012	<0.00011	<0.00011	<0.00012

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RESULTS

Table 2-5:
Unit 2 FF Outlet - Fluorides

Run No.	1	2	3	Average
Date (2011)	Mar 23	Mar 23	Mar 23	
Start Time (approx.)	11:32	13:07	14:39	
Stop Time (approx.)	12:45	14:17	15:45	
Process Conditions				
R _p Steam Production Rate (Klbs/hour)	183.8	183.5	184.1	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	296	296	296	296
Gas Conditions				
O ₂ Oxygen (dry volume %)	9.1	9.1	8.6	8.9
CO ₂ Carbon dioxide (dry volume %)	10.4	10.5	11.1	10.7
T _s Sample temperature (°F)	307	307	307	307
B _w Actual water vapor in gas (% by volume)	20.9	21.9	22.0	21.6
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	171,149	176,205	168,206	171,853
Q _{std} Volumetric flow rate, dry standard (dscfm)	91,302	92,854	88,530	90,895
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	36.39	37.86	36.38	36.88
%I Isokinetic sampling (%)	99.7	102.0	102.8	101.5
Laboratory Data				
m _n Total HF collected (mg)	<0.0426	<0.0473	<0.0449	
Hydrogen Fluoride (HF) Results				
C _{sd} HF Concentration (ppmdv)	<0.050	<0.053	<0.052	<0.052
C _{sd7} HF Concentration @7% O ₂ (ppmdv)	<0.058	<0.063	<0.059	<0.060
C _{sd} HF Concentration (mg/dscm)	<0.041	<0.044	<0.044	<0.043
C _{sd7} HF Concentration @7% O ₂ (mg/dscm)	<0.048	<0.052	<0.049	<0.050
E _{lb/hr} HF Rate (lb/hr)	<0.014	<0.015	<0.014	<0.015
E _{Fd} HF Rate - Fd-based (lb/MMBtu)	<0.000044	<0.000048	<0.000045	<0.000046

RESULTS

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

Run No.	1	2	3	Average
Date (2011)	Mar 23	Mar 23	Mar 23	
Start Time (approx.)	07:12	08:38	09:59	
Stop Time (approx.)	08:12	09:38	10:59	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	183.7	183.8	184.7	184.1
P ₁ Fabric Filter Inlet Temperature (°F)	295	295	295	295
SDA Inlet Gas Conditions				
O ₂ Oxygen (dry volume %)	8.0	8.2	7.9	8.0
CO ₂ Carbon dioxide (dry volume %)	11.3	11.0	11.4	11.2
T _s Sample temperature (°F)	491	496	498	495
B _w Actual water vapor in gas (% by volume)	16.9	16.1	17.4	16.8
SDA Inlet Sampling Data				
V _{mstd} Volume metered, standard (dscf)	35.90	35.52	35.22	35.55
SDA Inlet Laboratory Data				
m _n Total HCl collected (mg)	757.887	660.147	665.475	
SDA Inlet Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (ppmdv)	492	433	440	455
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	528	473	469	490
FF Outlet Gas Conditions				
O ₂ Oxygen (dry volume %)	8.6	8.9	8.7	8.7
CO ₂ Carbon dioxide (dry volume %)	10.6	10.4	10.6	10.5
T _s Sample temperature (°F)	309	308	309	308
B _w Actual water vapor in gas (% by volume)	21.2	20.4	21.3	21.0
FF Outlet Sampling Data				
V _{mstd} Volume metered, standard (dscf)	41.40	40.52	40.22	40.71
FF Outlet Laboratory Data				
m _n Total HCl collected (mg)	12.060	11.484	9.816	
FF Outlet Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (ppmdv)	6.8	6.6	5.7	6.4
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	7.7	7.7	6.5	7.3
RE Reduction Efficiency (% Removal)	98.5%	98.4%	98.6%	98.5%

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POMPANO BEACH, FL

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RESULTS

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

Run No.	1	2	3	Average
Date (2011)	Mar 22	Mar 22	Mar 22	
Start Time (approx.)	06:57	09:35	12:16	
Stop Time (approx.)	09:10	11:50	14:30	
Process Conditions				
R _P Steam Production Rate (Klbs/hr)	183.7	184.2	183.5	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	310	310	310	310
Gas Conditions				
O ₂ Oxygen (dry volume %)	9.3	8.8	9.3	9.1
CO ₂ Carbon dioxide (dry volume %)	10.0	10.7	10.1	10.3
T _s Sample temperature (°F)	311	311	312	311
B _w Actual water vapor in gas (% by volume)	20.9	21.3	20.6	20.9
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	183,000	173,000	180,000	178,000
Q _{std} Volumetric flow rate, dry standard (dscfm)	97,200	91,800	96,200	95,100
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	75.26	70.80	74.40	73.49
%I Isokinetic sampling (%)	99.7	99.3	99.7	99.6
Particulate Laboratory Data				
m _n Total FPM (g)	0.00220	0.00280	0.00170	
FPM Results				
C _{sd} Particulate Concentration (mg/dscm)	1.0	1.4	0.81	1.1
C _{sd7} Particulate Concentration @7% O ₂ (mg/dscm)	1.2	1.6	0.97	1.3
Mercury Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	3.2840	3.0296	3.8612	
Mercury Results - Total				
C _{sd} Concentration (mg/dscm)	0.0015	0.0015	0.0018	0.0016
C _{sd7} Concentration @7% O ₂ (mg/dscm)	0.0018	0.0017	0.0022	0.0019
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)	<0.000023	<0.000025	<0.000024	<0.000024
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<0.000028	<0.000029	<0.000029	<0.000028
Cadmium Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	<0.2000	<0.2034	<0.2000	
Cadmium Results - Total				
C _{sd} Concentration (mg/dscm)	<0.000094	<0.00010	<0.000095	<0.000097
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<0.000112	<0.000116	<0.000114	<0.000114
Lead Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	0.8519	0.3552	0.3347	
Lead Results - Total				
C _{sd} Concentration (mg/dscm)	0.00040	0.00018	0.00016	0.00025
C _{sd7} Concentration @7% O ₂ (mg/dscm)	0.00048	0.00020	0.00019	0.00029

RESULTS

Table 2-8:
Unit 3 FF Outlet - Fluorides

Run No.	1	2	3	Average
Date (2011)	Mar 24	Mar 24	Mar 24	
Start Time (approx.)	11:40	13:11	14:38	
Stop Time (approx.)	12:55	14:19	15:46	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	183.1	184.7	184.7	184.2
P ₁ Fabric Filter Inlet Temperature (°F)	311	310	310	311
Gas Conditions				
O ₂ Oxygen (dry volume %)	9.7	9.7	8.9	9.4
CO ₂ Carbon dioxide (dry volume %)	9.9	10.0	10.7	10.2
T _s Sample temperature (°F)	313	312	312	312
B _w Actual water vapor in gas (% by volume)	20.7	19.9	20.8	20.4
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	200,570	191,610	184,429	192,203
Q _{std} Volumetric flow rate, dry standard (dscfm)	106,255	102,647	97,609	102,170
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	42.95	40.88	39.55	41.13
%I Isokinetic sampling (%)	101.1	99.7	101.4	100.7
Laboratory Data				
m _n Total HF collected (mg)	<0.03905	<0.04058	<0.04256	
Hydrogen Fluoride (HF) Results				
C _{sd} HF Concentration (ppmdv)	<0.039	<0.042	<0.046	<0.042
C _{sd7} HF Concentration @7% O ₂ (ppmdv)	<0.048	<0.052	<0.053	<0.051
C _{sd} HF Concentration (mg/dscm)	<0.032	<0.035	<0.038	<0.035
C _{sd7} HF Concentration @7% O ₂ (mg/dscm)	<0.040	<0.043	<0.044	<0.042
E _{lb/hr} HF Rate (lb/hr)	<0.013	<0.013	<0.014	<0.013
E _{Fd} HF Rate - Fd-based (lb/MMBtu)	<0.000037	<0.000040	<0.000040	<0.000039

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POMPANO BEACH, FL

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RESULTS

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

Run No.	1	2	3	Average
Date (2011)	Mar 22	Mar 23	Mar 23	
Start Time (approx.)	09:37	06:40	11:36	
Stop Time (approx.)	13:58	11:05	15:56	
Process Conditions				
R _p Steam Production Rate (Klbs/hour)	184.0	183.7	184.2	184.0
P ₁ Fabric Filter Inlet Temperature (°F)	310	310	310	310
Gas Conditions				
O ₂ Oxygen (dry volume %)	9.3	9.4	9.2	9.3
CO ₂ Carbon dioxide (dry volume %)	10.2	9.8	10.3	10.1
T _s Sample temperature (°F)	312	312	312	312
B _w Actual water vapor in gas (% by volume)	20.9	20.6	21.0	20.8
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	194,733	199,214	194,126	196,024
Q _{std} Volumetric flow rate, dry standard (dscfm)	103,876	106,025	102,820	104,240
Sampling Data				
V _{std} Volume metered, standard (dscf)	163.33	169.19	164.25	165.59
%I Isokinetic sampling (%)	99.8	101.3	101.4	100.8
Results (ND and EMPC = 0)				
Laboratory Data from USEPA Method 23				
m _n Total PCDDs & PCDFs (ng)	5.3900	4.3602	5.2116	
m _{n,TEQ} Total TEQ PCDDs & PCDFs (ng)	0.0496	0.0381	0.0415	
Total PCDD/F Results (TEF=1)				
C _{sd} PCDD/F Concentration (ng/dscm)	1.2	0.91	1.1	1.1
C _{sd7} PCDD/F Concentration @7% O ₂ (ng/dscm)	1.4	1.1	1.3	1.3
E _{lb/hr} PCDD/F Rate (lb/hr)	4.5E-07	3.6E-07	4.3E-07	4.2E-07
E _{Fd} PCDD/F Rate - F _d -based (lb/MMBtu)	1.3E-09	1.0E-09	1.2E-09	1.2E-09
Total PCDD/F TEQ Results (using USEPA/INTL 2005 TEFs)				
C _{sdTEQ} TEQ Concentration (ng/dscm)	0.011	0.0080	0.0089	0.0092
C _{sd7TEQ} TEQ Concentration @7% O ₂ (ng/dscm)	0.013	0.0096	0.011	0.011
E _{lb/hrTEQ} TEQ Rate (lb/hr)	4.2E-09	3.2E-09	3.4E-09	3.6E-09
E _{FdTEQ} TEQ Rate - F _d -based (lb/MMBtu)	1.2E-11	8.8E-12	9.7E-12	1.0E-11
Results (ND and EMPC = actual value)				
Laboratory Data from USEPA Method 23, including NDs and EMPCs				
m _n Total PCDDs & PCDFs (ng)	5.4800	4.5150	5.4180	
m _{n,TEQ} Total TEQ PCDDs & PCDFs (ng)	0.0497	0.0426	0.0448	
Total PCDD/F Results (TEF=1)				
C _{sd} PCDD/F Concentration (ng/dscm)	1.2	0.94	1.2	1.1
C _{sd7} PCDD/F Concentration @7% O ₂ (ng/dscm)	1.4	1.1	1.4	1.3
E _{lb/hr} PCDD/F Rate (lb/hr)	4.6E-07	3.7E-07	4.5E-07	4.3E-07
E _{Fd} PCDD/F Rate - F _d -based (lb/MMBtu)	1.3E-09	1.0E-09	1.3E-09	1.2E-09
Total PCDD/F TEQ Results (using USEPA/INTL 2005 TEFs)				
C _{sdTEQ} TEQ Concentration (ng/dscm)	0.011	0.0089	0.0096	0.0098
C _{sd7TEQ} TEQ Concentration @7% O ₂ (ng/dscm)	0.013	0.011	0.011	0.012
E _{lb/hrTEQ} TEQ Rate (lb/hr)	4.2E-09	3.5E-09	3.7E-09	3.8E-09
E _{FdTEQ} TEQ Rate - F _d -based (lb/MMBtu)	1.2E-11	9.8E-12	1.0E-11	1.1E-11

RESULTS

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

Run No.	1	2	3	Average
Date (2011)	Mar 24	Mar 24	Mar 24	
Start Time (approx.)	06:57	08:25	10:24	
Stop Time (approx.)	07:57	09:25	11:24	
Process Conditions				
R _P Steam Production Rate (Klbs/hr)	184.6	183.4	183.3	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	309	310	310	310
SDA Inlet Gas Conditions				
O ₂ Oxygen (dry volume %)	8.4	8.7	9.7	8.9
CO ₂ Carbon dioxide (dry volume %)	10.9	10.8	10.0	10.6
T _s Sample temperature (°F)	496	501	505	500
B _w Actual water vapor in gas (% by volume)	17.0	16.2	15.5	16.2
SDA Inlet Sampling Data				
V _{mstd} Volume metered, standard (dscf)	36.03	35.61	35.63	35.76
SDA Inlet Laboratory Data				
m _n Total HCl collected (mg)	742.447	755.593	606.208	
SDA Inlet Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (ppmdv)	480	495	397	457
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	534	563	490	529
FF Outlet Gas Conditions				
O ₂ Oxygen (dry volume %)	8.5	9.0	9.4	9.0
CO ₂ Carbon dioxide (dry volume %)	10.8	10.4	10.1	10.4
T _s Sample temperature (°F)	311	312	312	311
B _w Actual water vapor in gas (% by volume)	21.2	20.9	20.5	20.9
FF Outlet Sampling Data				
V _{mstd} Volume metered, standard (dscf)	41.17	41.23	40.70	41.03
FF Outlet Laboratory Data				
m _n Total HCl collected (mg)	20.196	20.101	11.998	
FF Outlet Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (ppmdv)	11	11	6.9	10
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	13	13	8	11
RE Reduction Efficiency (% Removal)	97.6%	97.6%	98.3%	97.8%

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POMPANO BEACH, FL

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RESULTS

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

Run No.	1	2	3	Average
<u>Unit 1</u>				
Date (2011)	Mar 23	Mar 23	Mar 23	
Start Time (approx.)	06:30	09:00	11:36	
Stop Time (approx.)	08:42	11:12	13:48	
Visible Emissions (%)¹				
Average Opacity	0	0	1	0
Maximum Reading	1	1	2	1
Minimum Reading	0	0	1	0
<u>Unit 2</u>				
Date (2011)	Mar 24	Mar 24	Mar 24	
Start Time (approx.)	06:24	08:48	11:18	
Stop Time (approx.)	08:36	11:00	14:30	
Visible Emissions (%)¹				
Average Opacity	0	0	0	0
Maximum Reading	0	0	0	0
Minimum Reading	0	0	0	0
<u>Unit 3</u>				
Date (2011)	Mar 22	Mar 22	Mar 22	
Start Time (approx.)	06:54	09:30	12:12	
Stop Time (approx.)	09:06	11:48	14:30	
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

Source Constituent	Date (2011)	Start Time (approx.)	Stop Time (approx.)	Observation Duration (minutes)	Accumulated Emission Duration (seconds)	
<u>Ash Unloading Area / Conveyor</u>						
Visual Opacity (%)	March 24	11:39	12:50	60	21	
<u>Door to Baghouse / Ash Unloading</u>						
Visual Opacity (%)	March 24	12:55	14:05	60	0	
<u>Rolling Door/Door to Baghouse</u>						
Visual Opacity (%)	March 24	14:10	15:20	60	0	<u>Permit Limit</u>
				Total (% of observation time) = 0.19		< 5% of observation Time
				Total (minutes) = 0.35		< 9 minutes

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

Run No.	1	1
Date (2011)	Mar 24	Mar 25
Start Time (approx.)	09:52	08:50
Stop Time (approx.)	10:19	11:15
<u>Process Conditions</u>		
Total lime unloaded (tons)		25.4
Rate of unloading (tons/hr)		10.9
<u>Visible Emissions</u>		
Average (percent opacity)	5	0
Maximum reading (percent opacity)	5	0
The VE performed on March 24 was stopped due to FF Baghouse problem		

WHEELABRATOR NORTH BROWARD, INC.
POMPANO BEACH, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-1

RESULTS**2-13**

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	3/23/2011	06:34-08:45	184.2	303	196,674	9.8	9.5	105,772	84,313
1-O-M5/29-2	3/23/2011	09:05-11:17	184.4	302	189,108	9.6	9.8	101,264	82,468
1-O-M5/29-3	3/23/2011	11:41-13:52	183.4	303	191,054	9.8	9.8	102,444	81,734
1-O-M13B-1	3/22/2011	12:31-13:41	184.2	301	183,985	9.6	10.0	98,857	80,295
1-O-M13B-2	3/22/2011	14:08-15:17	182.9	301	190,354	9.7	9.9	102,037	82,217
1-O-M13B-3	3/22/2011	15:39-16:47	182.4	305	195,833	10.3	9.6	105,058	80,494
		Average	183.6	302	191,168	9.8	9.8	102,572	81,920
2-O-M5/29-1	3/24/2011	06:28-08:38	183.3	305	152,098	8.1	11.1	80,314	73,785
2-O-M5/29-2	3/24/2011	08:53-11:03	184.1	306	163,134	8.3	11.0	85,854	77,948
2-O-M5/29-3	3/24/2011	11:19-14:30	184.1	306	156,135	7.6	11.6	81,729	78,084
2-O-M13B-1	3/23/2011	11:32-12:45	183.8	307	171,149	9.1	10.4	91,302	77,836
2-O-M13B-2	3/23/2011	13:07-14:17	183.5	307	176,205	9.1	10.5	92,854	78,625
2-O-M13B-3	3/23/2011	14:39-15:45	184.1	307	168,206	8.6	11.1	88,530	78,339
		Average	183.8	306	164,488	8.5	10.9	86,764	77,436
3-O-M5/29-1	3/22/2011	06:57--09:10	183.7	311	182,687	9.3	10.0	97,212	81,127
3-O-M5/29-2	3/22/2011	09:35-11:50	184.2	311	172,797	8.8	10.7	91,842	80,015
3-O-M5/29-3	3/22/2011	12:16-14:30	183.5	312	179,567	9.3	10.1	96,184	80,061
3-O-M13B-1	3/24/2011	11:40-12:55	183.1	313	200,570	9.7	9.9	106,255	85,386
3-O-M13B-2	3/24/2011	13:11-14:19	184.7	312	191,610	9.7	10.0	102,647	83,077
3-O-M13B-3	3/24/2011	14:38-15:46	184.7	312	184,429	8.9	10.7	97,609	83,986
2-O-M23-1	3/22/2011	09:37-13:58	184.0	312	194,733	9.3	10.2	103,876	86,912
2-O-M23-2	3/23/2011	06:40-11:05	183.7	312	199,214	9.4	9.8	106,025	87,871
2-O-M23-3	3/23/2011	11:36-15:56	184.2	312	194,126	9.2	10.3	102,820	86,399
		Average	184.0	312	188,859	9.3	10.2	100,497	83,870
Facility Average			183.8	307	181,505	9.2	10.3	96,611	81,076

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
MB1_8600-RJ_DF_SDS	83.6	92.4	85.3	83.2	84.5	82.9	77
Unit 3 FF Outlet-Field Blank	81	92.6	86	87	85.2	86.1	83
Unit 3 FF Outlet- Run 1	85.9	92.4	88.5	86.8	88.8	87.5	82.3
Unit 3 FF Outlet- Run 2	85.8	93.1	89	90.1	87.7	88.5	81.7
Unit 3 FF Outlet- Run 3	80.3	85.7	86.3	85.7	87.3	82.3	76.8

Average	83	91	87	87	87	85	80
SD	3	3	2	2	2	3	3
Min	80.3	85.7	85.3	83.2	84.5	82.3	76.8
Max	85.9	93.1	89	90.1	88.8	88.5	83
Within M23 QC	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE

Sample Number	Extraction Standard Percent Recoveries, %									
	¹³ C- TCDF	¹³ C- PeCDF	¹³ C- PeCDF	¹³ C- HxCDF	¹³ C- HxCDF	¹³ C- HxCDF	¹³ C- HxCDF	¹³ C- HpCDF	¹³ C- HpCDF	¹³ C- OCDF
MB1_8600-RJ_DF_SDS	86.1	90.1	85.6	83.2	83.1	81.4	84.1	83.1	83.6	76.3
Unit 3 FF Outlet-Field Blank	84.4	93.4	96	85.1	85.3	84.4	85.4	84.3	85.3	81.3
Unit 3 FF Outlet- Run 1	85.3	88	88.2	87.4	86.8	84.4	86.3	85	87.4	82.3
Unit 3 FF Outlet- Run 2	91	93	95.1	88.1	88.4	85.5	87.2	86.5	88.1	82.7
Unit 3 FF Outlet- Run 3	84.8	86.1	86.7	87.7	85.1	82.1	85	80.9	84.3	78.5

Average	86	90	90	86	86	84	86	84	86	80
SD	3	3	5	2	2	2	1	2	2	3
Min	84.4	86.1	85.6	83.2	83.1	81.4	84.1	80.9	83.6	76.3
Max	91	93.4	96	88.1	88.4	85.5	87.2	86.5	88.1	82.7
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
MB1_8600-RJ_DF_SDS	102	99	101	99.2	102
Unit 3 FF Outlet-Field Blank	100	101	98.9	98.1	102
Unit 3 FF Outlet- Run 1	101	101	103	98.7	102
Unit 3 FF Outlet- Run 2	99.4	104	103	99.7	101
Unit 3 FF Outlet- Run 3	102	107	102	101	105

Average	101	102	102	99	102
SD	1	3	2	1	2
Min	99.4	99	98.9	98.1	101
Max	102	107	103	101	105
Min within M23 QC	TRUE	TRUE	TRUE	TRUE	TRUE

WHEELABRATOR NORTH BROWARD, INC.
POMPANO BEACH, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-1

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	NA	1.2%	NA	NA	NA
U1 FF Outlet R2	NA	0.8%	NA	NA	NA
U1 FF Outlet R3	NA	0.7%	NA	NA	NA
U2 FF Outlet R1	NA	0.4%	NA	NA	NA
U2 FF Outlet R2	NA	0.8%	NA	NA	NA
U2 FF Outlet R3	NA	0.5%	NA	NA	NA
U3 FF Outlet R1	NA	2.5%	NA	NA	NA
U3 FF Outlet R2	NA	4.4%	NA	NA	NA
U3 FF Outlet R3	NA	10.4%	6.6%	NA	NA
Field Blank	NA	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	
	16384-2		16384-5	16384-8	
Beryllium	NA		NA	NA	
Cadmium	6.2%		NA	NA	
Lead	0.6%		0.0%	3.2%	

RESULTS

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

		Sample Spike and Recovery				
		FH Front Half	BH H ₂ O ₂ /HNO ₄	A Empty Impinger	B KMnO ₄	C HCl
Run Number						
U1 FF Outlet R3	#1	95%	94%	102%	98%	93%
	#2	97%	92%	99%	98%	93%
U2 FF Outlet R3	#1	118%	104%	112%	105%	94%
	#2	117%	103%	113%	104%	95%
U3 FF Outlet R3	#1	99%	93%	108%	91%	125%
	#2	96%	94%	112%	92%	121%

	U1 FF-O-R3	U2 FF-O-R3	U3 FF-O-R3
Element	Recovery 16384-3	Recovery 16384-6	Recovery 16384-9
Beryllium	64%	62%	65%
Beryllium ¹	86%	82%	84%
Cadmium	78%	78%	78%
Lead	96%	97%	96%

Second Source Calibration Verification					
	.25 ppb	1 ppb	50 ppb	100 ppb	250 ppb
Element	QC Std 8	QC Std 2	QC Std 5	QC Std 4	QC Std 3
Beryllium	103%	114%	100%	105%	103%
Cadmium		114%	98%	104%	101%
Lead		113%	101%	104%	103%

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

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

Method 23	MB1_8600- RJ_DF_SDS pg	Unit 3 FF Outlet- Field Blank pg
2,3,7,8-TCDD	(1.29)	(1.16)
1,2,3,7,8-PeCDD	(1.45)	(1.37)
1,2,3,4,7,8-HxCDD	(1.44)	(1.29)
1,2,3,6,7,8-HxCDD	(1.49)	(1.42)
1,2,3,7,8,9-HxCDD	(1.66)	(1.54)
1,2,3,4,6,7,8-HpCDD	(2.32)	[1.9]
OCDD	(3.25)	10.9
2,3,7,8-TCDF	(0.826)	(0.692)
1,2,3,7,8-PeCDF	(0.796)	(0.816)
2,3,4,7,8-PeCDF	(0.822)	(0.76)
1,2,3,4,7,8-HxCDF	(1.01)	(0.867)
1,2,3,6,7,8-HxCDF	(0.967)	(0.821)
2,3,4,6,7,8-HxCDF	(1.09)	(0.863)
1,2,3,7,8,9-HxCDF	(1.35)	(1.16)
1,2,3,4,6,7,8-HpCDF	(1.22)	(0.873)
1,2,3,4,7,8,9-HpCDF	(1.87)	(1.27)
OCDF	(2.88)	(2.4)
ITEF TEQ (ND=0; EMPC=0)	0.00	0.0109
ITEF TEQ (ND=0; EMPC=EMPC)	0.00	0.0299
ITEF TEQ (ND=DL/2; EMPC=0)	1.76	1.60
ITEF TEQ (ND=DL/2; EMPC=EMPC)	1.76	1.61
ITEF TEQ (ND=DL; EMPC=EMPC)	3.51	3.18

Method 29	Average Hg 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
Field Blank #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
Reagent Blank #2		< 0.1	< 0.2	< 0.2	< 0.5	< 0.4
		Field Blank Total µg	Reagent Blank Total µg			
	Element	16384-10	16384-11			
	Beryllium	< 0.05	< 0.05			
	Cadmium	< 0.2	0.201			
	Lead	0.610	0.925			

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)	<0.092	
HCl 0.1 N H ₂ SO ₄ (mg/l)	<0.092	
HF DI H ₂ O (mg/l)	<0.047	
Meters - Post Cal	Result	Limit
61-5	-1.1%	≤ ± 5%
66-4	-1.7%	≤ ± 5%
66-7	-1.1%	≤ ± 5%
66-14	-1.4%	≤ ± 5%
66-21	-1.9%	≤ ± 5%
66-22	-1.7%	≤ ± 5%
66-24	-1.0%	≤ ± 5%

End of Section 2 – Results

DESCRIPTION OF INSTALLATION

3-1

PROCESS DESCRIPTION

The North 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 186,000 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. 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.

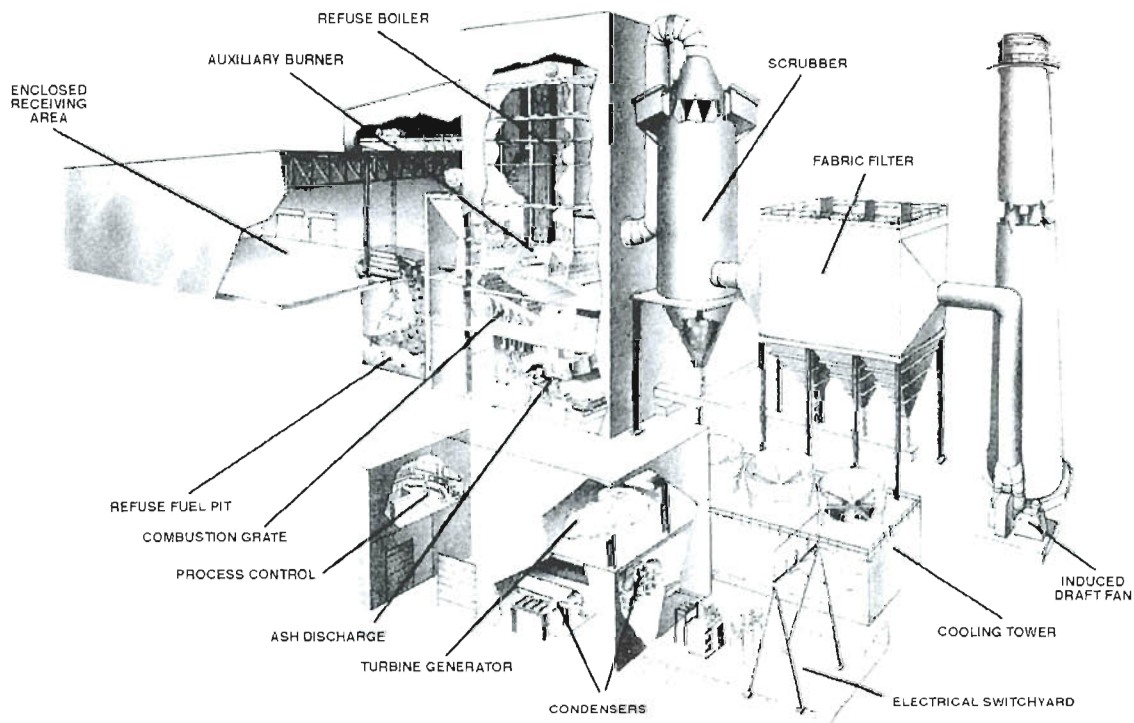


Figure 3-1: General Process Schematic

DESCRIPTION OF INSTALLATION

3-2

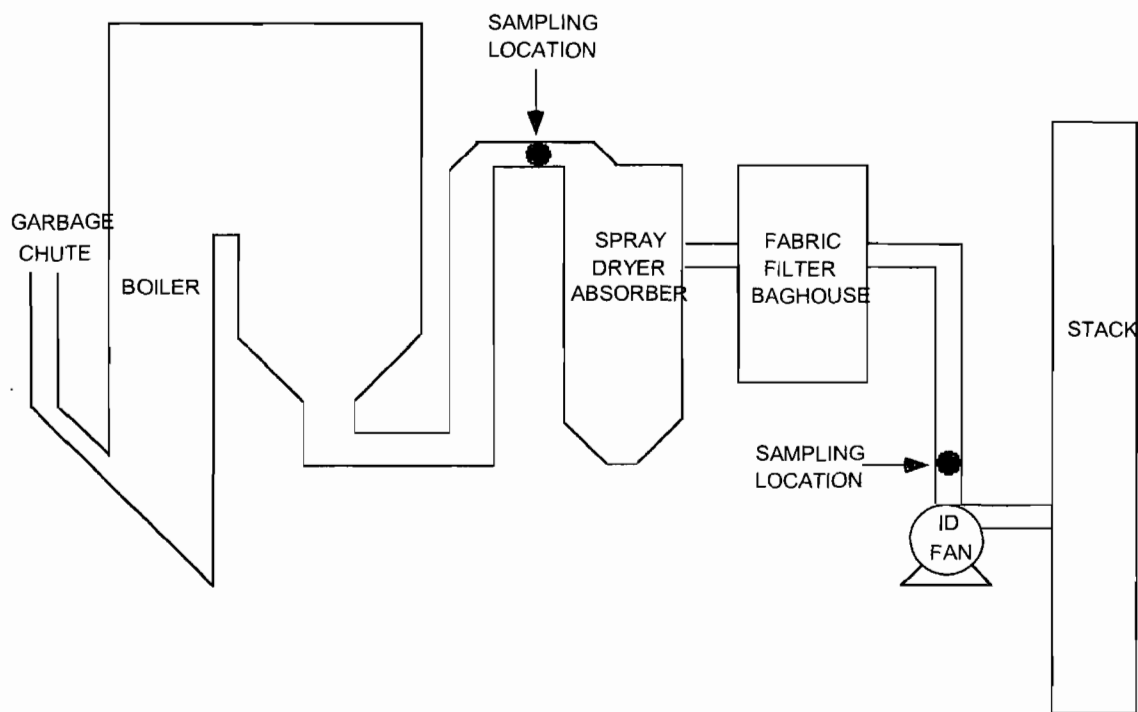


Figure 3-2: Process Schematic

DESCRIPTION OF INSTALLATION

3-3

CleanAir

**Table 3-1:
Unit 1 Compliance Test Process Data**

PLANT NAME: NORTH BROWARD 2011						Data from DCS Printouts						Calculated		Lime Feed Rate			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	
M-26A HCl	1	1	3/22/2011	0736	0836	184.1	303.9	6.6	527.8	47.8	41.9	5.9	11.2	1.110	1.212	426.9	All times based on CEMS time
		2	3/22/2011	0940	1040	184.9	303.4	6.7	523.4	44.1	37.3	6.9	12.2	1.115	1.211	499.2	
		3	3/22/2011	1102	1202	183.8	303.0	6.6	521.8	44.6	36.4	8.1	12.1	1.115	1.206	589.0	
		Avg				184.3	303.4	6.6	524.3	45.5	38.5	7.0	11.8	1.113	1.210	505.0	
M-29/5 Metals PM	1	1	3/23/2011	0634	0845	184.2	300.1	6.8	518.6	47.1	43.0	4.2	10.8	1.122	1.287	322.0	All times based on CEMS time
		2	3/23/2011	0905	1117	184.4	299.3	6.7	518.8	45.5	42.1	3.5	11.2	1.121	1.282	266.9	
		3	3/23/2011	1141	1352	183.4	300.1	6.7	525.1	47.8	41.8	6.1	10.7	1.121	1.277	463.6	
		Avg				184.0	299.8	6.8	520.8	46.8	42.3	4.6	10.9	1.121	1.282	350.8	
M-13B HF	1	1	3/22/2011	1231	1341	184.2	299.1	6.7	521.3	44.7	37.4	7.2	11.9	1.116	1.219	529.5	All times based on CEMS time
		2	3/22/2011	1408	1517	182.9	299.4	6.7	530.1	49.0	43.0	6.0	10.9	1.116	1.226	441.4	
		3	3/22/2011	1539	1647	182.4	304.6	6.8	537.5	50.9	42.7	8.2	10.6	1.115	1.215	594.9	
		Avg				183.1	301.0	6.7	529.6	48.2	41.0	7.1	11.1	1.116	1.220	521.9	

DESCRIPTION OF INSTALLATION

3-4

Table 3-2:
Unit 2 Compliance Test Process Data

PLANT NAME: NORTH BROWARD 2011						Data From DCS Printouts						Calculated		Lime Feed Rate			
						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	
Test	Unit No.	Run No.	Date	Time Start	Time Stop												
M-26A HCI	2	1		0712	0812	183.7	295.3	5.9	496.9	34.2	29.7	4.5	14.9	1.122	1.289	351.1	All times based on CEMS time
				0838	0938	183.8	294.9	5.9	502.3	35.4	31.3	4.1	14.4	1.121	1.285	316.9	
				0959	1059	184.7	295.3	5.7	506.1	36.1	32.1	4.0	14.2	1.121	1.281	304.4	
				Avg		184.0	295.2	5.8	501.8	35.2	31.0	4.2	14.5	1.121	1.285	324.1	
M-29/5 Metals PM	2	1		0628	0838	183.3	293.9	5.8	498.5	32.9	27.3	5.6	15.5	1.121	1.285	433.3	All times based on CEMS time
				0853	1103	184.1	294.7	5.8	506.7	35.1	31.0	4.0	15.0	1.117	1.238	300.1	
				1119	1430	184.1	293.7	5.8	504.2	33.8	29.6	4.2	16.0	1.113	1.191	300.1	
				Avg		183.8	294.1	5.8	503.1	33.9	29.3	4.6	15.5	1.117	1.238	344.5	
M-13B HF	2	1		1132	1245	183.8	296.1	5.7	511.6	37.7	33.9	3.8	13.6	1.120	1.275	293.8	All times based on CEMS time
				1307	1417	183.5	295.9	5.8	515.1	38.5	34.4	4.1	13.2	1.121	1.279	317.7	
				1439	1545	184.1	295.7	5.8	511.0	36.3	30.1	6.2	14.1	1.121	1.282	477.7	
				Avg		183.8	295.9	5.8	512.6	37.5	32.8	4.7	13.6	1.121	1.279	363.0	

DESCRIPTION OF INSTALLATION

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CleanAir

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

PLANT NAME: NORTH BROWARD 2011						Data From DCS Printouts						Calculated		Lime Feed Rate			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	
M-26A HCI	3	1	3/24/2011	0657	0757	184.6	308.9	6.3	503.1	35.9	32.0	4.0	14.2	1.122	1.286	304.8	All times based on CEMS time
		2	3/24/2011	0825	0925	183.4	309.6	6.4	508.6	38.3	34.2	4.1	13.3	1.121	1.285	318.4	
		3	3/24/2011	1024	1124	183.3	310.0	6.4	515.3	41.0	36.9	4.1	13.1	1.115	1.206	293.1	
		Avg				183.8	309.5	6.4	509.0	38.4	34.4	4.0	13.5	1.119	1.259	305.4	
M-29/5 Metals PM	3	1	3/22/2011	0657	0910	183.7	310.0	6.4	503.8	38.1	33.2	5.0	14.1	1.115	1.209	359.8	All times based on CEMS time
		2	3/22/2011	0935	1150	184.2	309.9	6.4	503.6	37.7	32.4	5.4	14.2	1.115	1.208	389.9	
		3	3/22/2011	1216	1430	183.5	310.3	6.4	507.5	38.8	34.0	4.8	13.7	1.116	1.221	350.2	
		Avg				183.8	310.1	6.4	504.9	38.2	33.2	5.0	14.0	1.115	1.213	366.6	
M-23 dioxins	3	1	03/22/11	0937	1358	184.0	310.0	6.4	504.7	38.0	32.9	5.1	14.1	1.115	1.213	370.5	All times based on CEMS time
		2	03/23/11	0640	1105	183.7	309.5	6.4	506.9	39.6	35.0	4.6	12.9	1.121	1.284	351.3	
		3	03/23/11	1136	1558	184.2	310.0	6.4	509.8	39.1	35.3	3.9	13.1	1.121	1.279	297.8	
		Avg				183.9	309.8	6.4	507.1	38.9	34.4	4.5	13.3	1.119	1.259	339.8	
M-13B HF	3	1	03/24/11	1140	1255	183.1	310.9	6.4	525.9	46.3	41.2	5.1	11.7	1.114	1.192	364.0	All times based on CEMS time
		2	03/24/11	1311	1419	184.7	310.2	6.4	522.3	43.9	39.6	4.3	12.4	1.113	1.190	308.4	
		3	03/24/11	1438	1544	184.7	310.4	6.4	516.7	41.7	37.8	3.9	13.1	1.112	1.177	276.1	
		Avg				184.2	310.5	6.4	521.6	44.0	39.5	4.4	12.4	1.113	1.186	316.2	

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	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	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.

DESCRIPTION OF INSTALLATION

3-7

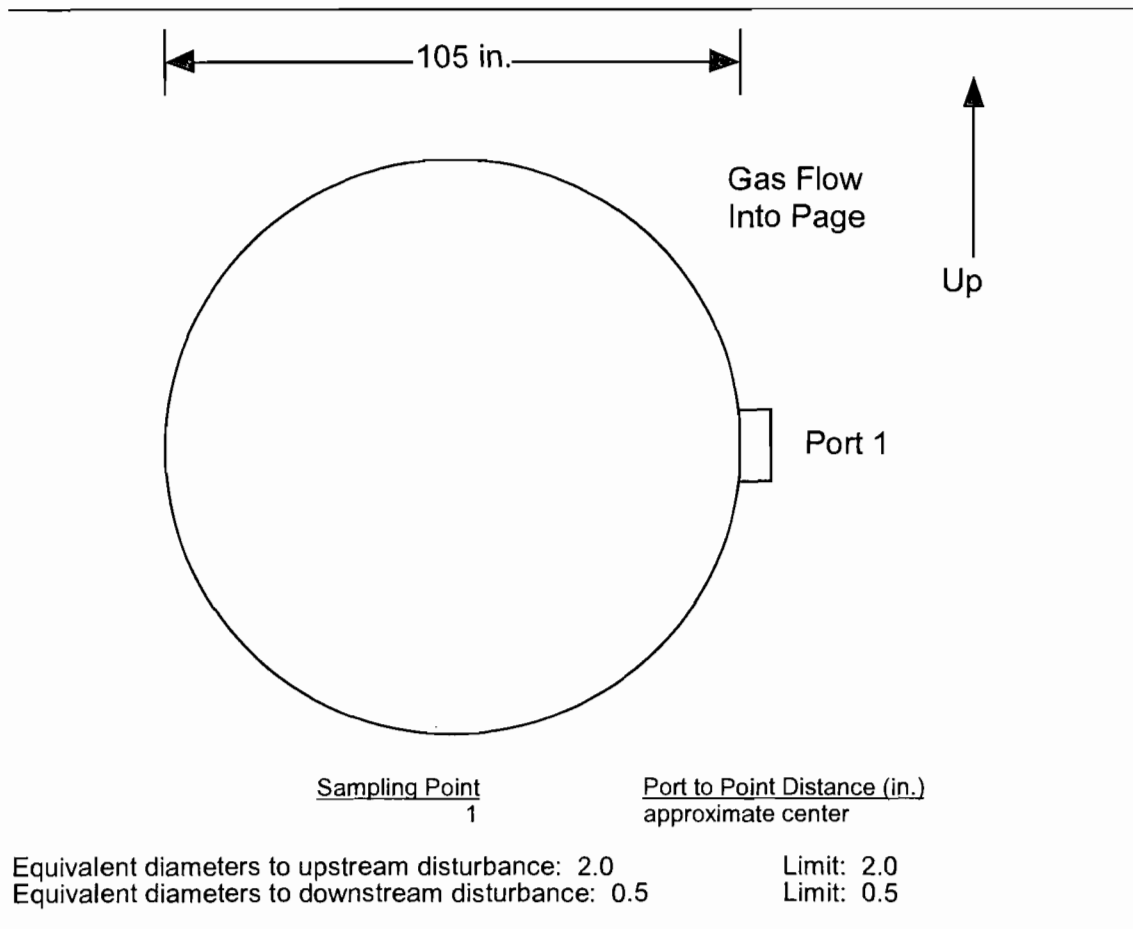


Figure 3-3: SDA Inlets - Sampling Point Determination (HCI Sampling)
(Units 1, 2 and 3 are identical)

DESCRIPTION OF INSTALLATION

3-8

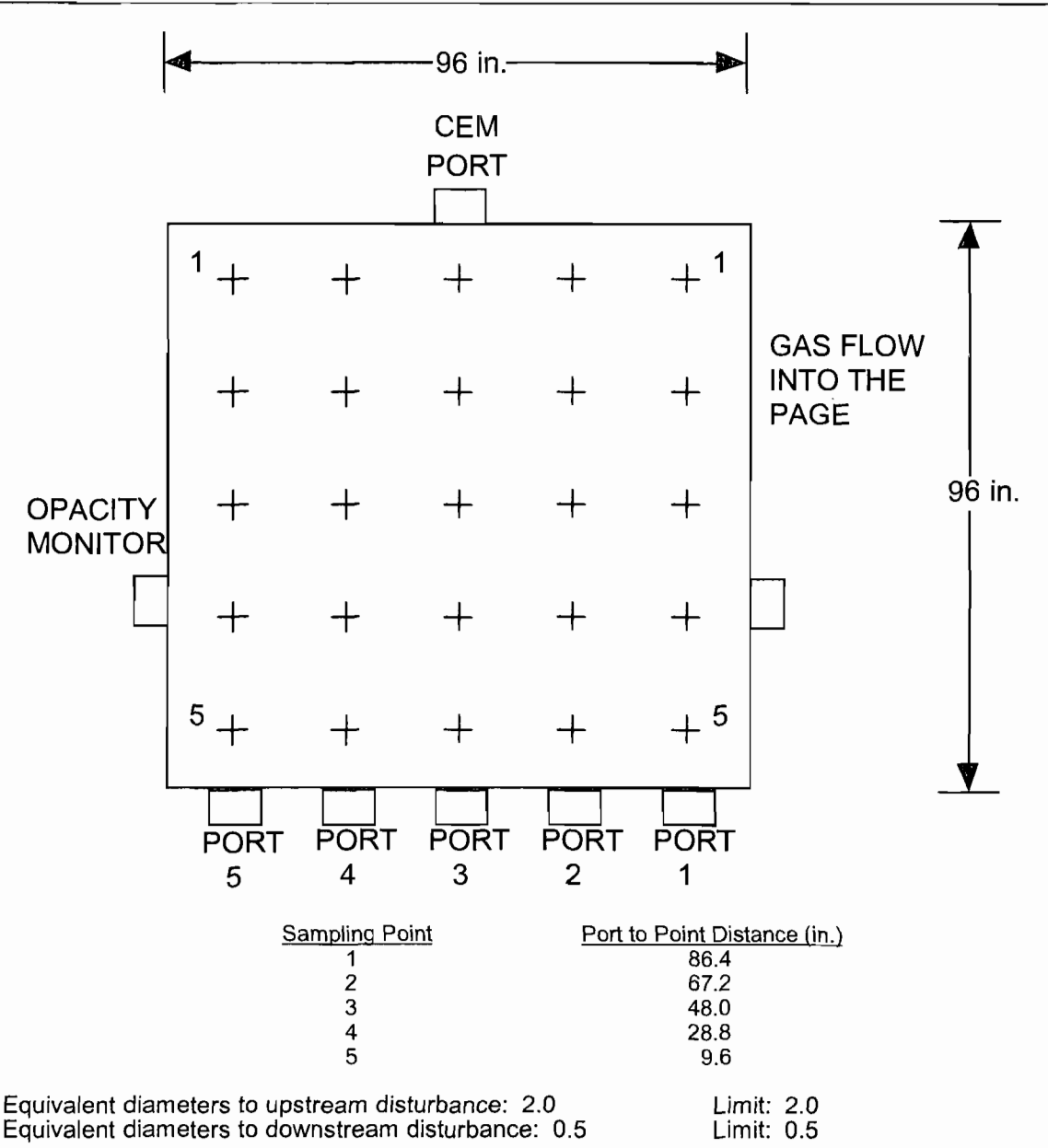


Figure 3-4: FF Outlets - Sampling Point Determination
(Units 1, 2 and 3 are identical)

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 NORTH BROWARD, INC.
POMPANO BEACH, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-1

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 NORTH BROWARD, INC.
POMPANO BEACH, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-1

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: MR

Date: 5/4/11



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Specification Sheet for**EPA Method 5/29**

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

	Standard Method Specification	Actual Specification Used
Pollutant Sampling Information		
Duration of Run	N/A	125 minutes
No. of Sample Traverse Points	N/A	25
Sample Time per Point	N/A	5 minutes
Sampling Rate	Isokinetic (90-110%)	Isokinetic (90-110%)
Sampling Probe		
Nozzle Material	Borosilicate or Quartz Glass	Borosilicate Glass
Nozzle Design	Button-Hook or Elbow	Button-Hook
Probe Liner Material	Borosilicate or Quartz Glass	Borosilicate Glass
Effective Probe Length	N/A	8 feet
Probe Temperature Set-Point	248°F±25°F	248°F±25°F
Velocity Measuring Equipment		
Pitot Tube Design	Type S	Type S
Pitot Tube Coefficient	N/A	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

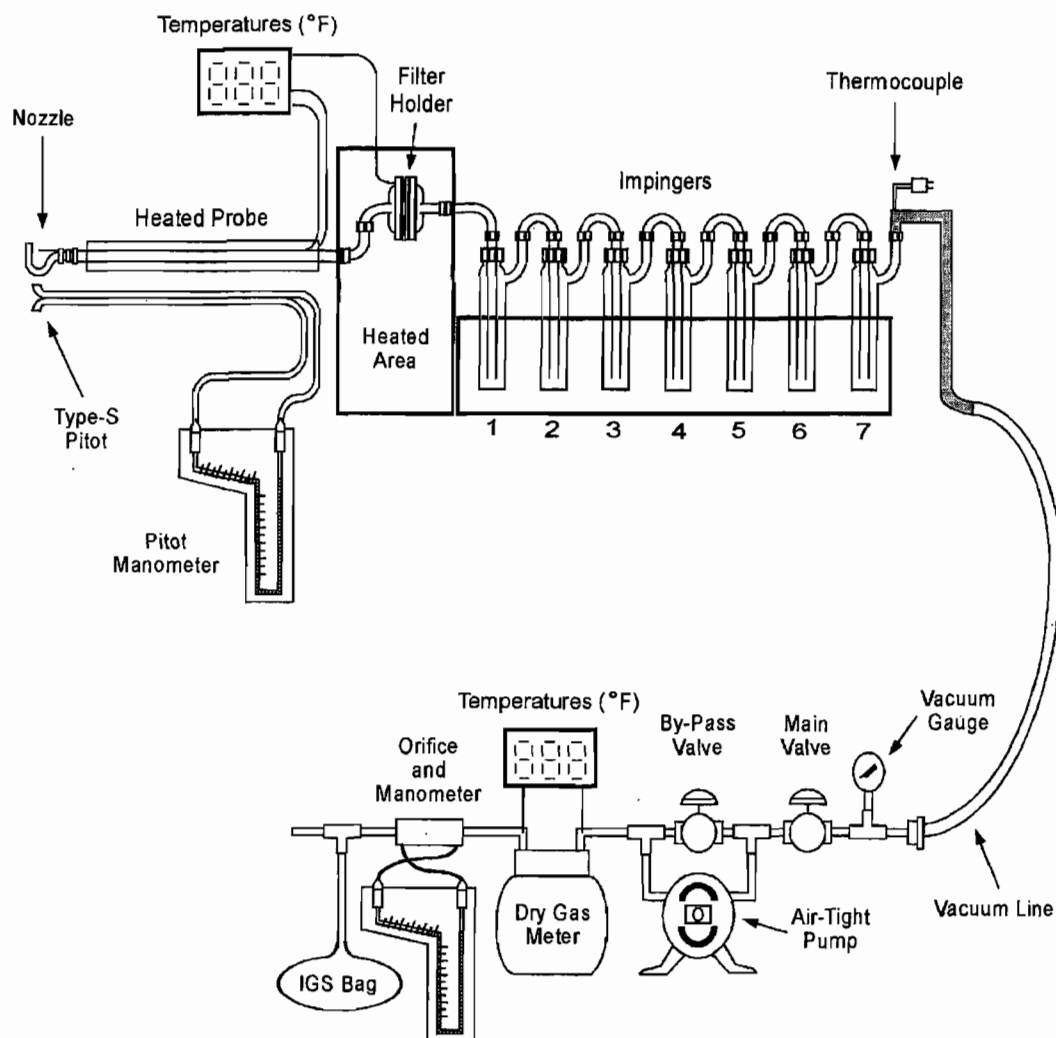
Analytical Information

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)

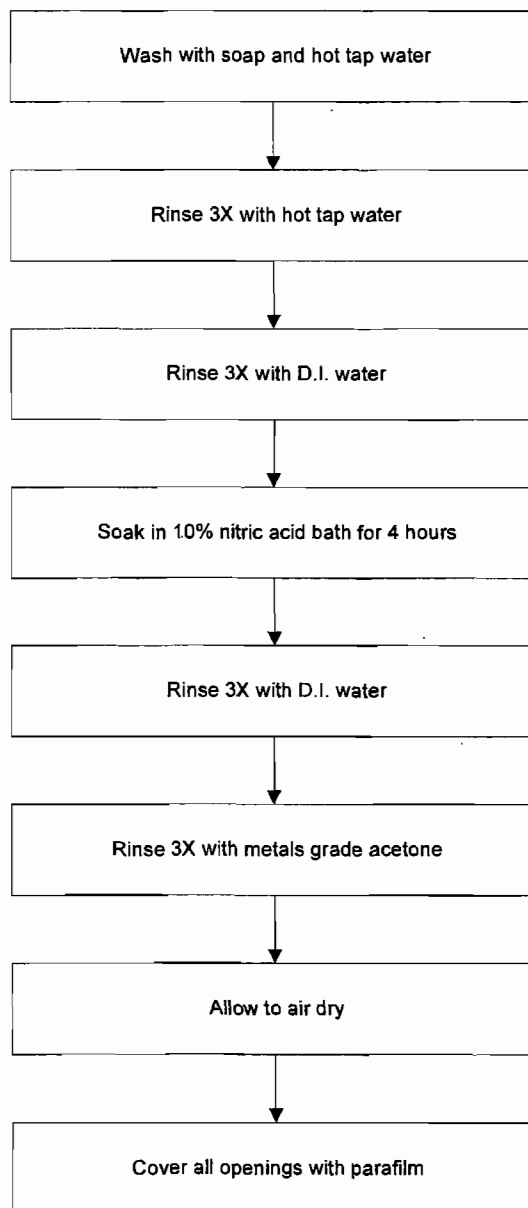
EPA Method 5/29 Sampling Train Configuration



Impinger Contents

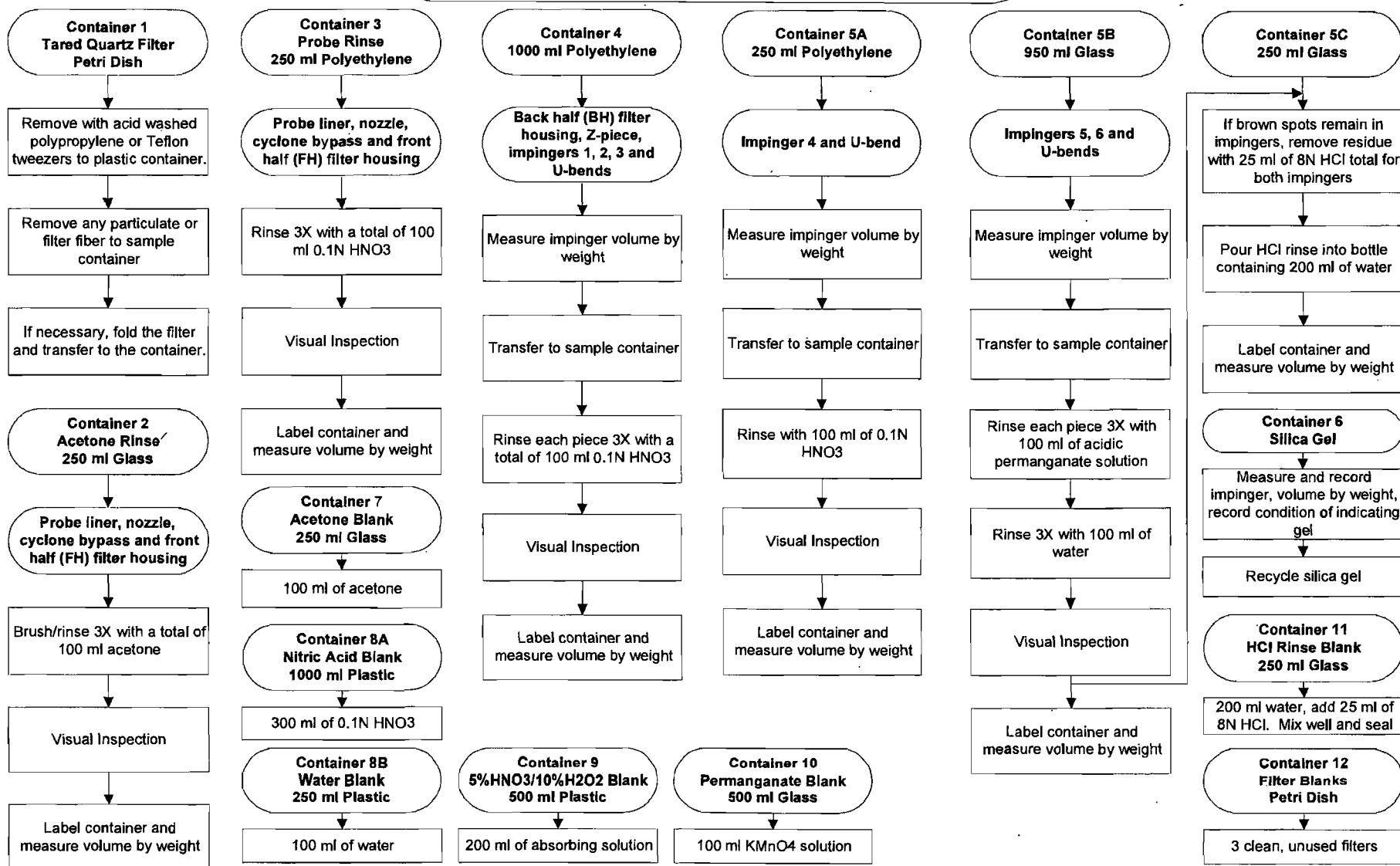
Impinger 1	Empty
Impinger 2	100 ml 5% HNO_3 / 10% H_2O_2
Impinger 3	100 ml 5% HNO_3 / 10% H_2O_2
Impinger 4	Empty
Impinger 5	100 ml 4% KMnO_4 / 10% H_2SO_4
Impinger 6	100 ml 4% KMnO_4 / 10% H_2SO_4
Impinger 7	Silica Gel

EPA Method 29 Glassware Preparation Procedures

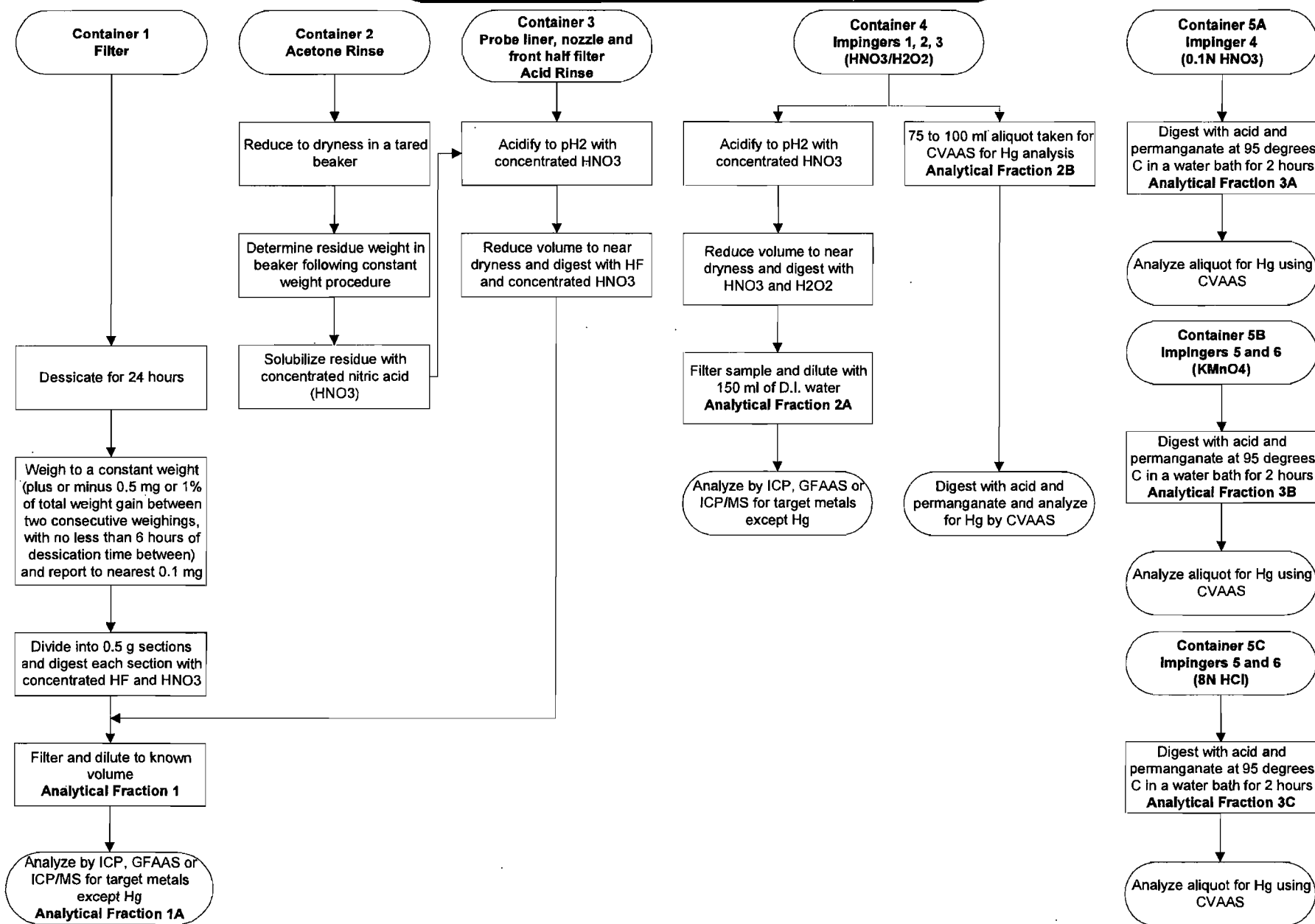


EPA Method 29
Sample Recovery Flowchart
 (includes Mercury and Particulate Matter)

- 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



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

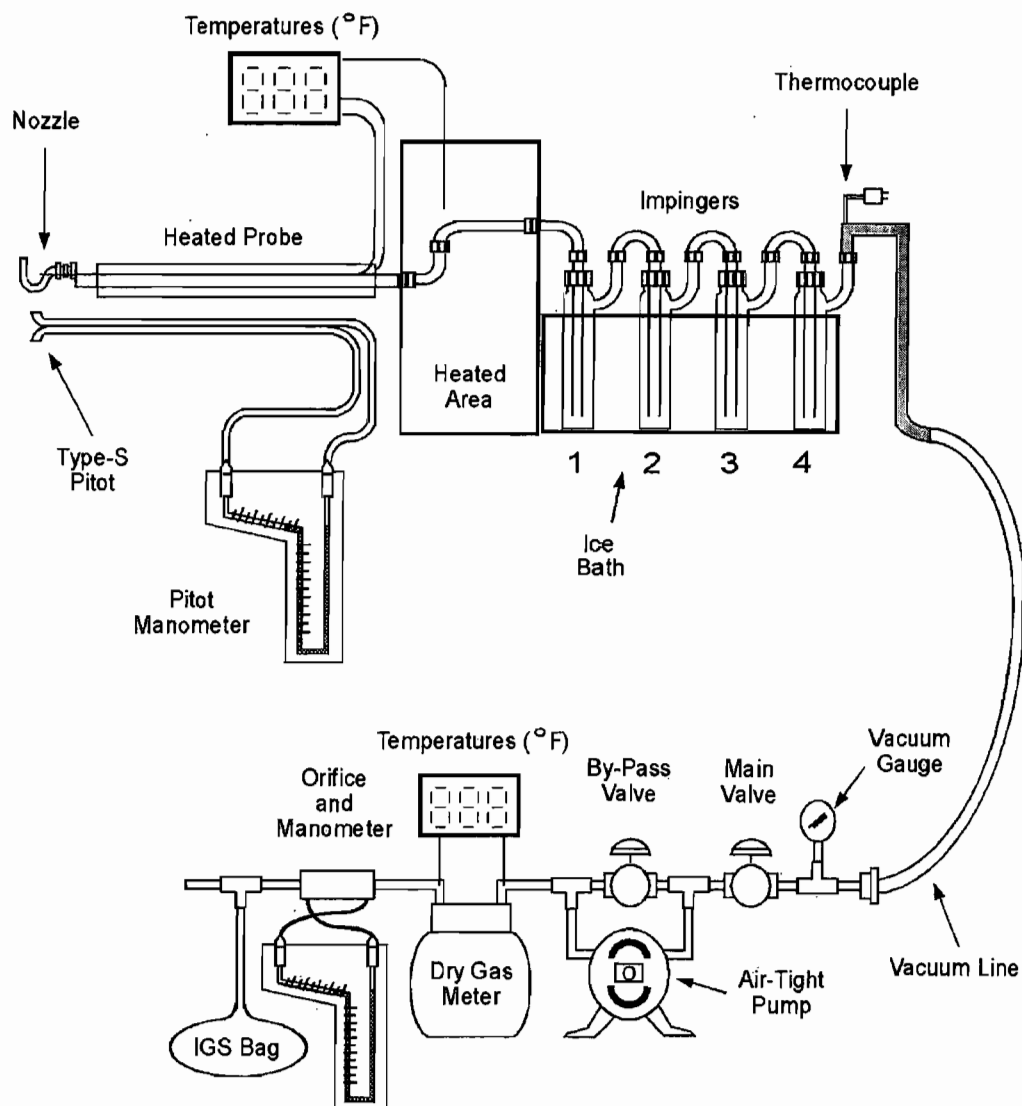
	Standard Method Specification	Actual Specification Used
Pollutant Sampling Information		
Duration of Run	N/A	62.5 minutes
No. of Sample Traverse Points	N/A	25
Sample Time per Point	N/A	2.5 minutes
Sampling Rate	Isokinetic (90-110%) 1 cfm maximum	Isokinetic (90-110%) 1 cfm maximum
Sampling Probe		
Nozzle 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	0.818
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

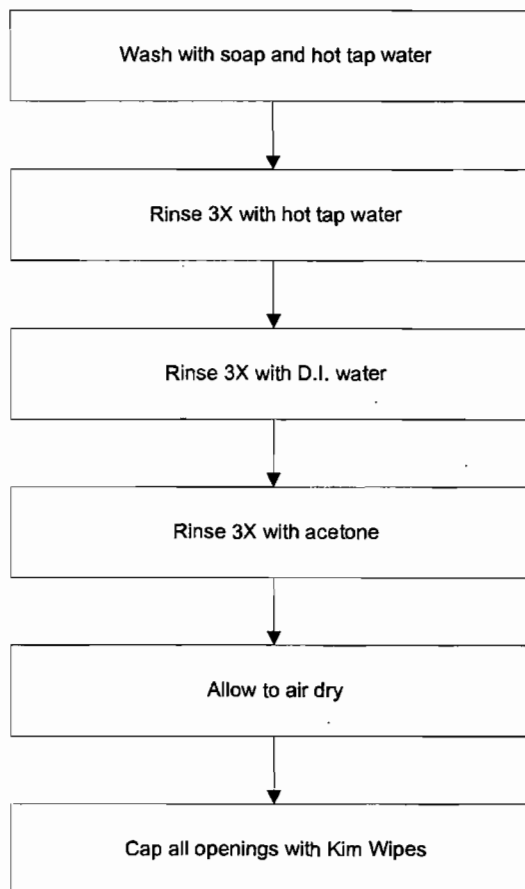
EPA Method 13B Sampling Train Configuration



Impinger Contents

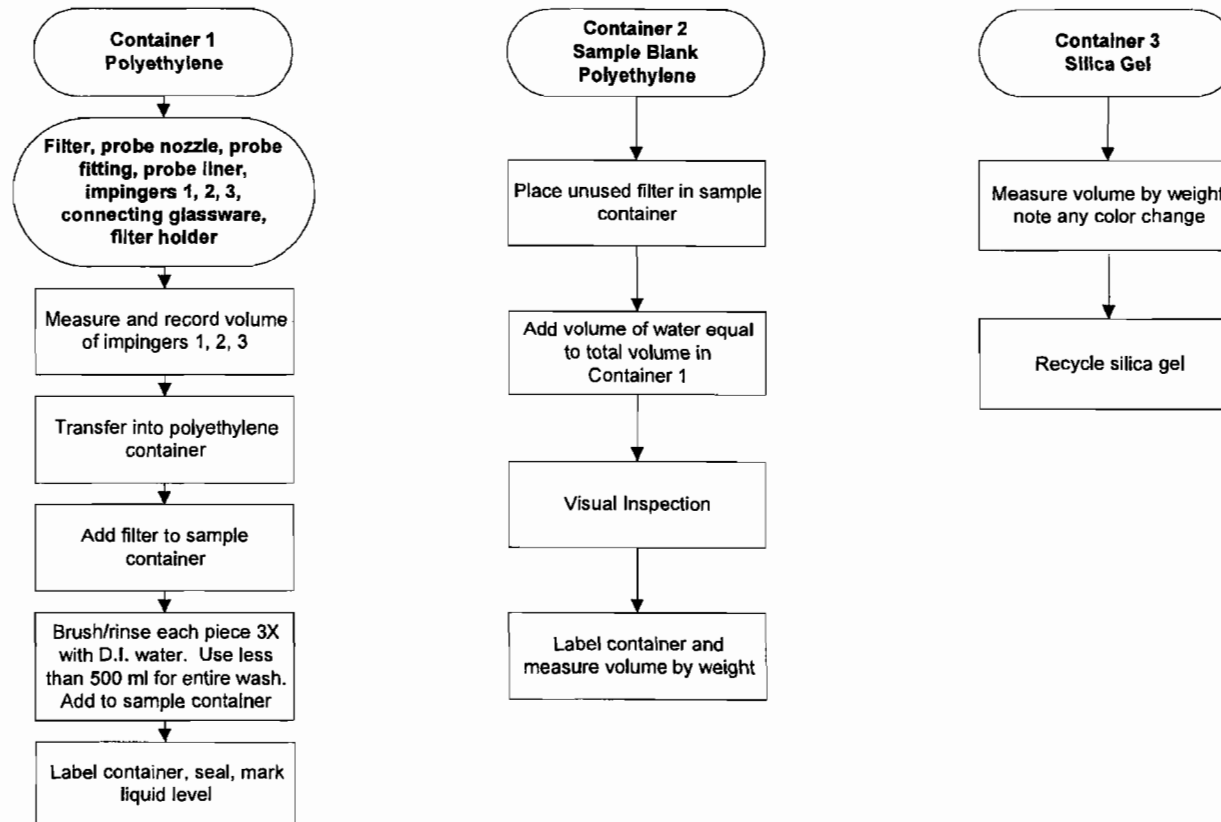
Impinger 1	100 ml DI H ₂ O
Impinger 2	100 ml DI H ₂ O
Impinger 3	Empty
Impinger 4	Silica Gel

EPA Method 13B Glassware Preparation Procedures

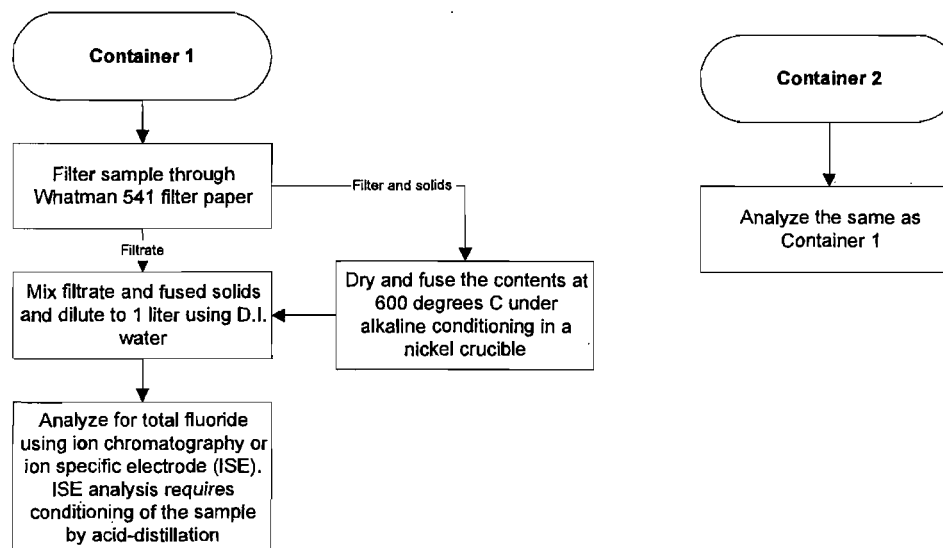


EPA Method 13B Sample Recovery Flowchart

- 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

Gas Density Determination

Sample Collection

Sample Collection Medium

Sample Analysis

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

Analytical Information

Method 4 H₂O Determination by

Filter Preparation Conditions

Front-Half Rinse Preparation

Back-Half Analysis

Additional Analysis

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

Multi-point integrated

Flexible Gas Bag

Orsat or Fyrite Analyzer

Inert Bristle

Acetone/Methylene Chloride/Toluene

Glass or Teflon

Glass

Yes

Petri Dish - Glass or Polystyrene

No

N/A

N/A

N/A

Volumetric or Gravimetric

See Method 23 Analytical Flow Chart

See Method 23 Analytical Flow Chart

N/A

None

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

Multi-Point Integrated

Vinyl Bag

CEM

Teflon Mat

Acetone/Toluene (see Appendix J)

Teflon

Glass

Yes

Glass

Archived

HPLC Water

Teflon

Polyethylene

Gravimetric

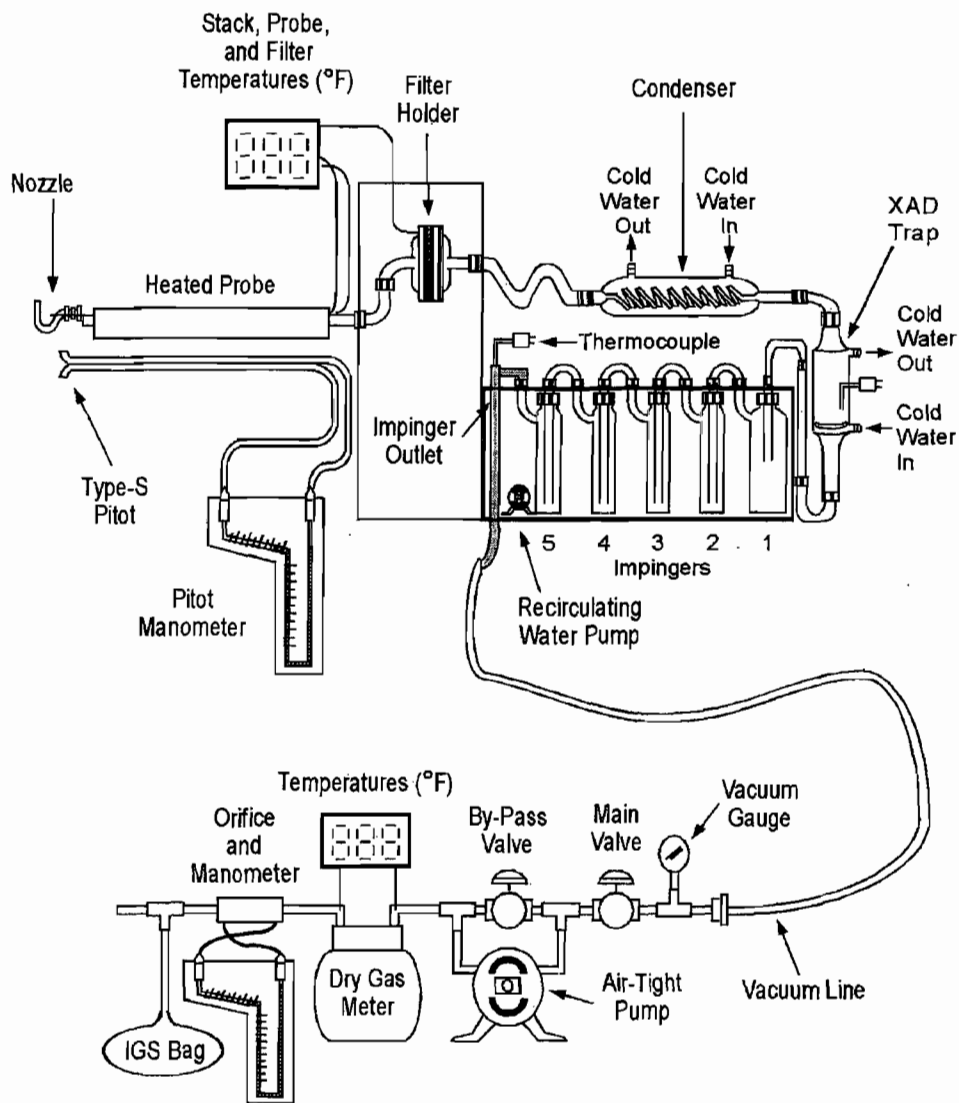
For Organic Analysis

Organic Analysis

Archive

None

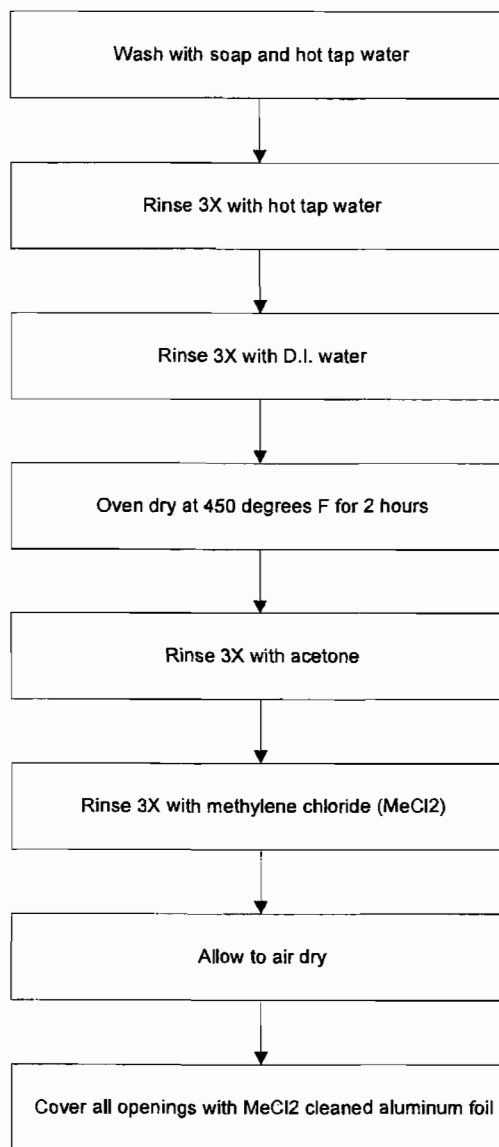
EPA Method 23 Sampling Train Configuration



Impinger Contents

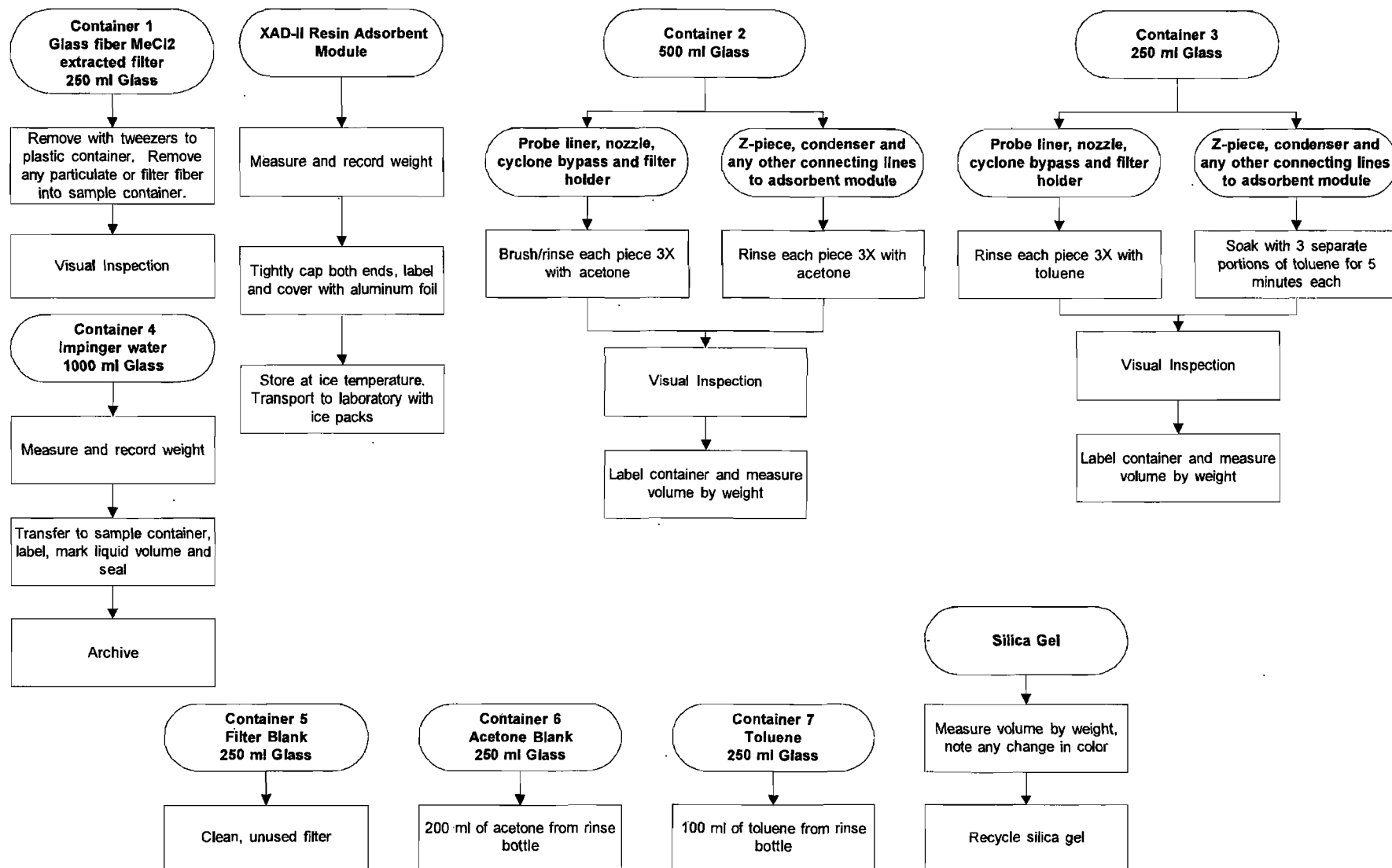
Impinger 1	Empty
Impinger 2	100 ml HPLC H ₂ O
Impinger 3	100 ml HPLC H ₂ O
Impinger 4	Empty
Impinger 5	Silica Gel

EPA Method 23 Glassware Preparation Procedures



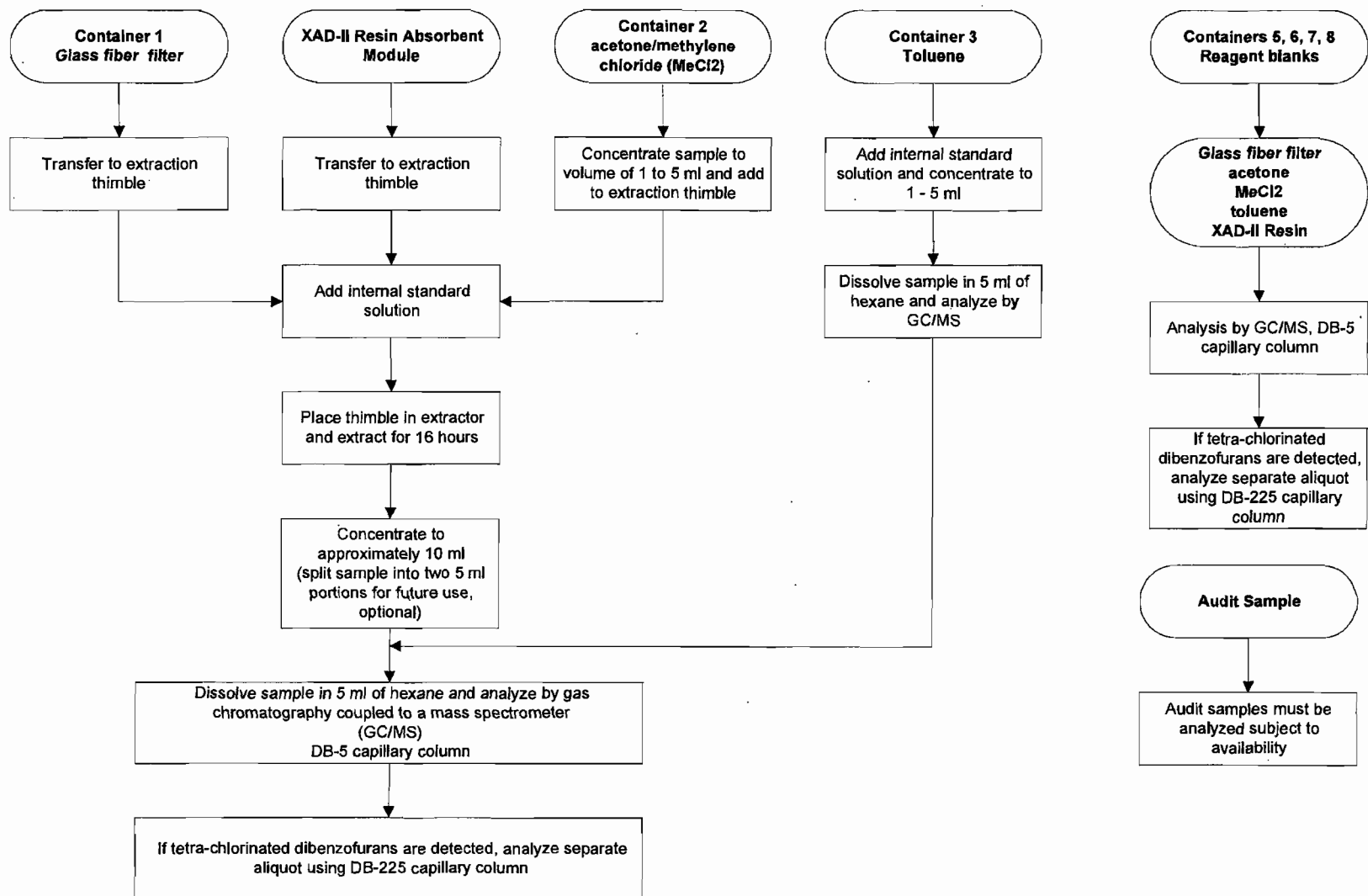
EPA Method 23 Sample Recovery Flowchart

- 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 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"



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>410°F)	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

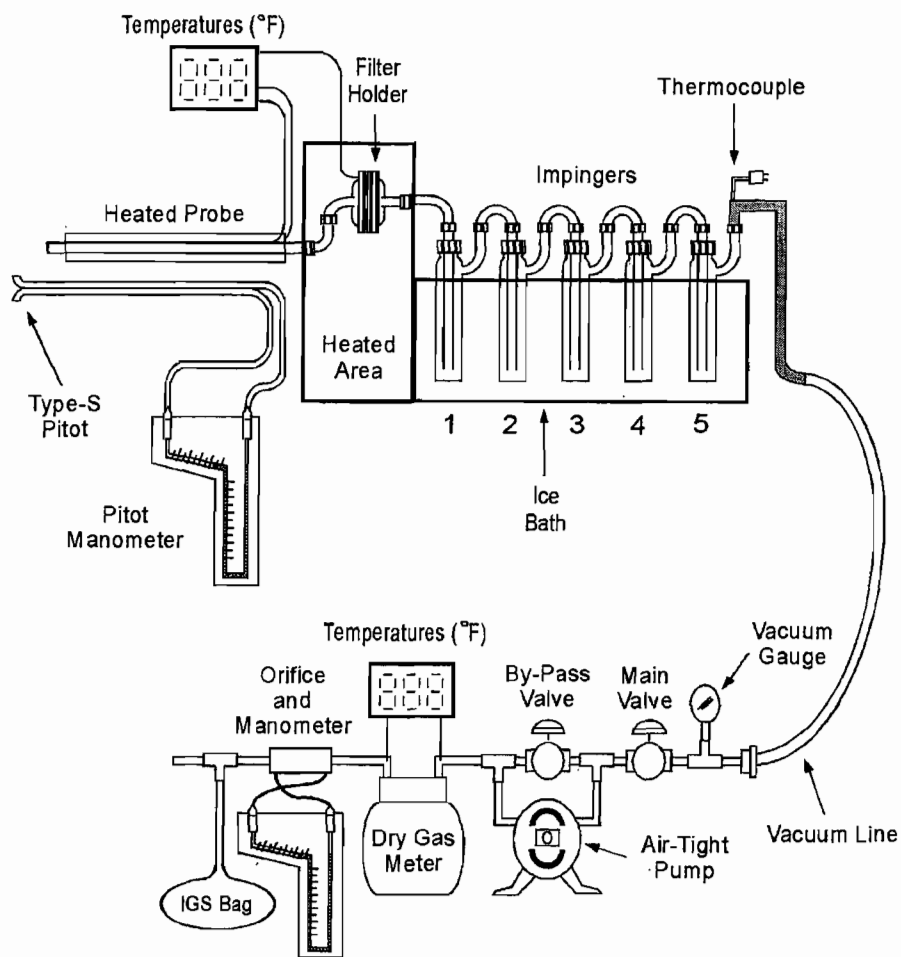
N/A

N/A

Ion Chromatography

None

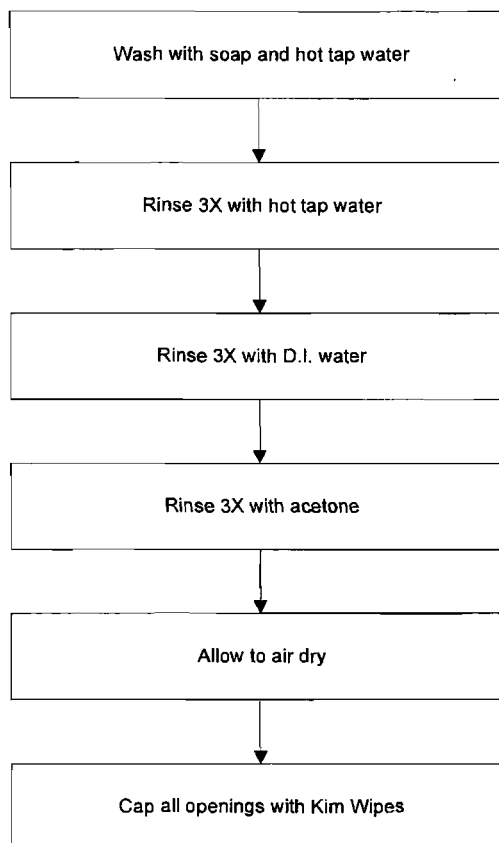
Modified EPA Method 26A Sampling Train Configuration



Impinger Contents

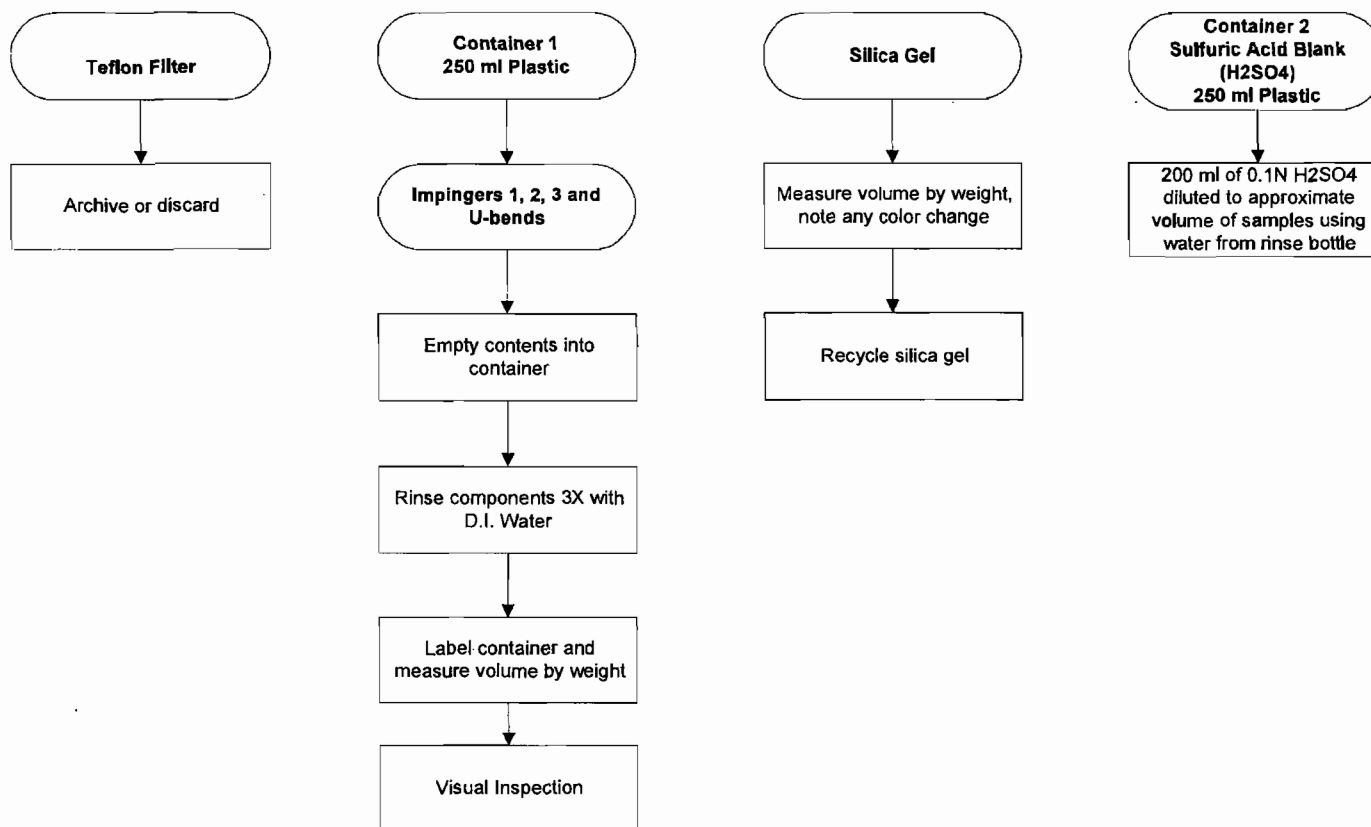
Impinger 1	50 ml 0.1 N H_2SO_4
Impinger 2	100 ml 0.1 N H_2SO_4
Impinger 3	100 ml 0.1 N H_2SO_4
Impinger 4	Empty
Impinger 5	Silica Gel

EPA Method 26A Glassware Preparation Procedures



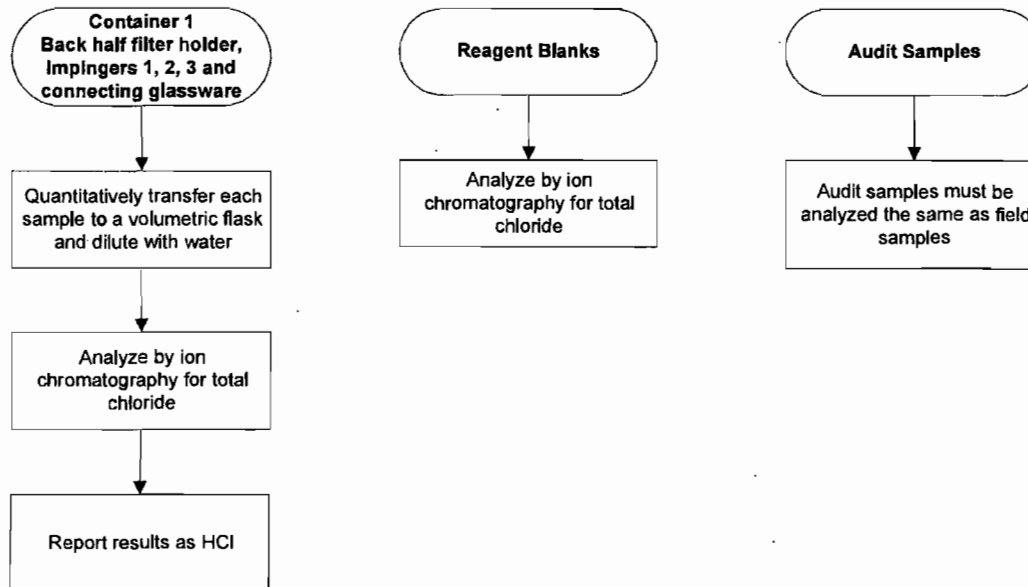
EPA Method 26
Sample Recovery Flowchart
(without Cl₂)
(Modified)

- 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



WHEELABRATOR NORTH BROWARD, INC.
POMPANO BEACH, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-1

SAMPLE CALCULATIONS

B

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: PK

Date: 5/4/11



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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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O

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)	=	447.6	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)	=	21.06	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)	=	30.10	in. Hg
T_m	= average dry gas meter temperature (°F)	=	69.86	°F
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	82.42	dcf
Y_d	= gas meter correction factor (dimensionless)	=	0.9847	
ΔH	= average pressure drop across meter box orifice (in. H ₂ O)	=	1.38	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)	=	81.603	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)	=	30.10	in. Hg
P_g	= sample gas static pressure (in. H ₂ O)	=	-11.70	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)	=	29.24	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)	=	302.60	°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)	=	29.24	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)	=	29.24	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.24	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)	=	81.603	dscf
V_{wstd}	= volume of water collected at standard conditions (scf)	=	21.06	scf
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2052	
		=	20.52	%

7. Saturated moisture content (% by volume)

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

Where:

P_s	= absolute sample gas pressure (in. Hg)	=	29.24	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.24	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	=	0.2052	
B_w	= actual water vapor in gas	=	0.2052	
		=	20.52	%

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 (%)	=	9.5	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.8	%
100	= conversion factor (%)	=	100	%
$N_2 + CO$	= proportion of nitrogen and CO in the gas stream by volume (%)	=	80.70	%

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 (%)	=	9.5	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.8	%
$N_2 + CO$	= proportion of nitrogen and CO in the gas stream by volume (%)	=	80.7	%
100	= conversion factor (%)	=	100	%
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	29.91	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	=	0.2052	
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	29.91	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)	=	27.47	lb/lb-mole

12. Velocity of sample gas (ft/sec)

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

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)	=	27.47	lb/lb-mole
P_s	= absolute sample gas pressure (in. Hg)	=	29.24	in. Hg
T_s	= average sample gas temperature (°F)	=	302.60	°F
$\sqrt{\Delta P}$	= average square roots of velocity heads of sample gas (in. H ₂ O)	=	0.741	√in. H ₂ O
460	= °F to °R conversion constant	=	460	
V_s	= sample gas velocity (ft/sec)	=	51.22	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)	=	51.22	ft/sec
60	conversion factor (sec/min)	=	60	sec/min
Q_a	= volumetric flow rate at actual conditions (acfm)	=	196,674	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)	=	196,674	acfm
P_s	= absolute sample gas pressure (in. Hg)	=	29.24	in. Hg
29.92	= standard pressure (in. Hg)	=	29.92	in. Hg
T_s	= average sample gas temperature (°F)	=	302.6	°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)	=	133,075	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	=	0.2052	
Q_s	= volumetric flow rate at standard conditions, wet basis (scfm)	=	133,075	scfm
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	105,772	dscfm

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

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

Where:

Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	105,772	dscfm
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.8	%
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)	=	84,313	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)	=	105,772	dscfm
60	= conversion factor (min/hr)	=	60	min/hr

Q_{std-hr}	= volumetric flow rate, hourly basis (dscf/hr)	=	6,346,308	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)	=	105,772	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)	=	179,731	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)	=	179,731	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)	=	167,477	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)	=	0.270	in.
B_w	= proportion of water vapor in the gas stream by volume	=	0.2052	
P_s	= absolute sample gas pressure (in. Hg)	=	29.24	in. Hg
T_s	= average sample gas temperature (°F)	=	302.6	°F
V_{mstd}	= volume of gas sample through the dry gas meter at standard conditions (dscf)	=	81.603	dscf
V_s	= sample gas velocity (ft/sec)	=	51.22	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 (%)	=	99.40	%

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)	=	82.42	dcf
T_m	= average dry gas meter temperature (°F)	=	69.86	°F
$\Delta H_{@}$	= dry gas meter orifice coefficient	=	1.7639	
P_{bar}	= barometric pressure (in. Hg)	=	30.10	in. Hg
ΔH	= average pressure drop across meter box orifice (in. H ₂ O)	=	1.384	in. H ₂ O
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	29.91	lb/lb-mole
$\sqrt{\Delta H}_{avg}$	= average of square root of pressure drop across meter orifice	=	1.172	$\sqrt{\text{in. H}_2\text{O}}$
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	=	0.9855	

**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

$$\begin{aligned} m_{fi-calc} &= m_{fi} && \text{if } m_{fi} \geq MDL_f \\ m_{fi-calc} &= (MDL_f)(F_r) && \text{if } m_{fi} < MDL_f \end{aligned}$$

Where:

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

2. Total filter residue (g)

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

Where:

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

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

$$\begin{aligned} r_{ai-blank-calc} &= r_{ai-blank} && \text{if } r_{ai-blank} \geq MDL_s \\ r_{ai-blank-calc} &= (MDL_s)(F_b) && \text{if } r_{ai-blank} < MDL_s \end{aligned}$$

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)

$$\begin{aligned} r_{ai-calc} &= r_{ai} && \text{if } r_{ai} \geq MDL_s \\ r_{ai-calc} &= (MDL_s)(F_r) && \text{if } r_{ai} < MDL_s \end{aligned}$$

Where:

r_{ai}	= aliquot residue mass of run sample for solvent "i" (g)	= 0.00012 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)	= 0.00012 g

5. Residue mass of run sample (g)

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

Where:

$r_{ai-calc}$	= aliquot residue mass of run sample for solvent "i" used in calculation (g)	Acetone	= 0.00012 g
v_{si}	= liquid volume of run sample for solvent rinse "i" (mL)		= 116 mL
v_{ai}	= aliquot volume use for solvent rinse "i" (mL) used in gravimetric analysis (mL)		= 116 mL
r_{si}	= residue mass of run sample for solvent rinse "i" (g)		= 0.00012 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)	Acetone	= 0.00000 g
v_{si}	= liquid volume of run sample for solvent rinse "i" (mL)		= 116.0 mL
$v_{ai-blank}$	= liquid volume of blank sample for solvent rinse "i" (mL)		= 124.0 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)		= 0.00012 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)	Acetone	= 0.00012 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)		= 0.00012 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)		= 0.00012 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)		= 0.00012 g

9. Total gravimetric result (g)

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

Where:

m_{filter}	= total particulate collected on filters (g)		= 0.00010 g
m_s	= total solvent residue (g)		= 0.00012 g
m_T	= total gravimetric result (g)		= 0.00022 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)	= 0.00022 g
m _D	= total gravimetric detection limit (g)	= 0.00020 g
m _n	= total filterable particulate matter (g)	= 0.00022 g

USEPA Method 5 (FPM) Sample Emission Calculations for FPM

Sample data taken from Run 1

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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)	= 0.00010	g
V_{mstd}	= volume metered, standard (dscf)	= 81.6030	dscf
2.205×10^{-3}	= conversion factor (lb/g)	= 2.205E-03	lb/g
C_{sd}	= filterable particulate matter concentration (lb/dscf)	= 5.945E-09	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)	= 0.00010	g
V_{mstd}	= volume metered, standard (dscf)	= 81.6030	dscf
15.43	= conversion factor (gr/g)	= 15.43	gr/g
C_{sd}	= filterable particulate matter concentration (gr/dscf)	= 0.00004	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)	= 0.00010	g
V_{mstd}	= volume metered, standard (dscf)	= 81.6030	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)	= 0.09519	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)	= 0.00010	g
V_{mstd}	= volume metered, standard (dscf)	= 81.6030	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)	= 0.10216	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)	=	0.00004	gr/dscf
x	= oxygen content of corrected gas (%)	=	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.8	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
C_{sdx}	= filterable particulate matter concentration corrected to x%O ₂ (gr/dscf)	=	0.00005	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)	=	0.00004	gr/dscf
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	9.5	%
C_{sdy}	= filterable particulate matter concentration corrected to y%CO ₂ (gr/dscf)	=	0.00005	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)	=	0.00004	gr/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	105,772	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	=	196,674	acfm
C_a	= filterable particulate matter concentration at actual gas conditions (gr/acf)	=	0.00002	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)	=	0.00010	g
V_{mstd}	= volume metered, standard (dscf)	=	81.6030	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)	=	105,772	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
$E_{lb/hr}$	= filterable particulate matter rate (lb/hr)	=	0.0377	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)	=	0.00010	g
V_{mstd}	= volume metered, standard (dscf)	=	81.6030	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	105,772	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)	=	0.0171	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)	=	0.00010	g
V_{mstd}	= volume metered, standard (dscf)	=	81.6030	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)	=	105,772	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)	=	0.1652	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)	=	0.00010	g
V_{mstd}	= volume metered, standard (dscf)	=	81.6030	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 (%)	=	9.8	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= filterable particulate matter rate - Fd-based (lb/MMBtu)	=	0.00011	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)	=	0.00010	g
V_{mstd}	= volume metered, standard (dscf)	=	81.6030	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 (%)	=	9.5	%
100	= conversion factor	=	100	
E_{Fc}	= filterable particulate matter rate - Fc-based (lb/MMBtu)	=	0.00011	lb/MMBtu

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			
$ND = 0$	$m_{Total-B} = \text{Sum D, 1-5}$	$m_{Total-B} = \text{Sum D}$	$m_{Total-B} = < \text{Sum ND}$
$ND \neq 1x$	$m_{Total-B} = \text{Sum D, 1-5}$	$m_{Total-B} = \text{Sum D}$	$m_{Total-B} = < \text{Sum ND}$
$ND \neq 0.5x$	$m_{Total-B} = \text{Sum D, 1-5}$	$m_{Total-B} = \text{Sum D}$	$m_{Total-B} = < 0.5 \text{ Sum ND}$

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			
$ND = 0$	$m_{Total-S} = \text{Sum D, 1-5}$	$m_{Total-S} = \text{Sum D}$	$m_{Total-S} = < \text{Sum ND}$
$ND \neq 1x$	$m_{Total-S} = \text{Sum D, 1-5}$	$m_{Total-S} = < [\text{Sum D} + \text{Sum ND}]$	$m_{Total-S} = < \text{Sum ND}$
$ND \neq 0.5x$	$m_{Total-S} = \text{Sum D, 1-5}$	$m_{Total-S} = < [\text{Sum D} + 0.5 \text{ Sum ND}]$	$m_{Total-S} = < 0.5 \text{ Sum ND}$

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				
$ND = 0$	$m_{T-B-allow} = \text{M29 Rule}$	$m_{T-B-allow} = \text{M29 Rule}^*$	$m_{T-B-allow} = 0$	$m_{T-B-allow} = 0$
$ND \neq 1x$	$m_{T-B-allow} = \text{M29 Rule}$	$m_{T-B-allow} = \text{M29 Rule}^*$	$m_{T-B-allow} = 0$	$m_{T-B-allow} = 0$
$ND \neq 0.5x$	$m_{T-B-allow} = \text{M29 Rule}$	$m_{T-B-allow} = \text{M29 Rule}^*$	$m_{T-B-allow} = 0$	$m_{T-B-allow} = 0$

* 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				
$ND = 0$	$m_n = m_{Total-S} - m_{T-B-allow}$	$m_n = m_{Total-S} - m_{T-B-allow}$	$m_n = < m_{Total-S}$	$m_n = < \text{MIN}[\text{MDL}]$
$ND \neq 1x$	$m_n = m_{Total-S} - m_{T-B-allow}$	$m_n = < [m_{Total-S} - m_{T-B-allow}]$	$m_n = < m_{Total-S}$	$m_n = < \text{MIN}[\text{MDL}]$
$ND \neq 0.5x$	$m_n = m_{Total-S} - m_{T-B-allow}$	$m_n = < [m_{Total-S} - m_{T-B-allow}]$	$m_n = < m_{Total-S}$	$m_n = < \text{MIN}[\text{MDL}]$

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	=	<0.1000	µg
m_{2b-S}	= mercury amount in sample for Fraction 2b	=	5.5135	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	=	5.5135	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	=	5.5135	µg
$0.05 \times m_{total-S}$	= 5% of $m_{total-S}$	=	0.2757	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	=	5.5135	µg
$m_{T-B-allow}$	= total allowable blank correction	=	0.0000	µg
m_n	= total mercury in sample corrected for allowable blank	=	5.5135	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	=	5.5135	µg
m_{1b-S}	= mercury amount in sample for Fraction 1b	=	<0.1000	µg
m_{2b-S}	= mercury amount in sample for Fraction 2b	=	5.5135	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	=	5.5135	µg
m_{n-1b}	= mercury corrected for blank - prorated for Fraction 1b	=	0.0000	µg
m_{n-2b}	= mercury corrected for blank - prorated for Fraction 2b	=	5.5135	µg
m_{n-3a}	= mercury corrected for blank - prorated for Fraction 3a	=	0.0000	µg
m_{n-3b}	= mercury corrected for blank - prorated for Fraction 3b	=	0.0000	µg
m_{n-3c}	= mercury corrected for blank - prorated for Fraction 3c	=	0.0000	µg

USEPA Method 5/29 Mercury Sample Calculations

Sample data taken from Run 1

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

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O_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)	= 5.5135	μg
V_{mstd}	= volume metered, standard (dscf)	= 81.6030	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}	= mercury concentration (lb/dscf)	= 1.4898E-10	lb/dscf

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

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

Where:

m_n	= mercury collected in sample (total μg)	= 5.5135	μg
V_{mstd}	= volume metered, standard (dscf)	= 81.6030	dscf
35.31	= conversion factor (dscf/dscm)	= 35.31	dscf/dscm
C_{sd}	= mercury concentration ($\mu\text{g/dscm}$)	= 2.3857E+00	$\mu\text{g/dscm}$

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)	= 5.5135	μg
V_{mstd}	= volume metered, standard (dscf)	= 81.6030	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}	= mercury concentration (mg/dscm)	= 2.3857E-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)	= 5.5135	μg
V_{mstd}	= volume metered, standard (dscf)	= 81.6030	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	

$$C_{sd} = \text{mercury concentration } (\mu\text{g}/\text{Nm}^3 \text{ dry}) = 2.5603\text{E}+00 \mu\text{g}/\text{Nm}^3 \text{ dry}$$

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)	= 1.4898E-10	lb/dscf
x	= oxygen content of corrected gas (%)	= 7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	= 9.8	%
20.9	= oxygen content of ambient air (%)	= 20.9	%
C_{sdx}	= mercury concentration corrected to x% oxygen (lb/dscf)	= 1.8690E-10	lb/dscf @ x% O_2

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

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

Where:

C_{sd}	= mercury concentration (lb/dscf)	= 1.4898E-10	lb/dscf
y	= carbon dioxide content of corrected gas (%)	= 12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	= 9.5	%
C_{sdy}	= mercury conc. corrected to y% carbon dioxide (lb/dscf)	= 1.8858E-10	lb/dscf @ y% CO_2

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

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

Where:

C_{sd}	= mercury concentration (lb/dscf)	= 1.4898E-10	lb/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	= 105,772	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	= 196,674	acfm
C_a	= mercury concentration at actual gas conditions (lb/acf)	= 8.0122E-11	lb/acf

8. Mercury emission rate (lb/hr)

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

Where:

m_n	= mercury collected in sample (total µg)	=	5.5135	µg
V_{mstd}	= volume metered, standard (dscf)	=	81.6030	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)	=	105,772	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
$E_{lb/hr}$	= mercury emission rate (lb/hr)	=	9.4548E-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)	=	5.5135	µg
V_{mstd}	= volume metered, standard (dscf)	=	81.6030	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	105,772	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)	=	1.1911E-04	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)	=	5.5135	µg
V_{mstd}	= volume metered, standard (dscf)	=	81.6030	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)	=	105,772	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)	=	4.1412E-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)	=	5.5135	µg
V_{mstd}	= volume metered, standard (dscf)	=	81.6030	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 (%)	=	9.8	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= mercury emission rate - Fd-based (lb/MMBtu)	=	2.6894E-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)	=	5.5135	µg
V_{mstd}	= volume metered, standard (dscf)	=	81.6030	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 (%)	=	9.5	%
100	= conversion factor	=	100	
E_{Fc}	= mercury emission rate - Fc-based (lb/MMBtu)	=	2.8602E-06	lb/MMBtu

LOGIC FOR TREATING DETECTION LIMITS

(all metals except mercury)

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

	CASE 1	CASE 2
	$m_{FB} = D$	$m_{FB} = ND$
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	CASE 2
	$m_{FS} - m_{FB-allow} \geq MDL$	$m_{FS} - m_{FB-allow} < MDL$
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	CASE 2
	$m_{BB} = D$	$m_{BB} = ND$
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	CASE 2
	$m_{BS} - m_{BB-allow} \geq MDL$	$m_{BS} - m_{BB-allow} < MDL$
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	CASE 2	CASE 3
	Both are D	One is D, other is ND	Both are ND
Rule			
$ND = 0$	$m_n = m_F + m_B$	$m_n = D$	$m_n = < \text{Sum ND}$
$ND = 1x$	$m_n = m_F + m_B$	$m_n = < [D + ND]$	$m_n = < \text{Sum ND}$
$ND = 0.5x$	$m_n = m_F + m_B$	$m_n = < [D + 0.5ND]$	$m_n = < 0.5 \text{ Sum ND}$

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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M

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

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

Where:

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

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

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

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

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

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Q_M

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)	=	81.6030	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}	= beryllium concentration (lb/dscf)	=	<1.3511E-12	lb/dscf

2. Beryllium concentration (µg/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)	=	81.6030	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= beryllium concentration (µg/dscm)	=	<2.1635E-02	µg/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)	=	81.6030	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
1000	= conversion factor (µg/mg)	=	1000	µg/mg
C_{sd}	= beryllium concentration (mg/dscm)	=	<2.1635E-05	mg/dscm

4. Beryllium 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	= beryllium collected in sample (total μg)	=	<0.0500	μg
V_{mstd}	= volume metered, standard (dscf)	=	81.6030	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	

$$C_{sd} = \text{beryllium concentration } (\mu\text{g}/\text{Nm}^3 \text{ dry}) = <2.3218\text{E-}02 \mu\text{g}/\text{Nm}^3 \text{ dry}$$

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)	=	<1.3511E-12	lb/dscf
x	= oxygen content of corrected gas (%)	=	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.8	%
20.9	= oxygen content of ambient air (%)	=	20.9	%

$$C_{sdx} = \text{beryllium concentration corrected to x\% oxygen (lb/dscf)} = <1.6949\text{E-}12 \text{ lb/dscf @ x\%O}_2$$

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)	=	<1.3511E-12	lb/dscf
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	9.5	%

$$C_{sdy} = \text{beryllium conc. corrected to y\% carbon dioxide (lb/dscf)} = <1.7102\text{E-}12 \text{ lb/dscf @ y\%CO}_2$$

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)	=	<1.3511E-12	lb/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	105,772	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	=	196,674	acfm

$$C_a = \text{beryllium concentration at actual gas conditions (lb/acf)} = <7.2660\text{E-}13 \text{ lb/acf}$$

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)	=	81.6030	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	$\mu\text{g/g}$
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	105,772	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
$E_{lb/hr}$	= beryllium emission rate (lb/hr)	=	<8.5742E-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)	=	81.6030	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	105,772	dscfm
10^6	= conversion factor ($\mu\text{g/g}$)	=	1.0E+06	$\mu\text{g/g}$
60	= conversion factor (sec/min)	=	60	sec/min
$E_{g/s}$	= beryllium emission rate (g/s)	=	<1.0801E-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)	=	81.6030	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	$\mu\text{g/g}$
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	105,772	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)	=	<3.7555E-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)	=	81.6030	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 (%)	=	9.8	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= beryllium emission rate - Fd-based (lb/MMBtu)	=	<2.4389E-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)	=	81.6030	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 (%)	=	9.5	%
100	= conversion factor	=	100	
E_{Fc}	= beryllium emission rate - Fc-based (lb/MMBtu)	=	<2.5938E-08	lb/MMBtu

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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K

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)	=	213.3	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)	=	10.04	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)	=	30.20	in. Hg
T_m	= average dry gas meter temperature (°F)	=	91.04	°F
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	38.68	dcf
Y_d	= gas meter correction factor (dimensionless)	=	0.9983	
ΔH	= average pressure drop across meter box orifice (in. H ₂ O)	=	1.21	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)	=	37.446	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)	=	30.20	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)	=	29.39	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)	=	301.24	°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)	=	29.39	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)	=	29.39	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.39	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)	=	37.446	dscf
V_{wstd}	= volume of water collected at standard conditions (scf)	=	10.04	scf
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2114	
		=	21.14	%

7. Saturated moisture content (% by volume)

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

Where:

P_s	= absolute sample gas pressure (in. Hg)	=	29.39	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.39	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)

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

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	=	0.2114	
B_w	= actual water vapor in gas	=	0.2114	
		=	21.14	%

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 (%)	=	80.39	%

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)	=	29.98	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	=	0.2114	
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	29.98	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)	=	27.45	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)	=	27.45	lb/lb-mole
P_s	= absolute sample gas pressure (in. Hg)	=	29.39	in. Hg
T_s	= average sample gas temperature (°F)	=	301.24	°F
$\sqrt{\Delta P}$	= average square roots of velocity heads of sample gas (in. H ₂ O)	=	0.705	√in. H ₂ O
460	= °F to °R conversion constant	=	460	
V_s	= sample gas velocity (ft/sec)	=	47.91	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)	=	47.91	ft/sec
60	= conversion factor (sec/min)	=	60	sec/min
Q_a	= volumetric flow rate at actual conditions (acfm)	=	183,985	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)	=	183,985	acfm
P_s	= absolute sample gas pressure (in. Hg)	=	29.39	in. Hg
29.92	= standard pressure (in. Hg)	=	29.92	in. Hg
T_s	= average sample gas temperature (°F)	=	301.2	°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)	=	125,357	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	=	0.2114	
Q_s	= volumetric flow rate at standard conditions, wet basis (scfm)	=	125,357	scfm
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	98,857	dscfm

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

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

Where:

Q _{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	98,857	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)	=	80,295	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)	=	98,857	dscfm
60	= conversion factor (min/hr)	=	60	min/hr

Q _{std-hr}	= volumetric flow rate, hourly basis (dscf/hr)	=	5,931,427	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)	=	98,857	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)	=	167,982	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)	=	167,982	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)	=	156,528	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	=	0.2114	
P_s	= absolute sample gas pressure (in. Hg)	=	29.39	in. Hg
T_s	= average sample gas temperature (°F)	=	301.2	°F
V_{mstd}	= volume of gas sample through the dry gas meter at standard conditions (dscf)	=	37.446	dscf
V_s	= sample gas velocity (ft/sec)	=	47.91	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 (%)	=	96.89	%

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)	=	38.68	dcf
T_m	= average dry gas meter temperature (°F)	=	91.04	°F
$\Delta H_{@}$	= dry gas meter orifice coefficient	=	1.6979	
P_{bar}	= barometric pressure (in. Hg)	=	30.20	in. Hg
ΔH	= average pressure drop across meter box orifice (in. H ₂ O)	=	1.207	in. H ₂ O
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	29.98	lb/lb-mole
$\sqrt{\Delta H}_{avg}$	= average of square root of pressure drop across meter orifice	=	1.095	$\sqrt{\text{in. H}_2\text{O}}$
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	=	1.0160	

USEPA Method 13B HF Analyte Calculations

Sample data taken from Run 1

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

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0

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}	= conversion factor to convert mass F ⁻ 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)	=	930.0	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}	= total HF collected in sample (mg)	=	<0.0460	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)	=	930.0	ml
v_2	= liquid volume of sample fraction 2 (ml)	=	0.0	ml
1000	= conversion factor (ml/liter)	=	1000	ml/liter

m_b	= allowable blank subtraction (mg)	=	0.0000	mg

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

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

Where:

m_{HF}	= total HF collected in sample (mg)	=	<0.0460	mg
m_b	= allowable blank subtraction (mg)	=	0.0000	mg
m_{nb}	= total HF collected, corrected for blank (mg)	=	<0.0460	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)	=	930.0	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)	=	0.0088	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)	=	<0.0460	mg
m_{MDL}	= minimum detectable HF (mg)	=	0.0088	mg
m_n	= total HF value used in emission calculations (mg)	=	<0.0460	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)	=	<0.0460	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

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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K_O

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)	=	<0.0460	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.4456	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)	=	<2.7103E-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)	=	<0.0460	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.4456	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)	=	<0.0522	ppmdv

3. HF concentration (ppmwv)

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

Where:

C_{sd}	= HF concentration (ppmdv)	=	<0.0522	ppmdv
B_w	= actual water vapor in gas (% v/v)	=	21.1398	% v/v
100	= conversion factor (%)	=	100	%
C_w	= HF concentration (ppmwv)	=	<0.0412	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)	=	<0.0460	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.4456	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= HF concentration (mg/dscm)	=	<0.0434	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)	=	<0.0460	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.4456	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)	=	<0.0466	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)	=	<0.0522	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)	=	<0.0643	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)	=	<0.0522	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)	=	<0.0627	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)	=	<2.7103E-09	lb/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	98,857	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	=	183,985	acfm
C_a	= HF concentration at actual gas conditions (lb/acf)	=	<1.4563E-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)	=	<0.0460	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.4456	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)	=	98,857	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
$E_{lb/hr}$	= HF rate (lb/hr)	=	<0.0161	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)	=	<0.0460	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.4456	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	98,857	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)	=	<0.0073	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)	=	<0.0460	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.4456	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)	=	98,857	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)	=	<0.0704	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)	=	<0.0460	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.4456	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)	=	<4.8919E-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)	=	<0.0460	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.4456	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)	=	<4.9327E-05	lb/MMBtu

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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N

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)	=	917.3	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)	=	43.17	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)	=	30.20	in. Hg
T_m	= average dry gas meter temperature (°F)	=	90.54	°F
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	168.88	dcf
Y_d	= gas meter correction factor (dimensionless)	=	0.9961	
ΔH	= average pressure drop across meter box orifice (in. H ₂ O)	=	1.40	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)	=	163.335	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)	=	30.20	in. Hg
P_g	= sample gas static pressure (in. H ₂ O)	=	-9.60	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)	=	29.49	in. Hg

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

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

Where:

T_s	= average sample gas temperature (°F)	=	311.76	°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)	=	29.49	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)	=	29.49	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.49	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)	=	163.335	dscf
V_{wstd}	= volume of water collected at standard conditions (scf)	=	43.17	scf
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2090	%
		=	20.90	%

7. Saturated moisture content (% by volume)

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

Where:

P_s	= absolute sample gas pressure (in. Hg)	=	29.49	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.49	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	=	0.2090	
B_w	= actual water vapor in gas	=	0.2090	%

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 (%)	=	10.2	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.3	%
100	= conversion factor (%)	=	100	%
N_2+CO	= proportion of nitrogen and CO in the gas stream by volume (%)	=	80.53	%

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 (%)	=	10.2	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.3	%
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)	=	30.00	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	=	0.2090	
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	30.00	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)	=	27.49	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)	=	27.49	lb/lb-mole
P_s	= absolute sample gas pressure (in. Hg)	=	29.49	in. Hg
T_s	= average sample gas temperature (°F)	=	311.76	°F
$\sqrt{\Delta P}$	= average square roots of velocity heads of sample gas (in. H ₂ O)	=	0.740	√in. H ₂ O
460	= °F to °R conversion constant	=	460	
V_s	= sample gas velocity (ft/sec)	=	50.71	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)	=	50.71	ft/sec
60	conversion factor (sec/min)	=	60	sec/min
Q_a	= volumetric flow rate at actual conditions (acfm)	=	194,733	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)	=	194,733	acfm
P_s	= absolute sample gas pressure (in. Hg)	=	29.49	in. Hg
29.92	= standard pressure (in. Hg)	=	29.92	in. Hg
T_s	= average sample gas temperature (°F)	=	311.8	°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)	=	131,330	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	=	0.2090	
Q_s	= volumetric flow rate at standard conditions, wet basis (scfm)	=	131,330	scfm
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	103,876	dscfm

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

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

Where:

Q _{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	103,876	dscfm
O ₂	= proportion of oxygen in the gas stream by volume (%)	=	9.3	%
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)	=	86,912	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)	=	103,876	dscfm
60	= conversion factor (min/hr)	=	60	min/hr

Q _{std-hr}	= volumetric flow rate, hourly basis (dscf/hr)	=	6,232,586	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)	=	103,876	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)	=	176,511	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)	=	176,511	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)	=	164,476	dry Nm ³ /hr

20. Percent isokinetic (%)

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

Where:

D_n	= diameter of nozzle (in)	=	0.272	in.
B_w	= proportion of water vapor in the gas stream by volume	=	0.2090	
P_s	= absolute sample gas pressure (in. Hg)	=	29.49	in. Hg
T_s	= average sample gas temperature (°F)	=	311.8	°F
V_{msld}	= volume of gas sample through the dry gas meter at standard conditions (dscf)	=	163.335	dscf
V_s	= sample gas velocity (ft/sec)	=	50.71	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 (%)	=	99.81	%

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)	=	168.88	dcf
T_m	= average dry gas meter temperature (°F)	=	90.54	°F
$\Delta H_{@}$	= dry gas meter orifice coefficient	=	1.7697	
P_{bar}	= barometric pressure (in. Hg)	=	30.20	in. Hg
ΔH	= average pressure drop across meter box orifice (in. H ₂ O)	=	1.403	in. H ₂ O
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	30.00	lb/lb-mole
$\sqrt{\Delta H}_{avg}$	= average of square root of pressure drop across meter orifice	=	1.176	$\sqrt{\text{in. H}_2\text{O}}$
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	=	0.9784	

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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		Normal Case (ND & EMPC = 0)		Maximum Case (ND & EMPC fully counted)	
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)	= 4.9600E-02	ng	4.9700E-02	ng
V_{mstd}	= volume metered, standard (dscf)	= 163.3349	dscf	163.3349	dscf
35.31	= conversion factor (dscf/dscm)	= 35.31	dscf/dscm	35.31	dscf/dscm
C_{sd}	= PCDD/F TEQ concentration (ng/dscm)	= 1.0723E-02	ng/dscm	1.0744E-02	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)	= 4.9600E-02	ng	4.9700E-02	ng
V_{mstd}	= volume metered, standard (dscf)	= 163.3349	dscf	163.3349	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)	= 1.1507E-02	ng/Nm ³ dry	1.1530E-02	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)	= 1.0723E-02	ng/dscm	1.0744E-02	ng/dscm
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscm/h)	= 176,511	dry std m ³ /hr	176,511	dry std m ³ /hr
Q_a	= volumetric flow rate at actual conditions (acm/h)	= 330,897	actual m ³ /hr	330,897	actual m ³ /hr
C_a	= PCDD/F TEQ concentration at actual gas conditions (ng/acm)	= 5.7198E-03	ng/acm	5.7313E-03	ng/acm
4. TEQ concentration corrected to x% O₂ (ng/dscm example)					
$C_{sd,x}$	$= C_{sd} \left(\frac{20.9 - x}{20.9 - O_2} \right)$				
Where:					
C_{sd}	= PCDD/F TEQ concentration (ng/dscm)	= 1.0723E-02	ng/dscm	1.0744E-02	ng/dscm
x	= oxygen content of corrected gas (%)	= 7.0	%	7.0	%
O ₂	= proportion of oxygen in the gas stream by volume (%)	= 9.3	%	9.3	%
20.9	= oxygen content of ambient air (%)	= 20.9	%	20.9	%
$C_{sd,x}$	= PCDD/F TEQ concentration (ng/dscm corrected to x% O ₂)	= 1.2815E-02	ng/dscm @ x% O ₂	1.2841E-02	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)	=	1.0723E-02	ng/dscm	1.0744E-02	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 (%)	=	10.2	%	10.2	%
C_{sdy}	= PCDD/F TEQ concentration (ng/dscm corrected to y% CO ₂)	=	1.2615E-02	ng/dscm @ y% CO ₂	1.2640E-02	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)	=	4.9600E-02	ng	4.9700E-02	ng
V_{mstd}	= volume metered, standard (dscf)	=	163.3349	dscf	163.3349	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)	=	103,876	dscfm	103,876	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
$E_{lb/hr}$	= PCDD/F TEQ Emission rate (lb/hr)	=	4.1733E-09	lb/hr	4.1817E-09	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)	=	4.9600E-02	ng	4.9700E-02	ng
V_{mstd}	= volume metered, standard (dscf)	=	163.3349	dscf	163.3349	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	103,876	dscfm	103,876	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
$E_{g/sec}$	= PCDD/F TEQ Emission rate (g/sec)	=	5.2574E-10	g/sec	5.2680E-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)	=	4.9600E-02	ng	4.9700E-02	ng
V_{mstd}	= volume metered, standard (dscf)	=	163.3349	dscf	163.3349	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)	=	103,876	dscfm	103,876	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
$E_{T/yr}$	= PCDD/F TEQ Emission rate (Ton/yr)	=	1.8279E-08	Ton/yr	1.8316E-08	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)	= 4.9600E-02	ng	4.9700E-02	ng
V_{mstd}	= volume metered, standard (dscf)	= 163.3349	dscf	163.3349	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 (%)	= 9.3	%	9.3	%
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)	= 1.1732E-11	lb/MMBtu	1.1756E-11	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)	= 4.9600E-02	ng	4.9700E-02	ng
V_{mstd}	= volume metered, standard (dscf)	= 163.3349	dscf	163.3349	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 (%)	= 10.2	%	10.2	%
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)	= 1.1948E-11	lb/MMBtu	1.1972E-11	lb/MMBtu

USEPA Method 26A (HCl) 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)	=	238.2	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)	=	11.21	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)	=	30.20	in. Hg
T_m	= average dry gas meter temperature (°F)	=	74.88	°F
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	41.62	dcf
Y_d	= gas meter correction factor (dimensionless)	=	0.9847	
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)	=	40.963	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)	=	30.20	in. Hg
P_g	= sample gas static pressure (in. H ₂ O)	=	-11.40	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)	=	29.36	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)	=	307.67	°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)	=	29.36	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)	=	29.36	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.36	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)	=	40.963	dscf
V_{wstd}	= volume of water collected at standard conditions (scf)	=	11.21	scf
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2149	
		=	21.49	%

7. Saturated moisture content (% by volume)

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

Where:

P_s	= absolute sample gas pressure (in. Hg)	=	29.36	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.36	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	=	0.2149	
B_w	= actual water vapor in gas	=	0.2149	
		=	21.49	%

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 (%)	=	9.4	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	10.1	%
100	= conversion factor (%)	=	100	%
N_2+CO	= proportion of nitrogen and CO in the gas stream by volume (%)	=	80.45	%

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 (%)	=	9.4	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	10.1	%
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)	=	29.91	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	=	0.2149	
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	29.91	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)	=	27.35	lb/lb-mole

12. 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)	=	60	min
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	41.62	dcf
T_m	= average dry gas meter temperature (°F)	=	74.88	°F
$\Delta H_{@}$	= dry gas meter orifice coefficient	=	1.7639	
P_{bar}	= barometric pressure (in. Hg)	=	30.20	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)	=	29.91	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_{qa}	= alternative Method 5 post-test meter calibration factor	=	0.9815	

USEPA Method 26A HCl Analyte Calculations

Sample data taken from Run 1

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

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1. Chloride to HCl conversion factor

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

Where:

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

2. Total HCl collected (mg)

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

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)	=	27.4000	mg/liter
v_1	= liquid volume of sample fraction 1 (ml)	=	828.0	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)	=	23.3224	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)	=	828.0	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)	=	23.3224	mg
m_b	= allowable blank subtraction (mg)	=	0.0000	mg
m_{nb}	= total HCl collected, corrected for blank (mg)	=	23.3224416	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)	=	828.0	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)	=	0.015321312	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)	=	23.3224	mg
m_{MDL}	= minimum detectable HCl (mg)	=	0.015321312	mg
m_n	= total HCl value used in emission calculations (mg)	=	23.3224416	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)	=	23	mg
1000	= conversion factor (ml/liter)	=	1000	ml/liter
100	= conversion factor	=	100	%
EFF	= Collection QC check (% mass collected in second fraction)	=	0	%

USEPA Method 26A HCl Sample Calculations

Sample data taken from Run 1

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

041811 121202
L@

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)	=	23.3224	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.9629	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)	=	1.2554E-06	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)	=	23.3224	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.9629	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)	=	13.2732	ppmdv

3. HCl concentration (ppmwv)

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

Where:

C_{sd}	= HCl concentration (ppmdv)	=	13.2732	ppmdv
B_w	= actual water vapor in gas (% v/v)	=	21.4858	% v/v
100	= conversion factor (%)	=	100	%
C_w	= HCl concentration (ppmwv)	=	10.4213	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)	=	23.3224	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.9629	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= HCl concentration (mg/dscm)	=	20.1040	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)	=	23.3224	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.9629	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)	=	21.5750	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)	=	13.2732	ppmdv
x	= oxygen content of corrected gas (%)	=	7.0	%
O ₂	= proportion of oxygen in the gas stream by volume (%)	=	10.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
C_{sdx}	= HCl concentration corrected to x%O ₂ (ppmdv)	=	17.1306	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)	=	13.2732	ppmdv
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO ₂	= proportion of carbon dioxide in the gas stream by volume (%)	=	9.4	%
C_{sdy}	= HCl concentration corrected to y%CO ₂ (ppmdv)	=	16.9085	ppmdv @ y%CO ₂

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

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

Where:

m_n	= total HCl collected, corrected for applicable blank (mg)	=	23.3224	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.9629	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 (%)	=	10.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= HCl rate (lb/MMBtu)	=	2.3753E-02	lb/MMBtu

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

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

Where:

m_n	= total HCl collected, corrected for applicable blank (mg)	=	23.3224	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.9629	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 (%)	=	9.4	%
100	= conversion factor	=	100	
E_{Fc}	= HCl rate (lb/MMBtu)	=	2.4256E-02	lb/MMBtu

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WHEELABRATOR NORTH BROWARD, INC.
POMPANO BEACH, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-1

PLANT DATA

C

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: MR

Date: 3/4/11



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CONTROL ROOM STACK TEST LOG

UNIT #1					
Date	Test	Method #	Run #	Start Time	End Time
03/22/11	HCl	26A	1	0736	0836
03/22/11	HCl	26A	2	0940	1040
03/22/11	HCl	26A	3	1102	1202
03/23/11	Metals & Particulate*	5/29	1	0634	0845
03/23/11	Metals & Particulate*	5/29	2	0905	1117
03/23/11	Metals & Particulate*	5/29	3	1141	1352
03/22/11	Fluorides	13B	1	1231	1341
03/22/11	Fluorides	13B	2	1408	1517
03/22/11	Fluorides	13B	3	1539	1647
N/A	Dioxins/Furans	23	1	N/A	N/A
N/A	Dioxins/Furans	23	2	N/A	N/A
N/A	Dioxins/Furans	23	3	N/A	N/A

UNIT #2					
Date	Test	Method #	Run #	Start Time	End Time
03/23/11	HCl	26A	1	0712	0812
03/23/11	HCl	26A	2	0838	0938
03/23/11	HCl	26A	3	0959	1059
03/24/11	Metals & Particulate*	5/29	1	0628	0838
03/24/11	Metals & Particulate*	5/29	2	0853	1103
03/24/11	Metals & Particulate*	5/29	3	1119	1430
03/23/11	Fluorides	13B	1	1132	1245
03/23/11	Fluorides	13B	2	1307	1417
03/23/11	Fluorides	13B	3	1439	1545
N/A	Dioxins/Furans	23	1	N/A	N/A
N/A	Dioxins/Furans	23	2	N/A	N/A
N/A	Dioxins/Furans	23	3	N/A	N/A

UNIT #3					
Date	Test	Method #	Run #	Start Time	End Time
03/24/11	HCl	26A	1	0657	0757
03/24/11	HCl	26A	2	0825	0925
03/24/11	HCl	26A	3	1024	1124
03/22/11	Metals & Particulate*	5/29	1	0657	0910
03/22/11	Metals & Particulate*	5/29	2	0935	1150
03/22/11	Metals & Particulate*	5/29	3	1216	1430
03/24/11	Fluorides	13B	1	1140	1255
03/24/11	Fluorides	13B	2	1311	1419
03/24/11	Fluorides	13B	3	1438	1544
03/22/11	Dioxins/Furans	23	1	0937	1358
03/23/11	Dioxins/Furans	23	2	0640	1105
03/23/11	Dioxins/Furans	23	3	1136	1558

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

WHEELABRATOR NORTH 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)
3/22/2011	HCl	26A	1	184.1	1.00	34.1
3/22/2011	HCl	26A	2	184.2	1.00	34.1
3/22/2011	HCl	26A	3	184.2	1.00	34.1
3/23/2011	Particulate/Metals	5/29	1	184.2	2.18	74.3
3/23/2011	Particulate/Metals	5/29	2	184.4	2.20	75.1
3/23/2011	Particulate/Metals	5/29	3	183.4	2.18	74.0
3/22/2011	Fluorides	13B	1	184.2	1.17	39.9
3/22/2011	Fluorides	13B	2	182.9	1.17	39.6
3/22/2011	Fluorides	13B	3	182.4	1.13	38.2
N/A	Dioxins/Furans	23	1	N/A	N/A	N/A
N/A	Dioxins/Furans	23	2	N/A	N/A	N/A
N/A	Dioxins/Furans	23	3	N/A	N/A	N/A

UNIT #2						
Date	Test	Method #	Run #	Steam (klb/hr)	Run Length (hr)	Trash Processed (tons)
3/23/2011	HCl	26A	1	183.7	1.00	34.0
3/23/2011	HCl	26A	2	183.8	1.00	34.0
3/23/2011	HCl	26A	3	184.7	1.00	34.2
3/24/2011	Particulate/Metals	5/29	1		1.17	0.0
3/24/2011	Particulate/Metals	5/29	2		1.17	0.0
3/24/2011	Particulate/Metals	5/29	3		1.18	0.0
3/24/2011	Fluorides	13B	1	183.8	1.22	41.5
3/23/2011	Fluorides	13B	2	183.5	1.17	39.8
3/23/2011	Fluorides	13B	3	184.1	1.10	37.5
N/A	Dioxins/Furans	23	1	N/A	N/A	N/A
N/A	Dioxins/Furans	23	2	N/A	N/A	N/A
N/A	Dioxins/Furans	23	3	N/A	N/A	N/A

UNIT #3						
Date	Test	Method #	Run #	Steam (klb/hr)	Run Length (hr)	Trash Processed (tons)
3/24/2011	HCl	26A	1	184.6	1.00	34.2
3/24/2011	HCl	26A	2	183.4	1.00	34.0
3/24/2011	HCl	26A	3	183.3	1.00	33.9
3/22/2011	Particulate/Metals	5/29	1	183.7	2.22	75.5
3/22/2011	Particulate/Metals	5/29	2	184.2	2.25	76.8
3/22/2011	Particulate/Metals	5/29	3	183.5	2.23	75.8
3/24/2011	Fluorides	13B	1	183.1	1.25	42.4
3/24/2011	Fluorides	13B	2	184.7	1.13	38.7
3/24/2011	Fluorides	13B	3	184.7	1.10	37.6
3/22/2011	Dioxins/Furans	23	1	184.0	4.35	148.2
3/23/2011	Dioxins/Furans	23	2	183.7	4.42	150.3
3/23/2011	Dioxins/Furans	23	3	184.2	4.37	149.1

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



Wheelabrator North Broward Inc
2600 Northwest 48th Street
Pompano Beach, FL, 33073

Reprint
Ticket# 31830
Ph: 954-971-8701

Customer Name CHEMICAL LIME CHEMICAL LIME
Ticket Date 03/25/2011
Payment Type Credit Account
Manual Ticket#
Route
Manifest# 2766600
Destination
PO# 2766600

Carrier CHEMICAL LIME CHEMICAL LIME
Tag # LIME1
Container
Truck # TRACTOR
Check#
Billing#
Grid

	Time	Scale	Operator	Inbound	Gross	
In	03/25/2011 07:48:20	Scale 1	lp		Tare	79200 lb
Out	03/25/2011 11:19:35	Scale 3	lp		Net	28400 lb
					Tons	50800 lb
						25.40

Comments

Product	LDX	Qty	UOM	Rate	Tax	Amount	Origin
1 LIME-LIME	100	25.40	Tons				WHEELABRA

Total Tax
Total Ticket

202WM Driver's Signature

0447 Dan Dubinski PTO for today.

0500 Raised boiler 2 SO₂ setpoint to 20, we got the average back ^{D/S} down.

0523 A-Slaker out of service.

0540 Monitored Auth in auto every 4 hrs.

[Signature]

3/25/11 D-Shift Friday 0600-1800 McClung

Blr 1,2,3 at 184 ^{kib}/hr; T/G at 62.51 MW + 26.87" Hg; FATC 4,5,3;

Berlin, Swindell, Johnson, Gonzalez, Marenco; Feeding from Bays 4-7 mix in trench

0615 #3 FATC b.i.s., did not find any issues. It tripped out at turnover

0632 run out #1 + #2 FATC

0650 SDA hoppers are clear

0655 running IK 3-2 + 3-3 for maintenance

0659 Shaft voltage alarm

0748 lime truck

0754 shaft voltage reset by E&I

0800 clean air on site; testing lime silo

→ 0848 begin unloading lime

0910 LOTO fire loop at NE-462 stair well to change out sprinkler head in Broadway; FM Global was

1028 fire loop back in service; FM Global was notified

1100 E&I performed T/G exciter PM; changed out 4 brushes

→ 1113 finished unloading lime truck

1240 APO testing gas guns

Plant Name: NBWD
General Average Report

Page: 1

Reporting Period: 03/23/2011 to 03/23/2011

Name: UNIT1

Averaging Type: 6m

Time of Report: 03/25/11 11:40

Rolling Average Interval: 1

Date	Time	OPACITY1 (PERCENT)
03/23/11	06:30	0
	06:36	0
	06:42	0
	06:48	0
	06:54	0
	07:00	0
	07:06	0
	07:12	0
	07:18	0
	07:24	0
	07:30	1
	07:36	1
	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

Average =	0
Geometric Avg. =	0
Maximum =	1
Minimum =	0
Possible Values =	23
Included Values =	23
Total =	4

* - 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: NBWD
General Average Report

Page: 1

Reporting Period: 03/23/2011 to 03/23/2011

Site Name: UNIT1

Data Averaging Type: 6m

Time of Report: 03/25/11 11:41

Rolling Average Interval: 1

Date	Time	OPACITY1 (PERCENT)
03/23/11	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
	09:54	0
	10:00	0
	10:06	0
	10:12	0
	10:18	0
	10:24	1
	10:30	1
	10:36	1
	10:42	1
	10:48	1
	10:54	1
	11:00	0
	11:06	1
	11:12	1

Average =	0
Geometric Avg. =	0
Maximum =	1
Minimum =	0
Possible Values =	23
Included Values =	23
Total =	7

* - 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

Reporting Period: 03/23/2011 to 03/23/2011

Name: UNIT1

Averaging Type: 6m

Time of Report: 03/25/11 11:42

Rolling Average Interval: 1

Date	Time	OPACITY1 (PERCENT)
03/23/11	11:36	1
	11:42	1
	11:48	1
	11:54	1
	12:00	1
	12:06	1
	12:12	0
	12:18	1
	12:24	1
	12:30	1
	12:36	1
	12:42	1
	12:48	1
	12:54	2
	13:00	1
	13:06	1
	13:12	2
	13:18	2
	13:24	2
	13:30	2
	13:36	2
	13:42	1
	13:48	1

Average =	1
Geometric Avg: =	1
Maximum =	2
Minimum =	0
Possible Values =	23
Included Values =	23
Total =	27

* - 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: NSW
General Average Report

Page: 1

Reporting Period: 03/24/2011 to 03/24/2011

Site Name: UNIT2

Data Averaging Type: 6m

Time of Report: 03/25/11 11:44

Rolling Average Interval: 1

Date	Time	OPACITY2 (PERCENT)
03/24/11	06:24	0
	06:30	0
	06:36	0
	06:42	0
	06:48	0
	06:54	0
	07:00	0
	07:06	0
	07:12	0
	07:18	0
	07:24	0
	07:30	0
	07:36	0
	07:42	0
	07:48	0
	07:54	0
	08:00	0
	08:06	0
	08:12	0
	08:18	0
	08:24	0
	08:30	0
	08:36	0

Average =	0
Geometric Avg. =	
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: NBWD
General Average Report

Page: 1

Reporting Period: 03/24/2011 to 03/24/2011

Name: UNIT2
Averaging Type: 6m

Time of Report: 03/25/11 11:45
Rolling Average Interval: 1

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

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

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

Plant Name: NEWD
General Average Report

Page: 1

Reporting Period: 03/24/2011 to 03/24/2011

Site Name: UNIT2

Data Averaging Type: 6m

Time of Report: 03/25/11 11:46

Rolling Average Interval: 1

Date	Time	OPACITY2 (PERCENT)
03/24/11	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

Average =	0
Geometric Avg. =	
Maximum =	0
Minimum =	0
Possible Values =	33
Included Values =	33
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 (FADRR)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: NBWD
General Average Report

Page: 1

Reporting Period: 03/22/2011 to 03/22/2011

Site Name: UNIT3

Averaging Type: 6m

Time of Report: 03/25/11 11:47

Rolling Average Interval: 1

Date	Time	OPACITY3 (PERCENT)
03/22/11	06:54	0
	07:00	0
	07:06	0
	07:12	0
	07:18	0
	07:24	0
	07:30	0
	07:36	0
	07:42	0
	07:48	0
	07:54	0
	08:00	0
	08:06	0
	08:12	0
	08:18	0
	08:24	0
	08:30	0
	08:36	0
	08:42	0
	08:48	0
	08:54	0
	09:00	0
	09:06	0

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

* - excluded values (missing, OOC, invalid, suspect)
c - missing
f - out-of-control
I - invalid
S - suspect
i - exceedance
P - stack not operating
3 - invalid (PADER)
J - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: NBWD
General Average Report
Reporting Period: 03/22/2011 to 03/22/2011

Page: 1

Site Name: UNIT3
Data Averaging Type: 6m

Time of Report: 03/25/11 11:47
Rolling Average Interval: 1

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

Average =	0
Geometric Avg. =	
Maximum =	0
Minimum =	0
Possible Values =	24
Included Values =	24
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: 03/22/2011 to 03/22/2011

Site Name: UNIT3

Time of Report: 03/25/11 11:48

Averaging Type: 6m

Rolling Average Interval: 1

Date	Time	OPACITY3 (PERCENT)
03/22/11	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

Average =	0
Geometric Avg. =	
Maximum =	0
Minimum =	0
Possible Values =	24
Included Values =	24
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
NORTH BROWARD
Emission Test Log**

Date: 03/22/11
Start Time 7:36
End Time: 8:36

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

	Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	HCL	527.83	319.95	47.79	41.92	5.88	11.18	303.94	6.62	-10.39
Unit 2		508.78	318.98	37.70	33.33	4.37	14.21	295.52	5.85	-10.87
Unit 3		506.09	320.87	39.33	34.23	5.10	13.62	310.60	6.48	-8.13

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	191.68	896.09	827.98	75.59	-0.09	263.56	1063.64	3.42	184.14
Unit 2	191.43	898.71	831.58	87.14	-0.11	273.64	1063.87	11.51	185.92
Unit 3	189.10	900.08	831.72	77.81	-0.10	282.84	1128.75	4.41	182.47

U1 lime (#/hr) 427.20

U2 lime (#/hr) 317.97

U3 lime (#/hr) 370.49

Specific Gravity 1.115

Round Down 1.110 1.150

Round Up 1.120 1.270

Slope 12.00

lb CaO/gal 1.212

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/22/11
Start Time 9:40
End Time: 10:40

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

	Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	HCL	523.36	319.41	44.14	37.27	6.88	12.15	303.38	6.65	-9.96
Unit 2		508.95	320.57	38.29	32.87	5.42	14.01	296.42	5.54	-10.62
Unit 3		503.98	320.18	37.84	32.86	4.99	14.12	309.87	6.37	-7.67

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	192.83	896.04	832.53	71.50	-0.09	263.42	1081.22	2.76	184.86
Unit 2	182.20	896.34	820.54	91.81	-0.09	273.31	1047.68	6.33	179.23
Unit 3	191.12	900.18	837.09	74.94	-0.10	282.40	1130.80	4.59	184.18

U1 lime (#/hr) 499.68

U2 lime (#/hr) 393.59

U3 lime (#/hr) 362.19

Specific Gravity 1.115

Round Down 1.110 1.150

Round Up 1.120 1.270

Slope 12.00

lb CaO/gal 1.211

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/22/11
Start Time 11:02
End Time: 12:02

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

	Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	HCL	521.84	319.28	44.56	36.42	8.14	12.06	303.00	6.63	-9.95
Unit 2		513.23	320.40	39.34	32.51	6.83	13.67	296.37	5.89	-10.98
Unit 3		502.99	319.88	37.47	31.96	5.50	14.31	309.93	6.41	-7.51

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBS/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBS/hr
Unit 1	190.60	895.98	826.66	71.69	-0.10	263.47	1096.84	3.40	183.81
Unit 2	188.79	898.35	838.73	90.50	-0.10	273.39	1083.90	7.79	182.92
Unit 3	190.43	900.41	830.68	73.93	-0.11	282.25	1149.91	5.74	184.31

U1 lime (#/hr) 589.17

U2 lime (#/hr) 494.18

U3 lime (#/hr) 398.36

Specific Gravity 1.115

Round Down 1.110 1.150

Round Up 1.120 1.270

Slope 12.00

lb CaO/gal 1.206

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/23/11
Start Time 6:34
End Time: 8:45

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

	Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	Particulate	518.55	315.12	47.12	42.95	4.18	10.82	300.08	6.81	-10.58
Unit 2		496.66	320.39	33.97	28.78	5.19	15.02	295.04	5.82	-10.56
Unit 3		507.52	320.33	40.13	35.15	4.98	12.67	309.74	6.41	-7.98

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	191.03	895.89	828.20	76.35	-0.10	263.22	1136.49	4.47	184.16
Unit 2	187.88	897.87	829.31	84.75	-0.11	273.41	1082.66	4.07	183.48
Unit 3	189.21	899.84	829.87	77.94	-0.10	282.47	1132.75	4.78	182.99

U1 lime (#/hr) 322.46

U2 lime (#/hr) 400.67

U3 lime (#/hr) 384.50

Specific Gravity 1.122

Round Down 1.120 1.270

Round Up 1.130 1.370

Slope 10.00

lb CaO/gal 1.287

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/23/11
Start Time 9:05
End Time: 11:17

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

	Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	Particulate	518.79	314.64	45.52	42.05	3.47	11.23	299.31	6.74	-10.17
Unit 2		505.53	320.12	36.13	32.08	4.05	14.14	295.37	5.76	-10.61
Unit 3		505.95	319.92	38.95	34.76	4.19	13.12	309.28	6.39	-7.70

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	191.67	896.39	830.25	73.77	-0.10	263.64	1139.80	3.47	184.39
Unit 2	188.26	898.30	830.11	87.28	-0.10	273.71	1084.89	3.78	183.88
Unit 3	190.35	900.47	830.38	76.71	-0.10	282.76	1137.40	3.92	184.08

U1 lime (#/hr) 266.76

U2 lime (#/hr) 311.42

U3 lime (#/hr) 322.29

Specific Gravity 1.121

Round Down 1.120 1.270

Round Up 1.130 1.370

Slope 10.00

lb CaO/gal 1.282

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/23/11
Start Time 11:41
End Time: 13:52

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

	Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	Particulate	525.12	315.43	47.82	41.77	6.05	10.74	300.06	6.73	-10.22
Unit 2		513.97	320.21	38.34	34.39	3.95	13.36	296.21	5.85	-10.78
Unit 3		509.85	320.03	39.58	35.70	3.87	12.97	310.02	6.39	-7.49

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBS/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBS/hr
Unit 1	190.17	895.72	827.58	75.99	-0.10	263.88	1132.06	2.84	183.37
Unit 2	187.79	897.71	828.38	89.61	-0.09	273.59	1088.30	3.90	183.35
Unit 3	189.72	899.84	825.98	76.64	-0.09	282.56	1140.18	5.13	183.97

U1 lime (#/hr) 463.59

U2 lime (#/hr) 303.09

U3 lime (#/hr) 296.92

Specific Gravity 1.121

Round Down 1.120 1.270

Round Up 1.130 1.370

Slope 10.00

lb CaO/gal 1.277

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/22/11
Start Time 12:31
End Time: 13:41

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

	Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	Fluorides	521.27	315.14	44.65	37.41	7.24	11.94	299.09	6.66	-9.83
Unit 2		519.18	320.81	41.10	35.59	5.51	13.02	296.00	5.82	-11.00
Unit 3		506.43	320.18	38.38	33.60	4.78	13.87	310.24	6.36	-7.46

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBS/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBS/hr
Unit 1	191.75	896.01	831.28	70.24	-0.10	263.53	1116.27	2.69	184.21
Unit 2	187.00	897.54	827.44	93.30	-0.10	273.24	1086.63	6.47	183.00
Unit 3	189.00	899.58	823.25	75.25	-0.11	282.08	1125.87	4.57	183.78

U1 lime (#/hr) 529.55

U2 lime (#/hr) 402.78

U3 lime (#/hr) 349.70

Specific Gravity 1.116

Round Down 1.110 1.150

Round Up 1.120 1.270

Slope 12.00

lb CaO/gal 1.219

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/22/11
Start Time 14:08
End Time: 15:17

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

	Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	Fluorides	530.11	315.72	49.01	43.01	6.00	10.85	299.42	6.66	-10.15
Unit 2		515.23	330.40	29.35	19.87	9.48	21.85	304.04	5.54	-10.50
Unit 3		509.06	319.61	39.36	34.83	4.54	13.52	310.31	6.29	-7.52

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBS/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBS/hr
Unit 1	190.10	895.31	829.82	74.91	-0.09	262.99	1128.11	3.49	182.86
Unit 2	183.29	896.33	831.97	88.07	-0.09	272.48	1073.24	8.23	178.22
Unit 3	189.08	899.07	820.82	76.79	-0.09	281.39	1120.82	4.40	184.16

U1 lime (#/hr) 441.25

U2 lime (#/hr) 697.27

U3 lime (#/hr) 333.84

Specific Gravity 1.116

Round Down 1.110 1.150

Round Up 1.120 1.270

Slope 12.00

lb CaO/gal 1.226

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/22/11
Start Time 15:39
End Time: 16:47

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

	Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	Fluorides	537.47	324.02	50.88	42.72	8.16	10.60	304.59	6.80	-10.69
Unit 2		520.64	319.61	41.10	37.05	4.05	13.17	299.16	5.54	-10.73
Unit 3		507.57	319.65	38.71	34.21	4.50	13.89	310.09	6.32	-7.56

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	188.35	893.64	821.96	79.20	-0.10	262.82	1130.52	3.96	182.37
Unit 2	172.88	892.74	822.71	89.42	-0.11	272.26	1062.13	7.70	167.97
Unit 3	189.83	897.83	821.22	75.16	-0.09	281.15	1139.89	5.56	184.56

U1 lime (#/hr) 594.98

U2 lime (#/hr) 295.30

U3 lime (#/hr) 328.08

Specific Gravity 1.115

Round Down 1.110 1.150

Round Up 1.120 1.270

Slope 12.00

lb CaO/gal 1.215

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/23/11
Start Time 7:12
End Time: 8:12

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

	Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1		520.28	315.40	48.30	43.12	5.18	10.52	300.44	6.83	-10.66
Unit 2	HCL	496.93	320.54	34.24	29.70	4.54	14.85	295.29	5.89	-10.63
Unit 3		507.94	320.01	40.23	36.38	3.85	12.60	309.65	6.39	-7.99

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBS/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBS/hr
Unit 1	191.26	896.08	829.44	76.40	-0.10	263.19	1136.65	5.16	184.24
Unit 2	188.50	898.14	831.81	84.53	-0.11	273.37	1090.44	3.71	183.70
Unit 3	189.27	899.96	829.17	77.98	-0.10	282.43	1137.25	4.79	183.18

U1 lime (#/hr) 400.62

U2 lime (#/hr) 351.50

U3 lime (#/hr) 297.52

Specific Gravity 1.122

Round Down 1.120 1 270

Round Up 1.130 1 370

Slope 10.00

lb CaO/gal 1.289

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/23/11
Start Time 8:38
End Time: 9:38

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	521.28	314.87	47.38	44.16	3.22	10.77	299.60	6.86	-10.54
Unit 2 HCL	502.32	319.99	35.36	31.25	4.12	14.43	294.92	5.88	-10.69
Unit 3	506.49	319.37	39.41	34.89	4.51	12.92	309.22	6.38	-7.76

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	190.76	896.09	828.13	76.07	-0.09	263.48	1142.64	3.33	183.71
Unit 2	188.07	898.02	825.69	86.43	-0.10	273.52	1079.38	0.00	183.76
Unit 3	191.20	900.64	832.66	76.49	-0.09	282.62	1139.98	5.27	184.60

U1 lime (#/hr) 248.09

U2 lime (#/hr) 317.20

U3 lime (#/hr) 347.79

Specific Gravity 1.121

Round Down 1.120 1.270

Round Up 1.130 1.370

Slope 10.00

lb CaO/gal 1.285

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/23/11
Start Time 9:59
End Time: 10:59

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

	Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1		517.57	314.53	44.79	41.22	3.56	11.42	299.10	6.70	-10.05
Unit 2	HCL	506.14	319.84	36.09	32.13	3.96	14.19	295.32	5.72	-10.53
Unit 3		506.18	319.76	38.79	34.99	3.80	13.20	309.34	6.33	-7.61

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	191.93	896.52	829.41	73.03	-0.10	263.73	1139.79	3.47	184.67
Unit 2	189.48	898.70	831.83	86.69	-0.09	273.79	1081.98	5.75	184.67
Unit 3	190.34	900.65	830.92	76.14	-0.10	282.82	1137.79	3.80	184.29

U1 lime (#/hr) 274.03

U2 lime (#/hr) 304.07

U3 lime (#/hr) 291.91

Specific Gravity 1.121

Round Down 1.120 1.270

Round Up 1.130 1.370

Slope 10.00

lb CaO/gal 1.281

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/24/11
Start Time 6:28
End Time: 8:38

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	513.53	315.20	44.29	37.13	7.15	11.54	300.70	6.74	-10.32
Unit 2 Particulate	498.48	320.20	32.92	27.30	5.62	15.51	293.93	5.76	-10.40
Unit 3	504.51	320.13	36.72	32.07	4.66	13.87	309.17	6.40	-7.57

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONG OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBS/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBS/hr
Unit 1	190.26	895.90	825.65	74.03	-0.10	263.20	1115.45	3.25	183.61
Unit 2	187.93	898.11	829.67	81.39	-0.10	273.45	1092.37	3.66	183.34
Unit 3	190.76	900.52	832.14	72.90	-0.10	282.42	1146.35	7.29	184.11

U1 lime (#/hr) 551.24

U2 lime (#/hr) 433.09

U3 lime (#/hr) 358.78

Specific Gravity 1.121

Round Down 1.120 1.270

Round Up 1.130 1.370

Slope 10.00

lb CaO/gal 1.285

Wheelabrator
NORTH BROWARD
Emission Test Log

Date: 03/24/11
Start Time 8:53
End Time: 11:03

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	518.28	315.07	45.23	41.19	4.03	11.64	300.39	6.75	-10.22
Unit 2 Particulate	506.69	320.06	35.06	31.02	4.04	15.00	294.68	5.75	-10.43
Unit 3	512.24	320.19	39.66	35.63	4.03	13.26	309.72	6.36	-7.61

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBS/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBS/hr
Unit 1	190.71	896.23	828.11	74.54	-0.10	263.32	1128.43	2.74	183.80
Unit 2	188.49	898.43	829.74	82.89	-0.10	273.45	1096.77	4.17	184.05
Unit 3	189.43	900.33	828.25	76.27	-0.09	282.47	1138.71	6.08	183.36

U1 lime (#/hr) 299.60

U2 lime (#/hr) 299.99

U3 lime (#/hr) 299.62

Specific Gravity 1.117
Round Down 1.110 1.150
Round Up 1.120 1.270

Slope 12.00
lb CaO/gal 1.238

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/24/11
Start Time 11:19
End Time: 14:30

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	517.95	315.01	43.90	40.38	3.53	12.36	300.00	6.66	-9.81
Unit 2 Particulate	504.24	320.00	33.78	29.58	4.20	16.02	293.69	5.78	-10.19
Unit 3	523.87	320.09	45.01	40.29	4.71	12.05	310.64	6.41	-7.81

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	190.94	896.30	828.20	71.84	-0.10	263.82	1127.02	3.01	183.99
Unit 2	188.65	898.46	830.32	80.15	-0.09	273.55	1093.79	4.19	184.10
Unit 3	188.90	900.10	823.93	81.29	-0.09	282.57	1141.28	6.42	183.67

U1 lime (#/hr) 252.00

U2 lime (#/hr) 300.04

U3 lime (#/hr) 336.75

Specific Gravity 1.113

Round Down 1.110 1.150

Round Up 1.120 1.270

Slope 12.00

lb CaO/gal 1.191

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/23/11
Start Time 11:32
End Time: 12:45

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	519.90	315.41	45.34	40.18	5.16	11.34	299.66	6.73	-10.05
Unit 2 Fluorides	511.60	320.50	37.74	33.90	3.84	13.60	296.14	5.74	-10.71
Unit 3	508.08	319.73	38.91	35.01	3.89	13.22	309.85	6.41	-7.48

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	190.99	896.17	831.76	73.33	-0.10	263.98	1141.74	2.97	183.73
Unit 2	187.83	897.95	827.03	88.91	-0.10	273.74	1084.90	3.33	183.83
Unit 3	190.67	900.30	828.04	75.40	-0.09	282.75	1140.14	5.28	184.57

U1 lime (#/hr) 394.74

U2 lime (#/hr) 293.36

U3 lime (#/hr) 297.77

Specific Gravity 1.120

Round Down 1.120 1.270

Round Up 1.130 1.370

Slope 10.00

lb CaO/gal 1.275

Wheelabrator
NORTH BROWARD
Emission Test Log

Date: 03/23/11
Start Time 13:07
End Time: 14:17

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	531.16	315.58	51.08	42.24	8.85	10.00	300.63	6.77	-10.49
Unit 2 Fluorides	515.13	319.96	38.54	34.40	4.14	13.24	295.94	5.78	-10.65
Unit 3	513.10	320.13	40.60	36.78	3.82	12.57	310.32	6.34	-7.51

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBS/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBS/hr
Unit 1	189.23	895.47	824.02	79.25	-0.10	263.85	1122.11	2.89	183.12
Unit 2	188.03	897.75	828.10	89.32	-0.10	273.50	1092.48	5.61	183.51
Unit 3	189.26	899.82	827.11	77.65	-0.09	282.39	1142.21	4.99	183.86

U1 lime (#/hr) 679.07

U2 lime (#/hr) 317.43

U3 lime (#/hr) 293.41

Specific Gravity 1.121

Round Down 1.120 1.270

Round Up 1.130 1.370

Slope 10.00

lb CaO/gal 1.279

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/23/11
Start Time 14:39
End Time: 15:45

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	532.48	314.57	50.36	44.31	6.06	10.15	301.44	6.67	-10.29
Unit 2 Fluorides	510.95	319.43	36.33	30.12	6.21	14.10	295.68	5.75	-10.45
Unit 3	508.57	319.51	38.13	34.18	3.95	13.41	309.95	6.30	-7.32

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBS/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBS/hr
Unit 1	191.89	896.40	829.43	76.96	-0.10	264.19	1139.23	3.11	184.78
Unit 2	188.83	898.34	830.96	84.46	-0.11	273.71	1097.59	4.11	184.10
Unit 3	190.42	900.39	827.41	73.54	-0.10	282.60	1155.32	6.93	184.59

U1 lime (#/hr) 465.69

U2 lime (#/hr) 477.53

U3 lime (#/hr) 303.77

Specific Gravity 1.121

Round Down 1.120 1.270

Round Up 1.130 1.370

Slope 10.00

lb CaO/gal 1.282

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/24/11
Start Time 6:57
End Time: 7:57

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	514.49	315.72	44.99	37.41	7.57	11.36	300.87	6.77	-10.44
Unit 2	496.97	320.06	32.31	26.47	5.83	15.79	293.53	6.00	-10.60
Unit 3 HCL	503.14	319.68	35.93	31.98	3.95	14.16	308.88	6.33	-7.44

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBS/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBS/hr
Unit 1	189.72	895.80	825.00	74.79	-0.11	263.28	1118.13	3.22	183.09
Unit 2	188.39	898.29	831.04	80.55	-0.12	273.54	1085.37	3.57	183.53
Unit 3	191.59	900.75	834.03	71.95	-0.10	282.48	1157.67	7.80	184.55

U1 lime (#/hr) 584.35

U2 lime (#/hr) 450.06

U3 lime (#/hr) 304.96

Specific Gravity 1.122

Round Down 1.120 1.270

Round Up 1.130 1.370

Slope 10.00

lb CaO/gal 1.286

Wheelabrator
NORTH BROWARD
Emission Test Log

Date: 03/24/11
 Start Time 8:25
 End Time: 9:25

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

	Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1		515.54	314.88	44.41	38.89	5.52	11.51	300.10	6.77	-10.23
Unit 2		505.21	320.30	34.87	30.92	3.95	14.62	294.72	5.54	-10.30
Unit 3	HCL	508.56	320.36	38.32	34.19	4.13	13.29	309.62	6.42	-7.68

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	190.40	895.95	824.61	74.36	-0.10	263.15	1125.15	2.55	183.89
Unit 2	186.70	897.85	825.34	84.40	-0.11	273.31	1107.42	2.69	183.16
Unit 3	190.14	900.35	832.78	74.47	-0.10	282.31	1151.85	6.87	183.41

U1 lime (#/hr) 425.44

U2 lime (#/hr) 304.42

U3 lime (#/hr) 318.40

Specific Gravity 1.121

Round Down 1.120 1.270

Round Up 1.130 1.370

Slope 10.00

lb CaO/gal 1.285

Wheelabrator NORTH BROWARD Emission Test Log

Date: 03/24/11
Start Time 10:24
End Time: 11:24

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	520.23	314.85	45.56	42.29	3.27	11.79	300.51	6.68	-10.12
Unit 2	505.78	319.88	34.41	30.25	4.16	15.58	294.08	5.71	-10.28
Unit 3 HCL	515.28	320.34	40.97	36.92	4.05	13.12	310.00	6.35	-7.58

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	190.74	896.24	828.35	74.45	-0.10	263.46	1130.42	2.88	183.67
Unit 2	189.04	898.61	831.92	81.40	-0.10	273.47	1093.28	4.00	184.31
Unit 3	188.83	900.13	824.01	77.95	-0.08	282.48	1134.26	4.84	183.30

U1 lime (#/hr) 236.73

U2 lime (#/hr) 301.10

U3 lime (#/hr) 293.09

Specific Gravity 1.115

Round Down 1.110 1.150

Round Up 1.120 1.270

Slope 12.00

lb CaO/gal 1.206

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/22/11
Start Time 6:57
End Time: 9:10

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	526.82	320.04	47.15	40.84	6.32	11.34	303.89	6.67	-10.40
Unit 2	508.19	319.88	37.90	33.45	4.46	14.21	295.92	5.77	-10.84
Unit 3 Particulate	503.79	320.01	38.12	33.16	4.96	14.08	310.02	6.35	-7.84

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBS/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBS/hr
Unit 1	191.74	896.01	829.65	74.94	-0.10	263.46	1071.85	3.22	184.03
Unit 2	187.86	897.93	829.21	88.30	-0.10	273.51	1070.19	10.38	183.25
Unit 3	190.53	900.38	834.67	75.85	-0.10	282.71	1129.40	4.42	183.72

U1 lime (#/hr) 458.19

U2 lime (#/hr) 323.31

U3 lime (#/hr) 359.61

Specific Gravity 1.115

Round Down 1.110 1.150

Round Up 1.120 1.270

Slope 12.00

lb CaO/gal 1.209

Wheelabrator NORTH BROWARD Emission Test Log

Date: 03/22/11
Start Time 9:35
End Time: 11:50

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	522.52	319.77	44.08	36.35	7.73	12.17	303.37	6.63	-9.94
Unit 2	510.17	320.42	38.42	32.23	6.20	14.01	296.43	5.67	-10.75
Unit 3 Particulate	503.57	320.08	37.74	32.36	5.38	14.18	309.91	6.41	-7.63

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONC OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	191.78	895.95	829.00	71.42	-0.09	263.42	1089.72	3.03	184.53
Unit 2	185.09	897.12	828.42	90.87	-0.10	273.31	1060.64	6.76	180.70
Unit 3	190.78	900.16	833.25	74.59	-0.10	282.33	1140.49	5.18	184.23

U1 lime (#/hr) 560.18

U2 lime (#/hr) 449.14

U3 lime (#/hr) 389.63

Specific Gravity 1.115

Round Down 1.110 1.150

Round Up 1.120 1.270

Slope 12.00

lb CaO/gal 1.208

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/22/11
Start Time 12:16
End Time: 14:30

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	523.58	315.26	45.68	38.88	6.80	11.66	299.22	6.66	-9.89
Unit 2	519.73	325.54	39.90	33.03	6.87	13.91	298.46	5.83	-11.01
Unit 3 Particulate	507.47	320.18	38.82	34.04	4.78	13.71	310.34	6.37	-7.53

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBS/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBS/hr
Unit 1	190.94	895.65	829.77	71.41	-0.10	263.52	1117.35	2.73	183.77
Unit 2	186.12	896.94	826.52	93.32	-0.10	273.17	1082.63	6.63	181.44
Unit 3	188.78	899.26	823.18	76.23	-0.10	282.03	1124.72	4.41	183.45

U1 lime (#/hr) 497.98

U2 lime (#/hr) 503.39

U3 lime (#/hr) 350.26

Specific Gravity 1.116

Round Down 1.110 1.150

Round Up 1.120 1.270

Slope 12.00

lb CaO/gal 1.221

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/22/11
Start Time 9:37
End Time: 13:58

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	522.42	317.61	44.71	37.37	7.34	11.97	301.52	6.66	-9.93
Unit 2	514.13	320.96	39.35	33.23	6.12	13.71	296.40	5.76	-10.85
Unit 3 Dioxins	504.69	320.12	37.96	32.87	5.09	14.07	310.04	6.38	-7.55

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	191.47	895.91	828.88	71.29	-0.10	263.50	1100.61	2.96	184.17
Unit 2	186.51	897.45	828.78	91.61	-0.10	273.33	1074.51	7.05	182.02
Unit 3	190.08	899.96	829.46	74.89	-0.10	282.25	1135.08	4.86	183.96

U1 lime (#/hr) 534.54

U2 lime (#/hr) 445.34

U3 lime (#/hr) 370.31

Specific Gravity 1.115

Round Down 1.110 1.150

Round Up 1.120 1.270

Slope 12.00

lb CaO/gal 1.213

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/23/11
Start Time 6:40
End Time: 11:05

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	519.10	314.90	46.56	42.78	3.79	10.97	299.71	6.80	-10.42
Unit 2	501.15	320.21	35.07	30.49	4.58	14.57	295.16	5.80	-10.59
Unit 3 Dioxins	506.85	320.02	39.60	35.04	4.57	12.87	309.49	6.40	-7.84

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBS/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBS/hr
Unit 1	191.27	896.16	829.31	75.27	-0.10	263.42	1138.75	3.96	184.21
Unit 2	188.19	898.12	829.48	86.02	-0.10	273.55	1082.15	3.59	183.71
Unit 3	189.98	900.25	830.53	77.23	-0.10	282.60	1135.59	4.51	183.68

U1 lime (#/hr) 291.76

U2 lime (#/hr) 352.59

U3 lime (#/hr) 351.86

Specific Gravity 1.121

Round Down 1.120 1.270

Round Up 1.130 1.370

Slope 10.00

lb CaO/gal 1.284

Wheelabrator NORTH BROWARD Emission Test Log

Date: 03/23/11
Start Time 11:36
End Time: 15:58

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	528.65	315.60	49.26	42.35	6.92	10.42	300.66	6.74	-10.34
Unit 2	512.86	319.96	37.63	33.02	4.61	13.62	295.92	5.76	-10.61
Unit 3 Dioxins	509.76	319.82	39.13	35.25	3.88	13.10	310.00	6.35	-7.44

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	190.38	895.85	827.84	77.23	-0.10	264.02	1132.73	3.03	183.59
Unit 2	188.17	897.91	828.38	87.53	-0.10	273.64	1092.64	4.51	183.79
Unit 3	189.98	900.03	827.33	75.60	-0.09	282.58	1145.81	5.70	184.20

U1 lime (#/hr) 530.67

U2 lime (#/hr) 353.54

U3 lime (#/hr) 297.76

Specific Gravity 1.121

Round Down 1.120 1.270

Round Up 1.130 1.370

Slope 10.00

lb CaO/gal 1.279

Wheelabrator NORTH BROWARD Emission Test Log

Date: 03/24/11
Start Time 11:40
End Time: 12:55

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	515.88	314.53	43.06	39.52	3.54	12.62	299.56	6.67	-9.77
Unit 2	504.40	320.14	34.05	29.86	4.18	15.92	293.98	5.76	-10.20
Unit 3 Flourides	525.87	320.56	46.29	41.20	5.08	11.69	310.91	6.42	-7.97

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	191.83	896.53	829.19	70.92	-0.10	263.73	1126.48	2.85	184.71
Unit 2	188.71	898.65	832.71	80.35	-0.10	273.58	1086.87	4.65	184.04
Unit 3	187.97	899.96	821.91	82.39	-0.09	282.64	1142.75	6.19	183.11

U1 lime (#/hr) 252.99

U2 lime (#/hr) 299.22

U3 lime (#/hr) 363.71

Specific Gravity 1.114

Round Down 1.110 1.150

Round Up 1.120 1.270

Slope 12.00

lb CaO/gal 1.192

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/24/11
Start Time 13:11
End Time: 14:19

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	519.50	315.75	44.57	41.01	3.56	12.19	300.39	6.68	-9.88
Unit 2	503.37	319.91	33.31	29.12	4.18	16.19	293.32	5.78	-10.13
Unit 3 Flourides	522.28	319.37	43.93	39.61	4.32	12.35	310.15	6.39	-7.63

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	189.80	895.91	827.13	72.95	-0.09	263.97	1126.99	2.87	182.94
Unit 2	187.92	898.04	825.43	79.82	-0.09	273.54	1101.36	2.97	183.91
Unit 3	190.29	900.22	825.05	79.98	-0.09	282.53	1139.99	6.43	184.73

U1 lime (#/hr) 253.92

U2 lime (#/hr) 298.53

U3 lime (#/hr) 308.30

Specific Gravity 1.113

Round Down 1.110 1.150

Round Up 1.120 1.270

Slope 12.00

lb CaO/gal 1.190

**Wheelabrator
NORTH BROWARD
Emission Test Log**

Date: 03/24/11
Start Time 14:38
End Time: 15:44

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS

Test	DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1	519.06	314.53	44.30	40.82	3.49	12.39	299.79	6.69	-9.76
Unit 2	508.03	319.87	34.75	30.51	4.24	15.80	293.72	5.69	-10.20
Unit 3 Flourides	516.66	319.59	41.72	37.81	3.91	13.12	310.35	6.42	-7.62

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW

	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	191.95	897.12	834.00	71.04	-0.09	264.18	1119.39	2.79	184.26
Unit 2	189.10	899.14	830.86	80.21	-0.12	273.59	1097.75	5.98	184.71
Unit 3	191.24	901.30	832.19	77.80	-0.09	282.67	1134.02	6.93	184.72

U1 lime (#/hr) 246.10

U2 lime (#/hr) 299.43

U3 lime (#/hr) 276.13

Specific Gravity 1.112

Round Down 1.110 1.150

Round Up 1.120 1.270

Slope 12.00

lb CaO/gal 1.177

Stack Test Process Data

PLANT NAME: NORTH BROWARD 2011					Data from DCS Printouts							Calculated		Lime Feed Rate			
					Steam	FF Inlet	Fabric	SDA	Total	Diluton	Slurry	Slurry	Slurry	Slurry	CaO	CaO	
Test	Unit	Run	Date	Time		Flow	Temp	Filter	Inlet	Flow	flow	Flow	Conc.	Specific	Density	Flow	
	No.	No.		Start	Stop	klbs/hr	deg F	Delta	Temp	gpm	gpm	gpm	%	Gravity	lb/gal	lbs/hr	
M-26A	1	1	3/22/2011	0736	0836	184.1	303.9	6.6	527.8	47.8	41.9	5.9	11.2	1.110	1.212	426.9	All times based on CEMS time
HCl		2	3/22/2011	0940	1040	184.9	303.4	6.7	523.4	44.1	37.3	6.9	12.2	1.115	1.211	499.2	
		3	3/22/2011	1102	1202	183.8	303.0	6.6	521.8	44.6	36.4	8.1	12.1	1.115	1.206	589.0	
				Avg		184.3	303.4	6.6	524.3	45.5	38.5	7.0	11.8	1.113	1.210	505.0	
M-29/5	1	1	3/23/2011	0634	0845	184.2	300.1	6.8	518.6	47.1	43.0	4.2	10.8	1.122	1.287	322.0	All times based on CEMS time
Metals		2	3/23/2011	0905	1117	184.4	299.3	6.7	518.8	45.5	42.1	3.5	11.2	1.121	1.282	266.9	
PM		3	3/23/2011	1141	1352	183.4	300.1	6.7	525.1	47.8	41.8	6.1	10.7	1.121	1.277	463.6	
				Avg		184.0	299.8	6.8	520.8	46.8	42.3	4.6	10.9	1.121	1.282	350.8	
M-23	1	1	NA									0.0				0.0	Not done due to reduced dioxin schedule
dioxins		2	NA									0.0				0.0	
		3	NA									0.0				0.0	
				Avg		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	#DIV/0!	#DIV/0!	#DIV/0!	0.0	
M-13B	1	1	3/22/2011	1231	1341	184.2	299.1	6.7	521.3	44.7	37.4	7.2	11.9	1.116	1.219	529.5	All times based on CEMS time
HF		2	3/22/2011	1408	1517	182.9	299.4	6.7	530.1	49.0	43.0	6.0	10.9	1.116	1.226	441.4	
		3	3/22/2011	1539	1647	182.4	304.6	6.8	537.5	50.9	42.7	8.2	10.6	1.115	1.215	594.9	
				Avg		183.1	301.0	6.7	529.6	48.2	41.0	7.1	11.1	1.116	1.220	521.9	

Stack Test Process Data

PLANT NAME: NORTH BROWARD 2011					Data From DCS Printouts							Calculated		Lime Feed Rate			
					Steam	FF Inlet	Fabric	SDA	Total	Diluton	Slurry	Slurry	Slurry	Slurry	CaO	CaO	
Test	Unit	Run	Date	Time		Flow	Temp	Filter	Inlet	SDA	H2O	Flow	Conc.	Specific	Density	Flow	
	No.	No.		Start	Stop	klbs/hr	deg F	Delta	Temp	gpm	gpm	gpm	%	Gravity	lb/gal	lbs/hr	
M-26A HCl	2	1		0712	0812	183.7	295.3	5.9	496.9	34.2	29.7	4.5	14.9	1.122	1.289	351.1	All times based on CEMS time
		2		0838	0938	183.8	294.9	5.9	502.3	35.4	31.3	4.1	14.4	1.121	1.285	316.9	
		3		0959	1059	184.7	295.3	5.7	506.1	36.1	32.1	4.0	14.2	1.121	1.281	304.4	
		Avg			184.0	295.2	5.8	501.8	35.2	31.0	4.2	14.5	1.121	1.285	324.1		
M-29/5 Metals PM	2	1		0628	0838	183.3	293.9	5.8	498.5	32.9	27.3	5.6	15.5	1.121	1.285	433.3	All times based on CEMS time
		2		0853	1103	184.1	294.7	5.8	506.7	35.1	31.0	4.0	15.0	1.117	1.238	300.1	
		3		1119	1430	184.1	293.7	5.8	504.2	33.8	29.6	4.2	16.0	1.113	1.191	300.1	
		Avg			183.8	294.1	5.8	503.1	33.9	29.3	4.6	15.5	1.117	1.238	344.5		
M-23 dioxins	2	1										0.0				0.0	All times based on CEMS time
		2										0.0				0.0	
		3										0.0				0.0	
				Avg		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	#DIV/0!	#DIV/0!	#DIV/0!	0.0	
M-13B HF	2	1		1132	1245	183.8	296.1	5.7	511.6	37.7	33.9	3.8	13.6	1.120	1.275	293.8	All times based on CEMS time
		2		1307	1417	183.5	295.9	5.8	515.1	38.5	34.4	4.1	13.2	1.121	1.279	317.7	
		3		1439	1545	184.1	295.7	5.8	511.0	36.3	30.1	6.2	14.1	1.121	1.282	477.7	
		Avg			183.8	295.9	5.8	512.6	37.5	32.8	4.7	13.6	1.121	1.279	363.0		

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Stack Test Process Data

PLANT NAME: NORTH BROWARD 2011						Data From DCS Printouts						Calculated		Lime Feed Rate			
						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	
Test	Unit No.	Run No.	Date	Time Start Stop													
M-26A HCI	3	1	3/24/2011	0657	0757	184.6	308.9	6.3	503.1	35.9	32.0	4.0	14.2	1.122	1.286	304.8	All times based on CEMS time
		2	3/24/2011	0825	0925	183.4	309.6	6.4	508.6	38.3	34.2	4.1	13.3	1.121	1.285	318.4	
		3	3/24/2011	1024	1124	183.3	310.0	6.4	515.3	41.0	36.9	4.1	13.1	1.115	1.206	293.1	
		Avg		183.8	309.5	6.4	509.0	38.4	34.4	4.0	13.5	1.119	1.259	305.4			
M-29/5 Metals PM	3	1	3/22/2011	0657	0910	183.7	310.0	6.4	503.8	38.1	33.2	5.0	14.1	1.115	1.209	359.8	All times based on CEMS time
		2	3/22/2011	0935	1150	184.2	309.9	6.4	503.6	37.7	32.4	5.4	14.2	1.115	1.208	389.9	
		3	3/22/2011	1216	1430	183.5	310.3	6.4	507.5	38.8	34.0	4.8	13.7	1.116	1.221	350.2	
		Avg		183.8	310.1	6.4	504.9	38.2	33.2	5.0	14.0	1.115	1.213	366.6			
M-23 dioxins	3	1	03/22/11	0937	1358	184.0	310.0	6.4	504.7	38.0	32.9	5.1	14.1	1.115	1.213	370.5	Not done due to reduced dioxin schedule
		2	03/23/11	0640	1105	183.7	309.5	6.4	506.9	39.6	35.0	4.6	12.9	1.121	1.284	351.3	
		3	03/23/11	1136	1558	184.2	310.0	6.4	509.8	39.1	35.3	3.9	13.1	1.121	1.279	297.8	
		Avg		183.9	309.8	6.4	507.1	38.9	34.4	4.5	13.3	1.119	1.259	339.8			
M-13B HF	3	1	03/24/11	1140	1255	183.1	310.9	6.4	525.9	46.3	41.2	5.1	11.7	1.114	1.192	364.0	All times based on CEMS time
		2	03/24/11	1311	1419	184.7	310.2	6.4	522.3	43.9	39.6	4.3	12.4	1.113	1.190	308.4	
		3	03/24/11	1438	1544	184.7	310.4	6.4	516.7	41.7	37.8	3.9	13.1	1.112	1.177	276.1	
		Avg		184.2	310.5	6.4	521.6	44.0	39.5	4.4	12.4	1.113	1.186	316.2			

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End of Appendix

WHEELABRATOR NORTH BROWARD, INC.
POMPANO BEACH, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-1

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: 5/4/11



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Wheelabrator North 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 23	Mar 23	Mar 23	
Start Time (approx.)	06:34	09:05	11:41	
Stop Time (approx.)	08:45	11:17	13:52	
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)	-11.7000	-11.5000	-11.6000	
A _s Sample location area (ft ²)	64.0000	64.0000	64.0000	
P _{bar} Barometric pressure (in. Hg)	30.10	30.10	30.10	30.1000
D _n Nozzle diameter (in.)	0.2700	0.2700	0.2700	
O ₂ Oxygen (dry volume %)	9.8200	9.5800	9.8100	9.7367
CO ₂ Carbon dioxide (dry volume %)	9.4800	9.8100	9.8400	9.7100
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.7000	80.6100	80.3500	80.5533
V _{lc} Total Liquid collected (ml)	447.60	437.50	433.20	
V _m Volume metered, meter conditions (ft ³)	82.4200	79.7950	81.4240	
T _m Dry gas meter temperature (°F)	69.8600	79.2400	88.6000	
T _s Sample temperature (°F)	302.6000	301.9600	302.8000	302.4533
ΔH Meter box orifice pressure drop (in. H ₂ O)	1.3840	1.2888	1.3204	
θ Total sampling time (min)	125.0	125.0	125.0	
Flow Results				
V _{wstd} Volume of water collected (ft ³)	21.0641	20.5888	20.3864	20.6797
V _{mstd} Volume metered, standard (dscf)	81.6030	77.6118	77.8510	79.0219
P _s Sample gas pressure, absolute (in. Hg)	29.2397	29.2544	29.2471	29.2471
P _v Vapor pressure, actual (in. Hg)	29.2397	29.2544	29.2471	29.2471
B _{wo} Moisture measured in sample (% by volume)	20.5169	20.9660	20.7522	20.7450
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	20.5169	20.9660	20.7522	20.7450
√ΔP Velocity head (√in. H ₂ O)	0.7407	0.7125	0.7198	0.7243
M _d MW of sample gas, dry (lb/lb-mole)	29.9096	29.9528	29.9668	29.9431
M _s MW of sample gas, wet (lb/lb-mole)	27.4661	27.4468	27.4834	27.4654
V _s Velocity of sample (ft/sec)	51.2171	49.2470	49.7538	50.0726
%I Isokinetic sampling (%)	99.4047	98.7511	97.9143	98.6900
Q _a Volumetric flow rate, actual (acfm)	196,674	189,108	191,054	192,279
Q _s Volumetric flow rate, standard (scfm)	133,075	128,128	129,271	130,158
Q _{std} Volumetric flow rate, dry standard (dscfm)	105,772	101,264	102,444	103,160
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	84,313	82,468	81,734	82,839
Q _a Volumetric flow rate, actual (acf/hr)	11,800,423	11,346,507	11,463,266	11,536,732
Q _s Volumetric flow rate, standard (scf/hr)	7,984,471	7,687,652	7,756,258	7,809,460
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	6,346,308	6,075,857	6,146,666	6,189,610
Q _a Volumetric flow rate, actual (m ³ /hr)	334,195	321,340	324,646	326,727
Q _s Volumetric flow rate, standard (m ³ /hr)	226,125	217,719	219,662	221,169
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	179,731	172,072	174,077	175,293
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	143,268	140,133	138,886	140,762
Q _s Volumetric flow rate, normal (Nm ³ /hr)	210,707	202,874	204,685	206,089
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	167,477	160,340	162,208	163,342
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	133,499	130,579	129,417	131,165

Comments:

Average includes 3 runs.

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

USEPA Method 5 (FPM) Emission Parameters for FPM

Run No.	1	2	3	Average
Date (2011)	Mar 23	Mar 23	Mar 23	
Start Time (approx.)	06:34	09:05	11:41	
Stop Time (approx.)	08:45	11:17	13:52	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	184.2	184.4	183.4	184.0
P ₁ Fabric Filter Inlet Temperature (°F)	300	299	300	300
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 %)	9.8200	9.5800	9.8100	9.7367
CO ₂ Carbon dioxide (dry volume %)	9.4800	9.8100	9.8400	9.7100
T _s Sample temperature (°F)	302.6000	301.9600	302.8000	302.4533
B _w Actual water vapor in gas (% by volume)	20.5169	20.9660	20.7522	20.7450
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	196,674	189,108	191,054	192,279
Q _s Volumetric flow rate, standard (scfm)	133,075	128,128	129,271	130,158
Q _{std} Volumetric flow rate, dry standard (dscfm)	105,772	101,264	102,444	103,160
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	84,313	82,468	81,734	82,839
Q _a Volumetric flow rate, actual (acf/hr)	11,800,423	11,346,507	11,463,266	11,536,732
Q _s Volumetric flow rate, standard (scf/hr)	7,984,471	7,687,652	7,756,258	7,809,460
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	6,346,308	6,075,857	6,146,666	6,189,610
Q _a Volumetric flow rate, actual (m ³ /hr)	334,195	321,340	324,646	326,727
Q _s Volumetric flow rate, standard (m ³ /hr)	226,125	217,719	219,662	221,169
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	179,731	172,072	174,077	175,293
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	143,268	140,133	138,886	140,762
Q _a Volumetric flow rate, normal (Nm ³ /hr)	210,707	202,874	204,685	206,089
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	167,477	160,340	162,208	163,342
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	133,499	130,579	129,417	131,165
Sampling Data				
V _{std} Volume metered, standard (dscf)	81.6030	77.6118	77.8510	79.0219
%I Isokinetic sampling (%)	99.4047	98.7511	97.9143	98.6900
Laboratory Data				
m _{filter} Matter collected on filter(s) (g)	0.00010	0.00000	0.00000	
m _s Matter collected in solvent rinse(s) (g)	0.00012	0.00050	0.00040	
m _t Total filterable particulate matter (g)	0.00022	0.00050	0.00040	
n _{NCL} Number of non-detectable fractions	N/A	1 out of 2	1 out of 2	
DLC Detection level classification	ADL	DLL	DLL	
Filterable Particulate Matter Results				
C _{std} Particulate Concentration (lb/dscf)	5.9446E-09	1.4205E-08	1.1329E-08	1.0493E-08
C _{std7} Particulate Concentration @7% O ₂ (lb/dscf)	7.4576E-09	1.7443E-08	1.4200E-08	1.3034E-08
C _{std12} Particulate Concentration @12% CO ₂ (lb/dscf)	7.5249E-09	1.7377E-08	1.3816E-08	1.2906E-08
C _a Particulate Concentration (lb/acf)	3.1970E-09	7.6067E-09	6.0749E-09	5.6262E-09
C _{std} Particulate Concentration (gr/dscf)	0.0000	0.0001	0.0001	0.0001
C _{std7} Particulate Concentration @7% O ₂ (gr/dscf)	0.0001	0.0001	0.0001	0.0001
C _{std12} Particulate Concentration @12% CO ₂ (gr/dscf)	0.0001	0.0001	0.0001	0.0001
C _a Particulate Concentration (gr/acf)	0.0000	0.0001	0.0000	0.0000
C _{std} Particulate Concentration (mg/dscm)	0.0952	0.2275	0.1814	0.1680
C _{std7} Particulate Concentration @7% O ₂ (mg/dscm)	0.1194	0.2793	0.2274	0.2087
C _{std12} Particulate Concentration @12% CO ₂ (mg/dscm)	0.1205	0.2783	0.2212	0.2067
C _a Particulate Concentration (mg/m ³ (actual, wet))	0.0512	0.1218	0.0973	0.0901
C _{std} Particulate Concentration (mg/Nm ³ dry)	0.1022	0.2441	0.1947	0.1803
C _{std7} Particulate Concentration @7% O ₂ (mg/Nm ³ dry)	0.1282	0.2998	0.2440	0.2240
C _{std12} Particulate Concentration @12% CO ₂ (mg/Nm ³ dry)	0.1293	0.2986	0.2374	0.2218
E _{std} Particulate Rate (lb/hr)	0.0377	0.0863	0.0696	0.0646
E _{std7} Particulate Rate (kg/hr)	0.0171	0.0391	0.0316	0.0293
E _{std} Particulate Rate (Ton/yr)	0.1652	0.3780	0.3050	0.2828
E _{Fd} Particulate Rate - F _d -based (lb/MMBtu)	0.0001	0.0003	0.0002	0.0002
E _{Fc} Particulate Rate - F _c -based (lb/MMBtu)	0.0001	0.0003	0.0002	0.0002
E _{Hi} Particulate Rate - Heat Input-based (lb/MMBtu)	N/A	N/A	N/A	
E _{Rp} Particulate Rate - Production-based (lb/Klbs)	0.0002	0.0005	0.0004	0.0004
E _{Rp} Particulate Rate - Production-based (kg/Klbs)	0.0001	0.0002	0.0002	0.0002

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 North 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 23	Mar 23	Mar 23	
Start Time (approx.)	06:34	09:05	11:41	
Stop Time (approx.)	08:45	11:17	13:52	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	184.2	184.4	183.4	184.0
P ₁ Fabric Filter Inlet Temperature (°F)	300	299	300	300
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 %)	9.8200	9.5800	9.8100	9.7367
CO ₂ Carbon dioxide (dry volume %)	9.4800	9.8100	9.8400	9.7100
T _s Sample temperature (°F)	302.6000	301.9600	302.8000	302.4533
B _w Actual water vapor in gas (% by volume)	20.5169	20.9660	20.7522	20.7450
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	196,674	189,108	191,054	192,279
Q _s Volumetric flow rate, standard (scfm)	133,075	128,128	129,271	130,158
Q _{std} Volumetric flow rate, dry standard (dscfm)	105,772	101,264	102,444	103,160
Sampling Data				
V _{std} Volume metered, standard (dscf)	81.6030	77.6118	77.8510	79.0219
%I Isokinetic sampling (%)	99.4047	98.7511	97.9143	98.6900
Laboratory Data				
m _{n-1b} Fraction 1B (µg)	0.0000	0.0000	0.0000	
m _{n-2b} Fraction 2B (µg)	5.5135	4.6403	4.9369	
m _{n-3a} Fraction 3A (µg)	0.0000	0.0000	0.0000	
m _{n-3b} Fraction 3B (µg)	0.0000	0.0000	0.0000	
m _{n-3c} Fraction 3C (µg)	0.0000	0.0000	0.0000	
m _n Total matter corrected for allowable blanks (µg)	5.5135	4.6403	4.9369	
Mercury Results - Total				
C _{sd} Concentration (lb/dscf)	1.4898E-10	1.3184E-10	1.3983E-10	1.4022E-10
C _{sd7} Concentration @7% O ₂ (lb/dscf)	1.8690E-10	1.6188E-10	1.7526E-10	1.7468E-10
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	1.8858E-10	1.6127E-10	1.7053E-10	1.7346E-10
C _a Concentration (lb/acf)	8.0122E-11	7.0595E-11	7.4978E-11	7.5232E-11
C _{sd} Concentration (µg/dscm)	2.3857E+00	2.1112E+00	2.2392E+00	2.2454E+00
C _{sd7} Concentration @7% O ₂ (µg/dscm)	2.9929E+00	2.5923E+00	2.8066E+00	2.7973E+00
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	3.0199E+00	2.5825E+00	2.7307E+00	2.7777E+00
C _{sd} Concentration (mg/dscm)	2.3857E-03	2.1112E-03	2.2392E-03	2.2454E-03
C _{sd7} Concentration @7% O ₂ (mg/dscm)	2.9929E-03	2.5923E-03	2.8066E-03	2.7973E-03
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	3.0199E-03	2.5825E-03	2.7307E-03	2.7777E-03
C _a Concentration (µg/m ³ (actual,wet))	1.2830E+00	1.1305E+00	1.2007E+00	1.2047E+00
C _{sd} Concentration (µg/Nm ³ dry)	2.5603E+00	2.2656E+00	2.4030E+00	2.4097E+00
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	3.2119E+00	2.7820E+00	3.0119E+00	3.0019E+00
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	3.2409E+00	2.7714E+00	2.9305E+00	2.9809E+00
E _{lb/hr} Rate (lb/hr)	9.4548E-04	8.0101E-04	8.5949E-04	8.6866E-04
E _{g/s} Rate (g/s)	1.1911E-04	1.0091E-04	1.0828E-04	1.0943E-04
E _{T/yr} Rate (Ton/yr)	4.1412E-03	3.5084E-03	3.7646E-03	3.8047E-03
E _{Fd} Rate - Fd-based (lb/MMBtu)	2.6894E-06	2.3294E-06	2.5219E-06	2.5136E-06
E _{Fc} Rate - Fc-based (lb/MMBtu)	2.8602E-06	2.4459E-06	2.5863E-06	2.6308E-06

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Wheelabrator North 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 23	Mar 23	Mar 23	
Start Time (approx.)	06:34	09:05	11:41	
Stop Time (approx.)	08:45	11:17	13:52	

Mercury Results - Front Half

C _{sd}	Concentration (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (lb/acf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (µg/m ³ (actual,wet))	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{lb/hr}	Rate (lb/hr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{g/s}	Rate (g/s)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{T/yr}	Rate (Ton/yr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fd}	Rate - Fd-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fc}	Rate - Fc-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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Wheelabrator North 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 23	Mar 23	Mar 23	
Start Time (approx.)	06:34	09:05	11:41	
Stop Time (approx.)	08:45	11:17	13:52	

Mercury Results - Impingers 1-3 Solution

C _{sd}	Concentration (lb/dscf)	1.4898E-10	1.3184E-10	1.3983E-10	1.4022E-10
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	1.8690E-10	1.6188E-10	1.7526E-10	1.7468E-10
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	1.8858E-10	1.6127E-10	1.7053E-10	1.7346E-10
C _a	Concentration (lb/acf)	8.0122E-11	7.0595E-11	7.4978E-11	7.5232E-11
C _{sd}	Concentration (µg/dscm)	2.3857E+00	2.1112E+00	2.2392E+00	2.2454E+00
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	2.9929E+00	2.5923E+00	2.8066E+00	2.7973E+00
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	3.0199E+00	2.5825E+00	2.7307E+00	2.7777E+00
C _{sd}	Concentration (mg/dscm)	2.3857E-03	2.1112E-03	2.2392E-03	2.2454E-03
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	2.9929E-03	2.5923E-03	2.8066E-03	2.7973E-03
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	3.0199E-03	2.5825E-03	2.7307E-03	2.7777E-03
C _a	Concentration (µg/m ³ (actual,wet))	1.2830E+00	1.1305E+00	1.2007E+00	1.2047E+00
C _{sd}	Concentration (µg/Nm ³ dry)	2.5603E+00	2.2656E+00	2.4030E+00	2.4097E+00
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	3.2119E+00	2.7820E+00	3.0119E+00	3.0019E+00
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	3.2409E+00	2.7714E+00	2.9305E+00	2.9809E+00
E _{lb/hr}	Rate (lb/hr)	9.4548E-04	8.0101E-04	8.5949E-04	8.6866E-04
E _{g/s}	Rate (g/s)	1.1911E-04	1.0091E-04	1.0828E-04	1.0943E-04
E _{T/yr}	Rate (Ton/yr)	4.1412E-03	3.5084E-03	3.7646E-03	3.8047E-03
E _{Fd}	Rate - Fd-based (lb/MMBtu)	2.6894E-06	2.3294E-06	2.5219E-06	2.5136E-06
E _{Fc}	Rate - Fc-based (lb/MMBtu)	2.8602E-06	2.4459E-06	2.5863E-06	2.6308E-06

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Wheelabrator North 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 23	Mar 23	Mar 23	
Start Time (approx.)	06:34	09:05	11:41	
Stop Time (approx.)	08:45	11:17	13:52	

Mercury Results - Impinger 4 Solution

C _{sd}	Concentration (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _s	Concentration (lb/acf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _s	Concentration (µg/m ³ (actual,wet))	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{lb/hr}	Rate (lb/hr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{g/s}	Rate (g/s)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{T/yr}	Rate (Ton/yr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fd}	Rate - Fd-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fc}	Rate - Fc-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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Wheelabrator North 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 23	Mar 23	Mar 23	
Start Time (approx.)	06:34	09:05	11:41	
Stop Time (approx.)	08:45	11:17	13:52	

Mercury Results - Filtered Permanganate Solution

C _{sd}	Concentration (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (lb/acf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (µg/m ³ (actual,wet))	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{lb/hr}	Rate (lb/hr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{g/s}	Rate (g/s)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{T/yr}	Rate (Ton/yr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fd}	Rate - Fd-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fc}	Rate - Fc-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Mercury Results - HCl Rinse + HCl/MnO2 Precipitate

C _{sd}	Concentration (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (lb/acf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (µg/m ³ (actual,wet))	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{lb/hr}	Rate (lb/hr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{g/s}	Rate (g/s)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{T/yr}	Rate (Ton/yr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fd}	Rate - Fd-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fc}	Rate - Fc-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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Wheelabrator North 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 23	Mar 23	Mar 23	
Start Time (approx.)	06:34	09:05	11:41	
Stop Time (approx.)	08:45	11:17	13:52	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	184.2	184.4	183.4	184.0
P ₁ Fabric Filter Inlet Temperature (°F)	300	299	300	300
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 %)	9.8200	9.5800	9.8100	9.7367
CO ₂ Carbon dioxide (dry volume %)	9.4800	9.8100	9.8400	9.7100
T _s Sample temperature (°F)	302.6000	301.9600	302.8000	302.4533
B _w Actual water vapor in gas (% by volume)	20.5169	20.9660	20.7522	20.7450
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	196,674	189,108	191,054	192,279
Q _s Volumetric flow rate, standard (scfm)	133,075	128,128	129,271	130,158
Q _{std} Volumetric flow rate, dry standard (dscfm)	105,772	101,264	102,444	103,160
Sampling Data				
V _{std} Volume metered, standard (dscf)	81.6030	77.6118	77.8510	79.0219
%I Isokinetic sampling (%)	99.4047	98.7511	97.9143	98.6900
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)	<1.3511E-12	<1.4205E-12	<1.4162E-12	<1.3959E-12
C _{sd7} Concentration @7% O ₂ (lb/dscf)	<1.6949E-12	<1.7443E-12	<1.7750E-12	<1.7381E-12
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	<1.7102E-12	<1.7377E-12	<1.7270E-12	<1.7250E-12
C _a Concentration (lb/acf)	<7.2660E-13	<7.6067E-13	<7.5936E-13	<7.4888E-13
C _{sd} Concentration (µg/dscm)	<2.1635E-02	<2.2748E-02	<2.2678E-02	<2.2354E-02
C _{sd7} Concentration @7% O ₂ (µg/dscm)	<2.7142E-02	<2.7932E-02	<2.8424E-02	<2.7833E-02
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	<2.7386E-02	<2.7826E-02	<2.7656E-02	<2.7623E-02
C _{sd} Concentration (mg/dscm)	<2.1635E-05	<2.2748E-05	<2.2678E-05	<2.2354E-05
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<2.7142E-05	<2.7932E-05	<2.8424E-05	<2.7833E-05
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	<2.7386E-05	<2.7826E-05	<2.7656E-05	<2.7623E-05
C _a Concentration (µg/m ³ (actual,wet))	<1.1635E-02	<1.2181E-02	<1.2160E-02	<1.1992E-02
C _{sd} Concentration (µg/Nm ³ dry)	<2.3218E-02	<2.4412E-02	<2.4337E-02	<2.3989E-02
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	<2.9128E-02	<2.9976E-02	<3.0504E-02	<2.9869E-02
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	<2.9390E-02	<2.9862E-02	<2.9680E-02	<2.9644E-02
E _{lb/hr} Rate (lb/hr)	<8.5742E-06	<8.6309E-06	<8.7047E-06	<8.6366E-06
E _{g/s} Rate (g/s)	<1.0801E-06	<1.0873E-06	<1.0966E-06	<1.0880E-06
E _{T/yr} Rate (Ton/yr)	<3.7555E-05	<3.7804E-05	<3.8127E-05	<3.7828E-05
E _{Fd} Rate - Fd-based (lb/MMBtu)	<2.4389E-08	<2.5099E-08	<2.5541E-08	<2.5010E-08
E _{Fc} Rate - Fc-based (lb/MMBtu)	<2.5938E-08	<2.6354E-08	<2.6193E-08	<2.6162E-08

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Wheelabrator North 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 23	Mar 23	Mar 23	
Start Time (approx.)	06:34	09:05	11:41	
Stop Time (approx.)	08:45	11:17	13:52	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	184.2	184.4	183.4	184.0
P ₁ Fabric Filter Inlet Temperature (°F)	300	299	300	300
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 %)	9.8200	9.5800	9.8100	9.7367
CO ₂ Carbon dioxide (dry volume %)	9.4800	9.8100	9.8400	9.7100
T _s Sample temperature (°F)	302.6000	301.9600	302.8000	302.4533
B _w Actual water vapor in gas (% by volume)	20.5169	20.9660	20.7522	20.7450
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	196,674	189,108	191,054	192,279
Q _s Volumetric flow rate, standard (scfm)	133,075	128,128	129,271	130,158
Q _{std} Volumetric flow rate, dry standard (dscfm)	105,772	101,264	102,444	103,160
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	81.6030	77.6118	77.8510	79.0219
%I Isokinetic sampling (%)	99.4047	98.7511	97.9143	98.6900
Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	0.2435	0.2097	0.3090	
Cadmium Results - Total				
C _{cd} Concentration (lb/dscf)	6.5783E-12	5.9571E-12	8.7523E-12	7.0959E-12
C _{sd7} Concentration @7% O ₂ (lb/dscf)	8.2526E-12	7.3148E-12	1.0970E-11	8.8458E-12
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	8.3270E-12	7.2870E-12	1.0674E-11	8.7625E-12
C _a Concentration (lb/acf)	3.5378E-12	3.1899E-12	4.6930E-12	3.8069E-12
C _{sd} Concentration (µg/dscm)	1.0534E-01	9.5394E-02	1.4016E-01	1.1363E-01
C _{sd7} Concentration @7% O ₂ (µg/dscm)	1.3215E-01	1.1714E-01	1.7567E-01	1.4165E-01
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	1.3335E-01	1.1669E-01	1.7092E-01	1.4032E-01
C _{sd} Concentration (mg/dscm)	1.0534E-04	9.5394E-05	1.4016E-04	1.1363E-04
C _{sd7} Concentration @7% O ₂ (mg/dscm)	1.3215E-04	1.1714E-04	1.7567E-04	1.4165E-04
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	1.3335E-04	1.1669E-04	1.7092E-04	1.4032E-04
C _a Concentration (µg/m ³ (actual,wet))	5.6654E-02	5.1082E-02	7.5152E-02	6.0963E-02
C _{sd} Concentration (µg/Nm ³ dry)	1.1305E-01	1.0237E-01	1.5041E-01	1.2195E-01
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	1.4182E-01	1.2571E-01	1.8852E-01	1.5202E-01
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	1.4310E-01	1.2523E-01	1.8343E-01	1.5059E-01
E _{lb/hr} Rate (lb/hr)	4.1748E-05	3.6194E-05	5.3798E-05	4.3913E-05
E _{g/s} Rate (g/s)	5.2593E-06	4.5596E-06	6.7772E-06	5.5320E-06
E _{T/yr} Rate (Ton/yr)	1.8286E-04	1.5853E-04	2.3563E-04	1.9234E-04
E _{fd} Rate - Fd-based (lb/MMBtu)	1.1875E-07	1.0526E-07	1.5785E-07	1.2729E-07
E _{fc} Rate - Fc-based (lb/MMBtu)	1.2629E-07	1.1052E-07	1.6188E-07	1.3290E-07

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Wheelabrator North 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 23	Mar 23	Mar 23	
Start Time (approx.)	06:34	09:05	11:41	
Stop Time (approx.)	08:45	11:17	13:52	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	184.2	184.4	183.4	184.0
P ₁ Fabric Filter Inlet Temperature (°F)	300	299	300	300
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 %)	9.8200	9.5800	9.8100	9.7367
CO ₂ Carbon dioxide (dry volume %)	9.4800	9.8100	9.8400	9.7100
T _s Sample temperature (°F)	302.6000	301.9600	302.8000	302.4533
B _w Actual water vapor in gas (% by volume)	20.5169	20.9660	20.7522	20.7450
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	196,674	189,108	191,054	192,279
Q _s Volumetric flow rate, standard (scfm)	133,075	128,128	129,271	130,158
Q _{std} Volumetric flow rate, dry standard (dscfm)	105,772	101,264	102,444	103,160
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	81.6030	77.6118	77.8510	79.0219
%I Isokinetic sampling (%)	99.4047	98.7511	97.9143	98.6900
Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	0.3789	<0.2000	<0.2000	
Lead Results - Total				
C _{sd} Concentration (lb/dscf)	1.0238E-11	<5.6821E-12	<5.6647E-12	<7.1948E-12
C _{sd7} Concentration @7% O ₂ (lb/dscf)	1.2843E-11	<6.9772E-12	<7.1000E-12	<8.9734E-12
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	1.2959E-11	<6.9506E-12	<6.9081E-12	<8.9392E-12
C _a Concentration (lb/acf)	5.5058E-12	<3.0427E-12	<3.0374E-12	<3.8620E-12
C _{sd} Concentration (µg/dscm)	1.6394E-01	<9.0991E-02	<9.0712E-02	<1.1521E-01
C _{sd7} Concentration @7% O ₂ (µg/dscm)	2.0567E-01	<1.1173E-01	<1.1370E-01	<1.4370E-01
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	2.0752E-01	<1.1130E-01	<1.1062E-01	<1.4315E-01
C _{sd} Concentration (mg/dscm)	1.6394E-04	<9.0991E-05	<9.0712E-05	<1.1521E-04
C _{sd7} Concentration @7% O ₂ (mg/dscm)	2.0567E-04	<1.1173E-04	<1.1370E-04	<1.4370E-04
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	2.0752E-04	<1.1130E-04	<1.1062E-04	<1.4315E-04
C _a Concentration (µg/m ³ (actual,wet))	8.8168E-02	<4.8724E-02	<4.8640E-02	<6.1844E-02
C _{sd} Concentration (µg/Nm ³ dry)	1.7594E-01	<9.7649E-02	<9.7349E-02	<1.2364E-01
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	2.2071E-01	<1.1990E-01	<1.2202E-01	<1.5421E-01
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	2.2270E-01	<1.1945E-01	<1.1872E-01	<1.5362E-01
E _{lb/hr} Rate (lb/hr)	6.4971E-05	<3.4524E-05	<3.4819E-05	<4.4771E-05
E _{g/s} Rate (g/s)	8.1848E-06	<4.3492E-06	<4.3863E-06	<5.6401E-06
E _{T/yr} Rate (Ton/yr)	2.8457E-04	<1.5121E-04	<1.5251E-04	<1.9610E-04
E _{Fd} Rate - Fd-based (lb/MMBtu)	1.8481E-07	<1.0040E-07	<1.0216E-07	<1.2912E-07
E _{Fc} Rate - Fc-based (lb/MMBtu)	1.9654E-07	<1.0542E-07	<1.0477E-07	<1.3558E-07

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Wheelabrator North 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 22	Mar 22	Mar 22	
Start Time (approx.)	12:31	14:08	15:39	
Stop Time (approx.)	13:41	15:17	16:47	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9983	0.9983	0.9983	
C _p Pitot tube coefficient	0.8180	0.8180	0.8180	
P _g Static pressure (in. H ₂ O)	-11.0000	-11.0000	-11.2000	
A _s Sample location area (ft ²)	64.0000	64.0000	64.0000	
P _{bar} Barometric pressure (in. Hg)	30.20	30.20	30.20	30.2000
D _n Nozzle diameter (in.)	0.2710	0.2710	0.2710	
O ₂ Oxygen (dry volume %)	9.6100	9.7000	10.2500	9.8533
CO ₂ Carbon dioxide (dry volume %)	10.0000	9.9300	9.6000	9.8433
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.3900	80.3700	80.1500	80.3033
V _{lc} Total Liquid collected (ml)	213.30	229.00	225.60	
V _m Volume metered, meter conditions (ft ³)	38.6850	41.4000	42.3950	
T _m Dry gas meter temperature (°F)	91.0400	97.8600	99.9000	
T _s Sample temperature (°F)	301.2400	300.6000	305.2800	302.3733
ΔH Meter box orifice pressure drop (in. H ₂ O)	1.2068	1.3676	1.4344	
θ Total sampling time (min)	62.5	62.5	62.5	
Flow Results				
V _{watd} Volume of water collected (ft ³)	10.0379	10.7767	10.6167	10.4771
V _{matd} Volume metered, standard (dscf)	37.4456	39.5991	40.4096	39.1514
P _s Sample gas pressure, absolute (in. Hg)	29.3912	29.3912	29.3765	29.3863
P _v Vapor pressure, actual (in. Hg)	29.3912	29.3912	29.3765	29.3863
B _{wo} Moisture measured in sample (% by volume)	21.1398	21.3927	20.8064	21.1129
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	21.1398	21.3927	20.8064	21.1129
√ΔP Velocity head (√in. H ₂ O)	0.7054	0.7296	0.7487	0.7279
M _d MW of sample gas, dry (lb/lb-mole)	29.9844	29.9768	29.9460	29.9691
M _s MW of sample gas, wet (lb/lb-mole)	27.4509	27.4146	27.4605	27.4420
V _s Velocity of sample (ft/sec)	47.9127	49.5713	50.9981	49.4941
%I Isokinetic sampling (%)	96.8906	99.2698	98.3891	98.1832
Q _a Volumetric flow rate, actual (acfm)	183,985	190,354	195,833	190,057
Q _s Volumetric flow rate, standard (scfm)	125,357	129,806	132,659	129,274
Q _{std} Volumetric flow rate, dry standard (dscfm)	98,857	102,037	105,058	101,984
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	80,295	82,217	80,494	81,002
Q _a Volumetric flow rate, actual (acf/hr)	11,039,096	11,421,226	11,749,972	11,403,431
Q _s Volumetric flow rate, standard (scf/hr)	7,521,444	7,788,355	7,959,548	7,756,449
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	5,931,427	6,122,217	6,303,455	6,119,033
Q _a Volumetric flow rate, actual (m ³ /hr)	312,634	323,456	332,766	322,952
Q _s Volumetric flow rate, standard (m ³ /hr)	213,012	220,571	225,419	219,667
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	167,982	173,385	178,518	173,295
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	136,440	139,706	136,778	137,641
Q _a Volumetric flow rate, normal (Nm ³ /hr)	198,488	205,532	210,050	204,690
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	156,528	161,563	166,346	161,479
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	127,137	130,180	127,452	128,256

Comments:

Average includes 3 runs.

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Wheelabrator North 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 22	Mar 22	Mar 22	
Start Time (approx.)	12:31	14:08	15:39	
Stop Time (approx.)	13:41	15:17	16:47	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	184.2	182.9	182.4	183.2
P ₁ Fabric Filter Inlet Temperature (°F)	299	299	305	301
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	9.7000	10.2500	9.8533
CO ₂ Carbon dioxide (dry volume %)	10.0000	9.9300	9.6000	9.8433
T _s Sample temperature (°F)	301.2400	300.6000	305.2800	302.3733
B _v Actual water vapor in gas (% by volume)	21.1398	21.3927	20.8064	21.1129
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	183,985	190,354	195,833	190,057
Q _s Volumetric flow rate, standard (scfm)	125,357	129,806	132,659	129,274
Q _{std} Volumetric flow rate, dry standard (dscfm)	98,857	102,037	105,058	101,984
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	80,295	82,217	80,494	81,002
Q _a Volumetric flow rate, actual (act/hr)	11,039,096	11,421,226	11,749,972	11,403,431
Q _s Volumetric flow rate, standard (scf/hr)	7,521,444	7,788,355	7,959,548	7,756,449
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	5,931,427	6,122,217	6,303,455	6,119,033
Q _a Volumetric flow rate, actual (m ³ /hr)	312,634	323,456	332,766	322,952
Q _s Volumetric flow rate, standard (m ³ /hr)	213,012	220,571	225,419	219,667
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	167,982	173,385	178,518	173,295
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	136,440	139,706	136,778	137,641
Q _a Volumetric flow rate, normal (Nm ³ /hr)	198,488	205,532	210,050	204,690
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	156,528	161,563	166,346	161,479
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	127,137	130,180	127,452	128,256
Sampling Data				
V _{std} Volume metered, standard (dscf)	37.4456	39.5991	40.4096	39.1514
%I Isokinetic sampling (%)	96.8906	99.2698	98.3891	98.1832
Laboratory Data				
m _n Total HF collected (mg)	<0.0460	<0.0506	<0.0435	
Hydrogen Fluoride (HF) Results				
C _{sd} HF Concentration (lb/dscf)	<2.7103E-09	<2.8164E-09	<2.3711E-09	<2.6326E-09
C _{sd7} HF Concentration @7% O ₂ (lb/dscf)	<3.3369E-09	<3.4954E-09	<3.0946E-09	<3.3090E-09
C _{sd12} HF Concentration @12% CO ₂ (lb/dscf)	<3.2524E-09	<3.4036E-09	<2.9638E-09	<3.2066E-09
C _a HF Concentration (lb/acf)	<1.4563E-09	<1.5097E-09	<1.2720E-09	<1.4127E-09
C _{sd} HF Concentration (ppmdv)	<0.0522	<0.0543	<0.0457	<0.0507
C _{sd7} HF Concentration @7% O ₂ (ppmdv)	<0.0643	<0.0674	<0.0596	<0.0638
C _{sd12} HF Concentration @12% CO ₂ (ppmdv)	<0.0627	<0.0656	<0.0571	<0.0618
C _w HF Concentration (ppmwv)	<0.0412	<0.0427	<0.0362	<0.0400
C _{sd} HF Concentration (mg/dscm)	<0.0434	<0.0451	<0.0380	<0.0422
C _{sd7} HF Concentration @7% O ₂ (mg/dscm)	<0.0534	<0.0560	<0.0496	<0.0530
C _{sd12} HF Concentration @12% CO ₂ (mg/dscm)	<0.0521	<0.0545	<0.0475	<0.0513
C _a HF Concentration (mg/m ³ (actual,wet))	<0.0233	<0.0242	<0.0204	<0.0226
C _{sd} HF Concentration (mg/Nm ³ dry)	<0.0466	<0.0484	<0.0407	<0.0452
C _{sd7} HF Concentration @7% O ₂ (mg/Nm ³ dry)	<0.0573	<0.0601	<0.0532	<0.0569
C _{sd12} HF Concentration @12% CO ₂ (mg/Nm ³ dry)	<0.0559	<0.0585	<0.0509	<0.0551
E _{lb/hr} HF Rate (lb/hr)	<0.0161	<0.0172	<0.0149	<0.0161
E _{kg/hr} HF Rate (kg/hr)	<0.0073	<0.0078	<0.0068	<0.0073
E _{T/yr} HF Rate (Ton/yr)	<0.0704	<0.0755	<0.0655	<0.0705
E _{Fd} HF Rate - Fd-based (lb/MMBtu)	<0.000049	<0.000051	<0.000045	<0.000049
E _{Fc} HF Rate - Fc-based (lb/MMBtu)	<0.000049	<0.000052	<0.000045	<0.000049

Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 1 SDA Inlet

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

Run No.	1	2	3	Average
Date (2011)	Mar 22	Mar 22	Mar 22	
Start Time (approx.)	07:36	09:40	11:02	
Stop Time (approx.)	08:36	10:40	12:02	
Sampling Conditions				
Y_d Dry gas meter correction factor	0.9882	0.9882	0.9882	
P_g Static pressure (in. H ₂ O)	-2.1000	-2.1000	-2.1000	
A_s Sample location area (ft ²)	60.1320	60.1320	60.1320	
P_{bar} Barometric pressure (in. Hg)	30.20	30.20	30.20	30.2000
O_2 Oxygen (dry volume %)	9.7600	8.9700	8.8400	9.1900
CO_2 Carbon dioxide (dry volume %)	9.7300	10.4400	10.6300	10.2667
N_2+CO Nitrogen plus carbon monoxide (dry volume %)	80.5100	80.5900	80.5300	80.5433
V_{lc} Total Liquid collected (ml)	160.80	152.80	148.00	
V_m Volume metered, meter conditions (ft ³)	35.8900	36.2250	36.1250	
T_m Dry gas meter temperature (°F)	78.5417	85.4583	84.4583	
T_s Sample temperature (°F)	502.7500	496.5000	494.9167	498.0556
ΔH Meter box orifice pressure drop (in. H ₂ O)	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)	7.5672	7.1908	6.9649	7.2410
V_{mstd} Volume metered, standard (dscf)	35.1861	35.0642	35.0317	35.0940
P_s Sample gas pressure, absolute (in. Hg)	30.0456	30.0456	30.0456	30.0456
P_v Vapor pressure, actual (in. Hg)	30.0456	30.0456	30.0456	30.0456
B_{wo} Moisture measured in sample (% by volume)	17.6998	17.0176	16.5844	17.1006
B_{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B_w Actual water vapor in gas (% by volume)	17.6998	17.0176	16.5844	17.1006
$\sqrt{\Delta P}$ Velocity head ($\sqrt{\text{in. H}_2\text{O}}$)	0.0000	0.0000	0.0000	0.0000
M_d MW of sample gas, dry (lb/lb-mole)	29.9472	30.0292	30.0544	30.0103
M_s MW of sample gas, wet (lb/lb-mole)	27.8326	27.9821	28.0552	27.9566

Comments:

Average includes 3 runs.

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 1 SDA Inlet

USEPA Method 26A HCl Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 22	Mar 22	Mar 22	
Start Time (approx.)	07:36	09:40	11:02	
Stop Time (approx.)	08:36	10:40	12:02	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	184.1	184.9	183.8	184.3
P ₁ Fabric Filter Inlet Temperature (°F)	304	303	303	303
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 %)	9.7600	8.9700	8.8400	9.1900
CO ₂ Carbon dioxide (dry volume %)	9.7300	10.4400	10.6300	10.2667
T _s Sample temperature (°F)	502.7500	496.5000	494.9167	498.0556
B _w Actual water vapor in gas (% by volume)	17.6998	17.0176	16.5844	17.1006
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	35.1861	35.0642	35.0317	35.0940
Laboratory Data				
m _n Total HCl collected (mg)	477.8743	499.1553	582.7197	
Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (lb/dscf)	2.9947E-05	3.1389E-05	3.6678E-05	3.2671E-05
C _{sd7} HCl Concentration @7% O ₂ (lb/dscf)	3.7366E-05	3.6572E-05	4.2274E-05	3.8738E-05
C _{sd12} HCl Concentration @12% CO ₂ (lb/dscf)	3.6933E-05	3.6080E-05	4.1405E-05	3.8139E-05
C _{sd} HCl Concentration (ppmdv)	316.6157	331.8653	387.7836	345.4215
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	395.0591	386.6662	446.9479	409.5577
C _{sd12} HCl Concentration @12% CO ₂ (ppmdv)	390.4819	381.4544	437.7614	403.2325
C _w HCl Concentration (ppmwv)	260.5755	275.3899	323.4720	286.4791
C _{sd} HCl Concentration (mg/dscm)	479.5565	502.6541	587.3498	523.1868
C _{sd7} HCl Concentration @7% O ₂ (mg/dscm)	598.3695	585.6573	676.9620	620.3296
C _{sd12} HCl Concentration @12% CO ₂ (mg/dscm)	591.4366	577.7633	663.0477	610.7492
C _{sd} HCl Concentration (mg/Nm ³ dry)	514.6460	539.4336	630.3266	561.4688
C _{sd7} HCl Concentration @7% O ₂ (mg/Nm ³ dry)	642.1526	628.5103	726.4958	665.7196
C _{sd12} HCl Concentration @12% CO ₂ (mg/Nm ³ dry)	634.7125	620.0387	711.5634	655.4382
E _{Fd} HCl Rate - F _d -based (lb/MMBtu)	0.5478	0.5362	0.6197	0.5679
E _{Fc} HCl Rate - F _c -based (lb/MMBtu)	0.5602	0.5472	0.6280	0.5784

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

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

Run No.	1	2	3	Average
Date (2011)	Mar 22	Mar 22	Mar 22	
Start Time (approx.)	07:36	09:40	11:02	
Stop Time (approx.)	08:36	10:40	12:02	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9847	0.9847	0.9847	
P _g Static pressure (in. H ₂ O)	-11.4000	-11.5000	-11.0000	
A _s Sample location area (ft ²)	64.0000	64.0000	64.0000	
P _{bar} Barometric pressure (in. Hg)	30.20	30.20	30.20	30.2000
O ₂ Oxygen (dry volume %)	10.1300	9.0800	9.1600	9.4567
CO ₂ Carbon dioxide (dry volume %)	9.4200	10.3400	10.3400	10.0333
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.4500	80.5800	80.5000	80.5100
V _{lc} Total Liquid collected (ml)	238.20	241.30	233.00	
V _m Volume metered, meter conditions (ft ³)	41.6150	42.2450	41.9050	
T _m Dry gas meter temperature (°F)	74.8750	87.6250	89.4583	
T _s Sample temperature (°F)	307.6667	307.3333	306.1667	307.0556
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)	11.2097	11.3556	10.9650	11.1768
V _{mstd} Volume metered, standard (dscf)	40.9629	40.6148	40.1535	40.5771
P _s Sample gas pressure, absolute (in. Hg)	29.3618	29.3544	29.3912	29.3691
P _v Vapor pressure, actual (in. Hg)	29.3618	29.3544	29.3912	29.3691
B _{wc} Moisture measured in sample (% by volume)	21.4858	21.8501	21.4501	21.5953
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	21.4858	21.8501	21.4501	21.5953
M _d MW of sample gas, dry (lb/lb-mole)	29.9124	30.0176	30.0208	29.9836
M _s MW of sample gas, wet (lb/lb-mole)	27.3529	27.3917	27.4423	27.3957

Comments:

Average includes 3 runs.

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

USEPA Method 26A HCl Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 22	Mar 22	Mar 22	
Start Time (approx.)	07:36	09:40	11:02	
Stop Time (approx.)	08:36	10:40	12:02	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	184.1	184.9	183.8	184.3
P ₁ Fabric Filter Inlet Temperature (°F)	304	303	303	303
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 %)	10.1300	9.0800	9.1600	9.4567
CO ₂ Carbon dioxide (dry volume %)	9.4200	10.3400	10.3400	10.0333
T _s Sample temperature (°F)	307.6667	307.3333	306.1667	307.0556
B _w Actual water vapor in gas (% by volume)	21.4858	21.8501	21.4501	21.5953
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	40.9629	40.6148	40.1535	40.5771
Laboratory Data				
m _n Total HCl collected (mg)	23.3224	29.1139	24.0399	
Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (lb/dscf)	1.2554E-06	1.5806E-06	1.3201E-06	1.3854E-06
C _{sd7} HCl Concentration @7% O ₂ (lb/dscf)	1.6203E-06	1.8588E-06	1.5630E-06	1.6807E-06
C _{sd12} HCl Concentration @12% CO ₂ (lb/dscf)	1.5993E-06	1.8344E-06	1.5321E-06	1.6552E-06
C _{sd} HCl Concentration (ppmdv)	13.2732	16.7111	13.9572	14.6472
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	17.1306	19.6518	16.5252	17.7692
C _{sd12} HCl Concentration @12% CO ₂ (ppmdv)	16.9085	19.3939	16.1979	17.5001
C _w HCl Concentration (ppmwv)	10.4213	13.0597	10.9634	11.4815
C _{sd} HCl Concentration (mg/dscm)	20.1040	25.3112	21.1401	22.1851
C _{sd7} HCl Concentration @7% O ₂ (mg/dscm)	25.9466	29.7653	25.0296	26.9138
C _{sd12} HCl Concentration @12% CO ₂ (mg/dscm)	25.6101	29.3747	24.5339	26.5063
C _{sd} HCl Concentration (mg/Nm ³ dry)	21.5750	27.1632	22.6869	23.8084
C _{sd7} HCl Concentration @7% O ₂ (mg/Nm ³ dry)	27.8451	31.9432	26.8610	28.8831
C _{sd12} HCl Concentration @12% CO ₂ (mg/Nm ³ dry)	27.4840	31.5241	26.3291	28.4457
E _{fd} HCl Rate - Fd-based (lb/MMBtu)	0.0238	0.0272	0.0229	0.0246
E _{fc} HCl Rate - Fc-based (lb/MMBtu)	0.0243	0.0278	0.0232	0.0251

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Wheelabrator North 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 24	Mar 24	Mar 24	
Start Time (approx.)	06:28	08:53	11:19	
Stop Time (approx.)	08:38	11:03	14:30	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9837	0.9837	0.9837	
C _p Pitot tube coefficient	0.8300	0.8300	0.8300	
P _g Static pressure (in. H ₂ O)	-10.8000	-10.6000	-11.1000	
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 %)	8.1300	8.2800	7.6200	8.0100
CO ₂ Carbon dioxide (dry volume %)	11.0900	11.0200	11.6100	11.2400
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.7800	80.7000	80.7700	80.7500
V _{lc} Total Liquid collected (ml)	377.50	403.80	392.30	
V _m Volume metered, meter conditions (ft ³)	65.7000	70.7250	68.4700	
T _m Dry gas meter temperature (°F)	71.5000	80.8600	91.5400	
T _s Sample temperature (°F)	305.2400	306.4000	305.6400	305.7600
ΔH Meter box orifice pressure drop (in. H ₂ O)	0.8724	1.0020	0.9208	
θ Total sampling time (min)	125.0	125.0	125.0	
Flow Results				
V _{wstd} Volume of water collected (ft ³)	17.7652	19.0028	18.4616	18.4099
V _{mstd} Volume metered, standard (dscf)	64.4870	68.2395	64.7716	65.8327
P _s Sample gas pressure, absolute (in. Hg)	29.2059	29.2206	29.1838	29.2034
P _v Vapor pressure, actual (in. Hg)	29.2059	29.2206	29.1838	29.2034
B _{w0} Moisture measured in sample (% by volume)	21.5984	21.7817	22.1806	21.8536
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	21.5984	21.7817	22.1806	21.8536
√ΔP Velocity head (√in. H ₂ O)	0.5717	0.6126	0.5863	0.5902
M _d MW of sample gas, dry (lb/lb-mole)	30.0996	30.0944	30.1624	30.1188
M _s MW of sample gas, wet (lb/lb-mole)	27.4863	27.4600	27.4647	27.4703
V _s Velocity of sample (ft/sec)	39.6089	42.4828	40.6601	40.9173
%I Isokinetic sampling (%)	103.4544	102.4112	102.1122	102.6592
Q _a Volumetric flow rate, actual (acfm)	152,098	163,134	156,135	157,122
Q _s Volumetric flow rate, standard (scfm)	102,440	109,762	105,024	105,742
Q _{std} Volumetric flow rate, dry standard (dscfm)	80,314	85,854	81,729	82,632
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	73,785	77,948	78,084	76,606
Q _a Volumetric flow rate, actual (acf/hr)	9,125,889	9,788,042	9,368,094	9,427,342
Q _s Volumetric flow rate, standard (scf/hr)	6,146,391	6,585,695	6,301,460	6,344,515
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	4,818,869	5,151,221	4,903,758	4,957,949
Q _a Volumetric flow rate, actual (m ³ /hr)	258,451	277,203	265,310	266,988
Q _s Volumetric flow rate, standard (m ³ /hr)	174,069	186,511	178,461	179,680
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	136,473	145,886	138,877	140,412
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	125,379	132,452	132,683	130,171
Q _s Volumetric flow rate, normal (Nm ³ /hr)	162,201	173,794	166,293	167,429
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	127,168	135,939	129,408	130,838
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	116,830	123,421	123,636	121,296

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 24	Mar 24	Mar 24	
Start Time (approx.)	06:28	08:53	11:19	
Stop Time (approx.)	08:38	11:03	14:30	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	183.3	184.1	184.1	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	293	295	294	294
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 %)	8.1300	8.2800	7.6200	8.0100
CO ₂ Carbon dioxide (dry volume %)	11.0900	11.0200	11.6100	11.2400
T _s Sample temperature (°F)	305.2400	306.4000	305.6400	305.7600
B _w Actual water vapor in gas (% by volume)	21.5984	21.7817	22.1806	21.8536
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	152,098	163,134	156,135	157,122
Q _s Volumetric flow rate, standard (scfm)	102,440	109,762	105,024	105,742
Q _{std} Volumetric flow rate, dry standard (dscfm)	80,314	85,854	81,729	82,632
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	73,785	77,948	78,084	76,606
Q _a Volumetric flow rate, actual (acf/hr)	9,125,889	9,788,042	9,368,094	9,427,342
Q _s Volumetric flow rate, standard (scf/hr)	6,146,391	6,585,695	6,301,460	6,344,515
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	4,818,869	5,151,221	4,903,758	4,957,949
Q _a Volumetric flow rate, actual (m ³ /hr)	258,451	277,203	265,310	266,988
Q _s Volumetric flow rate, standard (m ³ /hr)	174,089	186,511	178,461	179,660
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	136,473	145,886	138,877	140,412
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	125,379	132,452	132,683	130,171
Q _t Volumetric flow rate, normal (Nm ³ /hr)	162,201	173,794	166,293	167,429
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	127,168	135,939	129,408	130,838
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	116,830	123,421	123,638	121,296
Sampling Data				
V _{std} Volume metered, standard (dscf)	64.4870	68.2395	64.7716	65.8327
%I Isokinetic sampling (%)	103.4544	102.4112	102.1122	102.6592
Laboratory Data				
m _{filter} Matter collected on filter(s) (g)	0.00000	0.00000	0.00000	
m _a Matter collected in solvent rinse(s) (g)	0.00160	0.00000	0.00200	
m _n Total filterable particulate matter (g)	0.00160	0.00020	0.00200	
n _{MDL} Number of non-detectable fractions	1 out of 2	2 out of 2	1 out of 2	
DLC Detection level classification	DLL	BDL	DLL	
Filterable Particulate Matter Results				
C _{std} Particulate Concentration (lb/dscf)	5.4709E-08	<6.4625E-09	6.8085E-08	<4.3086E-08
C _{std7} Particulate Concentration @7% O ₂ (lb/dscf)	5.9550E-08	<7.1180E-09	7.1264E-08	<4.5977E-08
C _{std12} Particulate Concentration @12% CO ₂ (lb/dscf)	5.9198E-08	<7.0372E-09	7.0372E-08	<4.5536E-08
C _a Particulate Concentration (lb/acf)	2.8889E-08	<3.4011E-09	3.5639E-08	<2.2643E-08
C _{std} Particulate Concentration (gr/dscf)	0.0004	<0.00005	0.0005	<0.0003
C _{std7} Particulate Concentration @7% O ₂ (gr/dscf)	0.0004	<0.00005	0.0005	<0.0003
C _{std12} Particulate Concentration @12% CO ₂ (gr/dscf)	0.0004	<0.00005	0.0005	<0.0003
C _a Particulate Concentration (gr/acf)	0.0002	<0.00002	0.0002	<0.0002
C _{std} Particulate Concentration (mg/dscm)	0.8761	<0.1035	1.0903	<0.6900
C _{std7} Particulate Concentration @7% O ₂ (mg/dscm)	0.9536	<0.1140	1.1412	<0.7363
C _{std12} Particulate Concentration @12% CO ₂ (mg/dscm)	0.9480	<0.1127	1.1269	<0.7292
C _a Particulate Concentration (mg/m ³ (actual, wet))	0.4626	<0.0545	0.5707	<0.3626
C _{std} Particulate Concentration (mg/Nm ³ dry)	0.9402	<0.1111	1.1701	<0.7404
C _{std7} Particulate Concentration @7% O ₂ (mg/Nm ³ dry)	1.0234	<0.1223	1.2247	<0.7901
C _{std12} Particulate Concentration @12% CO ₂ (mg/Nm ³ dry)	1.0173	<0.1209	1.2084	<0.7825
E _{lb/hr} Particulate Rate (lb/hr)	0.2636	<0.0333	0.3339	<0.2103
E _{kg/hr} Particulate Rate (kg/hr)	0.1196	<0.0151	0.1514	<0.0954
E _{ton/yr} Particulate Rate (Ton/yr)	1.1547	<0.1458	1.4624	<0.9210
E _{std} Particulate Rate - F _d -based (lb/MMBtu)	0.0009	<0.0001	0.0010	<0.0007
E _{std} Particulate Rate - F _c -based (lb/MMBtu)	0.0009	<0.0001	0.0011	<0.0007

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

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Wheelabrator North 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 24	Mar 24	Mar 24	
Start Time (approx.)		06:28	08:53	11:19	
Stop Time (approx.)		08:38	11:03	14:30	
Process Conditions					
R _p	Steam Production Rate (Klbs/hr)	183.3	184.1	184.1	183.8
P ₁	Fabric Filter Inlet Temperature (°F)	293	295	294	294
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 %)	8.1300	8.2800	7.6200	8.0100
CO ₂	Carbon dioxide (dry volume %)	11.0900	11.0200	11.6100	11.2400
T _s	Sample temperature (°F)	305.2400	306.4000	305.6400	305.7600
B _w	Actual water vapor in gas (% by volume)	21.5984	21.7817	22.1806	21.8536
Gas Flow Rate					
Q _a	Volumetric flow rate, actual (acfm)	152,098	163,134	156,135	157,122
Q _s	Volumetric flow rate, standard (scfm)	102,440	109,762	105,024	105,742
Q _{std}	Volumetric flow rate, dry standard (dscfm)	80,314	85,854	81,729	82,632
Sampling Data					
V _{mstd}	Volume metered, standard (dscf)	64.4870	68.2395	64.7716	65.8327
%I	Isokinetic sampling (%)	103.4544	102.4112	102.1122	102.6592
Laboratory Data					
m _{n-1b}	Fraction 1B (µg)	0.0000	0.0000	0.0000	0.0000
m _{n-2b}	Fraction 2B (µg)	7.0725	6.3602	6.2891	6.5739
m _{n-3a}	Fraction 3A (µg)	0.0000	0.0000	0.0000	0.0000
m _{n-3b}	Fraction 3B (µg)	0.0000	0.0000	0.0000	0.0000
m _{n-3c}	Fraction 3C (µg)	0.0000	0.0000	0.0000	0.0000
m _n	Total matter corrected for allowable blanks (µg)	7.0725	6.3602	6.2891	6.5739
Mercury Results - Total					
C _{sd}	Concentration (lb/dscf)	2.4183E-10	2.0551E-10	2.1410E-10	2.2048E-10
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	2.6323E-10	2.2636E-10	2.2409E-10	2.3789E-10
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	2.6167E-10	2.2379E-10	2.2129E-10	2.3558E-10
C _a	Concentration (lb/acf)	1.2770E-10	1.0816E-10	1.1207E-10	1.1597E-10
C _{sd}	Concentration (µg/dscm)	3.8726E+00	3.2910E+00	3.4285E+00	3.5307E+00
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	4.2152E+00	3.6248E+00	3.5885E+00	3.8095E+00
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	4.1903E+00	3.5837E+00	3.5436E+00	3.7726E+00
C _{sd}	Concentration (mg/dscm)	3.8726E-03	3.2910E-03	3.4285E-03	3.5307E-03
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	4.2152E-03	3.6248E-03	3.5885E-03	3.8095E-03
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	4.1903E-03	3.5837E-03	3.5436E-03	3.7726E-03
C _a	Concentration (µg/m ³ (actual,wet))	2.0449E+00	1.7320E+00	1.7946E+00	1.8572E+00
C _{sd}	Concentration (µg/Nm ³ dry)	4.1559E+00	3.5318E+00	3.6793E+00	3.7890E+00
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	4.5237E+00	3.8901E+00	3.8511E+00	4.0883E+00
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	4.4969E+00	3.8459E+00	3.8029E+00	4.0486E+00
E _{lb/hr}	Rate (lb/hr)	1.1653E-03	1.0587E-03	1.0499E-03	1.0913E-03
E _{g/s}	Rate (g/s)	1.4681E-04	1.3337E-04	1.3226E-04	1.3748E-04
E _{T/yr}	Rate (Ton/yr)	5.1042E-03	4.6369E-03	4.5985E-03	4.7799E-03
E _{Fd}	Rate - Fd-based (lb/MMBtu)	3.7877E-06	3.2572E-06	3.2246E-06	3.4231E-06
E _{Fc}	Rate - Fc-based (lb/MMBtu)	3.9687E-06	3.3942E-06	3.3562E-06	3.5730E-06

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Wheelabrator North 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 24	Mar 24	Mar 24	
Start Time (approx.)	06:28	08:53	11:19	
Stop Time (approx.)	08:38	11:03	14:30	

Mercury Results - Front Half

C _{sd}	Concentration (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (lb/acf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (µg/m ³ (actual,wet))	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{lb/hr}	Rate (lb/hr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{g/s}	Rate (g/s)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{T/yr}	Rate (Ton/yr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fd}	Rate - Fd-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fc}	Rate - Fc-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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Wheelabrator North 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 24	Mar 24	Mar 24	
Start Time (approx.)	06:28	08:53	11:19	
Stop Time (approx.)	08:38	11:03	14:30	

Mercury Results - Impingers 1-3 Solution

C _{sd}	Concentration (lb/dscf)	2.4183E-10	2.0551E-10	2.1410E-10	2.2048E-10
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	2.6323E-10	2.2636E-10	2.2409E-10	2.3789E-10
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	2.6167E-10	2.2379E-10	2.2129E-10	2.3558E-10
C _a	Concentration (lb/acf)	1.2770E-10	1.0816E-10	1.1207E-10	1.1597E-10
C _{sd}	Concentration (µg/dscm)	3.8726E+00	3.2910E+00	3.4285E+00	3.5307E+00
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	4.2152E+00	3.6248E+00	3.5885E+00	3.8095E+00
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	4.1903E+00	3.5837E+00	3.5436E+00	3.7726E+00
C _{sd}	Concentration (mg/dscm)	3.8726E-03	3.2910E-03	3.4285E-03	3.5307E-03
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	4.2152E-03	3.6248E-03	3.5885E-03	3.8095E-03
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	4.1903E-03	3.5837E-03	3.5436E-03	3.7726E-03
C _a	Concentration (µg/m ³ (actual,wet))	2.0449E+00	1.7320E+00	1.7946E+00	1.8572E+00
C _{sd}	Concentration (µg/Nm ³ dry)	4.1559E+00	3.5318E+00	3.6793E+00	3.7890E+00
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	4.5237E+00	3.8901E+00	3.8511E+00	4.0883E+00
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	4.4969E+00	3.8459E+00	3.8029E+00	4.0486E+00
E _{lb/hr}	Rate (lb/hr)	1.1653E-03	1.0587E-03	1.0499E-03	1.0913E-03
E _{g/s}	Rate (g/s)	1.4681E-04	1.3337E-04	1.3226E-04	1.3748E-04
E _{T/yr}	Rate (Ton/yr)	5.1042E-03	4.6369E-03	4.5985E-03	4.7799E-03
E _{Fd}	Rate - Fd-based (lb/MMBtu)	3.7877E-06	3.2572E-06	3.2246E-06	3.4231E-06
E _{Fc}	Rate - Fc-based (lb/MMBtu)	3.9687E-06	3.3942E-06	3.3562E-06	3.5730E-06

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Wheelabrator North 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 24	Mar 24	Mar 24	
Start Time (approx.)	06:28	08:53	11:19	
Stop Time (approx.)	08:38	11:03	14:30	

Mercury Results - Impinger 4 Solution

C _{sd}	Concentration (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (lb/acf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (µg/m ³ (actual,wet))	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{lb/hr}	Rate (lb/hr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{g/s}	Rate (g/s)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{T/yr}	Rate (Ton/yr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fd}	Rate - Fd-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fc}	Rate - Fc-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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Wheelabrator North 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 24	Mar 24	Mar 24	
Start Time (approx.)	06:28	08:53	11:19	
Stop Time (approx.)	08:38	11:03	14:30	

Mercury Results - Filtered Permanganate Solution

C _{sd}	Concentration (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (lb/acf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (µg/m ³ (actual,wet))	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{lb/hr}	Rate (lb/hr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{g/s}	Rate (g/s)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{T/yr}	Rate (Ton/yr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fd}	Rate - Fd-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fc}	Rate - Fc-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Mercury Results - HCl Rinse + HCl/MnO₂ Precipitate

C _{sd}	Concentration (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (lb/acf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (µg/m ³ (actual,wet))	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{lb/hr}	Rate (lb/hr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{g/s}	Rate (g/s)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{T/yr}	Rate (Ton/yr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fd}	Rate - Fd-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fc}	Rate - Fc-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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Wheelabrator North 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 24	Mar 24	Mar 24	
Start Time (approx.)	06:28	08:53	11:19	
Stop Time (approx.)	08:38	11:03	14:30	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	183.3	184.1	184.1	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	293	295	294	294
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 %)	8.1300	8.2800	7.6200	8.0100
CO ₂ Carbon dioxide (dry volume %)	11.0900	11.0200	11.6100	11.2400
T _s Sample temperature (°F)	305.2400	306.4000	305.6400	305.7600
B _w Actual water vapor in gas (% by volume)	21.5984	21.7817	22.1806	21.8536
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	152,098	163,134	156,135	157,122
Q _s Volumetric flow rate, standard (scfm)	102,440	109,762	105,024	105,742
Q _{std} Volumetric flow rate, dry standard (dscfm)	80,314	85,854	81,729	82,632
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	64.4870	68.2395	64.7716	65.8327
%I Isokinetic sampling (%)	103.4544	102.4112	102.1122	102.6592
Laboratory Data				
m _F Combined front/back corrected for blank (µg)	<0.0500	<0.0500	<0.0500	<0.0500
m _B Back half corrected for allowable blank (µg)	0.0000	0.0000	0.0000	0.0000
m _n Total matter corrected for allowable blanks (µg)	<0.0500	<0.0500	<0.0500	<0.0500
Beryllium Results - Total				
C _{sd} Concentration (lb/dscf)	<1.7096E-12	<1.6156E-12	<1.7021E-12	<1.6758E-12
C _{sd7} Concentration @7% O ₂ (lb/dscf)	<1.8609E-12	<1.7795E-12	<1.7816E-12	<1.8073E-12
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	<1.8499E-12	<1.7593E-12	<1.7593E-12	<1.7895E-12
C _a Concentration (lb/acf)	<9.0277E-13	<8.5027E-13	<8.9099E-13	<8.8134E-13
C _{sd} Concentration (µg/dscm)	<2.7378E-02	<2.5872E-02	<2.7257E-02	<2.6836E-02
C _{sd7} Concentration @7% O ₂ (µg/dscm)	<2.9800E-02	<2.8496E-02	<2.8530E-02	<2.8942E-02
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	<2.9624E-02	<2.8173E-02	<2.8173E-02	<2.8657E-02
C _{sd} Concentration (mg/dscm)	<2.7378E-05	<2.5872E-05	<2.7257E-05	<2.6836E-05
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<2.9800E-05	<2.8496E-05	<2.8530E-05	<2.8942E-05
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	<2.9624E-05	<2.8173E-05	<2.8173E-05	<2.8657E-05
C _a Concentration (µg/m ³ (actual, wet))	<1.4457E-02	<1.3616E-02	<1.4268E-02	<1.4113E-02
C _{sd} Concentration (µg/Nm ³ dry)	<2.9381E-02	<2.7765E-02	<2.9252E-02	<2.8799E-02
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	<3.1981E-02	<3.0581E-02	<3.0617E-02	<3.1060E-02
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	<3.1792E-02	<3.0234E-02	<3.0234E-02	<3.0753E-02
E _{lb/hr} Rate (lb/hr)	<8.2386E-06	<8.3225E-06	<8.3469E-06	<8.3026E-06
E _{g/s} Rate (g/s)	<1.0379E-06	<1.0484E-06	<1.0515E-06	<1.0459E-06
E _{T/yr} Rate (Ton/yr)	<3.6085E-05	<3.6452E-05	<3.6559E-05	<3.6366E-05
E _{Fd} Rate - Fd-based (lb/MMBtu)	<2.6778E-08	<2.5606E-08	<2.5636E-08	<2.6007E-08
E _{Fc} Rate - Fc-based (lb/MMBtu)	<2.8057E-08	<2.6683E-08	<2.6683E-08	<2.7141E-08

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Wheelabrator North 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 24	Mar 24	Mar 24	
Start Time (approx.)	06:28	08:53	11:19	
Stop Time (approx.)	08:38	11:03	14:30	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	183.3	184.1	184.1	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	293	295	294	294
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 %)	8.1300	8.2800	7.6200	8.0100
CO ₂ Carbon dioxide (dry volume %)	11.0900	11.0200	11.6100	11.2400
T _s Sample temperature (°F)	305.2400	306.4000	305.6400	305.7600
B _w Actual water vapor in gas (% by volume)	21.5984	21.7817	22.1806	21.8536
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	152,098	163,134	156,135	157,122
Q _s Volumetric flow rate, standard (scfm)	102,440	109,762	105,024	105,742
Q _{std} Volumetric flow rate, dry standard (dscfm)	80,314	85,854	81,729	82,632
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	64.4870	68.2395	64.7716	65.8327
%I Isokinetic sampling (%)	103.4544	102.4112	102.1122	102.6592
Laboratory Data				
m _F Combined front/back corrected for blank (µg)	0.2318	<0.2000	0.2982	<0.2434
m _B Back half corrected for allowable blank (µg)	0.0000	0.0000	0.0000	0.0000
m _n Total matter corrected for allowable blanks (µg)	0.2318	<0.2000	0.2982	<0.2434
Cadmium Results - Total				
C _{sd} Concentration (lb/dscf)	7.9267E-12	<6.4625E-12	1.0153E-11	<8.1807E-12
C _{sd7} Concentration @7% O ₂ (lb/dscf)	8.6282E-12	<7.1180E-12	1.0627E-11	<8.7910E-12
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	8.5772E-12	<7.0372E-12	1.0494E-11	<8.7027E-12
C _a Concentration (lb/acf)	4.1857E-12	<3.4011E-12	5.3145E-12	<4.3004E-12
C _{sd} Concentration (µg/dscm)	1.2694E-01	<1.0349E-01	1.6258E-01	<1.3100E-01
C _{sd7} Concentration @7% O ₂ (µg/dscm)	1.3817E-01	<1.1398E-01	1.7017E-01	<1.4077E-01
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	1.3735E-01	<1.1269E-01	1.6804E-01	<1.3936E-01
C _{sd} Concentration (mg/dscm)	1.2694E-04	<1.0349E-04	1.6258E-04	<1.3100E-04
C _{sd7} Concentration @7% O ₂ (mg/dscm)	1.3817E-04	<1.1398E-04	1.7017E-04	<1.4077E-04
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	1.3735E-04	<1.1269E-04	1.6804E-04	<1.3936E-04
C _a Concentration (µg/m ³ (actual, wet))	6.7028E-02	<5.4464E-02	8.5104E-02	<6.8865E-02
C _{sd} Concentration (µg/Nm ³ dry)	1.3622E-01	<1.1106E-01	1.7448E-01	<1.4059E-01
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	1.4828E-01	<1.2233E-01	1.8262E-01	<1.5108E-01
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	1.4740E-01	<1.2094E-01	1.8034E-01	<1.4956E-01
E _{lb/hr} Rate (lb/hr)	3.8198E-05	<3.3290E-05	4.9786E-05	<4.0425E-05
E _{g/s} Rate (g/s)	4.8120E-06	<4.1937E-06	6.2719E-06	<5.0926E-06
E _{T/yr} Rate (Ton/yr)	1.6731E-04	<1.4581E-04	2.1806E-04	<1.7706E-04
E _{Fd} Rate - Fd-based (lb/MMBtu)	1.2415E-07	<1.0242E-07	1.5291E-07	<1.2650E-07
E _{Fc} Rate - Fc-based (lb/MMBtu)	1.3009E-07	<1.0673E-07	1.5915E-07	<1.3199E-07

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Wheelabrator North 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 24	Mar 24	Mar 24	
Start Time (approx.)	06:28	08:53	11:19	
Stop Time (approx.)	08:38	11:03	14:30	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	183.3	184.1	184.1	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	293	295	294	294
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 %)	8.1300	8.2800	7.6200	8.0100
CO ₂ Carbon dioxide (dry volume %)	11.0900	11.0200	11.6100	11.2400
T _s Sample temperature (°F)	305.2400	306.4000	305.6400	305.7600
B _w Actual water vapor in gas (% by volume)	21.5984	21.7817	22.1806	21.8536
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	152,098	163,134	156,135	157,122
Q _s Volumetric flow rate, standard (scfm)	102,440	109,762	105,024	105,742
Q _{std} Volumetric flow rate, dry standard (dscfm)	80,314	85,854	81,729	82,632
Sampling Data				
V _{std} Volume metered, standard (dscf)	64.4870	68.2395	64.7716	65.8327
%I Isokinetic sampling (%)	103.4544	102.4112	102.1122	102.6592
Laboratory Data				
m _F Combined front/back corrected for blank (µg)	<0.2000	<0.2000	<0.2000	<0.2000
m _B Back half corrected for allowable blank (µg)	0.0000	0.0000	0.0000	0.0000
m _n Total matter corrected for allowable blanks (µg)	<0.2000	<0.2000	<0.2000	<0.2000
Lead Results - Total				
C _{sd} Concentration (lb/dscf)	<6.8386E-12	<6.4625E-12	<6.8085E-12	<6.7032E-12
C _{sd7} Concentration @7% O ₂ (lb/dscf)	<7.4437E-12	<7.1180E-12	<7.1264E-12	<7.2294E-12
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	<7.3997E-12	<7.0372E-12	<7.0372E-12	<7.1581E-12
C _a Concentration (lb/acf)	<3.6111E-12	<3.4011E-12	<3.5639E-12	<3.5254E-12
C _{sd} Concentration (µg/dscm)	<1.0951E-01	<1.0349E-01	<1.0903E-01	<1.0734E-01
C _{sd7} Concentration @7% O ₂ (µg/dscm)	<1.1920E-01	<1.1398E-01	<1.1412E-01	<1.1577E-01
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	<1.1850E-01	<1.1269E-01	<1.1269E-01	<1.1463E-01
C _{sd} Concentration (mg/dscm)	<1.0951E-04	<1.0349E-04	<1.0903E-04	<1.0734E-04
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<1.1920E-04	<1.1398E-04	<1.1412E-04	<1.1577E-04
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	<1.1850E-04	<1.1269E-04	<1.1269E-04	<1.1463E-04
C _a Concentration (µg/m ³ (actual,wet))	<5.7826E-02	<5.4464E-02	<5.7072E-02	<5.6454E-02
C _{sd} Concentration (µg/Nm ³ dry)	<1.1752E-01	<1.1106E-01	<1.1701E-01	<1.1520E-01
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	<1.2792E-01	<1.2233E-01	<1.2247E-01	<1.2424E-01
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	<1.2717E-01	<1.2094E-01	<1.2094E-01	<1.2301E-01
E _{lb/hr} Rate (lb/hr)	<3.2954E-05	<3.3290E-05	<3.3387E-05	<3.3211E-05
E _{g/s} Rate (g/s)	<4.1515E-06	<4.1937E-06	<4.2060E-06	<4.1837E-06
E _{T/yr} Rate (Ton/yr)	<1.4434E-04	<1.4581E-04	<1.4624E-04	<1.4546E-04
E _{Fd} Rate - Fd-based (lb/MMBtu)	<1.0711E-07	<1.0242E-07	<1.0254E-07	<1.0403E-07
E _{Fc} Rate - Fc-based (lb/MMBtu)	<1.1223E-07	<1.0673E-07	<1.0673E-07	<1.0856E-07

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Wheelabrator North 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 23	Mar 23	Mar 23	
Start Time (approx.)	11:32	13:07	14:39	
Stop Time (approx.)	12:45	14:17	15:45	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9837	0.9837	0.9837	
C _p Pitot tube coefficient	0.8180	0.8180	0.8180	
P _g Static pressure (in. H ₂ O)	-10.4000	-10.7000	-10.7000	
A _s Sample location area (ft ²)	64.0000	64.0000	64.0000	
P _{bar} Barometric pressure (in. Hg)	30.10	30.10	30.10	30.1000
D _n Nozzle diameter (in.)	0.2740	0.2740	0.2740	
O ₂ Oxygen (dry volume %)	9.0500	9.1300	8.6000	8.9267
CO ₂ Carbon dioxide (dry volume %)	10.4300	10.4600	11.0600	10.6500
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.5200	80.4100	80.3400	80.4233
V _{lc} Total Liquid collected (ml)	204.90	225.10	217.90	
V _m Volume metered, meter conditions (ft ³)	37.8900	39.3200	37.6350	
T _m Dry gas meter temperature (°F)	85.4200	84.0400	81.8400	
T _s Sample temperature (°F)	307.1200	307.0400	306.7200	306.9600
ΔH Meter box orifice pressure drop (in. H ₂ O)	1.1344	1.2264	1.1192	
θ Total sampling time (min)	62.5	62.5	62.5	
Flow Results				
V _{wstd} Volume of water collected (ft ³)	9.6426	10.5932	10.2544	10.1634
V _{mstd} Volume metered, standard (dscf)	36.3851	37.8625	36.3776	36.8751
P _s Sample gas pressure, absolute (in. Hg)	29.3353	29.3132	29.3132	29.3206
P _v Vapor pressure, actual (in. Hg)	29.3353	29.3132	29.3132	29.3206
B _{wo} Moisture measured in sample (% by volume)	20.9496	21.8616	21.9900	21.6004
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	20.9496	21.8616	21.9900	21.6004
√ΔP Velocity head (√in. H ₂ O)	0.6537	0.6715	0.6417	0.6556
M _d MW of sample gas, dry (lb/lb-mole)	30.0308	30.0388	30.1136	30.0611
M _s MW of sample gas, wet (lb/lb-mole)	27.5104	27.4069	27.4498	27.4557
V _s Velocity of sample (ft/sec)	44.5701	45.8866	43.8036	44.7534
%I Isokinetic sampling (%)	99.7176	102.0320	102.8184	101.5226
Q _a Volumetric flow rate, actual (acfm)	171,149	176,205	168,206	171,853
Q _s Volumetric flow rate, standard (scfm)	115,498	118,833	113,485	115,939
Q _{std} Volumetric flow rate, dry standard (dscfm)	91,302	92,854	88,530	90,895
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	77,836	78,625	78,339	78,267
Q _a Volumetric flow rate, actual (acf/hr)	10,268,945	10,572,284	10,092,342	10,311,191
Q _s Volumetric flow rate, standard (scf/hr)	6,929,874	7,129,957	6,809,124	6,956,318
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	5,478,095	5,571,233	5,311,798	5,453,709
Q _a Volumetric flow rate, actual (m ³ /hr)	290,823	299,413	285,821	292,019
Q _s Volumetric flow rate, standard (m ³ /hr)	196,258	201,925	192,838	197,007
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	155,143	157,781	150,433	154,452
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	132,262	133,603	133,117	132,994
Q _s Volumetric flow rate, normal (Nm ³ /hr)	182,877	188,157	179,690	183,575
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	144,565	147,023	140,176	143,921
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	123,244	124,493	124,041	123,926

Comments:

Average includes 3 runs.

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Wheelabrator North 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 23	Mar 23	Mar 23	
Start Time (approx.)	11:32	13:07	14:39	
Stop Time (approx.)	12:45	14:17	15:45	
Process Conditions				
R _p Steam Production Rate (Klbs/hour)	183.8	183.5	184.1	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	296	296	296	296
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 %)	9.0500	9.1300	8.6000	8.9267
CO ₂ Carbon dioxide (dry volume %)	10.4300	10.4600	11.0600	10.6500
T _s Sample temperature (°F)	307.1200	307.0400	306.7200	306.9600
B _w Actual water vapor in gas (% by volume)	20.9496	21.8616	21.9900	21.6004
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	171,149	176,205	168,206	171,853
Q _s Volumetric flow rate, standard (scfm)	115,498	118,833	113,485	115,939
Q _{std} Volumetric flow rate, dry standard (dscfm)	91,302	92,854	88,530	90,895
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	77,836	78,625	78,339	78,267
Q _a Volumetric flow rate, actual (acf/hr)	10,268,945	10,572,284	10,092,342	10,311,191
Q _s Volumetric flow rate, standard (scf/hr)	6,929,874	7,129,957	6,809,124	6,956,318
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	5,478,095	5,571,233	5,311,798	5,453,709
Q _a Volumetric flow rate, actual (m ³ /hr)	290,823	299,413	285,821	292,019
Q _s Volumetric flow rate, standard (m ³ /hr)	196,258	201,925	192,838	197,007
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	155,143	157,781	150,433	154,452
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	132,262	133,603	133,117	132,994
Q _a Volumetric flow rate, normal (Nm ³ /hr)	182,877	188,157	179,690	183,575
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	144,565	147,023	140,176	143,921
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	123,244	124,493	124,041	123,926
Sampling Data				
V _{std} Volume metered, standard (dscf)	36.3851	37.8625	36.3776	36.8751
%I Isokinetic sampling (%)	99.7176	102.0320	102.8184	101.5226
Laboratory Data				
m _n Total HF collected (mg)	<0.0426	<0.0473	<0.0449	
Hydrogen Fluoride (HF) Results				
C _{sd} HF Concentration (lb/dscf)	<2.5793E-09	<2.7525E-09	<2.7239E-09	<2.6852E-09
C _{sd7} HF Concentration @7% O ₂ (lb/dscf)	<3.0256E-09	<3.2506E-09	<3.0782E-09	<3.1181E-09
C _{sd12} HF Concentration @12% CO ₂ (lb/dscf)	<2.9676E-09	<3.1578E-09	<2.9554E-09	<3.0269E-09
C _a HF Concentration (lb/acf)	<1.3760E-09	<1.4505E-09	<1.4336E-09	<1.4200E-09
C _{sd} HF Concentration (ppmdv)	<0.0497	<0.0530	<0.0525	<0.0517
C _{sd7} HF Concentration @7% O ₂ (ppmdv)	<0.0583	<0.0626	<0.0593	<0.0601
C _{sd12} HF Concentration @12% CO ₂ (ppmdv)	<0.0572	<0.0608	<0.0569	<0.0583
C _w HF Concentration (ppmwv)	<0.0393	<0.0414	<0.0409	<0.0406
C _{sd} HF Concentration (mg/dscm)	<0.0413	<0.0441	<0.0436	<0.0430
C _{sd7} HF Concentration @7% O ₂ (mg/dscm)	<0.0485	<0.0521	<0.0493	<0.0499
C _{sd12} HF Concentration @12% CO ₂ (mg/dscm)	<0.0475	<0.0506	<0.0473	<0.0485
C _a HF Concentration (mg/m ³ actual,wet)	<0.0220	<0.0232	<0.0230	<0.0227
C _{sd} HF Concentration (mg/Nm ³ dry)	<0.0443	<0.0473	<0.0468	<0.0461
C _{sd7} HF Concentration @7% O ₂ (mg/Nm ³ dry)	<0.0520	<0.0559	<0.0529	<0.0536
C _{sd12} HF Concentration @12% CO ₂ (mg/Nm ³ dry)	<0.0510	<0.0543	<0.0508	<0.0520
E _{lb/hr} HF Rate (lb/hr)	<0.0141	<0.0153	<0.0145	<0.0146
E _{kg/hr} HF Rate (kg/hr)	<0.0064	<0.0070	<0.0066	<0.0066
E _{T/yr} HF Rate (Ton/yr)	<0.0619	<0.0672	<0.0634	<0.0641
E _{Fd} HF Rate - Fd-based (lb/MMBtu)	<0.000044	<0.000048	<0.000045	<0.000046
E _{Fc} HF Rate - Fc-based (lb/MMBtu)	<0.000045	<0.000048	<0.000045	<0.000046

Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 2 SDA Inlet

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

Run No.	1	2	3	Average
Date (2011)	Mar 23	Mar 23	Mar 23	
Start Time (approx.)	07:12	08:38	09:59	
Stop Time (approx.)	08:12	09:38	10:59	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9882	0.9882	0.9882	
P _g Static pressure (in. H ₂ O)	-1.2000	-1.2000	-1.6000	
A _s Sample location area (ft ²)	60.1320	60.1320	60.1320	
P _{bar} Barometric pressure (in. Hg)	30.10	30.10	30.10	30.1000
O ₂ Oxygen (dry volume %)	7.9500	8.1600	7.8600	7.9900
CO ₂ Carbon dioxide (dry volume %)	11.2900	11.0000	11.3600	11.2167
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.7600	80.8400	80.7800	80.7933
V _{lc} Total Liquid collected (ml)	155.70	144.90	158.00	
V _m Volume metered, meter conditions (ft ³)	36.2550	36.2900	36.3700	
T _m Dry gas meter temperature (°F)	71.4167	77.5833	83.3750	
T _s Sample temperature (°F)	490.5000	495.6667	497.5833	494.5833
ΔH Meter box orifice pressure drop (in. H ₂ O)	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)	7.3272	6.8190	7.4355	7.1939
V _{mstd} Volume metered, standard (dscf)	35.9016	35.5240	35.2229	35.5495
P _s Sample gas pressure, absolute (in. Hg)	30.0118	30.0118	29.9824	30.0020
P _v Vapor pressure, actual (in. Hg)	30.0118	30.0118	29.9824	30.0020
B _{w0} Moisture measured in sample (% by volume)	16.9499	16.1042	17.4303	16.8281
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	16.9499	16.1042	17.4303	16.8281
M _d MW of sample gas, dry (lb/lb-mole)	30.1244	30.0864	30.1320	30.1143
M _s MW of sample gas, wet (lb/lb-mole)	28.0693	28.1400	28.0174	28.0756

Comments:

Average includes 3 runs.

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 2 SDA Inlet

USEPA Method 26A HCl Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 23	Mar 23	Mar 23	
Start Time (approx.)	07:12	08:38	09:59	
Stop Time (approx.)	08:12	09:38	10:59	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	183.7	183.8	184.7	184.1
P ₁ Fabric Filter Inlet Temperature (°F)	295	295	295	295
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 %)	7.9500	8.1600	7.8600	7.9900
CO ₂ Carbon dioxide (dry volume %)	11.2900	11.0000	11.3600	11.2167
T _s Sample temperature (°F)	490.5000	495.6667	497.5833	494.5833
B _w Actual water vapor in gas (% by volume)	16.9499	16.1042	17.4303	16.8281
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	35.9016	35.5240	35.2229	35.5495
Laboratory Data				
m _n Total HCl collected (mg)	757.8867	660.1468	665.4747	
Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (lb/dscf)	4.6548E-05	4.0976E-05	4.1660E-05	4.3061E-05
C _{sd7} HCl Concentration @7% O ₂ (lb/dscf)	4.9962E-05	4.4707E-05	4.4407E-05	4.6359E-05
C _{sd12} HCl Concentration @12% CO ₂ (lb/dscf)	4.9475E-05	4.4701E-05	4.4007E-05	4.6061E-05
C _{sd} HCl Concentration (ppmdv)	492.1310	433.2200	440.4505	455.2672
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	528.2333	472.6655	469.4986	490.1325
C _{sd12} HCl Concentration @12% CO ₂ (ppmdv)	523.0799	472.6037	465.2646	486.9827
C _w HCl Concentration (ppmwv)	408.7153	363.4535	363.6787	378.6158
C _{sd} HCl Concentration (mg/dscm)	745.3978	656.1693	667.1208	689.5626
C _{sd7} HCl Concentration @7% O ₂ (mg/dscm)	800.0795	715.9147	711.1180	742.3707
C _{sd12} HCl Concentration @12% CO ₂ (mg/dscm)	792.2740	715.8210	704.7051	737.6000
C _{sd} HCl Concentration (mg/Nm ³ dry)	799.9391	704.1816	715.9345	740.0184
C _{sd7} HCl Concentration @7% O ₂ (mg/Nm ³ dry)	858.6219	768.2987	763.1511	796.6905
C _{sd12} HCl Concentration @12% CO ₂ (mg/Nm ³ dry)	850.2452	768.1982	756.2689	791.5708
E _{Fd} HCl Rate - Fd-based (lb/MMBtu)	0.7325	0.6554	0.6510	0.6796
E _{Fc} HCl Rate - Fc-based (lb/MMBtu)	0.7504	0.6780	0.6674	0.6986

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

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

Run No.	1	2	3	Average
Date (2011)	Mar 23	Mar 23	Mar 23	
Start Time (approx.)	07:12	08:38	09:59	
Stop Time (approx.)	08:12	09:38	10:59	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9936	0.9936	0.9936	
P _g Static pressure (in. H ₂ O)	-9.9000	-11.8000	-11.3000	
A _s Sample location area (ft ²)	64.0000	64.0000	64.0000	
P _{bar} Barometric pressure (in. Hg)	30.10	30.10	30.10	30.1000
O ₂ Oxygen (dry volume %)	8.6000	8.9000	8.7000	8.7333
CO ₂ Carbon dioxide (dry volume %)	10.5800	10.4300	10.5600	10.5233
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.8200	80.6700	80.7400	80.7433
V _{lc} Total Liquid collected (ml)	237.10	221.00	231.00	
V _m Volume metered, meter conditions (ft ³)	42.2100	41.8650	41.7850	
T _m Dry gas meter temperature (°F)	79.8750	87.0417	90.1250	
T _s Sample temperature (°F)	308.8333	308.0000	308.5000	308.4444
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)	11.1579	10.4003	10.8709	10.8097
V _{mstd} Volume metered, standard (dscf)	41.3988	40.5225	40.2183	40.7132
P _s Sample gas pressure, absolute (in. Hg)	29.3721	29.2324	29.2691	29.2912
P _v Vapor pressure, actual (in. Hg)	29.3721	29.2324	29.2691	29.2912
B _{wo} Moisture measured in sample (% by volume)	21.2303	20.4236	21.2782	20.9774
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	21.2303	20.4236	21.2782	20.9774
M _d MW of sample gas, dry (lb/lb-mole)	30.0368	30.0248	30.0376	30.0331
M _s MW of sample gas, wet (lb/lb-mole)	27.4814	27.5689	27.4762	27.5088

Comments:

Average includes 3 runs.

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

USEPA Method 26A HCl Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 23	Mar 23	Mar 23	
Start Time (approx.)	07:12	08:38	09:59	
Stop Time (approx.)	08:12	09:38	10:59	
Process Conditions				
R _P Steam Production Rate (Klbs/hr)	183.7	183.8	184.7	184.1
P ₁ Fabric Filter Inlet Temperature (°F)	295	295	295	295
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 %)	8.6000	8.9000	8.7000	8.7333
CO ₂ Carbon dioxide (dry volume %)	10.5800	10.4300	10.5600	10.5233
T _s Sample temperature (°F)	308.8333	308.0000	308.5000	308.4444
B _w Actual water vapor in gas (% by volume)	21.2303	20.4236	21.2782	20.9774
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	41.3988	40.5225	40.2183	40.7132
Laboratory Data				
m _n Total HCl collected (mg)	12.0602	11.4836	9.8156	
Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (lb/dscf)	6.4236E-07	6.2487E-07	5.3815E-07	6.0179E-07
C _{sd7} HCl Concentration @7% O ₂ (lb/dscf)	7.2592E-07	7.2381E-07	6.1313E-07	6.8762E-07
C _{sd12} HCl Concentration @12% CO ₂ (lb/dscf)	7.2857E-07	7.1893E-07	6.1153E-07	6.8635E-07
C _{sd} HCl Concentration (ppmdv)	6.7914	6.6065	5.6896	6.3625
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	7.6748	7.6526	6.4824	7.2699
C _{sd12} HCl Concentration @12% CO ₂ (ppmdv)	7.7029	7.6010	6.4655	7.2565
C _w HCl Concentration (ppmwv)	5.3496	5.2572	4.4790	5.0286
C _{sd} HCl Concentration (mg/dscm)	10.2865	10.0065	8.6177	9.6369
C _{sd7} HCl Concentration @7% O ₂ (mg/dscm)	11.6245	11.5908	9.8185	11.0113
C _{sd12} HCl Concentration @12% CO ₂ (mg/dscm)	11.6671	11.5127	9.7928	10.9909
C _{sd} HCl Concentration (mg/Nm ³ dry)	11.0391	10.7387	9.2482	10.3420
C _{sd7} HCl Concentration @7% O ₂ (mg/Nm ³ dry)	12.4751	12.4390	10.5369	11.8170
C _{sd12} HCl Concentration @12% CO ₂ (mg/Nm ³ dry)	12.5208	12.3551	10.5093	11.7951
E _{Fd} HCl Rate - F _d -based (lb/MMBtu)	0.0106	0.0106	0.0090	0.0101
E _{Fc} HCl Rate - F _c -based (lb/MMBtu)	0.0111	0.0109	0.0093	0.0104

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Wheelabrator North 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 22	Mar 22	Mar 22	
Start Time (approx.)	06:57	09:35	12:16	
Stop Time (approx.)	09:10	11:50	14:30	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9995	0.9995	0.9995	
C _p Pilot tube coefficient	0.8300	0.8300	0.8300	
P _g Static pressure (in. H ₂ O)	-10.7000	-9.6000	-9.5000	
A _s Sample location area (ft ²)	64.0000	64.0000	64.0000	
P _{bar} Barometric pressure (in. Hg)	30.20	30.20	30.20	30.2000
D _n Nozzle diameter (in.)	0.2700	0.2700	0.2700	
O ₂ Oxygen (dry volume %)	9.3000	8.7900	9.3300	9.1400
CO ₂ Carbon dioxide (dry volume %)	10.0200	10.6500	10.1400	10.2700
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.6800	80.5600	80.5300	80.5900
V _{lc} Total Liquid collected (ml)	422.80	407.10	410.70	
V _m Volume metered, meter conditions (ft ³)	75.5950	72.4940	77.2550	
T _m Dry gas meter temperature (°F)	76.3200	86.5600	94.4400	
T _s Sample temperature (°F)	311.4800	310.7200	311.5200	311.2400
ΔH Meter box orifice pressure drop (in. H ₂ O)	1.1340	1.0304	1.1612	
θ Total sampling time (min)	125.0	125.0	125.0	
Flow Results				
V _{wstd} Volume of water collected (ft ³)	19.8970	19.1581	19.3275	19.4609
V _{mstd} Volume metered, standard (dscf)	75.2584	70.8012	74.4023	73.4873
P _s Sample gas pressure, absolute (in. Hg)	29.4132	29.4941	29.5015	29.4696
P _v Vapor pressure, actual (in. Hg)	29.4132	29.4941	29.5015	29.4696
B _{wso} Moisture measured in sample (% by volume)	20.9100	21.2964	20.6205	20.9423
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	20.9100	21.2964	20.6205	20.9423
√ΔP Velocity head (√in. H ₂ O)	0.6862	0.6504	0.6761	0.6709
M _d MW of sample gas, dry (lb/lb-mole)	29.9752	30.0556	29.9956	30.0088
M _s MW of sample gas, wet (lb/lb-mole)	27.4712	27.4882	27.5221	27.4938
V _s Velocity of sample (ft/sec)	47.5748	44.9993	46.7622	46.4454
%I Isokinetic sampling (%)	99.7481	99.3274	99.6675	99.5810
Q _a Volumetric flow rate, actual (acfm)	182,687	172,797	179,567	178,350
Q _s Volumetric flow rate, standard (scfm)	122,913	116,694	121,170	120,259
Q _{std} Volumetric flow rate, dry standard (dscfm)	97,212	91,842	96,184	95,079
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	81,127	80,015	80,061	80,401
Q _a Volumetric flow rate, actual (acf/hr)	10,961,242	10,367,829	10,774,004	10,701,025
Q _s Volumetric flow rate, standard (scf/hr)	7,374,799	7,001,627	7,270,193	7,215,540
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	5,832,730	5,510,530	5,771,045	5,704,768
Q _a Volumetric flow rate, actual (m ³ /hr)	310,429	293,623	305,126	303,059
Q _s Volumetric flow rate, standard (m ³ /hr)	208,859	198,290	205,896	204,348
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	165,186	156,061	163,439	161,562
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	137,853	135,964	136,043	136,620
Q _s Volumetric flow rate, normal (Nm ³ /hr)	194,618	184,770	191,858	190,415
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	153,924	145,421	152,296	150,547
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	128,454	126,694	126,767	127,305

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 22	Mar 22	Mar 22	
Start Time (approx.)	06:57	09:35	12:16	
Stop Time (approx.)	09:10	11:50	14:30	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	183.7	184.2	183.5	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	310	310	310	310
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 %)	9.3000	8.7900	9.3300	9.1400
CO ₂ Carbon dioxide (dry volume %)	10.0200	10.6500	10.1400	10.2700
T _s Sample temperature (°F)	311.4800	310.7200	311.5200	311.2400
B _w Actual water vapor in gas (% by volume)	20.9100	21.2964	20.6205	20.9423
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	182,687	172,797	179,567	178,350
Q _s Volumetric flow rate, standard (scfm)	122,913	116,694	121,170	120,259
Q _{std} Volumetric flow rate, dry standard (dscfm)	97,212	91,842	96,184	95,079
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	81,127	80,015	80,061	80,401
Q _a Volumetric flow rate, actual (acf/hr)	10,961,242	10,367,829	10,774,004	10,701,025
Q _s Volumetric flow rate, standard (scf/hr)	7,374,799	7,001,627	7,270,193	7,215,540
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	5,832,730	5,510,530	5,771,045	5,704,768
Q _a Volumetric flow rate, actual (m ³ /hr)	310,429	293,623	305,126	303,059
Q _s Volumetric flow rate, standard (m ³ /hr)	208,859	198,290	205,896	204,348
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	165,186	156,061	163,439	161,562
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	137,853	135,964	136,043	136,620
Q _a Volumetric flow rate, normal (Nm ³ /hr)	194,618	184,770	191,858	190,415
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	153,924	145,421	152,296	150,547
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	128,454	126,694	126,767	127,305
Sampling Data				
V _{std} Volume metered, standard (dscf)	75.2584	70.8012	74.4023	73.4873
%I Isokinetic sampling (%)	99.7481	99.3274	99.6675	99.5810
Laboratory Data				
m _{filter} Matter collected on filter(s) (g)	0.00000	0.00000	0.00000	
m _a Matter collected in solvent rinse(s) (g)	0.00220	0.00280	0.00170	
m _n Total filterable particulate matter (g)	0.00220	0.00280	0.00170	
n _{NOL} Number of non-detectable fractions	1 out of 2	1 out of 2	1 out of 2	
DLC Detection level classification	DLL	DLL	DLL	
Filterable Particulate Matter Results				
C _{std} Particulate Concentration (lb/dscf)	6.4458E-08	8.7202E-08	5.0381E-08	6.7347E-08
C _{std7} Particulate Concentration @7% O ₂ (lb/dscf)	7.7238E-08	1.0009E-07	6.0527E-08	7.9286E-08
C _{std12} Particulate Concentration @12% CO ₂ (lb/dscf)	7.7195E-08	9.8256E-08	5.9623E-08	7.8358E-08
C _a Particulate Concentration (lb/acf)	3.4300E-08	4.6348E-08	2.6987E-08	3.5878E-08
C _{std} Particulate Concentration (gr/dscf)	0.0005	0.0006	0.0004	0.0005
C _{std7} Particulate Concentration @7% O ₂ (gr/dscf)	0.0005	0.0007	0.0004	0.0006
C _{std12} Particulate Concentration @12% CO ₂ (gr/dscf)	0.0005	0.0007	0.0004	0.0005
C _a Particulate Concentration (gr/acf)	0.0002	0.0003	0.0002	0.0003
C _{std} Particulate Concentration (mg/dscm)	1.0322	1.3964	0.8068	1.0785
C _{std7} Particulate Concentration @7% O ₂ (mg/dscm)	1.2369	1.6028	0.9693	1.2697
C _{std12} Particulate Concentration @12% CO ₂ (mg/dscm)	1.2362	1.5734	0.9548	1.2548
C _a Particulate Concentration (mg/m ³ (actual,wet))	0.5493	0.7422	0.4322	0.5745
C _{std} Particulate Concentration (mg/Nm ³ dry)	1.1077	1.4986	0.8658	1.1574
C _{std7} Particulate Concentration @7% O ₂ (mg/Nm ³ dry)	1.3274	1.7201	1.0402	1.3626
C _{std12} Particulate Concentration @12% CO ₂ (mg/Nm ³ dry)	1.3266	1.6886	1.0246	1.3466
E _{lb/hr} Particulate Rate (lb/hr)	0.3760	0.4805	0.2908	0.3824
E _{kg/hr} Particulate Rate (kg/hr)	0.1705	0.2179	0.1319	0.1734
E _{Tyr} Particulate Rate (Ton/yr)	1.6467	2.1047	1.2735	1.6750
E _{Fd} Particulate Rate - F _d -based (lb/MMBtu)	0.0011	0.0014	0.0009	0.0011
E _{Fc} Particulate Rate - F _c -based (lb/MMBtu)	0.0012	0.0015	0.0009	0.0012
E _{Hi} Particulate Rate - Heat Input-based (lb/MMBtu)	N/A	N/A	N/A	
E _{Rp} Particulate Rate - Production-based (lb/Klbs)	0.0020	0.0026	0.0016	0.0021
E _{Rp} Particulate Rate - Production-based (kg/Klbs)	0.0009	0.0012	0.0007	0.0009

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

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Wheelabrator North 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 22	Mar 22	Mar 22	
Start Time (approx.)	06:57	09:35	12:16	
Stop Time (approx.)	09:10	11:50	14:30	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	183.7	184.2	183.5	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	310	310	310	310
P ₃ Process data - (units)				
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
H _i Actual heat input (MMBtu/hr)				
Cap Capacity factor (hours/year)	8,760	8,760	8,760	8,760
Gas Conditions				
O ₂ Oxygen (dry volume %)	9.3000	8.7900	9.3300	9.1400
CO ₂ Carbon dioxide (dry volume %)	10.0200	10.6500	10.1400	10.2700
T _s Sample temperature (°F)	311.4800	310.7200	311.5200	311.2400
B _w Actual water vapor in gas (% by volume)	20.9100	21.2964	20.6205	20.9423
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	182,687	172,797	179,567	178,350
Q _s Volumetric flow rate, standard (scfm)	122,913	116,694	121,170	120,259
Q _{std} Volumetric flow rate, dry standard (dscfm)	97,212	91,842	96,184	95,079
Sampling Data				
V _{metd} Volume metered, standard (dscf)	75.2584	70.8012	74.4023	73.4873
%I Isokinetic sampling (%)	99.7481	99.3274	99.6675	99.5810
Laboratory Data				
m _{n-1b} Fraction 1B (µg)	0.0000	0.0000	0.0000	0.0000
m _{n-2b} Fraction 2B (µg)	3.2840	3.0296	3.8612	3.3916
m _{n-3a} Fraction 3A (µg)	0.0000	0.0000	0.0000	0.0000
m _{n-3b} Fraction 3B (µg)	0.0000	0.0000	0.0000	0.0000
m _{n-3c} Fraction 3C (µg)	0.0000	0.0000	0.0000	0.0000
m _n Total matter corrected for allowable blanks (µg)	3.2840	3.0296	3.8612	3.3916
Mercury Results - Total				
C _{sd} Concentration (lb/dscf)	9.6218E-11	9.4354E-11	1.1443E-10	1.0167E-10
C _{sd7} Concentration @7% O ₂ (lb/dscf)	1.1530E-10	1.0830E-10	1.3748E-10	1.2036E-10
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	1.1523E-10	1.0631E-10	1.3542E-10	1.1899E-10
C _a Concentration (lb/acf)	5.1200E-11	5.0149E-11	6.1294E-11	5.4215E-11
C _{sd} Concentration (µg/dscm)	1.5408E+00	1.5109E+00	1.8324E+00	1.6281E+00
C _{sd7} Concentration @7% O ₂ (µg/dscm)	1.8463E+00	1.7343E+00	2.2015E+00	1.9274E+00
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	1.8453E+00	1.7025E+00	2.1686E+00	1.9054E+00
C _{sd} Concentration (mg/dscm)	1.5408E-03	1.5109E-03	1.8324E-03	1.6281E-03
C _{sd7} Concentration @7% O ₂ (mg/dscm)	1.8463E-03	1.7343E-03	2.2015E-03	1.9274E-03
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	1.8453E-03	1.7025E-03	2.1686E-03	1.9054E-03
C _s Concentration (µg/m ³ (actual,wet))	8.1989E-01	8.0307E-01	9.8154E-01	8.6817E-01
C _{sd} Concentration (µg/Nm ³ dry)	1.6535E+00	1.6215E+00	1.9665E+00	1.7472E+00
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	1.9814E+00	1.8612E+00	2.3626E+00	2.0684E+00
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	1.9803E+00	1.8270E+00	2.3273E+00	2.0449E+00
E _{lb/hr} Rate (lb/hr)	5.6121E-04	5.1994E-04	6.6038E-04	5.8051E-04
E _{g/s} Rate (g/s)	7.0700E-05	6.5500E-05	8.3193E-05	7.3131E-05
E _{1/yr} Rate (Ton/yr)	2.4581E-03	2.2773E-03	2.8925E-03	2.5426E-03
E _{Fd} Rate - Fd-based (lb/MMBtu)	1.6590E-06	1.5584E-06	1.9782E-06	1.7319E-06
E _{Fc} Rate - Fc-based (lb/MMBtu)	1.7477E-06	1.6124E-06	2.0539E-06	1.8047E-06

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Wheelabrator North 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 22	Mar 22	Mar 22	
Start Time (approx.)	06:57	09:35	12:16	
Stop Time (approx.)	09:10	11:50	14:30	

Mercury Results - Front Half

C _{sd}	Concentration (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (lb/acf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (µg/m ³ (actual,wet))	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{b/hr}	Rate (lb/hr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{g/s}	Rate (g/s)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{T/yr}	Rate (Ton/yr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fd}	Rate - Fd-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fc}	Rate - Fc-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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Wheelabrator North 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 22	Mar 22	Mar 22	
Start Time (approx.)	06:57	09:35	12:16	
Stop Time (approx.)	09:10	11:50	14:30	

Mercury Results - Impingers 1-3 Solution

C _{sd}	Concentration (lb/dscf)	9.6218E-11	9.4354E-11	1.1443E-10	1.0167E-10
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	1.1530E-10	1.0830E-10	1.3748E-10	1.2036E-10
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	1.1523E-10	1.0631E-10	1.3542E-10	1.1899E-10
C _a	Concentration (lb/acf)	5.1200E-11	5.0149E-11	6.1294E-11	5.4215E-11
C _{sd}	Concentration (µg/dscm)	1.5408E+00	1.5109E+00	1.8324E+00	1.6281E+00
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	1.8463E+00	1.7343E+00	2.2015E+00	1.9274E+00
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	1.8453E+00	1.7025E+00	2.1686E+00	1.9054E+00
C _{sd}	Concentration (mg/dscm)	1.5408E-03	1.5109E-03	1.8324E-03	1.6281E-03
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	1.8463E-03	1.7343E-03	2.2015E-03	1.9274E-03
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	1.8453E-03	1.7025E-03	2.1686E-03	1.9054E-03
C _a	Concentration (µg/m ³ (actual, wet))	8.1989E-01	8.0307E-01	9.8154E-01	8.6817E-01
C _{sd}	Concentration (µg/Nm ³ dry)	1.6535E+00	1.6215E+00	1.9665E+00	1.7472E+00
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	1.9814E+00	1.8612E+00	2.3626E+00	2.0684E+00
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	1.9803E+00	1.8270E+00	2.3273E+00	2.0449E+00
E _{lb/hr}	Rate (lb/hr)	5.6121E-04	5.1994E-04	6.6038E-04	5.8051E-04
E _{g/s}	Rate (g/s)	7.0700E-05	6.5500E-05	8.3193E-05	7.3131E-05
E _{T/yr}	Rate (Ton/yr)	2.4581E-03	2.2773E-03	2.8925E-03	2.5426E-03
E _{Fd}	Rate - Fd-based (lb/MMBtu)	1.6590E-06	1.5584E-06	1.9782E-06	1.7319E-06
E _{Fc}	Rate - Fc-based (lb/MMBtu)	1.7477E-06	1.6124E-06	2.0539E-06	1.8047E-06

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Wheelabrator North 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 22	Mar 22	Mar 22	
Start Time (approx.)	06:57	09:35	12:16	
Stop Time (approx.)	09:10	11:50	14:30	

Mercury Results - Impinger 4 Solution

C_{sd}	Concentration (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C_{sd7}	Concentration @7% O ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C_{sd12}	Concentration @12% CO ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C_a	Concentration (lb/acf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C_{sd}	Concentration (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C_{sd7}	Concentration @7% O ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C_{sd12}	Concentration @12% CO ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C_{sd}	Concentration (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C_{sd7}	Concentration @7% O ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C_{sd12}	Concentration @12% CO ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C_a	Concentration (µg/m ³ (actual,wet))	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C_{sd}	Concentration (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C_{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C_{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
$E_{lb/hr}$	Rate (lb/hr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
$E_{g/s}$	Rate (g/s)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
$E_{T/yr}$	Rate (Ton/yr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E_{Fd}	Rate - Fd-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E_{Fc}	Rate - Fc-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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Wheelabrator North 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 22	Mar 22	Mar 22	
Start Time (approx.)	06:57	09:35	12:16	
Stop Time (approx.)	09:10	11:50	14:30	

Mercury Results - Filtered Permanganate Solution

C _{sd}	Concentration (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (lb/acf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (µg/m ³ (actual,wet))	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{lb/hr}	Rate (lb/hr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{g/s}	Rate (g/s)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{T/yr}	Rate (Ton/yr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fd}	Rate - Fd-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fc}	Rate - Fc-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Mercury Results - HCl Rinse + HCl/MnO2 Precipitate

C _{sd}	Concentration (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (lb/acf)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _a	Concentration (µg/m ³ (actual,wet))	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd}	Concentration (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{lb/hr}	Rate (lb/hr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{g/s}	Rate (g/s)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{T/yr}	Rate (Ton/yr)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fd}	Rate - Fd-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
E _{Fc}	Rate - Fc-based (lb/MMBtu)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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Wheelabrator North 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 22	Mar 22	Mar 22	
Start Time (approx.)	06:57	09:35	12:16	
Stop Time (approx.)	09:10	11:50	14:30	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	183.7	184.2	183.5	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	310	310	310	310
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 %)	9.3000	8.7900	9.3300	9.1400
CO ₂ Carbon dioxide (dry volume %)	10.0200	10.6500	10.1400	10.2700
T _s Sample temperature (°F)	311.4800	310.7200	311.5200	311.2400
B _w Actual water vapor in gas (% by volume)	20.9100	21.2964	20.6205	20.9423
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	182,687	172,797	179,567	178,350
Q _s Volumetric flow rate, standard (scfm)	122,913	116,694	121,170	120,259
Q _{std} Volumetric flow rate, dry standard (dscfm)	97,212	91,842	96,184	95,079
Sampling Data				
V _{metd} Volume metered, standard (dscf)	75.2584	70.8012	74.4023	73.4873
%I Isokinetic sampling (%)	99.7481	99.3274	99.6675	99.5810
Laboratory Data				
m _F Combined front/back corrected for blank (µg)	<0.0500	<0.0500	<0.0500	<0.0500
m _B Back half corrected for allowable blank (µg)	0.0000	0.0000	0.0000	0.0000
m _n Total matter corrected for allowable blanks (µg)	<0.0500	<0.0500	<0.0500	<0.0500
Beryllium Results - Total				
C _{sd} Concentration (lb/dscf)	<1.4650E-12	<1.5572E-12	<1.4818E-12	<1.5013E-12
C _{sd7} Concentration @7% O ₂ (lb/dscf)	<1.7554E-12	<1.7873E-12	<1.7802E-12	<1.7743E-12
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	<1.7544E-12	<1.7546E-12	<1.7536E-12	<1.7542E-12
C _a Concentration (lb/acf)	<7.7954E-13	<8.2764E-13	<7.9372E-13	<8.0030E-13
C _{sd} Concentration (µg/dscm)	<2.3459E-02	<2.4936E-02	<2.3729E-02	<2.4041E-02
C _{sd7} Concentration @7% O ₂ (µg/dscm)	<2.8111E-02	<2.8622E-02	<2.8508E-02	<2.8413E-02
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	<2.8095E-02	<2.8097E-02	<2.8082E-02	<2.8091E-02
C _{sd} Concentration (mg/dscm)	<2.3459E-05	<2.4936E-05	<2.3729E-05	<2.4041E-05
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<2.8111E-05	<2.8622E-05	<2.8508E-05	<2.8413E-05
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	<2.8095E-05	<2.8097E-05	<2.8082E-05	<2.8091E-05
C _a Concentration (µg/m ³ (actual,wet))	<1.2483E-02	<1.3254E-02	<1.2710E-02	<1.2816E-02
C _{sd} Concentration (µg/Nm ³ dry)	<2.5176E-02	<2.6761E-02	<2.5465E-02	<2.5801E-02
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	<3.0167E-02	<3.0716E-02	<3.0594E-02	<3.0492E-02
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	<3.0151E-02	<3.0153E-02	<3.0137E-02	<3.0147E-02
E _{lb/hr} Rate (lb/hr)	<8.5447E-06	<8.5809E-06	<8.5516E-06	<8.5590E-06
E _{g/s} Rate (g/s)	<1.0764E-06	<1.0810E-06	<1.0773E-06	<1.0782E-06
E _{T/yr} Rate (Ton/yr)	<3.7426E-05	<3.7584E-05	<3.7456E-05	<3.7489E-05
E _{fd} Rate - Fd-based (lb/MMBtu)	<2.5259E-08	<2.5719E-08	<2.5616E-08	<2.5532E-08
E _{fc} Rate - Fc-based (lb/MMBtu)	<2.6609E-08	<2.6611E-08	<2.6597E-08	<2.6605E-08

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Wheelabrator North 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 22	Mar 22	Mar 22	
Start Time (approx.)	06:57	09:35	12:16	
Stop Time (approx.)	09:10	11:50	14:30	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	183.7	184.2	183.5	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	310	310	310	310
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 %)	9.3000	8.7900	9.3300	9.1400
CO ₂ Carbon dioxide (dry volume %)	10.0200	10.6500	10.1400	10.2700
T _s Sample temperature (°F)	311.4800	310.7200	311.5200	311.2400
B _w Actual water vapor in gas (% by volume)	20.9100	21.2964	20.6205	20.9423
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	182,687	172,797	179,567	178,350
Q _s Volumetric flow rate, standard (scfm)	122,913	116,694	121,170	120,259
Q _{std} Volumetric flow rate, dry standard (dscfm)	97,212	91,842	96,184	95,079
Sampling Data				
V _{std} Volume metered, standard (dscf)	75.2584	70.8012	74.4023	73.4873
%I Isokinetic sampling (%)	99.7481	99.3274	99.6675	99.5810
Laboratory Data				
m _F Combined front/back corrected for blank (µg)	<0.2000	<0.2034	<0.2000	<0.2011
m _B Back half corrected for allowable blank (µg)	0.0000	0.0000	0.0000	0.0000
m _n Total matter corrected for allowable blanks (µg)	<0.2000	<0.2034	<0.2000	<0.2011
Cadmium Results - Total				
C _{sd} Concentration (lb/dscf)	<5.8598E-12	<6.3346E-12	<5.9272E-12	<6.0405E-12
C _{sd7} Concentration @7% O ₂ (lb/dscf)	<7.0217E-12	<7.2709E-12	<7.1209E-12	<7.1378E-12
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	<7.0177E-12	<7.1376E-12	<7.0145E-12	<7.0566E-12
C _a Concentration (lb/acf)	<3.1181E-12	<3.3669E-12	<3.1749E-12	<3.2200E-12
C _{sd} Concentration (µg/dscm)	<9.3837E-02	<1.0144E-01	<9.4916E-02	<9.6731E-02
C _{sd7} Concentration @7% O ₂ (µg/dscm)	<1.1244E-01	<1.1643E-01	<1.1403E-01	<1.1430E-01
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	<1.1238E-01	<1.1430E-01	<1.1233E-01	<1.1300E-01
C _{sd} Concentration (mg/dscm)	<9.3837E-05	<1.0144E-04	<9.4916E-05	<9.6731E-05
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<1.1244E-04	<1.1643E-04	<1.1403E-04	<1.1430E-04
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	<1.1238E-04	<1.1430E-04	<1.1233E-04	<1.1300E-04
C _a Concentration (µg/m ³ (actual,wet))	<4.9933E-02	<5.3915E-02	<5.0842E-02	<5.1563E-02
C _{sd} Concentration (µg/Nm ³ dry)	<1.0070E-01	<1.0886E-01	<1.0186E-01	<1.0381E-01
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	<1.2067E-01	<1.2495E-01	<1.2237E-01	<1.2267E-01
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	<1.2060E-01	<1.2266E-01	<1.2055E-01	<1.2127E-01
E _{lb/hr} Rate (lb/hr)	<3.4179E-05	<3.4907E-05	<3.4206E-05	<3.4431E-05
E _{g/s} Rate (g/s)	<4.3057E-06	<4.3975E-06	<4.3092E-06	<4.3374E-06
E _{T/yr} Rate (Ton/yr)	<1.4970E-04	<1.5289E-04	<1.4982E-04	<1.5081E-04
E _{Fd} Rate - Fd-based (lb/MMBtu)	<1.0104E-07	<1.0462E-07	<1.0247E-07	<1.0271E-07
E _{Fc} Rate - Fc-based (lb/MMBtu)	<1.0644E-07	<1.0825E-07	<1.0639E-07	<1.0703E-07

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Wheelabrator North 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 22	Mar 22	Mar 22	
Start Time (approx.)	06:57	09:35	12:16	
Stop Time (approx.)	09:10	11:50	14:30	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	183.7	184.2	183.5	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	310	310	310	310
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 %)	9.3000	8.7900	9.3300	9.1400
CO ₂ Carbon dioxide (dry volume %)	10.0200	10.6500	10.1400	10.2700
T _s Sample temperature (°F)	311.4800	310.7200	311.5200	311.2400
B _w Actual water vapor in gas (% by volume)	20.9100	21.2964	20.6205	20.9423
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	182,687	172,797	179,567	178,350
Q _s Volumetric flow rate, standard (scfm)	122,913	116,694	121,170	120,259
Q _{std} Volumetric flow rate, dry standard (dscfm)	97,212	91,842	96,184	95,079
Sampling Data				
V _{std} Volume metered, standard (dscf)	75.2584	70.8012	74.4023	73.4873
%I Isokinetic sampling (%)	99.7481	99.3274	99.6675	99.5810
Laboratory Data				
m _f Combined front/back corrected for blank (µg)	0.8519	0.3552	0.3347	0.5139
m _b Back half corrected for allowable blank (µg)	0.0000	0.0000	0.0000	0.0000
m _n Total matter corrected for allowable blanks (µg)	0.8519	0.3552	0.3347	0.5139
Lead Results - Total				
C _{sd} Concentration (lb/dscf)	2.4959E-11	1.1063E-11	9.9199E-12	1.5314E-11
C _{sd7} Concentration @7% O ₂ (lb/dscf)	2.9908E-11	1.2698E-11	1.1918E-11	1.8175E-11
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	2.9891E-11	1.2466E-11	1.1740E-11	1.8032E-11
C _a Concentration (lb/acf)	1.3281E-11	5.8801E-12	5.3136E-12	8.1583E-12
C _{sd} Concentration (µg/dscm)	3.9969E-01	1.7716E-01	1.5885E-01	2.4523E-01
C _{sd7} Concentration @7% O ₂ (µg/dscm)	4.7893E-01	2.0335E-01	1.9084E-01	2.9104E-01
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	4.7867E-01	1.9962E-01	1.8799E-01	2.8876E-01
C _{sd} Concentration (mg/dscm)	3.9969E-04	1.7716E-04	1.5885E-04	2.4523E-04
C _{sd7} Concentration @7% O ₂ (mg/dscm)	4.7893E-04	2.0335E-04	1.9084E-04	2.9104E-04
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	4.7867E-04	1.9962E-04	1.8799E-04	2.8876E-04
C _a Concentration (µg/m ³ (actual, wet))	2.1268E-01	9.4162E-02	8.5089E-02	1.3064E-01
C _{sd} Concentration (µg/Nm ³ dry)	4.2893E-01	1.9012E-01	1.7048E-01	2.6318E-01
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	5.1398E-01	2.1823E-01	2.0481E-01	3.1234E-01
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	5.1369E-01	2.1422E-01	2.0175E-01	3.0989E-01
E _{lb/hr} Rate (lb/hr)	1.4558E-04	6.0964E-05	5.7248E-05	8.7931E-05
E _{g/s} Rate (g/s)	1.8340E-05	7.6800E-06	7.2119E-06	1.1077E-05
E _{1/yr} Rate (Ton/yr)	6.3764E-04	2.6702E-04	2.5075E-04	3.8514E-04
E _{Fd} Rate - Fd-based (lb/MMBtu)	4.3036E-07	1.8272E-07	1.7149E-07	2.6152E-07
E _{Fc} Rate - Fc-based (lb/MMBtu)	4.5335E-07	1.8906E-07	1.7805E-07	2.7349E-07

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Wheelabrator North 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 24	Mar 24	Mar 24	
Start Time (approx.)	11:40	13:11	14:38	
Stop Time (approx.)	12:55	14:19	15:46	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9961	0.9961	0.9961	
C _p Pitot tube coefficient	0.8180	0.8180	0.8180	
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 %)	9.7300	9.6500	8.9400	9.4400
CO ₂ Carbon dioxide (dry volume %)	9.9400	10.0000	10.6800	10.2067
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.3300	80.3500	80.3800	80.3533
V _{lc} Total Liquid collected (ml)	237.60	215.50	220.70	
V _m Volume metered, meter conditions (ft ³)	44.5750	43.1100	41.5600	
T _m Dry gas meter temperature (°F)	89.2400	97.8200	95.7800	
T _s Sample temperature (°F)	312.8800	311.8400	312.2400	312.3200
ΔH Meter box orifice pressure drop (in. H ₂ O)	1.5720	1.4468	1.3420	
θ Total sampling time (min)	62.5	62.5	62.5	
Flow Results				
V _{wstd} Volume of water collected (ft ³)	11.1815	10.1414	10.3861	10.5697
V _{mstd} Volume metered, standard (dscf)	42.9459	40.8831	39.5477	41.1256
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 _{wo} Moisture measured in sample (% by volume)	20.6577	19.8756	20.7998	20.4443
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	20.6577	19.8756	20.7998	20.4443
√ΔP Velocity head (√in. H ₂ O)	0.7619	0.7297	0.7016	0.7311
M _d MW of sample gas, dry (lb/lb-mole)	29.9796	29.9860	30.0664	30.0107
M _s MW of sample gas, wet (lb/lb-mole)	27.5049	27.6037	27.5566	27.5551
V _s Velocity of sample (ft/sec)	52.2317	49.8985	48.0283	50.0528
%I Isokinetic sampling (%)	101.1350	99.6610	101.3811	100.7257
Q _a Volumetric flow rate, actual (acfm)	200.570	191.610	184.429	192.203
Q _s Volumetric flow rate, standard (scfm)	133.919	128.109	123.244	128.424
Q _{std} Volumetric flow rate, dry standard (dscfm)	106.255	102.647	97.609	102.170
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	85.386	83.077	83.986	84.150
Q _a Volumetric flow rate, actual (acf/hr)	12,034,190	11,496,623	11,065,716	11,532,176
Q _s Volumetric flow rate, standard (scf/hr)	8,035,147	7,686,560	7,394,626	7,705,445
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	6,375,273	6,158,811	5,856,559	6,130,215
Q _a Volumetric flow rate, actual (m ³ /hr)	340,815	325,591	313,388	326,598
Q _s Volumetric flow rate, standard (m ³ /hr)	227,560	217,688	209,420	218,223
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	180,551	174,421	165,861	173,611
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	145,091	141,168	142,712	142,990
Q _s Volumetric flow rate, normal (Nm ³ /hr)	212,045	202,846	195,142	203,344
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	168,241	162,529	154,552	161,774
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	135,198	131,543	132,982	133,241

Comments:

Average includes 3 runs.

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Wheelabrator North 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 24	Mar 24	Mar 24	
Start Time (approx.)	11:40	13:11	14:38	
Stop Time (approx.)	12:55	14:19	15:46	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	183.1	184.7	184.7	184.2
P ₁ Fabric Filter Inlet Temperature (°F)	311	310	310	311
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 %)	9.7300	9.6500	8.9400	9.4400
CO ₂ Carbon dioxide (dry volume %)	9.9400	10.0000	10.6800	10.2067
T _s Sample temperature (°F)	312.8800	311.8400	312.2400	312.3200
B _w Actual water vapor in gas (% by volume)	20.6577	19.8756	20.7998	20.4443
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	200,570	191,610	184,429	192,203
Q _s Volumetric flow rate, standard (scfm)	133,919	128,109	123,244	128,424
Q _{std} Volumetric flow rate, dry standard (dscfm)	106,255	102,647	97,609	102,170
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	85,386	83,077	83,986	84,150
Q _a Volumetric flow rate, actual (acfm/hr)	12,034,190	11,496,623	11,065,716	11,532,176
Q _s Volumetric flow rate, standard (scf/hr)	8,035,147	7,686,560	7,394,626	7,705,445
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	6,375,273	6,158,811	5,856,559	6,130,215
Q _a Volumetric flow rate, actual (m ³ /hr)	340,815	325,591	313,388	326,598
Q _s Volumetric flow rate, standard (m ³ /hr)	227,560	217,688	209,420	218,223
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	180,551	174,421	165,861	173,611
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	145,091	141,168	142,712	142,990
Q _a Volumetric flow rate, normal (Nm ³ /hr)	212,045	202,846	195,142	203,344
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	168,241	162,529	154,552	161,774
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	135,198	131,543	132,982	133,241
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	42.9459	40.8831	39.5477	41.1256
%I Isokinetic sampling (%)	101.1350	99.6610	101.3811	100.7257
Laboratory Data				
m _n Total HF collected (mg)	<0.0390	<0.0406	<0.0426	
Hydrogen Fluoride (HF) Results				
C _{ad} HF Concentration (lb/dscf)	<2.0049E-09	<2.1888E-09	<2.3731E-09	<2.1889E-09
C _{ad7} HF Concentration @7% O ₂ (lb/dscf)	<2.4949E-09	<2.7044E-09	<2.7580E-09	<2.6524E-09
C _{ad12} HF Concentration @12% CO ₂ (lb/dscf)	<2.4204E-09	<2.6266E-09	<2.6664E-09	<2.5711E-09
C _a HF Concentration (lb/acf)	<1.0621E-09	<1.1725E-09	<1.2560E-09	<1.1635E-09
C _{ad} HF Concentration (ppmdv)	<0.0386	<0.0422	<0.0457	<0.0422
C _{ad7} HF Concentration @7% O ₂ (ppmdv)	<0.0481	<0.0521	<0.0531	<0.0511
C _{ad12} HF Concentration @12% CO ₂ (ppmdv)	<0.0466	<0.0506	<0.0514	<0.0495
C _w HF Concentration (ppmwv)	<0.0307	<0.0338	<0.0362	<0.0336
C _{ad} HF Concentration (mg/dscm)	<0.0321	<0.0351	<0.0380	<0.0351
C _{ad7} HF Concentration @7% O ₂ (mg/dscm)	<0.0400	<0.0433	<0.0442	<0.0425
C _{ad12} HF Concentration @12% CO ₂ (mg/dscm)	<0.0388	<0.0421	<0.0427	<0.0412
C _a HF Concentration (mg/m ³ (actual,wet))	<0.0170	<0.0188	<0.0201	<0.0186
C _{ad} HF Concentration (mg/Nm ³ dry)	<0.0345	<0.0376	<0.0408	<0.0376
C _{ad7} HF Concentration @7% O ₂ (mg/Nm ³ dry)	<0.0429	<0.0465	<0.0474	<0.0456
C _{ad12} HF Concentration @12% CO ₂ (mg/Nm ³ dry)	<0.0416	<0.0451	<0.0458	<0.0442
E _{lb/hr} HF Rate (lb/hr)	<0.0128	<0.0135	<0.0139	<0.0134
E _{kg/hr} HF Rate (kg/hr)	<0.0058	<0.0061	<0.0063	<0.0061
E _{T/yr} HF Rate (Ton/yr)	<0.0560	<0.0590	<0.0609	<0.0586
E _{Fd} HF Rate - Fd-based (lb/MMBtu)	<0.0000	<0.0000	<0.0000	<0.0000
E _{Fc} HF Rate - Fc-based (lb/MMBtu)	<0.0000	<0.0000	<0.0000	<0.0000

Wheelabrator North 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 22	Mar 23	Mar 23	
Start Time (approx.)	09:37	06:40	11:36	
Stop Time (approx.)	13:58	11:05	15:56	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9961	0.9961	0.9961	
C _p Pitot tube coefficient	0.8220	0.8220	0.8220	
P _g Static pressure (in. H ₂ O)	-9.6000	-10.3000	-10.5000	
A _s Sample location area (ft ²)	64.0000	64.0000	64.0000	
P _{bar} Barometric pressure (in. Hg)	30.20	30.10	30.10	30.1333
D _n Nozzle diameter (in.)	0.2720	0.2720	0.2720	
O ₂ Oxygen (dry volume %)	9.2700	9.3800	9.2200	9.2900
CO ₂ Carbon dioxide (dry volume %)	10.2000	9.8400	10.3400	10.1267
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.5300	80.7800	80.4400	80.5833
V _{lc} Total Liquid collected (ml)	917.30	933.40	925.20	
V _m Volume metered, meter conditions (ft ³)	168.8800	173.3350	171.2150	
T _m Dry gas meter temperature (°F)	90.5400	83.8000	93.2000	
T _s Sample temperature (°F)	311.7600	312.4000	312.4000	312.1867
ΔH Meter box orifice pressure drop (in. H ₂ O)	1.4032	1.4640	1.4040	
θ Total sampling time (min)	250.0	250.0	250.0	
Flow Results				
V _{wstd} Volume of water collected (ft ³)	43.1681	43.9258	43.5399	43.5446
V _{mstd} Volume metered, standard (dscf)	163.3349	169.1864	164.2535	165.5916
P _s Sample gas pressure, absolute (in. Hg)	29.4941	29.3426	29.3279	29.3882
P _v Vapor pressure, actual (in. Hg)	29.4941	29.3426	29.3279	29.3882
B _{wo} Moisture measured in sample (% by volume)	20.9044	20.6116	20.9535	20.8231
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	20.9044	20.6116	20.9535	20.8231
√ΔP Velocity head (√in. H ₂ O)	0.7397	0.7544	0.7352	0.7431
M _d MW of sample gas, dry (lb/lb-mole)	30.0028	29.9496	30.0232	29.9919
M _s MW of sample gas, wet (lb/lb-mole)	27.4937	27.4866	27.5039	27.4947
V _s Velocity of sample (ft/sec)	50.7117	51.8787	50.5537	51.0480
%I Isokinetic sampling (%)	99.8142	101.2951	101.4066	100.8386
Q _a Volumetric flow rate, actual (acfm)	194,733	199,214	194,126	196,024
Q _s Volumetric flow rate, standard (scfm)	131,330	133,552	130,076	131,653
Q _{std} Volumetric flow rate, dry standard (dscfm)	103,876	106,025	102,820	104,240
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	86,912	87,871	86,399	87,061
Q _a Volumetric flow rate, actual (acf/hr)	11,683,965	11,952,860	11,647,570	11,761,465
Q _s Volumetric flow rate, standard (scf/hr)	7,879,810	8,013,112	7,804,534	7,899,152
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	6,232,586	6,361,482	6,169,214	6,254,427
Q _a Volumetric flow rate, actual (m ³ /hr)	330,897	338,512	329,866	333,092
Q _s Volumetric flow rate, standard (m ³ /hr)	223,161	226,936	221,029	223,709
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	176,511	180,161	174,716	177,129
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	147,685	149,313	146,812	147,936
Q _a Volumetric flow rate, normal (Nm ³ /hr)	207,945	211,463	205,959	208,456
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	164,476	167,877	162,803	165,052
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	137,615	139,133	136,802	137,850

Comments:

Average includes 3 runs.

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Wheelabrator North 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 22	Mar 23	Mar 23	
Start Time (approx.)	09:37	06:40	11:36	
Stop Time (approx.)	13:58	11:05	15:56	
Process Conditions				
R _{sp} Steam Production Rate (Klbs/hr)	184.0	183.7	184.2	184.0
P ₁ Fabric Filter Inlet Temperature (°F)	310	310	310	310
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
C _{ap} Capacity factor (hours/year)	8,760	8,760	8,760	8,760
Gas Conditions				
O ₂ Oxygen (dry volume %)	9.2700	9.3800	9.2200	9.2900
CO ₂ Carbon dioxide (dry volume %)	10.2000	9.8400	10.3400	10.1267
T _s Sample temperature (°F)	311.8	312.4	312.4	312.2
B _w Actual water vapor in gas (% by volume)	20.9044	20.6116	20.9535	20.8231
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	194,733	199,214	194,126	196,024
Q _s Volumetric flow rate, standard (scfm)	131,330	133,552	130,076	131,653
Q _{std} Volumetric flow rate, dry standard (dscfm)	103,876	106,025	102,820	104,240
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	86,912	87,871	86,399	87,061
Q _a Volumetric flow rate, actual (acfm)	11,683,965	11,952,860	11,647,570	11,761,465
Q _s Volumetric flow rate, standard (scf/hr)	7,879,810	8,013,112	7,804,534	7,899,152
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	6,232,586	6,361,482	6,169,214	6,254,427
Q _a Volumetric flow rate, actual (m ³ /hr)	330,897	338,512	329,866	333,092
Q _s Volumetric flow rate, standard (m ³ /hr)	223,161	226,936	221,029	223,709
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	176,511	180,161	174,716	177,129
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	147,685	149,313	146,812	147,936
Q _s Volumetric flow rate, normal (Nm ³ /hr)	207,945	211,463	205,959	208,456
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	164,476	167,877	162,803	165,052
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	137,615	139,133	136,802	137,850
Sampling Data				
V _{std} Volume metered, standard (dscf)	163.3349	169.1864	164.2535	165.5916
%I Isokinetic sampling (%)	99.8142	101.2951	101.4066	100.8386
Laboratory Data from USEPA Method 23				
m _h Total PCDDs & PCDFs (ng)	5.39000	4.36020	5.21160	
m _{h,TEQ} Total TEQ PCDDs & PCDFs (ng)	0.04960	0.03812	0.04153	
Total PCDD/F Results (TEF=1)				
C _{std} PCDD/F Concentration (ng/dscm)	1.1652E+00	9.0999E-01	1.1204E+00	1.0652E+00
C _{std7} PCDD/F Concentration @7% O ₂ (ng/dscm)	1.3927E+00	1.0980E+00	1.3333E+00	1.2746E+00
C _{std12} PCDD/F Concentration @12% CO ₂ (ng/dscm)	1.3708E+00	1.1097E+00	1.3002E+00	1.2603E+00
C _{std} PCDD/F Concentration (ng/Nm ³ dry)	1.2505E+00	9.7658E-01	1.2023E+00	1.1431E+00
C _{std7} PCDD/F Concentration @7% O ₂ (ng/Nm ³ dry)	1.4946E+00	1.1783E+00	1.4309E+00	1.3679E+00
C _{std12} PCDD/F Concentration @12% CO ₂ (ng/Nm ³ dry)	1.4712E+00	1.1910E+00	1.3954E+00	1.3525E+00
E _{lb/hr} PCDD/F Rate (lb/hr)	4.5351E-07	3.6150E-07	4.3161E-07	4.1554E-07
E _{g/s} PCDD/F Rate (g/s)	5.7131E-08	4.5540E-08	5.4373E-08	5.2348E-08
E _{T/yr} PCDD/F Rate (Ton/yr)	1.9864E-06	1.5834E-06	1.8905E-06	1.8201E-06
E _{Fd} PCDD/F Rate - F _d -based (lb/MMBtu)	1.2749E-09	1.0052E-09	1.2206E-09	1.1669E-09
E _{Fc} PCDD/F Rate - F _c -based (lb/MMBtu)	1.2983E-09	1.0511E-09	1.2314E-09	1.1936E-09
E _{Rp} PCDD/F Rate - Production-based (lb/xxxxx)	2.4647E-09	1.9679E-09	2.3432E-09	2.2586E-09
E _{Rp} PCDD/F Rate - Production-based (g/xxxxx)	1.1178E-06	8.9246E-07	1.0627E-06	1.0243E-06
Total PCDD/F TEQ Results (using USEPA/INTL 2005 TEFs)				
C _{stdTEQ} TEQ Concentration (ng/dscm)	1.0723E-02	7.9560E-03	8.9272E-03	9.2019E-03
C _{std7TEQ} TEQ Concentration @7% O ₂ (ng/dscm)	1.2815E-02	9.5997E-03	1.0624E-02	1.1013E-02
C _{std12TEQ} TEQ Concentration @12% CO ₂ (ng/dscm)	1.2615E-02	9.7025E-03	1.0360E-02	1.0893E-02
C _{stdTEQ} TEQ Concentration (ng/Nm ³ dry)	1.1507E-02	8.5382E-03	9.5804E-03	9.8752E-03
C _{std7TEQ} TEQ Concentration @7% O ₂ (ng/Nm ³ dry)	1.3753E-02	1.0302E-02	1.1401E-02	1.1819E-02
C _{std12TEQ} TEQ Concentration @12% CO ₂ (ng/Nm ³ dry)	1.3538E-02	1.0412E-02	1.1118E-02	1.1690E-02
E _{lb/hrTEQ} TEQ Rate (lb/hr)	4.1733E-09	3.1606E-09	3.4392E-09	3.5910E-09
E _{g/sTEQ} TEQ Rate (g/sec)	5.2574E-10	3.9818E-10	4.3325E-10	4.5238E-10
E _{T/yrTEQ} TEQ Rate (Ton/yr)	1.8279E-08	1.3843E-08	1.5084E-08	1.5729E-08
E _{FdTEQ} TEQ Rate - F _d -based (lb/MMBtu)	1.1732E-11	8.7883E-12	9.7260E-12	1.0082E-11
E _{FcTEQ} TEQ Rate - F _c -based (lb/MMBtu)	1.1948E-11	9.1893E-12	9.8124E-12	1.0316E-11
E _{RpTEQ} TEQ Rate - Production-based (lb/xxxxx)	2.2681E-11	1.7205E-11	1.8671E-11	1.9519E-11
E _{RpTEQ} TEQ Rate - Production-based (g/xxxxx)	1.0286E-08	7.8028E-09	8.4675E-09	8.8521E-09

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

Max

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 22	Mar 23	Mar 23	
Start Time (approx.)	09:37	06:40	11:36	
Stop Time (approx.)	13:58	11:05	15:56	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	184.0	183.7	184.2	184.0
P ₁ Fabric Filter Inlet Temperature (°F)	310	310	310	310
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 %)	9.2700	9.3800	9.2200	9.2900
CO ₂ Carbon dioxide (dry volume %)	10.2000	9.8400	10.3400	10.1267
T _s Sample temperature (°F)	311.8	312.4	312.4	312.2
B _w Actual water vapor in gas (% by volume)	20.9044	20.6116	20.9535	20.8231
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	194,733	199,214	194,126	196,024
Q _s Volumetric flow rate, standard (scfm)	131,330	133,552	130,076	131,653
Q _{std} Volumetric flow rate, dry standard (dscfm)	103,876	106,025	102,820	104,240
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	86,912	87,871	86,399	87,061
Q _a Volumetric flow rate, actual (acf/hr)	11,683,965	11,952,860	11,647,570	11,761,465
Q _s Volumetric flow rate, standard (scf/hr)	7,879,810	8,013,112	7,804,534	7,899,152
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	6,232,586	6,361,482	6,169,214	6,254,427
Q _s Volumetric flow rate, actual (m ³ /hr)	330,897	338,512	329,866	333,092
Q _s Volumetric flow rate, standard (m ³ /hr)	223,161	226,936	221,029	223,709
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	176,511	180,161	174,716	177,129
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	147,885	149,313	146,812	147,936
Q _s Volumetric flow rate, normal (Nm ³ /hr)	207,045	211,463	205,959	208,456
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	164,476	167,877	162,803	165,052
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	137,615	139,133	136,802	137,850
Sampling Data				
V _{msd} Volume metered, standard (dscf)	163.3349	169.1864	164.2535	165.5916
%I Isokinetic sampling (%)	99.8142	101.2951	101.4066	100.8386
Laboratory Data from USEPA Method 23, including NDs and EMPCs				
m _n Total PCDDs & PCDFs (ng)	5.48000	4.51500	5.41800	
m _{n,TEQ} Total TEQ PCDDs & PCDFs (ng)	0.04970	0.04258	0.04480	
Total PCDD/F Results (TEF=1)				
C _{sd} PCDD/F Concentration (ng/dscm)	1.1847E+00	9.4230E-01	1.1647E+00	1.0972E+00
C _{sd7} PCDD/F Concentration @7% O ₂ (ng/dscm)	1.4159E+00	1.1370E+00	1.3861E+00	1.3130E+00
C _{sd12} PCDD/F Concentration @12% CO ₂ (ng/dscm)	1.3937E+00	1.1491E+00	1.3517E+00	1.2982E+00
C _{sd} PCDD/F Concentration (ng/Nm ³ dry)	1.2714E+00	1.0113E+00	1.2499E+00	1.1775E+00
C _{sd7} PCDD/F Concentration @7% O ₂ (ng/Nm ³ dry)	1.5195E+00	1.2202E+00	1.4875E+00	1.4091E+00
C _{sd12} PCDD/F Concentration @12% CO ₂ (ng/Nm ³ dry)	1.4957E+00	1.2332E+00	1.4506E+00	1.3932E+00
E _{sd7r} PCDD/F Rate (lb/hr)	4.6108E-07	3.7433E-07	4.4871E-07	4.2804E-07
E _{g/s} PCDD/F Rate (g/s)	5.8085E-08	4.7157E-08	5.6526E-08	5.3923E-08
E _{7yr} PCDD/F Rate (Ton/yr)	2.0195E-06	1.6396E-06	1.9653E-06	1.8746E-06
E _{fd} PCDD/F - F _d -based (lb/MMBtu)	1.2962E-09	1.0408E-09	1.2689E-09	1.2020E-09
E _{fc} PCDD/F Rate - F _c -based (lb/MMBtu)	1.3200E-09	1.0884E-09	1.2802E-09	1.2295E-09
E _{rp} PCDD/F Rate - Production-based (lb/xxxxx)	2.5059E-09	2.0377E-09	2.4360E-09	2.3265E-09
E _{rp} PCDD/F Rate - Production-based (g/xxxxx)	1.1365E-06	9.2415E-07	1.1048E-06	1.0551E-06
Total PCDD/F TEQ Results (using USEPA/INTL 2005 TEFs)				
C _{sd,TEQ} TEQ Concentration (ng/dscm)	1.0744E-02	8.8856E-03	9.6312E-03	9.7537E-03
C _{sd7,TEQ} TEQ Concentration @7% O ₂ (ng/dscm)	1.2841E-02	1.0721E-02	1.1462E-02	1.1675E-02
C _{sd12,TEQ} TEQ Concentration @12% CO ₂ (ng/dscm)	1.2640E-02	1.0836E-02	1.1177E-02	1.1551E-02
C _{sd,TEQ} TEQ Concentration (ng/Nm ³ dry)	1.1530E-02	9.5358E-03	1.0336E-02	1.0467E-02
C _{sd7,TEQ} TEQ Concentration @7% O ₂ (ng/Nm ³ dry)	1.3781E-02	1.1506E-02	1.2300E-02	1.2529E-02
C _{sd12,TEQ} TEQ Concentration @12% CO ₂ (ng/Nm ³ dry)	1.3565E-02	1.1629E-02	1.1995E-02	1.2396E-02
E _{sd7r,TEQ} TEQ Rate (lb/hr)	4.1817E-09	3.5298E-09	3.7104E-09	3.8073E-09
E _{g/s,TEQ} TEQ Rate (g/sec)	5.2680E-10	4.4468E-10	4.6742E-10	4.7963E-10
E _{7yr,TEQ} TEQ Rate (Ton/yr)	1.8316E-08	1.5461E-08	1.6252E-08	1.6676E-08
E _{fd,TEQ} TEQ Rate - F _d -based (lb/MMBtu)	1.1756E-11	9.8151E-12	1.0493E-11	1.0688E-11
E _{fc,TEQ} TEQ Rate - F _c -based (lb/MMBtu)	1.1972E-11	1.0263E-11	1.0586E-11	1.0940E-11
E _{rp,TEQ} TEQ Rate - Production-based (lb/xxxxx)	2.2727E-11	1.9215E-11	2.0143E-11	2.0695E-11
E _{rp,TEQ} TEQ Rate - Production-based (g/xxxxx)	1.0307E-08	8.7144E-09	9.1353E-09	9.3855E-09

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 3 SDA Inlet

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

Run No.	1	2	3	Average
Date (2011)	Mar 24	Mar 24	Mar 24	
Start Time (approx.)	06:57	08:25	10:24	
Stop Time (approx.)	07:57	09:25	11:24	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9882	0.9882	0.9882	
P _g Static pressure (in. H ₂ O)	-1.3000	-1.5000	-1.5000	
A _s Sample location area (ft ²)	60.1320	60.1320	60.1320	
P _{bar} Barometric pressure (in. Hg)	30.00	30.00	30.00	30.0000
O ₂ Oxygen (dry volume %)	8.3900	8.6800	9.6500	8.9067
CO ₂ Carbon dioxide (dry volume %)	10.9400	10.8300	9.9500	10.5733
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.6700	80.4900	80.4000	80.5200
V _{lc} Total Liquid collected (ml)	156.50	146.40	139.20	
V _m Volume metered, meter conditions (ft ³)	36.3150	36.2750	36.6900	
T _m Dry gas meter temperature (°F)	68.6667	74.2500	80.1667	
T _s Sample temperature (°F)	495.5000	500.9167	504.6667	500.3611
ΔH Meter box orifice pressure drop (in. H ₂ O)	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)	7.3649	6.8896	6.5508	6.9351
V _{mstd} Volume metered, standard (dscf)	36.0283	35.6125	35.6254	35.7554
P _s Sample gas pressure, absolute (in. Hg)	29.9044	29.8897	29.8897	29.8946
P _v Vapor pressure, actual (in. Hg)	29.9044	29.8897	29.8897	29.8946
B _{wc} Moisture measured in sample (% by volume)	16.9724	16.2100	15.5319	16.2381
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	16.9724	16.2100	15.5319	16.2381
M _d MW of sample gas, dry (lb/lb-mole)	30.0860	30.0800	29.9780	30.0480
M _s MW of sample gas, wet (lb/lb-mole)	28.0347	28.1218	28.1176	28.0914

Comments:

Average includes 3 runs.

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 3 SDA Inlet

USEPA Method 26A HCl Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 24	Mar 24	Mar 24	
Start Time (approx.)	06:57	08:25	10:24	
Stop Time (approx.)	07:57	09:25	11:24	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	184.6	183.4	183.3	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	309	310	310	310
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	8.6800	9.6500	8.9067
CO ₂ Carbon dioxide (dry volume %)	10.9400	10.8300	9.9500	10.5733
T _s Sample temperature (°F)	495.5000	500.9167	504.6667	500.3611
B _w Actual water vapor in gas (% by volume)	16.9724	16.2100	15.5319	16.2381
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	36.0283	35.6125	35.6254	35.7554
Laboratory Data				
m _n Total HCl collected (mg)	742.4467	755.5933	606.2081	
Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (lb/dscf)	4.5439E-05	4.6784E-05	3.7521E-05	4.3248E-05
C _{sd7} HCl Concentration @7% O ₂ (lb/dscf)	5.0488E-05	5.3215E-05	4.6359E-05	5.0021E-05
C _{sd12} HCl Concentration @12% CO ₂ (lb/dscf)	4.9842E-05	5.1838E-05	4.5251E-05	4.8977E-05
C _{sd} HCl Concentration (ppmdv)	480.4093	494.6242	396.6907	457.2414
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	533.7881	562.6250	490.1334	528.8488
C _{sd12} HCl Concentration @12% CO ₂ (ppmdv)	526.9571	548.0601	478.4209	517.8127
C _w HCl Concentration (ppmwv)	398.8721	414.4458	335.0772	382.7983
C _{sd} HCl Concentration (mg/dscm)	727.6436	749.1741	600.8407	692.5528
C _{sd7} HCl Concentration @7% O ₂ (mg/dscm)	808.4929	852.1702	742.3721	801.0118
C _{sd12} HCl Concentration @12% CO ₂ (mg/dscm)	798.1466	830.1098	724.6320	784.2961
C _{sd} HCl Concentration (mg/Nm ³ dry)	780.8859	803.9917	644.8047	743.2274
C _{sd7} HCl Concentration @7% O ₂ (mg/Nm ³ dry)	867.6510	914.5242	796.6920	859.6224
C _{sd12} HCl Concentration @12% CO ₂ (mg/Nm ³ dry)	856.5476	890.8496	777.6539	841.6837
E _{Fd} HCl Rate - Fd-based (lb/MMBtu)	0.7402	0.7801	0.6796	0.7333
E _{Fc} HCl Rate - Fc-based (lb/MMBtu)	0.7559	0.7862	0.6863	0.7428

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

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

Run No.	1	2	3	Average
Date (2011)	Mar 24	Mar 24	Mar 24	
Start Time (approx.)	06:57	08:25	10:24	
Stop Time (approx.)	07:57	09:25	11:24	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9995	0.9995	0.9995	
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
O ₂ Oxygen (dry volume %)	8.5400	9.0000	9.4400	8.9933
CO ₂ Carbon dioxide (dry volume %)	10.7700	10.4300	10.0600	10.4200
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.6900	80.5700	80.5000	80.5867
V _{lc} Total Liquid collected (ml)	235.40	231.50	223.10	
V _m Volume metered, meter conditions (ft ³)	41.4550	42.0650	42.2000	
T _m Dry gas meter temperature (°F)	74.5417	81.6250	90.4167	
T _s Sample temperature (°F)	311.1667	311.5000	311.7500	311.4722
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)	11.0779	10.8944	10.4991	10.8238
V _{mstd} Volume metered, standard (dscf)	41.1710	41.2305	40.7021	41.0346
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)	21.2022	20.9006	20.5055	20.8694
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	21.2022	20.9006	20.5055	20.8694
M _d MW of sample gas, dry (lb/lb-mole)	30.0648	30.0288	29.9872	30.0269
M _s MW of sample gas, wet (lb/lb-mole)	27.5068	27.5147	27.5292	27.5169

Comments:

Average includes 3 runs.

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

USEPA Method 26A HCl Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 24	Mar 24	Mar 24	
Start Time (approx.)	06:57	08:25	10:24	
Stop Time (approx.)	07:57	09:25	11:24	
Process Conditions				
R _P Steam Production Rate (Klbs/hr)	184.6	183.4	183.3	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	309	310	310	310
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 %)	8.5400	9.0000	9.4400	8.9933
CO ₂ Carbon dioxide (dry volume %)	10.7700	10.4300	10.0600	10.4200
T _s Sample temperature (°F)	311.1667	311.5000	311.7500	311.4722
B _w Actual water vapor in gas (% by volume)	21.2022	20.9006	20.5055	20.8694
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	41.1710	41.2305	40.7021	41.0346
Laboratory Data				
m _n Total HCl collected (mg)	20.1962	20.1005	11.9980	
Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (lb/dscf)	1.0816E-06	1.0750E-06	6.4998E-07	9.3553E-07
C _{sd7} HCl Concentration @7% O ₂ (lb/dscf)	1.2164E-06	1.2556E-06	7.8837E-07	1.0868E-06
C _{sd12} HCl Concentration @12% CO ₂ (lb/dscf)	1.2052E-06	1.2368E-06	7.7532E-07	1.0724E-06
C _{sd} HCl Concentration (ppmdv)	11.4358	11.3653	6.8720	9.8910
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	12.8607	13.2754	8.3351	11.4904
C _{sd12} HCl Concentration @12% CO ₂ (ppmdv)	12.7419	13.0760	8.1972	11.3384
C _w HCl Concentration (ppmwv)	9.0112	8.9899	5.4628	7.8213
C _{sd} HCl Concentration (mg/dscm)	17.3211	17.2142	10.4085	14.9813
C _{sd7} HCl Concentration @7% O ₂ (mg/dscm)	19.4792	20.1073	12.6247	17.4037
C _{sd12} HCl Concentration @12% CO ₂ (mg/dscm)	19.2993	19.8054	12.4157	17.1735
C _{sd} HCl Concentration (mg/Nm ³ dry)	18.5885	18.4738	11.1701	16.0775
C _{sd7} HCl Concentration @7% O ₂ (mg/Nm ³ dry)	20.9045	21.5786	13.5484	18.6772
C _{sd12} HCl Concentration @12% CO ₂ (mg/Nm ³ dry)	20.7114	21.2546	13.3242	18.4301
E _{Fd} HCl Rate - Fd-based (lb/MMBtu)	0.0178	0.0184	0.0116	0.0159
E _{Fc} HCl Rate - Fc-based (lb/MMBtu)	0.0183	0.0188	0.0118	0.0163

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Visible Emission Parameters

Run 1
Date (2011) Mar 25
Start Time 8:50

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	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

Average Opacity 0
Minimum Reading 0
Maximum Reading 0
No. of Readings >5% 0



Wheelabrator North Broward, Inc.
2600 NW 48th Street
Pompano Beach, FL 33073

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MAY 06 2011

AIR REGULATION

REPORT ON COMPLIANCE TESTING

Performed for:
WHEELABRATOR NORTH BROWARD, INC.
ASH HANDLING SYSTEM, LIME SILO VENT,
UNITS 1, 2 AND 3 SDA INLETS, FF OUTLETS AND STACKS
POMPANO BEACH, FL
VOLUME II OF II

Client Reference No: Service Agreement
CleanAir Project No: 11182-1
Revision 0: May 4, 2011

WHEELABRATOR NORTH BROWARD, INC.
POMPANO BEACH, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-1

QA/QC 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: MR

Date: 5/4/11



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Wheelabrator North 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 23	Mar 23	Mar 23
Start Time (approx.)	06:34	09:05	11:41
Stop Time (approx.)	08:45	11:17	13:52
Total Duration of Test Run (min.)	131	132	131
Net Sampling Time (min.)	125	125	125

Sampling System Calibration Summary

	Nozzle ID No:	270-1	270-1	270-1
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)	0.0264	0.0255	0.0261
(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	0.0040

Sample Volume

	Minimum Volume Required (dscf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dscf)	81.603	77.612	77.851

Alternative Method 5 Post-Test Calibration (EPA ALT-009)

√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	1.1724	1.1308	1.1436
Y _{qs}	Alternative Meter Calibration Factor	0.9855	0.9898	0.9892
	Variation from full-test Y _d (average ≤ ±5%)	0.1%	0.5%	0.5%

Average
0.4%

Mean Isokinetic Sampling Rate Variation

	Minimum Allowable (%)	90	90	90
	Maximum Allowable (%)	110	110	110
%I	Actual Variation (%)	99.40	98.75	97.91

Point-by-Point Isokinetic Variation

	Number of points <90%	0	1	0
	Number of points >110%	0	1	0
	Number of points <80%	0	0	0
	Number of points >120%	0	0	0

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Wheelabrator North 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 22	Mar 22	Mar 22
Start Time (approx.)	12:31	14:08	15:39
Stop Time (approx.)	13:41	15:17	16:47
Total Duration of Test Run (min.)	70	69	68
Net Sampling Time (min.)	63	63	63

Sampling System Calibration Summary

	Nozzle ID No:	271-2	271-2	271-2
D _n	Nozzle Diameter (in):	0.271	0.271	0.271
	Probe ID No:	67-8-20	67-8-20	67-8-20
C _p	Pitot Coefficient:	0.8180	0.8180	0.8180
	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	0.0265	0.0271
(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

Sample Volume

V _{mstd}	Minimum Volume Required (dscf)	30.00	30.00	30.00
	Actual Sample Volume (dscf)	37.446	39.599	40.410

Alternative Method 5 Post-Test Calibration (EPA ALT-009)

√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	1.0945	1.1618	1.1892
Y _{qa}	Alternative Meter Calibration Factor	1.0160	1.0139	1.0157
	Variation from full-test Y _d (average ≤ ±5%)	1.8%	1.6%	1.7%

Average
1.7%

Mean Isokinetic Sampling Rate Variation

	Minimum Allowable (%)	90	90	90
	Maximum Allowable (%)	110	110	110
%I	Actual Variation (%)	96.89	99.27	98.39

Point-by-Point Isokinetic Variation

	Number of points <90%	0	0	1
	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 North Broward, Inc.
Clean Air Project No: 11182
Unit 1 SDA Inlet

USEPA Method 26A (HCl) QA/QC Results

Run No.	1	2	3
Date (2011)	Mar 22	Mar 22	Mar 22
Start Time (approx.)	07:36	09:40	11:02
Stop Time (approx.)	08:36	10:40	12:02
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:	66-14	66-14	66-14
Y _d	Meter Box Yd - Field Sheet	0.9882	0.9882	0.9882
	Meter Box Yd - Database	0.9882	0.9882	0.9882
	Meter Box ΔH@ - Field Sheet	1.7571	1.7571	1.7571
	Meter Box ΔH@ - Database	1.7571	1.7571	1.7571

QA/QC

Final Leak Check

(a) 4% of Sampling Rate (cfm)	0.0239	0.0242	0.0241
(b) Allowable Rate from Method (cfm)	0.0200	0.0200	0.0200
Allowable Limit - minimum of a and b (cfm)	0.0200	0.0200	0.0200
Actual Final Leak Rate (cfm)	0.0020	0.0010	0.0030

Sample Volume

	Minimum Volume Required (dscf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dscf)	35.186	35.064	35.032

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	1.0232	1.0188	1.0203
	Variation from full-test Y _d (average ≤ ±5%)	3.5%	3.1%	3.2%

Average
3.3%

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

USEPA Method 26A (HCl) QA/QC Results

Run No.	1	2	3
Date (2011)	Mar 22	Mar 22	Mar 22
Start Time (approx.)	07:36	09:40	11:02
Stop Time (approx.)	08:36	10:40	12:02
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:	66-24	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

	<u>Final Leak Check</u>			
	(a) 4% of Sampling Rate (cfm)	0.0277	0.0282	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)	0.0010	0.0010	0.0010
	<u>Sample Volume</u>			
	Minimum Volume Required (dscf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dscf)	40.963	40.615	40.154
	<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	0.9815	0.9766	0.9862
	Variation from full-test Y _d (average ≤ ±5%)	-0.3%	-0.8%	0.1%

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Wheelabrator North 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 24	Mar 24	Mar 24
Start Time (approx.)	06:28	08:53	11:19
Stop Time (approx.)	08:38	11:03	14:30
Total Duration of Test Run (min.)	130	130	191
Net Sampling Time (min.)	125	125	125

Sampling System Calibration Summary

	Nozzle ID No:	270-1	270-1	270-1
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:	66-21	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)	0.0210	0.0226	0.0219
(b) Allowable Rate from Method (cfm)	0.0200	0.0200	0.0200
Allowable Limit - minimum of a and b (cfm)	0.0200	0.0200	0.0200
Actual Final Leak Rate (cfm)	0.0030	0.0030	0.0020

Sample Volume

	Minimum Volume Required (dscf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dscf)	64.487	68.240	64.772

Alternative Method 5 Post-Test Calibration (EPA ALT-009)

√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	0.9318	0.9995	0.9563
Y _{qa}	Alternative Meter Calibration Factor	0.9666	0.9716	0.9686
	Variation from full-test Y _d (average ≤ ±5%)	-1.7%	-1.2%	-1.5%

Average
-1.5%

Mean Isokinetic Sampling Rate Variation

	Minimum Allowable (%)	90	90	90
	Maximum Allowable (%)	110	110	110
%I	Actual Variation (%)	103.45	102.41	102.11

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 North 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 23	Mar 23	Mar 23
Start Time (approx.)	11:32	13:07	14:39
Stop Time (approx.)	12:45	14:17	15:45
Total Duration of Test Run (min.)	73	70	66
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:	67-8-20	67-8-20	67-8-20
C _p	Pitot Coefficient:	0.8180	0.8180	0.8180
	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)	0.0242	0.0252	0.0241
(b) Allowable Rate from Method (cfm)	0.0200	0.0200	0.0200
Allowable Limit - minimum of a and b (cfm)	0.0200	0.0200	0.0200
Actual Final Leak Rate (cfm)	0.0020	0.0020	0.0020

Sample Volume

	Minimum Volume Required (dscf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dscf)	36.385	37.863	36.378

Alternative Method 5 Post-Test Calibration (EPA ALT-009)

√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	1.0595	1.1011	1.0545
Y _{qs}	Alternative Meter Calibration Factor	0.9645	0.9645	0.9619
	Variation from full-test Y _d (average ≤ ±5%)	-2.0%	-2.0%	-2.2%

**Average
-2.0%**

Mean Isokinetic Sampling Rate Variation

	Minimum Allowable (%)	90	90	90
	Maximum Allowable (%)	110	110	110
%I	Actual Variation (%)	99.72	102.03	102.82

Point-by-Point Isokinetic Variation

	Number of points <90%	2	0	1
	Number of points >110%	1	0	1
	Number of points <80%	0	0	0
	Number of points >120%	1	0	0

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 2 SDA Inlet

USEPA Method 26A (HCl) QA/QC Results

Run No.	1	2	3
Date (2011)	Mar 23	Mar 23	Mar 23
Start Time (approx.)	07:12	08:38	09:59
Stop Time (approx.)	08:12	09:38	10:59
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:	66-14	66-14	66-14
Y _d	Meter Box Yd - Field Sheet	0.9882	0.9882	0.9882
	Meter Box Yd - Database	0.9882	0.9882	0.9882
	Meter Box ΔH@ - Field Sheet	1.7571	1.7571	1.7571
	Meter Box ΔH@ - Database	1.7571	1.7571	1.7571

QA/QC

Final Leak Check

(a) 4% of Sampling Rate (cfm)	0.0242	0.0242	0.0242
(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	0.0020	0.0020

Sample Volume

	Minimum Volume Required (dscf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dscf)	35.902	35.524	35.223

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	1.0049	1.0103	1.0128
	Variation from full-test Y _d (average ≤ ±5%)	1.7%	2.2%	2.5%

Average
2.1%

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

USEPA Method 26A (HCl) QA/QC Results

Run No.	1	2	3
Date (2011)	Mar 23	Mar 23	Mar 23
Start Time (approx.)	07:12	08:38	09:59
Stop Time (approx.)	08:12	09:38	10:59
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)	0.0281	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 _{matd}	Actual Sample Volume (dscf)	41.399	40.522	40.218

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	0.9708	0.9855	0.9899
	Variation from full-test Y _d (average ≤ ±5%)	-2.3%	-0.8%	-0.4%

Average
-1.2%

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Wheelabrator North 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 22	Mar 22	Mar 22
Start Time (approx.)	06:57	09:35	12:16
Stop Time (approx.)	09:10	11:50	14:30
Total Duration of Test Run (min.)	133	135	134
Net Sampling Time (min.)	125	125	125

Sampling System Calibration Summary

	Nozzle ID No:	270-1	270-1	270-1
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:	66-22	66-22	66-22
Y _d	Meter Box Yd - Field Sheet	0.9995	0.9995	0.9995
	Meter Box Yd - Database	0.9995	0.9995	0.9995
	Meter Box ΔH@ - Field Sheet	1.6892	1.6892	1.6892
	Meter Box ΔH@ - Database	1.6892	1.6892	1.6892

QA/QC

Final Leak Check

(a) 4% of Sampling Rate (cfm)	0.0242	0.0232	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)	0.0060	0.0030	0.0040

Sample Volume

	Minimum Volume Required (dscf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dscf)	75.258	70.801	74.402

Alternative Method 5 Post-Test Calibration (EPA ALT-009)

√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	1.0612	1.0103	1.0750
Y _{qa}	Alternative Meter Calibration Factor	0.9974	0.9984	1.0049
	Variation from full-test Y _d (average ≤ ±5%)	-0.2%	-0.1%	0.5%

Average
0.1%

Mean Isokinetic Sampling Rate Variation

	Minimum Allowable (%)	90	90	90
	Maximum Allowable (%)	110	110	110
%I	Actual Variation (%)	99.75	99.33	99.67

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 North 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 22	Mar 23	Mar 23
Start Time (approx.)	09:37	06:40	11:36
Stop Time (approx.)	13:58	11:05	15:56
Total Duration of Test Run (min.)	261	265	260
Net Sampling Time (min.)	250	250	250

Sampling System Calibration Summary

	Nozzle ID No:	272-1	272-1	271-1
D _n	Nozzle Diameter (in):	0.272	0.272	0.272
	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:	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)	0.0270	0.0277	0.0274
(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	0.0020	0.0020

Sample Volume

	Minimum Volume Required (dscf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dscf)	163.335	169.186	164.253

Alternative Method 5 Post-Test Calibration (EPA ALT-009)

√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	1.1756	1.2060	1.1815
Y _{qa}	Alternative Meter Calibration Factor	0.9784	0.9744	0.9736
	Variation from full-test Y _d (average ≤ ±5%)	-1.8%	-2.2%	-2.3%

Average
-2.1%

Mean Isokinetic Sampling Rate Variation

	Minimum Allowable (%)	90	90	90
	Maximum Allowable (%)	110	110	110
%I	Actual Variation (%)	99.81	101.30	101.41

Point-by-Point Isokinetic Variation

	Number of points <90%	2	0	0
	Number of points >110%	2	0	0
	Number of points <80%	1	0	0
	Number of points >120%	0	0	0

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 3 SDA Inlet

USEPA Method 26A (HCl) QA/QC Results

Run No.	1	2	3
Date (2011)	Mar 24	Mar 24	Mar 24
Start Time (approx.)	06:57	08:25	10:24
Stop Time (approx.)	07:57	09:25	11:24
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:	66-14	66-14	66-14
Y _d	Meter Box Yd - Field Sheet	0.9882	0.9882	0.9882
	Meter Box Yd - Database	0.9882	0.9882	0.9882
	Meter Box ΔH@ - Field Sheet	1.7571	1.7571	1.7571
	Meter Box ΔH@ - Database	1.7571	1.7571	1.7571

QA/QC

	<u>Final Leak Check</u>			
	(a) 4% of Sampling Rate (cfm)	0.0242	0.0242	0.0245
	(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	0.0020	0.0020
	<u>Sample Volume</u>			
	Minimum Volume Required (dscf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dscf)	36.028	35.613	35.625
	<u>Alternative Method 5 Post-Test Calibration (EPA ALT-009)</u>			
√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	1.0954	1.0954	1.0954
Y _{qa}	Alternative Meter Calibration Factor	1.0029	1.0094	1.0052
	Variation from full-test Y _d (average ≤ ±5%)	1.5%	2.1%	1.7%

Average
1.8%

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

USEPA Method 26A (HCl) QA/QC Results

Run No.	1	2	3
Date (2011)	Mar 24	Mar 24	Mar 24
Start Time (approx.)	06:57	08:25	10:24
Stop Time (approx.)	07:57	09:25	11:24
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:	66-22	66-22	66-22
Y _d	Meter Box Yd - Field Sheet	0.9995	0.9995	0.9995
	Meter Box Yd - Database	0.9995	0.9995	0.9995
	Meter Box ΔH@ - Field Sheet	1.6892	1.6892	1.6892
	Meter Box ΔH@ - Database	1.6892	1.6892	1.6892

QA/QC

	<u>Final Leak Check</u>			
	(a) 4% of Sampling Rate (cfm)	0.0276	0.0280	0.0281
	(b) Allowable Rate from Method (cfm)	0.0200	0.0200	0.0200
	Allowable Limit - minimum of a and b (cfm)	0.0200	0.0200	0.0200
	Actual Final Leak Rate (cfm)	0.0040	0.0020	0.0010
	<u>Sample Volume</u>			
	Minimum Volume Required (dscf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dscf)	41.171	41.230	40.702
	<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	1.0073	0.9999	1.0054
	Variation from full-test Y _d (average ≤ ±5%)	0.8%	0.0%	0.6%

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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>0084536</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																	0.99357	1.76758

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)
4.7	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: Omega CL23A

Serial No: T-225950

Calibrated By: JH Metrology

Exp. Date : 10/7/2010

Calibration Report No: RO44791

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: 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	5.046	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	5.046	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), $Y_i \leq Y_{avg} \pm 0.02$ 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)
5.2	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: 88-4

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

$$Y_i = \frac{K' \times P_b \times (T_m + 460) \times \theta}{17.64 \times V_m \times (P_b + \frac{\Delta H}{13.6}) \times \sqrt{T_{amb} + 460}}$$

$$\Delta Y_i = \frac{Y_i - \bar{Y}}{\bar{Y}} \times 100$$

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

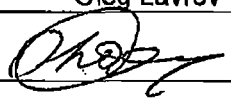
Meter Box No: 66-7

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	10.161	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 _n (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

$$Y_i = \frac{K' \times P_b \times (T_m + 460) \times \theta}{17.64 \times V_m \times \left(P_b + \frac{\Delta H}{13.6}\right) \times \sqrt{T_{amb} + 460}}$$

$$\Delta Y_i = \frac{Y_i - \bar{Y}_i}{\bar{Y}_i} \times 100$$

Spec. : $\Delta Y_i \leq \pm 2\%$

$$Cal. Error = \frac{\bar{Y}_i - Y_d}{Y_d} \times 100$$

Spec. : $Cal. Error \leq \pm 5\%$

Meter Box Full Test Calibration

Meter Box No: 66-14

Date of Calibration: 9/14/2010

Meter Box Y_d : 0.9882

Calibration Conducted by: O. Lavrov

Meter Box $\Delta H@$: 1.7571

Barometric Pressure: 29.33

				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	$\Delta H@$
0.948	3.00	-1.80	1.0000	0.000	10.000	10.000	229.379	239.467	10.088	76.5	76.5	76.50	86.0	77.0	81.50	10.17	0.9886	1.8089
0.944	3.00	-1.80	1.0000	0.000	10.000	10.000	239.467	249.597	10.130	76.5	76.5	76.50	88.0	79.0	83.50	10.22	0.9881	1.8199
0.393	0.50	-1.10	1.0000	0.000	5.000	5.000	259.861	264.964	5.103	76.5	76.5	76.50	85.0	81.0	83.00	12.28	0.9877	1.7452
0.392	0.50	-1.10	1.0000	0.000	5.000	5.000	264.964	270.058	5.094	76.5	76.5	76.50	85.0	81.0	83.00	12.31	0.9895	1.7537
0.686	1.50	-1.40	1.0000	0.000	10.000	10.000	274.147	284.371	10.224	76.5	76.5	76.50	90.0	82.0	86.00	14.05	0.9882	1.7103
0.687	1.50	-1.40	1.0000	0.000	10.000	10.000	284.371	294.613	10.242	76.5	76.5	76.50	90.0	83.0	86.50	14.04	0.9874	1.7047
Averages																	0.98823	1.75712

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)
5.4	5.0
10.4	10.0
15.6	15.0
20.5	20.0
24.5	25.0

Meter Box - Pyrometer Calibration Sheet

Meter Box No: 66-14 Office: _____

Calibrated by: O. Lavrov Client: _____

Date: 9/14/10 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	49	52	52				
100	99	102	102				
150	149	152	151				
200	199	202	202				
250	249	252	252				
300	299	302	302				
350	349	352	351				
400	399	402	401				
450	449	452	451				
500	499	502	501				
550	549	552	551				
600	599	602	601				

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. 66-14A Orifice A-4
 Location Warehouse Meter Yd 0.9882 Orifice K' 0.4934
 Test Date 04/04/11 Meter ΔH@ 1.7571 Orifice Cal. Date 02/09/11
 Operator N Hitchins Full Test Cal. Date 09/14/10

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) 28.05 in. Hg

Run	Elapsed Time (minutes)	Meter Volume (cc)	Meter Temperature		Ambient Temp. (°F)	Orifice ΔH (in. W.C.)	Vacuum (in. Hg)	Net Run Time - θ (minutes)	Net Meter Volume for Run - V _m (cc)	Avg Meter Temp. for Run T _m (°F)	DGM Calibration Factor - Y _i	Percent Variation - ΔY _i
			Inlet (°F)	Outlet (°F)								
	0.0	293.005	66	69								
1	5.0	296.28	65	69	68	1.30	14.0	5.0	3.27	67.3	0.9765	0.2%
2	10.0	299.56	65	71	69	1.30	14.0	5.0	3.28	67.5	0.9746	0.0%
3	15.0	302.850	65	71	70	1.30	14.0	5.0	3.29	68.0	0.9716	-0.3%

Average Y_i

0.9742

Cal. Error

-1.4%

Calculations and Specifications

$$Y_i = \frac{K' \times P_b \times (T_m + 460) \times \theta}{17.64 \times V_m \times \left(P_b + \frac{\Delta H}{13.6}\right) \times \sqrt{T_{amb} + 460}}$$

$$\Delta Y_i = \frac{Y_i - \bar{Y}_i}{\bar{Y}_i} \times 100$$

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: 66-21

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. (°F)	Orifice ΔH (in. W.C.)	Vacuum (in. Hg)	Net Run Time - Q (minutes)	Net Meter Volume for Run - V _n (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: 66-22

Date of Calibration: 10/7/2010

Meter Box Y_d : 0.9995

Calibration Conducted by: Jeff Ivens

Meter Box $\Delta H@$: 1.6892

Signature: [Signature]

Barometric Pressure: 29.28

				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	$\Delta H@$
0.987	3.00	-1.80	1.0000	0.000	10.000	10.000	240.588	250.673	10.085	74.0	74.0	74.00	89.0	81.0	85.00	9.80	0.9999	1.6545
0.987	3.00	-1.80	1.0000	0.000	10.000	10.000	250.673	260.783	10.110	74.0	74.0	74.00	89.0	81.0	85.00	9.80	0.9974	1.6545
0.392	0.50	-1.20	1.0000	0.000	5.000	5.000	280.338	285.393	5.057	74.5	74.5	74.50	85.0	82.0	83.50	12.32	1.0011	1.7433
0.392	0.50	-1.20	1.0000	0.000	5.000	5.000	285.393	290.451	5.058	74.5	74.5	74.50	85.0	82.0	83.50	12.32	1.0009	1.7433
0.693	1.50	-1.50	1.0000	0.000	10.000	10.000	304.800	314.956	10.156	75.0	75.0	75.00	90.0	84.0	87.00	13.94	0.9992	1.6709
0.693	1.50	-1.50	1.0000	0.000	10.000	10.000	314.956	325.118	10.162	75.0	75.0	75.00	90.0	84.0	87.00	13.93	0.9986	1.6685
Averages																	0.99951	1.68917

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
10.1	10.0
15.3	15.0
20.4	20.0
25.4	25.0

Meter Box - Pyrometer Calibration Sheet

Meter Box No: 66-22

Office: _____

Calibrated by: Jeff Ivens

Client: _____

Date: 10/7/10

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	49	51	52				
100	99	101	102				
150	149	151	152				
200	199	201	202				
250	249	250	252				
300	299	301	302				
350	349	351	352				
400	399	401	402				
450	449	451	452				
500	499	501	502				
550	549	551	552				
600	599	601	602				

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>8/17/2011</u>
Calibration Report No: <u>T-279500</u>	

Meter Box Critical Orifice Post-Test Calibration Data

Project No. 11182 Meter No. 66-22 Orifice A-2
 Location warehouse Meter Yd 0.9995 Orifice K' 0.4522
 Test Date 04/06/11 Meter ΔH@ 1.6892 Orifice Cal. Date 02/09/11
 Operator P. Bihun Full Test Cal. Date 10/07/10

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) 28.29 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	135.00	68	66								
1	5.0	137.98	68	66	72	1.00	20	5.0	2.98	67.0	0.9802	-0.2%
2	10.0	140.95	69	67	73	1.00	20	5.0	2.97	67.5	0.9835	0.1%
3	15.0	143.92	70	67	75	1.00	20	5.0	2.97	68.3	0.9831	0.1%

Average Y_i 0.9823

Cal. Error -1.7%

Calculations and Specifications

$$Y_i = \frac{K' \times P_b \times (T_m + 460) \times \theta}{17.64 \times V_m \times (P_b + \frac{\Delta H}{13.6}) \times \sqrt{T_{amb} + 460}}$$

$$\Delta Y_i = \frac{Y_i - \bar{Y}_i}{\bar{Y}_i} \times 100 \quad \text{Spec.: } \Delta Y_i \leq \pm 2\%$$

$$\text{Cal. Error} = \frac{\bar{Y}_i - Y_d}{Y_d} \times 100 \quad \text{Spec.: } \text{Cal. Error} \leq \pm 5\%$$

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. 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) $\Delta H@_i \leq \Delta H@_{avg} \pm 0.2$ 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)
4.4	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

$$Y_i = \frac{K' \times P_b \times (T_m + 460) \times \theta}{17.64 \times V_m \times (P_b + \frac{\Delta H}{13.6}) \times \sqrt{T_{amb} + 460}}$$

$$\Delta Y_i = \frac{Y_i - \bar{Y}_i}{\bar{Y}_i} \times 100 \quad \text{Spec. : } \Delta Y_i \leq \pm 2\%$$

$$\text{Cal. Error} = \frac{\bar{Y}_i - Y_d}{Y_d} \times 100 \quad \text{Spec. : } \text{Cal. Error} \leq \pm 5\%$$

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	'B' Average C _p	Difference
0.833	0.826	0.007

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= 0.830

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: 67-8-20

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	64	64	0	0.00%	%Difference ≤ 1.5
2	200°F-250°F	233	230	3	0.43%	

* Based on Absolute Temperature (Rankine)

Does thermocouple assembly meet specifications? YES

Pitot Tube Calibration (Wind Tunnel Method @ 50 ft/sec)

Reference Pitot I.D. No: Wind Tunnel

Reference Pitot Cp: 0.99

Pitot Side 'A':

Trial No.	Reference ΔP	Probe ΔP	Probe C _{P(S)} *	Abs. Deviation from Avg. C _{P(A)} **
1	0.565	0.823	0.820	0.000
2	0.564	0.822	0.820	0.000
3	0.565	0.821	0.821	0.000
Side 'A' Average Probe C _{P(A)} =			0.8205	0.0003

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	0.568	0.830	0.819	0.004
2	0.565	0.833	0.815	0.000
3	0.559	0.832	0.811	0.004
Side 'B' Average Probe C _{P(B)} =			0.8150	0.0026

Specification
Avg. C_p Deviations ≤ 0.01

'A' Average C _p	'B' Average C _p	Difference
0.821	0.815	0.006

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.

$$* C_{P(S)} = C_{P(STD)} \sqrt{\frac{\Delta P_{(STD)}}{\Delta P_{(S)}}}$$

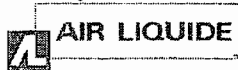
$$** Deviation = |C_{P(S)} - \overline{C_{P(A \text{ or } B)}}|$$

All specifications are from EPA-600/9-76-005, section 3.1

Probe Cp= 0.818

Calibrated by: B. Arnold

Date: 03/14/2011



Air Liquide America
Specialty Gases LLC



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 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.: 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

Certification Date: 28Feb2011

Exp. Date: 27Feb2014

Cylinder Pressure***: 2000 PSIG

COMPONENT

OXYGEN
CARBON DIOXIDE
NITROGEN

CERTIFIED CONCENTRATION (Moles)

6.05 %
13.9 %
BALANCE

ACCURACY**

+/- 1 %
+/- 1 %

TRACEABILITY

Direct NIST and VSL
Direct NIST and VSL

*** 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#
CAI/110P/V03018
PIR/2000/609015

DATE LAST CALIBRATED
24Feb2011
04Feb2011

ANALYTICAL PRINCIPLE
PARAMAGNETIC
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 = 1.000039653 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**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 GasAssay LaboratoryAIR LIQUIDE AMERICA SPECIALTY GASES LLC
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: 58568-71-65000

Document #: 39624159-002

CustomerCLEAN AIR INSTRUMENT RENTAL
GARY ZAPPEL
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

COMPONENTCERTIFIED CONCENTRATION (Moles)ACCURACY**TRACEABILITYOXYGEN
CARBON DIOXIDE
NITROGEN14.1 %
5.93 %
BALANCE+/- 1%
+/- 1%Direct NIST and VSL
Direct NIST and VSL

*** 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

INSTRUMENTATIONINSTRUMENT/MODEL/SERIAL#CAI/110P/V03018
PR/2000/609015DATE LAST CALIBRATED15Nov2010
01Dec2010ANALYTICAL PRINCIPLEPARAMAGNETIC
NDIR**ANALYZER READINGS**

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

First Triad AnalysisSecond Triad AnalysisCalibration Curve**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 %Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.999998Constants: 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 = -0.999993Constants: A = -0.00428797
B = 0.132701577 C = -0.0001549
D = 0.000011295 E = 0

APPROVED BY:

JEFF CROTEAU

Page 1 of 1

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WHEELABRATOR NORTH BROWARD, INC.
POMPANO BEACH, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-1

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: _____

Date: _____



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TEST LOCATION: PT OutletUNIT: 1RUN: 1

TESTING FIELD DATA SHEET

METHOD: 5129 PAGE 1 OF 2

Client: <u>Wheelabrator</u>	Project No: <u>11182</u>
Plant: <u>N. Broward</u>	Date: <u>3/23/11</u>
Meter Operator: <u>P. Brown</u>	
Probe Operator: <u>P. Brown</u>	

Meter Box: <u>66-24</u>	Sample Box No: <u>M 3</u>
Meter Yd: <u>0.9847</u>	Meter ΔH: <u>1.7639</u>
K Factor: <u>2.52</u>	Pilot C: <u>0.13</u>
Leak Rate Before: <u>0.004</u> (cfm) [Lpm]	@ <u>12</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

Duct Dimensions (in.) 96x96

Static Pres. (in. H ₂ O): <u>-11.7</u>	Port Len. (in.): <u>10.0</u>	Gas Flow (in. [Out] of page): <u>0</u>	First point all the way (in. [Out]): <u>0</u>

Amb. Temp. (°F): <u>68</u>	Bar. Press: <u>30.10</u> (in. Hg) (mbar)
Probe I.D. No: <u>67-f-3</u>	
Liner Material: <u>CR 15</u>	

Filter No: <u>23-13</u>	
Thimble No: <u>N/A</u>	
Nozzle Diameter: <u>0.270</u>	Nozzle I.D.: <u>270-1</u>

Start Time: <u>6:34</u>	Stop Time: <u>8:41</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. (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 _{m in} (°F)	DGM Outlet T _{m out} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp. T _t (°F)	Notes
5-1	5	0.45	1.1	541.450	307	254	252	65	67	67	4.0	N/A	100
2	10	0.51	1.3	547.80	303	253	252	47	66	64	4.5		10.1
3	15	0.59	1.5	551.20	302	251	246	45	67	64	5.0		10.4
4	20	0.69	1.7	554.80	302	248	244	45	69	64	5.5		9.8
5	25	0.62	1.6	558.350	304	250	282	46	70	64	5.5		9.0
4-1	30	0.51	1.3	561.61	303	244	280	50	69	65	5.0		9.2
2	35	0.49	1.2	564.67	302	252	250	49	70	65	4.5		10.0
3	40	0.53	1.3	567.90	301	251	250	50	71	66	5.0		9.6
4	45	0.69	1.7	571.53	303	244	280	51	72	66	5.5		9.8
5	50	0.67	1.7	575.150	304	250	250	51	74	66	5.5		10.0
3-1	55	0.48	1.2	578.32	304	249	250	54	73	67	5.0		9.8
2	60	0.52	1.3	581.54	303	246	249	53	73	67	5.0		9.6
Total		<u>10.7407</u>		<u>82.415</u>									
Average		<u>1.3810</u>			<u>302.600</u>				<u>69.8600</u>				

Sum of square roots

Circle correct bracketed units on data sheet.

QA/QC: PTB
Date: 3/23/11

TEST LOCATION: RF Outlet
 UNIT: 1 RUN: 1

Parhulale/Metals TESTING
FIELD DATA SHEET

METHOD: 5729 PAGE 2 OF 2

Client: <u>Wheelabrator</u>	Project No: <u>11182</u>
Plant: <u>N. Brown</u>	Date: <u>3/23/11</u>
Meter Operator: <u>P. Bihun</u>	
Probe Operator: <u>P. Bihun</u>	

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		

Meter Box	Sample Box No.
Meter Y _a	Meter ΔH _a
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 ☐	

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. (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
	5					200	200		74	67			0.2
3	65	0.60	1.5	584.95	304	247	243	54	74	68	5.5	N/A	10.2
4	70	0.71	1.8	588.72	305	248	244	55	74	68	6.0		9.9
5	75	0.72	1.8	592.45	304	250	245	55	74	68	6.0		9.3
2-1	80	0.63	1.6	596.08	302	251	247	57	74	68	5.5		8.8
2	85	0.48	1.1	599.06	301	251	249	57	74	68	4.5		9.3
3	90	0.45	1.1	602.03	301	251	251	57	74	69	4.5		9.3
4	95	0.53	1.3	605.25	302	248	250	57	74	69	5.0		8.9
5	100	0.60	1.5	608.65	303	250	243	58	76	69	5.5		8.9
1-1	105	0.43	1.1	611.57	301	247	241	60	74	70	4.5		10.1
2	110	0.43	1.1	614.52	301	251	245	61	75	70	4.5		10.0
3	115	0.49	1.2	617.61	299	251	251	61	76	70	5.0		11.0
4	120	0.46	1.2	620.70	302	250	253	62	75	71	5.0		10.2
5	125	0.56	1.4	624.02	302	250	251	62	75	71	5.5		9.7
Total													
Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: PTB
 Date: 3/23/11



TEST LOCATION: FF Outlet
 UNIT: 1 RUN: 2

TESTING FIELD DATA SHEET

METHOD: 5729 PAGE 1 OF 2

Client: Whitcomb Project No.: 11182
 Plant: N. Brown Date: 3/23/11
 Meter Operator: P. Bilgus
 Probe Operator: P. Bilgus

Meter Box: 660-24 Sample Box No.: M10
 Meter Y: 0.9847 Meter ΔH: 1.7639
 K Factor: 2.52 Pilot C: 0.83
 Leak Rate Before: 0.004 (mm) [Lpm] @ 11 (in. Hg)
 Leak Rate After: 0.004 (mm) [Lpm] @ 10 (in. Hg)
 Pilot 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
<u>-4.5</u>	<u>10.0</u>	<u>(in)</u> [Out]	<u>(In)</u> [Out]

Amb. Temp. (°F): 70 Bar. Press: 30.10 (in. Hg) (mbar)
 Probe ID No.: 67-83
 Liner Material: 665

Filter No.: 03-14
 Thimble No.: N/A
 Nozzle Diameter: 0.270 Nozzle ID: 270-1

Start Time: 9:05 Stop Time: 4:17

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) [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
5-1	5	0.54	1.4	624.280	303	257	252	65	73	72	5.0	N/A	9.5
2	10	0.46	1.2	630.77	303	254	260	62	75	72	4.5		9.6
3	15	0.53	1.3	634.00	302	252	253	59	77	72	4.5		9.4
4	20	0.63	1.6	637.57	303	248	251	58	78	73	5.0		9.7
5	25	0.60	1.5	641.035	303	250	249	59	79	73	5.0		9.7
4-1	30	0.48	1.2	644.20	302	249	251	62	79	74	4.5		9.8
2	35	0.45	1.1	647.12	303	251	251	62	79	74	4.0		9.7
3	40	0.59	1.5	650.57	302	251	250	63	80	75	5.0		9.4
4	45	0.64	1.6	654.16	304	249	251	63	81	75	5.0		8.8
5	50	0.64	1.6	657.730	303	250	250	62	81	75	5.0		9.6
3-1	55	0.49	1.2	660.87	302	249	253	63	81	76	4.5		9.3
2	60	0.43	1.1	663.81	302	251	254	62	82	76	4.5		9.0
Total				79.795									
Average		0.7125	1.2888	3019600					79.2400				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: PB
 Date: 3/23/11



14.3

3032

1832

TEST LOCATION: FF Outlet
 UNIT: 1 RUN: 2

Particulate / Metals TESTING
FIELD DATA SHEET

METHOD: 5729 PAGE 2 OF 2

Client: <u>Wheeler</u>	Project No.: <u>11142</u>
Plant: <u>N. Broward</u>	Date: <u>3/23/11</u>
Meter Operator: <u>P. Bihun</u>	
Probe Operator: <u>P. Bihun</u>	

Meter Box	Sample Box No.
Meter Y ₂	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)	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 _i (°F)	Notes
3	65	0.52	1.3	667.03	302	251	247	57	83	77	4.5	N/A	9.6
4	70	0.58	1.1	670.55	303	249	249	47	83	77	5.0		9.6
5	75	0.59	1.1	674.03	303	249	249	46	86	78	5.0		9.3
2-1	80	0.49	1.2	677.16	303	249	251	50	85	79	4.5		9.7
2	85	0.45	1.1	680.08	303	251	248	48	86	80	4.1		10.0
3	90	0.42	1.1	682.98	300	252	249	49	86	80	4.1		9.1
4	95	0.55	1.4	686.37	302	245	246	50	86	80	5.0		9.6
5	100	0.68	1.7	690.05	301	250	245	52	85	80	5.1		9.7
1-1	105	0.39	0.98	692.91	301	250	250	57	84	80	4.0		8.6
2	110	0.39	0.98	695.68	300	251	243	58	84	80	4.0		9.8
3	115	0.34	0.86	698.28	295	251	253	56	83	80	4.0		9.8
4	120	0.40	1.0	701.09	301	249	253	57	83	80	4.1		9.7
5	125	0.51	1.3	704.31	303	250	252	57	85	80	5.0		9.2
Total													
Average													

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC PB
 Date 3/23/11



TEST LOCATION: FF On/Hot
UNIT: 1 RUN: 3

FIELD DATA SHEET

METHOD: 5729 PAGE 1 OF 2

Client	Whelan, Brian	Project No.	11182
Plant	N. Broward	Date	3/23/11
Meter Operator	P. Bihun		
Probe Operator	P. Bihun		

Meter Box	66-24	Sample Box No.	M4
Meter Yr.	09847	Meter ΔH ₀	17639
K-Factor	2.52	Pitot C _p	0.83
Leak Rate Before	0.004 (cfm)	[Lpm]	@ 12 (in. Hg)
Leak Rate After	0.004 (cfm)	[Lpm]	@ 11 (in. Hg)
Pitot Leak Check Before	☒	After: Good	☒ Bad ☐

Cross-Section of Test Location



Amb. Temp. (°F)	78	Bar. Press.	30.10	(in. Hg) (mbar)
Probe I.D. No.	67-f-3			
Liner Material	PVC			

Filter No.	C3-11		
Thimble No.	N/A		
Nozzle Diameter	0.7711	Nozzle I.D.	270-1

Start Time: 11:41	Stop Time: 12:52

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 T_t (°F)	Notes
						Set Points							
				704.740		210	250						0.2
1	5	0.41	1.0	707.62	303	259	246	65	83	83	4.0	N/A	10.1
2	10	0.42	1.1	710.53	304	252	256	59	85	83	4.0		9.0
3	15	0.49	1.2	713.65	303	252	252	56	87	83	4.0		8.3
4	20	0.57	1.4	716.95	303	249	253	54	88	84	4.5		8.9
5	25	0.58	1.5	720.470	303	249	249	56	89	84	4.5		8.8 720.531
4-1	30	0.41	1.0	723.35	302	243	253	61	90	84	4.0		9.4 690.65
2	35	0.40	1.0	726.17	304	249	250	62	90	85	4.0		9.6
3	40	0.46	1.2	729.32	302	252	249	63	90	86	4.0		9.3
4	45	0.58	1.5	732.79	304	250	251	64	91	86	4.5		9.7
5	50	0.63	1.6	736.400	303	250	250	64	92	86	4.5		9.5 736.442
3-1	55	0.36	0.91	739.14	302	249	251	59	91	87	3.5		10.2 904
2	60	0.44	1.1	742.10	303	251	250	54	91	87	4.0		9.9
	Total			81.420									
	Average	0.707	1.320		302.8000				88.6000				

Circle correct bracketed units on data sheets.

QA/QC PB
Date 3/23/11



CleanAir
ENGINEERING

TEST LOCATION: FF Outlet
 UNIT: 1 RUN: 3

Part 1 Metals TESTING
 FIELD DATA SHEET

METHOD: 5129 PAGE 2 OF 2

Client <u>Wheelabrator</u>	Project No. <u>11102</u>
Plant <u>N. Broward</u>	Date <u>3/23/11</u>
Meter Operator <u>P. Bihun</u>	
Probe Operator <u>P. Bihun</u>	

Meter Box	Sample Box No.
Meter Y ₂	Meter ΔH ₂
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 _{ms} 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								
						250	250							
3	65	0.54	1.4	745.44	302	251	249	51	90	87	4.5	N/A	9.8	
4	70	0.62	1.6	749.06	303	249	250	52	91	87	5.0		9.7	
2-1	75	0.75	1.9	752.99	305	249	249	52	92	88	5.5		10.2	253.45
	80	0.55	1.4	756.42	302	249	250	58	91	88	4.5		10.4	(-9.05)
2	85	0.46	1.2	759.60	303	251	249	57	92	88	4.5		9.8	
3	90	0.56	1.4	762.94	302	251	248	58	93	88	4.5		10.6	
4	95	0.61	1.5	766.45	303	244	248	59	93	88	5.0		10.7	
1-1	100	0.80	2.0	770.48	305	244	248	59	93	89	5.5		10.6	770.53
	105	0.48	1.2	773.65	302	248	253	61	92	89	4.5		10.5	(-9.04)
2	110	0.47	1.2	776.81	302	251	253	62	92	89	4.5		9.7	
3	115	0.47	1.2	779.94	299	251	248	63	92	89	4.5		10.3	
4	120	0.49	1.2	783.07	303	249	248	64	93	89	4.5		10.2	
5	125	0.52	1.3	786.36	303	250	249	64	93	89	4.5		9.2	
Total														
Average														

Sum of square roots.

Circle correct bracketed units on data sheet.

Impinger Weight Sheet

Client Wheelabrator	Unit Name/Location Unit 1 FF Outlet
Plant North Broward	Job No. 11182 Method 5/29

Run No. 1	Filter Type Quartz	Sample Box No. M3
Date 3/23/11	Lot No.	pH
Analyst Daniel Luckhard	Filter No. e3-13	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	706.4	451.6	254.8	
Impinger 2	100 ml 5% HNO3/10% H2O2	690.1	564.9	125.2	QA/QC DC
Impinger 3	100 ml 5% HNO3/10% H2O2	605.4	566.3	39.1	Date 3/23/11
Impinger 4	Empty	456.6	449.1	7.5	
Impinger 5	100 ml 4% KMnO4/10% H2SO4	542.2	537.7	4.5	Total Weight (gm)
Impinger 6	100 ml 4% KMnO4/10% H2SO4	531.4	530.1	1.3	432.4
Impinger 7	Silica Gel	742.1	726.9	15.2	447.6

Run No. 2	Filter Type Quartz	Sample Box No. M10
Date 3/23/11	Lot No.	pH
Analyst Daniel Luckhard	Filter No. e3-14	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	708.7	435.1	273.6	
Impinger 2	100 ml 5% HNO3/10% H2O2	677.4	570.5	106.9	QA/QC DC
Impinger 3	100 ml 5% HNO3/10% H2O2	557.0	528.4	28.6	Date 3/23/11
Impinger 4	Empty	436.9	429.7	7.2	
Impinger 5	100 ml 4% KMnO4/10% H2SO4	545.1	540.6	4.5	Total Weight (gm)
Impinger 6	100 ml 4% KMnO4/10% H2SO4	553.9	551.9	2.0	422.8
Impinger 7	Silica Gel	783.3	768.6	14.7	437.5

Run No. 3	Filter Type Quartz	Sample Box No. M4
Date 3/23/11	Lot No.	pH
Analyst Daniel Luckhard	Filter No. e3-15	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	704.0	439.5	264.5	
Impinger 2	100 ml 5% HNO3/10% H2O2	654.4	487.6	166.8	QA/QC DC
Impinger 3	100 ml 5% HNO3/10% H2O2	560.6	534.7	25.9	Date 3/23/11
Impinger 4	Empty	444.0	438.7	5.3	
Impinger 5	100 ml 4% KMnO4/10% H2SO4	550.8	547.5	3.3	Total Weight (gm)
Impinger 6	100 ml 4% KMnO4/10% H2SO4	605.0	604.6	0.4	415.1
Impinger 7	Silica Gel	809.6	791.5	18.1	433.2

TEST LOCATION: FF Outlet
 UNIT: 1 RUN: 1

Fluoride TESTING FIELD DATA SHEET

METHOD: 13B PAGE 1 OF 2

Client Whetlabator Project No. 11182
 Plant N. Brown Date 3.22.11
 Meter Operator NH
 Probe Operator BA

Meter Box 66-4 Sample Box No. B1
 Meter Yr. 0.9983 Meter ΔH @ 1.6779
 K Factor 2.45 Pitot Co. 0.918
 Leak Rate Before 0.003 [cfm] [Lpm] @ 15 (in. Hg)
 Leak Rate After 0.001 [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.) [Out]	First point all the way (in.) [Out]
<u>-11.0</u>	<u>10</u>	<u>in</u>	<u>in</u>

of page

Amb. Temp (°F) 87 Bar Press 30.20 [in. Hg] [mbar]
 Probe I.D. No. 67-8-20
 Liner Material CLASS

Filter No.
 Thimble No.
 Nozzle Diameter 0.271 Nozzle I.D. 271-2

Start Time: 12:31 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) [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
						Set Points							
5 -1	2:30	0.44	1.1	805.05	303	254	255	66	83	82	3	10.2	
2	5:00	0.46	1.1	806.52	302	250	256	66	84	82	3	9.6	
3	7:30	0.46	1.1	807.96	302	255	255	65	84	82	3	9.0	
4	10:00	0.46	1.1	809.53	302	256	254	64	89	82	3	9.5	
5	12:30	0.51	1.2	811.060	302	255	250	60	88	84	3	9.4	8/11.210
4 -1	15:00	0.51	1.2	812.76	300	254	250	60	89	85	3	9.5	
2	17:30	0.45	1.1	814.28	301	257	250	63	90	85	3	9.0	
3	20:00	0.51	1.2	815.75	301	248	250	63	91	85	3	9.4	
4	22:30	0.55	1.3	817.32	302	258	250	63	92	86	3	9.1	
5	25:00	0.55	1.2	818.885	301	250	250	63	95	86	3	9.5	818.995
3 -1	27:30	0.49	1.2	820.54	302	255	250	63	93	85	3	9.8	
2	30:00	0.47	1.2	822.08	302	257	250	62	95	87	3	10.1	
3	32:30	0.52	1.3	823.67	302	250	250	62	98	87	3	9.7	
	Total	17.6339	30.1700	38.6850	7531								
	Average	0.7054	1.2068		301.2400				91.0400				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC NH
 Date 3/22/11



TEST LOCATION: FF OUTLET
 UNIT: 1 RUN: 1

Fluoride TESTING FIELD DATA SHEET

METHOD: 13 B PAGE 2 OF 2

Client <u>Wheelabrator</u>	Project No. <u>11182</u>
Plant <u>N. Brown RD</u>	Date <u>3-22-11</u>
Meter Operator <u>NH</u>	
Probe Operator <u>BA</u>	

Meter Box <u>66-4</u>	Sample Box No. <u>61</u>
Meter Yr. <u>0.9983</u>	Meter ΔH @ <u>1.6979</u>
K Factor <u>2.45</u>	Pilot C _p
Leak Rate Before <u>67</u> [Lpm] @ (in. Hg)	
Leak Rate After <u>67</u> [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) <u>-11.0</u>	Port Len (in.) <u>10</u>	Gas Flow <u>10</u> [Out]	First point all the way <u>10</u> [Out]

of page 1

Amb Temp (°F)	Bar Press (in. Hg) [mbar]
Probe ID No. <u>47-8-20</u>	
Liner Material <u>GLASS</u>	

Filter No.	
Thimble No.	
Nozzle Diameter	Nozzle ID

Start Time	Stop Time <u>13:41</u>

Traverse Point Number	Min/pt 2:30 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 _x (°F)	Notes
3 -4	35:00	0.55	1.4	825.35	302	258	250	62	99	88	3	9.9	
5	37:30	0.67	1.5	827.140	302	248	250	61	100	88	3	9.0	827.275
2 -1	40:00	0.53	1.3	828.92	302	258	250	62	98	89	4	9.4	
2	42:30	0.44	1.1	830.43	303	247	250	62	99	90	3	9.0	
3	45	0.53	1.3	832.04	301	259	250	63	99	89	3	10.0	
4	47:30	0.57	1.2	833.61	302	250	250	62	101	90	3	9.6	
5	50:00	0.67	1.6	835.385	303	247	249	62	101	90	4	9.6	835.655
1 -1	52:30	0.29	0.71	836.89	298	245	247	62	100	91	3	9.0	
2	55:00	0.31	0.76	838.14	299	259	251	61	100	91	3	9.3	
3	57:30	0.45	1.1	839.66	297	247	251	61	101	92	3	9.5	
4	60:00	0.45	1.1	841.14	300	299	248	60	101	92	3	9.9	
5	62:30	0.63	1.5	842.890	300	258	250	61	102	92	4	10.0	
Total									2372	2180			
Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC _____
 Date _____

TEST LOCATION: FF OUTLET
 UNIT: 1 RUN: 2

FLUORIDE TESTING FIELD DATA SHEET

METHOD: 13 B PAGE 1 OF 2

Client: <u>Wheelabrator</u>	Project No: <u>11182</u>
Plant: <u>N. Brown</u>	Date: <u>3.22.11</u>
Meter Operator: <u>NH</u>	
Probe Operator: <u>BA</u>	

Meter Box: <u>66-4</u>	Sample Box No: <u>B22</u>
Meter Yr: <u>0.9983</u>	Meter ΔH : <u>1.6979</u>
K Factor: <u>2.5</u>	Pitot Cp: <u>0.816</u>
Leak Rate Before: <u>0.003</u> [cm] [Lpm]	@ <u>15</u> (in. Hg)
Leak Rate After: <u>0.001</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>-11.0</u>	Port Len (in.): <u>10</u>	Gas Flow (in. Hg) [Out]: <u>10</u>	First point all the way (in) [Out]: <u>10</u>

Amb. Temp (°F): <u>14</u>	Bar Press: <u>30.20</u> (in. Hg) [mbar]
Probe I.D. No: <u>67-8-20</u>	
Liner Material: <u>GLASS</u>	

Filter No: <u>NA</u>	
Thimble No: <u></u>	
Nozzle Diameter: <u>0.271</u>	Nozzle I.D.: <u>271-2</u>

Start Time: <u>14:08</u>	Stop Time: <u>15:17</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 (in. Hg) [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
						Set Points							
5 - 1	2:30	0.42	1.1	843.540	300	250	250	63	95	94	3	10.2	
2	5	0.42	1.1	846.52	300	244	255	63	95	94	3	9.2	
3	7:30	0.47	1.2	848.07	300	252	252	62	97	94	3	9.9	
4	10	0.58	1.5	849.79	301	259	252	63	98	93	3	10.5	
5	12:30	0.60	1.5	857.545	301	243	250	59	100	93	3	10.5	51.675
4 - 1	15	0.57	1.4	853.42	301	251	250	55	101	93	3	10.1	
2	17:30	0.50	1.3	855.05	301	250	255	55	101	93	3	10.1	
3	20	0.55	1.4	856.78	301	254	251	55	102	93	3	9.3	
4	22:30	0.61	1.5	858.57	302	250	249	54	102	94	3	9.7	
5	25	0.68	1.7	860.355	301	248	249	57	103	94	4	10.0	60.515
3 - 1	27:30	0.67	1.7	862.78	301	247	250	63	102	94	4	9.9	
2	30	0.50	1.3	864.03	302	258	250	63	103	94	3	10.1	
3	32:30	0.50	1.3	865.65	302	250	250	63	103	94	3	9.9	
Total		18.2399	34.1400	41.4000	7515								
Average		0.7296	1.3676		300.6000				97.8600				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: NH
 Date: 3.22.11



TEST LOCATION: FF OUTLET
 UNIT: 1 RUN: 2

FLUORIDE TESTING FIELD DATA SHEET

METHOD: 13B PAGE 2 OF 2

Client <u>Whelanator</u>	Project No. <u>11182</u>
Plant <u>N. BROWNS</u>	Date <u>2.22.11</u>
Meter Operator <u>NH</u>	
Probe Operator <u>BA</u>	

Meter Box <u>66-4</u>	Sample Box No. <u>622</u>
Meter Val. <u>0.9983</u>	Meter ΔH <u>1.6979</u>
K Factor <u>2.5</u>	Pitot C. <u>0.878</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:

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 (in. Hg) [mbar]
Probe I.D. No. <u>67-8-20</u>	
Liner Material	

Filter No.	
Thimble No.	
Nozzle Diameter	Nozzle I.D.

Start Time	Stop Time

Traverse Point Number	Min/pt 2:30 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 _{in} (°F)	DGM Outlet T _{out} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp (°F)	Notes
3 -4	35	0.60	1.5	867.41	302	245	250	57	102	93	4	10.2	
5	37:30	0.75	1.9	869.330	302	256	249	58	104	94	4	10.0	69.570
2 -1	40	0.75	1.9	871.47	302	245	251	58	104	93	4	10.2	
2	42:30	0.50	1.3	873.13	302	255	251	58	104	94	3	10.2	
3	45	0.54	1.4	874.80	302	245	250	59	104	94	4	10.3	
4	47:30	0.57	1.4	876.51	302	259	250	54	105	95	4	9.4	
5	50	0.63	1.6	878.300	303	258	250	54	105	95	3	8.8	78.455
1 -1	52:30	0.27	0.68	879.67	299	257	250	55	104	93	3	10.2	
2	55	0.29	0.73	880.83	299	255	250	55	103	94	3	9.8	
3	57:30	0.39	0.98	882.23	285	249	250	56	104	95	3	11.2	
4	60	0.49	1.2	883.79	302	259	249	56	104	95	3	10.6	
5	62:30	0.64	1.4	885.565	302	247	251	57	102	94	3	9.9	
Total									2547	2346			
Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC _____
 Date _____

TEST LOCATION: FF OUT
UNIT: 1 RUN: 3

Fluoride TESTING FIELD DATA SHEET

METHOD: 13B PAGE 1 OF 2

Client Wheelabrator Project No. 11182
Plant N BEAUMONT Date 3.22.11
Meter Operator NH
Probe Operator BA

Meter Box 116-4 Sample Box No. B1
Meter Yr. 0.9983 Meter ΔH 1.6979
K Factor 2.5 Pitot Co. 0.818
Leak Rate Before 0.002 [cfm] [Lpm] @ 15 (in. Hg)
Leak Rate After 0.001 [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) [Out]	First point all the way [Out]
<u>-11.1</u>	<u>10</u>	<u>10</u> [Out]	<u>10</u> [Out]

of page

Amb. Temp (°F) 82 Bar Press. 30.20 [in. Hg] [mbar]
Probe I.D. No. 67-8-20
Liner Material GLASS

Filter No. NA
Thimble No.
Nozzle Diameter 0.270 Nozzle I.D. 271-2

Start Time: 15:39 Stop Time: 16:47

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 _{m in} (°F)	DGM Outlet T _{m out} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp (°F)	Notes
5 -1	2:30	0.45	1.1	886.390	301	259	258	66	97	93	3	10.7	
2	5	0.45	1.1	889.46	301	247	259	63	96	93	3	10.7	
3	7:30	0.56	1.4	891.08	303	245	257	54	98	94	3	10.7	
4	10	0.67	1.7	892.91	306	259	257	55	100	94	4	10.4	
5	12:30	0.67	1.7	894.780	308	244	254	55	101	93	4	11.2	95.020
4 -1	15	0.47	1.2	896.58	308	247	244	56	102	94	3	10.7	
2	17:30	0.45	1.1	898.06	308	247	257	57	103	94	3	9.0	
3	20	0.56	1.4	899.76	305	259	259	58	103	94	4	10.4	
4	22:30	0.70	1.8	901.65	308	249	256	58	105	95	4	10.4	
5	25	0.70	1.8	903.535	307	245	257	59	104	94	4	10.6	903.785
3 -1	27:30	0.59	1.5	905.55	304	245	247	66	105	95	4	10.5	
2	30	0.60	1.5	907.29	307	256	257	65	106	96	4	10.3	
3	32:30	0.60	1.5	909.04	308	257	259	64	106	96	4	11.2	
Total		18.7184	35.8600	42.3950	7632				2607	2388			
Average		0.7487	1.4344	305.2800					99.9000				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC NH
Date 3-22-11

TEST LOCATION: FF OUTLET
 UNIT: 1 RUN: 3

FLUORIDE TESTING FIELD DATA SHEET

METHOD: 13B PAGE 2 OF 2

Client: Wheelabrator Project No.: 11182
 Plant: N. Broward Date: 3.22.11
 Meter Operator: NH
 Probe Operator: BA

Meter Box: 66-4 Sample Box No.: B1
 Meter Y: 0.9983 Meter ΔH: 1.6979
 K Factor: 2.5 Pilot C: 0.818
 Leak Rate Before: (cm) [Lpm] @ (in. Hg)
 Leak Rate After: (cm) [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
<u>-11.2</u>	<u>10</u>	<u>(in)</u> [Out]	<u>(in)</u> [Out]

Amb. Temp. (°F) _____ Bar. Press. _____ [in. Hg] [mbar]
 Probe ID No.: 67-8-20
 Liner Material: GLASS

Filter No. _____
 Thimble No. _____
 Nozzle Diameter: _____ Nozzle D. _____

Start Time: _____ Stop Time: _____

Traverse Point Number	Min/pt 2:30 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 -4	35	0.70	1.8	910.93	308	253	258	64	107	96	4	10.3	
5	37:30	0.77	1.9	912.915	307	245	248	65	107	96	5	10.5	913.145
2 -1	40	0.60	1.5	914.90	304	242	244	65	106	95	4	10.5	
2	42:30	0.50	1.3	916.67	302	249	252	61	107	96	4	9.8	
3	45	0.51	1.3	918.30	302	255	255	58	108	97	4	10.1	
4	47:30	0.60	1.5	920.11	302	247	252	57	107	98	4	9.6	
5	50	0.66	1.7	921.780	303	243	245	56	106	97	4	10.4	921.945
1 -1	52:30	0.27	0.68	923.14	302	247	246	52	106	98	3	9.4	
2	55	0.31	0.78	924.45	303	245	248	52	106	98	3	11.2	
3	57:30	0.30	1.3	926.06	306	255	252	53	107	97	4	10.0	
4	60	0.52	1.3	927.67	307	241	242	54	108	98	4	11.2	
5	62:30	0.50	2.0	929.670	310	251	250	55	106	97	5	11.6	
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 1 FF Outlet	
Plant: North Broward	Job No: 11182	Method:	13B

CAE 7107-2 C2+ #5653264 499.5

Run No. 1	Filter Type: Teflon glass mat	Sample Box No. B1
Date: 3/22/11	Lot No.	pH
Analyst: R. Vicere	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	100 mL DI H2O	707.2	631.5	75.7	
Impinger 2	100 mL DI H2O	619.9	541.8	78.1	
Impinger 3	Empty	482.5	452.2	30.3	
Impinger 4	Silica Gel	752.3	723.1	29.2	
					Total Weight (gm)
					184.1
					213.3

QA/QC RV
Date 3/22/11

Run No. 2	Filter Type: Teflon glass mat	Sample Box No. B22
Date: 3/22/11	Lot No.	pH
Analyst: R. Vicere	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	100 mL DI H2O	691.4	543.1	148.3	
Impinger 2	100 mL DI H2O	601.2	547.3	53.9	
Impinger 3	Empty	452.3	441.1	11.2	
Impinger 4	Silica Gel	751.9	736.3	15.6	
					Total Weight (gm)
					213.4
					229.0

QA/QC RV
Date 3/22/11

Run No. 3	Filter Type: Teflon glass mat	Sample Box No. B1
Date: 3/22/11	Lot No.	pH
Analyst: R. Vicere	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	100 mL DI H2O	737.4	633.2	104.2	
Impinger 2	100 mL DI H2O	620.3	544.7	75.6	
Impinger 3	Empty	477.3	454.1	23.2	
Impinger 4	Silica Gel	746.5	723.9	22.6	
					Total Weight (gm)
					203.0
					225.6

QA/QC SB
Date 3/22

TEST LOCATION: SDA INLET
 UNIT: 1 RUN: 1

HCL TESTING
FIELD DATA SHEET

METHOD: 26A PAGE 1 OF 1

Client: Wulabrador Project No: 11182
 Plant: N. BLOWARD Date: 3-22-11
 Meter Operator: B. ARNOLD
 Probe Operator: —

Meter Box: 166-14 Sample Box No: 811
 Meter Val: 0.9882 Meter ΔH: 1.7571
 K Factor: — Pitot C_p: —
 Leak Rate Before: 0.002 [cfm] [Lpm] @ 15 (in. Hg)
 Leak Rate After: 0.002 [cfm] [Lpm] @ 15 (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.
<u>-2.1</u>	<u>14</u>	<u>—</u>	<u>(IN) [Out]</u>

Amb. Temp (°F): — Bar. Press: 30.20 [in. Hg] [mbar]
 Probe I.D. No: 67-4-5
 Liner Material: GLASS

Filter No: —
 Thimble No: —
 Nozzle Diameter: NA Nozzle I.D: —

Start Time: 7:36 Stop Time: 8:36

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	959.360	505	350	350	58	75	73	3.0	8.1	
	10		1.2	965.34	503	350	350	55	74	74	3.0	8.1	
	15		1.2	968.34	506	351	352	53	76	74	5.0	7.9	
	20		1.2	971.28	508	351	350	50	78	74	6.0	8.2	
	25		1.2	974.27	505	350	350	50	80	74	7.0	8.0	
	30		1.2	977.26	504	353	351	41	81	75	8.0	8.0	
	35		1.2	986.30	505	353	350	41	83	76	9.5	7.7	
	40		1.2	983.34	499	354	350	42	84	77	11.0	7.0	
	45		1.2	986.35	497	350	350	42	85	77	12.0	6.5	
	50		1.2	989.36	497	355	351	43	86	78	13.0	7.7	
	55		1.2	992.38	504	353	350	45	86	79	14.5	7.8	
	60		1.2	995.250	506	356	351	46	86	80	16.0	8.0	
	Total	*	(14.4000)	(35.89)									
	Average		(1.6000)		(502.7500)				(78.5417)				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC BA
 Date 3-22-11

TEST LOCATION: SDA INLET
 UNIT: 1 RUN: 2

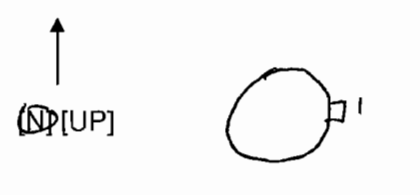
HCL TESTING FIELD DATA SHEET

METHOD: 26A PAGE 1 OF 1

Client: W. Laboratory Project No. 11182
 Plant: N. BLOWARD Date: 3-22-11
 Meter Operator: B. ARNOLD
 Probe Operator:

Meter Box: 66-14 Sample Box No.: 1816
 Meter Yr: 0.9882 Meter ΔH : 1.7571
 K Factor: Pitot Co.:
 Leak Rate Before: 0.003 [cfm] [Lpm] @ 15 (in. Hg)
 Leak Rate After: 0.003 [cfm] [Lpm] @ 15 (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.
<u>-2.1</u>	<u>14</u>	<u> </u>	<u> </u>

of page 10 [Out]

Amb. Temp. (°F): Bar. Press. 30.20 [in. Hg] [mbar]
 Probe ID No: 67-4-5
 Liner Material: GLASS

Filter No.:
 Thimble No.:
 Nozzle Diameter: M Nozzle I.D.:

Start Time: 9:40 Stop Time: 10:40

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_{min} (°F)	DGM Outlet T_{mout} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp. T_t (°F)	Notes
				000.355		350	350						
1-1	5	N/A	1.2	003.48	503	351	352	63	83	81	2.0	7.5	
	10		1.2	006.46	498	350	352	60	86	81	3.0	6.9	
	15		1.2	009.47	497	351	352	60	88	81	3.5	7.2	
	20		1.2	012.44	499	350	352	58	90	82	4.5	7.4	
	25		1.2	015.46	488	350	350	58	90	82	6.0	6.8	
	30		1.2	018.49	497	354	351	59	90	83	7.0	7.6	
	35		1.2	021.52	494	353	354	61	90	83	8.0	8.3	
	40		1.2	024.51	496	353	354	62	90	83	9.0	7.9	
	45		1.2	027.55	499	350	357	63	90	83	10.0	7.6	
	50		1.2	030.55	497	357	352	63	89	83	11.0	8.0	
	55		1.2	033.58	496	353	352	64	89	83	12.0	7.7	
	60		1.2	036.580	494	354	351	65	88	83	13.0	7.6	
Total			14.4000	36.825									
Average			1.2000	496.5000					85.458				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: SB
 Date: 7/22

TEST LOCATION: SDA INLET
 UNIT: 1 RUN: 3

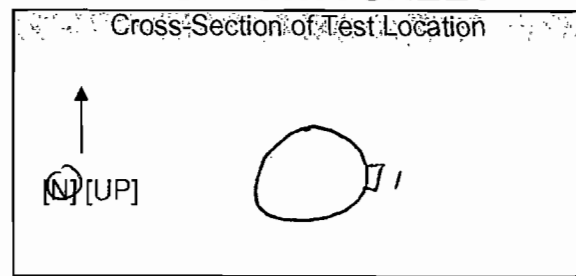
HCL TESTING
FIELD DATA SHEET

METHOD: Z6A PAGE 1 OF 1

Client: Whelabrator Project No: 11182
 Plant: N. BROWARD Date: 3-22-11
 Meter Operator: B. ARNOLD
 Probe Operator: —

Meter Box: 66-14 Sample Box No: —
 Meter Yd: 0.9882 Meter ΔH : 1.7571
 K Factor: — Pitot Cp: —

Leak Rate Before: 0.004 [cfm] [Lpm] @ 15 (in. Hg)
 Leak Rate After: 0.003 [cfm] [Lpm] @ 15 (in. Hg)
 Pitot Leak Check Before: ☐ After: Good ☐ Bad ☐



Duct Dimensions (in.): 105
 Static Pres (in. H₂O): -2.1 Port Len (in.): 14 Gas Flow (In) (Out): Out First point all the way (In) (Out): Out of page.

Amb Temp (°F): 79 Bar Press: 30.20 [in. Hg] [mbar]
 Probe ID No: 67-4-5
 Liner Material: GLASS

Filter No: —
 Thimble No: —
 Nozzle Diameter: NA Nozzle ID: —

Start Time: 11:02 Stop Time: 12:02

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 _{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	036.890	491	350	350	54	82	81	2.0	7.9	
	10		1.2	042.91	492	353	350	59	85	81	3.0	8.1	
	15		1.2	045.98	497	351	350	55	88	82	5.0	7.9	
	20		1.2	048.98	499	350	350	56	89	82	6.5	8.2	
	25		1.2	051.98	500	351	350	58	88	82	7.5	8.0	
	30		1.2	055.00	500	354	350	60	88	82	9.0	7.1	
	35		1.2	058.00	496	354	352	62	87	82	10.5	6.4	
	40		1.2	061.02	495	355	351	63	87	82	11.5	6.4	
	45		1.2	064.03	495	350	351	62	88	82	12.5	7.5	
	50		1.2	067.06	494	354	352	57	87	82	13.5	6.6	
	55		1.2	070.03	491	355	351	53	88	82	14.0	6.8	
	60		1.2	073.015	489	355	351	53	88	82	15.0	8.3	
Total	*	14.4000		36.1250									
Average		1.7000			494.9166				84.4583				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC BA
 Date: 3-22-11



Impinger Weight Sheet

Client: Wheelabrator		Unit Name/Location: Unit 1 SDA Inlet	
Plant: North Broward	Job No. 11182	Method	Mod. 26A

CAE-TL07-3 Cert # 565326A 499.5

Run No. 1	Filter Type: Quartz	Sample Box No. B11
Date 3/22/11	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	486.4	457.8	28.6	
Impinger 2	100 mL 0.1N H2SO4	627.0	536.8	90.2	
Impinger 3	100 mL 0.1N H2SO4	573.6	550.0	23.6	
Impinger 4	Empty	528.4	522.7	5.7	
Impinger 5	Silica Gel	761.4	748.7	12.7	Total Weight (gm)
					148.1
					160.8

QA/QC DL
Date 3/24/11

Run No. 2	Filter Type: Quartz	Sample Box No. B16
Date 3/22/11	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	515.6	481.6	34.0	
Impinger 2	100 mL 0.1N H2SO4	627.6	560.4	67.2	
Impinger 3	100 mL 0.1N H2SO4	564.6	540.4	24.2	
Impinger 4	Empty	445.7	436.9	8.8	
Impinger 5	Silica Gel	763.9	745.3	18.6	Total Weight (gm)
					134.2
					152.8

QA/QC DL
Date 5/22/11

Run No. 3	Filter Type: Quartz	Sample Box No. B11
Date 3/22/11	Lot No.	pH
Analyst R. Viscare	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	488.2	460.8	27.4	
Impinger 2	100 mL 0.1N H2SO4	616.6	541.0	75.6	
Impinger 3	100 mL 0.1N H2SO4	578.7	554.5	24.2	
Impinger 4	Empty	531.2	523.9	7.3	
Impinger 5	Silica Gel	774.6	761.1	13.5	Total Weight (gm)
					134.5
					148.0

QA/QC RV
Date 3/22/11

TEST LOCATION: FF OUTLET
 UNIT: 1 RUN: 1

HCl TESTING FIELD DATA SHEET

METHOD: 26A PAGE 1 OF 1

Client: Wheelabrator Project No: 11182
 Plant: North Date: 3-22-11
 Meter Operator: N. Hitchens
 Probe Operator:

Meter Box: 66-24 Sample Box No: B-21
 Meter Y: 0.9847 Meter ΔH: 1.7639
 K Factor: N/A Pitot Cp:
 Leak Rate Before: 0.003 [cfm] Lpm @ 15 (in. Hg)
 Leak Rate After: 0.001 [cfm] Lpm @ 6 (in. Hg)
 Pitot Leak Check Before: ☐ After: Good ☐ Bad ☐

Cross-Section of Test Location

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>-11.4</u>	<u>10</u>	<u>[In]</u> [Out]	<u>[In]</u> [Out]

Amb. Temp. (°F) 68 Bar Press. 30.20 [in. Hg] [mbar]
 Probe I.D. No: 67-4-1
 Liner Material: GLASS

Filter No: N/A
 Thimble No: N/A
 Nozzle Diameter: N/A Nozzle I.D.:

Start Time: 7:36 Stop Time: 8:36

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 T _{trap} (°F)	Notes
				<u>413.155</u>									
3-1	5	<u>N/A</u>	<u>1.5</u>	<u>416.68</u>	<u>309</u>	<u>310</u>	<u>303</u>	<u>54</u>	<u>68</u>	<u>67</u>	<u>4</u>	<u>9.4</u>	
	10		<u>1.5</u>	<u>420.13</u>	<u>308</u>	<u>310</u>	<u>305</u>	<u>54</u>	<u>68</u>	<u>67</u>	<u>4</u>	<u>10.2</u>	
	15		<u>1.5</u>	<u>423.56</u>	<u>308</u>	<u>304</u>	<u>304</u>	<u>54</u>	<u>72</u>	<u>67</u>	<u>4</u>	<u>10.6</u>	
	20		<u>1.5</u>	<u>427.04</u>	<u>308</u>	<u>301</u>	<u>304</u>	<u>60</u>	<u>74</u>	<u>68</u>	<u>4</u>	<u>10.4</u>	
	25		<u>1.5</u>	<u>430.53</u>	<u>309</u>	<u>306</u>	<u>303</u>	<u>60</u>	<u>78</u>	<u>69</u>	<u>4</u>	<u>10.3</u>	
	30		<u>1.5</u>	<u>433.98</u>	<u>308</u>	<u>306</u>	<u>302</u>	<u>58</u>	<u>80</u>	<u>70</u>	<u>4</u>	<u>10.8</u>	
	35		<u>1.5</u>	<u>437.43</u>	<u>308</u>	<u>307</u>	<u>303</u>	<u>58</u>	<u>81</u>	<u>71</u>	<u>4</u>	<u>10.5</u>	
	40		<u>1.5</u>	<u>440.90</u>	<u>307</u>	<u>306</u>	<u>303</u>	<u>58</u>	<u>83</u>	<u>71</u>	<u>4</u>	<u>10.0</u>	
	45		<u>1.5</u>	<u>444.34</u>	<u>306</u>	<u>306</u>	<u>304</u>	<u>55</u>	<u>85</u>	<u>73</u>	<u>4</u>	<u>9.6</u>	
	50		<u>1.5</u>	<u>447.82</u>	<u>306</u>	<u>306</u>	<u>303</u>	<u>53</u>	<u>85</u>	<u>74</u>	<u>4</u>	<u>10.5</u>	
	55		<u>1.5</u>	<u>451.30</u>	<u>307</u>	<u>306</u>	<u>303</u>	<u>52</u>	<u>86</u>	<u>75</u>	<u>4</u>	<u>10.5</u>	
	60		<u>1.5</u>	<u>454.770</u>	<u>308</u>	<u>307</u>	<u>303</u>	<u>51</u>	<u>87</u>	<u>76</u>	<u>4</u>	<u>10.5</u>	
	Total			<u>41615</u>	<u>3602</u>				<u>949</u>	<u>948</u>			
	Average			<u>41615</u>	<u>307</u>				<u>74.875</u>				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC N/A
 Date 3-22-11

METHOD: *26A* PAGE 1 OF 1

Start Time:	9:40	Stop Time:	10:40

Circle correct bracketed units on data sheets.

F - 22

TEST LOCATION: FF OUTLET
 UNIT: 1 RUN: 3

HCl

TESTING

METHOD: 26 A PAGE 1 OF 1

FIELD DATA SHEET

Client Wheelabrator Project No. 11182
 Plant N. BROWARDS Date 3-22-11
 Meter Operator NH
 Probe Operator

Meter Box 66-24 Sample Box No. 814
 Meter Yr. 0.9847 Meter ΔH_0 1.7639
 K-Factor NA Pitot Co.
 Leak Rate Before 0.004 [Lpm] @ 15 (in. Hg)
 Leak Rate After 0.001 [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>-11.9</u>	<u>10</u>	<u>[In]</u> [Out]	<u>[In]</u> [Out]

of page 1

Amb. Temp (°F) Bar Press: 30.20 (in. Hg) [mbar]
 Probe ID No. 67-4-1
 Liner Material GLASS

Filter No. NA
 Thimble No. NA
 Nozzle Diameter NA Nozzle ID

Start Time: 11:02 Stop Time: 12:02

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. (°F)	Filter T. (°F)	Cond Temp. T_c (°F)	DGM Inlet T_{min} (°F)	DGM Outlet T_{mout} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp. (°F)	Notes
3-1	5	N/A	1.5	502.69	306	309	309	62	87	84	4	9.5	
	10		1.5	506.19	306	309	308	62	89	84	4	9.7	
	15		1.5	509.69	307	307	303	55	92	84	4	10.3	
	20		1.5	513.12	306	303	303	54	93	85	4	10.0	
	25		1.5	516.63	306	301	303	57	94	85	4	10.1	
	30		1.5	520.14	307	303	303	62	94	85	4	9.8	
	35		1.5	523.70	306	304	303	63	95	86	4	8.8	
	40		1.5	527.19	306	301	302	63	95	86	4	9.8	
	45		1.5	530.65	307	303	303	63	95	86	4	9.2	
	50		1.5	534.15	306	303	303	62	96	87	4	9.3	
	55		1.5	537.62	306	304	303	59	96	86	4	9.0	
	60		1.5	541.065	303	302	303	57	94	87	4	10.3	
Total	*			41.9050	3674				1122	1025			
Average		1.5000			306.1667				89.4583				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC NH
 Date 3-22-11

Impinger Weight Sheet

Client Wheelabrator		Unit Name/Location Unit 1 FF Outlet	
Plant North Broward	Job No. 11182	Method	Mod. 26A

CAETL07-2 Co # 565326A 499.5

Run No. 1	Filter Type Quartz	Sample Box No. B21
Date 3/22/11	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	517.4	465.5 ^{RV}	456.1	61.3
Impinger 2	100 mL 0.1N H2SO4	672.8	555.7	117.1	
Impinger 3	100 mL 0.1N H2SO4	585.5	549.8	35.7	
Impinger 4	Empty	450.0	442.0	8.0	
Impinger 5	Silica Gel	739.4	723.3	16.1	Total Weight (gm)
					222.1
					238.2

QA/QC RV
Date 3/22/11

Run No. 2	Filter Type Quartz	Sample Box No. B12
Date 3/22/11	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	509.2	451.6	57.6	
Impinger 2	100 mL 0.1N H2SO4	658.6	541.6	117.0	
Impinger 3	100 mL 0.1N H2SO4	590.5	549.7	40.8	
Impinger 4	Empty	434.2	552.5 ^{RV}	42.63	7.9
Impinger 5	Silica Gel	773.3	755.3	18.0	Total Weight (gm)
					223.3
					241.3

QA/QC RV
Date 3/22/11

Run No. 3	Filter Type Quartz	Sample Box No. B14
Date 3/22/11	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	505.6	452.7	52.9	
Impinger 2	100 mL 0.1N H2SO4	615.7	522.8	92.9	
Impinger 3	100 mL 0.1N H2SO4	583.5	534.4	49.1	
Impinger 4	Empty	463.6	444.6	19.0	
Impinger 5	Silica Gel	750.6	731.5	19.1	Total Weight (gm)
					213.9
					233.0

QA/QC RV
Date 3/22/11

TEST LOCATION: FF Outlet
 UNIT: 2 RUN: 1

Part 1 Metals TESTING FIELD DATA SHEET

METHOD: 5129 PAGE 1 OF 2

Client: Whitaker Project No.: 11152
 Plant: N. Brunswick Date: 3/24/11
 Meter Operator: P. Bihun
 Probe Operator: P. Bihun

Meter Box: 106-21 Sample Box No.: M3
 Meter V: 0.9837 Meter ΔH: 1.8252
 K Factor: 2.165 Pilot C: 0.83
 Leak Rate Before: 0.003 (cm) (Lpm) @ 12 (in. Hg)
 Leak Rate After: 0.003 (cm) (Lpm) @ 10 (in. Hg)
 Pilot 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
<u>-10.8</u>	<u>10.0</u>	<u>(In) (Out)</u>	<u>(In) (Out)</u>

Amb. Temp. (°F) 65 Bar. Press. 30.00 (in. Hg) (inbar)
 Probe I.D. No.: 67-5-3
 Liner Material: Glass

Filter No.: e3-16
 Thimble No.: N/A
 Nozzle Diameter: 0.270 Nozzle I.D.: 2.201

Start Time: 6:28 Stop Time: 8:38

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 (°F)	Notes
	<u>5</u>			<u>406.020</u>									
5-1	5	0.34	0.90	405.71	307	257	258	62	65	65	4.0	N/A	7.8
2	10	0.35	0.93	411.42	307	259	256	60	66	65	4.0		8.7
3	15	0.33	0.88	414.64	306	253	252	57	68	65	3.5		8.6
4	20	0.31	0.82	416.59	306	249	251	55	70	66	3.5		6.9
	25	0.31	0.82	419.125	307	250	247	54	71	67	3.5		7.5
4-1	30	0.33	0.88	421.80	306	250	250	57	69	66	4.0		8.1
2	35	0.34	0.90	424.41	306	250	249	58	72	67	4.0		8.9
3	40	0.35	0.93	427.17	306	251	250	58	74	67	4.0		8.5
4	45	0.33	0.88	429.83	307	249	249	59	74	67	4.0		7.5
	50	0.28	0.74	432.260	306	250	250	60	73	68	3.5		7.9
3-1	55	0.35	0.93	435.02	307	250	255	61	75	68	4.0		7.9
2	60	0.35	0.93	437.74	306	253	250	61	76	69	4.0		7.9
Total		<u>0.5717</u>		<u>65.700</u>									
Average		<u>0.8724</u>			<u>305.7400</u>				<u>71.5000</u>				

Sum of square roots

Circle correct bracketed units on data sheet.

TEST LOCATION: FF Outlet
 UNIT: 2 RUN: 1

Part 1 Mobile TESTING FIELD DATA SHEET

METHOD: 5729 PAGE 2 OF 2

Client: <u>Wheeler</u>	Project No: <u>11182</u>
Plan: <u>N. Broward</u>	Date: <u>3/24/11</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]	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 (in. H ₂ O) [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 _i (°F)	Notes
3	65	0.33	0.88	440.37	305	200	210	62	77	69	4.0	N/A	7.4
4	70	0.34	0.90	443.04	306	248	250	62	77	70	4.0		8.6
5	75	0.34	0.90	445.735	306	249	249	63	77	70	4.0		8.2
2-7	80	0.34	0.90	448.47	305	280	250	58	76	70	4.0		8.7
2	85	0.37	0.98	451.27	305	251	252	56	76	71	4.0		8.6
3	90	0.40	1.1	454.19	305	251	251	52	77	71	4.5		9.0
4	95	0.36	0.95	456.91	306	249	200	50	77	71	4.0		9.1
5	100	0.36	0.95	459.730	307	200	280	52	79	71	4.0		9.2
1-1	105	0.20	0.53	461.79	296	249	249	56	77	72	3.5		9.6
2	110	0.22	0.58	463.91	296	200	210	57	77	72	3.5		9.7
3	115	0.30	0.80	466.48	304	251	251	54	75	72	4.0		9.8
4	120	0.34	0.90	469.15	306	249	210	55	77	72	4.5		9.0
5	125	0.34	0.90	471.880	307	210	210	55	77	72	4.5		8.5
Total													
Average													

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC PRB
 Date 3/24/11

TEST LOCATION: PF Outlet
 UNIT: 2 RUN: 2

Part 1 Metals TESTING
 FIELD DATA SHEET

METHOD: 5729 PAGE 1 OF 2

Client: Whelan for Project No: 11152
 Plant: N. Broward Date: 3/24/11
 Meter Operator: P. Bihun
 Probe Operator: P. Bihun

Meter Box: 66-21 Sample Box No: M10
 Meter Y: 0.4837 Meter ΔH: 1.8202
 K Factor: 7.465 Pitot C: 0.83

Leak Rate Before: 0.0015 (cfm) [Lpm] @ 12 (in. Hg)
 Leak Rate After: 0.0015 (cfm) [Lpm] @ 12 (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>-10.6</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): 73 Bar. Press: 30.00 (in. Hg) [mbar]
 Probe I.D. No: 67-f-3
 Liner Material: Glass

Filter No: e3-17
 Thimble No: N/A
 Nozzle Diameter: 0.270 Nozzle I.D.: 270-1

Start Time: 8:53 Stop Time: 11:03

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 _{m in} (°F)	DGM Outlet T _{m out} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp. T _t (°F)	Notes
5-1	5	0.33	0.88	472.120	307	256	252	65	75	74	4.0	12/11	8.5
2	10	0.33	0.88	477.51	306	257	254	64	76	73	4.0		8.2
3	15	0.33	0.88	480.16	305	253	253	60	78	73	3.5		8.9
4	20	0.37	0.98	482.97	307	249	250	58	78	74	4.0		7.9
5	25	0.35	0.93	485.735	307	250	251	58	79	74	4.0		8.1
4-1	30	0.43	1.1	488.66	306	250	251	60	79	75	4.0		9.3
2	35	0.42	1.1	491.55	308	251	251	61	80	75	4.0		8.2
3	40	0.40	1.1	494.48	307	251	250	61	81	76	4.0		8.3
4	45	0.38	1.0	497.30	308	249	249	63	82	76	4.0		8.1
5	50	0.40	1.1	500.240	308	250	252	64	82	76	4.0		8.3
3-1	55	0.37	0.98	503.10	307	249	250	62	81	77	4.0		8.6
2	60	0.37	0.98	505.92	307	251	250	55	84	77	4.0		8.1
Total		0.626		70.725									
Average					306.400				80.900				

Sum of square roots.

Circle correct bracketed units on data sheet

TEST LOCATION: PF Outlet
 UNIT: 2 RUN: 2

Part 1/ Michaels TESTING FIELD DATA SHEET

METHOD: 5129 PAGE 2 OF 2

Client <u>Whelan</u>	Project No. <u>11112</u>
Plant <u>M. Broward</u>	Date <u>3/24/11</u>
Meter Operator <u>P. Bihun</u>	
Probe Operator <u>P. Bihun</u>	

Meter Box	Sample Box No.
Meter Y ₁	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. (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
						202	210						
3	65	0.35	0.93	504.64	306	210	210	54	84	78	4.0	N/A	8.2
4	70	0.35	0.93	511.41	307	249	210	54	85	79	4.0		7.6
5	75	0.33	0.88	514.120	306	200	250	54	86	79	4.0		7.6
2-1	80	0.37	0.98	512.02	306	200	252	56	86	81	4.0		8.1
2	85	0.37	0.98	519.84	307	251	252	54	86	81	4.0		8.9
3	90	0.40	1.1	522.28	305	251	250	54	87	81	4.1		7.8
4	95	0.45	1.2	525.90	307	249	250	55	86	81	4.1		8.2
5	100	0.45	1.2	529.000	307	210	210	57	88	83	4.1		6.5
1-1	105	0.31	0.82	531.61	305	248	249	60	88	83	4.0		8.3
2	110	0.31	0.82	534.16	304	251	249	63	86	83	4.0		8.5
3	115	0.40	1.1	537.08	304	251	210	64	88	83	4.1		7.1
4	120	0.41	1.1	540.04	306	249	248	64	89	84	4.1		8.6
5	125	0.43	1.1	543.990	307	249	249	64	89	84	4.1		8.0
Total													
Average													

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC PB
 Date 3/24/11

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: 11182
Plant: N. Brown Date: 3/24/11
Meter Operator: P. Blythe
Probe Operator: P. Blythe

Meter Box: 160-21 Sample Box No: m4
Meter Yr: 0.9837 Meter ΔH : 1.8252
K Factor: 2.45 Pitot Cp: 0.83
Leak Rate Before: 0.002 (cm) [Lpm] @ 13 (in. Hg)
Leak Rate After: 0.002 (cm) [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)	Port Len. (in.)	Gas Flow (in) [Out]	First point all the way (In) [Out]
<u>-11.1</u>	<u>10.0</u>	<u>(In) [Out]</u>	<u>(In) [Out]</u>

Amb. Temp (°F) 80 Bar. Press: 30.00 (in. Hg) [mbar]
Probe I.D. No: 67-1-3
Liner Material: Glass

Filter No: c3-19
Thimble No: N/A
Nozzle Diameter: 0.270 Nozzle I.D.: 270-1

Start Time: 11:19 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. (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. T _{xad} (°F)	Notes
1	5	0.37	0.98	543.245	306	253	255	65	87	87	3.1	N/A	0.2
2	10	0.36	0.95	548.91	306	255	254	59	90	86	3.1		7.2
3	15	0.35	0.93	551.67	305	252	251	57	91	86	3.1		7.6
4	20	0.38	1.0	554.54	305	249	251	49	91	87	3.1		8.1
5	25	0.34	0.90	557.270	307	250	250	49	93	88	3.1		7.9
4-1	30	0.40	1.1	560.28	305	250	249	53	93	88	3.1		7.1
2	35	0.38	1.0	563.15	306	251	250	51	94	89	3.1		8.1
3	40	0.31	0.82	565.71	305	251	250	52	94	90	3.1		7.8
4	45	0.30	0.80	568.28	306	249	249	53	94	90	3.1		7.0
5	50	0.28	0.74	570.731	307	250	249	54	94	89	3.1		7.4
3-1	55	0.35	0.93	573.54	306	249	251	57	93	90	3.1		7.6
2	60	0.35	0.93	576.29	306	251	250	57	94	90	3.1		7.2
Total				684.470									7.1
Average		0.5863	0.9208		305.6400				91.5400				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: PB
Date: 3/24/11

TEST LOCATION: FF Outlet
 UNIT: 2 RUN: 3

Part 1 Metals TESTING
 FIELD DATA SHEET

METHOD: 5129 PAGE 2 OF 2

Client: Wheabrator Project No: 11182
 Plant: N. Brown Date: 3/24/11
 Meter Operator: R. Bigham
 Probe Operator: R. Bigham

Meter Box: _____ Sample Box No: _____
 Meter Yr: _____ Meter ΔH: _____
 K Factor: _____ 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] 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. (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 _{m in} (°F)	DGM Outlet T _{m out} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T _t (°F)	Notes
3	65	0.33	0.88	579.00	301	250	249	57	92	89	3.5	N/A	7.5
4	70	0.30	0.80	581.50	306	249	250	57	91	89	3.5		8.3
5	75	0.32	0.85	584.190	307	250	250	60	92	89	3.5		7.7
2-1	80	0.47	1.3	587.51	306	250	250	63	93	89	4.0		8.6
2	85	0.43	1.1	590.46	306	251	250	61	94	90	4.0		8.5
3	90	0.40	1.1	593.41	307	251	249	58	95	90	4.0		7.9
4	95	0.37	0.98	596.25	306	250	250	56	97	91	4.0		8.0
5	100	0.35	0.93	599.030	307	250	250	56	97	92	3.5		8.6
1-1	105	0.22	0.58	601.25	303	249	250	60	96	92	3.0		8.7
2	110	0.23	0.61	603.50	303	210	249	60	97	92	3.5		7.7
3	115	0.32	0.85	606.13	304	251	249	62	96	92	3.5		8.2
4	120	0.37	0.98	609.00	305	250	249	60	96	92	4.0		8.2
5	125	0.37	0.98	611.820	306	250	250	61	96	92	4.0		8.4
Total													
Average													

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: PB
 Date: 3/24/11

Impinger Weight Sheet

Client Wheelabrator	Unit Name/Location Unit 2 FF Outlet
Plant North Broward	Job No. 11182 Method 5/29

Run No. 1	Filter Type Quartz	Sample Box No. M3
Date 3/24/11	Lot No.	pH
Analyst R. Viree	Filter No. e3-16	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	666.2	449.5	216.7	
Impinger 2	100 ml 5% HNO3/10% H2O2	668.3	564.0	104.3	QA/QC Rv
Impinger 3	100 ml 5% HNO3/10% H2O2	592.5	565.1	27.4	Date 3/24/11
Impinger 4	Empty	457.8	449.5	8.3	
Impinger 5	100 ml 4% KMnO4/10% H2SO4	540.6	532.4	8.2	Total Weight (gm)
Impinger 6	100 ml 4% KMnO4/10% H2SO4	533.5	537.0	-3.5	3614
Impinger 7	Silica Gel	729.9	713.8	16.1	377.5

Run No. 2	Filter Type Quartz	Sample Box No. M10
Date 3/24/11	Lot No.	pH
Analyst R. Viree	Filter No. e3-17	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	638.0	433.1	204.9	
Impinger 2	100 ml 5% HNO3/10% H2O2	693.2	568.7	124.5	QA/QC Rv
Impinger 3	100 ml 5% HNO3/10% H2O2	565.7	527.1	38.6	Date 3/24/11
Impinger 4	Empty	439.1	429.1	10.0	
Impinger 5	100 ml 4% KMnO4/10% H2SO4	546.9	540.5	6.4	Total Weight (gm)
Impinger 6	100 ml 4% KMnO4/10% H2SO4	551.4	551.6	-0.2	384.2
Impinger 7	Silica Gel	771.8	752.2	19.6	403.8

Run No. 3	Filter Type Quartz	Sample Box No. M4
Date 3/24/11	Lot No.	pH
Analyst R. Viree	Filter No. e3-19	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	678.7	437.1	241.6	
Impinger 2	100 ml 5% HNO3/10% H2O2	647.4	535.6	111.8	QA/QC Rv
Impinger 3	100 ml 5% HNO3/10% H2O2	555.7	532.8	22.9	Date 3/24/11
Impinger 4	Empty	439.4	437.1	2.3	
Impinger 5	100 ml 4% KMnO4/10% H2SO4	546.5	544.6	1.9	Total Weight (gm)
Impinger 6	100 ml 4% KMnO4/10% H2SO4	603.5	604.6	-1.1	379.4
Impinger 7	Silica Gel	822.2	809.3	12.9	392.3

274-1 2.00

TEST LOCATION: FF OUT FLUORIDE TESTING METHOD: 13B PAGE 1 OF 2
 UNIT: 2 RUN: 1 FIELD DATA SHEET

Client Wheelabrator Project No. 11182
 Plant N. Broward Date _____
 Meter Operator NH
 Probe Operator BA

Meter Box 66-21 Sample Box No. B22
 Meter Y₄ 0.9837 Meter ΔH 1.8252
 K Factor 2.65 Pitot C_p 0.818
 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

[N] [UP]

Duct Dimensions (in.) 76 x 96

Static Pres (in. H ₂ O)	Port Len. (in.)	Gas Flow (in. Hg) [Out]	First point all the way [Out]
<u>-10.4</u>	<u>10</u>	<u>10</u>	<u>10</u>

Amb. Temp (°F) 84 Bar. Press. 30.10 [in. Hg] [mbar]
 Probe I.D. No. 67-8-20
 Liner Material 61455

Filter No. -
 Thimble No. -
 Nozzle Diameter 0.274 Nozzle I.D. 274-1

Start Time: 11:32 Stop Time: 12:45

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 _{m in} (°F)	DGM Outlet T _{m out} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp (°F)	Notes
5-1	2:30	0.40	1.1	288.96	308	257	254	65	83	81	3	9.3	
2	5	0.37	0.98	290.38	307	256	254	64	83	81	3	9.3	
3	7:30	0.40	1.1	291.84	307	257	257	63	83	82	3	9.5	
4	10	0.43	1.1	293.36	309	258	250	63	85	82	3	9.3	
5	12:30	0.43	1.1	294.890	308	251	250	63	85	83	4	8.9	4.950
4-1	15	0.41	1.1	296.45	306	243	250	63	86	82	3	9.9	
2	17:30	0.42	1.1	297.98	308	245	250	62	87	82	3	9.5	
3	20	0.42	1.1	299.48	308	256	250	55	88	83	7	9.7	
4	22:30	0.42	1.1	300.98	308	255	250	53	89	83	4	9.5	
5	25	0.39	1.0	302.415	308	249	250	55	90	84	4	8.6	2.545
3-1	27:30	0.33	0.87	303.90	306	245	250	59	90	84	3	9.7	
2	30	0.46	1.2	305.44	308	250	250	59	91	85	4	9.0	
3	32:30	0.46	1.2	306.99	308	249	251	59	91	85	4	9.5	
Total		4.348	28.3600	37.8900	7678				2.87	2.084			
Average		0.6537	1.1344	307.1200					85.4200				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC NH
 Date 7/23/11



TEST LOCATION: FF outUNIT: 2 RUN: 1

Fluoride TESTING FIELD DATA SHEET

METHOD: 13B PAGE 2 OF 2

Client: Wheelabrator Project No.: 11152
 Plant: N.A. Rowards Date: 3.23.11
 Meter Operator: N. Archibald
 Probe Operator: BARNOLD

Meter Box: 66-21 Sample Box No.: 822
 Meter Yd.: 0.9837 Meter ΔH: 1.8252
 K Factor: 2.65 Pilot Cp: 0.818

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 ID No.
 Liner Material

Filter No.
 Thimble No.
 Nozzle Diameter Nozzle ID

Start Time: Stop Time:

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 Init Vol. (ft ³) [L]	Stack Temp. Ts (°F)	Probe T _p (°F) Set Points 250 250	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	0.43	1.1	308.50	308	253	251	60	92	85	4	9.2	
5	37:30	0.41	1.1	310.020	309	251	250	61	91	85	4	9.0	0.240
2-1	40	0.52	1.5	312.16	307	245	250	63	87	84	4	9.2	
2	42:30	0.54	1.4	313.68	308	249	252	60	88	85	4	9.2	
3	45	0.47	1.2	315.25	308	254	250	55	89	85	4	8.8	
4	47:30	0.46	1.2	316.79	307	255	250	53	89	85	4	8.9	
5	50	0.46	1.2	318.340	307	250	250	52	88	83	4	10.5	8.515
1-1	52:30	0.24	0.64	319.65	303	245	247	55	86	83	3	10.5	
2	55	0.27	0.72	321.12	305	246	250	53	86	83	3	10.2	
3	57:30	0.36	0.95	322.24	301	251	250	52	86	83	3	10.1	
4	60	0.62	1.6	324.64	307	252	250	52	87	83	4	9.6	
5	62:30	0.64	1.7	325.895	304	253	250	51	87	83	4	9.0	
Total	*												
Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC 38
 Date 3/23

TEST LOCATION: FF OUTLET
 UNIT: 2 RUN: 2

FLUORIDE TESTING FIELD DATA SHEET

METHOD: 13/3 PAGE 1 OF 2

Client Wheelabrator Project No. 1182
 Plant N. Browns Date 3.23.11
 Meter Operator NH
 Probe Operator BA

Meter Box 66-21 Sample Box No.
 Meter Yr. 0.9837 2.7 Meter ΔH @ 1.8252
 K Factor 2.45 2.65 Pitot Co. 0.818
 Leak Rate Before 0.403 (Lpm) @ 15 (in. Hg)
 Leak Rate After 0.002 (Lpm) @ 8 (in. Hg)
 Pitot Leak Check Before ☒ After: Good ☒ Bad ☐

Cross-Section of Test Location

5<-1

Duct Dimensions: (in.) 96 x 96

Static Pres. (in. H ₂ O)	Port Len. (in.)	Gas Flow (lb) [Out]	First point all the way (lb) [Out]
<u>-10.7</u>	<u>10</u>		

Amb. Temp (°F) 82 Bar Press. 30.10 (in. Hg) [mbar]
 Probe I.D. No. 67-8-20
 Liner Material 6/659

Filter No. -
 Thimble No. -
 Nozzle Diameter .274 Nozzle I.D. 274-1

Start Time: 13:07 Stop Time: 14:17

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)	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
	2.5			326.365		250	250						
1-1	2.5	0.20	0.54	327.41	302	258	259	63	83	82	3	9.6	
2	5	0.27	0.72	328.62	304	259	259	63	83	82	3	9.6	
3	7.5	0.39	1.0	330.04	302	254	254	63	83	82	3	9.6	
4	10	0.53	1.2	331.70	307	256	252	58	84	79	4	9.8	
5	12.5	0.58	1.6	333.535	308	251	251	57	85	82	4	8.6	.870
2-1	15	0.57	1.5	335.63	308	245	250	52	85	82	4	9.0	
2	17.5	0.58	1.6	337.41	307	247	250	54	85	82	4	8.9	
3	20	0.49	1.3	339.03	308	250	250	54	86	82	4	8.8	
4	22.5	0.51	1.4	340.70	308	252	250	55	86	82	4	9.7	.530
5	25	0.50	1.4	342.375	308	251	250	56	87	81	4	9.8	.530
3-1	27.5	0.60	1.6	344.35	308	247	250	61	86	82	5	9.5	
2	30	0.49	1.3	346.02	308	246	250	60	87	82	5	9.2	
3	32.5	0.46	1.2	347.56	308	251	250	61	87	82	4	8.5	
Total		16.8055	30.6600	34.3200	7676				1107	1062			
Average		0.6722	1.2264	307.0400					84.0400				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC NH
 Date 3.23.11



TEST LOCATION: FF OUTLET

UNIT: 2 RUN: 2

FLUORIDE

TESTING

METHOD: ^{13B}₁₂ PAGE 2 OF 2

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11182
Plant	N. Browns	Date	3.23.11
Meter Operator	NH		
Probe Operator	BA		

Meter Box	66-21	Sample Box No	B1
Meter Ya	0.9837	Meter ΔH_{a}	1.8252
K Factor	27	Pilot C	0.818

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.) <table border="1"> <tr> <td> Static Pres- (in. H₂O) </td> <td> Port Len. (in.) </td> <td> Gas Flow [In] [Out] of page </td> <td> First point all the way [In] [Out] </td> </tr> </table>				Static Pres- (in. H₂O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
Static Pres- (in. H₂O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]				

Amb Temp (°F)	Bar Press	[in. Hg] [mbars]
Probe I.D. No.		
Liner Material		

Filter No:		
Thimble No:		
Nozzle Diameter:	Nozzle D:	

Start Time: 11	Stop Time: 14:17

[illegible]

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC 43
Date 3/23

F - 35

TEST LOCATION: FF OUTLET
 UNIT: 2 RUN: 3

FLUORIDE TESTING FIELD DATA SHEET

METHOD: 13B PAGE 1 OF 2

Client <u>Wheelabrator</u>	Project No. <u>11182</u>
Plant <u>N. Broward</u>	Date <u>3.23.11</u>
Meter Operator <u>NH</u>	
Probe Operator <u>BA</u>	

Meter Box <u>66-21</u>	Sample Box No. <u>B22</u>
Meter Yg. <u>0.9837</u>	Meter ΔH. <u>1.8252</u>
K Factor <u>2.7</u>	Pitot Cp. <u>0.818</u>
Leak Rate Before <u>0.004</u> [cfm] @ <u>15</u> (in. Hg)	
Leak Rate After <u>0.002</u> [cfm] @ <u>9</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)	Port Len. (in.)	Gas Flow (in) [Out]	First point all the way
<u>-10.7</u>	<u>10</u>	<u>(In)</u> [Out]	<u>(In)</u> [Out]

of page 10

Amb Temp (°F) <u>84</u>	Bar Press <u>30.1</u> (in. Hg) [mbar]
Probe ID No. <u>67-8-20</u>	
Liner Material <u>GLASS</u>	

Filter No. <u>-</u>	
Thimble No. <u>-</u>	
Nozzle Diameter <u>0.274</u>	Nozzle ID <u>274-1</u>

Start Time: <u>14:39</u>	Stop Time: <u>15:45</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. Ts (°F)	Probe T _p (°F)	Filter T _f (°F)	Cond Temp T _c (°F)	DGM Inlet T _{m in} (°F)	DGM Outlet T _{m out} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T _o (°F)	Notes
				<u>367.295</u>		<u>250</u>	<u>250</u>						
5-1	2.5	0.45	1.2	368.90	307	246	258	64	82	81	3	10.0	
2	5	0.47	1.3	370.57	308	254	258	57	82	81	3	9.9	
3	7.5	0.45	1.2	372.06	308	255	254	47	83	81	3	8.6	
4	10	0.47	1.3	373.68	307	259	252	44	83	81	3	9.5	
5	12.5	0.47	1.1	375.225	308	252	250	42	84	81	3	7.7	.430
4-1	15	0.44	1.2	377.03	308	245	250	43	83	81	3	8.2	
2	17.5	0.44	1.2	378.60	307	249	250	40	84	80	4	9.8	
3	20	0.42	1.1	380.11	307	256	257	40	85	81	4	8.9	
4	22.5	0.43	1.2	381.65	308	253	250	40	85	81	4	9.1	
5	25	0.37	1.0	383.120	302	248	257	41	84	80	4	8.8	.280
3-1	27.5	0.30	0.81	384.55	305	242	249	44	83	80	3	9.5	
2	30	0.40	1.1	386.08	307	244	250	44	83	80	3	8.6	
3	32.5	0.42	1.1	387.56	307	255	251	44	84	80	3	8.8	
Total		<u>16.0422</u>	<u>27.9800</u>	<u>37.6350</u>	<u>7668</u>				<u>1085</u>	<u>1048</u>			
Average		<u>0.6417</u>	<u>1.1192</u>	<u>306.7200</u>					<u>81.8400</u>				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC NH
 Date 3.23.11

TEST LOCATION: FF OUTLET
 UNIT: 2 RUN: 3

FLUORIDE TESTING FIELD DATA SHEET

METHOD: 13B PAGE 2 OF 2

Client: Wheelabrator Project No: 11182
 Plan: N. Broward Date: 3.22.11
 Meter Operator: NH
 Probe Operator: AT

Meter Box: 6621 Sample Box No: A22
 Meter Y: 0.9839 Meter ΔH: 1.1252
 K Factor: 2.7 Pitot C_p: 0.818
 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: 15:45

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 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 _x (°F)	Notes
						Set Points:							
3-4	35	0.40	1.1	389.04	307	250	250	45	84	80	3	9.2	
5	37.5	0.40	1.1	390.535	308	250	250	47	84	80	3	9.5	.725
2-1	40	0.57	1.5	392.43	306	242	249	51	83	79	4	9.8	
2	42.5	0.50	1.4	394.16	309	248	250	51	84	80	4	8.7	
3	45	0.48	1.3	395.79	308	254	250	51	84	80	4	8.9	
4	47.5	0.43	1.2	397.36	308	254	250	52	85	79	4	8.2	
5	50	0.37	1.0	398.785	308	250	250	53	85	80	4	7.5	.950
1-1	52.5	0.37	1.0	400.35	303	245	249	56	83	79	3	9.0	
2	55	0.25	0.68	401.65	304	247	250	56	84	79	3	8.5	
3	57.5	0.33	0.89	402.73	304	251	251	55	83	79	3	9.4	
4	60	0.38	1.0	404.17	307	252	251	56	83	80	3	8.3	
5	62.5	0.38	1.0	405.650	307	250	250	56	83	79	3	8.5	
Total	*								1005	954			
Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC SB
 Date 3/23

Impinger Weight Sheet

Client Wheelabrator	Unit Name/Location - Unit 2 FF Outlet
Plant North Broward	Job No. 11182 Method 13B

Run No. 1	Filter Type Teflon glass mat	Sample Box No. B22
Date 3/23/11	Lot No.	pH
Analyst D. Lukhand	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	100 mL DI H2O	672.6	546.2	126.4	
Impinger 2	100 mL DI H2O	604.6	550.7	53.9	
Impinger 3	Empty	455.6	443.8	11.8	
Impinger 4	Silica Gel	764.7	751.9	12.8	
					Total Weight (gm)
					192.1
					204.9

QA/QC DL
Date 3/23/11

Run No. 2	Filter Type Teflon glass mat	Sample Box No. B1
Date 3/23/11	Lot No.	pH
Analyst R. Vicore	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	100 mL DI H2O	760.9	636.1	124.8	
Impinger 2	100 mL DI H2O	618.7	547.1	71.6	
Impinger 3	Empty	469.6	456.2	13.4	
Impinger 4	Silica Gel	749.5	734.2	15.3	
					Total Weight (gm)
					209.9
					225.1

QA/QC RV
Date 3/23/11

Run No. 3	Filter Type Teflon glass mat	Sample Box No.
Date 3/23/11	Lot No.	pH
Analyst R. Vicore	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	100 mL DI H2O	694.3	546.0	148.3	
Impinger 2	100 mL DI H2O	599.8	549.2	50.6	
Impinger 3	Empty	450.5	443.6	6.9	
Impinger 4	Silica Gel	778.0	765.9	12.1	
					Total Weight (gm)
					205.8
					217.9

QA/QC RV
Date 3/23/11

TEST LOCATION: SDA INLET
 UNIT: 2 RUN: 1

14c1 TESTING FIELD DATA SHEET

METHOD: 26 A PAGE 1 OF 1

Client: <u>Wheabrator</u>	Project No: <u>11182</u>
Plant: <u>N. BROWARD</u>	Date: <u>3-23-11</u>
Meter Operator: <u>B. ARNOLD</u>	
Probe Operator: <u> </u>	

Meter Box: <u>66-14</u>	Sample Box No: <u>B16</u>
Meter Y: <u>0.9882</u>	Meter ΔH: <u>1.7571</u>
K Factor: <u> </u>	Pilot C: <u> </u>
Leak Rate Before: <u>0.003</u> [cfm] [Lpm] @ <u>15</u> (in. Hg)	
Leak Rate After: <u>0.003</u> [cfm] [Lpm] @ <u>17</u> (in. Hg)	
Pilot Leak Check Before: ☐ After: Good ☐ Bad ☐	

Cross-Section of Test Location

Duct Dimensions (in.): 105

Static Pres. (in. H ₂ O): <u>-1.2</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>63</u>	Bar. Press. <u>30.10</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>1/4</u>	Nozzle I.D.: <u> </u>

Start Time: <u>7:12</u>	Stop Time: <u>8:12</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 (°F)	Notes
1-1	5	N/A	1.2	073.220	483	350	350	60	66	65	2.0	7.6	
	10		1.2	076.32	485	351	351	53	68	65	2.0	8.0	
	15		1.2	082.34	486	351	350	51	70	65	3.5	7.9	
	20		1.2	085.36	488	355	352	51	72	66	4.5	8.3	
	25		1.2	088.37	489	352	354	54	75	67	6.0	7.9	
	30		1.2	091.37	491	352	355	57	76	68	7.0	7.5	
	35		1.2	094.38	491	351	353	61	77	69	8.5	8.5	
	40		1.2	097.41	496	351	354	67	78	70	10.0	8.3	
	45		1.2	100.45	495	350	350	66	78	70	11.0	8.4	
	50		1.2	103.47	493	351	352	63	78	71	12.0	8.2	
	55		1.2	106.45	495	353	350	63	78	71	13.0	7.7	
	60		1.2	109.475	494	351	350	62	79	72	14.0	7.1	
	Total		14.4000	36.2550									
	Average		1.2000		490.5000				71.4166				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC 39
Date 3/23

METHOD: 26th PAGE 1 OF 1

Start Time: 8:38	Stop Time: 9:38

Circle correct bracketed units on data sheet.



CleanAir
ENGINEERING

TEST LOCATION: SDA INLET
 UNIT: 2 RUN: 3

HCl TESTING
FIELD DATA SHEET

METHOD: 26A PAGE 1 OF 1

Client: Wheabrator Project No: 11182
 Plant: N. BLOWARD Date: 3-23-11
 Meter Operator: B. ARNOLD
 Probe Operator: —

Meter Box: 66-14 Sample Box No: B16
 Meter Yr: 09882 Meter ΔH : 1.7571
 K Factor: — Pitot Cp: —

Leak Rate Before: 0.002 [cfm] [Lpm] @ 15 (in. Hg)
 Leak Rate After: 0.002 [cfm] [Lpm] @ 15 (in. Hg)
 Pitot Leak Check Before: ☐ After: Good ☐ Bad ☐

Cross-Section of Test Location:



[N] [UP]

Duct Dimensions (in.): 105

Static Pres (in. H ₂ O): <u>-1.6</u>	Port Len. (in.): <u>14</u>	Gas Flow (In) (Out) [In] [Out] of page <u>1</u>	First point all the way [In] [Out]

Amb. Temp. (°F): 78 Bar. Press: 30.10 (in. Hg) [mbar]
 Probe I.D. No: 67-4-5
 Liner Material: GLASS

Filter No: —
 Thimble No: —
 Nozzle Diameter: NA Nozzle I.D.: —

Start Time: 9:59 Stop Time: 10:59

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	146.130	497	350	350	62	80	78	2.0	8.6	
	10		1.2	152.27	500	353	350	53	82	79	2.5	7.0	
	15		1.2	155.28	501	354	351	49	85	79	3.5	7.4	
	20		1.2	158.33	501	355	350	50	87	80	4.0	7.1	
	25		1.2	161.33	496	355	350	53	87	80	5.0	7.1	
	30		1.2	164.35	498	351	353	54	88	80	6.0	7.9	
	35		1.2	167.41	498	351	351	57	88	81	7.0	7.8	
	40		1.2	170.46	499	355	352	59	88	81	8.5	7.9	
	45		1.2	173.46	495	352	352	63	88	81	9.0	8.4	
	50		1.2	176.48	495	354	353	63	88	81	10.0	8.9	
	55		1.2	179.48	495	355	352	65	88	82	11.0	8.3	
	60		1.2	182.500	496	352	349	63	88	82	12.0	8.5	
Total				1444.000									
Average				36.37					83.3750				

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC
 Date: 3-23-11

Impinger Weight Sheet

Client Wheelabrator	Unit Name/Location Unit 2 SDA Inlet
Plant North Broward	Job No. 11182 Method Mod. 26A

Run No. 1	Filter Type Quartz	Sample Box No. B16
Date 3/23/11	Lot No.	pH
Analyst D. Luckhand	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	490.3	459.6	30.1	
Impinger 2	100 mL 0.1N H2SO4	626.9	478.4	62.1	QA/QC DL
Impinger 3	100 mL 0.1N H2SO4	583.0	458.4	38.2	Date 3/23/11
Impinger 4	Empty	450.8	441.3	9.5	
Impinger 5	Silica Gel	778.8	763.6	15.2	Total Weight (gm)
					140.5
					155.7

Run No. 2	Filter Type Quartz	Sample Box No. B11
Date 3/23/11	Lot No.	pH
Analyst R. Vicore	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	495.7	459.6	36.1	
Impinger 2	100 mL 0.1N H2SO4	619.8	540.0	79.8	QA/QC RV
Impinger 3	100 mL 0.1N H2SO4	572.1	555.4	16.7	Date 5/23/11
Impinger 4	Empty	528.2	524.8	3.4	
Impinger 5	Silica Gel	783.2	774.3	8.9	Total Weight (gm)
					136.0
					144.9

Run No. 3	Filter Type Quartz	Sample Box No. B16
Date 3/23/11	Lot No.	pH
Analyst R. Vicore	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	492.2	460.8	31.4	
Impinger 2	100 mL 0.1N H2SO4	643.3	565.7	77.6	QA/QC RV
Impinger 3	100 mL 0.1N H2SO4	572.3	543.0	29.3	Date 3/23/11
Impinger 4	Empty	444.8	440.2	4.6	
Impinger 5	Silica Gel	747.8	732.7	15.1	Total Weight (gm)
					142.9
					158.0

TEST LOCATION: FF OUTLET
 UNIT: 2 RUN: 1

ACI TESTING FIELD DATA SHEET

METHOD: 24A PAGE 1 OF 1

Client Wheelabrator Project No. 11182
 Plant N BROWARDS Date 3.23.11
 Meter Operator NH
 Probe Operator NH

Meter Box 61-5 Sample Box No. 821
 Meter Yr. 0.4936 Meter ΔH @ 1.7676
 K Factor NA Pitot Co. NA

Leak Rate Before 0.002 [Lpm] @ 15 (in. Hg)
 Leak Rate After 0.002 [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 [Out]	First point all the way
<u>-9.9</u>	<u>10</u>	<u>10</u> [Out]	<u>10</u> [Out]

Amb. Temp. (°F) 68 Bar. Press. 30.1 [mm. Hg] [mbar]
 Probe I.D. No. 67-4-1
 Liner Material GLASS

Filter No. NA
 Thimble No. NA
 Nozzle Diameter NA Nozzle I.D. NA

Start Time: 7:12 Stop Time: 8:12

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) [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. (°F)	Notes
3-1	5	NA	1.5	617.490	308	304	303	62	72	70	4	9.3	
	10		1.5	624.67	308	303	303	53	77	71	4	8.0	
	15		1.5	628.13	308	303	302	52	81	72	4	8.4	
	20		1.5	631.40	309	301	303	55	84	72	4	8.7	
	25		1.5	636.05	309	301	303	61	86	73	4	8.3	
	30		1.5	638.54	309	302	302	62	87	74	4	8.4	
	35		1.5	642.05	309	302	302	63	89	75	4	8.9	
	40		1.5	645.54	310	302	301	62	89	76	4	9.0	
	45		1.5	649.12	310	302	302	60	89	77	4	8.7	
	50		1.5	652.61	309	302	302	58	89	77	4	8.9	
	55		1.5	656.14	309	302	302	57	90	78	4	8.4	
	60		1.5	659.700	308	301	302	56	90	79	4	8.6	
Total				42.2100	3706				1023	894			
Average				1.5206	308.8333				79.8750				

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC NH
 Date 3.23.11

TEST LOCATION: FF OUTLET
 UNIT: 2 RUN: 2

HEX TESTING FIELD DATA SHEET

METHOD: 26A PAGE 1 OF 1

Client: <u>Wheelabrator</u>	Project No: <u>11182</u>
Plant: <u>N. BROWARD</u>	Date: <u>3.23.11</u>
Meter Operator: <u>NH</u>	
Probe Operator:	

Meter Box: <u>61-5</u>	Sample Box No: <u>B12</u>
Meter Yd: <u>0.9936</u>	Meter ΔH: <u>1.7876</u>
K Factor: <u>-</u>	Pitot C: <u>-</u>
Leak Rate Before: <u>0.03</u> [in] [Lpm]	@ <u>15</u> (in. Hg)
Leak Rate After: <u>0.002</u> [in] [Lpm]	@ <u>7</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)	Port Len. (in.)	Gas Flow (in) [Out]	First point all the way
<u>-11.8</u>	<u>10</u>	<u>(in) [Out]</u>	<u>(in) [Out]</u>

Amb. Temp. (°F)	<u>71</u>	Bar. Press	<u>30.10</u> [in. Hg] [mbar]
Probe I.D. No:	<u>67-82</u>	<u>67-4-1</u>	
Liner Material:	<u>GLASS</u>		

Filter No:	<u>NA</u>		
Thimble No:	<u>NA</u>		
Nozzle Diameter:		Nozzle I.D.	

Start Time:	<u>8:38</u>	Stop Time:	<u>9:38</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. (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 (°F)	Notes
						Set Points						~~X~~	
	5			660.615		300	300					~~0~~	
2-1	5	N/A	1.5	664.15	309	302	305	64	82	80	4	9.6	
	10	↓	1.5	667.61	308	307	302	60	87	80	4	8.7	
	15		1.5	671.01	308	303	301	59	89	80	4	9.1	
	20		1.5	674.58	308	301	302	63	92	81	4	8.7	
	25		1.5	678.05	308	301	302	64	93	81	4	8.4	
	30		1.5	681.56	308	301	302	65	94	83	4	9.3	
	35		1.5	684.97	308	302	302	65	94	83	4	8.7	
	40		1.5	688.50	308	302	302	62	94	83	4	8.5	
	45		1.5	691.90	307	302	302	59	94	84	4	8.9	
	50		1.5	695.43	308	302	303	56	93	84	4	9.4	
	55		1.5	698.96	308	302	302	54	94	85	4	9.2	
	60		1.5	702.480	308	302	302	53	94	85	4	9.3	
	Total	*		41.8650	3696				1100	989			
	Average		1.5000		308.0000				87.0417				

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: NH
 Date: 3.23.11



TEST LOCATION: PF OUT
 UNIT: 2 RUN: 3

HCl TESTING FIELD DATA SHEET

METHOD: 264 PAGE 1 OF 1

Client Wheelabrator Project No. 1182
 Plant N. Browards Date 3.23.11
 Meter Operator NH
 Probe Operator NH

Meter Box 615 Sample Box No. 814
 Meter Yr. 0.9936 Meter ΔH @ 1-7676
 K Factor NH Pitot C_p -
 Leak Rate Before 0.004 [cfm] [Lpm] @ 16 (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 [cfm] [Out]	First point all the way
<u>-11.3</u>	<u>10</u>	<u>0.002</u> [Out]	<u>0.002</u> [Out]

Amb. Temp: (°F) 77 Bar. Press. 30.1 (in. Hg) [mbar]
 Probe I.D. No. 67-4-1
 Liner Material GLASS

Filter No. -
 Thimble No. -
 Nozzle Diameter - Nozzle I.D. -

Start Time: 9:59 Stop Time: 10:59

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. T _x (°F)	Notes
2-1	5	N/A	1.5	703.025	309	300	300	60	89	85	4	8.0	
	10		1.5	710.14	309	305	304	58	91	85	4	8.3	
	15		1.5	713.60	308	304	305	57	93	85	4	8.6	
	20		1.5	717.12	309	302	303	59	95	86	4	7.5	
	25		1.5	720.50	309	302	302	63	95	87	4	5.7	
	30		1.5	723.99	309	302	302	65	95	87	4	8.7	
	35		1.5	727.44	308	301	302	64	95	87	4	8.5	
	40		1.5	730.89	308	303	303	64	95	88	4	8.2	
	45		1.5	734.33	308	302	303	65	95	88	4	8.2	
	50		1.5	737.83	308	302	303	65	94	88	4	8.1	
	55		1.5	741.34	309	301	301	66	94	87	4	8.3	
	60		1.5	744.810	308	302	302	65	93	86	4	8.3	
Total	*			41.7850	3002				1124	1039			
Average			1.5000		308.5000				90.1250				

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC NH
 Date 3-23-11

Impinger Weight Sheet

Client Wheelabrator	Unit Name/Location Unit 2 FF Outlet
Plant North Broward	Job No. 11182 Method Mod. 26A

Run No. 1	Filter Type Quartz	Sample Box No. B21
Date 3/23/11	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	499.3	457.2	42.1	
Impinger 2	100 mL 0.1N H2SO4	658.1	547.9	110.2	QA/QC RV
Impinger 3	100 mL 0.1N H2SO4	603.4	552.9	50.5	Date 3/23/11
Impinger 4	Empty	460.3	443.6	16.7	
Impinger 5	Silica Gel	756.7	739.1	17.6	Total Weight (gm)
					2195
					237.1

Run No. 2	Filter Type Quartz	Sample Box No. B12
Date 3/23/11	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	507.7	454.4	53.3	
Impinger 2	100 mL 0.1N H2SO4	643.7	540.2	103.5	QA/QC RV
Impinger 3	100 mL 0.1N H2SO4	589.8	553.0	36.8	Date 3/23/11
Impinger 4	Empty	438.7	428.1	10.6	
Impinger 5	Silica Gel	790.0	773.2	16.8	Total Weight (gm)
					209.2
					226.0

Run No. 3	Filter Type Quartz	Sample Box No. B14
Date 3/23/11	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	508.5	455.5	53.0	
Impinger 2	100 mL 0.1N H2SO4	624.0	525.0	99.0	QA/QC RV
Impinger 3	100 mL 0.1N H2SO4	585.6	535.9	49.7	Date 3/23/11
Impinger 4	Empty	459.4	446.7	12.7	
Impinger 5	Silica Gel	767.1	750.5	16.6	Total Weight (gm)
					214.4
					231.0

METHOD: 5729 PAGE 1 OF 2

Start Time: 6:57	Stop Time: 9:10

Circle correct bracketed units on data sheet.



Clean
ENGINEERING

TEST LOCATION: PF Outlet
UNIT: 3 RUN: 1

Particulate/Metals TESTING
FIELD DATA SHEET

METHOD: 5129 PAGE 2 OF 2

Client: Whitcomb Project No: 11182
Plant: N. Broward Date: 3/22/11
Meter Operator: P. Behar
Probe Operator: P. Behar

Meter Box: Sample Box No:
Meter Y_d: Meter ΔH₀:
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) [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	65	0.52	1.3	816.52	312	251 250	250	49	81	73	4.0	N/A	9.6
Y	70	0.45	1.1	819.48	313	249 249	249	50	82	74	4.0		9.4
5	75	0.43	1.0	822.360	313	249 251	251	52	82	74	3.5		9.2
2-1	80	0.67	1.6	826.01	313	249 249	249	56	81	75	5.0		9.8
2	85	0.55	1.3	829.28	313	257 250	250	53	84	75	4.5		9.4
3	90	0.50	1.2	832.43	312	257 249	249	54	84	76	4.5		9.2
4	95	0.56	1.3	835.69	313	249 251	251	56	85	76	4.0		9.7
5	100	0.51	1.2	838.835	313	249 249	249	57	85	77	4.0		9.3
1-1	105	0.50	1.2	842.04	309	248 244	244	58	84	77	4.0		10.0
2	110	0.33	0.79	844.62	303	250 251	251	59	85	78	3.5		9.5
3	115	0.33	0.79	847.16	306	251 253	253	60	86	78	3.5		9.6
4	120	0.43	1.0	850.05	310	251 248	248	61	86	78	3.5		9.6
5	125	0.43	1.0	852.941	311	250 251	251	61	87	79	3.5		9.3
Total													
Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

TEST LOCATION: FF Outlet
 UNIT: 3 RUN: 2

Purification/ Metals TESTING
 FIELD DATA SHEET

METHOD: 5129 PAGE 1 OF 2

Client <u>Wheeler</u>	Project No. <u>11182</u>
Plant <u>N. Brown</u>	Date <u>3/22/11</u>
Meter Operator <u>P. Blynn</u>	
Probe Operator <u>P. Blynn</u>	

Meter Box <u>66-22</u>	Sample Box No. <u>M112</u>
Meter Y. <u>0.9925</u>	Meter ΔH ₀ <u>1.1892</u>
K Factor <u>2.40</u>	Pilot C _p <u>0.83</u>
Leak Rate Before <u>0.003</u> (cfm) [Lpm] @ <u>12</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

Duct Dimensions (in.) 96 x 96

Static Pres (in. H ₂ O) <u>-9.6</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>73</u>	Bar. Press. <u>30.20</u> (in. Hg) [mbar]
Probe I.D. No. <u>67-3</u>	
Liner Material <u>Glass</u>	

Filter No. <u>03-11</u>	
Thimble No. <u>N/A</u>	
Nozzle Diameter <u>0.270</u>	Nozzle I.D. <u>270-1</u>

Start Time: <u>9:35</u>	Stop Time: <u>11:50</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. (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
				<u>853.365</u>		<u>252</u>	<u>252</u>						<u>02</u>
4-1	5	<u>0.42</u>	<u>1.0</u>	<u>856.26</u>	<u>311</u>	<u>252</u>	<u>253</u>	<u>64</u>	<u>81</u>	<u>79</u>	<u>3.0</u>	<u>N/A</u>	<u>9.4</u> <u>K243</u>
2	10	<u>0.41</u>	<u>1.0</u>	<u>859.14</u>	<u>311</u>	<u>253</u>	<u>254</u>	<u>55</u>	<u>83</u>	<u>80</u>	<u>3.0</u>		<u>9.3</u>
3	15	<u>0.48</u>	<u>1.2</u>	<u>862.26</u>	<u>312</u>	<u>251</u>	<u>250</u>	<u>50</u>	<u>86</u>	<u>80</u>	<u>3.0</u>		<u>9.4</u>
4	20	<u>0.42</u>	<u>1.0</u>	<u>865.16</u>	<u>313</u>	<u>280</u>	<u>250</u>	<u>48</u>	<u>87</u>	<u>80</u>	<u>3.0</u>		<u>8.9</u>
5	25	<u>0.41</u>	<u>1.0</u>	<u>868.030</u>	<u>312</u>	<u>249</u>	<u>250</u>	<u>48</u>	<u>88</u>	<u>81</u>	<u>3.0</u>		<u>8.9</u> <u>868.121</u>
3-1	30	<u>0.46</u>	<u>1.1</u>	<u>871.15</u>	<u>312</u>	<u>249</u>	<u>248</u>	<u>50</u>	<u>88</u>	<u>81</u>	<u>3.0</u>		<u>8.5</u> <u>(-0.145)</u>
2	35	<u>0.46</u>	<u>1.1</u>	<u>874.13</u>	<u>311</u>	<u>280</u>	<u>247</u>	<u>49</u>	<u>90</u>	<u>82</u>	<u>3.0</u>		<u>8.4</u>
3	40	<u>0.43</u>	<u>1.0</u>	<u>877.02</u>	<u>311</u>	<u>251</u>	<u>251</u>	<u>49</u>	<u>90</u>	<u>83</u>	<u>3.0</u>		<u>8.7</u>
4	45	<u>0.42</u>	<u>1.0</u>	<u>879.90</u>	<u>311</u>	<u>249</u>	<u>249</u>	<u>49</u>	<u>90</u>	<u>83</u>	<u>3.0</u>		<u>8.7</u> <u>882.731</u>
5	50	<u>0.37</u>	<u>0.90</u>	<u>882.631</u>	<u>311</u>	<u>249</u>	<u>250</u>	<u>49</u>	<u>91</u>	<u>83</u>	<u>2.5</u>		<u>8.3</u> <u>(-0.101)</u>
2-1	55	<u>0.67</u>	<u>1.6</u>	<u>886.36</u>	<u>312</u>	<u>249</u>	<u>250</u>	<u>54</u>	<u>89</u>	<u>83</u>	<u>4.0</u>		<u>9.0</u>
2	60	<u>0.49</u>	<u>1.2</u>	<u>889.52</u>	<u>311</u>	<u>251</u>	<u>249</u>	<u>52</u>	<u>91</u>	<u>84</u>	<u>3.5</u>		<u>8.8</u>
Total				<u>72.490</u>									
Average		<u>0.654</u>	<u>1.0304</u>			<u>310.7200</u>					<u>84.5600</u>		

Sum of square roots.

Circle correct bracketed units on data sheet.

TEST LOCATION: FF Outlet
 UNIT: 3 RUN: 2

TESTING FIELD DATA SHEET

METHOD: SP29 PAGE 2 OF 2

Client <u>Wheeler</u>	Project No. <u>11142</u>
Plant <u>N. Brunswick</u>	Date <u>3/22/11</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]	First point all the way [In] [Out]

Amb. Temp (°F)	Ba. 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. (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
	5					210	250						
3	65	0.45	1.2	892.68	311	251	250	52	92	81	3.1	N/A	9.2
4	70	0.40	0.97	885.54	313	249	251	53	92	85	3.0		8.7
5	75	0.39	0.95	828.350	311	249	250	55	93	86	3.0		8.1
1-1	80	0.22	0.53	900.47	304	249	251	58	89	86	2.0		9.2
2	85	0.25	0.61	902.68	303	250	250	60	87	85	2.1		9.2
3	90	0.37	0.90	905.39	310	251	250	61	88	81	3.0		8.8
4	95	0.41	1.0	908.27	311	249	251	60	90	86	3.0		8.7
5	100	0.41	1.0	911.75	311	250	250	58	90	86	3.0		8.7
5-1	105	0.47	1.1	914.24	309	250	250	61	89	86	3.1		8.8
2	110	0.51	1.2	917.46	312	251	251	59	89	86	3.1		8.9
3	115	0.46	1.1	920.43	311	251	250	57	92	86	3.1		9.1
4	120	0.46	1.1	923.32	312	249	250	58	94	87	3.1		9.0
5	125	0.41	1.0	926.25	312	250	251	59	94	87	3.0		8.0
Total													
Average													

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC SP
 Date 3/22/11

TEST LOCATION: PF Outlet
UNIT: 3 RUN: 3

Rockwater Metals TESTING FIELD DATA SHEET

METHOD: 5129 PAGE 1 OF 2

Client: Wheeler Project No: 11142
Plant: N. Broward Date: 3/22/11
Meter Operator: P. Bohn
Probe Operator: P. Bohn

Meter Box: 46-22 Sample Box No: M4
Meter Y: 0.9995 Meter ΔH: 1.6892
K Factor: 2.50 Pitot C: 0.43
Leak Rate Before: 0.005 (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)	Port Len. (in.)	Gas Flow (Nm) [Out] of page	First point all the way (in) [Out]
<u>-9.5</u>	<u>10.0</u>		

Amb. Temp. (°F): 81 Bar. Press: 30.20 (in. Hg) [mbar]
Probe ID No: 67-8-3
Liner Material: Glass

Filter No: C3-12
Thimble No: N/A
Nozzle Diameter: 0.270 Nozzle ID: 770-1

Start Time: 12:16 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 (in 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 _i (°F)	Notes
				<u>926.540</u>		<u>210</u>	<u>202</u>						<u>0.2</u>
1	5	<u>0.46</u>	<u>1.2</u>	<u>929.73</u>	<u>311</u>	<u>259</u>	<u>256</u>	<u>65</u>	<u>89</u>	<u>89</u>	<u>2.5</u>	<u>N/A</u>	<u>9.1</u>
2	10	<u>0.43</u>	<u>1.1</u>	<u>932.66</u>	<u>310</u>	<u>258</u>	<u>254</u>	<u>63</u>	<u>91</u>	<u>89</u>	<u>2.5</u>		<u>9.0</u>
3	15	<u>0.46</u>	<u>1.2</u>	<u>935.78</u>	<u>309</u>	<u>200</u>	<u>250</u>	<u>59</u>	<u>94</u>	<u>90</u>	<u>3.0</u>		<u>9.4</u>
4	20	<u>0.45</u>	<u>1.1</u>	<u>938.78</u>	<u>310</u>	<u>200</u>	<u>250</u>	<u>57</u>	<u>96</u>	<u>90</u>	<u>2.5</u>		<u>9.4</u>
5	25	<u>0.45</u>	<u>1.1</u>	<u>941.775</u>	<u>313</u>	<u>249</u>	<u>249</u>	<u>58</u>	<u>96</u>	<u>90</u>	<u>2.5</u>		<u>9.0</u>
5	30	<u>0.44</u>	<u>1.1</u>	<u>944.90</u>	<u>312</u>	<u>249</u>	<u>250</u>	<u>63</u>	<u>95</u>	<u>91</u>	<u>2.5</u>		<u>8.8</u>
2	35	<u>0.43</u>	<u>1.1</u>	<u>947.85</u>	<u>312</u>	<u>251</u>	<u>250</u>	<u>62</u>	<u>96</u>	<u>92</u>	<u>2.5</u>		<u>8.3</u>
3	40	<u>0.47</u>	<u>1.2</u>	<u>951.01</u>	<u>311</u>	<u>251</u>	<u>250</u>	<u>61</u>	<u>97</u>	<u>92</u>	<u>3.0</u>		<u>8.8</u>
4	45	<u>0.45</u>	<u>1.2</u>	<u>954.19</u>	<u>312</u>	<u>249</u>	<u>249</u>	<u>59</u>	<u>98</u>	<u>92</u>	<u>3.0</u>		<u>9.2</u>
5	10	<u>0.46</u>	<u>1.2</u>	<u>957.380</u>	<u>312</u>	<u>249</u>	<u>200</u>	<u>59</u>	<u>98</u>	<u>92</u>	<u>3.0</u>		<u>9.4</u>
4	55	<u>0.55</u>	<u>1.4</u>	<u>960.83</u>	<u>312</u>	<u>249</u>	<u>200</u>	<u>61</u>	<u>97</u>	<u>93</u>	<u>3.5</u>		<u>9.0</u>
2	60	<u>0.50</u>	<u>1.3</u>	<u>964.04</u>	<u>312</u>	<u>251</u>	<u>250</u>	<u>62</u>	<u>98</u>	<u>93</u>	<u>3.0</u>		<u>8.6</u>
Total				<u>77.25</u>									
Average		<u>0.61</u>	<u>1.1612</u>	<u>311.5200</u>					<u>94.4400</u>				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: PB
Date: 3/22/11



TEST LOCATION: FF Outlet
 UNIT: 3 RUN: 3

TESTING FIELD DATA SHEET

METHOD: 5129 PAGE 2 OF 2

Client: <u>W. H. H. H. H. H.</u>	Project No.: <u>11182</u>
Plant: <u>N. B. B. B. B.</u>	Date: <u>3/22/11</u>
Meter Operator: <u>P. B. B. B.</u>	
Probe Operator: <u>P. B. B. B.</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] 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) [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 (°F)	Notes
						Set Points							
3	65	0.46	1.2	967.23	311	257	257	52	99	94	3.0	N/A	9.2
4	70	0.40	1.0	970.13	312	249	250	51	100	94	3.0		8.2
5	75	0.36	0.90	972.89	311	250	249	48	97	94	2.5		8.3 972.89
3-1	80	0.32	0.80	975.54	311	249	250	54	95	93	2.5		9.2 (-0.07)
2	85	0.47	1.2	978.67	312	251	251	52	96	93	3.0		9.3
3	90	0.45	1.1	981.73	310	251	250	51	96	93	3.0		9.0
4	95	0.47	1.2	984.92	312	249	250	51	96	94	3.0		9.1 984.92
5	100	0.43	1.1	987.89	313	250	250	53	98	94	3.0		9.1 (-0.06)
2-1	105	0.61	1.5	991.52	312	248	251	58	97	94	3.5		8.9
2	110	0.59	1.5	995.05	311	251	250	56	98	94	3.5		9.6
3	115	0.52	1.3	998.35	312	251	250	55	99	94	3.5		9.6
4	120	0.45	1.1	1001.38	313	248	250	56	97	94	3.0		9.9
5	125	0.37	0.93	1004.150	312	250	250	56	97	94	3.0		9.6
Total													
Average													

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: RB
 Date: 3/22/11

Impinger Weight Sheet

Client: Wheelabrator	Unit Name/Location: Unit 3 FF Outlet
Plant: ~~North~~ South Broward	Job No: 11182 Method: 5/29

CAE TLO7-3 Cert #56526A 499.5

Run No: 1	Filter Type: Quartz	Sample Box No: M3
Date:	Lot No: NA	pH:
Analyst: D. Luckhard	Filter No: e3-10	Rinse:

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	678.6	448.1	230.5	
Impinger 2	100 ml 5% HNO3/10% H2O2	682.1	560.8	121.3	QA/QC SB Date 3/22
Impinger 3	100 ml 5% HNO3/10% H2O2	593.8	562.1	31.7	
Impinger 4	Empty	453.5	437.1	16.4	
Impinger 5	100 ml 4% KMnO4/10% H2SO4	536.6	534.6	2.0	Total Weight (gm)
Impinger 6	100 ml 4% KMnO4/10% H2SO4	529.7	528.6	1.1	
Impinger 7	Silica Gel	727.2	707.4	19.8	
					422.8

Run No: 2	Filter Type: Quartz	Sample Box No: M10
Date:	Lot No:	pH:
Analyst: D. Luckhard	Filter No: e3-11	Rinse:

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	685.4	432.1	253.3	
Impinger 2	100 ml 5% HNO3/10% H2O2	673.6	569.0	104.6	QA/QC SB Date 3/22
Impinger 3	100 ml 5% HNO3/10% H2O2	550.9	525.0	25.9	
Impinger 4	Empty	432.5	427.7	4.8	
Impinger 5	100 ml 4% KMnO4/10% H2SO4	542.7	540.3	2.4	Total Weight (gm)
Impinger 6	100 ml 4% KMnO4/10% H2SO4	551.1	550.3	0.8	
Impinger 7	Silica Gel	769.1	753.8	15.3	
					407.1

Run No: 3	Filter Type: Quartz	Sample Box No: M4
Date:	Lot No:	pH:
Analyst: D. Luckhard	Filter No: e3-12	Rinse:

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	692.0	434.9	257.1	
Impinger 2	100 ml 5% HNO3/10% H2O2	639.3	539.5	99.8	QA/QC SB Date 3/22
Impinger 3	100 ml 5% HNO3/10% H2O2	556.4	531.1	25.3	
Impinger 4	Empty	442.4	436.1	6.3	
Impinger 5	100 ml 4% KMnO4/10% H2SO4	547.8	544.0	3.8	Total Weight (gm)
Impinger 6	100 ml 4% KMnO4/10% H2SO4	603.6	602.6	1.0	
Impinger 7	Silica Gel	827.8	810.4	17.4	
					410.7

TEST LOCATION: FF OUT
 UNIT: 3 RUN: 1

FLUORIDE TESTING FIELD DATA SHEET

METHOD: 13B PAGE 1 OF 2

Client: Wheelabrator Project No. 1182
 Plant: N BEAVERDAS Date: 3.24.11
 Meter Operator: NH
 Probe Operator: CS

Meter Box: 66-7 Sample Box No. B1
 Meter Y: 0.9961 Meter ΔH: 1.7697
 K-Factor: 2.7 Pitot Co: 0.818
 Leak Rate Before: 0.004 [cfm] [Lpm] @ 15 (in. Hg)
 Leak Rate After: 0.004 [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) [Out]	First point all the way
<u>-10.3</u>	<u>10</u>	<u>(N) [Out]</u>	<u>(N) [Out]</u>

Amb. Temp. (°F): 84 Bar Press: 30.00 (in. Hg) [mbar]
 Probe I.D. No: 67-8-870
 Liner Material: GLASS 5B

Filter No: -
 Thimble No: -
 Nozzle Diameter: 0.274 Nozzle I.D.: 274-1

Start Time: 11:40 Stop Time: 12:55

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>(N) [L]</u>	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
				<u>686.195</u>		<u>250</u>	<u>250</u>						
1-1	2.5	0.43	1.2	687.79	311	253	258	63	85	84	3	11.2	
2	5	0.43	1.2	689.33	312	253	255	62	85	84	3	11.2	
3	7.5	0.45	1.2	690.88	312	250	254	59	84	83	3	10.8	
4	10	0.53	1.4	692.54	314	250	253	56	85	84	3	10.0	
5	12.5	0.67	1.8	694.180	313	245	252	49	86	83	3	10.9	
2-1	15	0.68	1.8	696.24	313	245	251	47	86	84	4	10.5	
2	17.5	0.68	1.8	698.19	313	240	252	47	87	84	4	11.0	
3	20	0.76	1.9	700.13	315	247	251	49	87	84	4	11.0	
4	22.5	0.71	1.9	702.13	317	258	252	53	88	84	4	10.2	
5	26	0.71	1.9	703.765	316	255	252	55	93	86	4	10.1	
3-1	27.5	0.43	1.2	705.79	314	254	250	58	91	85	4	10.6	
2	30	0.56	1.5	707.54	311	249	250	57	90	84	4	10.3	
3	32.5	0.57	1.5	709.28	311	250	252	58	91	85	4	10.0	
Total		<u>19.0486</u>	<u>39.3000</u>	<u>44.5750</u>	<u>7822</u>				<u>1138</u>	<u>1094</u>			
Average		<u>0.7619</u>	<u>1.5720</u>	<u>312.8800</u>					<u>89.2400</u>				

Sum of square roots.

20.3

Circle correct bracketed units on data sheet.

QA/QC: NH
 Date: 3.24.11

TEST LOCATION: FF OUTLETUNIT: 3 RUN: 1

Fluoride TESTING

METHOD: 13 B PAGE 2 OF 2

FIELD DATA SHEET

Client <u>Wheelabrator</u>	Project No. <u>11182</u>
Plant <u>N. Brouard</u>	Date <u>3.24.11</u>
Meter Operator <u>NH</u>	
Probe Operator <u>CS</u>	

Meter Box <u>66-7</u>	Sample Box No. <u>B1</u>
Meter Yd. <u>0.9961</u>	Meter ΔH @ <u>1.7697</u>
K Factor <u>2.7</u>	Pitot C. <u>0.818</u>

Leak Rate Before <u>(Cfm)</u> [Lpm] @ (in. Hg)
Leak Rate After <u>(Cfm)</u> [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>(ft³)</u> [L]	Stack Temp. T _s (°F)	Probe T. (°F) Set Points	Filter T. (°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	0.57	1.5	711.04	313	251	252	63	93	86	4	10.6	
5	37.5	0.57	1.5	712.740	311	256	251	63	95	87	4	11.0	0.09
4 -1	40	0.70	1.9	714.81	315	252	250	65	96	88	4	10.9	
2	42.5	0.68	1.8	716.74	315	250	252	64	97	88	4	9.8	
3	45	0.62	1.7	718.62	313	254	251	64	99	88	4	10.0	
4	47.5	0.55	1.5	720.37	312	251	251	63	97	88	4	10.6	
5	50	0.55	1.5	722.120	311	250	251	63	99	89	4	10.8	0.12
5 -1	52.5	0.60	1.6	724.08	311	250	251	62	95	88	4	10.6	
2	55	0.55	1.5	725.84	312	247	251	63	98	89	4	10.2	
3	51.5	0.57	1.5	727.60	312	253	251	63	98	90	4	10.1	
4	60	0.54	1.5	729.37	313	251	251	63	100	91	4	10.6	
5	62.5	0.55	1.5	731.180	312	254	250	63	100	91	4	11.0	
Total									1067	1063			
Average													

Sum of square roots.

Circle correct bracketed units on data sheet.

TEST LOCATION: FF OUTLET
UNIT: 3 RUN: 2

FLUORIDE TESTING FIELD DATA SHEET

METHOD: 13 B PAGE 1 OF 2

Client Wheelabrator Project No. 1182
Plant N. Browns Date 3.24.11
Meter Operator: NH
Probe Operator: CS

Meter Box 44-7 Sample Box No. B22
Meter Yd. 0.9961 Meter $\Delta H_{@}$ 1.7697
K Factor 2.7 Pitot Cp. 0.818
Leak Rate Before 0.003 [cfm] [Lpm] @ 14 (in. Hg)
Leak Rate After 0.001 [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) <u>-10.3</u>	Port Len. (in.) <u>10</u>	Gas Flow (in. H ₂ O) <u>10</u> [Out] of page	First point all the way <u>10</u> [Out]

Amb. Temp. (°F) 84 Bar. Press. 30.00 [in. Hg] [mbar]
Probe I.D. No. 47-8-820
Liner Material CLASS

Filter No. -
Thimble No. -
Nozzle Diameter 0.274 Nozzle I.D. 274-1

Start Time: 13:11 Stop Time: 14:19

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>731.615</u> [L]	Stack Temp. T_s (°F)	Probe T_p (°F) Set Points <u>250</u> <u>250</u>	Filter T_f (°F)	Cond. Temp. T_c (°F)	DGM Inlet T_{min} (°F)	DGM Outlet T_{mout} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp <u>02</u> (°F)	Notes
1-1	2.5	0.58	1.6	733.47	314	257	258	61	95	92	3	10.1	
2	5	0.61	1.6	735.25	313	258	257	61	97	92	3	10.4	
3	7.5	0.58	1.6	737.00	313	257	254	53	99	92	3	9.8	
4	10	0.52	1.4	738.75	313	256	253	57	100	93	3	9.6	
5	12.5	0.48	1.3	740.420	312	255	252	50	101	93	3	9.6	7.510 .09
4-1	15	0.58	1.6	742.33	311	248	251	57	100	93	3	10.5	
2	17.5	0.73	2.0	744.36	313	246	250	53	103	94	4	11.1	
3	20	0.71	1.9	746.34	314	253	257	54	104	94	4	11.8	
4	22.5	0.58	1.6	748.15	314	254	252	57	104	94	4	9.4	
5	25	0.48	1.3	749.845	310	253	257	57	103	94	3	9.7	1.045 .2
3-1	27.5	0.64	1.7	751.89	312	250	252	60	103	95	3	9.8	
2	30	0.54	1.5	753.71	312	246	257	62	106	96	3	9.5	
3	32.5	0.56	1.5	755.45	312	252	257	59	106	96	3	10.0	
	Total	18.2426	36.1700		7796				1321	1218			
	Average	0.7297	1.4468	43.1100	311.8400				97.8200				

Sum of square roots.

Circle correct bracketed units on data sheet.

4063 QA/QC NH
Date 3.24.11

TEST LOCATION: FF out
 UNIT: 3 RUN: 2

FLUORIDE TESTING FIELD DATA SHEET

METHOD: 13B PAGE 2 OF 2

Client: Wheelabrator Project No: 11182
 Plant: N. Browns Date: 3.24.11
 Meter Operator: NH
 Probe Operator: CS

Meter Box: 46-7 Sample Box No: B22
 Meter Yr: 0.9961 Meter ΔH: 1.7697
 K Factor: 2.7 Pitot Co: 0.818

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. (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	0.55	1.5	756.89	311	253	250	54	104	96	3	10.1	
5	37.5	0.46	1.2	758.830	311	253	250	54	104	96	3	10.3	.985
2-1	40	0.60	1.6	760.73	309	250	251	52	98	93	3	10.9	
2	42.5	0.52	1.4	762.44	309	248	251	50	99	93	3	10.1	
3	45	0.52	1.4	764.12	310	252	251	51	100	94	3	10.5	
4	47.5	0.51	1.4	765.85	312	254	251	51	101	94	3	10.0	
5	50	0.49	1.3	767.495	313	251	251	52	103	96	3	10.9	.585
1-2	52.5	0.57	1.0	769.01	310	252	251	54	100	94	3	10.9	
2	55	0.56	0.97	770.43	310	250	251	55	100	95	3	10.4	
3	57.5	0.34	1.0	771.85	313	251	251	57	102	95	3	10.1	
4	60	0.46	1.2	773.45	313	251	251	57	103	96	3	10.3	
5	62.5	0.60	1.6	775.260	312	252	252	58	102	94	3	10.1	
	Total								1214	1136			
	Average								97.8200				

* 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 1 OF 2

Client Wheelabrator Project No. 11182
 Plant N. GROWARDS Date 3.24.11
 Meter Operator NM
 Probe Operator CS

Meter Box 66-7 Sample Box No. B1
 Meter Yr. 0.9961 Meter ΔH₀ 1.7697
 K-Factor 2.7 Pitot C_p 0.818
 Leak Rate Before 0.003 [Lpm] @ 15 (in. Hg)
 Leak Rate After 0.001 [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>-10.3</u>	<u>10</u>	<u>IN</u> [Out]	<u>IN</u> [Out]

Amb Temp (°F) 85 Bar Press 30.00 [in. Hg] [mbar]
 Probe ID No. 67-8-20
 Liner Material GLASS

Filter No. -
 Thimble No. -
 Nozzle Diameter .274 Nozzle I.D. 274-1

Start Time: 14:38 Stop Time: 15:46

Traverse Point Number	Min/pi 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>1</u> [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
1-1	2.5	0.47	1.3	777.43	313	254	255	65	95	92	3	9.3	
2	5	0.42	1.1	778.93	313	255	257	65	95	92	3	9.3	
3	7.5	0.45	1.2	780.49	313	255	258	60	98	92	3	9.6	
4	10	0.47	1.3	782.12	312	259	254	55	97	92	3	10.0	
5	12.5	0.56	1.5	783.910	313	256	252	50	98	92	3	10.0	.985
2-1	15	0.56	1.5	785.75	313	251	249	51	98	92	3	10.5	
2	17.5	0.55	1.5	787.52	314	251	251	49	100	95	3	8.9	
3	20	0.59	1.6	789.30	313	253	252	48	100	92	3	10.2	
4	22.5	0.56	1.5	791.05	311	251	251	48	98	90	3	10.2	
5	25	0.60	1.6	792.845	312	251	252	50	99	91	3	10.3	.945
3-1	27.5	0.40	1.1	794.47	311	252	252	53	98	91	3	10.4	
2	30	0.58	1.6	795.89	312	253	252	53	98	91	3	9.5	
3	32.5	0.56	1.5	797.99	313	251	251	53	100	93	3	9.5	
Total		7.9394	33.9500	41.5650	7806				1274	1195			
Average		0.7016	1.3420	41.560	312.2400				95.7800				

Sum of square roots.

Circle correct bracketed units on data sheet.

TEST LOCATION: FF OUTLETFLUORIDE

TESTING

METHOD: 13B PAGE 2 OF 2UNIT: 3 RUN: 3

FIELD DATA SHEET

Client: <u>WHEELABRATOR</u>	Project No: <u>111P2</u>
Plant: <u>N. BROWARDS</u>	Date: <u>8.24.11</u>
Meter Operator: <u>NH</u>	
Probe Operator: <u>CS</u>	

Meter Box: <u>66-7</u>	Sample Box No: <u>B1</u>
Meter Yr: <u>0.9961</u>	Meter ΔH: <u>1.7697</u>
K Factor: <u>2.7</u>	Pilot C _p : <u>0.818</u>

Leak Rate Before: <u>0.003</u> [cm] [Lpm] @ <u>15</u> (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 ID No	
Liner Material	

Filter No.	
Thimble No.	
Nozzle Diameter	Nozzle I.D.

Start Time:	Stop Time: <u>15:46</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>775.710</u>	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 250 250							
3-4	35	0.51	1.4	799.71	314	253	251	52	102	93	3	9.4	
5	37.5	0.46	1.2	801.290	312	251	248	54	101	92	3	10.0	0.380
4-1	40	0.54	1.5	803.17	313	250	251	59	100	93	3	10.4	
2	42.5	0.50	1.4	804.84	314	252	250	60	102	94	3	9.1	
3	45	0.48	1.3	806.47	312	256	251	60	103	94	3	8.6	
4	47.5	0.43	1.2	808.05	312	252	251	58	100	92	3	9.7	
5	50	0.40	1.1	809.575	312	251	249	60	102	93	3	9.2	0.665
5-1	52.5	0.50	1.4	811.35	311	253	254	60	100	92	3	9.8	
2	55	0.50	1.4	812.99	311	253	251	61	100	92	3	9.7	
3	57.5	0.46	1.2	814.63	312	254	251	60	99	92	3	9.5	
4	60	0.46	1.2	816.23	311	250	249	61	99	92	3	9.2	
5	62.5	0.35	0.95	817.625	309	252	257	62	100	93	3	9.1	
	Total								1208	1112			
	Average												

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC 31
Date 3/24


CleanAir®

ENGINEERING

Impinger Weight Sheet

Client: Wheelabrator	Unit Name/Location: Unit 3 FF Outlet	
Plant: North Broward	Job No. 11182	Method 13B

Run No. 1	Filter Type: Teflon glass mat	Sample Box No. B1
Date 3/24/11	Lot No.	pH
Analyst P. Vicare	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	100 mL DI H2O	757.6	636.9	120.7	
Impinger 2	100 mL DI H2O	630.2	545.5	84.7	
Impinger 3	Empty	471.4	455.8	15.6	
Impinger 4	Silica Gel	766.1	749.5	16.6	
					Total Weight (gm)
					221.0
					237.6

QA/QC RV
Date 3/24/11

Run No. 2	Filter Type: Teflon glass mat	Sample Box No. B22
Date 3/24/11	Lot No.	pH
Analyst P. Luckhard	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	100 mL DI H2O	679.6	546.6	133.0	
Impinger 2	100 mL DI H2O	606.3	550.2	56.1	
Impinger 3	Empty	458.1	443.9	14.2	
Impinger 4	Silica Gel	790.2	778.0	12.2	
					Total Weight (gm)
					203.3
					215.5

QA/QC 58
Date 3/24

Run No. 3	Filter Type: Teflon glass mat	Sample Box No. B1
Date 3/24/11	Lot No.	pH
Analyst P. Vicare	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	100 mL DI H2O	802.2	633.9	168.3	
Impinger 2	100 mL DI H2O	582.5	544.7	37.8	
Impinger 3	Empty	459.3	454.7	4.6	
Impinger 4	Silica Gel	775.9	765.9	10.0	
					Total Weight (gm)
					210.7
					220.7

QA/QC RV
Date 3/24/11

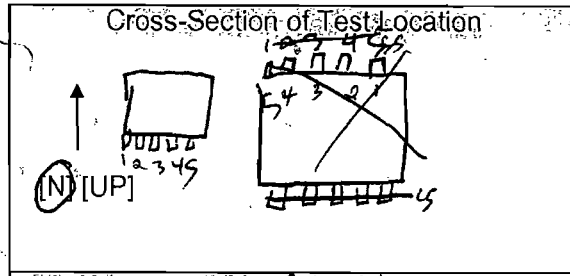
TEST LOCATION: FF Outlet
 UNIT: 3 RUN: 1

Piston TESTING
FIELD DATA SHEET

METHOD: 23 PAGE 1 OF 2

Client: Wheelabrator Project No: 11182
 Plant: N. Brownards Date: 3/22/11
 Meter Operator: C. Slomp
 Probe Operator: C. Slomp

Meter Box: 66-7 Sample Box No: 04
 Meter Yd: 0.9961 Meter ΔH: 1.7697
 K Factor: 2.54 Pitot Cp: 0.822
 Leak Rate Before: 0.040 [Lpm] @ 12 (in. Hg)
 Leak Rate After: 0.003 [cfm] [Lpm] @ 16 (in. Hg)
 Pitot Leak Check Before: ☒ After: Good ☒ Bad ☐



Duct Dimensions (in.): 96x96
 Static Pres. (in. H₂O): -9.6 Port Len. (in.): 10 Gas Flow (In) [Out]: 0 First point all the way: (In) [Out]

Amb. Temp. (°F): 73 Bar. Press: 30.20 (in Hg) [mbar]
 Probe I.D. No: 67-8-10
 Liner Material: 6144

Filter No: — Thimble No: —
 Nozzle Diameter: 0.271 Nozzle I.D.: 272-1

Start Time: 9:37 Stop Time: 13:58

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 (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
5-1	10	0.53	1.3	174.07	313	248	259	59	76	74	5	44	9.6 0.2
2	20	0.67	1.7	181.32	314	253	251	50	82	75	9	48	10.1 0.2
3	30	0.59	1.5	188.31	313	251	252	53	87	77	9	62	8.8 0.2
4	40	0.50	1.3	199.04	316	249	250	60	91	79	8.5	62	9.0 0.2
5	50	0.46	1.2	201.345	310	250	250	64	92	81	7.5	44	8.8 0.2
4-1	60	0.76	1.9	209.06	313	246	254	57	91	83	10	43	9.7 0.2
2	70	0.72	1.8	216.69	313	253	251	56	95	86	10	53	10.0 0.2
3	80	0.57	1.4	222.88	312	251	250	62	97	86	9	60	9.1 0.2
4	90	0.53	1.3	230.71	314	249	250	64	92	86	9	46	8.6 0.2
5	100	0.44	1.1	237.185	311	250	250	64	94	86	8	58	9.1 0.2
3-1	110	0.64	1.6	244.36	311	246	248	64	92	87	9	44	8.9 0.2
2	120	0.59	1.5	251.42	313	253	251	63	94	87	9	55	9.0 0.2
		9.1347	17.6		3753				1087	987			
	Total	18.4928	35.08	168.880	7294				2356	2171			
	Average	0.7397	6.4032		511.7600				90.5400				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC CS
 Date 3/22



TEST LOCATION: FF Outlet
 UNIT: 3 RUN: 1

Dioxin TESTING
FIELD DATA SHEET

METHOD: 23 PAGE 2 OF 2

Client: Wheelabrator Project No.: 11182
 Plant: N. Browns Date: 3/22/11
 Meter Operator: C. Slomp
 Probe Operator: "

Meter Box: 66-7 Sample Box No.: 04
 Meter Y₄: 0.9961 Meter ΔH₀: 1.7697
 K Factor: 1.77254 Pitot C_p: 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) -9.6 Port Len. (in.) 10 Gas Flow [In] [Out] of page [In] [Out] First point all the way [In] [Out]

Amb Temp (°F) 73 Bar Press: 30.20 [in. Hg] [mbar]
 Probe I.D. No.: 67-8-10
 Liner Material: Glass

Filter No.:
 Thimble No.:
 Nozzle Diameter: Nozzle I.D.:

Start Time: Stop Time:

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. (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 ₁ (°F)	Notes
						250	250						
3	130	0.58	1.5	258.50	314	252	251	64	97	88	9	65	10.1 0.2
4	140	0.53	1.3	265.28	314	250	251	63	98	89	9	45	9.7 0.2
5	150	0.47	1.2	271.745	308	249	248	64	99	90	9	56	9.3 0.2 271.870
-1	160	0.62	1.6	279.08	313	247	249	64	93	90	9.5	46	9.8 0.2 ΔP=0.125
2	170	0.66	1.7	286.47	312	253	251	61	98	90	9.8	53	9.7 0.2
3	180	0.60	1.5	293.66	313	250	250	64	100	91	10	60	9.6 0.2
4	190	0.56	1.4	300.59	313	249	252	64	100	91	9	42	9.9 0.2 "
5	200	0.64	1.6	307.825	313	249	249	61	100	92	9	49	9.8 0.2 307.880
-1	210	0.15	0.38	311.29	295	250	242	64	97	93	5	62	10.3 0.2 0.055
2	220	0.45	1.1	316.06	311	249	250	64	97	93	7	63	10.4 0.2
3	230	0.42	1.1	323.05	310	250	248	63	98	93	7	44	10.6 0.2
4	240	0.55	1.4	329.70	313	251	246	55	98	92	9	39	9.2 0.2
5	250	0.66	1.7	337.115	312	250	250	54	98	92	10	41	9.4 0.2
Total													
Average													

Sum of square roots.

-0.355

Circle correct bracketed units on data sheet.

QA/QC CS
 Date 3/22

TEST LOCATION: FF Outlet
 UNIT: 3 RUN: 2

DIOXIN TESTING FIELD DATA SHEET

METHOD: 23 PAGE 1 OF 2

Client: <u>Wheelabrator</u>	Project No: <u>11182</u>
Plant: <u>N. Bonwards</u>	Date: <u>3/23/11</u>
Meter Operator: <u>C. Slomp</u>	
Probe Operator: <u>C. Slomp</u>	

Meter Box: <u>66-7</u>	Sample Box No: <u>06</u>
Meter Yd: <u>0.9961</u>	Meter ΔH: <u>1.7697</u>
K-Factor: <u>2.55</u>	Pitot Co: <u>0.822</u>
Leak Rate Before: <u>0.004</u> (cfm) [Lpm] @ <u>15</u> (in. Hg)	
Leak Rate After: <u>0.003</u> (cfm) [Lpm] @ <u>13</u> (in. Hg)	
Pitot Leak Check Before: ☒ After: Good ☒ Bad ☐	

Cross-Section of Test Location

Duct Dimensions (in.): 46 x 96

Static Pres. (in. H ₂ O)	Port Len. (in.)	Gas Flow (In) [Out]	First point all the way (In) [Out]
<u>-10.3</u>	<u>10</u>	<u>(In)</u>	<u>(In)</u>

Amb. Temp (°F): <u>7</u>	Bar. Press: <u>30.1</u> [in. Hg] [mbar]
Probe I.D. No: <u>67-8-10</u>	
Liner Material: <u>Glass</u>	

Filter No: <u>—</u>		
Thimble No: <u>—</u>		
Nozzle Diameter: <u>0.271</u>	Nozzle I.D.: <u>271-1</u>	

Start Time: <u>6:40</u>	Stop Time: <u>11:09</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. (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 _{min} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T _i (°F)	Notes
5-1	10	0.96	1.4	349.46	313	249	250	43	66	65	5	40	9.3 0.2
2	20	0.92	1.3	352.07	313	252	249	39	74	66	7	32	9.4 0.2
3	30	0.99	1.5	358.80	313	251	251	40	79	68	8	42	10.0 0.2
4	40	0.61	1.6	369.84	314	250	250	43	83	70	8	53	9.8 0.2
5	50	0.99	1.4	372.810	315	249	251	51	84	72	8	62	10.3 0.2 372.810
4-1	60	0.65	1.7	380.01	312	250	246	59	81	74	9	49	10.1 0.2 ΔV=0.070
2	70	0.99	1.5	387.09	313	251	251	53	86	74	9	46	9.9 0.2
3	80	0.61	1.6	344.26	313	251	250	55	87	76	9	50	9.7 0.2
4	90	0.61	1.6	401.94	313	250	250	63	88	77	9	61	10.2 0.2
5	100	0.50	1.7	408.420	313	250	251	53	90	78	8	41	9.5 0.2 408.420
3-1	110	0.82	2.1	416.73	313	246	251	50	85	78	10	45	10.9 0.2 0.065
2	120	0.73	1.9	424.75	313	253	249	49	90	79	10	45	10.0 0.2
		9.3636	18.9		3759				995	877			
Total		18.8595	18.6	173.395	78.10				2216	1974			
Average		0.7544	1.4640	173.335	78.10				83.8000				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC CS
 Date 3/23/11



TEST LOCATION:

FF Outlet

DIOXIN

TESTING

METHOD: 23

PAGE 2

OF 2

UNIT: 3

RUN: 2

FIELD DATA SHEET

Client: <u>Wheelerator</u>	Project No. <u>11182</u>
Plant: <u>N. Broward's</u>	Date <u>3/23/11</u>
Meter Operator: <u>C. Slomp</u>	
Probe Operator: <u>C. Slomp</u>	

Meter Box: <u>66-7</u>	Sample Box No. <u>D6</u>
Meter Y: <u>0.9961</u>	Meter ΔH: <u>1.7697</u>
K Factor: <u>2.55</u>	Pitot C: <u>0.822</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.) <u>96 x 96</u>			
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.	[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 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]	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
3-3	130	0.62	1.6	432.06	312	251	250	57	90	79	9.5	54	9.8 0.2
4	140	0.55	1.4	439.07	313	250	250	63	92	80	9	61	9.4 0.2
5	150	0.49	1.2	445.750	313	249	250	58	93	81	8	45	9.0 0.2 445.855
4-1	160	0.66	1.7	453.13	312	248	250	55	88	82	9	46	9.2 0.2 0.025
2	170	0.66	1.7	460.59	312	252	250	51	94	83	9	49	9.3 0.2
3	180	0.60	1.5	467.82	312	251	250	57	95	84	9	46	9.2 0.2
4	190	0.52	1.3	474.60	312	250	250	56	96	85	8	52	9.2 0.2
5	200	0.51	1.3	481.255	313	250	250	50	97	86	8	46	9.1 0.2 481.365
5-1	210	0.45	1.1	487.22	309	249	251	55	94	87	7	55	9.0 0.2 0.110
2	220	0.55	1.4	493.87	310	250	251	60	96	87	8	58	9.2 0.2
3	230	0.46	1.2	500.22	310	251	251	63	93	87	7	51	9.5 0.2
4	240	0.44	1.1	506.45	313	250	251	63	96	84	7	58	9.5 0.2
5	250	0.46	1.2	512.635	310	250	251	64	97	81	7	53	9.8 0.2
Total													
Average													

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC CS
Date 3/23/11

TEST LOCATION: FF Outlet DTOXIA TESTING
 UNIT: 3 RUN: 3 FIELD DATA SHEET

METHOD: 23 PAGE 1 OF 2

Client: Wheelabrator Project No. 11182
 Plant: N. Brandy Date: 3/23/11
 Meter Operator: C. Shimp
 Probe Operator: 11

Meter Box: 66-7 Sample Box No.: 66-7
 Meter Yr: C. 9961 Meter ΔH : 1.7697
 K Factor: 2.55 2.6 Pitot C_p : 0.822
 Leak Rate Before: 0.008 [cfm] [Lpm] @ 15 (in. Hg)
 Leak Rate After: 0.002 [cfm] [Lpm] @ 12 (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 [In] [Out]
<u>-10.9</u>	<u>10</u>	<u>0</u>	<u>(In) [Out]</u>

Amb. Temp. (°F): 70 Bar. Press: 30.10 [in. Hg] [mbar]
 Probe I.D. No.: 67-8-10
 Liner Material: Glass

Filter No.: —
 Thimble No.: —
 Nozzle Diameter: 0.271 Nozzle I.D.: 271-1

Start Time: 11:36 Stop Time: 15:56

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 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>514.070</u>		<u>250</u>	<u>250</u>						
5-1	<u>10</u>	<u>0.65</u>	<u>1.7</u>	<u>521.50</u>	<u>313</u>	<u>249</u>	<u>244</u>	<u>63</u>	<u>89</u>	<u>8287</u>	<u>8705</u>	<u>62</u>	<u>0.3 0.2</u>
2	<u>20</u>	<u>0.56</u>	<u>1.4</u>	<u>528.54</u>	<u>313</u>	<u>254</u>	<u>251</u>	<u>61</u>	<u>93</u>	<u>87</u>	<u>8</u>	<u>53</u>	<u>85 0.2</u>
3	<u>30</u>	<u>0.61</u>	<u>1.6</u>	<u>535.84</u>	<u>312</u>	<u>250</u>	<u>250</u>	<u>61</u>	<u>99</u>	<u>89</u>	<u>8</u>	<u>52</u>	<u>9.1 0.2</u>
4	<u>40</u>	<u>0.60</u>	<u>1.6</u>	<u>543.09</u>	<u>313</u>	<u>250</u>	<u>250</u>	<u>58</u>	<u>101</u>	<u>90</u>	<u>8</u>	<u>49</u>	<u>9.8 0.2</u>
5	<u>50</u>	<u>0.48</u>	<u>1.2</u>	<u>549.860</u>	<u>313</u>	<u>249</u>	<u>250</u>	<u>60</u>	<u>100</u>	<u>91</u>	<u>7</u>	<u>62</u>	<u>9.3 0.2 549.960</u>
4-1	<u>60</u>	<u>0.55</u>	<u>1.4</u>	<u>556.59</u>	<u>312</u>	<u>248</u>	<u>249</u>	<u>60</u>	<u>95</u>	<u>91</u>	<u>7</u>	<u>44</u>	<u>10.2 0.2 0.010</u>
2	<u>70</u>	<u>0.48</u>	<u>1.2</u>	<u>563.14</u>	<u>313</u>	<u>250</u>	<u>251</u>	<u>53</u>	<u>99</u>	<u>92</u>	<u>7</u>	<u>44</u>	<u>8.9 0.2</u>
3	<u>80</u>	<u>0.61</u>	<u>1.6</u>	<u>570.35</u>	<u>313</u>	<u>251</u>	<u>250</u>	<u>50</u>	<u>96</u>	<u>92</u>	<u>8</u>	<u>49</u>	<u>10.6 0.2</u>
4	<u>90</u>	<u>0.58</u>	<u>1.5</u>	<u>577.60</u>	<u>313</u>	<u>250</u>	<u>250</u>	<u>55</u>	<u>99</u>	<u>92</u>	<u>8</u>	<u>60</u>	<u>10.0 0.2</u>
5	<u>100</u>	<u>0.54</u>	<u>1.4</u>	<u>584.580</u>	<u>314</u>	<u>250</u>	<u>250</u>	<u>58</u>	<u>100</u>	<u>93</u>	<u>8</u>	<u>47</u>	<u>0.0 0.2 584.685</u>
3-1	<u>110</u>	<u>0.66</u>	<u>1.6</u>	<u>591.91</u>	<u>313</u>	<u>250</u>	<u>251</u>	<u>62</u>	<u>99</u>	<u>92</u>	<u>8</u>	<u>50</u>	<u>10.1 0.2 0.105</u>
2	<u>120</u>	<u>0.61</u>	<u>1.6</u>	<u>599.22</u>	<u>313</u>	<u>251</u>	<u>250</u>	<u>60</u>	<u>98</u>	<u>92</u>	<u>8</u>	<u>41</u>	<u>9.3 0.2</u>
		<u>9.1083</u>	<u>17.8</u>		<u>3755</u>				<u>1164</u>	<u>1088</u>			
Total		<u>18.379</u>	<u>33.7</u>	<u>171309</u>	<u>7810</u>				<u>2400</u>	<u>2260</u>			
Average		<u>6.7352</u>	<u>12.488</u>	<u>171.215</u>	<u>312.4000</u>				<u>93.2000</u>				

Sum of square roots

Circle correct bracketed units on data sheet.

QA/QC: CS
 Date: 3/23/11

CleanAir
 ENGINEERING

TEST LOCATION: FF OutletUNIT: 3 RUN: 3

FIELD DATA SHEET

TESTING

METHOD: 23 PAGE 2 OF 2

Client <u>Wheeler</u>	Project No. <u>11182</u>
Plant <u>N. B. and S.</u>	Date <u>3/23/11</u>
Meter Operator <u>C. S. Long</u>	
Probe Operator <u>1</u>	

Meter Box <u>66-7</u>	Sample Box No.
Meter Yd. <u>0.9961</u>	Meter ΔH <u>1.7697</u>
K Factor <u>2.6</u>	Pitot Cp <u>0.622</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 96

Static Pres. (in. H ₂ O) <u>-10.5</u>	Port Len. (in.) <u>10</u>	Gas Flow [In] [Out] of page <u>In</u>	First point all the way, <u>In</u> [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. [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							
3-3	130	0.60	1.6	606.47	313	250	250	58	100	93	8	42	10.3 0.2
4	140	0.55	1.4	613.59	313	250	250	60	102	94	8	54	9.4 0.2
5	150	0.56	1.5	620.705	313	250	250	60	103	95	8	49	9.1 0.2 420.760
2-1	160	0.52	1.4	627.55	313	250	249	61	98	95	9	58	10 0.2 0.055
2	170	0.65	1.7	634.96	313	248	249	63	96	94	9	58	10.0 0.2
3	180	0.55	1.4	641.93	312	251	251	58	96	92	8	42	9.0 0.2
4	190	0.57	1.5	648.92	314	250	250	59	93	90	8	46	10.1 0.2
5	200	0.48	1.2	655.410	310	250	250	60	95	89	8	52	10.2 0.2 655.480
5-1	210	0.39	1.0	661.48	308	249	250	62	90	87	6	45	10.3 0.2 0.070
2	220	0.40	1.0	667.37	311	250	250	59	90	87	6	41	9.3 0.2
3	230	0.40	1.0	673	311	250	250	58	90	86	6	41	9.8 0.2
4	240	0.49	1.3	679.21	312	250	250	59	90	85	7	47	9.1 0.2
5	250	0.49	1.3	685.615	312	250	250	60	91	85	7	55	7.4
Total													
Average													

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC CS
Date 3/23/11

Impinger Weight Sheet

Client Wheelabrator		Unit Name/Location Unit 3 FF Outlet	
Plant North Broward	Job No. 11182	Method 23	

CAE TLO7-3 Cert #565326A 499.5

Run No. 4	Filter Type	Sample Box No. D4
Date 3/22/11	Lot No.	pH
Analyst R. Viere	Filter No.	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	1474.8	642.3	832.5	
Impinger 2	100 ml HPLC H2O	566.1	560.6	5.5	QA/QC RV
Impinger 3	100 ml HPLC H2O	538.0	540.4	-2.4	Date 3/22/11
Impinger 4	Empty	441.7	437.2	4.5	
Impinger 5	Trap # T0927-004	371.1	353.9	17.2	Total Weight (gm)
Impinger 6	Silica Gel	794.0	734.0	60.0	857.3
					917.3

Run No. 5	Filter Type	Sample Box No. D6
Date 3/22/11	Lot No.	pH
Analyst R. Viere	Filter No.	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	1451.7	602.7	849	
Impinger 2	100 ml HPLC H2O	531.1	528.9	2.2	QA/QC SB
Impinger 3	100 ml HPLC H2O	545.3	542.6	2.7	Date 3/23
Impinger 4	Empty	454.3	451.0	3.3	
Impinger 5	Trap # T0927-003	345.4	327.4	18.0	Total Weight (gm)
Impinger 6	Silica Gel	785.8	727.6	58.2	875.2
					933.4

Run No. 6	Filter Type	Sample Box No. D4
Date 3/23/11	Lot No.	pH
Analyst R. Viere	Filter No.	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	1487.8	648.3	839.5	
Impinger 2	100 ml HPLC H2O	571.4	563.6	7.8	QA/QC RV
Impinger 3	100 ml HPLC H2O	542.9	544.0	-1.1	Date 3/23/11
Impinger 4	Empty	444.8	441.3	3.5	
Impinger 5	Trap # T0927-006	363.9	344.2	19.7	Total Weight (gm)
Impinger 6	Silica Gel	821.1	765.3	55.8	869.4
					925.2



TEST LOCATION: SDA INLET
 UNIT: 3 RUN: 1

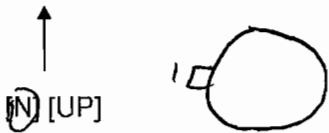
HCI TESTING
FIELD DATA SHEET

METHOD: 26A PAGE 1 OF 1

Client <u>Weslabrator</u>	Project No. <u>11182</u>
Plant <u>N. BROWARD</u>	Date <u>3-24-11</u>
Meter Operator <u>B. ARNOLD</u>	
Probe Operator <u>—</u>	

Meter Box <u>66-14</u>	Sample Box No. <u>811</u>
Meter Yr. <u>0.9882</u>	Meter ΔH @ <u>1.7571</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>0.003</u> [cfm] [Lpm] @ <u>19</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>-1.3</u>	Port Len. (in.) <u>14</u>	Gas Flow (in) [Out] <u>(IN) [Out]</u>	First point all the way (in) [Out] <u>(IN) [Out]</u>

of page

Amb. Temp. (°F) <u>66</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 <u>NM</u>	Nozzle I.D.	

Start Time <u>6:57</u>	Stop Time <u>7:57</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. (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 _{trap} (°F)	Notes
	<u>5</u>			<u>182.940</u>		<u>350</u>	<u>350</u>					<u>0.2</u>	
<u>1-1</u>	<u>5</u>	<u>1/16</u>	<u>1.2</u>	<u>185.94</u>	<u>496</u>	<u>350</u>	<u>352</u>	<u>61</u>	<u>68</u>	<u>66</u>	<u>3.0</u>	<u>7.0</u>	
	<u>10</u>		<u>1.2</u>	<u>188.94</u>	<u>501</u>	<u>351</u>	<u>353</u>	<u>54</u>	<u>69</u>	<u>65</u>	<u>4.0</u>	<u>6.7</u>	
	<u>15</u>		<u>1.2</u>	<u>191.96</u>	<u>500</u>	<u>350</u>	<u>357</u>	<u>52</u>	<u>70</u>	<u>65</u>	<u>5.8</u>	<u>7.6</u>	
	<u>20</u>		<u>1.2</u>	<u>194.98</u>	<u>499</u>	<u>355</u>	<u>356</u>	<u>51</u>	<u>72</u>	<u>66</u>	<u>7.5</u>	<u>7.7</u>	
	<u>25</u>		<u>1.2</u>	<u>197.98</u>	<u>496</u>	<u>354</u>	<u>350</u>	<u>52</u>	<u>73</u>	<u>67</u>	<u>8.5</u>	<u>7.4</u>	
	<u>30</u>		<u>1.2</u>	<u>201.03</u>	<u>495</u>	<u>351</u>	<u>353</u>	<u>55</u>	<u>73</u>	<u>67</u>	<u>10.0</u>	<u>7.4</u>	
	<u>35</u>		<u>1.2</u>	<u>204.07</u>	<u>493</u>	<u>354</u>	<u>350</u>	<u>56</u>	<u>72</u>	<u>67</u>	<u>11.5</u>	<u>7.9</u>	
	<u>40</u>		<u>1.2</u>	<u>207.08</u>	<u>496</u>	<u>352</u>	<u>356</u>	<u>59</u>	<u>71</u>	<u>67</u>	<u>12.5</u>	<u>7.3</u>	
	<u>45</u>		<u>1.2</u>	<u>210.11</u>	<u>497</u>	<u>356</u>	<u>350</u>	<u>62</u>	<u>71</u>	<u>66</u>	<u>13.5</u>	<u>6.9</u>	
	<u>50</u>		<u>1.2</u>	<u>213.19</u>	<u>490</u>	<u>354</u>	<u>351</u>	<u>63</u>	<u>71</u>	<u>67</u>	<u>15.0</u>	<u>8.0</u>	
	<u>55</u>		<u>1.2</u>	<u>216.23</u>	<u>493</u>	<u>353</u>	<u>350</u>	<u>63</u>	<u>71</u>	<u>67</u>	<u>16.5</u>	<u>7.6</u>	
	<u>60</u>		<u>1.2</u>	<u>219.255</u>	<u>490</u>	<u>350</u>	<u>355</u>	<u>62</u>	<u>70</u>	<u>67</u>	<u>17.5</u>	<u>7.2</u>	
Total	*		<u>(14.4000)</u>	<u>(36.315)</u>									
Average			<u>(1.7000)</u>	<u>(495.5000)</u>					<u>(68.6666)</u>				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC BA
 Date 3-24-11

METHOD: 76A PAGE 1 OF 1

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11182
Plant	N. BLANED	Date	3-24-11
Meter Operator	B. Arnold		
Probe Operator	—		

Meter Box 66-14	Sample Box No.
Meter Y 0.9882	Meter ΔH_0 1.7571
K Factor —	Pitot C_p NA
Leak Rate Before 0.002 (cfm) [Lpm]	@ 15 (in Hg)
Leak Rate After 0.002 (cfm) [Lpm]	@ 12 (in Hg)
Pitot Leak Check Before ☐	After: Good ☐ Bad ☐

Cross-Section of Test Location

↑
[N] [UP]



Duct Dimensions (in.)	105		
Static Pres. (in. H ₂ O)	Port Len. (in.)	Gas Flow (in) [Out]	First point all the way
-1.5	14	of page.	(in) [Out]

Amb Temp (°F)	Bar Press	30.00	(in.) Hg [mbar]
Probe ID No	6745		
Liner Material	GLASS		

Filter No.	—		
Thimble No.	—		
Nozzle Diameter	NX	Nozzle I.D.	

Start Time	8:25	Stop Time	9:25

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		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_{mout} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp (°F)	Notes
				Init Vol. (m ³) [L]			Set Points							
1-1	5	N/A	1.2	219.470		499	350	350	57	70	68	2.0	0.2	
	10		1.2	225.49		500	352	355	46	73	68	3.0	7.4	
	15		1.2	228.53		503	356	350	44	76	69	4.5	7.6	
	20		1.2	231.55		501	356	352	44	78	70	5.5	7.4	
	25		1.2	234.57		503	354	354	47	78	70	7.0	7.1	
	30		1.2	237.58		502	352	350	49	79	71	8.5	7.7	
	35		1.2	240.60		498	355	354	51	80	72	9.5	8.1	
	40		1.2	243.61		497	353	350	54	80	73	10.5	8.3	
	45		1.2	246.62		501	356	356	56	80	73	12.0	7.9	
	50		1.2	249.64		505	356	354	59	79	73	13.5	7.8	
	55		1.2	252.71		502	357	351	60	78	73	14.5	8.3	
	60		1.2	255.745		500	356	350	61	78	73	14.0	8.8	
	Total	*	(14.4000)	(36.275)										
	Average		(1.2000)			(500.9160)				(74.2500)				

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC *15/11*
Date *3/24/11*

UNIT: 3 RUN: 3

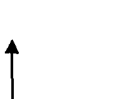
HCl TESTING
FIELD DATA SHEET

METHOD: 26A PAGE 1 OF 1

Client	Wheelabrator	Project No.	11182
Plant	N. BROWARD	Date	3-24-11
Meter Operator	B. ARNOLD		
Probe Operator	_____		

Meter Box <i>66-14</i>	Sample Box No.
Meter Y ₁ <i>0.9882</i>	Meter ΔH ₀ <i>1.7571</i>
K Factor <i>—</i>	Pilot C _p <i>N</i>
Leak Rate Before <i>0.002</i> (cfm) [cfm] Lpm @ <i>15</i> (in. Hg)	
Leak Rate After <i>0.002</i> (cfm) [cfm] Lpm @ <i>15</i> (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]
-1.5	14	105	

Amb. Temp. (°F)	75	Bar. Press.	30.05 (in) Hg [mbar]
Probe ID No.	674-5		
Liner Material	GLASS		

Filter No. _____		
Thimble No. _____		
Nozzle Diameter $\frac{1}{4}$	Nozzle I.D. _____	

Start Time: 10:24	Stop Time: 11:24

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		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
				Init Vol	[ft ³] [L]		Set Points						XAD Trap Temp T_t (°F)	
1-1	5	N/A	1.2	256.220		507	350	350	61	76	75	2.5	8.8	
	10		1.2	262.39		502	351	352	45	77	75	3.0	9.3	
	15		1.2	265.45		500	357	353	44	80	75	4.0	8.9	
	20		1.2	268.52		505	356	351	44	81	76	5.0	9.4	
	25		1.2	271.60		508	357	350	46	83	77	6.0	8.6	
	30		1.2	274.61		504	357	354	48	84	77	7.0	8.1	
	35		1.2	277.69		503	358	353	51	84	78	7.5	9.0	
	40		1.2	280.73		503	354	351	53	85	78	8.5	9.2	
	45		1.2	283.77		500	358	353	55	86	79	9.0	9.5	
	50		1.2	286.85		501	353	352	56	86	79	10.0	9.7	
	55		1.2	289.86		509	353	354	58	86	80	11.0	9.7	
	60		1.2	292.910		514	353	351	61	87	80	12.0	8.8	
	Total	*	14.9000	36.69										
	Average		1.2000			504.6666				80.1666				

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC BA
Date 2-24-11

Impinger Weight Sheet

Client Wheelabrator	Unit Name/Location Unit 3 SDA Inlet
Plant North Broward	Job No. 11182 Method Mod. 26A

Run No. 1	Filter Type Quartz	Sample Box No. B11
Date 3/24/11	Lot No.	pH
Analyst Daric Luckhard	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	482.6	461.2	21.4	
Impinger 2	100 mL 0.1N H2SO4	627.5	542.8	84.7	
Impinger 3	100 mL 0.1N H2SO4	580.1	555.1	25.0	
Impinger 4	Empty	533.6	525.1	8.5	
Impinger 5	Silica Gel	759.0	742.1	16.9	
					Total Weight (gm)
					139.6
					156.5

QA/QC DL
Date 3/24/11

Run No. 2	Filter Type Quartz	Sample Box No. B16
Date 3/24/11	Lot No.	pH
Analyst Daniel Luckhard	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	491.7	459.9	31.8	
Impinger 2	100 mL 0.1N H2SO4	632.5	563.3	69.2	
Impinger 3	100 mL 0.1N H2SO4	566.5	543.1	23.4	
Impinger 4	Empty	447.9	439.4	8.5	
Impinger 5	Silica Gel	761.0	747.5	13.5	
					Total Weight (gm)
					132.9
					146.4

QA/QC DL
Date 3/24/11

Run No. 3	Filter Type Quartz	Sample Box No. B11
Date 3/24/11	Lot No.	pH
Analyst R. V. Vance	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	494.5	459.5	35.0	
Impinger 2	100 mL 0.1N H2SO4	612.5	541.0	71.5	
Impinger 3	100 mL 0.1N H2SO4	566.2	552.6	13.6	
Impinger 4	Empty	527.3	524.3	3.0	
Impinger 5	Silica Gel	770.0	758.9	11.1	
					Total Weight (gm)
					128.1
					139.2

QA/QC RV
Date 3/24/11

METHOD: 26A PAGE 1 OF 1

Start Time: 6:57	Stop Time: 7:57

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 N. BROWARDS Date 3.24.11
 Meter Operator NH
 Probe Operator

Meter Box 66-22 Sample Box No. B12
 Meter Yr. 0.9995 Meter ΔH_o 1.6892
 K-Factor - Pitot C_p -

Leak Rate Before 0.002 [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) [Out]	First point all the way
<u>- 10.3</u>	<u>10</u>	<u>(In) [Out]</u> of page	<u>(In) [Out]</u>

Amb. Temp. (°F) Bar Press. 30.00 (in. Hg) [mbar]
 Probe ID No. 67-4-1
 Liner Material GLASS

Filter No. -
 Thimble No. -
 Nozzle Diameter - Nozzle I.D.

Start Time: 8:25 Stop Time: 9:25

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>46.575</u> [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
31	5	N/A	1.5	50.17 ~~46.575~~ N/A	311	302	301	52	77	75	3	8.3	
	10		1.5	53.64	311	305	303	52	81	75	3	8.3	
	15	↓	1.5	57.05	312	302	301	52	84	76	3	8.8	
	20		1.5	60.52	312	302	302	52	86	76	3	8.2	
	25		1.5	64.01	312	302	301	56	87	77	3	8.6	
	30		1.5	67.50	311	302	301	63	88	78	3	8.9	
	35		1.5	71.02	311	302	302	62	88	78	3	8.3	
	40		1.5	74.54	311	302	301	65	87	79	3	8.9	
	45		1.5	78.06	311	301	301	64	87	79	3	9.2	
	50		1.5	81.60	312	302	301	61	88	79	3	9.3	
	55		1.5	85.18	312	302	301	60	88	79	3	9.2	
	60		1.5	88.640	312	302	301	62	88	79	3	9.0	
Total	*			42.0650	3738				1029	930			
Average				1.5000	311.5000				81.6250				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC NH
 Date 3.24.11

TEST LOCATION: FF OUTLET
 UNIT: 3 RUN: 3

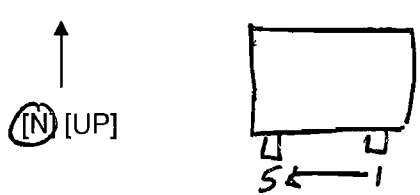
HCl TESTING
FIELD DATA SHEET

METHOD: 26A PAGE 1 OF 1

Client: <u>Wheelabrator</u>	Project No.: <u>11182</u>
Plant: <u>N. Browns</u>	Date: <u>3.24.11</u>
Meter Operator: <u>NH</u>	
Probe Operator:	

Meter Box: <u>66-21</u>	Sample Box No.: <u>B14</u>
Meter Yd: <u>0.9995</u>	Meter ΔH: <u>1.4892</u>
K Factor: <u>-</u>	Pitot Cp: <u>-</u>
Leak Rate Before: <u>0.003</u> [Lpm] @ <u>13</u> (in. Hg)	
Leak Rate After: <u>0.001</u> [Lpm] @ <u>5</u> (in. Hg)	
Pitot Leak Check Before: ☐ After: Good ☐ Bad: ☐	

Cross-Section of Test Location



Duct Dimensions (in.): <u>96 x 96</u>			
Static Pres (in. H ₂ O): <u>-10.3</u>	Port Len. (in.): <u>10</u>	Gas Flow (in. Hg) [Out]: <u>(N) [Out]</u>	First point all the way: <u>(N) [Out]</u>

Amb Temp (°F): <u>83</u>	Bar Press: <u>30.00</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>10:24</u>	Stop Time: <u>11:24</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. (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
				89.135		300	300						
3-1	5	N/A	1.5	92.77	312	302	301	64	83	82	3	9.3	
	10		1.5	96.27	311	302	301	63	88	82	3	9.2	
	15	↓	1.5	99.73	311	302	301	61	91	83	3	9.2	
	20		1.5	103.14	312	300	301	62	93	84	3	9.7	
	25		1.5	106.59	312	301	301	65	95	85	3	9.2	
	30		1.5	110.14	313	301	302	64	96	86	3	7.7	
	35		1.5	113.65	311	301	301	63	97	87	3	8.2	
	40		1.5	117.35	312	301	301	63	97	88	3	9.2	
	45		1.5	120.66	311	301	301	63	97	89	3	9.2	
	50		1.5	124.23	311	301	301	64	98	89	3	9.1	
	55		1.5	127.77	312	301	301	64	99	90	3	9.5	
	60		1.5	131.335	313	301	301	64	100	91	3	9.0	
								64					
Total	*			42.2000	3741				1134	1036			
Average		1.5000			311.7500				90.4167				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: NH
 Date: 3.24.11

Impinger Weight Sheet

Client Wheelabrator	Unit Name/Location Unit 3 FF Outlet
Plant North Broward	Job No. 11182 Method Mod. 26A

Run No. 1	Filter Type Quartz	Sample Box No. B21
Date 3/24/11	Lot No.	pH
Analyst R.V. Vere	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	509.9	457.4	52.5	
Impinger 2	100 mL 0.1N H2SO4	672.6	559.8	112.8	
Impinger 3	100 mL 0.1N H2SO4	598.9	554.7	44.2	
Impinger 4	Empty	455.2	444.1	11.1	
Impinger 5	Silica Gel	752.9	738.1	14.8	Total Weight (gm)
					220.6
					235.4

QA/QC RV
Date 3/24/11

Run No. 2	Filter Type Quartz	Sample Box No. B12
Date 3/24/11	Lot No.	pH
Analyst R.V. Vere	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	499.0	457.4	41.6	
Impinger 2	100 mL 0.1N H2SO4	649.0	540.3	108.7	
Impinger 3	100 mL 0.1N H2SO4	601.7	553.2	48.5	
Impinger 4	Empty	444.3	429.3	15.0	
Impinger 5	Silica Gel	771.3	753.6	17.7	Total Weight (gm)
					213.8
					231.5

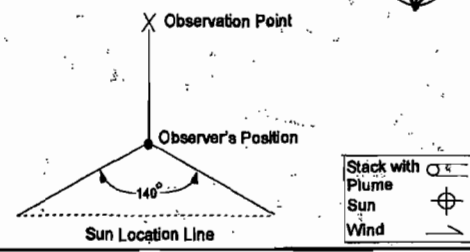
QA/QC RV
Date 3/24/11

Run No. 3	Filter Type Quartz	Sample Box No. B14
Date 3/24/11	Lot No.	pH
Analyst R.V. Vere	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	502.6	456.3	46.3	
Impinger 2	100 mL 0.1N H2SO4	637.5	524.6	112.9	
Impinger 3	100 mL 0.1N H2SO4	577.3	536.5	40.8	
Impinger 4	Empty	458.5	449.2	9.3	
Impinger 5	Silica Gel	737.1	723.3	13.8	Total Weight (gm)
					209.3
					223.1

QA/QC RV
Date 3/24/11

Visible Emissions Observation Form

CLIENT/OWNER Wheelabrator		PROJECT NUMBER 11182		OBSERVATION DATE 3/25/11					START TIME 8:50		END TIME 11:15				
PLANT North Broward	UNIT Line Silo	RUN 1		MIN	SEC	15	30	45	60	MIN	SEC	15	30	45	60
PROCESS EQUIPMENT sb Filter Line Silo		OPERATING MODE continuous		0	0	0	0	0	0	30	0	0	0	0	0
CONTROL EQUIPMENT Fabric Filter		OPERATING MODE continuous		1	0	0	0	0	0	31	0	0	0	0	0
DESCRIBE EMISSION POINT bottom of fabric filter				2	0	0	0	0	0	32	0	0	0	0	0
				3	0	0	0	0	0	33	0	0	0	0	0
				4	0	0	0	0	0	34	0	0	0	0	0
				5	0	0	0	0	0	35	0	0	0	0	0
				6	0	0	0	0	0	36	0	0	0	0	0
				7	0	0	0	0	0	37	0	0	0	0	0
				8	0	0	0	0	0	38	0	0	0	0	0
HEIGHT ABOVE GROUND LEVEL 50		DISTANCE FROM OBSERVER 175		9	0	0	0	0	0	39	0	0	0	0	0
HEIGHT RELATIVE TO OBSERVER 50		DIRECTION FROM OBSERVER South		10	0	0	0	0	0	40	0	0	0	0	0
DESCRIBE EMISSIONS white plume				11	0	0	0	0	0	41	0	0	0	0	0
				12	0	0	0	0	0	42	0	0	0	0	0
				13	0	0	0	0	0	43	0	0	0	0	0
				14	0	0	0	0	0	44	0	0	0	0	0
				15	0	0	0	0	0	45	0	0	0	0	0
				16	0	0	0	0	0	46	0	0	0	0	0
EMISSION COLOR white		PLUME TYPE: CONTINUOUS ☒		17	0	0	0	0	0	47	0	0	0	0	0
		FUGITIVE ☐ INTERMITTENT ☐		18	0	0	0	0	0	48	0	0	0	0	0
WATER DROPLETS PRESENT YES ☐ NO ☒		IF WATER DROPLET PLUME ATTACHED ☐ DETACHED ☐		19	0	0	0	0	0	49	0	0	0	0	0
				20	0	0	0	0	0	50	0	0	0	0	0
POINT IN PLUME AT WHICH EMISSIONS WERE DETERMINED The outlet to the fabric filter				21	0	0	0	0	0	51	0	0	0	0	0
				22	0	0	0	0	0	52	0	0	0	0	0
DESCRIBE BACKGROUND Foggy sky				23	0	0	0	0	0	53	0	0	0	0	0
				24	0	0	0	0	0	54	0	0	0	0	0
				25	0	0	0	0	0	55	0	0	0	0	0
WIND SPEED 0-5 MPH		WIND DIRECTION East		26	0	0	0	0	0	56	0	0	0	0	0
				27	0	0	0	0	0	57	0	0	0	0	0
AMBIENT TEMPERATURE 68°		RELATIVE HUMIDITY		28	0	0	0	0	0	58	0	0	0	0	0
				29	0	0	0	0	0	59	0	0	0	0	0
LAYOUT SKETCH OF SOURCE		INDICATE NORTH		RANGE OF OPACITY READINGS											
				MINIMUM 0											
				MAXIMUM											
				OBSERVER'S NAME (PRINT) Daniel Luckhard											
				OBSERVER'S SIGNATURE Daniel Luckhard											
				DATE 3/25/11											
				CERTIFIED BY Aeromet											
				DATE 3/25/11											
COMMENTS															

Visible Emissions Observation Form

CLIENT/OWNER wheelabrator		PROJECT NUMBER 11182		OBSERVATION DATE 3/29					START TIME		END TIME		
PLANT Nort Broward		UNIT	RUN	SEC MIN	15	30	45	60	SEC MIN	15	30	45	60
PROCESS EQUIPMENT		OPERATING MODE		0	0	0	0	0	30	0	0	0	0
CONTROL EQUIPMENT		OPERATING MODE		1	0	0	0	0	31	0	0	0	0
DESCRIBE EMISSION POINT				2	0	0	0	0	32	0	0	0	0
				3	0	0	0	0	33	0	0	0	0
				4	0	0	0	0	34	0	0	0	0
				5	0	0	0	0	35	0	0	0	0
				6	0	0	0	0	36	0	0	0	0
				7	0	0	0	0	37	0	0	0	0
				8	0	0	0	0	38	0	0	0	0
HEIGHT ABOVE GROUND LEVEL		DISTANCE FROM OBSERVER		9	0	0	0	0	39	0	0	0	0
				10	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
				12	0	0	0	0	42	0	0	0	0
DESCRIBE EMISSIONS				13	0	0	0	0	43	0	0	0	0
				14	0	0	0	0	44	0	0	0	0
				15	0	0	0	0	45	0	0	0	0
				16	0	0	0	0	46	0	0	0	0
EMISSION COLOR		PLUME TYPE: CONTINUOUS ☐		17	0	0	0	0	47	0	0	0	0
		FUGITIVE ☐ INTERMITTENT ☐		18	0	0	0	0	48	0	0	0	0
WATER DROPLETS PRESENT		IF WATER DROPLET PLUME		19	0	0	0	0	49	0	0	0	0
YES ☐ NO ☐		ATTACHED ☐ DETACHED ☐		20	0	0	0	0	50	0	0	0	0
POINT IN PLUME AT WHICH EMISSIONS WERE DETERMINED				21	0	0	0	0	51	0	0	0	0
				22	0	0	0	0	52	0	0	0	0
DESCRIBE BACKGROUND				23	0	0	0	0	53	0	0	0	0
				24	0	0	0	0	54	0	0	0	0
				25	0	0	0	0	55	0	0	0	0
WIND SPEED		WIND DIRECTION		26	0	0	0	0	56	0	0	0	0
				27	0	0	0	0	57	0	0	0	0
AMBIENT TEMPERATURE		RELATIVE HUMIDITY		28	0	0	0	0	58	0	0	0	0
				29	0	0	0	0	59	0	0	0	0
LAYOUT SKETCH OF SOURCE				RANGE OF OPACITY READINGS									
				INDICATE NORTH									
				MINIMUM MAXIMUM									
				OBSERVER'S NAME (PRINT)									
				OBSERVER'S SIGNATURE									
				DATE									
				CERTIFIED BY									
				DATE									
COMMENTS													

Visible Emissions Observation Form

CLIENT/OWNER Wheelabrator		PROJECT NUMBER 11182		OBSERVATION DATE 3/29/11					START TIME		END TIME	
PLANT North Broward	UNIT	RUN	SEC MIN	15	30	45	60	SEC MIN	15	30	45	60
PROCESS EQUIPMENT		OPERATING MODE		0	0	0	0	30				
				1	0	0	0	31				
				2	0	0	0	32				
CONTROL EQUIPMENT		OPERATING MODE		3	0	0	0	33				
				4	0	0	0	34				
DESCRIBE EMISSION POINT				5	0	0	0	35				
				6	0	0	0	36				
				7	0	0	0	37				
				8	0	0	0	38				
HEIGHT ABOVE GROUND LEVEL		DISTANCE FROM OBSERVER		9	0	0	0	39				
				10	0	0	0	40				
HEIGHT RELATIVE TO OBSERVER		DIRECTION FROM OBSERVER		11	0	0	0	41				
				12	0	0	0	42				
DESCRIBE EMISSIONS				13	0	0	0	43				
				14	0	0	0	44				
				15	0	0	0	45				
				16	0	0	0	46				
EMISSION COLOR		PLUME TYPE: CONTINUOUS ☐		17	0	0	0	47				
		FUGITIVE ☐ INTERMITTENT ☐		18	0	0	0	48				
WATER DROPLETS PRESENT		IF WATER DROPLET PLUME		19	0	0	0	49				
YES ☐ NO ☐		ATTACHED ☐ DETACHED ☐		20	0	0	0	50				
POINT IN PLUME AT WHICH EMISSIONS WERE DETERMINED				21	0	0	0	51				
				22	0	0	0	52				
DESCRIBE BACKGROUND				23	0	0	0	53				
				24	0	0		54				
				25				55				
WIND SPEED		WIND DIRECTION		26				56				
				27				57				
AMBIENT TEMPERATURE		RELATIVE HUMIDITY		28				58				
				29				59				

LAYOUT SKETCH OF SOURCE

RANGE OF OPACITY READINGS

MINIMUM _____ MAXIMUM _____

OBSERVER'S NAME (PRINT) _____

OBSERVER'S SIGNATURE _____ **DATE** _____

CERTIFIED BY _____ **DATE** _____

COMMENTS

Visible Emissions Observation Form

CLIENT/OWNER wheelabrator		PROJECT NUMBER 11182		OBSERVATION DATE 3/24/11				START TIME 952		END TIME 1019		
PLANT North Broward	UNIT 1	RUN 1	SEC MIN	15	30	45	60	SEC MIN	15	30	45	60
PROCESS EQUIPMENT Lime Silo		OPERATING MODE continuous		1	0	0	0	0	31			
CONTROL EQUIPMENT Fabric Filter		OPERATING MODE continuous		2	0	0	0	0	32			
DESCRIBE EMISSION POINT Fabric Filter on top of silo				3	0	0	0	0	33			
				4	0	0	0	0	34			
				5	0	0	0	0	35			
				6	0	0	0	0	36			
				7	0	0	0	0	37			
				8	0	0	5	5	38			
HEIGHT ABOVE GROUND LEVEL 50		DISTANCE FROM OBSERVER 175		9	5	5	5	5	39			
				10	5	5	5	5	40			
HEIGHT RELATIVE TO OBSERVER 50		DIRECTION FROM OBSERVER W		11	5	5	5	5	41			
				12	5	5	5	5	42			
DESCRIBE EMISSIONS white limestone				13	5	5	5	5	43			
				14	5	5	5	5	44			
				15	5	5	5	5	45			
				16	5	5	5	5	46			
EMISSION COLOR white		PLUME TYPE: CONTINUOUS ☒		17	5	5	5	5	47			
		FUGITIVE ☐ INTERMITTENT ☐		18	5	5	5	5	48			
WATER DROPLETS PRESENT YES ☐ NO ☒		IF WATER DROPLET PLUME ATTACHED ☐ DETACHED ☐		19	5	5	5	5	49			
				20	5	5	5	5	50			
POINT IN PLUME AT WHICH EMISSIONS WERE DETERMINED exit of fabric filter				21	5	5	5	5	51			
				22	5	5	5	5	52			
DESCRIBE BACKGROUND Blue sky				23	5	5	5	5	53			
				24	5	5	5	5	54			
				25	5	5	5	5	55			
WIND SPEED 72		WIND DIRECTION East¹⁰ North		26	5	5	5	5	56			
				27	5				57			
AMBIENT TEMPERATURE 72		RELATIVE HUMIDITY		28					58			
				29					59			
LAYOUT SKETCH OF SOURCE				RANGE OF OPACITY READINGS								
				MINIMUM 0 MAXIMUM								
				OBSERVER'S NAME (PRINT)								
				OBSERVER'S SIGNATURE				DATE				
				CERTIFIED BY				DATE				
COMMENTS												

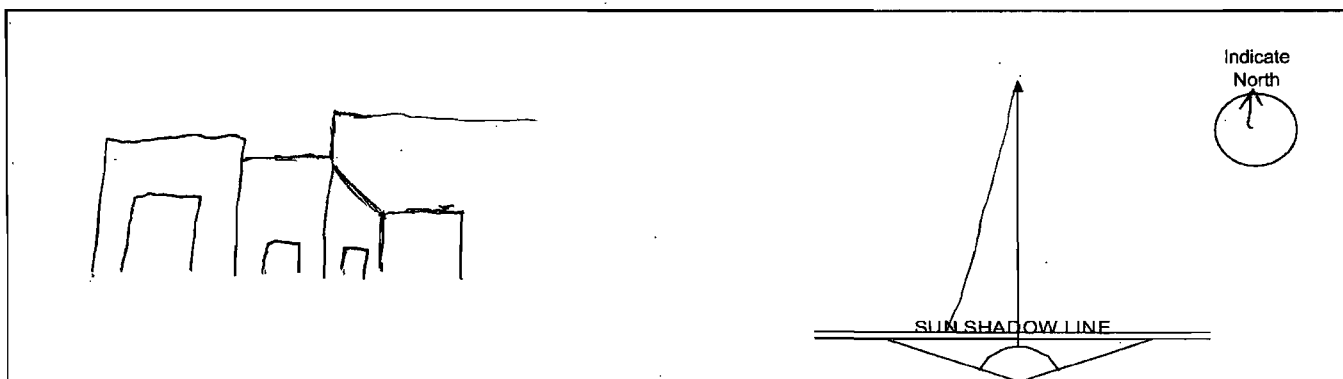
EPA METHOD 22

Fugitive or Smoke Emission Inspection

Outdoor Location

Job No.	11182	Date	3/24/11
Client	Wheelabrator	Observer	Daniel Luclesard
Plant	North Browns	Affiliation	Clean Air Engineering
Industry	Air emissions testing	Process Unit	Ash Handling System
Precipitation	none	Wind Direction	North
Sky Conditions	clear + sunny	Wind Speed	

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 Area + Conveyor Truck driving in and out of loading dock	Start 11:39	20:06	0:00
	Stop 11:59		
	Start 12:04	20:00	0:21
	Stop 12:24		
	Start 12:30	20:00	0:00
	Stop 12:50		
	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

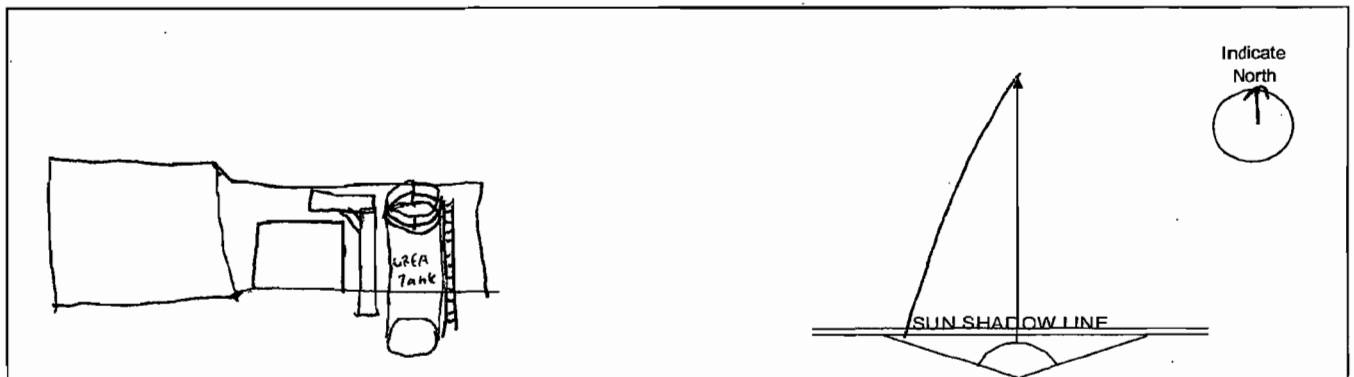
Outdoor Location

Job No.	11182	Date	3/24/11
Client	Wheelabrator	Observer	Daniel Lucibold
Plant	North Browards	Affiliation	Clean Air Engineering

Industry	Air testing	Process Unit	Baghouse + Metals unloading

Precipitation	None	Wind Direction	North
Sky Conditions	Clear + Sunny	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)
Don to Baghouse + Metals/Ash Unloading	Start 12:55	20:00	00:00
	Stop 13:15		
	Start 13:20	20:00	00:00
	Stop 13:40		
	Start 13:45	20:00	00:00
	Stop 14:05		
	Start		
	Stop		
	Start		
	Stop		
	Start		
	Stop		

Note: Rest breaks must be taken every 15 to 20 minutes for 5 to 10 minutes.

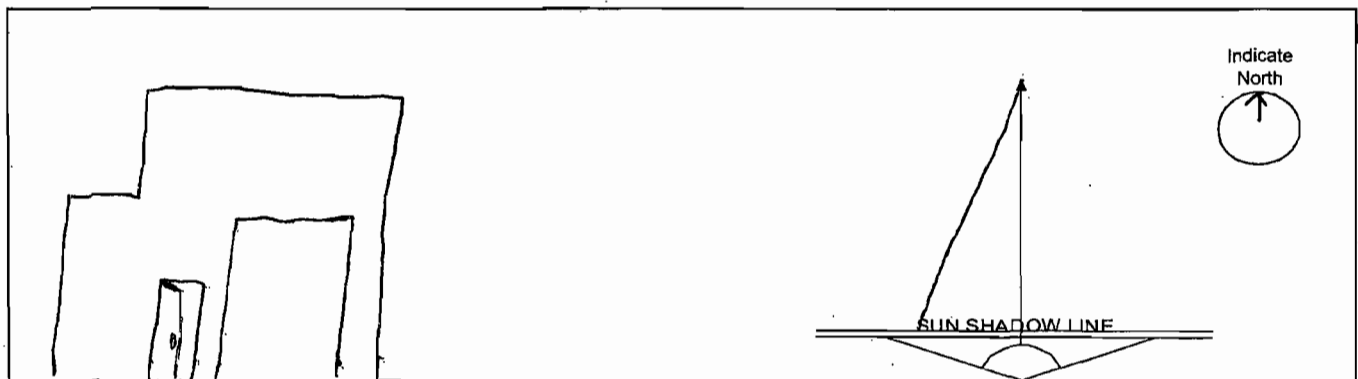
EPA METHOD 22

Fugitive or Smoke Emission Inspection

Outdoor Location

Job No.	11182	Date	3/24/11
Client	wheelabrator	Observer	Daniel Luckhard
Plant	North Browards	Affiliation	Clean Air Engineering
Industry	air emissions testing	Process Unit	Baghouse Roll Down Door
Precipitation	none	Wind Direction	North
Sky Conditions	clear & sunny	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)
Baghouse Roll Down Door	Start 14:10	20:00	00:00
	Stop 14:30		
	Start 14:35	20:00	00:00
	Stop 14:55		
	Start 15:00	20:00	00:00
	Stop 15:20		
	Start		
	Stop		
	Start		
	Stop		
	Start		
	Stop		

Note: Rest breaks must be taken every 15 to 20 minutes for 5 to 10 minutes.



WHEELABRATOR NORTH BROWARD, INC.
POMPANO BEACH, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-1

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: NR

Date: 5/4/11



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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 North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: P. Bihun 505
Probe Operator: P. Bihun 505
Test Date: 3/23/11
Start Time: 06:34
Stop Time: 08:45
Leak Rate Before: 0.004 cfm @ 12 "Hg
Leak Rate After: 0.003 cfm @ 10 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -11.7
O₂ (dry volume %): 9.82
CO₂ (dry volume %): 9.48
N₂+CO (dry volume %): 80.70

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): 432.4
H₂O (silica, g): 15.2
Actual Moisture (%): 20.52

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		√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
	0.0			541.450		T _{m-in} (°F)	T _{m-out} (°F)			
5-01	5.0	0.45	1.10	544.650	307	67	67	0.67	3.20	107.4
5-02	10.0	0.51	1.30	547.800	303	66	64	0.71	3.15	99.4
5-03	15.0	0.59	1.50	551.200	302	67	64	0.77	3.40	99.7
5-04	20.0	0.69	1.70	554.800	302	69	64	0.83	3.60	97.4
5-05	25.0	0.62	1.60	558.350	304	70	64	0.79	3.55	101.4
LEAK CHECK	25.0			558.395						
4-01	30.0	0.51	1.30	561.610	303	69	65	0.71	3.22	101.1
4-02	35.0	0.49	1.20	564.670	302	70	65	0.70	3.06	98.0
4-03	40.0	0.53	1.30	567.900	301	71	66	0.73	3.23	99.2
4-04	45.0	0.69	1.70	571.530	303	72	66	0.83	3.63	97.9
4-05	50.0	0.67	1.70	575.150	304	74	66	0.82	3.62	98.9
LEAK CHECK	50.0			575.185						
3-01	55.0	0.48	1.20	578.320	304	73	67	0.69	3.14	101.1
3-02	60.0	0.52	1.30	581.540	303	73	67	0.72	3.22	99.7
3-03	65.0	0.60	1.50	584.950	304	74	67	0.77	3.41	98.3
3-04	70.0	0.71	1.80	588.720	305	74	68	0.84	3.77	100.0
3-05	75.0	0.72	1.80	592.480	304	74	68	0.85	3.76	98.9
LEAK CHECK	75.0			592.525						
2-01	80.0	0.63	1.60	596.080	302	74	68	0.79	3.56	99.8
2-02	85.0	0.45	1.10	599.060	301	74	68	0.67	2.98	98.8
2-03	90.0	0.45	1.10	602.030	301	74	69	0.67	2.97	98.4
2-04	95.0	0.53	1.30	605.250	302	74	69	0.73	3.22	98.4
2-05	100.0	0.60	1.50	608.650	303	76	69	0.77	3.40	97.6
LEAK CHECK	100.0			608.680						
1-01	105.0	0.43	1.10	611.570	301	74	70	0.66	2.89	97.9
1-02	110.0	0.43	1.10	614.520	301	75	70	0.66	2.95	99.8
1-03	115.0	0.49	1.20	617.610	299	76	70	0.70	3.09	97.7
1-04	120.0	0.46	1.20	620.700	302	75	71	0.68	3.09	101.1
1-05	125.0	0.56	1.40	624.025	302	75	71	0.75	3.32	98.6
Final	125.0									
				1.38400	82.42000	302.60000	69.86000	0.74073	82.42000	

25 points sampled
QC-Check: Field Averages

Sq.Rt.ΔP	0.7407	1.3840	82.4150	302.6000	69.8600

☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

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0

Field Data Printout

Test Method: USEPA Method 5/29
Analyte: Particulate/Metals

Location: Unit 1 FF Outlet
Test Run: 2
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: P. Bihun 505
Probe Operator: P. Bihun 505
Test Date: 3/23/11
Start Time: 09:05
Stop Time: 11:17
Leak Rate Before: 0.004 cfm @ 11 "Hg
Leak Rate After: 0.004 cfm @ 10 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -11.5
O₂ (dry volume %): 9.58
CO₂ (dry volume %): 9.81
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

H₂O (condensate, ml or gm): 422.8
H₂O (silica, g): 14.7
Actual Moisture (%): 20.97

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			624.280						
5-01	5.0	0.54	1.40	627.650	303	73	72	0.73	3.37	102.5
5-02	10.0	0.46	1.20	630.770	303	75	72	0.68	3.12	102.5
5-03	15.0	0.53	1.30	634.000	302	77	72	0.73	3.23	98.7
5-04	20.0	0.63	1.60	637.560	303	78	73	0.79	3.56	99.7
5-05	25.0	0.60	1.50	641.035	303	79	73	0.77	3.48	99.6
LEAK CHECK	25.0			641.085						
4-01	30.0	0.48	1.20	644.200	302	79	74	0.69	3.12	99.6
4-02	35.0	0.45	1.10	647.120	303	79	74	0.67	2.92	96.5
4-03	40.0	0.59	1.50	650.580	302	80	75	0.77	3.46	99.7
4-04	45.0	0.64	1.60	654.160	304	81	75	0.80	3.58	99.1
4-05	50.0	0.64	1.60	657.730	303	81	75	0.80	3.57	98.7
LEAK CHECK	50.0			657.775						
3-01	55.0	0.49	1.20	660.387	302	81	76	0.70	2.61	82.3*
3-02	60.0	0.43	1.10	663.810	302	82	76	0.66	3.42	115.1*
3-03	65.0	0.52	1.30	667.030	302	83	77	0.72	3.22	98.3
3-04	70.0	0.58	1.50	670.550	303	83	77	0.76	3.52	101.9
3-05	75.0	0.59	1.50	674.035	303	86	78	0.77	3.49	99.6
LEAK CHECK	75.0			674.075						
2-01	80.0	0.49	1.20	677.160	303	85	79	0.70	3.08	96.7
2-02	85.0	0.45	1.10	680.080	303	86	80	0.67	2.92	95.3
2-03	90.0	0.42	1.10	682.980	300	86	80	0.65	2.90	97.8
2-04	95.0	0.55	1.40	686.370	302	86	80	0.74	3.39	100.1
2-05	100.0	0.68	1.70	690.050	301	85	80	0.82	3.68	97.8
LEAK CHECK	100.0			690.150						
1-01	105.0	0.39	0.98	692.910	301	84	80	0.62	2.76	96.8
1-02	110.0	0.39	0.98	695.680	300	84	80	0.62	2.77	97.1
1-03	115.0	0.34	0.86	698.280	295	83	80	0.58	2.60	97.3
1-04	120.0	0.40	1.00	701.090	301	83	80	0.63	2.81	97.4
1-05	125.0	0.51	1.30	704.310	303	85	80	0.71	3.22	98.9
Final	125.0		1.28880	79.79500	301.96000	79.24000		0.71246	79.79500	

25 points sampled

Sq. Rt. ΔP

QC-Check: Field Averages

0.7125	1.2888	79.7950	301.9600	79.2400

☒ 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 North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000

Meter Operator: P. Bihun 505
Probe Operator: P. Bihun 505

Test Date: 3/23/11
Start Time: 11:41
Stop Time: 13:52
Leak Rate Before: 0.004 cfm @ 12 "Hg
Leak Rate After: 0.004 cfm @ 11 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -11.6
O₂ (dry volume %): 9.81
CO₂ (dry volume %): 9.84
N₂+CO (dry volume %): 80.35

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): 415.1
H₂O (silica, g): 18.1
Actual Moisture (%): 20.75

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) (%)
	0.0			704.740						
5-01	5.0	0.41	1.00	707.620	303	83	83	0.64	2.88	98.3
5-02	10.0	0.42	1.10	710.530	304	85	83	0.65	2.91	98.0
5-03	15.0	0.49	1.20	713.650	303	87	83	0.70	3.12	97.1
5-04	20.0	0.57	1.40	716.980	303	88	84	0.75	3.33	95.9
5-05	25.0	0.58	1.50	720.470	303	89	84	0.76	3.49	99.6
LEAK CHECK	25.0			720.531						
4-01	30.0	0.41	1.00	723.350	302	90	84	0.64	2.82	95.0
4-02	35.0	0.40	1.00	726.170	304	90	85	0.63	2.82	96.7
4-03	40.0	0.46	1.20	729.320	302	90	86	0.68	3.15	100.5
4-04	45.0	0.58	1.50	732.790	304	91	86	0.76	3.47	98.7
4-05	50.0	0.63	1.60	736.400	303	92	86	0.79	3.61	98.4
LEAK CHECK	50.0			736.440						
3-01	55.0	0.36	0.91	739.140	302	91	87	0.60	2.70	97.2
3-02	60.0	0.44	1.10	742.100	303	91	87	0.66	2.96	96.5
3-03	65.0	0.54	1.40	745.440	302	90	87	0.73	3.34	98.3
3-04	70.0	0.62	1.60	749.060	303	91	87	0.79	3.62	99.5
3-05	75.0	0.75	1.90	752.990	305	92	88	0.87	3.93	98.2
LEAK CHECK	75.0			753.045						
2-01	80.0	0.55	1.40	756.420	302	91	88	0.74	3.38	98.3
2-02	85.0	0.46	1.20	759.600	303	92	88	0.68	3.18	101.2
2-03	90.0	0.56	1.40	762.940	302	93	88	0.75	3.34	96.2
2-04	95.0	0.61	1.50	766.450	303	93	88	0.78	3.51	97.0
2-05	100.0	0.80	2.00	770.485	305	93	89	0.89	4.03	97.5
LEAK CHECK	100.0			770.530						
1-01	105.0	0.48	1.20	773.650	302	92	89	0.69	3.12	97.0
1-02	110.0	0.47	1.20	776.810	302	92	89	0.69	3.16	99.3
1-03	115.0	0.47	1.20	779.940	299	92	89	0.69	3.13	98.2
1-04	120.0	0.49	1.20	783.070	303	93	89	0.70	3.13	96.3
1-05	125.0	0.52	1.30	786.365	303	93	89	0.72	3.29	98.5
Final	125.0		1.32040	81.42400	302.80000	88.60000		0.71979	81.42400	

25 points sampled
QC-Check: Field Averages

Sq.Rt.ΔP	0.7197	1.3204	81.4200	302.8000	88.6000

☒ 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 North 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:		9.48000		9.82000	80.70000	29.90960	1.16878	☒ Fo value within expected range.
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		9.81000		9.58000	80.61000	29.95280	1.15392	☒ Fo value within expected range.
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		9.84000		9.81000	80.35000	29.96680	1.12703	☒ 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 North Broward, Inc.

Project No: 11182

Test Method: USEPA Method 5/29

Analyte: Particulate/Metals

Analyst: D. Luckhard

Analyst Emp No: 568

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	Empty	706.4	451.6	254.8		
Impinger 2	5%HNO3/10%H2O2	690.1	564.9	125.2		
Impinger 3	5%HNO3/10%H2O2	605.4	566.3	39.1		
Impinger 4	Empty	456.6	449.1	7.5		
Impinger 5	4%KMnO4/10%H2SO4	542.2	537.7	4.5		
Impinger 6	4%KMnO4/10%H2SO4	531.4	530.1	1.3	432.4 Liquid (gm)	Field Data Check
Impinger 7	Silica Gel	742.1	726.9	15.2	0.0 less rinse (gm)	
Impinger 8					432.4 Net Liquid (gm)	432.4 ☒ QA/QC OK
					+ 15.2 Silica Gel (gm)	15.2 ☒ QA/QC OK
					447.6 Total Vlc (gm)	447.6 ☒ QA/QC OK
	Rinse:		(ml or gm)			

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	Empty	708.7	435.1	273.6		
Impinger 2	5%HNO3/10%H2O2	677.4	570.5	106.9		
Impinger 3	5%HNO3/10%H2O2	557.0	528.4	28.6		
Impinger 4	Empty	436.9	429.7	7.2		
Impinger 5	4%KMnO4/10%H2SO4	545.1	540.6	4.5		
Impinger 6	4%KMnO4/10%H2SO4	553.9	551.9	2.0	422.8 Liquid (gm)	Field Data Check
Impinger 7	Silica Gel	783.3	768.6	14.7	0.0 less rinse (gm)	
Impinger 8					422.8 Net Liquid (gm)	422.8 ☒ QA/QC OK
					+ 14.7 Silica Gel (gm)	14.7 ☒ QA/QC OK
					437.5 Total Vlc (gm)	437.5 ☒ QA/QC OK
	Rinse:		(ml or gm)			

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	Empty	704.0	439.5	264.5		
Impinger 2	5%HNO3/10%H2O2	654.4	538.7	115.7		
Impinger 3	5%HNO3/10%H2O2	560.6	534.7	25.9		
Impinger 4	Empty	444.0	438.7	5.3		
Impinger 5	4%KMnO4/10%H2SO4	550.8	547.5	3.3		
Impinger 6	4%KMnO4/10%H2SO4	605.0	604.6	0.4	415.1 Liquid (gm)	Field Data Check
Impinger 7	Silica Gel	809.6	791.5	18.1	0.0 less rinse (gm)	
Impinger 8					415.1 Net Liquid (gm)	415.1 ☒ QA/QC OK
					+ 18.1 Silica Gel (gm)	18.1 ☒ QA/QC OK
					433.2 Total Vlc (gm)	433.2 ☒ 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)	
					Total Vlc (gm)	
	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 North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator: B. Arnold 770
Test Date: 3/22/11
Start Time: 12:31
Stop Time: 13:41
Leak Rate Before: 0.003 cfm @ 15 "Hg
Leak Rate After: 0.001 cfm @ 5 "Hg

Bar. Press. (in. Hg): 30.20
Static P: -11.0
O₂ (dry volume %): 9.61
CO₂ (dry volume %): 10.00
N₂+CO (dry volume %): 80.39

Nozzle ID No: 271-2
Nozzle Diameter (D_n): 0.271
Probe ID No: 67-8-20
Pitot C_p: 0.818
Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 184.1
H₂O (silica, g): 29.2
Actual Moisture (%): 21.14

Meter Box ID: 66-4
Meter ΔH@: 1.69790
Meter Y_d: 0.99830

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			803.540						
5-01	2.5	0.44	1.10	805.050	303	83	82	0.66	1.51	102.2
5-02	5.0	0.46	1.10	806.520	302	84	82	0.68	1.47	97.2
5-03	7.5	0.46	1.10	807.960	302	84	82	0.68	1.44	95.2
5-04	10.0	0.55	1.30	809.530	302	89	82	0.74	1.57	94.5
5-05	12.5	0.51	1.20	811.060	302	88	84	0.71	1.53	95.5
LEAK CHECK	12.5			811.210						
4-01	15.0	0.51	1.20	812.760	300	89	85	0.71	1.55	96.5
4-02	17.5	0.45	1.10	814.280	301	90	85	0.67	1.52	100.7
4-03	20.0	0.51	1.20	815.750	301	91	85	0.71	1.47	91.4
4-04	22.5	0.55	1.30	817.320	302	92	86	0.74	1.57	93.9
4-05	25.0	0.55	1.20	818.885	301	95	86	0.74	1.56	93.3
LEAK CHECK	25.0			818.995						
3-01	27.5	0.49	1.20	820.540	302	93	85	0.70	1.54	97.9
3-02	30.0	0.47	1.20	822.080	302	95	87	0.69	1.54	99.3
3-03	32.5	0.52	1.30	823.670	302	98	87	0.72	1.59	97.2
3-04	35.0	0.59	1.40	825.350	302	99	88	0.77	1.68	96.3
3-05	37.5	0.67	1.60	827.140	302	100	88	0.82	1.79	96.2
LEAK CHECK	37.5			827.275						
2-01	40.0	0.53	1.30	828.920	302	98	89	0.73	1.64	99.4
2-02	42.5	0.44	1.10	830.430	303	99	90	0.66	1.51	100.0
2-03	45.0	0.53	1.30	832.040	301	99	89	0.73	1.61	97.2
2-04	47.5	0.51	1.20	833.610	302	101	90	0.71	1.57	96.4
2-05	50.0	0.67	1.60	835.385	303	101	90	0.82	1.77	95.2
LEAK CHECK	50.0			835.655						
1-01	52.5	0.29	0.71	836.890	298	100	91	0.54	1.24	100.1
1-02	55.0	0.31	0.76	838.160	299	100	91	0.56	1.27	99.7
1-03	57.5	0.45	1.10	839.660	297	101	92	0.67	1.50	97.5
1-04	60.0	0.45	1.10	841.140	300	101	92	0.67	1.48	96.4
1-05	62.5	0.63	1.50	842.890	300	102	92	0.79	1.75	96.3
Final	62.5		1.20680	38.68500	301.24000	91.04000		0.70536	38.68500	

25 points sampled

Sq.Rt.ΔP

QC-Check: Field Averages

0.7054 1.2068 38.6850 301.2400 91.0400

☒ 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 1 FF Outlet
Test Run: 2
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator: B. Arnold 770

Bar. Press. (in. Hg): 30.20
Static P: -11.0
O₂ (dry volume %): 9.70
CO₂ (dry volume %): 9.93
N₂+CO (dry volume %): 80.37

Nozzle ID No: 271-2
Nozzle Diameter (D_n): 0.271
Probe ID No: 67-8-20
Pitot C_p: 0.818
Pitot Leak Check: ☒ Pass ☐ Fail

Test Date: 3/22/11
Start Time: 14:08
Stop Time: 15:17
Leak Rate Before: 0.003 cfm @ 15 "Hg
Leak Rate After: 0.001 cfm @ 6 "Hg

H₂O (condensate, ml or gm): 213.4
H₂O (silica, g): 15.6
Actual Moisture (%): 21.39

Meter Box ID. No: 66-4
Meter ΔH@: 1.69790
Meter Y_d: 0.99830

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			843.540						
5-01	2.5	0.42	1.10	845.030	300	95	94	0.65	1.49	101.1
5-02	5.0	0.42	1.10	846.520	300	95	94	0.65	1.49	101.1
5-03	7.5	0.47	1.20	848.070	300	97	94	0.69	1.55	99.2
5-04	10.0	0.58	1.50	849.790	301	98	93	0.76	1.72	99.3
5-05	12.5	0.60	1.50	851.545	301	100	93	0.77	1.76	99.4
LEAK CHECK	12.5			851.675						
4-01	15.0	0.57	1.40	853.420	301	101	93	0.75	1.75	101.3
4-02	17.5	0.50	1.30	855.050	301	101	93	0.71	1.63	101.0
4-03	20.0	0.55	1.40	856.780	301	102	93	0.74	1.73	102.1
4-04	22.5	0.61	1.50	858.510	302	102	94	0.78	1.73	97.0
4-05	25.0	0.68	1.70	860.355	301	103	94	0.82	1.85	97.8
LEAK CHECK	25.0			860.515						
3-01	27.5	0.67	1.70	862.380	301	102	94	0.82	1.87	99.7
3-02	30.0	0.50	1.30	864.030	302	103	94	0.71	1.65	102.0
3-03	32.5	0.50	1.30	865.650	302	103	94	0.71	1.62	100.2
3-04	35.0	0.60	1.50	867.410	302	102	93	0.77	1.76	99.6
3-05	37.5	0.75	1.90	869.330	302	104	94	0.87	1.92	97.0
LEAK CHECK	37.5			869.510						
2-01	40.0	0.75	1.90	871.470	302	104	93	0.87	1.96	99.1
2-02	42.5	0.50	1.30	873.130	302	104	94	0.71	1.66	102.5
2-03	45.0	0.54	1.40	874.800	302	104	94	0.73	1.67	99.3
2-04	47.5	0.57	1.40	876.510	302	105	95	0.75	1.71	98.8
2-05	50.0	0.63	1.60	878.300	303	105	95	0.79	1.79	98.5
LEAK CHECK	50.0			878.455						
1-01	52.5	0.27	0.68	879.670	299	104	93	0.52	1.21	101.9
1-02	55.0	0.29	0.73	880.830	299	103	94	0.54	1.16	93.9
1-03	57.5	0.39	0.98	882.230	285	104	95	0.62	1.40	96.7
1-04	60.0	0.49	1.20	883.790	302	104	95	0.70	1.56	97.2
1-05	62.5	0.64	1.60	885.565	302	102	94	0.80	1.78	97.2
Final	62.5									
25 points sampled										
QC-Check: Field Averages		Sq.Rt.ΔP								
		0.7296	1.3676	41.4000	300.6000	97.8600		0.72960	41.40000	

☒ 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 1 FF Outlet
Test Run: 3
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator: B. Arnold 770
Test Date: 3/22/11
Start Time: 15:39
Stop Time: 16:47
Leak Rate Before: 0.002 cfm @ 15 "Hg
Leak Rate After: 0.001 cfm @ 7 "Hg

Bar. Press. (in. Hg): 30.20
Static P: -11.2
O₂ (dry volume %): 10.25
CO₂ (dry volume %): 9.60
N₂+CO (dry volume %): 80.15

Nozzle ID No: 271-2
Nozzle Diameter (D_n): 0.271
Probe ID No: 67-8-20
Pitot C_p: 0.818
Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 203.0
H₂O (silica, g): 22.6
Actual Moisture (%): 20.81

Meter Box ID. No: 66-4
Meter ΔH@: 1.69790
Meter Y_d: 0.99830

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			886.390						
5-01	2.5	0.45	1.10	887.970	301	97	93	0.67	1.58	102.8
5-02	5.0	0.45	1.10	889.460	301	96	93	0.67	1.49	97.1
5-03	7.5	0.56	1.40	891.080	303	98	94	0.75	1.62	94.6
5-04	10.0	0.67	1.70	892.910	306	100	94	0.82	1.83	97.7
5-05	12.5	0.67	1.70	894.780	308	101	93	0.82	1.87	100.0
LEAK CHECK	12.5			895.020						
4-01	15.0	0.47	1.20	896.580	308	102	94	0.69	1.56	99.3
4-02	17.5	0.45	1.10	898.060	308	103	94	0.67	1.48	96.2
4-03	20.0	0.56	1.40	899.760	305	103	94	0.75	1.70	98.9
4-04	22.5	0.70	1.80	901.650	308	105	95	0.84	1.89	98.4
4-05	25.0	0.70	1.80	903.535	307	104	94	0.84	1.88	98.2
LEAK CHECK	25.0			903.785						
3-01	27.5	0.59	1.50	905.550	306	105	95	0.77	1.76	99.9
3-02	30.0	0.60	1.50	907.290	307	106	96	0.77	1.74	97.5
3-03	32.5	0.60	1.50	909.040	308	106	96	0.77	1.75	98.1
3-04	35.0	0.70	1.80	910.930	308	107	96	0.84	1.89	98.1
3-05	37.5	0.77	1.90	912.915	307	107	96	0.88	1.99	98.2
LEAK CHECK	37.5			913.145						
2-01	40.0	0.60	1.50	914.900	304	106	95	0.77	1.76	98.3
2-02	42.5	0.50	1.30	916.670	302	107	96	0.71	1.77	108.2
2-03	45.0	0.51	1.30	918.300	302	108	97	0.71	1.63	98.5
2-04	47.5	0.60	1.50	920.110	302	107	98	0.77	1.81	100.8
2-05	50.0	0.66	1.70	921.780	303	106	97	0.81	1.67	89.0*
LEAK CHECK	50.0			921.945						
1-01	52.5	0.27	0.68	923.140	302	106	98	0.52	1.19	99.1
1-02	55.0	0.31	0.78	924.450	303	106	98	0.56	1.31	101.5
1-03	57.5	0.50	1.30	926.060	306	107	97	0.71	1.61	98.6
1-04	60.0	0.52	1.30	927.670	307	108	98	0.72	1.61	96.5
1-05	62.5	0.80	2.00	929.670	310	106	97	0.89	2.00	97.3
Final	62.5		1.43440	42.39500	305.28000	99.90000		0.74874	42.39500	

25 points sampled
QC-Check: Field Averages

Sq.Rt. ΔP _s				
0.7487	1.4344	42.3950	305.2800	99.9000
☒ 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 North 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:		10.00000		9.61000	80.39000	29.98440	1.12900	☒ Fo value within expected range.
2	1							
	2							
	3							
Avg.								
CEM or Other Avg:		9.93000		9.70000	80.37000	29.97680	1.12790	☒ Fo value within expected range.
3	1							
	2							
	3							
Avg.								
CEM or Other Avg:		9.60000		10.25000	80.15000	29.94600	1.10938	☒ 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 North 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	707.2	631.5	75.7
Impinger 2	DI Water	619.9	541.8	78.1
Impinger 3	Empty	482.5	452.2	30.3
Impinger 4	Silica Gel	752.3	723.1	29.2
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

184.1 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

184.1 Net Liquid (gm)

184.1

☒ QA/QC OK

+ 29.2 Silica Gel (gm)

29.2

☒ QA/QC OK

213.3 Total Vlc (gm)

213.3

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	DI Water	691.4	543.1	148.3
Impinger 2	DI Water	601.2	547.3	53.9
Impinger 3	Empty	452.3	441.1	11.2
Impinger 4	Silica Gel	751.9	736.3	15.6
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

213.4 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

213.4 Net Liquid (gm)

213.4

☒ QA/QC OK

+ 15.6 Silica Gel (gm)

15.6

☒ QA/QC OK

229.0 Total Vlc (gm)

229.0

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	DI Water	737.4	633.2	104.2
Impinger 2	DI Water	620.3	544.7	75.6
Impinger 3	Empty	477.3	454.1	23.2
Impinger 4	Silica Gel	746.5	723.9	22.6
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

203.0 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

203.0 Net Liquid (gm)

203.0

☒ QA/QC OK

+ 22.6 Silica Gel (gm)

22.6

☒ QA/QC OK

225.6 Total Vlc (gm)

225.6

☒ 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)

Field Data Printout

Test Method: USEPA Method 26A
Analyte: HCl

Location: Unit 1 SDA Inlet
Test Run: 1
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 60.13205
Meter Operator: B. Arnold 770
Probe Operator:
Test Date: 3/22/11
Start Time: 07:36
Stop Time: 08:36
Leak Rate Before: 0.002 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 15 "Hg

Bar. Press. (in. Hg): 30.20
Static P: -2.1
O₂ (dry volume %): 9.76
CO₂ (dry volume %): 9.73
N₂+CO (dry volume %): 80.51

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): 148.1
H₂O (silica, g): 12.7
Actual Moisture (%): 17.70

Meter Box ID No: 66-14
Meter ΔH@: 1.75710
Meter Y_d: 0.98820

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)		$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{\text{in. H}_2\text{O}}$)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
	0.0			959.360						
1-01	5.0		1.20	962.370	505	75	73		3.01	
1-01	10.0		1.20	965.340	503	74	74		2.97	
1-01	15.0		1.20	968.340	506	76	74		3.00	
1-01	20.0		1.20	971.280	508	78	74		2.94	
1-01	25.0		1.20	974.270	505	80	74		2.99	
1-01	30.0		1.20	977.260	504	81	75		2.99	
1-01	35.0		1.20	980.300	505	83	76		3.04	
1-01	40.0		1.20	983.340	499	84	77		3.04	
1-01	45.0		1.20	986.350	497	85	77		3.01	
1-01	50.0		1.20	989.360	497	86	78		3.01	
1-01	55.0		1.20	992.380	504	86	79		3.02	
1-01	60.0		1.20	995.250	500	86	80		2.87	
Final	60.0		1.20000	35.89000	502.75000	78.54167		0.00000	35.89000	
1 points sampled										
QC-Check: Field Averages		Sq.Rt.ΔP		1.2000	35.8900	502.7500	78.5416			
		☐ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK				

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Field Data Printout

Test Method: USEPA Method 26A
Analyte: HCl

Location: Unit 1 SDA Inlet
Test Run: 2
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 60.13205

Meter Operator: B. Arnold 770
Probe Operator:

Test Date: 3/22/11

Start Time: 09:40

Stop Time: 10:40

Leak Rate Before: 0.003 cfm @ 15 "Hg

Leak Rate After: 0.001 cfm @ 15 "Hg

Bar. Press. (in. Hg): 30.20

Static P: -2.1

O₂ (dry volume %): 8.97

CO₂ (dry volume %): 10.44

N₂+CO (dry volume %): 80.59

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): 134.2

H₂O (silica, g): 18.6

Actual Moisture (%): 17.02

Meter Box ID. No: 66-14

Meter ΔH@: 1.75710

Meter Y_d: 0.98820

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			0.355						
1-01	5.0		1.20	3.480	503	83	81		3.13	
1-01	10.0		1.20	6.460	498	86	81		2.98	
1-01	15.0		1.20	9.470	497	88	81		3.01	
1-01	20.0		1.20	12.440	499	90	82		2.97	
1-01	25.0		1.20	15.460	488	90	82		3.02	
1-01	30.0		1.20	18.490	497	90	83		3.03	
1-01	35.0		1.20	21.520	494	90	83		3.03	
1-01	40.0		1.20	24.510	496	90	83		2.99	
1-01	45.0		1.20	27.550	499	90	83		3.04	
1-01	50.0		1.20	30.550	497	89	83		3.00	
1-01	55.0		1.20	33.580	496	89	83		3.03	
1-01	60.0		1.20	36.580	494	88	83		3.00	
Final	60.0		1.20000	36.22500	496.50000	85.45833		0.00000	36.22500	

1 points sampled
QC-Check: Field Averages

Sq.Rt.ΔP

1.2000	36.2250	496.5000	85.4583

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

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Field Data Printout

Test Method: USEPA Method 26A
Analyte: HCl

Location: Unit 1 SDA Inlet
Test Run: 3
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 60.13205
Meter Operator: B. Arnold 770
Probe Operator:
Test Date: 3/22/11
Start Time: 11:02
Stop Time: 12:02
Leak Rate Before: 0.004 cfm @ 15 "Hg
Leak Rate After: 0.003 cfm @ 15 "Hg

Bar. Press. (in. Hg): 30.20
Static P: -2.1
O₂ (dry volume %): 8.84
CO₂ (dry volume %): 10.63
N₂+CO (dry volume %): 80.53

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): 134.5
H₂O (silica, g): 13.5
Actual Moisture (%): 16.58

Meter Box ID. No: 66-14
Meter ΔH@: 1.75710
Meter Y_d: 0.98820

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) (ft ³)	Isokinetics (calculated) (%)
	0.0			36.890						
1-01	5.0		1.20	39.890	491	82	81		3.00	
1-01	10.0		1.20	42.910	492	85	81		3.02	
1-01	15.0		1.20	45.980	497	88	82		3.07	
1-01	20.0		1.20	48.980	499	89	82		3.00	
1-01	25.0		1.20	51.980	500	88	82		3.00	
1-01	30.0		1.20	55.000	500	88	82		3.02	
1-01	35.0		1.20	58.000	496	87	82		3.00	
1-01	40.0		1.20	61.020	495	87	82		3.02	
1-01	45.0		1.20	64.030	495	88	82		3.01	
1-01	50.0		1.20	67.060	494	87	82		3.03	
1-01	55.0		1.20	70.030	491	88	82		2.97	
1-01	60.0		1.20	73.015	489	88	82		2.99	
Final	60.0		1.20000	36.12500	494.91667	84.45833		0.00000	36.12500	

1 points sampled
QC-Check: Field Averages

Sq Rt ΔP	1.2000	36.1250	494.9160	84.4583
☐ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

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USEPA Method 3 Laboratory Data

Location: Unit 1 SDA Inlet
 Client: Wheelabrator North 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 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:		9.73000		9.76000	80.51000	29.94720	1.14491	☒ Fo value within expected range.
2	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.44000		8.97000	80.59000	30.02920	1.14272	☒ Fo value within expected range.
3	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.63000		8.84000	80.53000	30.05440	1.13452	☒ 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 SDA Inlet

Client: Wheelabrator North Broward, Inc.

Project No: 11182

Test Method: USEPA Method 26A

Analyte: HCl

Analyst: D. Luckhard

Analyst Emp No: 568

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	486.4	457.8	28.6
Impinger 2	100 ml 0.1N H2SO4	627.0	536.8	90.2
Impinger 3	100 ml 0.1N H2SO4	573.6	550.0	23.6
Impinger 4	Empty	528.4	522.7	5.7
Impinger 5	Silica Gel	761.4	748.7	12.7
Impinger 6				
Impinger 7				
Impinger 8				

148.1 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

148.1 Net Liquid (gm)

148.1

☒ QA/QC OK

+ 12.7 Silica Gel (gm)

12.7

☒ QA/QC OK

160.8 Total Vlc (gm)

160.8

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	515.6	481.6	34.0
Impinger 2	100 ml 0.1N H2SO4	627.6	560.4	67.2
Impinger 3	100 ml 0.1N H2SO4	564.6	540.4	24.2
Impinger 4	Empty	445.7	436.9	8.8
Impinger 5	Silica Gel	763.9	745.3	18.6
Impinger 6				
Impinger 7				
Impinger 8				

134.2 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

134.2 Net Liquid (gm)

134.2

☒ QA/QC OK

+ 18.6 Silica Gel (gm)

18.6

☒ QA/QC OK

152.8 Total Vlc (gm)

152.8

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	488.2	460.8	27.4
Impinger 2	100 ml 0.1N H2SO4	616.6	541.0	75.6
Impinger 3	100 ml 0.1N H2SO4	578.7	554.5	24.2
Impinger 4	Empty	531.2	523.9	7.3
Impinger 5	Silica Gel	774.6	761.1	13.5
Impinger 6				
Impinger 7				
Impinger 8				

134.5 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

134.5 Net Liquid (gm)

134.5

☒ QA/QC OK

+ 13.5 Silica Gel (gm)

13.5

☒ QA/QC OK

148.0 Total Vlc (gm)

148.0

☒ 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)

Field Data Printout

Test Method: USEPA Method 26A
Analyte: HCl

Location: Unit 1 FF Outlet
Test Run: 1
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000

Meter Operator: N. Hitchins 569
Probe Operator:

Test Date: 3/22/11

Start Time: 07:36

Stop Time: 08:36

Leak Rate Before: 0.003 cfm @ 15 "Hg

Leak Rate After: 0.001 cfm @ 6 "Hg

Bar. Press. (in. Hg): 30.20

Static P: -11.4

O₂ (dry volume %): 10.13

CO₂ (dry volume %): 9.42

N₂+CO (dry volume %): 80.45

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): 222.1

H₂O (silica, g): 16.1

Actual Moisture (%): 21.49

Meter Box ID. No: 66-24

Meter ΔH@: 1.76390

Meter Y_a: 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		√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
	0.0			413.155		T _{m-in} (°F)	T _{m-out} (°F)			
3-01	5.0		1.50	416.680	309	68	67		3.53	
3-01	10.0		1.50	420.130	308	68	67		3.45	
3-01	15.0		1.50	423.560	308	72	67		3.43	
3-01	20.0		1.50	427.040	308	76	68		3.48	
3-01	25.0		1.50	430.530	309	78	69		3.49	
3-01	30.0		1.50	433.980	308	80	70		3.45	
3-01	35.0		1.50	437.430	308	81	71		3.45	
3-01	40.0		1.50	440.900	307	83	71		3.47	
3-01	45.0		1.50	444.360	306	85	73		3.46	
3-01	50.0		1.50	447.820	306	85	74		3.46	
3-01	55.0		1.50	451.300	307	86	75		3.48	
3-01	60.0		1.50	454.770	308	87	76		3.47	
Final	60.0		1.50000	41.61500	307.66667	74.87500		0.00000	41.61500	

3 points sampled

QC-Check: Field Averages

-Sq. R/L ΔP

1.5000	41.6150	307.6667	74.8750

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

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Field Data Printout

Test Method: USEPA Method 26A
Analyte: HCl

Location: Unit 1 FF Outlet
Test Run: 2
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator: N. Hitchins 569
Test Date: 3/22/11
Start Time: 09:40
Stop Time: 10:40
Leak Rate Before: 0.004 cfm @ 15 "Hg
Leak Rate After: 0.001 cfm @ 7 "Hg

Bar. Press. (in. Hg): 30.20
Static P: -11.5
O₂ (dry volume %): 9.08
CO₂ (dry volume %): 10.34
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 grm): 223.3
H₂O (silica, g): 18.0
Actual Moisture (%): 21.85

Meter Box ID. No: 66-24
Meter ΔH@: 1.76390
Meter Y_g: 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} T _{m-out} (°F) (°F)		√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
	0.0			456.195						
4-01	5.0		1.50	459.710	308	84	82		3.51	
4-01	10.0		1.50	463.180	308	88	82		3.47	
4-01	15.0		1.50	466.660	307	90	82		3.48	
4-01	20.0		1.50	470.170	307	92	83		3.51	
4-01	25.0		1.50	473.710	307	92	83		3.54	
4-01	30.0		1.50	477.250	308	93	83		3.54	
4-01	35.0		1.50	480.790	307	93	84		3.54	
4-01	40.0		1.50	484.360	307	93	84		3.57	
4-01	45.0		1.50	487.900	308	94	84		3.54	
4-01	50.0		1.50	491.430	307	94	85		3.53	
4-01	55.0		1.50	494.920	307	94	85		3.49	
4-01	60.0		1.50	498.440	307	94	85		3.52	
Final	60.0		1.50000	42.24500	307.33333	87.62500		0.00000	42.24500	

4 points sampled
QC-Check: Field Averages

Sq.Rt. ΔP	1.5000	42.2450	307.3333	87.6250
☐ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

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Field Data Printout

Test Method: USEPA Method 26A
Analyte: HCl

Location: Unit 1 FF Outlet
Test Run: 3
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator:
Test Date: 3/22/11
Start Time: 11:02
Stop Time: 12:02
Leak Rate Before: 0.004 cfm @ 15 "Hg
Leak Rate After: 0.001 cfm @ 6 "Hg

Bar. Press. (in. Hg): 30.20
Static P: -11.0
O₂ (dry volume %): 9.16
CO₂ (dry volume %): 10.34
N₂+CO (dry volume %): 80.50

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): 213.9
H₂O (silica, g): 19.1
Actual Moisture (%): 21.45

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} T _{m-out} (°F) (°F)		√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
	0.0			499.160						
3-01	5.0		1.50	502.690	306	87	84		3.53	
3-01	10.0		1.50	506.190	306	89	84		3.50	
3-01	15.0		1.50	509.690	307	92	84		3.50	
3-01	20.0		1.50	513.120	306	93	85		3.43	
3-01	25.0		1.50	516.630	308	94	85		3.51	
3-01	30.0		1.50	520.140	307	94	85		3.51	
3-01	35.0		1.50	523.700	306	95	86		3.56	
3-01	40.0		1.50	527.190	306	95	86		3.49	
3-01	45.0		1.50	530.650	307	95	86		3.46	
3-01	50.0		1.50	534.150	306	96	87		3.50	
3-01	55.0		1.50	537.620	306	96	86		3.47	
3-01	60.0		1.50	541.065	303	96	87		3.45	
Final	60.0		1.50000	41.90500	306.16667	89.45833		0.00000	41.90500	

3 points sampled
QC-Check: Field Averages

Sq. Rt. ΔP	1.5000	41.9050	306.1667	89.4583

☐ 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 North 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 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:		9.42000		10.13000	80.45000	29.91240	1.14331	☒ Fo value within expected range.
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.34000		9.08000	80.58000	30.01760	1.14313	☒ Fo value within expected range.
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.34000		9.16000	80.50000	30.02080	1.13540	☒ 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 North Broward, Inc.

Project No: 11182

Test Method: USEPA Method 26A

Analyte: HCl

Analyst: R. Vicere

Analyst Emp No: 563

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	517.4	456.1	61.3
Impinger 2	100 ml 0.1N H2SO4	672.8	555.7	117.1
Impinger 3	100 ml 0.1N H2SO4	585.5	549.8	35.7
Impinger 4	Empty	450.0	442.0	8.0
Impinger 5	Silica Gel	739.4	723.3	16.1
Impinger 6				
Impinger 7				
Impinger 8				

222.1 Liquid (gm) Field Data Check

0.0 less rinse (gm)

222.1 Net Liquid (gm) 222.1

+ 16.1 Silica Gel (gm) 16.1

238.2 Total Vlc (gm) 238.2

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	509.2	451.6	57.6
Impinger 2	100 ml 0.1N H2SO4	658.6	541.6	117.0
Impinger 3	100 ml 0.1N H2SO4	590.5	549.7	40.8
Impinger 4	Empty	434.2	426.3	7.9
Impinger 5	Silica Gel	773.3	755.3	18.0
Impinger 6				
Impinger 7				
Impinger 8				

223.3 Liquid (gm) Field Data Check

0.0 less rinse (gm)

223.3 Net Liquid (gm) 223.3

+ 18.0 Silica Gel (gm) 18.0

241.3 Total Vlc (gm) 241.3

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	505.6	452.7	52.9
Impinger 2	100 ml 0.1N H2SO4	615.7	522.8	92.9
Impinger 3	100 ml 0.1N H2SO4	583.5	534.4	49.1
Impinger 4	Empty	463.6	444.6	19.0
Impinger 5	Silica Gel	750.6	731.5	19.1
Impinger 6				
Impinger 7				
Impinger 8				

213.9 Liquid (gm) Field Data Check

0.0 less rinse (gm)

213.9 Net Liquid (gm) 213.9

+ 19.1 Silica Gel (gm) 19.1

233.0 Total Vlc (gm) 233.0

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 OK

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Field Data Printout

Test Method: USEPA Method 5/29
Analyte: Particulate/Metals

Location: Unit 2 FF Outlet
Test Run: 1
Client: Wheelabrator North 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:	-10.8
O ₂ (dry volume %):	8.13
CO ₂ (dry volume %):	11.09
N ₂ +CO (dry volume %):	80.78

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:	3/24/11		
Start Time:	06:28		
Stop Time:	08:38		
Leak Rate Before:	0.003	cfm	@ 12 "Hg
Leak Rate After:	0.003	cfm	@ 10 "Hg

H₂O (condensate, ml or gm): 361.4
H₂O (silica, g): 16.1
Actual Moisture (%): 21.60

Meter Box ID. No:	66-21
Meter $\Delta H@$:	1.82520
Meter Y_d :	0.98370

Traverse Point	Run Time	Pitot	Sample	Metered	Stack	Dry Gas Meter		ΔP_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)	(in. H ₂ O)	(ft ³)	(%)
5-01	5.0	0.34	0.90	408.710	307	65	65	0.58	2.69	105.2
5-02	10.0	0.35	0.93	411.420	307	66	65	0.59	2.71	104.4
5-03	15.0	0.33	0.88	414.040	306	68	65	0.57	2.62	103.7
5-04	20.0	0.31	0.82	416.590	306	70	66	0.56	2.55	103.8
5-05	25.0	0.31	0.82	419.125	307	71	67	0.56	2.54	103.1
LEAK CHECK	25.0			419.165						
4-01	30.0	0.33	0.88	421.800	306	69	66	0.57	2.63	104.1
4-02	35.0	0.34	0.90	424.450	306	72	67	0.58	2.65	102.7
4-03	40.0	0.35	0.93	427.170	306	74	67	0.59	2.72	103.7
4-04	45.0	0.33	0.88	429.830	307	74	67	0.57	2.66	104.5
4-05	50.0	0.28	0.74	432.260	306	73	68	0.53	2.43	103.6
LEAK CHECK	50.0			432.285						
3-01	55.0	0.35	0.93	435.020	307	75	68	0.59	2.73	104.2
3-02	60.0	0.35	0.93	437.740	306	76	69	0.59	2.72	103.4
3-03	65.0	0.33	0.88	440.370	305	77	69	0.57	2.63	102.7
3-04	70.0	0.34	0.90	443.040	306	77	70	0.58	2.67	102.7
3-05	75.0	0.34	0.90	445.735	306	77	70	0.58	2.69	103.7
LEAK CHECK	75.0			445.785						
2-01	80.0	0.34	0.90	448.470	305	76	70	0.58	2.69	103.3
2-02	85.0	0.37	0.98	451.270	305	76	71	0.61	2.80	103.2
2-03	90.0	0.40	1.10	454.190	305	77	71	0.63	2.92	103.5
2-04	95.0	0.36	0.95	456.950	306	77	71	0.60	2.76	103.1
2-05	100.0	0.36	0.95	459.730	307	79	71	0.60	2.78	103.7
LEAK CHECK	100.0			459.775						
1-01	105.0	0.20	0.53	461.790	296	77	72	0.45	2.02	100.1
1-02	110.0	0.22	0.58	463.950	296	77	72	0.47	2.16	102.4
1-03	115.0	0.30	0.80	466.480	304	75	72	0.55	2.53	103.5
1-04	120.0	0.34	0.90	469.150	306	77	72	0.58	2.67	102.5
1-05	125.0	0.34	0.90	471.880	307	77	72	0.58	2.73	104.9
Final	125.0		0.87240	65.70000	305.24000	71.50000		0.57173	65.70000	

25 points sampled:

Sq.Rt.ΔP

QC-Check: Field Averages

0.5717

0.8724

65.

000

305.2400

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2RSD = 8.0%

☒ Avg. O☒ Avg. C☒ Avg.

OK

☒ Avg. OK

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Field Data Printout

Test Method: USEPA Method 5/29
Analyte: Particulate/Metals

Location: Unit 2 FF Outlet
Test Run: 2
Client: Wheelabrator North 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: -10.6
O₂ (dry volume %): 8.28
CO₂ (dry volume %): 11.02
N₂+CO (dry volume %): 80.70

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: 3/24/11
Start Time: 08:53
Stop Time: 11:03
Leak Rate Before: 0.005 cfm @ 12 "Hg
Leak Rate After: 0.003 cfm @ 10 "Hg

H₂O (condensate, ml or gm): 384.2
H₂O (silica, g): 19.6
Actual Moisture (%): 21.78

Meter Box ID. No: 66-21
Meter ΔH@: 1.82520
Meter Y_d: 0.98370

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			472.120						
5-01	5.0	0.33	0.88	474.820	307	75	74	0.57	2.70	105.5
5-02	10.0	0.33	0.88	477.510	306	76	73	0.57	2.69	105.0
5-03	15.0	0.33	0.88	480.160	305	78	73	0.57	2.65	103.2
5-04	20.0	0.37	0.98	482.970	307	78	74	0.61	2.81	103.4
5-05	25.0	0.35	0.93	485.735	307	79	74	0.59	2.76	104.5
LEAK CHECK	25.0			485.775						
4-01	30.0	0.43	1.10	488.660	306	79	75	0.66	2.89	98.3
4-02	35.0	0.42	1.10	491.550	308	80	75	0.65	2.89	99.6
4-03	40.0	0.40	1.10	494.480	307	81	76	0.63	2.93	103.3
4-04	45.0	0.38	1.00	497.300	308	82	76	0.62	2.82	101.9
4-05	50.0	0.40	1.10	500.240	308	82	76	0.63	2.94	103.6
LEAK CHECK	50.0			500.275						
3-01	55.0	0.37	0.98	503.100	307	81	77	0.61	2.83	103.4
3-02	60.0	0.37	0.98	505.920	307	84	77	0.61	2.82	102.9
3-03	65.0	0.35	0.93	508.680	306	84	78	0.59	2.76	103.4
3-04	70.0	0.35	0.93	511.450	307	85	79	0.59	2.77	103.6
3-05	75.0	0.33	0.88	514.120	306	86	79	0.57	2.67	102.7
LEAK CHECK	75.0			514.155						
2-01	80.0	0.37	0.98	517.020	306	86	81	0.61	2.87	103.9
2-02	85.0	0.37	0.98	519.840	307	86	81	0.61	2.82	102.3
2-03	90.0	0.40	1.10	522.780	305	87	81	0.63	2.94	102.4
2-04	95.0	0.45	1.20	525.900	307	86	81	0.67	3.12	102.7
2-05	100.0	0.45	1.20	529.000	307	88	83	0.67	3.10	101.7
LEAK CHECK	100.0			529.035						
1-01	105.0	0.31	0.82	531.610	305	88	83	0.56	2.58	101.6
1-02	110.0	0.31	0.82	534.160	304	86	83	0.56	2.55	100.7
1-03	115.0	0.40	1.10	537.080	304	88	83	0.63	2.92	101.4
1-04	120.0	0.41	1.10	540.040	306	89	84	0.64	2.96	101.5
1-05	125.0	0.43	1.10	542.990	307	89	84	0.66	2.95	98.8
Final	125.0			70.72500	306.40000	80.86000		0.61261	70.72500	

25 points sampled
QC-Check: Field Averages

Sq.Rt.A.P				
0.6126	1.0020	70.7250	306.4000	80.8600
☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

2RSD = 6.8%

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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 North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000

Meter Operator: P. Bihun 505
Probe Operator: P. Bihun 505

Test Date: 3/24/11
Start Time: 11:19
Stop Time: 14:30
Leak Rate Before: 0.002 cfm @ 13 "Hg
Leak Rate After: 0.002 cfm @ 10 "Hg

Bar. Press. (in. Hg): 30.00
Static P: -11.1
O₂ (dry volume %): 7.62
CO₂ (dry volume %): 11.61
N₂+CO (dry volume %): 80.77

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): 379.4
H₂O (silica, g): 12.9
Actual Moisture (%): 22.18

Meter Box ID. No: 66-21
Meter ΔH@: 1.82520
Meter Y_d: 0.98370

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			543.245						
5-01	5.0	0.37	0.98	546.150	306	87	85	0.61	2.90	105.5
5-02	10.0	0.36	0.95	548.910	306	90	86	0.60	2.76	101.2
5-03	15.0	0.35	0.93	551.670	305	91	86	0.59	2.76	102.5
5-04	20.0	0.38	1.00	554.540	305	91	87	0.62	2.87	102.2
5-05	25.0	0.34	0.90	557.270	307	93	88	0.58	2.73	102.6
LEAK CHECK	25.0			557.300						
4-01	30.0	0.40	1.10	560.280	305	93	88	0.63	2.98	103.2
4-02	35.0	0.38	1.00	563.150	306	94	89	0.62	2.87	101.8
4-03	40.0	0.31	0.82	565.750	305	94	90	0.56	2.60	101.9
4-04	45.0	0.30	0.80	568.280	306	94	90	0.55	2.53	100.9
4-05	50.0	0.28	0.74	570.735	307	94	89	0.53	2.46	101.5
LEAK CHECK	50.0			570.770						
3-01	55.0	0.35	0.93	573.540	306	93	90	0.59	2.77	102.4
3-02	60.0	0.35	0.93	576.290	306	94	90	0.59	2.75	101.6
3-03	65.0	0.33	0.88	579.000	305	92	89	0.57	2.71	103.3
3-04	70.0	0.30	0.80	581.560	306	91	89	0.55	2.56	102.4
3-05	75.0	0.32	0.85	584.190	307	92	89	0.57	2.63	101.9
LEAK CHECK	75.0			584.240						
2-01	80.0	0.47	1.30	587.510	306	93	89	0.69	3.27	104.5
2-02	85.0	0.43	1.10	590.460	306	94	90	0.66	2.95	98.3
2-03	90.0	0.40	1.10	593.410	307	95	90	0.63	2.95	101.9
2-04	95.0	0.37	0.98	596.250	306	97	91	0.61	2.84	101.6
2-05	100.0	0.35	0.93	599.030	307	97	92	0.59	2.78	102.3
LEAK CHECK	100.0			599.070						
1-01	105.0	0.22	0.58	601.250	303	96	92	0.47	2.18	100.9
1-02	110.0	0.23	0.61	603.500	303	97	92	0.48	2.25	101.8
1-03	115.0	0.32	0.85	606.130	304	96	92	0.57	2.63	101.1
1-04	120.0	0.37	0.98	609.000	305	96	92	0.61	2.87	102.7
1-05	125.0	0.37	0.98	611.870	306	96	92	0.61	2.87	102.7
Final	125.0		0.92080	68.47000	305.64000	91.54000		0.58630	68.47000	

25 points sampled
QC-Check: Field Averages

Sq. Root ΔP _s	0.5863	0.9208	68.4700	305.6400	91.5400
☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

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USEPA Method 3 Laboratory Data

Location: Unit 2 FF Outlet
 Client: Wheelabrator North 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:		11.09000		8.13000	80.78000	30.09960	1.15149	☒ Fo value within expected range.
2	1							
	2							
	3							
Avg.								
CEM or Other Avg:		11.02000		8.28000	80.70000	30.09440	1.14519	☒ Fo value within expected range.
3	1							
	2							
	3							
Avg.								
CEM or Other Avg:		11.61000		7.62000	80.77000	30.16240	1.14384	☒ 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 North 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	666.2	449.5	216.7		
Impinger 2	5%HNO3/10%H2O2	668.3	564.0	104.3		
Impinger 3	5%HNO3/10%H2O2	592.5	565.1	27.4		
Impinger 4	Empty	457.8	449.5	8.3		
Impinger 5	4%KMnO4/10%H2SO4	540.6	532.4	8.2		
Impinger 6	4%KMnO4/10%H2SO4	533.5	537.0	-3.5	361.4 Liquid (gm)	Field Data Check
Impinger 7	Silica Gel	729.9	713.8	16.1	0.0 less rinse (gm)	
Impinger 8					361.4 Net Liquid (gm)	361.4 ☒ QA/QC OK
					+ 16.1 Silica Gel (gm)	16.1 ☒ QA/QC OK
					377.5 Total Vlc (gm)	377.5 ☒ QA/QC OK
	Rinse:		(ml or gm)			

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	Empty	638.0	433.1	204.9		
Impinger 2	5%HNO3/10%H2O2	693.2	568.7	124.5		
Impinger 3	5%HNO3/10%H2O2	565.7	527.1	38.6		
Impinger 4	Empty	439.1	429.1	10.0		
Impinger 5	4%KMnO4/10%H2SO4	546.9	540.5	6.4		
Impinger 6	4%KMnO4/10%H2SO4	551.4	551.6	-0.2	384.2 Liquid (gm)	Field Data Check
Impinger 7	Silica Gel	771.8	752.2	19.6	0.0 less rinse (gm)	
Impinger 8					384.2 Net Liquid (gm)	384.2 ☒ QA/QC OK
					+ 19.6 Silica Gel (gm)	19.6 ☒ QA/QC OK
					403.8 Total Vlc (gm)	403.8 ☒ QA/QC OK
	Rinse:		(ml or gm)			

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	Empty	678.7	437.1	241.6		
Impinger 2	5%HNO3/10%H2O2	647.4	535.6	111.8		
Impinger 3	5%HNO3/10%H2O2	555.7	532.8	22.9		
Impinger 4	Empty	439.4	437.1	2.3		
Impinger 5	4%KMnO4/10%H2SO4	546.5	544.6	1.9		
Impinger 6	4%KMnO4/10%H2SO4	603.5	604.6	-1.1	379.4 Liquid (gm)	Field Data Check
Impinger 7	Silica Gel	822.2	809.3	12.9	0.0 less rinse (gm)	
Impinger 8					379.4 Net Liquid (gm)	379.4 ☒ QA/QC OK
					+ 12.9 Silica Gel (gm)	12.9 ☒ QA/QC OK
					392.3 Total Vlc (gm)	392.3 ☒ 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)	
					Total Vlc (gm)	
	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 North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000

Meter Operator: N. Hitchins 569
Probe Operator: B. Arnold 770

Test Date: 3/23/11

Start Time: 11:32

Stop Time: 12:45

Leak Rate Before: 0.004 cfm @ 15 "Hg

Leak Rate After: 0.002 cfm @ 6 "Hg

Bar. Press. (in. Hg): 30.10

Static P: -10.4

O₂ (dry volume %): 9.05

CO₂ (dry volume %): 10.43

N₂+CO (dry volume %): 80.52

Nozzle ID No: 274-1

Nozzle Diameter (D_n): 0.274

Probe ID No: 67-8-20

Pitot C_p: 0.818

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 192.1

H₂O (silica, g): 12.8

Actual Moisture (%): 20.95

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} T _{m-out} (°F) (°F)		√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
	0.0			287.420						
5-01	2.5	0.40	1.10	288.960	308	83	81	0.63	1.54	105.4
5-02	5.0	0.37	0.98	290.380	307	83	81	0.61	1.42	101.0
5-03	7.5	0.40	1.10	291.840	307	83	82	0.63	1.46	99.8
5-04	10.0	0.43	1.10	293.360	309	85	82	0.66	1.52	100.2
5-05	12.5	0.43	1.10	294.890	308	85	83	0.66	1.53	100.7
LEAK CHECK	12.5			294.950						
4-01	15.0	0.41	1.10	296.450	306	86	82	0.64	1.50	100.9
4-02	17.5	0.42	1.10	297.980	308	87	82	0.65	1.53	101.8
4-03	20.0	0.42	1.10	299.480	308	88	83	0.65	1.50	99.6
4-04	22.5	0.42	1.10	300.980	308	89	83	0.65	1.50	99.5
4-05	25.0	0.39	1.00	302.415	308	90	84	0.62	1.44	98.6
LEAK CHECK	25.0			302.545						
3-01	27.5	0.33	0.87	303.900	306	90	84	0.57	1.35	101.0
3-02	30.0	0.46	1.20	305.440	308	91	85	0.68	1.54	97.3
3-03	32.5	0.46	1.20	306.990	308	91	85	0.68	1.55	97.9
3-04	35.0	0.43	1.10	308.500	308	92	85	0.66	1.51	98.5
3-05	37.5	0.41	1.10	310.020	309	91	85	0.64	1.52	101.7
LEAK CHECK	37.5			310.240						
2-01	40.0	0.56	1.50	312.100	307	87	84	0.75	1.86	107.0
2-02	42.5	0.54	1.40	313.680	308	88	85	0.73	1.58	92.4
2-03	45.0	0.47	1.20	315.250	308	89	85	0.69	1.57	98.3
2-04	47.5	0.46	1.20	316.790	307	89	85	0.68	1.54	97.4
2-05	50.0	0.46	1.20	318.340	307	88	83	0.68	1.55	98.3
LEAK CHECK	50.0			318.515						
1-01	52.5	0.24	0.64	319.515	303	86	83	0.49	1.00	87.6*
1-02	55.0	0.27	0.72	321.120	305	86	83	0.52	1.61	132.8*
1-03	57.5	0.36	0.95	322.260	301	86	83	0.60	1.14	81.5*
1-04	60.0	0.62	1.60	324.040	307	87	83	0.79	1.78	97.4
1-05	62.5	0.64	1.70	325.895	309	87	83	0.80	1.85	100.1
Final	62.5		1.13440	37.89000	307.12000	85.42000		0.65371	37.89000	

25 points sampled

Sq. Rt. ΔP

QC-Check: Field Averages

0.6537 1.1344 37.8900 307.1200 85.4200

☒ 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 North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator: B. Arnold 770
Test Date: 3/23/11
Start Time: 13:07
Stop Time: 14:17
Leak Rate Before: 0.003 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 8 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -10.7
O₂ (dry volume %): 9.13
CO₂ (dry volume %): 10.46
N₂+CO (dry volume %): 80.41

Nozzle ID No: 274-1
Nozzle Diameter (D_n): 0.274
Probe ID No: 67-8-20
Pitot C_p: 0.818
Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 209.8
H₂O (silica, g): 15.3
Actual Moisture (%): 21.86

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) (%)
	0.0			326.365						
1-01	2.5	0.20	0.54	327.410	302	83	82	0.45	1.05	101.6
1-02	5.0	0.27	0.72	328.620	304	83	82	0.52	1.21	101.4
1-03	7.5	0.37	1.00	330.040	302	83	82	0.61	1.42	101.7
1-04	10.0	0.53	1.40	331.700	307	84	79	0.73	1.66	99.8
1-05	12.5	0.58	1.60	333.535	308	85	82	0.76	1.84	105.2
LEAK CHECK	12.5			333.870						
2-01	15.0	0.57	1.50	335.630	308	85	82	0.75	1.76	101.8
2-02	17.5	0.58	1.60	337.410	307	85	82	0.76	1.78	102.0
2-03	20.0	0.49	1.30	339.030	308	86	82	0.70	1.62	100.9
2-04	22.5	0.51	1.40	340.700	308	86	82	0.71	1.67	102.0
2-05	25.0	0.50	1.40	342.375	308	87	81	0.71	1.68	103.3
LEAK CHECK	25.0			342.530						
3-01	27.5	0.60	1.60	344.350	308	86	82	0.77	1.82	102.5
3-02	30.0	0.49	1.30	346.020	308	87	82	0.70	1.67	103.9
3-03	32.5	0.46	1.20	347.560	308	87	82	0.68	1.54	98.9
3-04	35.0	0.42	1.10	349.110	307	87	82	0.65	1.55	104.1
3-05	37.5	0.42	1.10	350.620	308	87	82	0.65	1.51	101.5
LEAK CHECK	37.5			350.770						
4-01	40.0	0.47	1.30	352.350	304	87	82	0.69	1.58	100.1
4-02	42.5	0.47	1.30	353.970	308	87	82	0.69	1.62	102.9
4-03	45.0	0.46	1.20	355.530	308	88	82	0.68	1.56	100.1
4-04	47.5	0.42	1.10	357.040	308	87	82	0.65	1.51	101.5
4-05	50.0	0.39	1.10	358.550	307	88	83	0.62	1.51	105.0
LEAK CHECK	50.0			358.745						
5-01	52.5	0.44	1.20	360.290	307	86	82	0.66	1.55	101.5
5-02	55.0	0.45	1.20	361.810	308	87	82	0.67	1.52	98.7
5-03	57.5	0.47	1.30	363.410	308	87	82	0.69	1.60	101.7
5-04	60.0	0.42	1.10	364.950	309	88	82	0.65	1.54	103.4
5-05	62.5	0.42	1.10	366.520	308	88	83	0.65	1.57	105.3
Final	62.5									
25 points sampled										
QC-Check: Field Averages		Sq.Rt.ΔP								
		0.6722	1.2264	39.3200	307.0400	84.0400		0.67154	39.32000	

☒ 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: 3
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator: B. Arnold 770
Test Date: 3/23/11
Start Time: 14:39
Stop Time: 15:45
Leak Rate Before: 0.004 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 9 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -10.7
O₂ (dry volume %): 8.60
CO₂ (dry volume %): 11.06
N₂+CO (dry volume %): 80.34

Nozzle ID No: 274-1
Nozzle Diameter (D_n): 0.274
Probe ID No: 67-8-20
Pitot C_p: 0.818
Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 205.8
H₂O (silica, g): 12.1
Actual Moisture (%): 21.99

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			367.295						
5-01	2.5	0.45	1.20	368.900	307	82	81	0.67	1.60	105.0
5-02	5.0	0.47	1.30	370.510	308	82	81	0.69	1.61	103.1
5-03	7.5	0.45	1.20	372.060	308	83	81	0.67	1.55	101.3
5-04	10.0	0.47	1.30	373.680	307	83	81	0.69	1.62	103.6
5-05	12.5	0.42	1.10	375.225	308	84	81	0.65	1.55	104.4
LEAK CHECK	12.5			375.430						
4-01	15.0	0.44	1.20	377.030	308	83	81	0.66	1.60	105.8
4-02	17.5	0.46	1.20	378.600	307	84	80	0.68	1.57	101.5
4-03	20.0	0.42	1.10	380.110	307	85	81	0.65	1.51	101.9
4-04	22.5	0.43	1.20	381.650	308	85	81	0.66	1.54	102.8
4-05	25.0	0.37	1.00	383.120	302	84	80	0.61	1.47	105.5
LEAK CHECK	25.0			383.280						
3-01	27.5	0.30	0.81	384.550	305	83	80	0.55	1.27	101.5
3-02	30.0	0.40	1.10	386.080	307	83	80	0.63	1.53	106.1
3-03	32.5	0.42	1.10	387.560	307	84	80	0.65	1.48	100.1
3-04	35.0	0.40	1.10	389.040	307	84	80	0.63	1.48	102.5
3-05	37.5	0.40	1.10	390.535	308	84	80	0.63	1.50	103.6
LEAK CHECK	37.5			390.725						
2-01	40.0	0.57	1.50	392.430	306	83	79	0.75	1.70	99.2
2-02	42.5	0.50	1.40	394.160	309	84	80	0.71	1.73	107.4
2-03	45.0	0.48	1.30	395.790	308	84	80	0.69	1.63	103.2
2-04	47.5	0.43	1.20	397.360	308	85	79	0.66	1.57	105.0
2-05	50.0	0.37	1.00	398.785	308	85	80	0.61	1.43	102.6
LEAK CHECK	50.0			398.950						
1-01	52.5	0.37	1.00	400.350	303	83	79	0.61	1.40	100.8
1-02	55.0	0.25	0.68	401.650	304	84	79	0.50	1.30	113.7*
1-03	57.5	0.33	0.89	402.730	304	83	79	0.57	1.08	82.3*
1-04	60.0	0.38	1.00	404.170	307	83	80	0.62	1.44	102.4
1-05	62.5	0.38	1.00	405.650	307	83	79	0.62	1.48	105.4
Final	62.5		1.11920	37.63500	306.72000	81.84000		0.64169	37.63500	

25 points sampled

QC-Check: Field Averages

Sq.Rt.ΔP	0.6417	1.1192	37.6350	306.7200	81.8400

☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

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USEPA Method 3 Laboratory Data

Location: Unit 2 FF Outlet
 Client: Wheelabrator North 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:		10.43000		9.05000	80.52000	30.03080	1.13615	☒ Fo value within expected range.
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.46000		9.13000	80.41000	30.03880	1.12524	☒ Fo value within expected range.
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		11.06000		8.60000	80.34000	30.11360	1.11212	☒ 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 North 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	672.6	546.2	126.4
Impinger 2	DI Water	604.6	550.7	53.9
Impinger 3	Empty	455.6	443.8	11.8
Impinger 4	Silica Gel	764.7	751.9	12.8
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

192.1 Liquid (gm) Field Data Check

0.0 less rinse (gm)

192.1 Net Liquid (gm)

+ 12.8 Silica Gel (gm)

204.9 Total Vlc (gm)

192.1

☒ QA/QC OK

12.8

☒ QA/QC OK

204.9

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	DI Water	760.9	636.1	124.8
Impinger 2	DI Water	618.7	547.1	71.6
Impinger 3	Empty	469.6	456.2	13.4
Impinger 4	Silica Gel	749.5	734.2	15.3
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

209.8 Liquid (gm) Field Data Check

0.0 less rinse (gm)

209.8 Net Liquid (gm)

+ 15.3 Silica Gel (gm)

225.1 Total Vlc (gm)

209.8

☒ QA/QC OK

15.3

☒ QA/QC OK

225.1

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	DI Water	694.3	546.0	148.3
Impinger 2	DI Water	599.8	549.2	50.6
Impinger 3	Empty	450.5	443.6	6.9
Impinger 4	Silica Gel	778.0	765.9	12.1
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

205.8 Liquid (gm) Field Data Check

0.0 less rinse (gm)

205.8 Net Liquid (gm)

+ 12.1 Silica Gel (gm)

217.9 Total Vlc (gm)

205.8

☒ QA/QC OK

12.1

☒ QA/QC OK

217.9

☒ 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)

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LML

Field Data Printout

Test Method: USEPA Method 26A
Analyte: HCl

Location: Unit 2 SDA Inlet
Test Run: 1
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 60.13205
Meter Operator: B. Arnold 770
Probe Operator:

Bar. Press. (in. Hg): 30.10
Static P: -1.2
O₂ (dry volume %): 7.95
CO₂ (dry volume %): 11.29
N₂+CO (dry volume %): 80.76

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-5
Pitot C_p: NA
Pitot Leak Check: ☒ Pass ☐ Fail

Test Date: 3/23/11
Start Time: 07:12
Stop Time: 08:12
Leak Rate Before: 0.003 cfm @ 15 "Hg
Leak Rate After: 0.003 cfm @ 17 "Hg

H₂O (condensate, ml or gm): 140.5
H₂O (silica, g): 15.2
Actual Moisture (%): 16.95

Meter Box ID. No: 66-14
Meter ΔH@: 1.75710
Meter Y_d: 0.98820

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			73.220						
1-01	5.0		1.20	76.320	483	66	65		3.10	
1-01	10.0		1.20	79.350	485	68	65		3.03	
1-01	15.0		1.20	82.340	486	70	65		2.99	
1-01	20.0		1.20	85.360	488	72	66		3.02	
1-01	25.0		1.20	88.370	489	75	67		3.01	
1-01	30.0		1.20	91.370	491	76	68		3.00	
1-01	35.0		1.20	94.380	491	77	69		3.01	
1-01	40.0		1.20	97.410	496	78	70		3.03	
1-01	45.0		1.20	100.450	495	78	70		3.04	
1-01	50.0		1.20	103.470	493	78	71		3.02	
1-01	55.0		1.20	106.450	495	78	71		2.98	
1-01	60.0		1.20	109.475	494	79	72		3.02	
Final	60.0		1.20000	36.25500	490.50000	71.41667		0.00000	36.25500	

1 points sampled
QC-Check: Field Averages

Sq.Rt. ΔP	1.2000	36.2550	490.5000	71.4166
☐ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

041811 134837
L

Field Data Printout

Test Method: USEPA Method 26A
Analyte: HCl

Location: Unit 2 SDA Inlet
Test Run: 2
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 60.13205
Meter Operator: B. Arnold 770
Probe Operator:

Bar. Press. (in. Hg): 30.10
Static P: -1.2
O₂ (dry volume %): 8.16
CO₂ (dry volume %): 11.00
N₂+CO (dry volume %): 80.84

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-5
Pitot C_p: NA
Pitot Leak Check: ☒ Pass ☐ Fail

Test Date: 3/23/11
Start Time: 08:38
Stop Time: 09:38
Leak Rate Before: 0.002 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 16 "Hg

H₂O (condensate, ml or gm): 136.0
H₂O (silica, g): 8.9
Actual Moisture (%): 16.10

Meter Box ID. No: 66-14
Meter ΔH@: 1.75710
Meter Y_d: 0.98820

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			109.670						
1-01	5.0		1.20	112.650	498	74	72		2.98	
1-01	10.0		1.20	115.630	495	76	72		2.98	
1-01	15.0		1.20	118.650	496	79	73		3.02	
1-01	20.0		1.20	121.660	494	81	73		3.01	
1-01	25.0		1.20	124.680	495	81	74		3.02	
1-01	30.0		1.20	127.700	496	82	74		3.02	
1-01	35.0		1.20	130.720	494	82	75		3.02	
1-01	40.0		1.20	133.800	495	83	75		3.08	
1-01	45.0		1.20	136.830	494	83	76		3.03	
1-01	50.0		1.20	139.860	497	83	76		3.03	
1-01	55.0		1.20	142.890	495	83	76		3.03	
1-01	60.0		1.20	145.960	499	82	77		3.07	
Final	60.0		1.20000	36.29000	495.66667	77.58333		0.00000	36.29000	

1 points sampled
QC-Check: Field Averages

Sq.Rt.ΔP	1.2000	36.2900	495.6666	77.5833
☐ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

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K

Field Data Printout

Test Method: USEPA Method 26A
Analyte: HCl

Location: Unit 2 SDA Inlet
Test Run: 3
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 60.13205
Meter Operator: B. Arnold 770
Probe Operator:

Bar. Press. (in. Hg): 30.10
Static P: -1.6
O₂ (dry volume %): 7.86
CO₂ (dry volume %): 11.36
N₂+CO (dry volume %): 80.78

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-5
Pitot C_p: NA
Pitot Leak Check: ☒ Pass ☐ Fail

Test Date: 3/23/11
Start Time: 09:59
Stop Time: 10:59
Leak Rate Before: 0.002 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 15 "Hg

H₂O (condensate, ml or gm): 142.9
H₂O (silica, g): 15.1
Actual Moisture (%): 17.43

Meter Box ID. No: 66-14
Meter ΔH@: 1.75710
Meter Y_d: 0.98820

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) (ft ³)	Isokinetics (calculated) (%)
	0.0			146.130						
1-01	5.0		1.20	149.230	497	80	78		3.10	
1-01	10.0		1.20	152.270	500	82	79		3.04	
1-01	15.0		1.20	155.280	501	85	79		3.01	
1-01	20.0		1.20	158.330	501	87	80		3.05	
1-01	25.0		1.20	161.330	496	87	80		3.00	
1-01	30.0		1.20	164.350	498	88	80		3.02	
1-01	35.0		1.20	167.410	498	88	81		3.06	
1-01	40.0		1.20	170.460	499	88	81		3.05	
1-01	45.0		1.20	173.460	495	88	81		3.00	
1-01	50.0		1.20	176.480	495	88	81		3.02	
1-01	55.0		1.20	179.480	495	88	82		3.00	
1-01	60.0		1.20	182.500	496	88	82		3.02	
Final	60.0		1.20000	36.37000	497.58333	83.37500		0.00000	36.37000	

1 points sampled
QC-Check: Field Averages

Sq.Rt. ΔP	1.2000	36.3700	497.5833	83.3750

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

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M

USEPA Method 3 Laboratory Data

Location: Unit 2 SDA Inlet
 Client: Wheelabrator North 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 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:		11.29000		7.95000	80.76000	30.12440	1.14703	☒ Fo value within expected range.
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		11.00000		8.16000	80.84000	30.08640	1.15818	☒ Fo value within expected range.
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		11.36000		7.86000	80.78000	30.13200	1.14789	☒ 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 SDA Inlet

Client: Wheelabrator North Broward, Inc.

Project No: 11182

Test Method: USEPA Method 26A

Analyte: HCl

Analyst: D. Luckhard

Analyst Emp No: 568

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	490.3	459.6	30.7
Impinger 2	100 ml 0.1N H2SO4	626.9	564.8	62.1
Impinger 3	100 ml 0.1N H2SO4	583.0	544.8	38.2
Impinger 4	Empty	450.8	441.3	9.5
Impinger 5	Silica Gel	778.8	763.6	15.2
Impinger 6				
Impinger 7				
Impinger 8				

140.5 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

140.5 Net Liquid (gm)

140.5

☒ QA/QC OK

+ 15.2 Silica Gel (gm)

15.2

☒ QA/QC OK

155.7 Total Vlc (gm)

155.7

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	495.7	459.6	36.1
Impinger 2	100 ml 0.1N H2SO4	619.8	540.0	79.8
Impinger 3	100 ml 0.1N H2SO4	572.1	555.4	16.7
Impinger 4	Empty	528.2	524.8	3.4
Impinger 5	Silica Gel	783.2	774.3	8.9
Impinger 6				
Impinger 7				
Impinger 8				

136.0 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

136.0 Net Liquid (gm)

136.0

☒ QA/QC OK

+ 8.9 Silica Gel (gm)

8.9

☒ QA/QC OK

144.9 Total Vlc (gm)

144.9

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	492.2	460.8	31.4
Impinger 2	100 ml 0.1N H2SO4	643.3	565.7	77.6
Impinger 3	100 ml 0.1N H2SO4	572.3	543.0	29.3
Impinger 4	Empty	444.8	440.2	4.6
Impinger 5	Silica Gel	747.8	732.7	15.1
Impinger 6				
Impinger 7				
Impinger 8				

142.9 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

142.9 Net Liquid (gm)

142.9

☒ QA/QC OK

+ 15.1 Silica Gel (gm)

15.1

☒ QA/QC OK

158.0 Total Vlc (gm)

158.0

☒ 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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Field Data Printout

Test Method: USEPA Method 26A
Analyte: HCl

Location: Unit 2 FF Outlet
Test Run: 1
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator: N. Hitchins 569

Bar. Press. (in. Hg): 30.10
Static P: -9.9
O₂ (dry volume %): 8.60
CO₂ (dry volume %): 10.58
N₂+CO (dry volume %): 80.82

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-1
Pitot C_p: NA
Pitot Leak Check: ☒ Pass ☐ Fail

Test Date: 3/23/11
Start Time: 07:12
Stop Time: 08:12
Leak Rate Before: 0.002 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 7 "Hg

H₂O (condensate, ml or gm): 219.5
H₂O (silica, g): 17.6
Actual Moisture (%): 21.23

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		√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft³)	Isokinetics (calculated) (%)
	0.0			617.490		T _{m-in} (°F)	T _{m-out} (°F)			
3-01	5.0		1.50	621.270	308	72	70		3.78	
3-01	10.0		1.50	624.670	308	77	71		3.40	
3-01	15.0		1.50	628.130	308	81	72		3.46	
3-01	20.0		1.50	631.600	309	84	72		3.47	
3-01	25.0		1.50	635.050	309	86	73		3.45	
3-01	30.0		1.50	638.540	309	87	74		3.49	
3-01	35.0		1.50	642.050	309	89	75		3.51	
3-01	40.0		1.50	645.540	310	89	76		3.49	
3-01	45.0		1.50	649.120	310	89	77		3.58	
3-01	50.0		1.50	652.610	309	89	77		3.49	
3-01	55.0		1.50	656.140	309	90	78		3.53	
3-01	60.0		1.50	659.700	308	90	79		3.56	
Final	60.0		1.50000	42.21000	308.83333	79.87500		0.00000	42.21000	

3 points sampled
QC-Check: Field Averages

Sq.Rt:ΔP	1.5000	42.2100	308.8333	79.8750
☐ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

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Field Data Printout

Test Method: USEPA Method 26A
Analyte: HCl

Location: Unit 2 FF Outlet
Test Run: 2
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator:
Test Date: 3/23/11
Start Time: 08:38
Stop Time: 09:38
Leak Rate Before: 0.003 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 7 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -11.8
O₂ (dry volume %): 8.90
CO₂ (dry volume %): 10.43
N₂+CO (dry volume %): 80.67

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): 204.2
H₂O (silica, g): 16.8
Actual Moisture (%): 20.42

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)		$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{\text{in. H}_2\text{O}}$)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
	0.0			660.615						
2-01	5.0		1.50	664.150	309	82	80		3.53	
2-01	10.0		1.50	667.610	308	87	80		3.46	
2-01	15.0		1.50	671.010	308	89	80		3.40	
2-01	20.0		1.50	674.580	308	92	81		3.57	
2-01	25.0		1.50	678.050	308	93	81		3.47	
2-01	30.0		1.50	681.560	308	94	83		3.51	
2-01	35.0		1.50	684.970	308	94	83		3.41	
2-01	40.0		1.50	688.500	308	94	83		3.53	
2-01	45.0		1.50	691.900	307	94	84		3.40	
2-01	50.0		1.50	695.430	308	93	84		3.53	
2-01	55.0		1.50	698.960	308	94	85		3.53	
2-01	60.0		1.50	702.480	308	94	85		3.52	
Final	60.0		1.50000	41.86500	308.00000	87.04167		0.00000	41.86500	
2 points sampled										
QC-Check: Field Averages		Sq.RIΔP		1.5000	41.8650	308.0000		87.0417		

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

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K

Field Data Printout

Test Method: USEPA Method 26A
Analyte: HCl

Location: Unit 2 FF Outlet
Test Run: 3
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator: N. Hitchins 569

Bar. Press. (in. Hg): 30.10
Static P: -11.3
O₂ (dry volume %): 8.70
CO₂ (dry volume %): 10.56
N₂+CO (dry volume %): 80.74

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-1
Pitot C_p: NA
Pitot Leak Check: ☒ Pass ☐ Fail

Test Date: 3/23/11
Start Time: 09:59
Stop Time: 10:59
Leak Rate Before: 0.004 cfm @ 16 "Hg
Leak Rate After: 0.002 cfm @ 7 "Hg

H₂O (condensate, ml or gm): 214.4
H₂O (silica, g): 16.6
Actual Moisture (%): 21.28

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) (ft ³)	Isokinetics (calculated) (%)
	0.0			703.025						
2-01	5.0		1.50	706.850	309	89	85		3.83	
2-01	10.0		1.50	710.140	309	91	85		3.29	
2-01	15.0		1.50	713.600	308	93	85		3.46	
2-01	20.0		1.50	717.120	309	95	86		3.52	
2-01	25.0		1.50	720.500	309	95	87		3.38	
2-01	30.0		1.50	723.990	309	95	87		3.49	
2-01	35.0		1.50	727.440	308	95	87		3.45	
2-01	40.0		1.50	730.890	308	95	88		3.45	
2-01	45.0		1.50	734.330	308	95	88		3.44	
2-01	50.0		1.50	737.830	308	94	88		3.50	
2-01	55.0		1.50	741.340	309	94	87		3.51	
2-01	60.0		1.50	744.810	308	93	86		3.47	
Final	60.0		1.50000	41.78500	308.50000	90.12500		0.00000	41.78500	

2 points sampled
QC-Check: Field Averages

Sq.Rt.ΔP	1.5000	41.7850	308.5000	90.1250
☐ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

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M

USEPA Method 3 Laboratory Data

Location: Unit 2 FF Outlet
 Client: Wheelabrator North 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 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:		10.58000		8.60000	80.82000	30.03680	1.16257	☒ Fo value within expected range.
2	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.43000		8.90000	80.67000	30.02480	1.15053	☒ Fo value within expected range.
3	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.56000		8.70000	80.74000	30.03760	1.15530	☒ 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 North Broward, Inc.

Project No: 11182

Test Method: USEPA Method 26A

Analyte: HCl

Analyst: R. Vicere

Analyst Emp No:	563

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H ₂ SO ₄	499.3	457.2	42.1
Impinger 2	100 ml 0.1N H ₂ SO ₄	658.1	547.9	110.2
Impinger 3	100 ml 0.1N H ₂ SO ₄	603.4	552.9	50.5
Impinger 4	Empty	460.3	443.6	16.7
Impinger 5	Silica Gel	756.7	739.1	17.6
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)219.5 Liquid (gm) *Field Data Check*

0.0 less rinse (gm)

219.5 Net Liquid (gm)	219.5

+ 17.6 Silica Gel (gm)	17.6

237.1	Total Vlc (gm)	237.1

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	507.7	454.4	53.3
Impinger 2	100 ml 0.1N H2SO4	643.7	540.2	103.5
Impinger 3	100 ml 0.1N H2SO4	589.8	553.0	36.8
Impinger 4	Empty	438.7	428.1	10.6
Impinger 5	Silica Gel	790.0	773.2	16.8
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)204.2 Liquid (gm) *Field Data Check*

-0.0 less rinse (gm)

204.2 Net Liquid (gm)	204.2

+ 16.8 Silica Gel (gm)	16.8

221.0	Total Vlc (gm)	221.0

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H ₂ SO ₄	508.5	455.5	53.0
Impinger 2	100 ml 0.1N H ₂ SO ₄	624.0	525.0	99.0
Impinger 3	100 ml 0.1N H ₂ SO ₄	585.6	535.9	49.7
Impinger 4	Empty	459.4	446.7	12.7
Impinger 5	Silica Gel	767.1	750.5	16.6
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)214.4 Liquid (gm) *Field Data Check*

0.0 less rinse (gm)

214.4	Net Liquid (gm)	214.4

+ 16.6 Silica Gel (gm)	16.6

231.0 Total Vlc (gm)	231.0

Test Run:

Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1			
Impinger 2			
Impinger 3			
Impinger 4			
Impinger 5			
Impinger 6			
Impinger 7			
Impinger 8			

Rinse: (ml or gm)Liquid (gm) *Field Data Check*

less rinse (gm)

Net Liquid (gm)

Silica Gel (gm)

Total Vlc (gm)

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Field Data Printout

Test Method: USEPA Method 5/29
Analyte: Particulate/Metals

Location: Unit 3 FF Outlet
Test Run: 1
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: P. Bihun 505
Probe Operator: P. Bihun 505
Test Date: 3/22/11
Start Time: 06:57
Stop Time: 09:10
Leak Rate Before: 0.002 cfm @ 13 "Hg
Leak Rate After: 0.006 cfm @ 10 "Hg

Bar. Press. (in. Hg): 30.20
Static P: -10.7
O₂ (dry volume %): 9.30
CO₂ (dry volume %): 10.02
N₂+CO (dry volume %): 80.68

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): 403.0
H₂O (silica, g): 19.8
Actual Moisture (%): 20.91

Meter Box ID. No: 66-22
Meter ΔH@: 1.68920
Meter Y_d: 0.99950

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			777.160						
5-01	5.0	0.43	1.00	780.040	313	67	67	0.66	2.88	101.2
5-02	10.0	0.54	1.30	783.240	312	68	67	0.73	3.20	100.3
5-03	15.0	0.52	1.30	786.470	312	71	67	0.72	3.23	102.9
5-04	20.0	0.42	1.00	789.310	312	74	68	0.65	2.84	100.2
5-05	25.0	0.43	1.00	792.160	312	75	68	0.66	2.85	99.3
LEAK CHECK	25.0			792.230						
4-01	30.0	0.60	1.40	795.570	312	74	69	0.77	3.34	98.6
4-02	35.0	0.48	1.20	798.680	312	77	70	0.69	3.11	102.2
4-03	40.0	0.45	1.10	801.640	312	78	70	0.67	2.96	100.3
4-04	45.0	0.40	0.96	804.420	312	79	71	0.63	2.78	99.7
4-05	50.0	0.38	0.91	807.145	313	80	71	0.62	2.73	100.3
LEAK CHECK	50.0			807.185						
3-01	55.0	0.47	1.10	810.110	312	78	72	0.69	2.93	96.8
3-02	60.0	0.52	1.30	813.300	312	80	73	0.72	3.19	100.2
3-03	65.0	0.52	1.30	816.520	312	81	73	0.72	3.22	101.0
3-04	70.0	0.45	1.10	819.480	313	82	74	0.67	2.96	99.7
3-05	75.0	0.43	1.00	822.360	313	82	74	0.66	2.88	99.2
LEAK CHECK	75.0			822.395						
2-01	80.0	0.67	1.60	826.010	313	81	75	0.82	3.62	99.9
2-02	85.0	0.55	1.30	829.280	313	84	75	0.74	3.27	99.4
2-03	90.0	0.50	1.20	832.430	312	84	76	0.71	3.15	100.2
2-04	95.0	0.56	1.30	835.690	313	85	76	0.75	3.26	98.0
2-05	100.0	0.51	1.20	838.835	313	85	77	0.71	3.14	98.9
LEAK CHECK	100.0			838.880						
1-01	105.0	0.50	1.20	842.040	309	84	77	0.71	3.16	100.2
1-02	110.0	0.33	0.79	844.620	303	85	78	0.57	2.58	100.0
1-03	115.0	0.33	0.79	847.160	306	86	78	0.57	2.54	98.6
1-04	120.0	0.43	1.00	850.050	310	86	78	0.66	2.89	98.6
1-05	125.0	0.43	1.00	852.945	311	87	79	0.66	2.90	98.6
Final	125.0		1.13400	75.59500	311.48000	76.32000		0.68617	75.59500	

25 points sampled
QC-Check: Field Averages

Sq. Rt. ΔP	0.6862	1.1340	75.5950	311.4800	76.3200
☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

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Field Data Printout

Test Method: USEPA Method 5/29
Analyte: Particulate/Metals

Location: Unit 3 FF Outlet
Test Run: 2
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000

Meter Operator: P. Bihun 505
Probe Operator: P. Bihun 505

Test Date: 3/22/11

Start Time: 09:35

Stop Time: 11:50

Leak Rate Before: 0.003 cfm @ 12 "Hg
Leak Rate After: 0.003 cfm @ 10 "Hg

Bar. Press. (in. Hg): 30.20

Static P: -9.6

O₂ (dry volume %): 8.79

CO₂ (dry volume %): 10.65

N₂+CO (dry volume %): 80.56

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): 391.8

H₂O (silica, g): 15.3

Actual Moisture (%): 21.30

Meter Box ID. No: 66-22

Meter ΔH@: 1.68920

Meter Y_d: 0.99950

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			853.365						
4-01	5.0	0.42	1.00	856.260	311	81	79	0.65	2.89	100.7
4-02	10.0	0.41	1.00	859.140	311	83	80	0.64	2.88	101.2
4-03	15.0	0.48	1.20	862.260	312	86	80	0.69	3.12	101.1
4-04	20.0	0.42	1.00	865.160	313	87	80	0.65	2.90	100.4
4-05	25.0	0.41	1.00	868.030	312	88	81	0.64	2.87	100.3
LEAK CHECK	25.0			868.175						
3-01	30.0	0.46	1.10	871.150	312	88	81	0.68	2.98	98.2
3-02	35.0	0.46	1.10	874.130	311	90	82	0.68	2.98	98.0
3-03	40.0	0.43	1.00	877.020	311	90	83	0.66	2.89	98.2
3-04	45.0	0.42	1.00	879.900	311	90	83	0.65	2.88	99.0
3-05	50.0	0.37	0.90	882.635	311	91	83	0.61	2.74	100.1
LEAK CHECK	50.0			882.731						
2-01	55.0	0.67	1.60	886.360	312	89	83	0.82	3.63	99.1
2-02	60.0	0.49	1.20	889.520	311	91	84	0.70	3.16	100.5
2-03	65.0	0.48	1.20	892.680	311	92	85	0.69	3.16	101.3
2-04	70.0	0.40	0.97	895.540	313	92	85	0.63	2.86	100.5
2-05	75.0	0.39	0.95	898.350	311	93	86	0.62	2.81	99.7
LEAK CHECK	75.0			898.400						
1-01	80.0	0.22	0.53	900.470	304	89	86	0.47	2.07	97.6
1-02	85.0	0.25	0.61	902.680	303	87	85	0.50	2.21	98.0
1-03	90.0	0.37	0.90	905.390	310	88	85	0.61	2.71	99.2
1-04	95.0	0.41	1.00	908.270	311	90	86	0.64	2.88	100.0
1-05	100.0	0.41	1.00	911.175	311	90	86	0.64	2.90	100.8
LEAK CHECK	100.0			911.275						
5-01	105.0	0.47	1.10	914.240	309	89	86	0.69	2.97	96.1
5-02	110.0	0.51	1.20	917.460	312	89	86	0.71	3.22	100.4
5-03	115.0	0.46	1.10	920.430	311	92	86	0.68	2.97	97.2
5-04	120.0	0.46	1.10	923.360	312	94	87	0.68	2.93	95.7
5-05	125.0	0.41	1.00	926.250	312	94	87	0.64	2.89	99.9
Final	125.0		1.03040	72.49400	310.72000	86.56000		0.65044	72.49400	

25 points sampled

QC-Check: Field Averages

Sq. R/LΔP

0.6504 1.0304 72.4900 310.7200 86.5600

☒ 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 North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: P. Bihun 505
Probe Operator: P. Bihun 505
Test Date: 3/22/11
Start Time: 12:16
Stop Time: 14:30
Leak Rate Before: 0.005 cfm @ 12 "Hg
Leak Rate After: 0.004 cfm @ 10 "Hg

Bar. Press. (in. Hg): 30.20
Static P: -9.5
O₂ (dry volume %): 9.33
CO₂ (dry volume %): 10.14
N₂+CO (dry volume %): 80.53

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): 393.3
H₂O (silica, g): 17.4
Actual Moisture (%): 20.62

Meter Box ID. No: 66-22
Meter ΔH@: 1.68920
Meter Y_d: 0.99950

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			926.540						
1-01	5.0	0.46	1.20	929.730	311	89	89	0.68	3.19	103.5
1-02	10.0	0.43	1.10	932.660	310	91	89	0.66	2.93	98.1
1-03	15.0	0.46	1.20	935.780	309	94	90	0.68	3.12	100.6
1-04	20.0	0.45	1.10	938.780	310	96	90	0.67	3.00	97.7
1-05	25.0	0.45	1.10	941.775	313	96	90	0.67	3.00	97.7
LEAK CHECK	25.0			941.935						
5-01	30.0	0.44	1.10	944.900	312	95	91	0.66	2.97	97.7
5-02	35.0	0.43	1.10	947.850	312	96	92	0.66	2.95	98.2
5-03	40.0	0.47	1.20	951.010	311	97	92	0.69	3.16	100.5
5-04	45.0	0.48	1.20	954.190	312	98	92	0.69	3.18	100.0
5-05	50.0	0.46	1.20	957.380	312	98	92	0.68	3.19	102.5
LEAK CHECK	50.0			957.445						
4-01	55.0	0.55	1.40	960.830	312	97	93	0.74	3.38	99.5
4-02	60.0	0.50	1.30	964.040	312	98	93	0.71	3.21	98.9
4-03	65.0	0.46	1.20	967.230	311	99	94	0.68	3.19	102.2
4-04	70.0	0.40	1.00	970.130	312	100	94	0.63	2.90	99.5
4-05	75.0	0.36	0.90	972.895	311	97	94	0.60	2.76	100.2
LEAK CHECK	75.0			972.965						
3-01	80.0	0.32	0.80	975.540	311	95	93	0.57	2.57	99.2
3-02	85.0	0.47	1.20	978.670	312	96	93	0.69	3.13	99.6
3-03	90.0	0.45	1.10	981.730	310	96	93	0.67	3.06	99.3
3-04	95.0	0.47	1.20	984.920	312	96	94	0.69	3.19	101.4
3-05	100.0	0.43	1.10	987.895	313	98	94	0.66	2.98	98.7
LEAK CHECK	100.0			987.955						
2-01	105.0	0.61	1.50	991.520	312	97	94	0.78	3.56	99.5
2-02	110.0	0.59	1.50	995.050	311	98	94	0.77	3.53	100.0
2-03	115.0	0.52	1.30	998.350	312	99	94	0.72	3.30	99.5
2-04	120.0	0.45	1.10	1001.380	313	97	94	0.67	3.03	98.4
2-05	125.0	0.37	0.93	1004.150	312	97	94	0.61	2.77	99.1
Final	125.0			77.25500	311.52000	94.44000		0.67607	77.25500	

25 points sampled
QC-Check: Field Averages
Sq.Rt.ΔP
0.6761 1.1612 77.2550 311.5200 94.4400
☒ 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 North 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:		10.02000		9.30000	80.68000	29.97520	1.15768	☒ Fo value within expected range.
2	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.65000		8.79000	80.56000	30.05560	1.13709	☒ Fo value within expected range.
3	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.14000		9.33000	80.53000	29.99560	1.14103	☒ 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 North 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	678.6	448.1	230.5		
Impinger 2	5%HNO3/10%H2O2	682.1	560.8	121.3		
Impinger 3	5%HNO3/10%H2O2	593.8	562.1	31.7		
Impinger 4	Empty	453.5	437.1	16.4		
Impinger 5	4%KMnO4/10%H2SO4	536.6	534.6	2.0		
Impinger 6	4%KMnO4/10%H2SO4	529.7	528.6	1.1	403.0 Liquid (gm)	Field Data Check
Impinger 7	Silica Gel	727.2	707.4	19.8	0.0 less rinse (gm)	
Impinger 8					403.0 Net Liquid (gm)	403.0 ☒ QA/QC OK
					+ 19.8 Silica Gel (gm)	19.8 ☒ QA/QC OK
					422.8 Total Vlc (gm)	422.8 ☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	Empty	685.4	432.1	253.3		
Impinger 2	5%HNO3/10%H2O2	673.6	569.0	104.6		
Impinger 3	5%HNO3/10%H2O2	550.9	525.0	25.9		
Impinger 4	Empty	432.5	427.7	4.8		
Impinger 5	4%KMnO4/10%H2SO4	542.7	540.3	2.4		
Impinger 6	4%KMnO4/10%H2SO4	551.1	550.3	0.8	391.8 Liquid (gm)	Field Data Check
Impinger 7	Silica Gel	769.1	753.8	15.3	0.0 less rinse (gm)	
Impinger 8					391.8 Net Liquid (gm)	391.8 ☒ QA/QC OK
					+ 15.3 Silica Gel (gm)	15.3 ☒ QA/QC OK
					407.1 Total Vlc (gm)	407.1 ☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	Empty	692.0	434.9	257.1		
Impinger 2	5%HNO3/10%H2O2	639.3	539.5	99.8		
Impinger 3	5%HNO3/10%H2O2	556.4	531.1	25.3		
Impinger 4	Empty	442.4	436.1	6.3		
Impinger 5	4%KMnO4/10%H2SO4	547.8	544.0	3.8		
Impinger 6	4%KMnO4/10%H2SO4	603.6	602.6	1.0	393.3 Liquid (gm)	Field Data Check
Impinger 7	Silica Gel	827.8	810.4	17.4	0.0 less rinse (gm)	
Impinger 8					393.3 Net Liquid (gm)	393.3 ☒ QA/QC OK
					+ 17.4 Silica Gel (gm)	17.4 ☒ QA/QC OK
					410.7 Total Vlc (gm)	410.7 ☒ 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)	
					Total Vlc (gm)	

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 North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000

Meter Operator: N. Hitchins 569
Probe Operator: C. Slimp 558

Test Date: 3/24/11

Start Time: 11:40

Stop Time: 12:55

Leak Rate Before: 0.004 cfm @ 15 "Hg
Leak Rate After: 0.004 cfm @ 7 "Hg

Bar. Press. (in. Hg): 30.00

Static P: -10.3

O₂ (dry volume %): 9.73

CO₂ (dry volume %): 9.94

N₂+CO (dry volume %): 80.33

Nozzle ID No: 274-1

Nozzle Diameter (D_n): 0.274

Probe ID No: 67-8-20

Pitot C_p: 0.818

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 221.0

H₂O (silica, g): 16.6

Actual Moisture (%): 20.66

Meter Box ID. No: 66-7

Meter ΔH@: 1.76970

Meter Y_d: 0.99610

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			686.195						
1-01	2.5	0.43	1.20	687.790	311	85	84	0.66	1.59	105.8
1-02	5.0	0.43	1.20	689.330	312	85	84	0.66	1.54	102.2
1-03	7.5	0.45	1.20	690.880	312	84	83	0.67	1.55	100.8
1-04	10.0	0.53	1.40	692.540	314	85	84	0.73	1.66	99.4
1-05	12.5	0.67	1.80	694.180	313	86	83	0.82	1.64	87.4*
LEAK CHECK	12.5			694.290						
2-01	15.0	0.68	1.80	696.260	313	86	84	0.82	1.97	104.1
2-02	17.5	0.68	1.80	698.190	313	87	84	0.82	1.93	101.9
2-03	20.0	0.70	1.90	700.100	315	87	84	0.84	1.91	99.6
2-04	22.5	0.71	1.90	702.130	317	88	84	0.84	2.03	105.1
2-05	25.0	0.71	1.90	703.765	316	93	86	0.84	1.63	84.1*
LEAK CHECK	25.0			703.850						
3-01	27.5	0.43	1.20	705.790	314	91	85	0.66	1.94	128.1*
3-02	30.0	0.56	1.50	707.540	311	90	84	0.75	1.75	101.3
3-03	32.5	0.57	1.50	709.280	311	91	85	0.75	1.74	99.7
3-04	35.0	0.57	1.50	711.040	313	93	86	0.75	1.76	100.7
3-05	37.5	0.57	1.50	712.740	311	95	87	0.75	1.70	96.9
LEAK CHECK	37.5			712.835						
4-01	40.0	0.70	1.90	714.810	315	96	88	0.84	1.97	101.7
4-02	42.5	0.68	1.80	716.740	315	97	88	0.82	1.93	100.7
4-03	45.0	0.62	1.70	718.620	313	99	88	0.79	1.88	102.4
4-04	47.5	0.55	1.50	720.370	312	97	88	0.74	1.75	101.3
4-05	50.0	0.55	1.50	722.120	311	99	89	0.74	1.75	101.0
LEAK CHECK	50.0			722.240						
5-01	52.5	0.60	1.60	724.080	311	95	88	0.77	1.84	102.1
5-02	55.0	0.55	1.50	725.840	312	98	89	0.74	1.76	101.7
5-03	57.5	0.57	1.50	727.600	312	98	90	0.75	1.76	99.8
5-04	60.0	0.54	1.50	729.370	313	100	91	0.73	1.77	102.9
5-05	62.5	0.55	1.50	731.180	312	100	91	0.74	1.81	104.2
Final	62.5		1.57200	44.57500	312.88000	89.24000		0.76194	44.57500	

25 points sampled

Sq. RL ΔP

QC-Check: Field Averages

0.7619 1.5720 44.5750 312.8800 89.2400

☒ 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 North Broward, Inc.
 Project No: 11182
 Source Area (ft²): 64.00000
 Meter Operator: N. Hitchins 569
 Probe Operator: C. Slimp 558
 Test Date: 3/24/11
 Start Time: 13:11
 Stop Time: 14:19
 Leak Rate Before: 0.003 cfm @ 14 "Hg
 Leak Rate After: 0.001 cfm @ 5 "Hg

Bar. Press. (in. Hg): 30.00
 Static P: -10.3
 O₂ (dry volume %): 9.65
 CO₂ (dry volume %): 10.00
 N₂+CO (dry volume %): 80.35

Nozzle ID No: 274-1
 Nozzle Diameter (D_n): 0.274
 Probe ID No: 67-8-20
 Pitot C_p: 0.818
 Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 203.3
 H₂O (silica, g): 12.2
 Actual Moisture (%): 19.88

Meter Box ID. No: 66-7
 Meter ΔH@: 1.76970
 Meter Y_d: 0.99610

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			731.615						
5-01	2.5	0.58	1.60	733.470	314	95	92	0.76	1.86	103.7
5-02	5.0	0.61	1.60	735.250	313	97	92	0.78	1.78	96.8
5-03	7.5	0.58	1.60	737.000	313	99	92	0.76	1.75	97.4
5-04	10.0	0.52	1.40	738.750	313	100	93	0.72	1.75	102.7
5-05	12.5	0.48	1.30	740.420	312	101	93	0.69	1.67	101.8
LEAK CHECK	12.5			740.510						
4-01	15.0	0.58	1.60	742.330	311	100	93	0.76	1.82	101.0
4-02	17.5	0.73	2.00	744.360	313	103	94	0.85	2.03	100.3
4-03	20.0	0.71	1.90	746.340	314	104	94	0.84	1.98	99.1
4-04	22.5	0.58	1.60	748.150	314	104	94	0.76	1.81	100.2
4-05	25.0	0.48	1.30	749.845	310	103	94	0.69	1.70	102.9
LEAK CHECK	25.0			750.045						
3-01	27.5	0.64	1.70	751.890	312	103	95	0.80	1.85	97.1
3-02	30.0	0.54	1.50	753.710	312	106	96	0.73	1.82	103.9
3-03	32.5	0.56	1.50	755.450	312	106	96	0.75	1.74	97.5
3-04	35.0	0.55	1.50	756.890	311	104	96	0.74	1.44	81.5*
3-05	37.5	0.46	1.20	758.830	311	104	96	0.68	1.94	120.0*
LEAK CHECK	37.5			758.985						
2-01	40.0	0.60	1.60	760.730	309	98	93	0.77	1.75	95.3
2-02	42.5	0.52	1.40	762.440	309	99	93	0.72	1.71	100.1
2-03	45.0	0.52	1.40	764.120	310	100	94	0.72	1.68	98.3
2-04	47.5	0.51	1.40	765.850	312	101	94	0.71	1.73	102.2
2-05	50.0	0.49	1.30	767.495	313	103	96	0.70	1.64	98.8
LEAK CHECK	50.0			767.585						
1-01	52.5	0.37	1.00	769.010	310	100	94	0.61	1.42	98.7
1-02	55.0	0.36	0.97	770.430	310	100	95	0.60	1.42	99.6
1-03	57.5	0.38	1.00	771.850	313	102	95	0.62	1.42	97.0
1-04	60.0	0.46	1.20	773.450	313	103	96	0.68	1.60	99.2
1-05	62.5	0.60	1.60	775.260	312	102	94	0.77	1.81	98.6
Final	62.5									
25 points sampled										
QC-Check: Field Averages										

Sq. RL ΔP
 0.7297 1.4468 43.1100 311.8400 97.8200
☒ 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: 3

Client: Wheelabrator North Broward, Inc.

Project No: 11182

Source Area (ft²): 64.00000

Meter Operator: N. Hitchins 569

Probe Operator: C. Slimp 558

Test Date: 3/24/11

Start Time: 14:38

Stop Time: 15:46

Leak Rate Before: 0.003 cfm @ 15 "Hg

Leak Rate After: 0.001 cfm @ 6 "Hg

Bar. Press. (in. Hg): 30.00

Static P: -10.3

O₂ (dry volume %): 8.94

CO₂ (dry volume %): 10.68

N₂+CO (dry volume %): 80.38

Nozzle ID No: 274-1

Nozzle Diameter (D_n): 0.274

Probe ID No: 67-8-20

Pitot C_p: 0.818

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 210.7

H₂O (silica, g): 10.0

Actual Moisture (%): 20.80

Meter Box ID. No: 66-7

Meter ΔH@: 1.76970

Meter Y_d: 0.99610

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			775.710						
1-01	2.5	0.47	1.30	777.430	313	95	92	0.69	1.72	107.8
1-02	5.0	0.42	1.10	778.930	313	95	92	0.65	1.50	99.4
1-03	7.5	0.45	1.20	780.490	313	98	92	0.67	1.56	99.7
1-04	10.0	0.47	1.30	782.120	312	97	92	0.69	1.63	101.9
1-05	12.5	0.56	1.50	783.910	313	98	92	0.75	1.79	102.6
LEAK CHECK	12.5			783.985						
2-01	15.0	0.56	1.50	785.750	313	98	92	0.75	1.76	101.1
2-02	17.5	0.55	1.50	787.520	314	100	95	0.74	1.77	102.0
2-03	20.0	0.59	1.60	789.300	313	100	92	0.77	1.78	99.2
2-04	22.5	0.56	1.50	791.050	311	98	90	0.75	1.75	100.3
2-05	25.0	0.60	1.60	792.845	312	99	91	0.77	1.80	99.3
LEAK CHECK	25.0			792.945						
3-01	27.5	0.40	1.10	794.470	311	98	91	0.63	1.52	103.3
3-02	30.0	0.58	1.60	795.890	312	98	91	0.76	1.42	80.0*
3-03	32.5	0.56	1.50	797.990	313	100	93	0.75	2.10	120.0*
3-04	35.0	0.51	1.40	799.710	314	102	93	0.71	1.72	102.9
3-05	37.5	0.46	1.20	801.290	312	101	92	0.68	1.58	99.5
LEAK CHECK	37.5			801.380						
4-01	40.0	0.54	1.50	803.170	313	100	93	0.73	1.79	104.2
4-02	42.5	0.50	1.40	804.840	314	102	94	0.71	1.67	100.8
4-03	45.0	0.48	1.30	806.470	312	103	94	0.69	1.63	100.1
4-04	47.5	0.43	1.20	808.050	312	100	92	0.66	1.58	103.0
4-05	50.0	0.40	1.10	809.575	312	102	93	0.63	1.53	102.8
LEAK CHECK	50.0			809.665						
5-01	52.5	0.50	1.40	811.350	311	100	92	0.71	1.69	101.8
5-02	55.0	0.50	1.40	812.990	311	100	92	0.71	1.64	99.1
5-03	57.5	0.46	1.20	814.630	312	99	92	0.68	1.64	103.5
5-04	60.0	0.46	1.20	816.230	311	99	92	0.68	1.60	100.9
5-05	62.5	0.35	0.95	817.625	309	100	93	0.59	1.39	100.4
Final	62.5		1.34200	41.56000	312.24000	95.78000		0.70157	41.56000	

25 points sampled:

Sq.Rt.ΔP

QC-Check: Field Averages

0.7016 1.3420 41.5600 312.2400 95.7800

☒ 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 North 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:		9.94000	9.73000	80.33000	29.97960	1.12374	☒ F _o value within expected range.	
2	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.00000	9.65000	80.35000	29.98600	1.12500	☒ F _o value within expected range.	
3	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.68000	8.94000	80.38000	30.06640	1.11985	☒ F _o value within expected range.	
	1							
	2							
	3							
Avg.								
CEM or Other Avg:							☐ F _o value within expected range.	

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USEPA Method 4 Laboratory Data

Location: Unit 3 FF Outlet

Client: Wheelabrator North 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	757.6	636.9	120.7
Impinger 2	DI Water	630.2	545.5	84.7
Impinger 3	Empty	471.4	455.8	15.6
Impinger 4	Silica Gel	766.1	749.5	16.6
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

221.0 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

221.0 Net Liquid (gm)

221.0

☒ QA/QC OK

+ 16.6 Silica Gel (gm)

16.6

☒ QA/QC OK

237.6 Total Vlc (gm)

237.6

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	DI Water	679.6	546.6	133.0
Impinger 2	DI Water	606.3	550.2	56.1
Impinger 3	Empty	458.1	443.9	14.2
Impinger 4	Silica Gel	790.2	778.0	12.2
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

203.3 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

203.3 Net Liquid (gm)

203.3

☒ QA/QC OK

+ 12.2 Silica Gel (gm)

12.2

☒ QA/QC OK

215.5 Total Vlc (gm)

215.5

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	DI Water	802.2	633.9	168.3
Impinger 2	DI Water	582.5	544.7	37.8
Impinger 3	Empty	459.3	454.7	4.6
Impinger 4	Silica Gel	775.9	765.9	10.0
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

210.7 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

210.7 Net Liquid (gm)

210.7

☒ QA/QC OK

+ 10.0 Silica Gel (gm)

10.0

☒ QA/QC OK

220.7 Total Vlc (gm)

220.7

☒ 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)

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Field Data Printout

Test Method: USEPA Method 23
Analyte: PCDD/F

Location: Unit 3 FF Outlet
Test Run: 1
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: C. Slimp 558
Probe Operator: C. Slimp 558
Test Date: 3/22/11
Start Time: 09:37
Stop Time: 13:58
Leak Rate Before: 0.004 cfm @ 12 "Hg
Leak Rate After: 0.003 cfm @ 16 "Hg

Bar. Press. (in. Hg): 30.20
Static P: -9.6
O₂ (dry volume %): 9.27
CO₂ (dry volume %): 10.20
N₂+CO (dry volume %): 80.53

Nozzle ID No: 272-1
Nozzle Diameter (D_n): 0.272
Probe ID No: 67-8-10
Pitot C_p: 0.822
Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 857.3
H₂O (silica, g): 60.0
Actual Moisture (%): 20.90

Meter Box ID. No: 66-7
Meter ΔH@: 1.76970
Meter Y_d: 0.99610

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			167.880						
5-01	10.0	0.53	1.30	174.070	313	76	74	0.73	6.19	95.7
5-02	20.0	0.67	1.70	181.320	314	82	75	0.82	7.25	99.2
5-03	30.0	0.59	1.50	188.310	313	87	77	0.77	6.99	101.1
5-04	40.0	0.50	1.30	195.040	316	91	79	0.71	6.73	105.3
5-05	50.0	0.46	1.20	201.345	310	92	81	0.68	6.31	102.2
LEAK CHECK	50.0			201.465						
4-01	60.0	0.76	1.90	209.060	313	91	83	0.87	7.60	96.0
4-02	70.0	0.72	1.80	216.690	313	95	86	0.85	7.63	98.5
4-03	80.0	0.57	1.40	222.880	312	97	86	0.75	6.19	89.5*
4-04	90.0	0.53	1.30	230.710	314	92	86	0.73	7.83	118.0*
4-05	100.0	0.44	1.10	237.185	311	94	86	0.66	6.47	106.7
LEAK CHECK	100.0			237.240						
3-01	110.0	0.64	1.60	244.360	311	92	87	0.80	7.12	97.5
3-02	120.0	0.59	1.50	251.420	313	94	87	0.77	7.06	100.6
3-03	130.0	0.58	1.50	258.500	314	97	88	0.76	7.08	101.4
3-04	140.0	0.53	1.30	265.280	314	98	89	0.73	6.78	101.4
3-05	150.0	0.47	1.20	271.745	308	99	90	0.69	6.47	102.0
LEAK CHECK	150.0			271.870						
2-01	160.0	0.62	1.60	279.080	313	93	90	0.79	7.21	100.0
2-02	170.0	0.66	1.70	286.470	312	98	90	0.81	7.39	98.9
2-03	180.0	0.60	1.50	293.660	313	100	91	0.77	7.19	100.7
2-04	190.0	0.56	1.40	300.590	313	100	91	0.75	6.93	100.4
2-05	200.0	0.64	1.60	307.825	313	100	92	0.80	7.24	98.0
LEAK CHECK	200.0			307.880						
1-01	210.0	0.15	0.38	311.290	295	97	93	0.39	3.41	94.2
1-02	220.0	0.45	1.10	316.060	311	97	93	0.67	4.77	77.0*
1-03	230.0	0.42	1.10	323.050	310	98	93	0.65	6.99	116.6*
1-04	240.0	0.55	1.40	329.700	313	98	92	0.74	6.65	97.3
1-05	250.0	0.66	1.70	337.115	312	98	92	0.81	7.42	99.0
Final	250.0									
25 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages		0.7397	1.4032	168.8800	311.7600	90.5400		0.73971	168.88000	

☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

2RSD = 18.7%

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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 North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: C. Slimp 558
Probe Operator: C. Slimp 558

Bar. Press. (in. Hg): 30.10
Static P: -10.3
O₂ (dry volume %): 9.38
CO₂ (dry volume %): 9.84
N₂+CO (dry volume %): 80.78

Nozzle ID No: 272-1
Nozzle Diameter (D_n): 0.272
Probe ID No: 67-8-10
Pitot C_p: 0.822
Pitot Leak Check: ☒ Pass ☐ Fail

Test Date: 3/23/11
Start Time: 06:40
Stop Time: 11:05
Leak Rate Before: 0.004 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 13 "Hg

H₂O (condensate, ml or gm): 875.2
H₂O (silica, g): 58.2
Actual Moisture (%): 20.61

Meter Box ID. No: 66-7
Meter ΔH@: 1.76970
Meter Y_d: 0.99610

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			338.970						
5-01	10.0	0.56	1.40	345.460	313	68	65	0.75	6.49	98.7
5-02	20.0	0.52	1.30	352.070	313	74	66	0.72	6.61	103.7
5-03	30.0	0.59	1.50	358.800	313	79	68	0.77	6.73	98.5
5-04	40.0	0.61	1.60	365.840	314	83	70	0.78	7.04	100.8
5-05	50.0	0.55	1.40	372.810	315	84	72	0.74	6.97	104.9
LEAK CHECK	50.0			372.880						
4-01	60.0	0.65	1.70	380.010	313	81	74	0.81	7.13	98.7
4-02	70.0	0.59	1.50	387.090	313	86	74	0.77	7.08	102.4
4-03	80.0	0.61	1.60	394.260	313	87	76	0.78	7.17	101.7
4-04	90.0	0.61	1.60	401.540	313	88	77	0.78	7.28	103.1
4-05	100.0	0.50	1.30	408.420	313	90	78	0.71	6.88	107.2
LEAK CHECK	100.0			408.485						
3-01	110.0	0.82	2.10	416.730	313	85	78	0.91	8.25	101.0
3-02	120.0	0.73	1.90	424.750	313	90	79	0.85	8.02	103.5
3-03	130.0	0.62	1.60	432.060	312	90	79	0.79	7.31	102.2
3-04	140.0	0.55	1.40	439.070	313	92	80	0.74	7.01	103.8
3-05	150.0	0.49	1.20	445.750	313	93	81	0.70	6.68	104.5
LEAK CHECK	150.0			445.835						
2-01	160.0	0.66	1.70	453.130	312	88	82	0.81	7.30	98.8
2-02	170.0	0.66	1.70	460.590	312	94	83	0.81	7.46	100.4
2-03	180.0	0.60	1.50	467.820	312	95	84	0.77	7.23	101.8
2-04	190.0	0.52	1.30	474.600	312	96	85	0.72	6.78	102.3
2-05	200.0	0.51	1.30	481.255	313	97	86	0.71	6.65	101.3
LEAK CHECK	200.0			481.365						
1-01	210.0	0.45	1.10	487.220	309	94	87	0.67	5.86	94.7
1-02	220.0	0.55	1.40	493.870	310	96	87	0.74	6.65	97.3
1-03	230.0	0.46	1.20	500.220	310	93	87	0.68	6.35	101.8
1-04	240.0	0.44	1.10	506.450	313	96	88	0.66	6.23	101.9
1-05	250.0	0.46	1.20	512.635	310	97	88	0.68	6.19	98.7
Final	250.0		1.46400	173.33500	312.40000	83.80000		0.75438	173.33500	

25 points sampled
QC-Check: Field Averages

Sq. Rt. ΔP	0.7544	1.4640	173.3350	312.4000	83.8000
☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

2RSD = 11.7%

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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 North Broward, Inc.

Project No: 11182

Source Area (ft²): 64.00000

Meter Operator: C. Slimp 558
Probe Operator: C. Slimp 558

Test Date: 3/23/11

Start Time: 11:36

Stop Time: 15:56

Leak Rate Before: 0.008 cfm @ 15 "Hg

Leak Rate After: 0.002 cfm @ 12 "Hg

Bar. Press. (in. Hg): 30.10

Static P: -10.5

O₂ (dry volume %): 9.22

CO₂ (dry volume %): 10.34

N₂+CO (dry volume %): 80.44

Nozzle ID No: 271-1

Nozzle Diameter (D_n): 0.272

Probe ID No: 67-8-10

Pitot C_p: 0.822

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 869.4

H₂O (silica, g): 55.8

Actual Moisture (%): 20.95

Meter Box ID. No: 66-7

Meter ΔH@: 1.76970

Meter Y_d: 0.99610

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			514.070						
5-01	10.0	0.65	1.70	521.500	313	89	87	0.81	7.43	101.4
5-02	20.0	0.56	1.40	528.540	313	93	87	0.75	7.04	103.0
5-03	30.0	0.61	1.60	535.840	312	99	89	0.78	7.30	101.6
5-04	40.0	0.60	1.60	543.090	313	101	90	0.77	7.25	101.6
5-05	50.0	0.48	1.20	549.860	313	100	91	0.69	6.77	105.9
LEAK CHECK	50.0			549.960						
4-01	60.0	0.55	1.40	556.590	312	95	91	0.74	6.63	97.3
4-02	70.0	0.48	1.20	563.140	313	99	92	0.69	6.55	102.5
4-03	80.0	0.61	1.60	570.350	313	96	92	0.78	7.21	100.4
4-04	90.0	0.58	1.50	577.600	313	99	92	0.76	7.25	103.3
4-05	100.0	0.54	1.40	584.580	314	100	93	0.73	6.98	102.9
LEAK CHECK	100.0			584.685						
3-01	110.0	0.66	1.60	591.910	313	95	92	0.81	7.23	96.8
3-02	120.0	0.61	1.60	599.220	313	98	92	0.78	7.31	101.6
3-03	130.0	0.60	1.60	606.470	313	100	93	0.77	7.25	101.4
3-04	140.0	0.55	1.40	613.590	313	102	94	0.74	7.12	103.6
3-05	150.0	0.56	1.50	620.705	313	103	95	0.75	7.12	102.5
LEAK CHECK	150.0			620.760						
2-01	160.0	0.52	1.40	627.550	313	98	95	0.72	6.79	101.9
2-02	170.0	0.65	1.70	634.960	313	98	94	0.81	7.41	99.7
2-03	180.0	0.55	1.40	641.930	312	96	92	0.74	6.97	102.1
2-04	190.0	0.57	1.50	648.920	314	93	90	0.75	6.99	101.2
2-05	200.0	0.48	1.20	655.410	310	95	89	0.69	6.49	102.0
LEAK CHECK	200.0			655.480						
1-01	210.0	0.39	1.00	661.480	308	90	87	0.62	6.00	105.1
1-02	220.0	0.40	1.00	667.370	311	90	87	0.63	5.89	102.1
1-03	230.0	0.40	1.00	673.000	311	90	86	0.63	5.63	97.6
1-04	240.0	0.49	1.30	679.210	312	90	85	0.70	6.21	97.5
1-05	250.0	0.49	1.30	685.615	312	91	85	0.70	6.40	100.5
Final	250.0		1.40400	171.21500	312.40000	93.20000		0.73516	171.21500	

25 points sampled
QC-Check: Field Averages

Sq.Rt.ΔP	0.7352	1.4040	171.2150	312.4000	93.2000

2RSD = 10.7%

☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

041811 135307

USEPA Method 3 Laboratory Data

Location: Unit 3 FF Outlet
 Client: Wheelabrator North 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:		10.20000		9.27000	80.53000	30.00280	1.14020	☒ Fo value within expected range.
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		9.84000		9.38000	80.78000	29.94960	1.17073	☒ Fo value within expected range.
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.34000		9.22000	80.44000	30.02320	1.12959	☒ Fo value within expected range.
	1							
	2							
	3							
	Avg.							
CEM or Other Avg:								☐ Fo value within expected range.

041811 135307
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USEPA Method 4 Laboratory Data

Location: Unit 3 FF Outlet

Client: Wheelabrator North Broward, Inc.

Project No: 11182

Test Run: 1

Test Method: USEPA Method 23

Analyte: PCDD/F

Analyst: R. Vicere

Analyst Emp No: 563

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	Empty	1474.8	642.3	832.5		
Impinger 2	HPLC Water	566.1	560.6	5.5		
Impinger 3	HPLC Water	538.0	540.4	-2.4		
Impinger 4	Empty	441.7	437.2	4.5		
Impinger 5	XAD Trap	371.1	353.9	17.2		
Impinger 6	Silica Gel	794.0	734.0	60.0	857.3 Liquid (gm)	Field Data Check
Impinger 7					0.0 less rinse (gm)	
Impinger 8					857.3 Net Liquid (gm)	857.3 ☒ QA/QC OK
					+ 60.0 Silica Gel (gm)	60.0 ☒ QA/QC OK
					917.3 Total Vlc (gm)	917.3 ☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	Empty	1451.7	602.7	849.0		
Impinger 2	HPLC Water	531.1	528.9	2.2		
Impinger 3	HPLC Water	545.3	542.6	2.7		
Impinger 4	Empty	454.3	451.0	3.3		
Impinger 5	XAD Trap	345.4	327.4	18.0		
Impinger 6	Silica Gel	785.8	727.6	58.2	875.2 Liquid (gm)	Field Data Check
Impinger 7					0.0 less rinse (gm)	
Impinger 8					875.2 Net Liquid (gm)	875.2 ☒ QA/QC OK
					+ 58.2 Silica Gel (gm)	58.2 ☒ QA/QC OK
					933.4 Total Vlc (gm)	933.4 ☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	Empty	1487.8	648.3	839.5		
Impinger 2	HPLC Water	571.4	563.6	7.8		
Impinger 3	HPLC Water	542.9	544.0	-1.1		
Impinger 4	Empty	444.8	441.3	3.5		
Impinger 5	XAD Trap	363.9	344.2	19.7		
Impinger 6	Silica Gel	821.1	765.3	55.8	869.4 Liquid (gm)	Field Data Check
Impinger 7					0.0 less rinse (gm)	
Impinger 8					869.4 Net Liquid (gm)	869.4 ☒ QA/QC OK
					+ 55.8 Silica Gel (gm)	55.8 ☒ QA/QC OK
					925.2 Total Vlc (gm)	925.2 ☒ 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				Liquid (gm)	Field Data Check
Impinger 7					less rinse (gm)	
Impinger 8					Net Liquid (gm)	
					Silica Gel (gm)	
					Total Vlc (gm)	

Rinse: (ml or gm)

041811 135307
NLJ

Field Data Printout

Test Method: USEPA Method 26A
Analyte: HCl

Location: Unit 3 SDA Inlet
Test Run: 1
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 60:13205
Meter Operator: B. Arnold 770
Probe Operator:

Bar. Press. (in. Hg): 30.00
Static P: -1.3
O₂ (dry volume %): 8.39
CO₂ (dry volume %): 10.94
N₂+CO (dry volume %): 80.67

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-5
Pitot C_p: NA
Pitot Leak Check: ☒ Pass ☐ Fail

Test Date: 3/24/11
Start Time: 06:57
Stop Time: 07:57
Leak Rate Before: 0.003 cfm @ 15 *Hg
Leak Rate After: 0.003 cfm @ 19 *Hg

H₂O (condensate, ml or gm): 139.6
H₂O (silica, g): 16.9
Actual Moisture (%): 16.97

Meter Box ID. No: 66-14
Meter ΔH@: 1.75710
Meter Y_d: 0.98820

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			182.940						
1-01	5.0		1.20	185.940	496	68	66		3.00	
1-01	10.0		1.20	188.940	501	69	65		3.00	
1-01	15.0		1.20	191.960	500	70	65		3.02	
1-01	20.0		1.20	194.980	499	72	66		3.02	
1-01	25.0		1.20	197.980	496	73	67		3.00	
1-01	30.0		1.20	201.030	495	73	67		3.05	
1-01	35.0		1.20	204.070	493	72	67		3.04	
1-01	40.0		1.20	207.080	496	71	67		3.01	
1-01	45.0		1.20	210.110	497	71	66		3.03	
1-01	50.0		1.20	213.190	490	71	67		3.08	
1-01	55.0		1.20	216.230	493	71	67		3.04	
1-01	60.0		1.20	219.255	490	70	67		3.03	
Final	60.0		1.20000	36.31500	495.50000	68.66667		0.00000	36.31500	

1 points sampled
QC-Check: Field Averages

Sq. Rt. ΔP	1.2000	36.3150	495.5000	68.6660
☐ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

041811 135318
N

Field Data Printout

Test Method: USEPA Method 26A
Analyte: HCI

Location: Unit 3 SDA Inlet
Test Run: 2
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 60.13205
Meter Operator: B. Arnold 770
Probe Operator:
Test Date: 3/24/11
Start Time: 08:25
Stop Time: 09:25
Leak Rate Before: 0.002 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 17 "Hg

Bar. Press. (in. Hg): 30.00
Static P: -1.5
O₂ (dry volume %): 8.68
CO₂ (dry volume %): 10.83
N₂+CO (dry volume %): 80.49

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): 132.9
H₂O (silica, g): 13.5
Actual Moisture (%): 16.21

Meter Box ID. No: 66-14
Meter ΔH@: 1.75710
Meter Y_d: 0.98820

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			219.470						
1-01	5.0		1.20	222.500	499	70	68		3.03	
1-01	10.0		1.20	225.490	500	73	68		2.99	
1-01	15.0		1.20	228.530	503	76	69		3.04	
1-01	20.0		1.20	231.550	501	78	70		3.02	
1-01	25.0		1.20	234.570	503	78	70		3.02	
1-01	30.0		1.20	237.580	502	79	71		3.01	
1-01	35.0		1.20	240.600	498	80	72		3.02	
1-01	40.0		1.20	243.610	497	80	73		3.01	
1-01	45.0		1.20	246.620	501	80	73		3.01	
1-01	50.0		1.20	249.640	505	79	73		3.02	
1-01	55.0		1.20	252.710	502	78	73		3.07	
1-01	60.0		1.20	255.745	500	78	73		3.04	
Final	60.0		1.20000	36.27500	500.91667	74.25000		0.00000	36.27500	

1 points sampled
QC-Check: Field Averages

Sq. Rt. ΔP	1.2000	36.2750	500.9166	74.2500
☐ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

041811 135318
N

Field Data Printout

Test Method: USEPA Method 26A
Analyte: HCl

Location: Unit 3 SDA Inlet
Test Run: 3
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 60.13205
Meter Operator: B. Arnold 770
Probe Operator:

Bar. Press. (in. Hg): 30.00
Static P: -1.5
O₂ (dry volume %): 9.65
CO₂ (dry volume %): 9.95
N₂+CO (dry volume %): 80.40

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-5
Pitot C_p: NA
Pitot Leak Check: ☒ Pass ☐ Fail

Test Date: 3/24/11
Start Time: 10:24
Stop Time: 11:24
Leak Rate Before: 0.004 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 15 "Hg

H₂O (condensate, ml or gm): 128.1
H₂O (silica, g): 11.1
Actual Moisture (%): 15.53

Meter Box ID. No: 66-14
Meter ΔH@: 1.75710
Meter Y_d: 0.98820

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			256.220						
1-01	5.0		1.20	259.340	507	76	75		3.12	
1-01	10.0		1.20	262.390	502	77	75		3.05	
1-01	15.0		1.20	265.450	500	80	75		3.06	
1-01	20.0		1.20	268.520	505	81	76		3.07	
1-01	25.0		1.20	271.600	508	83	77		3.08	
1-01	30.0		1.20	274.610	504	84	77		3.01	
1-01	35.0		1.20	277.690	503	84	78		3.08	
1-01	40.0		1.20	280.730	503	85	78		3.04	
1-01	45.0		1.20	283.770	500	86	79		3.04	
1-01	50.0		1.20	286.850	501	86	79		3.08	
1-01	55.0		1.20	289.860	509	86	80		3.01	
1-01	60.0		1.20	292.910	514	87	80		3.05	
Final	60.0		1.20000	36.69000	504.66667	80.16667		0.00000	36.69000	

1 points sampled
QC-Check: Field Averages

Sq.Rt.ΔP	1.2000	36.6900	504.6666	80.1666
☐ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

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USEPA Method 3 Laboratory Data

Location: Unit 3 SDA Inlet
 Client: Wheelabrator North 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 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:		10.94000		8.39000	80.67000	30.08600	1.14351	☒ Fo value within expected range.
2	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.83000		8.68000	80.49000	30.08000	1.12835	☒ Fo value within expected range.
3	1							
	2							
	3							
Avg.								
CEM or Other Avg:		9.95000		9.65000	80.40000	29.97800	1.13065	☒ 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 SDA Inlet

Client: Wheelabrator North Broward, Inc.

Project No: 11182

Test Method: USEPA Method 26A

Analyte: HCl

Analyst: D. Luckhard

Analyst Emp No: 568

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)	
Impinger 1	50 ml 0.1N H2SO4	482.6	461.2	21.4	
Impinger 2	100 ml 0.1N H2SO4	627.5	542.8	84.7	
Impinger 3	100 ml 0.1N H2SO4	580.1	555.1	25.0	
Impinger 4	Empty	533.6	525.1	8.5	
Impinger 5	Silica Gel	759.0	742.1	16.9	
Impinger 6					
Impinger 7					
Impinger 8					
				139.6 Liquid (gm)	Field Data Check
				0.0 less rinse (gm)	
				139.6 Net Liquid (gm)	139.6 ☒ QA/QC OK
				+ 16.9 Silica Gel (gm)	16.9 ☒ QA/QC OK
				156.5 Total Vlc (gm)	156.5 ☒ QA/QC OK
	Rinse:		(ml or gm)		

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)	
Impinger 1	50 ml 0.1N H2SO4	491.7	459.9	31.8	
Impinger 2	100 ml 0.1N H2SO4	632.5	563.3	69.2	
Impinger 3	100 ml 0.1N H2SO4	566.5	543.1	23.4	
Impinger 4	Empty	447.9	439.4	8.5	
Impinger 5	Silica Gel	761.0	747.5	13.5	
Impinger 6					
Impinger 7					
Impinger 8					
				132.9 Liquid (gm)	Field Data Check
				0.0 less rinse (gm)	
				132.9 Net Liquid (gm)	132.9 ☒ QA/QC OK
				+ 13.5 Silica Gel (gm)	13.5 ☒ QA/QC OK
				146.4 Total Vlc (gm)	146.4 ☒ QA/QC OK
	Rinse:		(ml or gm)		

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)	
Impinger 1	50 ml 0.1N H2SO4	494.5	454.5	40.0	
Impinger 2	100 ml 0.1N H2SO4	612.5	541.0	71.5	
Impinger 3	100 ml 0.1N H2SO4	566.2	552.6	13.6	
Impinger 4	Empty	527.3	524.3	3.0	
Impinger 5	Silica Gel	770.0	758.9	11.1	
Impinger 6					
Impinger 7					
Impinger 8					
				128.1 Liquid (gm)	Field Data Check
				0.0 less rinse (gm)	
				128.1 Net Liquid (gm)	128.1 ☒ QA/QC OK
				+ 11.1 Silica Gel (gm)	11.1 ☒ QA/QC OK
				139.2 Total Vlc (gm)	139.2 ☒ 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)		

041811 135318
NNN@

Field Data Printout

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 3 FF Outlet
Test Run: 1
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator: N. Hitchins 569
Test Date: 3/24/11
Start Time: 06:57
Stop Time: 07:57
Leak Rate Before: 0.003 cfm @ 12 "Hg
Leak Rate After: 0.004 cfm @ 8 "Hg

Bar. Press. (in. Hg): 30.00
Static P: -10.3
O₂ (dry volume %): 8.54
CO₂ (dry volume %): 10.77
N₂+CO (dry volume %): 80.69

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): 220.6
H₂O (silica, g): 14.8
Actual Moisture (%): 21.20

Meter Box ID. No: 66-22
Meter ΔH@: 1.68920
Meter Y_d: 0.99950

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)	(%)
3-01	5.0		1.50	8.260	311	68	67		3.60	
3-01	10.0		1.50	11.720	312	68	67		3.46	
3-01	15.0		1.50	15.230	312	76	68		3.51	
3-01	20.0		1.50	18.400	312	78	68		3.17	
3-01	25.0		1.50	21.860	311	79	69		3.46	
3-01	30.0		1.50	25.280	311	81	70		3.42	
3-01	35.0		1.50	28.750	310	81	71		3.47	
3-01	40.0		1.50	32.200	311	82	71		3.45	
3-01	45.0		1.50	35.650	311	83	72		3.45	
3-01	50.0		1.50	39.170	311	83	73		3.52	
3-01	55.0		1.50	42.650	311	83	73		3.48	
3-01	60.0		1.50	46.115	311	84	74		3.47	
Final	60.0		1.50000	41.45500	311.16667	74.54167		0.00000	41.45500	
3 points sampled										
QC-Check: Field Averages		Sq.Rt.ΔP		1.5000	41.4550	311.1667	74.5417			

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

041811 135328
N

Field Data Printout

Test Method: USEPA Method 26A
Analyte: HCl

Location: Unit 3 FF Outlet
Test Run: 2
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator: N. Hitchins 569

Bar. Press. (in. Hg): 30.00
Static P: -10.3
O₂ (dry volume %): 9.00
CO₂ (dry volume %): 10.43
N₂+CO (dry volume %): 80.57

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-1
Pitot C_p: NA
Pitot Leak Check: ☒ Pass ☐ Fail

Test Date: 3/24/11
Start Time: 08:25
Stop Time: 09:25
Leak Rate Before: 0.002 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 5 "Hg

H₂O (condensate, ml or gm): 213.8
H₂O (silica, g): 17.7
Actual Moisture (%): 20.90

Meter Box ID. No: 66-22
Meter ΔH@: 1.68920
Meter Y_d: 0.99950

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			46.575						
3-01	5.0		1.50	50.170	311	77	75		3.60	
3-01	10.0		1.50	53.640	311	81	75		3.47	
3-01	15.0		1.50	57.050	312	84	76		3.41	
3-01	20.0		1.50	60.520	312	86	76		3.47	
3-01	25.0		1.50	64.010	312	87	77		3.49	
3-01	30.0		1.50	67.500	311	88	78		3.49	
3-01	35.0		1.50	71.020	311	88	78		3.52	
3-01	40.0		1.50	74.540	311	87	79		3.52	
3-01	45.0		1.50	78.060	311	87	79		3.52	
3-01	50.0		1.50	81.600	312	88	79		3.54	
3-01	55.0		1.50	85.180	312	88	79		3.58	
3-01	60.0		1.50	88.640	312	88	79		3.46	
Final	60.0		1.50000	42.06500	311.50000	81.62500		0.00000	42.06500	
3 points sampled										
QC-Check: Field Averages				Sq.Rt.ΔP	1.5000	42.0650	311.5000	81.6250		

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

041811 135328
O

Field Data Printout

Test Method: USEPA Method 26A
Analyte: HCl

Location: Unit 3 FF Outlet
Test Run: 3
Client: Wheelabrator North Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator: N. Hitchins 569

Bar. Press. (in. Hg): 30.00
Static P: -10.3
O₂ (dry volume %): 9.44
CO₂ (dry volume %): 10.06
N₂+CO (dry volume %): 80.50

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-1
Pitot C_p: NA
Pitot Leak Check: ☒ Pass ☐ Fail

Test Date: 3/24/11
Start Time: 10:24
Stop Time: 11:24
Leak Rate Before: 0.003 cfm @ 13 "Hg
Leak Rate After: 0.001 cfm @ 5 "Hg

H₂O (condensate, ml or gm): 209.3
H₂O (silica, g): 13.8
Actual Moisture (%): 20.51

Meter Box ID. No: 66-22
Meter ΔH@: 1.68920
Meter Y_g: 0.99950

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			89.135						
3-01	5.0		1.50	92.770	312	83	82		3.63	
3-01	10.0		1.50	96.270	311	88	82		3.50	
3-01	15.0		1.50	99.730	311	91	83		3.46	
3-01	20.0		1.50	103.140	312	93	84		3.41	
3-01	25.0		1.50	106.590	312	95	85		3.45	
3-01	30.0		1.50	110.140	313	96	86		3.55	
3-01	35.0		1.50	113.650	311	97	87		3.51	
3-01	40.0		1.50	117.350	312	97	88		3.70	
3-01	45.0		1.50	120.660	311	97	89		3.31	
3-01	50.0		1.50	124.230	311	98	89		3.57	
3-01	55.0		1.50	127.770	312	99	90		3.54	
3-01	60.0		1.50	131.335	313	100	91		3.57	
Final	60.0		1.50000	42.20000	311.75000	90.41667		0.00000	42.20000	

3 points sampled
QC-Check: Field Averages

Sq.Rt.ΔP			
1.5000	42.2000	311.7500	90.4167

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

041811 135328
N

USEPA Method 3 Laboratory Data

Location: Unit 3 FF Outlet
 Client: Wheelabrator North 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 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:		10.77000		8.54000	80.69000	30.06480	1.14763	☒ Fo value within expected range.
2	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.43000		9.00000	80.57000	30.02880	1.14094	☒ Fo value within expected range.
3	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.06000		9.44000	80.50000	29.98720	1.13917	☒ Fo value within expected range.
	1							
	2							
	3							
Avg.								
CEM or Other Avg:								☐ Fo value within expected range.

041811 135328
 NON

USEPA Method 4 Laboratory Data

Location: Unit 3 FF Outlet

Client: Wheelabrator North Broward, Inc.

Project No: 11182

Test Method: USEPA Method 26A

Analyte: HCl

Analyst: R. Vicere

Analyst Emp No: 563

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	509.9	457.4	52.5
Impinger 2	100 ml 0.1N H2SO4	672.6	559.8	112.8
Impinger 3	100 ml 0.1N H2SO4	598.9	554.7	44.2
Impinger 4	Empty	455.2	444.1	11.1
Impinger 5	Silica Gel	752.9	738.1	14.8
Impinger 6				
Impinger 7				
Impinger 8				

220.6 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

220.6 Net Liquid (gm)

220.6

☒ QA/QC OK

+ 14.8 Silica Gel (gm)

14.8

☒ QA/QC OK

235.4 Total Vlc (gm)

235.4

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	499.0	457.4	41.6
Impinger 2	100 ml 0.1N H2SO4	649.0	540.3	108.7
Impinger 3	100 ml 0.1N H2SO4	601.7	553.2	48.5
Impinger 4	Empty	444.3	429.3	15.0
Impinger 5	Silica Gel	771.3	753.6	17.7
Impinger 6				
Impinger 7				
Impinger 8				

213.8 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

213.8 Net Liquid (gm)

213.8

☒ QA/QC OK

+ 17.7 Silica Gel (gm)

17.7

☒ QA/QC OK

231.5 Total Vlc (gm)

231.5

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	502.6	456.3	46.3
Impinger 2	100 ml 0.1N H2SO4	637.5	524.6	112.9
Impinger 3	100 ml 0.1N H2SO4	577.3	536.5	40.8
Impinger 4	Empty	458.5	449.2	9.3
Impinger 5	Silica Gel	737.1	723.3	13.8
Impinger 6				
Impinger 7				
Impinger 8				

209.3 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

209.3 Net Liquid (gm)

209.3

☒ QA/QC OK

+ 13.8 Silica Gel (gm)

13.8

☒ QA/QC OK

223.1 Total Vlc (gm)

223.1

☒ 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)

WHEELABRATOR NORTH BROWARD, INC.

Clean Air Project No: 11182

Location: Ash Unloading Area / Conveyor

Date (2009): March 24

Start Time: 11:39

End Time: 12:50

METHOD 22 FIELD DATA PRINTOUT

Run	Clock Time (start)	Observation Period (minutes)	Accumulated Emission Duration (seconds)
1	11:39 11:59	20	0
2	12:04 12:24	20	21
3	12:30 12:50	20	0

Total (% of observation time) = 0.58

Total (minutes) = 0.35

WHEELABRATOR NORTH BROWARD, INC.

Clean Air Project No: 11182

Location: Door to Baghouse / Ash Unloading

Date (2009): March 24

Start Time: 12:55

End Time: 14:05

METHOD 22 FIELD DATA PRINTOUT

Run	Clock Time (start)	Observation Period (minutes)	Accumulated Emission Duration (seconds)
1	12:55 13:15	20	0
2	13:20 13:40	20	0
3	13:45 14:05	20	0

Total (% of observation time) = 0.0

Total (minutes) = 0.0

WHEELABRATOR NORTH BROWARD, INC.

Clean Air Project No: 11182

Location: Rolling Door/Door to Baghouse

Date (2009): March 24

Start Time: 14:10

End Time: 15:20

METHOD 22 FIELD DATA PRINTOUT

Run	Clock Time (start)	Observation Period (minutes)	Accumulated Emission Duration (seconds)
1	14:10 14:30	20	0
2	14:35 14:55	20	0
3	15:00 15:20	20	0

Total (% of observation time) = 0.0

Total (minutes) = 0.0

Wheelabrator
CleanAir Project No. 11182
North Broward
FF Outlet, SDA Inlet

March 22, 2011
Start Time 12:06
Stop time 12:35

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2
	FF Outlet %dv	FF Outlet %dv
Calibration Checks		
C _{oi} Initial zero	0.022	-0.030
C _{ui} Initial upscale	5.887	14.086
C _{of} Final zero	0.054	0.019
C _{uf} Final upscale	5.877	14.170
C _{ma} Actual gas value	5.930	14.100
C _{lin} Actual gas value (linearity)	13.90	6.05
Analyzer Averages (concentrations)		
C _{Avg} Average conc.	9.91	9.32
C _{Gas} Bias adjusted	10.02	9.30
Analyzer Averages (concentrations)		
C _{Avg} Average conc.	10.53	8.81
C _{Gas} Bias adjusted	10.65	8.79
Analyzer Averages (concentrations)		
C _{Avg} Average conc.	9.62	9.78
C _{Gas} Bias adjusted	9.73	9.76
Analyzer Averages (concentrations)		
C _{Avg} Average conc.	10.33	8.99
C _{Gas} Bias adjusted	10.44	8.97
Analyzer Averages (concentrations)		
C _{Avg} Average conc.	10.52	8.85
C _{Gas} Bias adjusted	10.63	8.84
Analyzer Averages (concentrations)		
C _{Avg} Average conc.	9.32	10.15
C _{Gas} Bias adjusted	9.42	10.13
Analyzer Averages (concentrations)		
C _{Avg} Average conc.	10.23	9.09
C _{Gas} Bias adjusted	10.34	9.08
Analyzer Averages (concentrations)		
C _{Avg} Average conc.	10.22	9.17
C _{Gas} Bias adjusted	10.34	9.16

Wheelabrator
CleanAir Project No. 11182
North Broward
FF Outlet, SDA Inlet

March 22, 2011
Start Time 12:06
Stop time 12:35

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
040811 115723			
12:07:16	0.013	-0.013	
12:07:31	0.017	-0.025	
12:07:46	0.022	-0.030	zero
12:08:01	0.036	-0.034	
12:08:16	0.036	-0.030	
12:08:31	0.036	-0.034	
12:08:46	0.019	-0.034	
12:09:01	0.026	-0.039	
12:09:16	0.026	-0.045	
12:09:31	0.026	-0.051	
12:09:46	0.037	-0.050	
12:10:01	0.037	-0.051	
12:10:16	0.037	0.418	
12:10:31	0.954	16.401	
12:10:46	5.555	14.059	
12:11:01	5.806	13.962	
12:11:16	5.820	13.971	
12:11:31	5.823	13.976	
12:11:46	5.824	14.055	
12:12:01	5.856	14.093	
12:12:16	5.887	14.094	
12:12:31	5.887	14.086	span
12:12:46	5.054	15.833	
12:13:01	3.586	15.724	
12:13:16	13.627	6.002	
12:13:31	13.949	5.838	
12:13:46	9.838	12.245	
12:14:01	4.092	15.186	
12:14:16	13.648	5.954	
12:14:31	13.914	5.815	linearity
12:14:46	13.940	5.816	
12:15:01	10.145	11.763	
12:15:16	0.439	20.871	
12:15:31	0.151	21.059	
12:15:46	0.100	21.062	
12:16:01	0.067	21.073	
12:16:16	0.077	21.071	
12:16:31	0.059	21.068	
12:16:46	0.096	21.091	
12:17:01	0.108	21.107	
12:17:16	0.113	21.138	
12:17:31	0.114	21.143	
12:17:46	0.112	21.147	
12:18:01	4.436	14.513	
12:18:16	9.808	9.369	
12:18:31	9.896	9.324	
12:18:46	9.908	9.321	U3 R1 5/29

Wheelabrator
CleanAir Project No. 11182
North Broward
FF Outlet, SDA Inlet

March 22, 2011
Start Time 12:06
Stop time 12:35

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
12:19:01	9.915	9.320	
12:19:16	6.181	15.318	
12:19:31	3.180	16.230	
12:19:46	10.370	8.917	
12:20:01	10.528	8.830	
12:20:16	10.529	8.810	U3 R2 5/29
12:20:31	10.530	8.820	
12:20:46	4.919	17.050	
12:21:01	3.213	16.198	
12:21:16	9.493	9.855	
12:21:31	9.622	9.777	U1 R1 26 in
12:21:46	9.632	9.767	
12:22:01	9.636	9.781	
12:22:16	9.642	9.782	
12:22:31	4.355	17.540	
12:22:46	3.864	15.334	
12:23:01	10.217	9.054	
12:23:16	10.319	8.989	
12:23:31	10.328	8.989	U1 R2 26 in
12:23:46	10.331	8.988	
12:24:01	10.329	9.205	
12:24:16	2.706	19.107	
12:24:31	8.373	10.252	
12:24:46	10.491	8.858	
12:25:01	10.507	8.850	
12:25:16	10.514	8.860	
12:25:31	10.517	8.854	U1 R3 26 in
12:25:46	10.522	8.865	
12:26:01	3.633	18.514	
12:26:16	0.173	21.096	
12:26:31	0.144	21.128	
12:26:46	4.213	14.952	
12:27:01	9.232	10.203	
12:27:16	9.311	10.165	
12:27:31	9.320	10.152	U1 R1 26 out
12:27:46	9.323	10.223	
12:28:01	2.831	19.267	
12:28:16	0.171	21.128	
12:28:31	0.138	21.162	
12:28:46	0.127	21.168	
12:29:01	0.133	20.990	
12:29:16	7.678	10.855	
12:29:31	10.224	9.128	
12:29:46	10.226	9.093	U1 R2 26 out
12:30:01	10.261	9.105	
12:30:16	10.267	9.098	
12:30:31	10.224	9.577	
12:30:46	2.098	19.934	

Wheelabrator
CleanAir Project No. 11182
North Broward
FF Outlet, SDA Inlet

March 22, 2011
Start Time 12:06
Stop time 12:35

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
12:31:01	0.159	21.125	
12:31:16	1.396	18.491	
12:31:31	9.760	9.433	
12:31:46	10.224	9.172	U1 R3 26 out
12:32:01	10.244	9.170	
12:32:16	10.249	9.167	
12:32:31	10.258	9.163	
12:32:46	10.250	9.381	
12:33:01	3.691	17.491	
12:33:16	5.726	14.250	
12:33:31	5.880	14.170	
12:33:46	5.877	14.170	span
12:34:01	5.160	15.752	
12:34:16	0.395	11.437	
12:34:31	0.054	0.133	
12:34:46	0.054	0.019	zero
12:35:01	0.055	0.007	
12:35:16	0.063	5.464	
12:35:31	0.118	20.636	
12:35:46	0.121	21.067	

Wheelabrator
CleanAir Project No. 11182
North Broward
FF Outlet, SDA Inlet

March 22, 2011
Start Time 16:56
Stop time 17:12

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2
	FF Outlet %dv	FF Outlet %dv
Calibration Checks		
C _{oi} Initial zero	0.031	-0.071
C _{ui} Initial upscale	5.951	14.075
C _{of} Final zero	0.038	-0.077
C _{uf} Final upscale	5.946	14.010
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.	10.21	9.21
C _{Gas} Bias adjusted	10.20	9.27
Analyzer Averages (concentrations)		
C _{AVG} Average conc.	10.14	9.27
C _{Gas} Bias adjusted	10.14	9.33
Analyzer Averages (concentrations)		
C _{AVG} Average conc.	10.01	9.55
C _{Gas} Bias adjusted	10.00	9.61
Analyzer Averages (concentrations)		
C _{AVG} Average conc.	9.94	9.64
C _{Gas} Bias adjusted	9.93	9.70
Analyzer Averages (concentrations)		
C _{AVG} Average conc.	9.61	10.19
C _{Gas} Bias adjusted	9.60	10.25

040811 120615

16:57:05	0.042	-0.063	
16:57:20	0.031	-0.071	
16:57:05	0.042	-0.063	
16:57:20	0.031	-0.071	zero
16:57:35	0.040	1.668	
16:57:50	2.652	15.695	
16:58:05	5.887	14.253	
16:58:20	5.971	14.076	
16:58:35	5.951	14.075	span
16:58:50	5.804	14.677	
16:59:05	3.252	16.530	
16:59:20	13.376	6.369	
16:59:35	14.128	5.909	
16:59:50	14.151	5.911	
17:00:05	14.161	5.890	linearity
17:00:20	13.159	8.343	

Wheelabrator
CleanAir Project No. 11182
North Broward
FF Outlet, SDA Inlet

March 22, 2011
Start Time 16:56
Stop time 17:12

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
17:00:35	6.098	13.415	
17:00:50	10.088	9.286	
17:01:05	10.208	9.208	U3 R3 M23
17:01:20	10.209	9.206	
17:01:35	4.950	16.839	
17:01:50	3.973	15.261	
17:02:05	9.863	9.437	
17:02:20	10.136	9.282	
17:02:35	10.144	9.265	U3 R3 5/29
17:02:50	9.260	11.365	
17:03:05	1.058	20.344	
17:03:20	0.706	19.524	
17:03:35	8.877	10.254	
17:03:50	9.984	9.564	
17:04:05	10.006	9.548	U1 R1 13B
17:04:20	10.007	9.554	
17:04:35	8.509	12.473	
17:04:50	0.714	20.592	
17:05:05	4.390	14.742	
17:05:20	9.808	9.714	
17:05:35	9.936	9.642	U1 R2 13B
17:05:50	9.944	9.638	
17:06:05	9.449	11.091	
17:06:20	1.319	20.176	
17:06:35	0.175	20.978	
17:06:50	0.146	20.995	
17:07:05	0.134	21.000	
17:07:20	2.067	17.674	
17:07:35	9.167	10.452	
17:07:50	9.588	10.204	
17:08:05	9.609	10.193	U1 R3 13B
17:08:20	9.610	10.169	
17:08:35	9.591	10.152	
17:08:50	9.595	10.145	
17:09:05	9.596	10.138	
17:09:20	5.512	16.026	
17:09:35	4.242	15.302	
17:09:50	5.921	14.016	
17:10:05	5.946	14.006	
17:10:20	5.946	14.010	span
17:10:35	5.785	14.593	
17:10:50	1.042	7.216	
17:11:05	0.077	-0.003	
17:11:20	0.038	-0.077	zero
17:11:35	0.043	-0.081	
17:11:50	0.064	7.643	
17:12:05	0.122	20.440	
17:12:20	0.123	20.857	

Wheelabrator
CleanAir Project No. 11182
North Broward
FF Outlet, SDA Inlet

March 23, 2011
Start Time 11:17
Stop time 11:58

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2
	FF Outlet %dv	FF Outlet %dv
Calibration Checks		
C _{0i} Initial zero	0.029	-0.025
C _{0i} Initial upscale	5.940	14.079
C _{0f} Final zero	0.043	0.010
C _{0f} Final upscale	5.922	14.107
C _{ma} Actual gas value	5.93	14.10
C _{lin} Actual gas value (linearity)	13.90	6.05
Analyzer Averages (concentrations)		U2 R1 26 in
C _{Avg} Average conc.	11.25	7.95
C _{Gas} Bias adjusted	11.29	7.95
Analyzer Averages (concentrations)		U2 R2 26 in
C _{Avg} Average conc.	10.97	8.16
C _{Gas} Bias adjusted	11.00	8.16
Analyzer Averages (concentrations)		U2 R3 M26 in
C _{Avg} Average conc.	11.33	7.85
C _{Gas} Bias adjusted	11.36	7.86
Analyzer Averages (concentrations)		U2 R1 26 out
C _{Avg} Average conc.	10.56	8.59
C _{Gas} Bias adjusted	10.58	8.60
Analyzer Averages (concentrations)		U2 R2 26 out
C _{Avg} Average conc.	10.41	8.89
C _{Gas} Bias adjusted	10.43	8.90
Analyzer Averages (concentrations)		U1 R1 5/29
C _{Avg} Average conc.	9.46	9.81
C _{Gas} Bias adjusted	9.48	9.82
Analyzer Averages (concentrations)		U1 R2 5/29
C _{Avg} Average conc.	9.79	9.57
C _{Gas} Bias adjusted	9.81	9.58
Analyzer Averages (concentrations)		U2 R3 M26 out
C _{Avg} Average conc.	10.53	8.69
C _{Gas} Bias adjusted	10.56	8.70
Analyzer Averages (concentrations)		U3 R2 M23
C _{Avg} Average conc.	9.82	9.38
C _{Gas} Bias adjusted	9.84	9.38

Wheelabrator
CleanAir Project No. 11182
North Broward
FF Outlet, SDA Inlet

March 23, 2011
Start Time 11:17
Stop time 11:58

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
040811 121452			
11:18:23	0.028	0.000	
11:18:38	0.033	-0.016	
11:18:53	0.029	-0.025	
11:18:23	0.028	0.000	
11:18:38	0.033	-0.016	
11:18:53	0.029	-0.025	zero
11:19:08	0.034	3.441	
11:19:23	0.112	19.424	
11:19:38	4.735	14.718	
11:19:53	6.061	13.970	
11:20:08	6.070	14.075	
11:20:23	5.918	14.069	
11:20:38	5.932	14.079	
11:20:53	5.940	14.079	span
11:21:08	5.912	14.267	
11:21:23	4.427	15.392	
11:21:38	13.299	6.297	
11:21:53	13.846	5.957	
11:22:08	13.863	5.942	
11:22:23	13.866	5.940	linearity
11:22:38	13.865	5.938	
11:22:53	6.782	15.756	
11:23:08	0.687	20.030	
11:23:23	9.005	9.545	
11:23:38	11.227	7.969	
11:23:53	11.248	7.951	
11:24:08	11.254	7.947	U2 R1 26 in
11:24:23	11.258	8.065	
11:24:38	3.487	18.748	
11:24:53	0.382	20.287	
11:25:08	9.176	9.381	
11:25:23	10.952	8.170	
11:25:38	10.975	8.156	U2 R2 26 in
11:25:53	10.981	8.151	
11:26:08	8.270	12.904	
11:26:23	5.199	15.256	
11:26:38	1.256	18.951	
11:26:53	10.384	8.425	
11:27:08	11.307	7.852	
11:27:23	11.326	7.851	U2 R3 M26 in
11:27:38	11.322	7.858	
11:27:53	4.016	18.215	
11:28:08	0.645	19.924	
11:28:23	8.870	9.742	
11:28:38	10.056	8.309	
11:28:53	10.633	8.675	

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IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
11:29:08	10.409	8.490	
11:29:23	10.541	8.629	
11:29:38	10.558	8.593	U2 R1 26 out
11:29:53	7.889	13.421	
11:30:08	-1.278	20.932	
11:30:23	-1.539	21.017	
11:30:38	0.024	21.123	
11:30:53	0.125	21.223	
11:31:08	2.688	16.791	
11:31:23	10.100	9.076	
11:31:38	10.386	8.906	
11:31:53	10.405	8.893	
11:32:08	10.408	8.888	U2 R2 26 out
11:32:23	10.408	8.885	
11:32:38	9.650	10.920	
11:32:53	1.061	20.572	
11:33:08	0.149	21.180	
11:33:23	0.130	21.219	
11:33:38	0.122	21.224	
11:33:53	4.907	14.112	
11:34:08	9.455	9.948	
11:34:23	9.505	9.870	
11:34:38	9.552	9.902	
11:34:53	9.460	9.810	U1 R1 5/29
11:35:08	4.801	16.976	
11:35:23	0.244	21.161	
11:35:38	0.144	21.232	
11:35:53	0.127	21.245	
11:36:08	0.122	21.247	
11:36:23	5.721	13.052	
11:36:38	9.734	9.608	
11:36:53	9.787	9.574	
11:37:08	9.795	9.565	
11:37:23	9.791	9.574	U1 R2 5/29
11:37:38	9.801	9.572	
11:37:53	9.805	9.561	
11:38:08	9.800	9.560	
11:38:23	5.296	16.428	
11:38:38	0.251	21.129	
11:38:53	0.146	21.127	
11:39:08	7.297	11.162	
11:39:23	10.498	8.727	
11:39:38	10.535	8.704	
11:39:53	10.529	8.692	U2 R3 M26 out
11:40:08	10.541	8.696	
11:40:23	10.544	8.695	
11:40:38	9.481	11.085	
11:40:53	0.892	20.687	

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March 23, 2011
Start Time 11:17
Stop time 11:58

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
11:41:08	0.159	21.191	
11:41:23	0.134	21.203	
11:41:38	0.123	21.200	
11:41:53	0.120	21.197	
11:42:08	0.388	20.550	
11:42:23	7.431	11.114	
11:42:38	9.784	9.400	
11:42:53	9.815	9.381	
11:43:08	9.817	9.377	U3 R2 M23
11:43:23	9.829	9.379	
11:43:38	3.523	18.540	
11:43:53	3.588	16.131	
11:44:08	5.906	14.124	
11:44:23	5.747	14.028	
11:44:38	5.922	14.107	span
11:44:53	5.938	14.120	
11:45:08	5.916	14.320	
11:45:23	1.472	14.377	
11:45:38	0.085	0.416	
11:45:53	0.050	0.026	
11:46:08	0.043	0.010	zero
11:46:23	0.046	0.593	
11:46:38	0.104	18.467	
11:46:53	0.120	21.125	
11:47:08	0.120	21.052	
11:47:23	0.122	21.042	
11:47:38	0.129	21.040	
11:47:53	0.143	21.041	
11:48:08	0.157	21.039	
11:48:23	0.169	21.038	
11:48:38	1.084	18.971	
11:48:53	8.889	10.758	
11:49:08	1.773	19.994	
11:49:23	0.178	21.154	
11:49:38	0.134	21.188	
11:49:53	0.125	21.204	
11:50:08	0.122	21.207	
11:50:23	0.118	21.214	
11:50:38	0.116	21.222	
11:50:53	0.115	21.223	
11:51:08	0.115	21.233	
11:51:23	0.111	21.236	
11:51:38	0.113	21.240	
11:51:53	0.112	21.243	
11:52:08	0.112	21.251	
11:52:23	0.110	21.251	
11:52:38	0.112	21.254	
11:52:53	0.110	21.260	

Wheelabrator
CleanAir Project No. 11182
North Broward
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March 23, 2011
Start Time 15:49
Stop time 16:08

IGS Bag Analysis

		Channel 1 CO2	Channel 2 O2
		FF Outlet %dv	FF Outlet %dv
Calibration Checks			
C _{oi}	Initial zero	0.027	-0.020
C _{ui}	Initial upscale	5.946	14.071
C _{of}	Final zero	0.050	-0.017
C _{uf}	Final upscale	5.954	14.158
C _{ma}	Actual gas value	5.93	14.10
C _{lin}	Actual gas value (linearity)	13.90	6.05
Analyzer Averages (concentrations)			U1 R3 5/29
C _{AvG}	Average conc.	9.85	9.82
C _{Gas}	Bias adjusted	9.84	9.81
Analyzer Averages (concentrations)			U2 R1 13B
C _{AvG}	Average conc.	10.44	9.05
C _{Gas}	Bias adjusted	10.43	9.05
Analyzer Averages (concentrations)			U2 R2 13B
C _{AvG}	Average conc.	10.47	9.13
C _{Gas}	Bias adjusted	10.46	9.13
Analyzer Averages (concentrations)			U2 R3 13B
C _{AvG}	Average conc.	11.06	8.60
C _{Gas}	Bias adjusted	11.06	8.60
Analyzer Averages (concentrations)			U3 R3 23
C _{AvG}	Average conc.	10.35	9.22
C _{Gas}	Bias adjusted	10.34	9.22

040811 124858

15:50:14	0.027	-0.020	
15:50:29	0.030	0.062	
15:50:14	0.027	-0.020	zero
15:50:29	0.030	0.062	
15:50:44	0.116	16.524	
15:50:59	4.551	14.956	
15:51:14	5.686	14.186	
15:51:29	5.877	14.085	
15:51:44	5.942	14.079	
15:51:59	5.946	14.071	span
15:52:14	5.949	14.080	
15:52:29	4.403	16.704	
15:52:44	5.671	13.396	
15:52:59	13.848	6.171	
15:53:14	14.021	6.084	
15:53:29	14.029	6.082	linearity

Wheelabrator
CleanAir Project No. 11182
North Broward
FF Outlet, SDA Inlet

March 23, 2011
Start Time 15:49
Stop time 16:08

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
15:53:44	13.921	6.927	
15:53:59	2.574	19.579	
15:54:14	0.179	21.001	
15:54:29	0.520	19.868	
15:54:44	8.643	10.551	
15:54:59	9.817	9.837	
15:55:14	9.850	9.818	U1 R3 5/29
15:55:29	9.856	9.815	
15:55:44	4.546	17.345	
15:55:59	0.204	20.999	
15:56:14	0.931	19.115	
15:56:29	9.597	9.539	
15:56:44	10.408	9.053	
15:56:59	10.438	9.051	U2 R1 13B
15:57:14	10.411	9.432	
15:57:29	2.409	19.614	
15:57:44	1.079	18.967	
15:57:59	9.669	9.485	
15:58:14	10.457	9.137	
15:58:29	10.470	9.132	U2 R2 13B
15:58:44	10.476	9.124	
15:58:59	5.240	16.666	
15:59:14	0.235	21.042	
15:59:29	0.142	21.093	
15:59:44	0.130	21.115	
15:59:59	0.124	21.113	
16:00:14	0.122	21.119	
16:00:29	0.118	21.116	
16:00:44	3.269	16.088	
16:00:59	10.853	8.723	
16:01:14	11.047	8.610	
16:01:29	11.062	8.601	U2 R3 13B
16:01:44	11.066	8.667	
16:01:59	3.483	18.800	
16:02:14	0.719	19.582	
16:02:29	9.360	9.804	
16:02:44	10.328	9.230	
16:02:59	10.348	9.230	
16:03:14	10.346	9.221	U3 R3 23
16:03:29	10.343	9.212	
16:03:44	8.482	11.685	
16:03:59	3.004	18.993	
16:04:14	1.913	18.221	
16:04:29	5.845	14.216	
16:04:44	5.954	14.158	span
16:04:59	5.958	14.154	
16:05:14	5.377	15.458	
16:05:29	0.474	5.500	

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IGS Bag Analysis

	Channel 1 CO2 FF Outlet %dv	Channel 2 O2 FF Outlet %dv	
16:05:44	0.062	0.026	
16:05:59	0.044	-0.004	
16:06:14	0.050	-0.017	zero
16:06:29	0.047	-0.024	
16:06:44	0.027	-0.027	
16:06:59	0.043	0.039	
16:07:14	0.085	14.250	
16:07:29	0.100	16.022	
16:07:44	0.108	16.072	
16:07:59	0.119	16.099	
16:08:14	0.131	16.118	
16:08:29	0.370	16.211	

Wheelabrator
CleanAir Project No. 11182
North Broward
FF Outlet, SDA Inlet

March 24, 2011
Start Time 11:23
Stop time 11:48

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2
	FF Outlet %dv	FF Outlet %dv
Calibration Checks		
C _{0i} Initial zero	0.046	-0.005
C _{0i} Initial upscale	5.882	14.149
C _{0f} Final zero	0.034	0.025
C _{0f} Final upscale	5.905	14.192
C _{ma} Actual gas value	5.93	14.10
C _{lin} Actual gas value (linearity)	13.90	6.05
Analyzer Averages (concentrations)		U3 R1 26 out
C _{Avg} Average conc.	10.67	8.59
C _{Gas} Bias adjusted	10.77	8.54
Analyzer Averages (concentrations)		U3 R2 26 out
C _{Avg} Average conc.	10.33	9.05
C _{Gas} Bias adjusted	10.43	9.00
Analyzer Averages (concentrations)		U3 R1 26 in
C _{Avg} Average conc.	10.84	8.43
C _{Gas} Bias adjusted	10.94	8.39
Analyzer Averages (concentrations)		U3 R2 26 in
C _{Avg} Average conc.	10.73	8.72
C _{Gas} Bias adjusted	10.83	8.68
Analyzer Averages (concentrations)		U3 R3 26 in
C _{Avg} Average conc.	9.86	9.70
C _{Gas} Bias adjusted	9.95	9.65
Analyzer Averages (concentrations)		U3 R3 26 out
C _{Avg} Average conc.	9.97	9.49
C _{Gas} Bias adjusted	10.06	9.44
Analyzer Averages (concentrations)		U2 R1 5/29
C _{Avg} Average conc.	10.99	8.17
C _{Gas} Bias adjusted	11.09	8.13
Analyzer Averages (concentrations)		U2 R2 5/29
C _{Avg} Average conc.	10.92	8.33
C _{Gas} Bias adjusted	11.02	8.28

040811 125815

11:28:03	8.712	13.221
11:28:18	0.328	3.283

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IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
11:28:33	0.067	-0.026	
11:28:48	0.055	-0.002	
11:29:03	0.046	-0.005	zero
11:29:18	0.048	4.106	
11:29:33	2.534	16.295	
11:29:48	5.784	14.210	
11:30:03	5.873	14.151	
11:30:18	5.882	14.149	span
11:30:33	5.639	14.947	
11:30:48	2.606	17.267	
11:31:03	13.071	6.576	
11:31:18	13.916	6.057	
11:31:33	13.942	6.060	linearity
11:31:48	12.798	8.699	
11:32:03	1.393	20.219	
11:32:18	0.195	20.765	
11:32:33	7.797	10.625	
11:32:48	10.604	8.608	
11:33:03	10.659	8.589	
11:33:18	10.668	8.586	U3 R1 26 out
11:33:33	10.675	8.646	
11:33:48	3.536	18.560	
11:34:03	0.713	19.685	
11:34:18	8.819	10.028	
11:34:33	10.314	9.068	
11:34:48	10.334	9.048	U3 R2 26 out
11:35:03	10.341	9.066	
11:35:18	3.662	18.405	
11:35:33	0.194	21.021	
11:35:48	6.135	12.488	
11:36:03	10.739	8.485	
11:36:18	10.805	8.447	
11:36:33	10.839	8.432	U3 R1 26 in
11:36:48	10.079	10.472	
11:37:03	1.155	20.412	
11:37:18	4.474	14.611	
11:37:33	10.592	8.806	
11:37:48	10.716	8.734	
11:38:03	10.727	8.725	U3 R2 26 in
11:38:18	10.731	8.725	
11:38:33	10.700	8.694	
11:38:48	10.735	8.838	
11:39:03	3.320	18.852	
11:39:18	0.191	21.055	
11:39:33	0.136	21.108	
11:39:48	2.368	17.248	
11:40:03	9.544	9.905	
11:40:18	9.865	9.746	

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IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
11:40:33	9.864	9.697	U3 R3 26 in
11:40:48	9.887	9.732	
11:41:03	9.889	9.732	
11:41:18	6.146	15.472	
11:41:33	0.341	20.784	
11:41:48	5.966	13.006	
11:42:03	9.918	9.543	
11:42:18	9.965	9.501	
11:42:33	9.973	9.492	U3 R3 26 out
11:42:48	9.977	9.501	
11:43:03	3.625	18.412	
11:43:18	0.291	20.520	
11:43:33	8.728	9.749	
11:43:48	10.956	8.194	
11:44:03	10.988	8.170	U2 R1 5/29
11:44:18	10.989	8.164	
11:44:33	5.347	16.473	
11:44:48	0.285	20.762	
11:45:03	5.437	13.392	
11:45:18	10.813	8.383	
11:45:33	10.912	8.328	
11:45:48	10.922	8.325	U2 R2 5/29
11:46:03	10.926	8.406	
11:46:18	3.523	18.317	
11:46:33	4.839	14.881	
11:46:48	5.889	14.186	
11:47:03	5.905	14.192	span
11:47:18	5.715	14.875	
11:47:33	0.837	11.187	
11:47:48	0.065	0.179	
11:48:03	0.053	0.025	
11:48:18	0.034	0.025	zero
11:48:33	0.041	2.941	
11:48:48	0.105	19.860	

Wheelabrator
CleanAir Project No. 11182
North Broward
FF Outlet, SDA Inlet

March 24, 2011
Start Time 15:45
Stop time 15:59

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2
	FF Outlet %dv	FF Outlet %dv
Calibration Checks		
C _{oi} Initial zero	0.017	0.114
C _{ui} Initial upscale	5.898	14.076
C _{of} Final zero	0.049	0.130
C _{uf} Final upscale	5.916	14.054
C _{ma} Actual gas value	5.93	14.10
C _{lin} Actual gas value (linearity)	13.90	6.05
Analyzer Averages (concentrations)		U2 R3 5/29
C _{avg} Average conc.	11.54	7.66
C _{Gas} Bias adjusted	11.61	7.62
Analyzer Averages (concentrations)		U3 R1 13B
C _{avg} Average conc.	9.88	9.75
C _{Gas} Bias adjusted	9.94	9.73
Analyzer Averages (concentrations)		U3 R2 13B
C _{avg} Average conc.	9.94	9.66
C _{Gas} Bias adjusted	10.00	9.65
Analyzer Averages (concentrations)		U3 R3 13B
C _{avg} Average conc.	10.61	8.97
C _{Gas} Bias adjusted	10.68	8.94

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15:46:29	0.118	20.975	
15:46:44	0.076	10.212	
15:46:59	0.032	0.543	
15:47:14	0.024	0.306	
15:47:29	0.024	0.110	
15:47:44	0.028	0.114	
15:47:59	0.017	0.114	zero
15:48:14	0.028	4.079	
15:48:29	1.555	17.093	
15:48:44	5.437	13.980	
15:48:59	5.659	13.958	
15:49:14	5.705	14.073	
15:49:29	5.915	14.076	
15:49:44	5.898	14.076	span
15:49:59	5.716	14.764	
15:50:14	5.828	13.512	
15:50:29	13.835	6.100	
15:50:44	14.142	5.934	
15:50:59	14.160	5.924	linearity
15:51:14	13.704	7.454	

Wheelabrator
CleanAir Project No. 11182
North Broward
FF Outlet, SDA Inlet

March 24, 2011
Start Time 15:45
Stop time 15:59

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
15:51:29	2.124	19.731	
15:51:44	5.071	13.729	
15:51:59	11.365	7.779	
15:52:14	11.517	7.676	
15:52:29	11.538	7.658	U2 R3 5/29
15:52:44	11.538	7.680	
15:52:59	4.084	18.017	
15:53:14	0.236	20.888	
15:53:29	0.930	19.111	
15:53:44	8.905	10.357	
15:53:59	9.850	9.765	
15:54:14	9.883	9.746	U3 R1 13B
15:54:29	9.895	9.741	
15:54:44	4.658	17.132	
15:54:59	0.282	20.846	
15:55:14	4.208	14.946	
15:55:29	9.759	9.769	
15:55:44	9.941	9.660	U3 R2 13B
15:55:59	9.955	9.650	
15:56:14	4.338	17.504	
15:56:29	0.269	20.842	
15:56:44	5.897	12.935	
15:56:59	10.522	9.001	
15:57:14	10.611	8.966	U3 R3 13B
15:57:29	10.633	8.956	
15:57:44	7.339	13.780	
15:57:59	5.118	14.593	
15:58:14	5.910	14.052	
15:58:29	5.916	14.054	span
15:58:44	3.601	14.195	
15:58:59	0.182	1.096	
15:59:14	0.053	0.155	
15:59:29	0.035	0.130	
15:59:44	0.049	0.130	zero
15:59:59	0.045	3.509	

WHEELABRATOR NORTH BROWARD, INC.
POMPANO BEACH, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-1

LABORATORY DATA

H

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: MR

Date: 5/4/11



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Wheelabrator North 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

Run No.	Blank	1	2	3
Date (2011)	Mar 23	Mar 23	Mar 23	Mar 23
Start Time (approx.)	06:34	09:05	11:41	
Stop Time (approx.)	08:45	11:17	13:52	

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)

	Blank	1	2	3
m _{f1} Filter No. 1 residue mass (g)	0.00010	nd	nd	
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)	0.00010	0.00000	0.00000	

First Solvent Rinse

Acetone

	Blank	1	2	3
ρ ₁ Density (g/mL)	0.785			
v _{s1} Sample volume (mL)		116	102	62
v _{a1} Aliquot volume (mL)	124	116	102	62
r _{a1} Aliquot residue mass (g)	nd	0.00012	0.00050	0.00040
r _{s1} Sample residue mass (g)		0.00012	0.00050	0.00040
m _{b1} Allowable blank correction (g)		0.00000	0.00000	0.00000
m ₁ Net residue mass (g)		0.00012	0.00050	0.00040

Second Solvent Rinse

N/A

	Blank	1	2	3
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	0.00000

m _s Total Solvent Residue (g)		0.00012	0.00050	0.00040

m _T Total Gravimetric Result (g)		0.00022	0.00050	0.00040

m _D Total Gravimetric Detection Limit (g)		0.00020	0.00020	0.00020

m _n Total Filterable Particulate Matter (g)		0.00022	0.00050	0.00040

n _{MDL} Number of Non-Detectable Fractions		N/A	1 out of 2	1 out of 2

DLC Detection Level Classification		ADL	DLL	DLL

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 North 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 24	Mar 24	Mar 24
Start Time (approx.)		06:28	08:53	11:19
Stop Time (approx.)		08:38	11:03	14:30

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)	nd	nd	nd
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)	0.00000	0.00000	0.00000

First Solvent Rinse

Acetone

p ₁	Density (g/mL)	0.785		
v _{s1}	Sample volume (mL)		78	88
v _{a1}	Aliquot volume (mL)	124	78	88
r _{a1}	Aliquot residue mass (g)	nd	0.00160	nd
r _{s1}	Sample residue mass (g)		0.00160	0.00000
m _{b1}	Allowable blank correction (g)		0.00000	0.00000
m ₁	Net residue mass (g)		0.00160	0.00000

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)		0.00160	0.00000

m _T	Total Gravimetric Result (g)		0.00160	0.00000

m _D	Total Gravimetric Detection Limit (g)		0.00020	0.00020

m _n	Total Filterable Particulate Matter (g)		0.00160	0.00020

n _{MDL}	Number of Non-Detectable Fractions		1 out of 2	2 out of 2

DLC	Detection Level Classification		DLL	BDL

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 North 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 22	Mar 22	Mar 22	Mar 22
Start Time (approx.)	06:57	09:35	12:16	12:16
Stop Time (approx.)	09:10	11:50	14:30	14:30

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)	nd	nd	nd
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)	0.00000	0.00000	0.00000

First Solvent Rinse

Acetone

ρ ₁	Density (g/mL)	0.785		
v _{s1}	Sample volume (mL)	116	66	119
v _{a1}	Aliquot volume (mL)	124	116	66
r _{a1}	Aliquot residue mass (g)	nd	0.00220	0.00280
r _{s1}	Sample residue mass (g)		0.00220	0.00280
m _{b1}	Allowable blank correction (g)		0.00000	0.00000
m ₁	Net residue mass (g)		0.00220	0.00170

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)	0.00220	0.00280	0.00170

m _T	Total Gravimetric Result (g)	0.00220	0.00280	0.00170

m _D	Total Gravimetric Detection Limit (g)	0.00020	0.00020	0.00020

m _n	Total Filterable Particulate Matter (g)	0.00220	0.00280	0.00170

n _{MDL}	Number of Non-Detectable Fractions	1 out of 2	1 out of 2	1 out of 2

DLC	Detection Level Classification	DLL	DLL	DLL

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 North 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 23	Mar 23	Mar 23
Start Time (approx.)	06:34	09:05	11:41
Stop Time (approx.)	08:45	11:17	13:52

Sample Analysis

m _{1b-S}	Fraction 1B Sample (µg)	<0.1000	<0.1000	<0.1000
m _{2b-S}	Fraction 2B Sample (µg)	5.5135	4.6403	4.9369
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)	5.5135	4.6403	4.9369

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)	5.5135	4.6403	4.9369

Sample Corrected for Blank

m _{n-1b}	Fraction 1B (µg)	0.0000	0.0000	0.0000
m _{n-2b}	Fraction 2B (µg)	5.5135	4.6403	4.9369
m _{n-3a}	Fraction 3A (µg)	0.0000	0.0000	0.0000
m _{n-3b}	Fraction 3B (µg)	0.0000	0.0000	0.0000
m _{n-3c}	Fraction 3C (µg)	0.0000	0.0000	0.0000

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 L

Wheelabrator North 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 23	Mar 23	Mar 23
Start Time (approx.)	06:34	09:05	11:41
Stop Time (approx.)	08:45	11:17	13:52
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 North 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 23	Mar 23	Mar 23
Start Time (approx.)	06:34	09:05	11:41
Stop Time (approx.)	08:45	11:17	13:52
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)	0.2435	0.2097	0.3090
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)	0.2435	0.2097	0.3090

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Wheelabrator North 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 23	Mar 23	Mar 23
Start Time (approx.)	06:34	09:05	11:41
Stop Time (approx.)	08:45	11:17	13:52
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)	1.3042	0.8048	0.8288
m _{FB} Matter collected in front half blank (µg)	0.9253	0.9253	0.9253
m _{FB-allow} Allowable front half blank correction (µg)	0.9253	0.9253	0.9253
m _n Total matter corrected for allowable blanks (µg)	0.3789	<0.2000	<0.2000

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M

Wheelabrator North 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 24	Mar 24	Mar 24
Start Time (approx.)	06:28	08:53	11:19
Stop Time (approx.)	08:38	11:03	14:30

Sample Analysis

m _{1b-S}	Fraction 1B Sample (µg)	<0.1000	<0.1000	<0.1000
m _{2b-S}	Fraction 2B Sample (µg)	7.0725	6.3602	6.2891
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)	7.0725	6.3602	6.2891

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)	7.0725	6.3602	6.2891

Sample Corrected for Blank

m _{n-1b}	Fraction 1B (µg)	0.0000	0.0000	0.0000
m _{n-2b}	Fraction 2B (µg)	7.0725	6.3602	6.2891
m _{n-3a}	Fraction 3A (µg)	0.0000	0.0000	0.0000
m _{n-3b}	Fraction 3B (µg)	0.0000	0.0000	0.0000
m _{n-3c}	Fraction 3C (µg)	0.0000	0.0000	0.0000

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L

Wheelabrator North 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 24	Mar 24	Mar 24
Start Time (approx.)	06:28	08:53	11:19
Stop Time (approx.)	08:38	11:03	14:30
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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K

Wheelabrator North 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 24	Mar 24	Mar 24
Start Time (approx.)	06:28	08:53	11:19
Stop Time (approx.)	08:38	11:03	14:30
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)	0.2318	<0.2000	0.2982
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)	0.2318	<0.2000	0.2982

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K

Wheelabrator North 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 24	Mar 24	Mar 24
Start Time (approx.)	06:28	08:53	11:19
Stop Time (approx.)	08:38	11:03	14:30
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)	0.7168	0.7703	0.6228
m _{FB} Matter collected in front half blank (µg)	0.9253	0.9253	0.9253
m _{FB-allow} Allowable front half blank correction (µg)	0.9253	0.9253	0.9253
m _n Total matter corrected for allowable blanks (µg)	<0.2000	<0.2000	<0.2000

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K

Wheelabrator North 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 22	Mar 22	Mar 22
Start Time (approx.)	06:57	09:35	12:16
Stop Time (approx.)	09:10	11:50	14:30

Sample Analysis

m _{1b-S}	Fraction 1B Sample (µg)	<0.1000	<0.1000	<0.1000
m _{2b-S}	Fraction 2B Sample (µg)	3.2840	3.0296	3.8612
m _{3a-S}	Fraction 3A Sample (µg)	<0.2000	<0.2049	<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)	3.2840	3.0296	3.8612

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)	3.2840	3.0296	3.8612

Sample Corrected for Blank

m _{n-1b}	Fraction 1B (µg)	0.0000	0.0000	0.0000
m _{n-2b}	Fraction 2B (µg)	3.2840	3.0296	3.8612
m _{n-3a}	Fraction 3A (µg)	0.0000	0.0000	0.0000
m _{n-3b}	Fraction 3B (µg)	0.0000	0.0000	0.0000
m _{n-3c}	Fraction 3C (µg)	0.0000	0.0000	0.0000

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M

Wheelabrator North 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 22	Mar 22	Mar 22
Start Time (approx.)	06:57	09:35	12:16
Stop Time (approx.)	09:10	11:50	14:30
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 North 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 22	Mar 22	Mar 22
Start Time (approx.)	06:57	09:35	12:16
Stop Time (approx.)	09:10	11:50	14:30
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)	0.2512	<0.2034	0.2305
m _{FB} Matter collected in front half blank (µg)	0.2000	0.2000	0.2000
m _{FB-allow} Allowable front half blank correction (µg)	0.2000	0.0000	0.2000
m _n Total matter corrected for allowable blanks (µg)	<0.2000	<0.2034	<0.2000

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Wheelabrator North 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 22	Mar 22	Mar 22
Start Time (approx.)	06:57	09:35	12:16
Stop Time (approx.)	09:10	11:50	14:30
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)	1.7772	1.2806	1.2601
m _{FB} Matter collected in front half blank (µg)	0.9253	0.9253	0.9253
m _{FB-allow} Allowable front half blank correction (µg)	0.9253	0.9253	0.9253
m _n Total matter corrected for allowable blanks (µg)	0.8519	0.3552	0.3347

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Clean Air Engineering, Inc.

500 West Wood Street
Palatine, IL 60067

Project Number: 11182NB

Particulate Matter, Beryllium,
Cadmium, Lead and Mercury

EPA Methods 29 & 5 Analyses

Analytical Report
16384



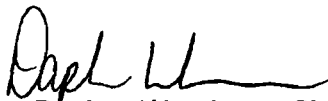
Element One, Inc.

5022-C Wrightsville Av., Wilmington, NC 28403

910-793-0128 FAX: 910-792-6853 e1lab@e1lab.com

The following data for Analytical Report 16384
has been reviewed for completeness, accuracy,
adherence to method protocol,
and compliance with quality assurance guidelines.

Review by:



Daphne Woodman, Chemist
April 12, 2011

Report Reviewed and Finalized By:



Ken Smith, Laboratory Director
April 12, 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	5.51	< 0.1	5.55	< 0.2	< 0.5	< 0.4
	#2		< 0.1	5.48	< 0.2	< 0.5	< 0.4
U1 FF Outlet R2	#1	4.64	< 0.1	4.66	< 0.2	< 0.5	< 0.4
	#2		< 0.1	4.62	< 0.2	< 0.5	< 0.4
U1 FF Outlet R3	#1	4.94	< 0.1	4.95	< 0.2	< 0.5	< 0.4
	#2		< 0.1	4.92	< 0.2	< 0.5	< 0.4

Unit 1 - Summary of Method 5 Particulate Analysis

	U1-FF-O-R1 e16384-1 Catch, mg	U1-FF-O-R2 e16384-2 Catch, mg	U1-FF-O-R3 e16384-3 Catch, mg
Fraction			
Filter	0.1	< 0.1	< 0.1
Rinse	1.2	0.5	0.4
Total PM	1.3	0.5	0.4

Unit 1 - Summary of Method 29 Metals Analysis

	U1 FF-O-R1 e16384-1 Total µg	U1 FF-O-R2 e16384-2 Total µg	U1 FF-O-R2 e16384-2 dup Total µg	U1 FF-O-R3 e16384-3 Total µg
Element				
Beryllium	< 0.05	< 0.05	< 0.05	< 0.05
Cadmium	0.243	0.216	0.203	0.309
Lead	1.30	0.807	0.803	0.829

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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	7.07	< 0.1	7.06	< 0.2	< 0.5	< 0.4
	#2		< 0.1	7.09	< 0.2	< 0.5	< 0.4
U2 FF Outlet R2	#1	6.36	< 0.1	6.33	< 0.2	< 0.5	< 0.4
	#2		< 0.1	6.39	< 0.2	< 0.5	< 0.4
U2 FF Outlet R3	#1	6.29	< 0.1	6.30	< 0.2	< 0.5	< 0.4
	#2		< 0.1	6.27	< 0.2	< 0.5	< 0.4

Unit 2 - Summary of Method 5 Particulate Analysis

Fraction	U2-FF-O-R1 e16384-4 Catch, mg	U2-FF-O-R2 e16384-5 Catch, mg	U2-FF-O-R3 e16384-6 Catch, mg
Filter	< 0.1	< 0.1	< 0.1
Rinse	1.6	< 0.1	2.0
Total PM	1.6	< 0.2	2.0

Unit 2 - Summary of Method 29 Metals Analysis

Element	U2 FF-O-R1 e16384-4 Total µg	U2 FF-O-R2 e16384-5 Total µg	U2 FF-O-R2 e16384-5 dup Total µg	U2 FF-O-R3 e16384-6 Total µg
Beryllium	< 0.05	< 0.05	< 0.05	< 0.05
Cadmium	0.232	< 0.2	< 0.2	0.298
Lead	0.717	0.770	0.771	0.623

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	3.28	< 0.1	3.33	< 0.2	< 0.5	< 0.4
	#2		< 0.1	3.24	< 0.2	< 0.5	< 0.4
U3 FF Outlet R2	#1	3.03	< 0.1	3.10	< 0.2	< 0.5	< 0.4
	#2		< 0.1	2.96	< 0.2	< 0.5	< 0.4
U3 FF Outlet R3	#1	3.97	< 0.1	3.66	0.210	< 0.5	< 0.4
	#2		< 0.1	4.06	< 0.2	< 0.5	< 0.4
Field Blank	#1	< 0.5	< 0.1	< 0.3	< 0.2	< 0.5	< 0.4
	#2		< 0.1	< 0.3	< 0.2	< 0.5	< 0.4
Reagent Blank	#1	< 0.5	< 0.1	< 0.2	< 0.2	< 0.5	< 0.4
	#2		< 0.1	< 0.2	< 0.2	< 0.5	< 0.4

Unit 3 - Summary of Method 5 Particulate Analysis

Fraction	U3-FF-O-R1 e16384-7 Catch, mg	U3-FF-O-R2 e16384-8 Catch, mg	U3-FF-O-R3 e16384-9 Catch, mg	Reagent Blank e16384-11 Total µg
Filter	< 0.1	< 0.1	< 0.1	NA
Rinse	2.2	2.8	1.7	< 0.1
Total PM	2.2	2.8	1.7	< 0.1

Unit 3 - Summary of Method 29 Metals Analysis

Element	U3 FF-O-R1 e16384-7 Total µg	U3 FF-O-R2 e16384-8 Total µg	U3 FF-O-R2 e16384-8 dup Total µg	U3 FF-O-R3 e16384-9 Total µg
Beryllium	< 0.05	< 0.05	< 0.05	< 0.05
Cadmium	0.251	0.207	< 0.2	0.230
Lead	1.78	1.30	1.26	1.26

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Summary of Analysis

Summary of Method 29 Metals Analysis

Element	Field Blank e16384-10	Reagent Blank e16384-11
	Total µg	Total µg
Beryllium	< 0.05	< 0.05
Cadmium	< 0.2	0.201
Lead	0.610	0.925

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ANALYTICAL NARRATIVE

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Element One Analytical Narrative

Client:	Clean Air, IL	Element One #:	16384
Client ID:	11182NB/N. Broward	Analyst:	DBW,ESM & KLS
Method:	Methods 29 & 5	Dates Received:	03/29/11
Analytes:	PM, Be, Cd, Pb & Hg	Dates Analyzed:	03/31/11-04/08/11

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 86% for U1 FF-O-R3, 82% for U2 FF-O-R3 and 84% 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 metals.

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	NA	1.2%	NA	NA	NA
U1 FF Outlet R2	NA	0.8%	NA	NA	NA
U1 FF Outlet R3	NA	0.7%	NA	NA	NA
U2 FF Outlet R1	NA	0.4%	NA	NA	NA
U2 FF Outlet R2	NA	0.8%	NA	NA	NA
U2 FF Outlet R3	NA	0.5%	NA	NA	NA
U3 FF Outlet R1	NA	2.5%	NA	NA	NA
U3 FF Outlet R2	NA	4.4%	NA	NA	NA
U3 FF Outlet R3	NA	10.4%	6.6%	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	95%	94%	102%	98%	93%
	#2	97%	92%	99%	98%	93%
U2 FF Outlet R3	#1	118%	104%	112%	105%	94%
	#2	117%	103%	113%	104%	95%
U3 FF Outlet R3	#1	99%	93%	108%	91%	125%
	#2	96%	94%	112%	92%	121%

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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	6.2%	NA	NA
Lead	0.6%	0.0%	3.2%

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	*64%	*62%	*65%
Cadmium	78%	78%	78%
Lead	96%	97%	96%

*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	103%	114%	100%	105%	103%
Cadmium		114%	98%	104%	101%
Lead		113%	101%	104%	103%

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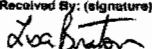
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CLIENT <u>Wheelabrator</u>		PROJECT <u>11182NB</u>		66-11182NB-10									
PLANT <u>North Broward</u>		DEPT. <u>66</u>											
PROJECT MANAGER <u>S. Brown</u>		 500 West Wood Street Palestine, IL 60067 800-627-0033 (phone) 847-991-3385 (fax)		ANALYSIS REQUESTED <table border="1" style="width: 100%; text-align: center;"> <tr> <td>Gravimetric</td> <td>Metals</td> <td>Mercury</td> <td>Archives</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>		Gravimetric	Metals	Mercury	Archives				
Gravimetric	Metals					Mercury	Archives						
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) 910-792-8853 (fax)										
ADDITIONAL INFORMATION													
LAB ID NUMBER	DATE (2011)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX									
	3/21	FF Outlet	Train Proof	Front Half Acetone Rinse, 250 mL Clear Glass	1								
	3/23	Unit 1 FF Outlet	1	Front Half Acetone Rinse, 250 mL Clear Glass	1								
	3/23	Unit 1 FF Outlet	2	Front Half Acetone Rinse, 250 mL Clear Glass	1								
	3/23	Unit 1 FF Outlet	3	Front Half Acetone Rinse, 250 mL Clear Glass	1								
	3/23	FF Outlet	Field Blank	Front Half Acetone Rinse, 250 mL Clear Glass	1								
	3/24	Unit 2 FF Outlet	1	Front Half Acetone Rinse, 250 mL Clear Glass	1								
	3/24	Unit 2 FF Outlet	2	Front Half Acetone Rinse, 250 mL Clear Glass	1								
	3/24	Unit 2 FF Outlet	3	Front Half Acetone Rinse, 250 mL Clear Glass	1								
	3/22	Unit 3 FF Outlet	1	Front Half Acetone Rinse, 250 mL Clear Glass	1								
	3/22	Unit 3 FF Outlet	2	Front Half Acetone Rinse, 250 mL Clear Glass	1								
	3/22	Unit 3 FF Outlet	3	Front Half Acetone Rinse, 250 mL Clear Glass	1								
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S. Brown		3/28/2011 18:00											
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S. Brown													
Signature  Date 3/28/11													

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CLIENT <u>Wheatlavor</u>		PROJECT <u>11182NB</u>		68-11182NB-11																																																																																																																						
PLANT <u>North Broward</u>		DEPT. <u>68</u>																																																																																																																								
PROJECT MANAGER <u>S. Brown</u>		 Clean Air INDUSTRIAL 500 West Wood Street Palatine, IL 60067 800-827-0033 (phone) 847-991-3385 (fax)		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="4">ANALYSIS REQUESTED</th> </tr> <tr> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Gravimetric</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Metals</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Mercury</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Aroclor</td> </tr> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;">X</td> <td></td> <td></td> </tr> </table>		ANALYSIS REQUESTED				Gravimetric	Metals	Mercury	Aroclor	X	X																																																																																																											
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ANALYTICAL METHOD USEPA M-5/28	CONTAINER NUMBER 3	SAMPLE FRACTION FRONT HALF HNO₃ RINSE 250 mL HDLP	FORWARDING LAB Element One, Inc. 5022-C Wrightsville Avenue Wilmington, NC 28403 910-793-0128 (phone) 910-792-6853 (fax)																																																																																																																							
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>LAB ID NUMBER</th> <th>DATE (2011)</th> <th>TEST LOCATION</th> <th>RUN NUMBER</th> <th>SAMPLE MATRIX</th> <th>NUMBER OF CONTAINERS</th> <th>CONTAINER SEALED?</th> <th>LIQUID LEVEL MARKED?</th> <th>ANALYSIS REQUESTED</th> <th>ADDITIONAL INFORMATION</th> </tr> <tr> <td></td> <td>3/23</td> <td>Unit 1 FF Outlet</td> <td>1</td> <td>Front Half HNO₃ Rinse, 250 mL HDLP</td> <td>1</td> <td></td> <td></td> <td style="text-align: center;">X X</td> <td rowspan="12"> Metals include: Beryllium (Be) Cadmium (Cd) Lead (Pb) </td> </tr> <tr> <td></td> <td>3/23</td> <td>Unit 1 FF Outlet</td> <td>2</td> <td>Front Half HNO₃ Rinse, 250 mL HDLP</td> <td>1</td> <td></td> <td></td> <td style="text-align: center;">X X</td> </tr> <tr> <td></td> <td>3/23</td> <td>Unit 1 FF Outlet</td> <td>3</td> <td>Front Half HNO₃ Rinse, 250 mL HDLP</td> <td>1</td> <td></td> <td></td> <td style="text-align: center;">X X</td> </tr> <tr> <td></td> <td>3/23</td> <td>FF Outlet</td> <td>Field Blank</td> <td>Front Half HNO₃ Rinse, 250 mL HDLP</td> <td>1</td> <td></td> <td></td> <td style="text-align: center;">X X</td> </tr> <tr> <td></td> <td>3/24</td> <td>Unit 2 FF Outlet</td> <td>1</td> <td>Front Half HNO₃ Rinse, 250 mL HDLP</td> <td>1</td> <td></td> <td></td> <td style="text-align: center;">X X</td> </tr> <tr> <td></td> <td>3/24</td> <td>Unit 2 FF Outlet</td> <td>2</td> <td>Front Half HNO₃ Rinse, 250 mL HDLP</td> <td>1</td> <td></td> <td></td> <td style="text-align: center;">X X</td> </tr> <tr> <td></td> <td>3/24</td> <td>Unit 2 FF Outlet</td> <td>3</td> <td>Front Half HNO₃ Rinse, 250 mL HDLP</td> <td>1</td> <td></td> <td></td> <td style="text-align: center;">X X</td> </tr> <tr> <td></td> <td>3/22</td> <td>Unit 3 FF Outlet</td> <td>1</td> <td>Front Half HNO₃ Rinse, 250 mL HDLP</td> <td>1</td> <td></td> <td></td> <td style="text-align: center;">X X</td> </tr> <tr> <td></td> <td>3/22</td> <td>Unit 3 FF Outlet</td> <td>2</td> <td>Front Half HNO₃ Rinse, 250 mL HDLP</td> <td>1</td> <td></td> <td></td> <td style="text-align: center;">X X</td> </tr> <tr> <td></td> <td>3/22</td> <td>Unit 3 FF Outlet</td> <td>3</td> <td>Front Half HNO₃ Rinse, 250 mL HDLP</td> <td>1</td> <td></td> <td></td> <td style="text-align: center;">X X</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		LAB ID NUMBER	DATE (2011)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED?	LIQUID LEVEL MARKED?	ANALYSIS REQUESTED	ADDITIONAL INFORMATION		3/23	Unit 1 FF Outlet	1	Front Half HNO ₃ Rinse, 250 mL HDLP	1			X X	Metals include: Beryllium (Be) Cadmium (Cd) Lead (Pb)		3/23	Unit 1 FF Outlet	2	Front Half HNO ₃ Rinse, 250 mL HDLP	1			X X		3/23	Unit 1 FF Outlet	3	Front Half HNO ₃ Rinse, 250 mL HDLP	1			X X		3/23	FF Outlet	Field Blank	Front Half HNO ₃ Rinse, 250 mL HDLP	1			X X		3/24	Unit 2 FF Outlet	1	Front Half HNO ₃ Rinse, 250 mL HDLP	1			X X		3/24	Unit 2 FF Outlet	2	Front Half HNO ₃ Rinse, 250 mL HDLP	1			X X		3/24	Unit 2 FF Outlet	3	Front Half HNO ₃ Rinse, 250 mL HDLP	1			X X		3/22	Unit 3 FF Outlet	1	Front Half HNO ₃ Rinse, 250 mL HDLP	1			X X		3/22	Unit 3 FF Outlet	2	Front Half HNO ₃ Rinse, 250 mL HDLP	1			X X		3/22	Unit 3 FF Outlet	3	Front Half HNO ₃ Rinse, 250 mL HDLP	1			X X																			ADDITIONAL INFORMATION 	
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	3/22	Unit 3 FF Outlet	3	Front Half HNO ₃ Rinse, 250 mL HDLP	1			X X																																																																																																																		

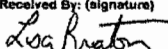
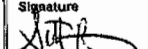
Relinquished By: (signature) <u>S. Brown</u>	Date / Time <u>3/28/2011 18:00</u>	Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	This form completed by: <u>S. Brown</u>
Received By: (signature) <u>[Signature]</u>	Date / Time <u>3/29/11 10:19</u>	Received By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Signature <u>[Signature]</u> Date <u>3/28/11</u>

16384

16384

16384

16384

CLIENT <u>Wheelabrator</u>		PROJECT <u>11182NB</u>		66-11182NB-15	
PLANT <u>North 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 Gravimetric Metals Mercury Arsenic	
ANALYTICAL METHOD <u>USEPA M-5/29</u>	CONTAINER NUMBER <u>5C</u>				
LAB ID NUMBER		DATE (2011)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX
	3/23	Unit 1 FF Outlet	1	Impingers 5-6 BN HCl Rinse, 250 mL Amber Glass	1
	3/23	Unit 1 FF Outlet	2	Impingers 5-6 BN HCl Rinse, 250 mL Amber Glass	1
	3/23	Unit 1 FF Outlet	3	Impingers 5-6 BN HCl Rinse, 250 mL Amber Glass	1
	3/23	FF Outlet	Field Blank	Impingers 5-6 BN HCl Rinse, 250 mL Amber Glass	1
	3/24	Unit 2 FF Outlet	1	Impingers 5-6 BN HCl Rinse, 250 mL Amber Glass	1
	3/24	Unit 2 FF Outlet	2	Impingers 5-6 BN HCl Rinse, 250 mL Amber Glass	1
	3/24	Unit 2 FF Outlet	3	Impingers 5-6 BN HCl Rinse, 250 mL Amber Glass	1
	3/22	Unit 3 FF Outlet	1	Impingers 5-6 BN HCl Rinse, 250 mL Amber Glass	1
	3/22	Unit 3 FF Outlet	2	Impingers 5-6 BN HCl Rinse, 250 mL Amber Glass	1
	3/22	Unit 3 FF Outlet	3	Impingers 5-6 BN HCl Rinse, 250 mL Amber Glass	1
Relinquished By: (signature)		Date / Time	Relinquished By: (signature)	Date / Time	Relinquished By: (signature)
S. Brown		3/28/2011 18:00			This form completed by:
Received By: (signature)		Date / Time	Received By: (signature)	Date / Time	Signature Date
		3/21/11 10:19			 3/28/11

16384

ANALYTICAL DATA

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Page 22 of 36

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= $\frac{\text{Received Volume (BV)}}{\text{Aliquot (Used)}} * \text{Final Volume (FV)}$ --*Sample Submission*

Combined Results= FH+BH

Mercury-

$$\text{Mercury Results } (\mu\text{g}) = \frac{\text{CVAA Results } (\mu\text{g})}{\text{Aliquot (ml)}} * \text{Final Volume (ml)}$$

Where-

CVAA Results= Raw sample reading (μg)--*Hg-Data Sheet*

Aliquot= Sample Aliquot (Alq.)--*Hg-Data Sheet*

Final Volume= Final Volume (FV)*--*Sample Submission*

* With the exception of the BH fraction where-
= Received Volume (BV)--*Sample Submission*

Analytical Calculations

Spike Recovery-

$$\text{Spike (\%)} = \frac{(\text{Spiked Result } (\mu\text{g/L}) - \text{Sample Result } (\mu\text{g/L}))}{\text{Spike Amount } (\mu\text{g/L})} \times 100$$

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 16384

Analysis Due Date 04.06.11
QA/QC/Report Due Date 04.08.11

Client Clean Air IL
Project No 11182NB

Date Rec 03.29.11
Time Rec 1019

HNO₃ Lot: HF Lot: HCl Lot: Ref. Method: 29 / 5
Volume Marked 8 / N Volume Loss Y / N ? Autotit 101550147

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)	
	pH < 2.0 Y/N		pH < 2.0 (Y) N		pH < 2.0 (Y) N			pH < 2.0 (Y) N		pH < 2.0 (Y) N		pH < 2.0 (Y) N	
Lab ID	Fil ID	BV ml	BV ml	FV ml	BV ml	Used	FV ml	BV ml	FV ml	BV ml	FV ml	BV ml	FV ml
1	3-13	116	105	100	720	360	50	110	200	390	140	230	40
2.D	3-14	102	108		705	383		110		375		230	
3.S	3-15	62	103		710	355		107.5		375		230	
4	3-16	79	105		645	323		110		380		230	
5.D	3-17	88	107		665	333		112.5		390		230	
6.S	3-19	100	115		670	335		110		375		230	
7	3-10	116	107		670	335		110		380		235	
8.D	3-11	66	105		685	343		110		390		245	
9.S	3-12	119	120		675	338		110		380		230	
10	3-18	47	103		2510	145		105		440		230	

Lab Communications
Reagent blank filters arrived w/ 3 filters in one bottle. Filters were torn & in pieces (see photo taken). Due to condition of filter sample, unable to do m5 particulates on #16384-11. Filters can still be digested & analyzed w/ m29. KLS 3.30.11

Per Scott via phone, do particulates on acetone only for RB. KLS 3.30.11 1545

M29: Received C1, C2, C3, C4, C5a, C5b, C5c; RB C12, C7, C8a, C8b, C9, C10, C11—03.29.11 LLB

SS Page 1 of 2
3/29/2011 1:03:56 PM
SS by SSB
Labeled By/Date pmh 3/29/11

FH Prep By/Date KLS 4.5.11 A Prep By/Date pmh 4/1/11
BH Prep By/Date KLS 4.5.11 B Prep By/Date pmh 4/1/11
BH/FH Prep By/Date pmh 4/1/11 C Prep By/Date pmh 4/1/11
PM Prep By/Date KLS 3.30.11 ID Verification By/Date KLS 3.30.11

elementOne AIR TESTING SAMPLE SUBMISSION FORM Lab ID 16384

Analysis Due Date 04.06.11
QA/QC/Report Due Date 04.08.11.

Client Clean Air IL
Project No 11182NB

Date Rec 03.29.11
Time Rec 1019

HNO₃ Lot: HF Lot: HCl Lot: Ref. Method: 29 / 5
Volume Marked Y / N Volume Loss Y / N ?

Sample Identification

11	Reagent Blank				
Analyses Requested		Sample 11	Hg		
		Sample 11	Be, Cd, Pb		
		Sample 11	PM		

M-29 Reagent Blank

Lab ID	Fraction	BV, ml	FV, ml	Comments
11	C-7 FH Acetone Blank	124		
	C-8A FH 0.1N HNO ₃	100	100	used 100 mL
	C-8A A 0.1N HNO ₃	140		
	C-8B B DI H ₂ O	105	92	
	C-9 BH 5% HNO ₃ /10% H ₂ O ₂	195	98	
	C-10 B 4% KMnO ₄ /10% H ₂ SO ₄	100	100+33	used 93 mL of C-8B
	C-11 C 8N HCl DI H ₂ O	230	400	
	C-12 FH Filter			

Lab Communications

LRB + Spiked w/ 25 ppm Std A (021411-A)
200uL for FH, 100uL for BH. KLS45.11

SS Page 2 of 2
3/29/2011 1:03:56 PM
SS by 2445
Labeled By/Date _____

FH Prep By/Date _____ A Prep By/Date pm 4/1/11
BH Prep By/Date _____ B Prep By/Date pm 4/1/11
BH/FH Prep By/Date _____ C Prep By/Date pm 4/5/11
PM Prep By/Date _____ ID Verification By/Date _____

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Method 5 Particulate

Lab # 16384

Client CAE

Page 1 of 2

Balance checks

Date: 3.31.11

2 g = 2.0000

Acetone Concentration

Date: 4.1.11

2g = 1.9999

0.00E+00

mg/mg

Date: 4.4.11

2 g = 2.0000

Filters

Sample ID #	Filter ID	Bag ID	A		B		B		B		Catch Description and Loading
			Bag Tare, g	Date - 3.31.11 Initials - KLS		Date - 4.1.11 Initials - ESM		Date - 4.4.11 Initials - ESM			
				Time	Bag & Filter Weight, g	Time	Bag & Filter Weight, g	Time	Bag & Filter Weight, g		
16384-1	e3-13	384-1	0	930	0.3970	1200	0.3962	800	0.3974		
16384-2	e3-14	384-2	0	930	0.4010	1200	0.4005				
16384-3	e3-15	384-3	0	930	0.3799	1200	0.3798				
16384-4	e3-16	384-4	0	930	0.3916	1200	0.3915				
16384-5	e3-17	384-5	0	930	0.3950	1200	0.3942	800	0.3955		
16384-6	e3-19	384-6	0	930	0.3964	1200	0.3956	800	0.3969		
Client Bik HERE											
E1 Blank											

Acetone Rinses

Sample ID #	Sample Volume, ml	Bag ID	C	D		D		D		Catch Description and Loading
			Bag Tare, g	Date - 4.01.11 Initials - ESM		Date - 4.4.11 Initials: ESM		Date - 4.5.11 Initials- ESM		
				Time	Bag & Sample Weight, g	Time	Bag & Sample Weight, g	Time	Bag & Sample Weight, g	
16384-1	116	x42	10.0395	900	10.0398	830	10.0407	800	10.0411	
16384-2	102	682	10.4083	900	10.4079	830	10.4088	800	10.4090	
16384-3	62	x30	10.0545	900	10.0553	830	10.0549	800	10.0550	
16384-4	79	x27	10.1767	900	10.1795	830	10.1788	800	10.1783	
16384-5	88	627	10.3551	900	10.3527	830	10.3514	800	10.3518	
16384-6	100	677	10.3984	900	10.4019	830	10.4004	800	10.4005	
Client Ace Bik HERE	124	667	10.2565	9:00	10.2555	830	10.2554	800	10.2549	
E1 Acetone Blank	100	x24	10.2675	9:00	10.2683	830	10.2673	800	10.2676	

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
16384-1	e3-13	0.3989	0.3970	0.1	x42	10.0395	10.0407	0.0	1.2	1.3
16384-2	e3-14	0.4012	0.4005	<0.1	682	10.4083	10.4088	0.0	0.5	0.5
16384-3	e3-15	0.3799	0.3798	<0.1	x30	10.0545	10.0549	0.0	0.4	0.4
16384-4	e3-16	0.3920	0.3915	<0.1	x27	10.1767	10.1783	0.0	1.6	1.6
16384-5	e3-17	0.3954	0.3950	<0.1	627	10.3551	10.3514	0.0	<0.1	<0.2
16384-6	e3-19	0.3968	0.3964	<0.1	677	10.3984	10.4004	0.0	2.0	2.0
Client Ace Bik HERE					667	10.2565	10.2549	0.0	<0.1	<0.1
E1 Acetone Blank					x24	10.2675	10.2673	0.0	<0.1	<0.1

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Method 5 Particulate

Lab # 16384

Client CAE

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Balance checks

Date: 3.31.11

2 g = 2.0000

Acetone Concentration

Date: 4.1.11

2g = 1.9899

0.00E+00

mg/mg

Date: 4.4.11

2 g = 2.0000

Filters

Sample ID #	Filter ID	Bag ID	A	B		B		B		Catch Description and Loading
			Bag Tare, g	Date - 3.31.11 Initials - KLS		Date - 4.1.11 Initials - ESM		Date - 4.4.11 Initials - ESM		
				Time	Bag & Filter Weight, g	Time	Bag & Filter Weight, g	Time	Bag & Filter Weight, g	
16384-7	e3-10	384-7		930	0.3976	1200	0.3935	800	0.3940	
16384-8	e3-11	384-8		930	0.3949	1200	0.3952	800	0.3956	
16384-9	e3-12	384-9		930	0.3968	1200	0.3989	800	0.3973	
16384-10	e3-18	384-10		930	0.3950	1200	0.3948			
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 - 4.01.11 Initials - ESM		Date - 4.4.11 Initials - ESM		Date - 4.5.11 Initials - ESM		
				Time	Bag & Sample Weight, g	Time	Bag & Sample Weight, g	Time	Bag & Sample Weight, g	
16384-7	116	x25	10.4533	9:00	10.4567	830	10.4555	800	10.4558	
16384-8	66	x02	10.0342	9:00	10.0494	830	10.0375	800	10.0370	
16384-9	119	x94	10.3320	9:00	10.3350	830	10.3337	800	10.3340	
16384-10	47	510	10.8500	9:00	10.8547	830	10.8497	800	10.8501	
Client Ace, Blk HERE	124	667	10.2565	9:00	10.2555	830	10.2554	800	10.2549	
E1 Acetone Blank	100	x24	10.2675	9:00	10.2683	830	10.2673	800	10.2676	

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
16384-7	e3-10	0.3937	0.3935	<0.1	x25	10.4533	10.4555	0.0	2.2	2.2
16384-8	e3-11	0.3955	0.3949	<0.1	x02	10.0342	10.0370	0.0	2.8	2.8
16384-9	e3-12	0.3975	0.3968	<0.1	x94	10.3320	10.3337	0.0	1.7	1.7
16384-10	e3-18	0.3945	0.3948	0.3	510	10.8500	10.8497	0.0	<0.1	0.3
Client Ace Blk HERE					667	10.2565	10.2549	0.0	<0.1	<0.1
E1 Acetone Blank					x24	10.2675	10.2673	0.0	<0.1	<0.1

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Method 29 Microwave Worksheet

Lab ID # e16412, 16384

Client: GEL, LAE

Date Digested: 4.5.11 Initials: ESM Worksheet Prepared by: ESM

[illegible]

Element One, Inc. Form 104 - Revision 1.0

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Sample/Batch Report

User Name: icp
Computer Name: D8D4DWD1
Sample File: C:\elandata_icp\Sample\10.sam
Report Date/Time: Friday, April 08, 2011 12:10:31

Signature
4/8/11

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		16384-1	CAE	Sample					
15		16384-2	CAE	Sample					
16 d		16384-2	CAE	Duplicate of 3					
17		16384-3	CAE	Sample					
18 s		16384-3	CAE	Spike - 1 of 5					
19		16384-4	CAE	Sample					
20		16384-5	CAE	Sample					
21 d		16384-5	CAE	Duplicate of 8					
22		16384-6	CAE	Sample					
23 s		16384-6	CAE	Spike - 1 of 10					
24		16384-7	CAE	Sample					
25		16384-8	CAE	Sample					
26 d		16384-8	CAE	Duplicate of 13					
27		16384-9	CAE	Sample					
28 s		16384-9	CAE	Spike - 1 of 15					
29		16384-10	CAE	Sample					
30		16384-11	CAE	Sample					
31 x2		16384-3	CAE	Sample					
32 x2s		16384-3	CAE	Spike - 1 of 19					
33 x2		16384-6	CAE	Sample					
34 x2s		16384-6	CAE	Spike - 1 of 21					
35 x2		16384-9	CAE	Sample					
36 x2s		16384-9	CAE	Spike - 1 of 23					

Dataset Report

User Name: icp
Computer Name: D8D4DWD1
Dataset File Path: C:\elandata_icp\DataSet\040611-2\
Report Date/Time: Friday, April 08, 2011 12:10:12

Daphne
4/8/11

Autosampler Position: 17

The Dataset

Time	Sample ID	Batch ID	Read Type	Description	Init. Quant	Prep. Vol.	Aliquot. Vol.	Diluted V
13:42:26 Wed 06-Apr-11	Blank		Blank					
13:44:22 Wed 06-Apr-11	Standard 1		Standard #1					
13:46:19 Wed 06-Apr-11	Standard 2		Standard #2					
13:48:17 Wed 06-Apr-11	Standard 3		Standard #3					
13:50:14 Wed 06-Apr-11	QC Std 1		QC Std #1					
13:52:12 Wed 06-Apr-11	QC Std 2		QC Std #2					
13:54:09 Wed 06-Apr-11	QC Std 3		QC Std #3					
13:56:06 Wed 06-Apr-11	QC Std 4		QC Std #4					
13:58:03 Wed 06-Apr-11	QC Std 5		QC Std #5					
14:00:00 Wed 06-Apr-11	QC Std 7		QC Std #7					
14:01:58 Wed 06-Apr-11	QC Std 8		QC Std #8					
14:03:57 Wed 06-Apr-11	QC Std 9		QC Std #9					
14:05:56 Wed 06-Apr-11	QC Std 10		QC Std #10					
14:07:55 Wed 06-Apr-11	QC Std 2		Sample					
14:09:52 Wed 06-Apr-11	16384-1		Sample	CAE				
14:11:49 Wed 06-Apr-11	16384-2		Sample	CAE				
14:13:45 Wed 06-Apr-11	16384-2	d	Duplicate of 16	CAE				
14:15:42 Wed 06-Apr-11	16384-3		Sample	CAE				
14:17:38 Wed 06-Apr-11	16384-3	s	Spike - 1 of 18	CAE				
14:19:35 Wed 06-Apr-11	16384-4		Sample	CAE				
14:21:32 Wed 06-Apr-11	16384-5		Sample	CAE				
14:23:29 Wed 06-Apr-11	16384-5	d	Duplicate of 21	CAE				
14:25:27 Wed 06-Apr-11	16384-6		Sample	CAE				
14:27:26 Wed 06-Apr-11	16384-6	s	Spike - 1 of 23	CAE				
14:29:23 Wed 06-Apr-11	QC Std 1		QC Std #1					
14:31:19 Wed 06-Apr-11	QC Std 4		QC Std #4					
14:33:18 Wed 06-Apr-11	16384-7		Sample	CAE				
14:35:17 Wed 06-Apr-11	16384-8		Sample	CAE				
14:37:15 Wed 06-Apr-11	16384-8	d	Duplicate of 28	CAE				
14:39:11 Wed 06-Apr-11	16384-9		Sample	CAE				
14:41:08 Wed 06-Apr-11	16384-9	s	Spike - 1 of 30	CAE				
14:43:05 Wed 06-Apr-11	16384-10		Sample	CAE				
14:45:02 Wed 06-Apr-11	16384-11		Sample	CAE				
14:46:58 Wed 06-Apr-11	QC Std 1		QC Std #1					
14:48:55 Wed 06-Apr-11	QC Std 4		QC Std #4					
17:38:24 Wed 06-Apr-11	16384-3	x2	Sample	CAE				
17:40:22 Wed 06-Apr-11	16384-3	x2s	Spike - 1 of 36	CAE				
17:42:19 Wed 06-Apr-11	16384-6	x2	Sample	CAE				
17:44:17 Wed 06-Apr-11	16384-6	x2s	Spike - 1 of 38	CAE				
17:46:15 Wed 06-Apr-11	16384-9	x2	Sample	CAE				
17:48:14 Wed 06-Apr-11	16384-9	x2s	Spike - 1 of 40	CAE				
17:50:11 Wed 06-Apr-11	QC Std 1		QC Std #1					
17:52:08 Wed 06-Apr-11	QC Std 4		QC Std #4					

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Analyst:--KMS--

ICP-MS RUN SHEET
4/8/2011

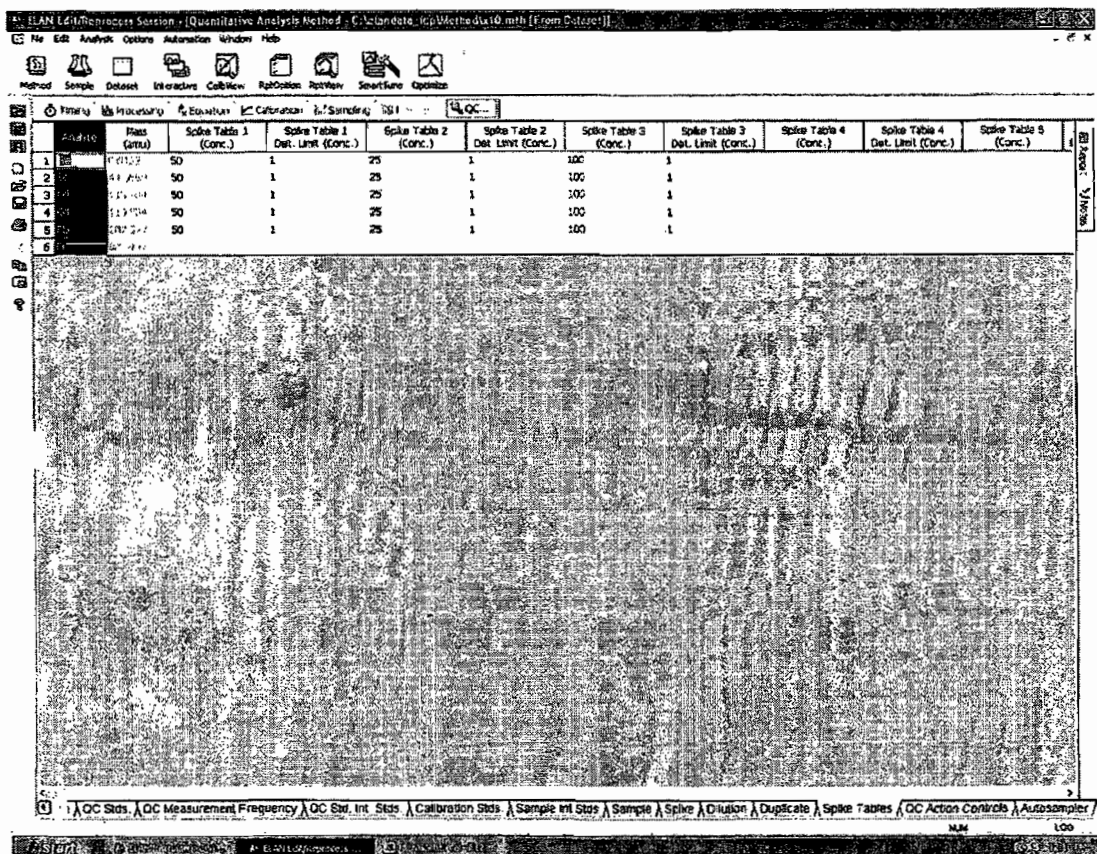
Job Number:

A/S Loc.	Dilution	Sample ID	Client	Type	Weight (g)	Prep Vol (ml)
5		QC Std 2		Sample		
14		16384-1	CAE	Sample		100x2
15		16384-2	CAE	Sample		100x2
16	d	16384-2	CAE	Duplicate of 3		100x2
17		16384-3	CAE	Sample		100x2
18	s	16384-3	CAE	Spike - 1 of 5		100x2
19		16384-4	CAE	Sample		100x2
20		16384-5	CAE	Sample		100x2
21	d	16384-5	CAE	Duplicate of 8		100x2
22		16384-6	CAE	Sample		100x2
23	s	16384-6	CAE	Spike - 1 of 10		100x2
24		16384-7	CAE	Sample		100x2
25		16384-8	CAE	Sample		100x2
26	d	16384-8	CAE	Duplicate of 13		100x2
27		16384-9	CAE	Sample		100x2
28	s	16384-9	CAE	Spike - 1 of 15		100x2
29		16384-10	CAE	Sample		100x2
30		16384-11	CAE	Sample		100x2
31	x2	16384-3	CAE	Sample		100x2
32	x2s	16384-3	CAE	Spike - 1 of 19		100x2
33	x2	16384-6	CAE	Sample		100x2
34	x2s	16384-6	CAE	Spike - 1 of 21		100x2
35	x2	16384-9	CAE	Sample		100x2
36	x2s	16384-9	CAE	Spike - 1 of 23		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:
DBW	4/8/11 12:12	DBW	4/12/11 12:15
Re-Test Required:	No: ☒ Yes: ☐	Comments:	
Resubmitted for QC by:	Date/Time:	QC Review:	By: Date/Time:

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Friday, Apr 08, 2011 12:10 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														

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PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: Blank

Sample Date: Wednesday, April 06, 2011 13:42:26

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	26743.3		ppb
	Be	9	2.7		ppb
	Sc	45	208862.2		ppb
>	Rh	103	527435.5		ppb
	Cd	111	31.4		ppb
	Cd	114	49.6		ppb
>	Ho	165	919690.7		ppb
	Pb	208	3882		ppb
	Kr	83	139.5		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 1

Sample Date: Wednesday, April 06, 2011 13:44:22

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	27245.6		ppb
	Be	9	296.7	1.0255	ppb
	Sc	45	213192.6		ppb
>	Rh	103	535453.9		ppb
	Cd	111	2873.3	1.0444	ppb
	Cd	114	6797.2	1.02708	ppb
>	Ho	165	926412.7		ppb
	Pb	208	44081.6	1.05181	ppb
	Kr	83	-27.2		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 2

Sample Date: Wednesday, April 06, 2011 13:46:19

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	26599.8		ppb
	Be	9	28899.2	103.26714	ppb
	Sc	45	212108.8		ppb
>	Rh	103	526526.3		ppb
	Cd	111	277274	103.60846	ppb
	Cd	114	660169	102.1562	ppb
>	Ho	165	931214		ppb
	Pb	208	3999304.3	104.0771	ppb
	Kr	83	-16509.5		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Date: Wednesday, April 06, 2011 13:48:17

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	27430.5		ppb
	Be	9	144145.8	499.34652	ppb
	Sc	45	220178.6		ppb
>	Rh	103	533077.4		ppb
	Cd	111	1352556.1	499.27822	ppb
	Cd	114	3267999.3	499.56871	ppb
>	Ho	165	966637		ppb
	Pb	208	19896406	499.18448	ppb
	Kr	83	-81750		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Wednesday, April 06, 2011 13:50:14

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	25786		ppb
	Be	9	16.7	0.05177	ppb
	Sc	45	208766.4		ppb
>	Rh	103	525777.6		ppb
	Cd	111	158.2	0.04761	ppb
	Cd	114	384.3	0.05208	ppb
>	Ho	165	912776		ppb
	Pb	208	6191.2	0.06224	ppb
	Kr	83	137.3		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Da Wednesday, April 06, 2011 13:52:12

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	26613.4		ppb
-	Be	9	327	1.15833	ppb
-	Sc	45	214505.4		ppb
>	Rh	103	533385.4		ppb
-	Cd	111	3179.6	1.16114	ppb
-	Cd	114	7424.8	1.12649	ppb
>	Ho	165	934698.4		ppb
-	Pb	208	47418.2	1.12832	ppb
	Kr	83	-50.6		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 3

Sample Da Wednesday, April 06, 2011 13:54:09

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	25446.3		ppb
-	Be	9	68873.2	257.19365	ppb
-	Sc	45	206674.7		ppb
>	Rh	103	499520.2		ppb
-	Cd	111	641324.9	252.61767	ppb
-	Cd	114	1529088.1	249.44663	ppb
>	Ho	165	888805.6		ppb
-	Pb	208	9396569.7	256.34065	ppb
	Kr	83	-38259.1		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Da Wednesday, April 06, 2011 13:56:06

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	25852.4		ppb
-	Be	9	28491.3	104.68962	ppb
-	Sc	45	210179.6		ppb
>	Rh	103	517892.5		ppb
-	Cd	111	273888.7	104.05399	ppb
-	Cd	114	648356.4	102.00818	ppb
>	Ho	165	916296.9		ppb
-	Pb	208	3938894.9	104.18009	ppb
	Kr	83	-16262.4		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 5

Sample Da Wednesday, April 06, 2011 13:58:03

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	27060.8		ppb
-	Be	9	14204.1	49.87382	ppb
-	Sc	45	215505		ppb
>	Rh	103	537391		ppb
-	Cd	111	134413.8	49.2055	ppb
-	Cd	114	321191.9	48.70022	ppb
>	Ho	165	928152.9		ppb
-	Pb	208	1939249.5	50.58352	ppb
	Kr	83	134.7		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 7

Sample Da Wednesday, April 06, 2011 14:00:00

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	29791.1		ppb
-	Be	9	7	0.01308	ppb
-	Sc	45	222218.1		ppb
>	Rh	103	478028.3		ppb
-	Cd	111	12767.2	5.24451	ppb
-	Cd	114	40418.7	6.88438	ppb
>	Ho	165	899462.6		ppb
-	Pb	208	5509.7	0.04633	ppb
	Kr	83	126.5		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 8

Sample Da Wednesday, April 06, 2011 14:01:58

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	29196.7		ppb
-	Be	9	81.7	0.25664	ppb
-	Sc	45	234880		ppb
>	Rh	103	574178.3		ppb
	Cd	111	923.1	0.30462	ppb
-	Cd	114	2170.7	0.30038	ppb
>	Ho	165	980872.7		ppb
-	Pb	208	21243.6	0.42296	ppb
	Kr	83	99.2		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 9

Sample Da Wednesday, April 06, 2011 14:03:57

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	27136.9		ppb
-	Be	9	5	0.00796	ppb
-	Sc	45	199401.7		ppb
>	Rh	103	521802.7		ppb
	Cd	111	143.1	0.04227	ppb
-	Cd	114	193.6	0.02256	ppb
>	Ho	165	932359.1		ppb
-	Pb	208	44810.5	1.0634	ppb
	Kr	83	97		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 10

Sample Da Wednesday, April 06, 2011 14:05:56

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	25940.2		ppb
-	Be	9	11635.8	42.61618	ppb
-	Sc	45	193062.9		ppb
>	Rh	103	516633.3		ppb
	Cd	111	116770.2	44.46543	ppb
-	Cd	114	278142.2	43.86424	ppb
>	Ho	165	915716.8		ppb
-	Pb	208	1948796	51.52745	ppb
	Kr	83	85.8		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Da Wednesday, April 06, 2011 14:07:55

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	29242.4		ppb
-	Be	9	353.7	1.13995	ppb
-	Sc	45	246214.9		ppb
>	Rh	103	575908.7		ppb
	Cd	111	3366.6	1.13881	ppb
-	Cd	114	8072	1.13451	ppb
>	Ho	165	976300.6		ppb
-	Pb	208	49462.8	1.12658	ppb
	Kr	83	-64		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-1

Sample Da Wednesday, April 06, 2011 14:09:52

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	34180.8		ppb
-	Be	9	8.7	0.01455	ppb
-	Sc	45	292882.1		ppb
>	Rh	103	543895.5		ppb
	Cd	111	3390.6	1.21726	ppb
-	Cd	114	2685.8	0.3937	ppb
>	Ho	165	962824.2		ppb
-	Pb	208	262877.7	6.52109	ppb
	Kr	83	65.2		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-2

Sample Da: Wednesday, April 06, 2011 14:11:49

Sample De: CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
>	Li	6	43732.1		ppb
-	Be	9		0.01058	ppb
-	Sc	45	592853.3		ppb
>	Rh	103	582438.7		ppb
	Cd	111	3235.3	1.08094	ppb
-	Cd	114	2337.6	0.31968	ppb
>	Ho	165	1023773		ppb
-	Pb	208	174619.7	4.03534	ppb
	Kr	83	912.7		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-2

Sample Da: Wednesday, April 06, 2011 14:13:45

Sample De: CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
>	Li	6	44428.7		ppb
-	Be	9		0.01005	ppb
-	Sc	45	550900.1		ppb
>	Rh	103	579462.4		ppb
	Cd	111	3019.7	1.01584	ppb
-	Cd	114	1868.7	0.25477	ppb
>	Ho	165	1020911.1		ppb
-	Pb	208	173212.7	4.01307	ppb
	Kr	83	806.3		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-3

Sample Da: Wednesday, April 06, 2011 14:15:42

Sample De: CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
>	Li	6	40989.1		ppb
-	Be	9	7.7	0.00836	ppb
-	Sc	45	325228.1		ppb
>	Rh	103	570928.2		ppb
	Cd	111	4517.7	1.54507	ppb
-	Cd	114	6509.6	0.92238	ppb
>	Ho	165	1020337.9		ppb
-	Pb	208	178637.8	4.14422	ppb
	Kr	83	387.1		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-3

Sample Da: Wednesday, April 06, 2011 14:17:38

Sample De: CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
>	Li	6	40751.3		ppb
-	Be	9	13691.3	31.9161	ppb
-	Sc	45	324326.6		ppb
>	Rh	103	566914.6		ppb
	Cd	111	116395.1	40.39434	ppb
-	Cd	114	273158.2	39.2551	ppb
>	Ho	165	1016002.6		ppb
-	Pb	208	2193124.7	52.26215	ppb
	Kr	83	292.7		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-4

Sample Da: Wednesday, April 06, 2011 14:19:35

Sample De: CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
>	Li	6	42387.5		ppb
-	Be	9	9.3	0.0114	ppb
-	Sc	45	320873.6		ppb
>	Rh	103	595198.9		ppb
	Cd	111	3539.8	1.15912	ppb
-	Cd	114	3366.7	0.4534	ppb
>	Ho	165	1062137.9		ppb
-	Pb	208	161378	3.58408	ppb
	Kr	83	237.3		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-5

Sample Da Wednesday, April 06, 2011 14:21:32

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	43606.4		ppb
-	Be	9	7	0.00601	ppb
-	Sc	45	483704.2		ppb
>	Rh	103	577037.1		ppb
	Cd	111	2902.7	0.97962	ppb
-	Cd	114	1174.1	0.15844	ppb
>	Ho	165	1033483.4		ppb
-	Pb	208	168403.1	3.85071	ppb
	Kr	83	552.2		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-5

Sample Da Wednesday, April 06, 2011 14:23:29

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	44530.2		ppb
-	Be	9	10	0.01206	ppb
-	Sc	45	473752.6		ppb
>	Rh	103	576009.8		ppb
	Cd	111	2771.9	0.93443	ppb
-	Cd	114	1656.1	0.22682	ppb
>	Ho	165	1034975.7		ppb
-	Pb	208	168733.6	3.85255	ppb
	Kr	83	433.2		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-6

Sample Da Wednesday, April 06, 2011 14:25:27

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	47505		ppb
-	Be	9	7.7	0.0057	ppb
-	Sc	45	618761.6		ppb
>	Rh	103	587240.4		ppb
	Cd	111	4484.3	1.49117	ppb
-	Cd	114	6311.3	0.86711	ppb
>	Ho	165	1053404.6		ppb
-	Pb	208	139690.8	3.11424	ppb
	Kr	83	849.2		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-6

Sample Da Wednesday, April 06, 2011 14:27:26

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	48819.9		ppb
-	Be	9	15916.6	30.97237	ppb
-	Sc	45	599522.9		ppb
>	Rh	103	587320.6		ppb
	Cd	111	120965.5	40.51674	ppb
-	Cd	114	285885.8	39.66303	ppb
>	Ho	165	1056209.9		ppb
-	Pb	208	2240765.6	51.36519	ppb
	Kr	83	717.3		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Da Wednesday, April 06, 2011 14:29:23

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	40471.8		ppb
-	Be	9	8.7	0.01085	ppb
-	Sc	45	279631.9		ppb
>	Rh	103	638222.1		ppb
	Cd	111	80	0.01296	ppb
-	Cd	114	144.2	0.01077	ppb
>	Ho	165	1088591.6		ppb
-	Pb	208	5197.9	0.01344	ppb
	Kr	83	147.7		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Da Wednesday, April 06, 2011 14:31:19

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	36326.6		ppb
-	Be	9	37703.4	98.62636	ppb
-	Sc	45	259904.7		ppb
>	Rh	103	599963.5		ppb
	Cd	111	317658.2	104.17786	ppb
-	Cd	114	759441.8	103.14489	ppb
>	Ho	165	1043296.6		ppb
-	Pb	208	4442712.4	103.19055	ppb
	Kr	83	-19259.1		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-7

Sample Da Wednesday, April 06, 2011 14:33:18

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	41150		ppb
-	Be	9	13.3	0.02127	ppb
-	Sc	45	371895.5		ppb
>	Rh	103	553205.9		ppb
	Cd	111	3562.7	1.25585	ppb
-	Cd	114	2968.6	0.43043	ppb
>	Ho	165	998923.7		ppb
-	Pb	208	370114.2	8.88609	ppb
	Kr	83	493.7		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-8

Sample Da Wednesday, April 06, 2011 14:35:17

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	43240.4		ppb
-	Be	9	10.3	0.01333	ppb
-	Sc	45	389356.9		ppb
>	Rh	103	559615.8		ppb
	Cd	111	2976.3	1.03438	ppb
-	Cd	114	2489	0.35465	ppb
>	Ho	165	1018994.8		ppb
-	Pb	208	277510.4	6.50653	ppb
	Kr	83	611		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-8

Sample Da Wednesday, April 06, 2011 14:37:15

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	45272.9		ppb
-	Be	9	9	0.00938	ppb
-	Sc	45	396829.9		ppb
>	Rh	103	583254.9		ppb
	Cd	111	2894.2	0.96459	ppb
-	Cd	114	2416.3	0.33002	ppb
>	Ho	165	1060319.3		ppb
-	Pb	208	279800.4	6.29923	ppb
	Kr	83	680.5		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-9

Sample Da Wednesday, April 06, 2011 14:39:11

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	43910.4		ppb
-	Be	9	6.3	0.00422	ppb
-	Sc	45	288320		ppb
>	Rh	103	577114.1		ppb
	Cd	111	3416	1.15244	ppb
-	Cd	114	1489.7	0.20317	ppb
>	Ho	165	1054804.5		ppb
-	Pb	208	278426.2	6.30034	ppb
	Kr	83	-6.7		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-9

Sample Da Wednesday, April 06, 2011 14:41:08

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	44099.2		ppb
-	Be	9	14973	32.25514	ppb
-	Sc	45	292769.3		ppb
>	Rh	103	584234.3		ppb
-	Cd	111	118740.9	39.98466	ppb
-	Cd	114	276775.4	38.59884	ppb
>	Ho	165	1063708.3		ppb
-	Pb	208	2374767.2	54.0548	ppb
	Kr	83	-12.6		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-10

Sample Da Wednesday, April 06, 2011 14:43:05

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	56883.1		ppb
-	Be	9	10.3	0.00781	ppb
-	Sc	45	1159084.6		ppb
>	Rh	103	616700.6		ppb
-	Cd	111	1875.3	0.58701	ppb
-	Cd	114	911.2	0.11265	ppb
>	Ho	165	1117302.1		ppb
-	Pb	208	145305.2	3.05226	ppb
	Kr	83	728		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-11

Sample Da Wednesday, April 06, 2011 14:45:02

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	49416.4		ppb
-	Be	9	16.3	0.02194	ppb
-	Sc	45	508723.5		ppb
>	Rh	103	607403.4		ppb
-	Cd	111	3137.7	1.00479	ppb
-	Cd	114	986.2	0.12548	ppb
>	Ho	165	1098447		ppb
-	Pb	208	214144.6	4.62672	ppb
	Kr	83	191.1		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Da Wednesday, April 06, 2011 14:46:58

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	42636.8		ppb
-	Be	9	6.7	0.00545	ppb
-	Sc	45	287727.5		ppb
>	Rh	103	639977.3		ppb
-	Cd	111	61.9	0.00731	ppb
-	Cd	114	75.5	0.00195	ppb
>	Ho	165	1095774.1		ppb
-	Pb	208	4939.2	0.00695	ppb
	Kr	83	141.4		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Da Wednesday, April 06, 2011 14:48:55

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	38990.6		ppb
-	Be	9	39270.3	95.71272	ppb
-	Sc	45	269050		ppb
>	Rh	103	609451.2		ppb
-	Cd	111	324288	104.69732	ppb
-	Cd	114	770427	103.01075	ppb
>	Ho	165	1062341.1		ppb
-	Pb	208	4535821	103.46828	ppb
	Kr	83	-19747.7		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-3

Sample Da Wednesday, April 06, 2011 17:38:24

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
>	Li	6	23167.5			ppb
-	Be	9	7	0.01912		ppb
-	Sc	45	213398.1			ppb
>	Rh	103	483206.1			ppb
	Cd	111	1941.5	0.77892		ppb
-	Cd	114	3012.3	0.5004		ppb
>	Ho	165	847627.5			ppb
-	Pb	208	83540.9	2.28844		ppb
	Kr	83	235.7			mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-3

Sample Da Wednesday, April 06, 2011 17:40:22

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
>	Li	6	22927			ppb
-	Be	9	10317.5	42.74427		ppb
-	Sc	45	213197.3			ppb
>	Rh	103	467907.6			ppb
	Cd	111	102277.8	43.00994		ppb
-	Cd	114	241222.8	42.00713		ppb
>	Ho	165	812676.6			ppb
-	Pb	208	1784989.1	53.17335		ppb
	Kr	83	275.5			mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-6

Sample Da Wednesday, April 06, 2011 17:42:19

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
>	Li	6	24496.7			ppb
-	Be	9	5.3	0.01131		ppb
-	Sc	45	303747			ppb
>	Rh	103	467891.4			ppb
	Cd	111	1833.9	0.7597		ppb
-	Cd	114	2679.3	0.45973		ppb
>	Ho	165	827510.6			ppb
-	Pb	208	64768.2	1.79741		ppb
	Kr	83	519.1			mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-6

Sample Da Wednesday, April 06, 2011 17:44:17

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
>	Li	6	24650			ppb
-	Be	9	10659.3	41.07141		ppb
-	Sc	45	293573.6			ppb
>	Rh	103	447335.3			ppb
	Cd	111	97125.8	42.71108		ppb
-	Cd	114	230051.3	41.90003		ppb
>	Ho	165	788269.8			ppb
-	Pb	208	1683321.3	51.69615		ppb
	Kr	83	497.8			mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-9

Sample Da Wednesday, April 06, 2011 17:46:15

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
>	Li	6	23126.5			ppb
-	Be	9	7	0.01934		ppb
-	Sc	45	195671.8			ppb
>	Rh	103	436806.7			ppb
	Cd	111	1328	0.58743		ppb
-	Cd	114	521.5	0.08969		ppb
>	Ho	165	768053.3			ppb
-	Pb	208	123754.4	3.80626		ppb
	Kr	83	99.9			mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16384-9

Sample Date: Wednesday, April 06, 2011 17:48:14

Sample Description: CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	20881.9		ppb
-	Be	9	9258.4	42.13466	ppb
-	Sc	45	178624.6		ppb
>	Rh	103	395516		ppb
	Cd	111	84563.4	42.05807	ppb
-	Cd	114	198625.4	40.91459	ppb
>	Ho	165	692830.9		ppb
-	Pb	208	1531868.8	53.52715	ppb
	Kr	83	130		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Wednesday, April 06, 2011 17:50:11

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	26310.7		ppb
-	Be	9	8	0.01947	ppb
-	Sc	45	225245		ppb
>	Rh	103	533796.9		ppb
	Cd	111	62.9	0.01154	ppb
-	Cd	114	113.2	0.00964	ppb
>	Ho	165	913512		ppb
-	Pb	208	4629.1	0.02054	ppb
	Kr	83	128.3		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Wednesday, April 06, 2011 17:52:08

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	26239.2		ppb
-	Be	9	30023.5	108.7188	ppb
-	Sc	45	219632.3		ppb
>	Rh	103	521766.1		ppb
	Cd	111	277959	104.81693	ppb
-	Cd	114	658024.9	102.7627	ppb
>	Ho	165	916119.3		ppb
-	Pb	208	3926598.4	103.88004	ppb
	Kr	83	-16663.7		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	4/6/2011	9:26:43	0.0004025			µg	4	100	0.0004025					
STD1=.004ug	4/6/2011	9:27:57	0.0009074			µg	4	100	0.0009074					
STD2=.04ug	4/6/2011	9:29:12	0.0074801			µg	4	100	0.0074801					
STD3=.08ug	4/6/2011	9:30:28	0.0157327			µg	4	100	0.0157327					
STD4=.16ug	4/6/2011	9:31:45	0.0310727			µg	4	100	0.0310727					
STD5=.2ug	4/6/2011	9:33:03	0.0419764			µg	4	100	0.0419764					
Reagent Blank	4/6/2011	9:34:49	-0.0000018	-0.0000091	-0.0000091	µg	4	100	-0.0000103	-0.000051	-0.000051	6.65E-06	3.279E-05	3.279E-05
0.004ug = DL	4/6/2011	9:38:30	0.0008169	0.0040226	0.0040226	µg	4	100	0.0008169	0.0040226	0.0040226			
0.080ug = STD.2	4/6/2011	9:39:46	0.01556	0.0766155	0.0766155	µg	4	100	0.01556	0.0766155	0.0766155			
REAGENT BLANK	4/6/2011	9:41:02	-0.0000198	-0.0000977	-0.0000977	µg	4	100	-0.0000198	-0.0000977	-0.0000977			
16384-1rb	4/6/2011	9:46:37	-0.0000411	-0.0002026	-0.0050662	µg	4	100	-0.0000528	-0.0002604	-0.0065105	-0.0000294	-0.0001448	-0.0036219
16384-1fh	4/6/2011	9:50:06	8.634E-05	0.0004251	0.0106283	µg	4	100	0.0001028	0.0005062	0.0126539	6.988E-05	0.0003441	0.0086027
16384-2fh	4/6/2011	9:51:52	0.0002672	0.0013158	0.0328939	µg	4	100	0.0002495	0.0012286	0.0307146	0.0002849	0.0014029	0.0350732
16384-2fh dup	4/6/2011	9:53:39	0.0001287	0.0006338	0.0158452	µg	4	100	0.0001379	0.0006789	0.0169737	0.0001196	0.0005887	0.0147168
169384-3fh	4/6/2011	9:55:27	0.0002752	0.001355	0.0338748	µg	4	100	0.0002698	0.0013287	0.0332164	0.0002805	0.0013813	0.0345332
16384-3fh spk	4/6/2011	9:57:16	0.0156039	0.0768316	1.9207908	µg	4	100	0.0154864	0.0762534	1.9063343	0.0157213	0.0774099	1.9352473
16384-4fh	4/6/2011	9:59:06	6.037E-05	0.0002973	0.0074326	µg	4	100	8.723E-05	0.0004295	0.0107381	3.352E-05	0.0001651	0.0041271
16384-5fh	4/6/2011	10:00:52	-0.0000388	-0.0001911	-0.0047779	µg	4	100	-0.0000209	-0.0001029	-0.0025736	-0.0000567	-0.0002792	-0.0069821
16384-5fh dup	4/6/2011	10:02:35	0.0001311	0.0006455	0.0163176	µg	4	100	0.0001491	0.0007341	0.0183521	0.0001131	0.0005569	0.0139231
0.004ug = DL	4/6/2011	10:06:14	0.0007932	0.0039056	0.0039056	µg	4	100	0.0007932	0.0039056	0.0039056			
0.080ug = STD.2	4/6/2011	10:07:30	0.0149317	0.0735222	0.0735222	µg	4	100	0.0149317	0.0735222	0.0735222			
REAGENT BLANK	4/6/2011	10:08:46	-0.0000395	-0.0001949	-0.0001949	µg	4	100	-0.0000395	-0.0001949	-0.0001949			
16384-6fh	4/6/2011	10:10:30	0.0002562	0.0012614	0.0315359	µg	4	100	0.0002654	0.001307	0.0326738	0.0002469	0.0012159	0.0303979
16384-6fh spk	4/6/2011	10:12:14	0.019087	0.093982	2.3495509	µg	4	100	0.0191261	0.0941746	2.3543652	0.0190479	0.0937895	2.3447366
16384-7fh	4/6/2011	10:13:58	0.0000642	0.0003161	0.0079033	µg	4	100	7.287E-05	0.0003588	0.0089701	5.533E-05	0.0002735	0.0068364
16384-8fh	4/6/2011	10:15:43	0.000117	0.000576	0.0143989	µg	4	100	0.0001215	0.0005982	0.0149557	0.0001124	0.0005537	0.0138421
16384-8fh dup	4/6/2011	10:17:29	4.283E-05	0.0002109	0.0052725	µg	4	100	3.829E-05	0.0001886	0.0047139	4.737E-05	0.0002332	0.0058311
16384-9fh	4/6/2011	10:19:15	0.0001105	0.0005438	0.0135962	µg	4	100	9.929E-05	0.0004889	0.0122224	0.0001216	0.0005988	0.014197
16384-9fh spk	4/6/2011	10:21:01	0.0158715	0.0781496	1.9537395	µg	4	100	0.0160697	0.0791253	1.9781334	0.0156734	0.0771738	1.9293455
16384-10fh	4/6/2011	10:22:48	0.000147	0.0007239	0.018098	µg	4	100	0.0001525	0.0007509	0.0187726	0.0001415	0.0006969	0.0174234
16384-1bh	4/6/2011	10:24:36	0.0062208	0.0306306	5.5134995	µg	4	720	0.0062579	0.0308129	5.546329	0.0061838	0.0304482	5.4806701
16384-2bh	4/6/2011	10:26:24	0.005347	0.0263282	4.6403464	µg	4	705	0.0053695	0.0264389	4.6598633	0.0053246	0.0262175	4.6208296
0.004ug = DL	4/6/2011	10:27:39	0.00076	0.0037422	0.0037422	µg	4	705	0.00076	0.0037422	0.0037422			
0.080ug = STD.2	4/6/2011	10:28:55	0.0149145	0.0734371	0.0734371	µg	4	705	0.0149145	0.0734371	0.0734371			
REAGENT BLANK	4/6/2011	10:30:11	-0.0000159	-0.0000783	-0.0000783	µg	4	705	-0.0000159	-0.0000783	-0.0000783			
16384-2bh dup	4/6/2011	10:31:57	0.0056443	0.0277921	4.8983524	µg	4	705	0.0057619	0.028371	5.0003931	0.0055268	0.0272131	4.7963117
16384-3bh	4/6/2011	10:33:45	0.0056488	0.0278138	4.9369489	µg	4	710	0.005668	0.0279084	4.9537449	0.0056295	0.0277192	4.9201529
16384-3bh spk	4/6/2011	10:35:35	0.0206881	0.1018658	18.081183	µg	4	710	0.0208412	0.1026195	18.214962	0.020535	0.1011121	17.947405
16384-4bh	4/6/2011	10:37:21	0.0089077	0.0438604	7.0724927	µg	4	645	0.0088866	0.0437662	7.0573037	0.0089268	0.0439546	7.0876817
16384-5bh	4/6/2011	10:39:03	0.0077696	0.0382568	6.3601947	µg	4	665	0.0077372	0.0380969	6.3363608	0.0078021	0.0384167	6.3867814
16384-5bh dup	4/6/2011	10:40:45	0.0078387	0.0385968	6.4167142	µg	4	665	0.0078532	0.0386685	6.4286306	0.0078241	0.0385251	6.4047979
16384-6bh	4/6/2011	10:42:29	0.0076254	0.0375467	6.2890722	µg	4	670	0.0076442	0.0376393	6.3045872	0.0076066	0.0374541	6.2735571
16384-6bh spk	4/6/2011	10:44:13	0.0244988	0.1206292	20.205398	µg	4	670	0.0245585	0.120923	20.2546	0.0244391	0.1203355	20.156196
16384-7bh	4/6/2011	10:45:57	0.0039818	0.019606	3.2839992	µg	4	670	0.0040323	0.0198547	3.3256675	0.0039313	0.0193572	3.2423308
16384-8bh	4/6/2011	10:47:41	0.0040594	0.0199882	3.4229765	µg	4	685	0.004198	0.0206704	3.5398003	0.0039209	0.019306	3.3061528
0.004ug = DL	4/6/2011	10:48:54	0.0007899	0.0038892	0.0038892	µg	4	685	0.0007899	0.0038892	0.0038892			
0.080ug = STD.2	4/6/2011	10:50:10	0.0158889	0.0782352	0.0782352	µg	4	685	0.0158889	0.0782352	0.0782352			
REAGENT BLANK	4/6/2011	10:51:26	-0.000028	-0.0001379	-0.0001379	µg	4	685	-0.000028	-0.0001379	-0.0001379			
16384-8bh dup	4/6/2011	10:53:11	0.003593	0.0176914	3.0296492	µg	4	685	0.0036719	0.0180802	3.0962352	0.003514	0.0173026	2.9630632
16384-9bh	4/6/2011	10:54:57	0.004647	0.0228811	3.8611826	µg	4	675	0.0044059	0.0216943	3.660911	0.004888	0.0240679	4.0614541
16384-9bh spk	4/6/2011	10:56:43	0.0198998	0.0979845	16.534885	µg	4	675	0.0198347	0.0976638	16.480759	0.019965	0.0983053	16.589012
16384-10bh	4/6/2011	10:58:31	8.253E-05	0.0004064	0.0294628	µg	4	290	9.385E-05	0.0004622	0.0335061	0.0000712	0.0003506	0.0254196
16384-11bh	4/6/2011	11:00:18	0.0003073	0.0015132	0.0737704	µg	4	195	0.000329	0.0016199	0.0789704	0.0002857	0.0014066	0.0685704
16384-1a	4/6/2011	11:02:06	-0.0000001	-0.0000005	-0.000028	µg	4	200	2.92E-06	1.441E-05	0.0007208	-0.0000031	-0.0000155	-0.0007769
16384-3a	4/6/2011	11:07:31	5.938E-05	0.0004724	0.0236192	µg	4	200	9.205E-05	0.0004533	0.0226636	9.981E-05	0.0004915	0.0245748
16384-3a spk	4/6/2011	11:09:17	0.0163174	0.0803449	4.0172449	µg	4	200	0.0165181	0.0813332	4.0666618	0.0161167	0.0793566	3.967828
0.004ug = DL	4/6/2011	11:10:29	0.0008497	0.0041836	0.0041836	µg	4	200	0.0008497	0.0041836	0.0041836			
0.080ug = STD.2	4/6/2011	11:11:45	0.0157314	0.0774597	0.0774597	µg	4	200	0.0157314	0.0774597	0.0774597			
REAGENT BLANK	4/6/2011	11:13:01	-0.0000165	-0.0000813	-0.0000813	µg	4	200	-0.0000165	-0.0000813	-0.0000813			
16384-4a	4/6/2011	11:14:44	0.0001109	0.0005459	0.0272965	µg	4	200	0.0001108	0.0005456	0.0272789	0.0001109	0.0005463	0.0273142
16384-5a	4/6/2011	11:16:26	0.0001557	0.0007668	0.0383399	µg	4	200	0.0001563	0.0007697	0.0384832	0.0001551	0.0007639	0.0381965
16384-5a dup	4/6/2011	11:18:08	0.0002472	0.0012174	0.060868	µg	4	200	0.0002498	0.00123	0.0614995	0.0002447	0.0012047	0.0602364
16384-6a	4/6/2011	11:19:52	0.0001124	0.0005537	0.0276834	µg	4	200	0.0001026	0.0005052	0.0252602	0.0001223	0.0006021	0.0301066
16384-6a spk	4/6/2011	11:21:36	0.0182609	0.0899144	4.4957204	µg	4	200	0.0181442	0.0893397	4.4669844	0.0183776	0.0904891	4.5244563
16384-7a	4/6/2011	11:23:20	2.858E-05	0.0001408	0.0070382	µg	4	200	3.555E-05	0.0001751	0.0087539	2.161E-05	0.0001065	0.0053226
16384-8a	4/6/2011	11:25:05	6.07E-06	2.992E-05	0.001496	µg	4	200	4.257E-05	0.0002097	0.0104828	-0.0000304	-0.0001498	-0.0074907
16384-8a dup	4/6/2011	11:26:51	6.908E-05	0.0003402	0.0170092	µg	4	200	7.373E-05	0.0003631	0.0181528	6.444E-05	0.0003173	0.0158655
16384-9a	4/6/2011	11:28:37	0.0008246	0.0040604	0.20302	µg	4	200	0.000852	0.0041949	0.2097469	0.0007973	0.0039259	0.1962932
16384-9a spk	4/6/2011	11:32:48	0.0182646	0.0899325	4.49									

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
16384-3b spk	4/6/2011	11:49:05	0.0159524	0.0785478	9.8184765	µg	4	500	0.0159568	0.0785695	9.8211924	0.015948	0.0785261	9.8157606
16384-4b	4/6/2011	11:50:49	0.0001651	0.000813	0.1016308	µg	4	500	0.0001761	0.0008669	0.1083662	0.0001542	0.0007592	0.0948953
16384-5b	4/6/2011	11:52:32	1.717E-05	8.457E-05	0.0105723	µg	4	500	-0.0000097	-0.0000479	-0.005997	4.409E-05	0.0002171	0.0271415
16384-5b dup	4/6/2011	11:54:16	-0.0000004	-0.0000022	-0.0002816	µg	4	500	8.14E-06	4.012E-05	0.0050153	-0.000009	-0.0000446	-0.0055785
0.004ug = DL	4/6/2011	11:55:30	0.0008104	0.0039902	0.0039902	µg	4	500	0.0008104	0.0039902	0.0039902			
0.080ug = STD.2	4/6/2011	11:56:47	0.0161079	0.0793136	0.0793136	µg	4	500	0.0161079	0.0793136	0.0793136			
REAGENT BLANK	4/6/2011	11:58:03	-0.0000338	-0.0001668	-0.0001668	µg	4	500	-0.0000338	-0.0001668	-0.0001668			
Calib Blank	4/6/2011	13:40:43	0.0004583			µg	4	400	0.0004583					
STD1=.004ug	4/6/2011	13:41:57	0.0009416			µg	4	400	0.0009416					
STD2=.04ug	4/6/2011	13:43:12	0.0105282			µg	4	400	0.0105282					
STD3=.08ug	4/6/2011	13:44:28	0.0214459			µg	4	400	0.0214459					
STD4=.16ug	4/6/2011	13:45:44	0.0413016			µg	4	400	0.0413016					
STD5=.2ug	4/6/2011	13:47:02	0.0562557			µg	4	400	0.0562557					
Reagent Blank	4/6/2011	13:50:46	-0.0001254	-0.0004608	-0.0004608	µg	4	400	-0.0001128	-0.0004147	-0.0004147	-0.0001379	-0.0005069	-0.0005069
0.004ug = DL	4/6/2011	13:51:59	0.0011642	0.0042786	0.0042786	µg	4	400	0.0011642	0.0042786	0.0042786			
0.080ug = STD.2	4/6/2011	13:53:15	0.022032	0.0809675	0.0809675	µg	4	400	0.022032	0.0809675	0.0809675			
0.080ug = QC STD 3	4/6/2011	13:54:34	0.0211009	0.0775456	0.0775456	µg	4	400	0.0211009	0.0775456	0.0775456			
REAGENT BLANK	4/6/2011	13:55:50	-0.0000482	-0.0001773	-0.0001773	µg	4	400	-0.0000482	-0.0001773	-0.0001773			
16384-6b	4/6/2011	13:57:34	0.0001182	0.0004345	0.0543159	µg	4	500	0.0001215	0.0004464	0.0557956	0.000115	0.0004227	0.0528362
16384-6b spk	4/6/2011	13:59:18	0.0227396	0.0835677	0.1445963	µg	4	500	0.0227852	0.0837352	0.1466902	0.022694	0.0834002	0.1425023
16384-7b	4/6/2011	14:01:04	0.0001775	0.0006522	0.0815227	µg	4	500	0.0002003	0.0007359	0.0919926	0.0001547	0.0005684	0.0710527
16384-8b	4/6/2011	14:02:50	0.0002052	0.000754	0.0942457	µg	4	500	0.0002244	0.0008245	0.1030643	0.000186	0.0006834	0.085427
16384-8b dup	4/6/2011	14:04:36	0.0005618	0.0020646	0.2580794	µg	4	500	0.0005645	0.0020745	0.2593089	0.0005591	0.0020548	0.2568499
16384-9b	4/6/2011	14:06:22	0.0001668	0.0006129	0.0766099	µg	4	500	0.0001613	0.0005928	0.0740959	0.0001722	0.000633	0.0791239
16384-9b spk	4/6/2011	14:08:09	0.0198379	0.0729041	9.1130068	µg	4	500	0.0197374	0.0725346	9.066826	0.0199384	0.0732735	9.1591875
16384-10b	4/6/2011	14:09:57	0.0004301	0.0015806	0.1975767	µg	4	500	0.000416	0.0015289	0.1911139	0.0004442	0.0016323	0.2040395
16384-11b	4/6/2011	14:11:45	0.0002922	0.0010737	0.1342179	µg	4	500	0.000288	0.0010585	0.1323131	0.0002963	0.001089	0.1361226
16384-1c	4/6/2011	14:13:29	0.0003528	0.0012965	0.1296533	µg	4	400	0.0003426	0.0012589	0.1258892	0.000363	0.0013342	0.1334174
0.004ug = DL	4/6/2011	14:14:41	0.0011658	0.0042844	0.0042844	µg	4	400	0.0011658	0.0042844	0.0042844			
0.080ug = STD.2	4/6/2011	14:15:58	0.0221849	0.0815292	0.0815292	µg	4	400	0.0221849	0.0815292	0.0815292			
REAGENT BLANK	4/6/2011	14:17:14	-0.0000148	-0.0000544	-0.0000544	µg	4	400	-0.0000148	-0.0000544	-0.0000544			
Calib Blank	4/7/2011	12:08:47	0.0007324			µg			0.0007324					
STD1=.004ug	4/7/2011	12:10:01	0.0004657			µg			0.0004657					
STD2=.04ug	4/7/2011	12:11:16	0.0076166			µg			0.0076166					
STD3=.08ug	4/7/2011	12:12:32	0.0167353			µg			0.0167353					
STD4=.16ug	4/7/2011	12:13:50	0.0338591			µg			0.0338591					
STD5=.2ug	4/7/2011	12:15:08	0.0432936			µg			0.0432936					
Reagent Blank	4/7/2011	12:16:54	-0.0000237	-0.0001111	-0.0001111	µg			5.02E-06	2.349E-05	2.349E-05	-0.0000525	-0.0002457	-0.0002457
0.004ug = DL	4/7/2011	12:18:07	0.0008668	0.004057	0.004057	µg			0.0008668	0.004057	0.004057			
0.080ug = STD.2	4/7/2011	12:19:23	0.0168159	0.0787035	0.0787035	µg			0.0168159	0.0787035	0.0787035			
0.080ug = QC STD 3	4/7/2011	12:20:42	0.0174705	0.0817675	0.0817675	µg			0.0174705	0.0817675	0.0817675			
REAGENT BLANK	4/7/2011	12:21:58	4.359E-05	0.0002041	0.0002041	µg			4.359E-05	0.0002041	0.0002041			
16384-11fh	4/7/2011	12:27:11	8.833E-05	0.0004134	0.010336	µg	4	100	9.779E-05	0.0004577	0.0114427	7.887E-05	0.0003692	0.0092293
16384-8bph dup	4/7/2011	12:30:44	0.0037662	0.0176272	3.0186626	µg	4	685	0.0037555	0.0175769	3.0100511	0.003777	0.0176775	3.0272741
16384-2a	4/7/2011	12:32:31	5.552E-05	0.0002599	0.0129934	µg	4	200	8.824E-05	0.000413	0.0206506	0.0000228	0.0001067	0.0053363
16384-2a dup	4/7/2011	12:34:20	8.145E-05	0.0003812	0.0190612	µg	4	200	6.807E-05	0.0003186	0.0159302	9.483E-05	0.0004438	0.0221922
16384-2c	4/7/2011	12:36:10	-0.0001241	-0.0005811	-0.0581139	µg	4	400	-0.0001422	-0.0006656	-0.0665692	-0.0001061	-0.0004965	-0.0496587
16384-2c dup	4/7/2011	12:37:57	-0.0000083	-0.0000392	-0.0039207	µg	4	400	-0.0000014	-0.0000069	-0.0006901	-0.0000152	-0.0000715	-0.0071514
16384-3c	4/7/2011	12:39:40	0.000166	0.000777	0.0777042	µg	4	400	0.0001786	0.0008358	0.0835785	0.0001535	0.0007183	0.0718298
0.004ug = DL	4/7/2011	12:40:53	0.0008301	0.003885	0.003885	µg	4	400	0.0008301	0.003885	0.003885			
0.080ug = STD.2	4/7/2011	12:42:08	0.0159272	0.0745445	0.0745445	µg	4	400	0.0159272	0.0745445	0.0745445			
REAGENT BLANK	4/7/2011	12:43:24	8.358E-05	0.0003912	0.0003912	µg	4	400	8.358E-05	0.0003912	0.0003912			
16384-3c spk	4/7/2011	12:45:08	0.0158327	0.0741018	7.41018	µg	4	400	0.0158442	0.0741558	7.4155824	0.0158211	0.0740478	7.4047776
16384-4c	4/7/2011	12:46:52	-0.0002237	-0.0010473	-0.1047344	µg	4	400	-0.00022	-0.0010297	-0.1029723	-0.0002275	-0.0010649	-0.1064965
16384-5c	4/7/2011	12:48:37	-0.0000666	-0.000312	-0.0312093	µg	4	400	-0.0000711	-0.0003329	-0.0332954	-0.0000622	-0.0002912	-0.0291231
16384-5c dup	4/7/2011	12:50:22	-0.0000347	-0.0001627	-0.0162709	µg	4	400	-0.0000367	-0.0001721	-0.0172161	-0.0000327	-0.0001532	-0.0153256
16384-6c	4/7/2011	12:52:08	-0.0000779	-0.0003646	-0.036466	µg	4	400	-0.0000794	-0.0003717	-0.0371795	-0.0000363	-0.0003575	-0.0357525
16384-6c spk	4/7/2011	12:53:54	0.0161572	0.0756208	7.5620787	µg	4	400	0.0161156	0.0754261	7.5426106	0.0161988	0.0758155	7.5815468
16384-7c	4/7/2011	12:55:40	-0.0000185	-0.0000866	-0.0086631	µg	4	400	-0.0000107	-0.0000502	-0.005026	-0.0000262	-0.000123	-0.0123002
16384-8c	4/7/2011	12:57:27	0.0002291	0.0010723	0.1072308	µg	4	400	0.0002321	0.0010865	0.1086497	0.0002261	0.0010581	0.1058119
16384-8c dup	4/7/2011	12:59:15	0.000232	0.0010858	0.1085787	µg	4	400	0.0002201	0.0010299	0.1029916	0.0002439	0.0011417	0.1141659
0.004ug = DL	4/7/2011	13:02:18	0.0008702	0.004073	0.004073	µg	4	400	0.0008702	0.004073	0.004073			
0.080ug = STD.2	4/7/2011	13:03:34	0.0175262	0.0820282	0.0820282	µg	4	400	0.0175262	0.0820282	0.0820282			
REAGENT BLANK	4/7/2011	13:04:50	0.0001085	0.0005079	0.0005079	µg	4	400	0.0001085	0.0005079	0.0005079			
16384-10c	4/7/2011	13:08:24	0.0003963	0.0018548	0.1854752	µg	4	400	0.0003931	0.0018396	0.1839621	0.0003995	0.0018699	0.1869883
16384-11c	4/7/2011	13:10:14	-0.0001254	-0.0005871	-0.0587161	µg	4	400	-0.0001154	-0.0005402	-0.0540268	-0.0001354	-0.000634	-0.0634053
0.004ug = DL	4/7/2011	13:23:35	0.0008636	0.0040418	0.0040418	µg	4	725	0.0008636	0.0040418	0.0040418			
0.080ug = STD.2	4/7/2011	13:24:50	0.0182767	0.0855409	0.0855409	µg	4	725	0.0182767	0.0855409	0.0855409			
REAGENT BLANK	4/7/2011	13:26:06	0.0002108	0.0009865	0.0009865	µg	4	725	0.0002108	0.0009865	0.0009865			
Calib Blank	4/8/2011	8:21:28	0.0007866			µg			0.0007866					
STD1=.004ug	4/8/2011	8:22:42	0.0010863			µg			0.0010863					
STD2=.04ug	4/8/2011	8:23:56	0.0093644			µg			0.0093644					
STD3=.08ug	4/8/2011	8:25:12	0.0184057			µg			0.0184057					
STD4=.16ug	4/8/2011	8:26:29	0.0346305			µg			0.0346305					
STD5=.2ug	4/8/2011	8:27:48	0.0428809											

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
0.080ug = QC STD 3	4/8/2011	8:33:21	0.0169772	0.078224	0.078224	µg			0.0169772	0.078224	0.078224			
REAGENT BLANK	4/8/2011	8:34:37	-0.0000572	-0.0002639	-0.0002639	µg			-0.0000572	-0.0002639	-0.0002639			
0.004ug = DL	4/8/2011	8:56:00	0.0009018	0.0041551	0.0041551	µg	20	1	0.0009018	0.0041551	0.0041551			
0.080ug = STD.2	4/8/2011	8:57:16	0.0178302	0.0821543	0.0821543	µg	20	1	0.0178302	0.0821543	0.0821543			
REAGENT BLANK	4/8/2011	8:58:32	1.719E-05	7.923E-05	7.923E-05	µg	20	1	1.719E-05	7.923E-05	7.923E-05			
16384-9c	4/8/2011	9:00:16	0.0002531	0.001166	0.1166	µg	4	400	0.000242	0.001115	0.111499	0.0002641	0.001217	0.121701
16384-9c spk	4/8/2011	9:02:00	0.021371	0.0984688	9.8468764	µg	4	400	0.0217224	0.1000878	10.008775	0.0210196	0.0968498	9.6849774
0.004ug = DL	4/8/2011	9:18:39	0.000916	0.0042205	0.0042205	µg	1	500	0.000916	0.0042205	0.0042205			
0.080ug = STD.2	4/8/2011	9:19:55	0.0177967	0.0819999	0.0819999	µg	1	500	0.0177967	0.0819999	0.0819999			
REAGENT BLANK	4/8/2011	9:21:11	4.52E-06	2.086E-05	2.086E-05	µg	1	500	4.52E-06	2.086E-05	2.086E-05			

Wheelabrator North 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 22	Mar 22	Mar 22
Start Time (approx.)		12:31	14:08	15:39
Stop Time (approx.)		13:41	15:17	16:47

☐ 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)	930.0	1022.0	878.0
v ₂	Fraction 2 sample volume (ml)			
m _{HF}	HF collected before blank subtraction (mg)	<0.0460	<0.0506	<0.0435
m _b	Allowable blank subtraction (mg)	0.0000	0.0000	0.0000
m _{nb}	HF collected after blank subtraction (mg)	<0.0460	<0.0506	<0.0435
m _{MDL}	Minimum detectable HF (mg)	0.0088	0.0097	0.0083
m _n	Total HF used in emission calculations (mg)	<0.0460	<0.0506	<0.0435

041811 140430
O

Wheelabrator North 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 23	Mar 23	Mar 23
Start Time (approx.)		11:32	13:07	14:39
Stop Time (approx.)		12:45	14:17	15:45

☐ 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)	860.0	955.0	908.0
v ₂	Fraction 2 sample volume (ml)			
m _{HF}	HF collected before blank subtraction (mg)	<0.0426	<0.0473	<0.0449
m _b	Allowable blank subtraction (mg)	0.0000	0.0000	0.0000
m _{nb}	HF collected after blank subtraction (mg)	<0.0426	<0.0473	<0.0449
m _{MDL}	Minimum detectable HF (mg)	0.0082	0.0091	0.0086
m _n	Total HF used in emission calculations (mg)	<0.0426	<0.0473	<0.0449

041811 140440
N

Wheelabrator North 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 24	Mar 24	Mar 24
Start Time (approx.)		11:40	13:11	14:38
Stop Time (approx.)		12:55	14:19	15:46

☐ 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)	789.0	820.0	860.0
v ₂	Fraction 2 sample volume (ml)			
m _{HF}	HF collected before blank subtraction (mg)	<0.0390	<0.0406	<0.0426
m _b	Allowable blank subtraction (mg)	0.0000	0.0000	0.0000
m _{nb}	HF collected after blank subtraction (mg)	<0.0390	<0.0406	<0.0426
m _{MDL}	Minimum detectable HF (mg)	0.0075	0.0078	0.0082
m _n	Total HF used in emission calculations (mg)	<0.0390	<0.0406	<0.0426

041811 140451
N

Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 1 SDA Inlet

USEPA Method 26A Chloride Laboratory Data Summary

Run No.	Blank	1	2	3
Date (2011)		Mar 22	Mar 22	Mar 22
Start Time (approx.)		07:36	09:40	11:02
Stop Time (approx.)		08:36	10:40	12:02

☐ DRAFT LAB DATA

MDL Min. detectable limit (mg Cl⁻/liter) 0.0180

HCl as Total Chloride
B_{Cl} Blank concentration (mg Cl⁻/liter) <0.0920

S _{Cl-1}	Fraction 1 concentration (mg Cl ⁻ /liter)	660.3100	640.5800	742.9200
S _{Cl-2}	Fraction 2 concentration (mg Cl ⁻ /liter)			
v ₁	Fraction 1 sample volume (ml)	704.0	758.0	763.0
v ₂	Fraction 2 sample volume (ml)			
m _{HCl}	HCl collected before blank subtraction (mg)	477.8743	499.1553	582.7197
m _b	Allowable blank subtraction (mg)	0.0000	0.0000	0.0000
m _{nb}	HCl collected after blank subtraction (mg)	477.8743	499.1553	582.7197
m _{MDL}	Minimum detectable HCl (mg)	0.0130	0.0140	0.0141
m _n	Total HCl used in emission calculations (mg)	477.8743	499.1553	582.7197

041811 125458
@



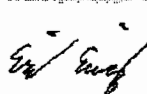
Laboratory Analysis for Anions

Performed For:
Palatine Engineering Group
500 West Wood Street
Palatine, IL 60067

Customer Reference No: 11182
Laboratory Project No: 28691

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
16:23:24 -05'00'

Eric Ewing
Title: Analyst
email: eewing@cleanair.com
Ph: 847-654-4519


Digitally signed by
Douglas D. Rhoades
Date: 2011.04.05
16:29:22 -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:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
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					
28691-01	DI + Filter Blank	300	<	0.009	0.047
Unit 1 FF Outlet					
28691-02	C&R R1	930	<	0.009	0.047
28691-03	C&R R2	1022	<	0.009	0.047
28691-04	C&R R3	878	<	0.009	0.047
Unit 2 FF Outlet					
28691-05	C&R R1	860	<	0.009	0.047
28691-06	C&R R2	955	<	0.009	0.047
28691-07	C&R R3	908	<	0.009	0.047
Unit 3 FF Outlet					
28691-08	C&R R1	789	<	0.009	0.047
28691-09	C&R R2	820	<	0.009	0.047
28691-10	C&R R3	860	<	0.009	0.047

Analysis Case Narrative

Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
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: 03/29/11
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:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
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 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:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
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:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
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	2	3	4	5	6	7
		0.0000	0.0754	0.2010	0.4020	0.6282	1.0051	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

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	-0.022	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			Is Coefficient of Regression > 0.995?				
Slope	m =	1.2485					
Intercept	b =	-0.0223					
Coeff.	R ² =	0.9992	Yes				

Stock Solution Standard Mixing Recipe (Anions)

Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

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%	84.66%

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

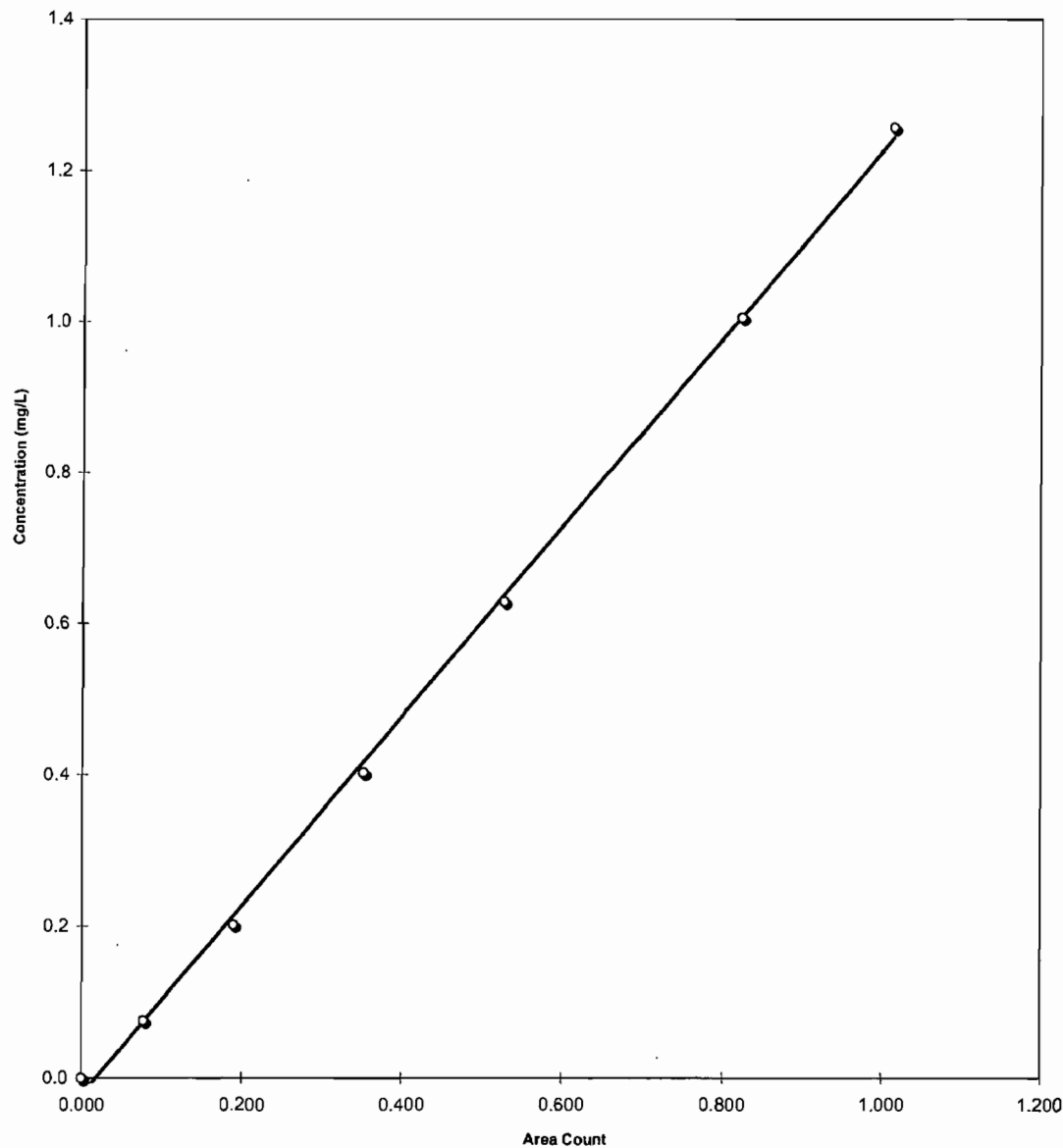
200	3	0.0754	0.1516	0.4503
250	10	0.2010	0.4043	1.2009
250	20	0.4020	0.8087	2.4019
200	20	0.5025	1.0108	3.0023
200	25	0.6282	1.2636	3.7529
100	20	1.0051	2.0217	6.0047
200	50	1.2563	2.5271	7.5058

1
2
3
CCV
4
5
6

CHROMATOGRAPHIC DATA REDUCTION
Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

Fluoride Calibration Curve



Sample Information

Customer:	Palatine Engineering Group	Lab Project No:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

Sample Identification Number	Sample Location	Run No.	Sample Identification	Sample Recovery Date	Field Tech	Sample Volume (mL)
28691-01	Blank	RB	DI + Filter Blank	3/21/2011	DL	300
28691-02	Unit 1 FF Outlet	1	C&R R1	3/22/2011	RV	930
28691-03	Unit 1 FF Outlet	2	C&R R2	3/22/2011	RV	1022
28691-04	Unit 1 FF Outlet	3	C&R R3	3/22/2011	DL	878
28691-05	Unit 2 FF Outlet	1	C&R R1	3/23/2011	DL	860
28691-06	Unit 2 FF Outlet	2	C&R R2	3/23/2011	RV	955
28691-07	Unit 2 FF Outlet	3	C&R R3	3/23/2011	DL	908
28691-08	Unit 3 FF Outlet	1	C&R R1	3/24/2011	RV	789
28691-09	Unit 3 FF Outlet	2	C&R R2	3/24/2011	DL	820
28691-10	Unit 3 FF Outlet	3	C&R R3	3/24/2011	DL	860

CHROMATOGRAPHIC DATA REDUCTION
Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

MDL=	0.009 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 _{inj} (Total Sample Volume, mL)	C _{reg} (Concentration, mg/L from Reg Curve)	M _{analyte} Total Amount of Analyte (mg)
Blank	28691-01	DI + Filter Blank	04/03/11	0.0000	0.0000	0.0000	1	300.0	<	<0.014
Unit 1 FF Outlet	28691-02	C&R R1	04/03/11	0.0000	0.0000	0.0000	1	930.0	<	<0.043
Unit 1 FF Outlet	28691-03	C&R R2	04/03/11	0.0000	0.0000	0.0000	1	1022.0	<	<0.048
Unit 1 FF Outlet	28691-04	C&R R3	04/04/11	0.0000	0.0000	0.0000	1	878.0	<	<0.041
Unit 2 FF Outlet	28691-05	C&R R1	04/04/11	0.0000	0.0000	0.0000	1	860.0	<	<0.040
Unit 2 FF Outlet	28691-06	C&R R2	04/04/11	0.0000	0.0000	0.0000	1	955.0	<	<0.045
Unit 2 FF Outlet	28691-07	C&R R3	04/04/11	0.0000	0.0000	0.0000	1	908.0	<	<0.042
Unit 3 FF Outlet	28691-08	C&R R1	04/04/11	0.0000	0.0000	0.0000	1	789.0	<	<0.037
Unit 3 FF Outlet	28691-09	C&R R2	04/04/11	0.0000	0.0000	0.0000	1	820.0	<	<0.038
Unit 3 FF Outlet	28691-10	C&R R3	04/04/11	0.0000	0.0000	0.0000	1	860.0	<	<0.040

CHROMATOGRAPHIC DATA REDUCTION
Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
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 Trial 1	Area Counts Trial 2	Area Count Average	Area Count Duplicate Difference	Duplicate Relative Difference (%)	Is Duplicate Difference < 5%?
Blank	28691-01	DI + Filter Blank	04/03/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 1 FF Outlet	28691-02	C&R R1	04/03/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 1 FF Outlet	28691-03	C&R R2	04/03/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 1 FF Outlet	28691-04	C&R R3	04/04/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 2 FF Outlet	28691-05	C&R R1	04/04/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 2 FF Outlet	28691-06	C&R R2	04/04/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 2 FF Outlet	28691-07	C&R R3	04/04/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 3 FF Outlet	28691-08	C&R R1	04/04/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 3 FF Outlet	28691-09	C&R R2	04/04/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 3 FF Outlet	28691-10	C&R R3	04/04/11	0.0000	0.0000	0.0000	na	na	Yes

CHROMATOGRAPHIC DATA REDUCTION

Customer:	Palatine Engineering Group	Lab Project No:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
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	28691-00	CCB	04/03/11	0.0000	0.0000	0.0000	na	na	<		
CleanAir	28691-990	CCV	04/03/11	0.4177	0.4308	0.4243	0.0131	3.1%	0.51	0.96%	Yes
CleanAir	28691-991	QC	04/04/11	0.5769	0.5628	0.5699	0.0141	2.5%	137.83	0.39%	Yes
CleanAir	28691-00	CCB	04/05/11	0.0000	0.0000	0.0000	na	na	<		
CleanAir	28691-992	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	28691-05	C&R R1	04/05/11	0.5119	0.5042	0.5081	0.0077	1.5%		100.2%	Yes
Matrix Spike	28691-05	C&R R1	04/05/11	0.5371	0.5308	0.5340	0.0063	1.2%	5.0%	105.3%	Yes

Determination of Method Detection Limit

Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
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	No. of Replicates	$t_{(n-1), 0.99}$
Matrix		Deionized Water	7	3.143
			8	2.998
			9	2.896
			10	2.821
			11	2.764
Analyte		Fluoride	16	2.602
Spike Concentration		0.0754 mg/L	21	2.528
Slope		1.2485		
Intercept		-0.0223		
Coefficient of Corr.		0.9992		

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
 Recovery (R_R): 100.87%
 Standard Deviation (S_R): 0.00312
 RMS Deviation: 4.1%
 $t_{(n-1), 0.99}$: 2.998
 MDL: 0.009
 MRL: 0.047

Is the spike level higher than the MDL? Yes
 Does the spike level exceed ten times the MDL? No
 Is the Avg Recovery between 90% < R_R < 110%? Yes

Sample Calculations

Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

Calibration Point No: 3
Sample No: 28691-03
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: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Fluoride	

Calibration Point No: 3
Sample No: 28691-03
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: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Fluoride	

Calibration Point No: 3
Sample No: 28691-03
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: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method: U.S. EPA Method 26A		Analyte: Fluoride

Calibration Point No: 3
Sample No: 28691-03
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:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

Calibration Point No: 3
Sample No: 28691-03
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 = $\bar{X}_{All}$
- $\bar{y}$ = Average of all concentration values = $\bar{Y}_{All}$
- 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: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Fluoride	

Calibration Point No: 3
Sample No: 28691-03
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: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method: U.S. EPA Method 26A		Analyte: Fluoride

Calibration Point No: 3
Sample No: 28691-03
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: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Fluoride	

Calibration Point No: 3
Sample No: 28691-03
Sample Location: Unit 1 FF Outlet

14. Determination of total amount of analyte in sample (total mg).

$$M_{Analyte} = \frac{(C_{Reg})(V_{Soln})}{1000}$$

Where:

$M_{Analyte}$ = Amount of analyte in sample (total mg)
 C_{Reg} = Sample concentration determined using the response factor (mg/L)
 V_{Soln} = Sample volume (ml)
1000 = Conversion constant (ml to L)

$M_{Analyte}$ = <0.048
 C_{Reg} = <
 V_{Soln} = 1022.0

15. Determination of Detection Limits.

15a. Determination of average spike result.

$$AvgM_{f-i} = \frac{\sum_{i=1}^n M_{f-i}}{n}$$

Where:

$AvgM_{f-i}$ = Average of spike result (mg/L)
 M_{f-i} = Net results recorded for each iteration (mg/L)
n = Number of iterations.
i = Placeholder for iteration.

$AvgM_{f-i}$	=	0.076			
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: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method: U.S. EPA Method 26A		Analyte: Fluoride

Calibration Point No: 3
Sample No: 28691-03
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.
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}	=	0.0031		
AvgM _{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: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method:	U.S. EPA Method 26A	Analyte: Fluoride

Calibration Point No: 3
Sample No: 28691-03
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: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Fluoride	

Calibration Point No: 3
Sample No: 28691-03
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.

σ_{f_i} = Standard deviation of spike result.

MDL = 0.009

$t_{(n-1, 0.99)}$ = 2.998

σ_{f_i} = 0.0031

Sample Calculations
Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

Calibration Point No: 3
Sample No: 28691-03
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: CAF Analyte(s): F
 Plant: Wheatland North Brown
 Customer Project No: 1182
 Lab Project No: 28691 (28695)
 Date: 9/7/11
 Analyst: Eric Gering

Date Received: 3/29/11
 Shipping Person: Scott Brown

Inj Type: Loop ConcInj Mode: Prop CnstInj / Vial: 1/2 3Serial Dilution DataCartridge 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	CAF-02	V1 FF at 102	930	1
2	CAF-03	" " " " R2	1022	1
3	CAF-04	" " " " R3	828	1
4	CAF-05	V2 " " " R1	860	1
5	CAF-06	" " " " R2	955	1
6	CAF-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 GeringPage: 1 of 4

AS40 Log Sheet

Customer: 66
 Plant: Wheelabrator South Fremont
 Customer Project No: 11182
 Lab Project No: 28691 / 28695
 Date: 4/1/11
 Analyst: Eric Ewing

Analyte(s): F

Date Received: _____
 Shipping Person: _____

Inj Type: Loop / Conc

Inj Mode: Prop Cnst

Inj / Vial: 1 2 3

Serial Dilution Data

Cartridge ID: 4A

Pos	Sample #	Identification	Volume	Dilution Ratio
1	691-08	V3 FC outlet CRR1	789	1
2	691-09	" " " " R2	820	1
3	691-10	" " " " 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	28695-01	DE + F. H. pr 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 Gwiny		

Date Received:	
Shipping Person:	

Inj Type: Loop / ConcInj Mode: Prop / CnstInj / Vial: 1 2 3Serial Dilution DataCartridge ID: 2A

Pos	Sample #	Identification	Volume	Dilution Ratio
1	28695-02	V1 FF Cathol C&R R1	875	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	V3 FF Cathol C&R R1	785	1
2	28695-09	" " " " R2	809	1
3	28695-10	" " " " R3	870	1
4	Blank			
5		CCV		
6	Blank			

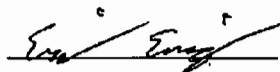
Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Cartridge ID: 4A

Pos	Sample #	Identification	Volume	Dilution Ratio
1	28691-05	Matrix Spike		1
2	28691-05	Matrix Spike		1
3	28691-05	Matrix Spike		1
4	28691-05	Matrix Spike		1
5	Blank			
6		Cal 9		

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Analyst Signature



AS40 Log Sheet

Customer: 66 Analyte(s): F
 Plant: Wheelabrator
 Customer Project No: 0182
 Lab Project No: 28691 (28695)
 Date: 4/4/11
 Analyst: Eric Ewing

Date Received:
 Shipping Person:

Inj Type: Loop ConcInj Mode: Prop / CnsInj / Vial: 1 2 3Serial Dilution DataCartridge ID: 5A

Pos	Sample #	Identification	Volume	Dilution Ratio
1		<u>Cal 01</u>		
2		<u>Cal 02</u>		
3		<u>Cal 03</u>		
4		<u>Cal 04</u>		
5		<u>Cal 05</u>		
6		<u>Cal 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.: 28691

Date Received: 3/29/2011

CleanAir No.: 11182

66

Customer : 66

Contact : Scott Brown

Phone :

Fax :

Email : sbrown@cleanair.com

Requested Analysis

Due	Analyst	Status	Sample	Type	Container	Method
4/12/2011	EE	In Queue	1-10	Imp C&R	Nalgene	EPA Method 26A Fluoride
4/12/2011	EE	In Queue	11-30	Imp C&R	Nalgene	EPA Method 26A Chloride

Printed 2011/03/29 11:03:47


CleanAir
ENGINEERING
500 West Wood Street
Palatine, IL 60067
800-627-0033 (phone)
847-991-3385 (fax)

CLIENT <u>Wheelabrator</u>		PROJECT <u>11182NB</u>		66-11182NB-7	
PLANT <u>North 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)			
ANALYTICAL METHOD USEPA M-26	CONTAINER NUMBER 1	SAMPLE FRACTION ACIDIC IMPINGER CATCH AND RINSE 1000 mL HDPE			
LAB ID NUMBER	DATE (2011)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	
	3/22	Unit 1 FF Outlet	1	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/22	Unit 1 FF Outlet	2	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/22	Unit 1 FF Outlet	3	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/22	Unit 1 SDA Inlet	1	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/22	Unit 1 SDA Inlet	2	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/22	Unit 1 SDA Inlet	3	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/23	Unit 2 FF Outlet	1	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/23	Unit 2 FF Outlet	2	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/23	Unit 2 FF Outlet	3	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/23	Unit 2 SDA Inlet	1	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/23	Unit 2 SDA Inlet	2	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/23	Unit 2 SDA Inlet	3	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
Relinquished By: (signature) S. Brown		Date / Time 3/28/2011 18:00	Relinquished By: (signature)		Date / Time
Received By: (signature) <i>[Signature]</i>		Date / Time 3/28/11 1100	Received By: (signature)		Date / Time
Relinquished By: (signature)		Date / Time	Relinquished By: (signature)		Date / Time
Relinquished By: (signature)		Date / Time	Relinquished By: (signature)		Date / Time
This form completed by: S. Brown <i>[Signature]</i> 3/28/11					

Page 34 of 70

PLEASE FOLD THIS SHIPPING DOCUMENT IN HALF AND PLACE IT IN A WAYBILL POUCH AFFIXED TO YOUR SHIPMENT SO THAT THE BARCODE PORTION OF THE LABEL CAN BE READ AND SCANNED. ***WARNING: USE ONLY THE PRINTED ORIGINAL LABEL FOR SHIPPING. USING A PHOTOCOPY OF THIS LABEL FOR SHIPPING PURPOSES IS FRAUDULENT AND COULD RESULT IN ADDITIONAL BILLING CHARGES, ALONG WITH THE CANCELLATION OF YOUR FEDEX ACCOUNT NUMBER.

From: Origin ID: NOHA (847) 612-0561
SCOTT BROWN
CLEAN AIR ENGINEERING
500 WEST WOOD STREET
PALATINE, IL 600674975



J101M103010224

Ship Date: 28MAR11
Act/Wgt: 45.0 LB MAN
CAD: 822520/CAFE2472
Dims: 18 X 16 X 16 IN

Delivery Address Bar Code

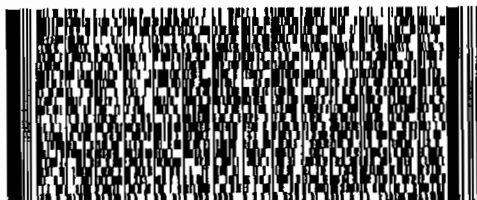


Ref # 11182
Invoice #
PO #
Dept # Palatine Source

SHIP TO: (800) 991-3300 BILL SENDER

DOUG RHOADES
CLEAN AIR ENGINEERING
500 WEST WOOD STREET

PALATINE, IL 60067



1 of 2
TRK# 4813 8226 8119
0201
MASTER

TUE - 29 MAR A1
PRIORITY OVERNIGHT

60067

IL-US

ORD

79 NOHA



005C326A00447



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 – Amendment version 2

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.	11182NB
AP Project No.	A3118
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	26 & 29 March 2011
Condition Received	good
Temperature upon Receipt (C)	2 (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:

1. See Appendix A&B for data qualifier, data attributes, and lab identifier information.
2. During sample processing, the solvents for samples 003 (Unit 3 FF Outlet-Run 2) and 004 (Unit 3 FF Outlet-Run 3) were incorrectly combined. The Acetone portion of sample 004 and the Toluene portion of sample 003 were spiked with labeled standards and analyzed via mass spectrometry in order to determine the contribution of the rinses to the overall TEQ and totals. Following the HRGC-HRMS analysis, it was determined that mixing of the rinses could have resulted in a ~31% bias in the overall TEQ for samples 003 and 004, and a ~29% bias in the overall totals for samples 003 and 004. Therefore, a range (the highest possible value and the lowest possible value) of the Upper-Bound (ND=DL, EMPC=EMPC) TEQs and the dioxin/furan totals are presented in the letter narrative. Given the potential impact of the overall bias on the TEQs, the actual Upper-Bound TEQs for samples 003 and 004 were determined to lie within a range of 22.4 to 42.6 and 23.6 to 44.8, respectively. The overall ranges for dioxin/furan totals were found to lie within a range from 2400 to 4360 pg/train and from 2868 to 5212 pg/train for samples 003 and 004, respectively.
3. We also used the results of the two affected samples and the associated rinses to determine the likely results for each sample had they been analyzed without the preparation error. Through a complex set of algebraic equations, it is possible to derive a quadratic equation that allows the amount of each congener present in each rinse to be determined. These amounts were then added to the results obtained for the samples (for both the 17 specific DFs and the totals) and checks were performed to ensure that all the contents of the rinses had been accounted for. These results are presented in columns labeled with the word "Adjusted" appended to the sample ID. These results represent the best estimates that can be obtained for the total contents of these two samples. Because we were unable to analyze the total contents of the samples together, we have also calculated and presented the ranges within which the sample results could lie, as presented above.
4. The letter has been amended to remove the words "Methylene Chloride" in front of the words "Acetone" in #2 above since Methylene Chloride was not a component of the rinses.

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



Bryan Vining, Ph.D.
QA Officer and Technical Director

2714 EXCHANGE DRIVE
WILMINGTON, NC 28405
PH: 910-794-1613
2 / 3

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, refractation, 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

A3118 - TEQ
Project ID: 11182NB

Sample Summary
Part 1



Method 23

Analyte	MB1_8600- RJ_DF_SDS	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	(1.29)	(1.16)	2.5	[2.11]	[1.93]
1,2,3,7,8-PeCDD	(1.45)	(1.37)	15.6	9.78	7.15
1,2,3,4,7,8-HxCDD	(1.44)	(1.29)	22.9	13.4	16.6
1,2,3,6,7,8-HxCDD	(1.49)	(1.42)	72.3	43.7	56.3
1,2,3,7,8,9-HxCDD	(1.66)	(1.54)	37.3	22.2	26.5
1,2,3,4,6,7,8-HpCDD	(2.32)	[1.9]	581	276	419
OCDD	(3.25)	10.9	688	245	480
2,3,7,8-TCDF	(0.826)	(0.692)	6.11	4.4	5.31
1,2,3,7,8-PeCDF	(0.796)	(0.816)	9.43	6.61	[5.36]
2,3,4,7,8-PeCDF	(0.822)	(0.76)	22.7	18.4	16.2
1,2,3,4,7,8-HxCDF	(1.01)	(0.867)	15.5	9.09	9.96
1,2,3,6,7,8-HxCDF	(0.967)	(0.821)	17.9	[10.6]	12.3
2,3,4,6,7,8-HxCDF	(1.09)	(0.863)	31	20.7	23.1
1,2,3,7,8,9-HxCDF	(1.35)	(1.16)	(1.77)	(1.86)	(1.94)
1,2,3,4,6,7,8-HpCDF	(1.22)	(0.873)	50.8	26.3	32.6
1,2,3,4,7,8,9-HpCDF	(1.87)	(1.27)	8.73	4.6	[5.31]
OCDF	(2.88)	(2.4)	13.6	8.2	10.5
ITEF TEQ (ND=0; EMPC=0)	0.00	0.0109	49.6	29.1	31.7
ITEF TEQ (ND=0; EMPC=EMPC)	0.00	0.0299	49.6	32.3	34.0
ITEF TEQ (ND=DL/2; EMPC=0)	1.76	1.60	49.6	30.1	32.6
ITEF TEQ (ND=DL/2; EMPC=EMPC)	1.76	1.61	49.6	32.4	34.1
ITEF TEQ (ND=DL; EMPC=EMPC)	3.51	3.18	49.7	32.5	34.2
Checkcode	655-227-JXK	918-817-GLL	058-193-GPW	330-979-WCH	396-389-CHX
Lab ID	MB1_8600-RJ_DF_SDS	A3118_8600_DF_001-RJ	A3118_8600_DF_002-RJ	A3118_8600_DF_003-RJ	A3118_8600_DF_004-RJ

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() = DL
[] = EMPC

A3118 - TEQ
Project ID: 11182NB

Sample Summary Part 1		ANALYTICAL PERSPECTIVES						Method 23	
Analyte	MB1_8600- RJ_DF_SDS	Unit 3 FF Outlet- Run 2	Unit 3 FF Outlet- Run 3	High TEQ - Unit 3 FF Outlet-Run 2	Low TEQ - Unit 3 FF Outlet-Run 2	High TEQ - Unit 3 FF Outlet - Run 3	Low TEQ - Unit 3 FF Outlet - Run 3	004A	004B
	pg	pg	pg					pg	pg
2,3,7,8-TCDD	(1.29)	[2.11]	[1.93]					(2.41)	(3.45)
1,2,3,7,8-PeCDD	(1.45)	9.78	7.15					(4.86)	(6.86)
1,2,3,4,7,8-HxCDD	(1.44)	13.4	16.6					5.94	(4.9)
1,2,3,6,7,8-HxCDD	(1.49)	43.7	56.3					16.3	(4.91)
1,2,3,7,8,9-HxCDD	(1.66)	22.2	26.5					[10.5]	(5.9)
1,2,3,4,6,7,8-HpCDD	(2.32)	276	419					178	28.2
OCDD	(3.25)	245	480					238	44.5
2,3,7,8-TCDF	(0.826)	4.4	5.31					(1.46)	(2.1)
1,2,3,7,8-PeCDF	(0.796)	6.61	[5.36]					[2.16]	(2.97)
2,3,4,7,8-PeCDF	(0.822)	18.4	16.2					4.19	7.5
1,2,3,4,7,8-HxCDF	(1.01)	9.09	9.96					(4.1)	[6.22]
1,2,3,6,7,8-HxCDF	(0.967)	[10.6]	12.3					(5.01)	[7.57]
2,3,4,6,7,8-HxCDF	(1.09)	20.7	23.1					[7.47]	8.22
1,2,3,7,8,9-HxCDF	(1.35)	(1.86)	(1.94)					(4.79)	(5.99)
1,2,3,4,6,7,8-HpCDF	(1.22)	26.3	32.6					15.8	(10.4)
1,2,3,4,7,8,9-HpCDF	(1.87)	4.6	[5.31]					(8.54)	(13.9)
OCDF	(2.88)	8.2	10.5					(5.9)	(11.5)
ITEF TEQ (ND=0; EMPC=0)	0.0	29.1	31.7	38.1	20.1	41.5	21.9	6.5	4.9
ITEF TEQ (ND=0; EMPC=EMPC)	0.0	32.3	34.0	42.3	22.3	44.5	23.5	8.4	6.3
ITEF TEQ (ND=DL/2; EMPC=0)	1.8	30.1	32.6	39.4	20.8	42.7	22.5	10.2	10.3
ITEF TEQ (ND=DL/2; EMPC=EMPC)	1.8	32.4	34.1	42.4	22.4	44.7	23.5	11.6	11.1
ITEF TEQ (ND=DL; EMPC=EMPC)	3.5	32.5	34.2	42.6	22.4	44.8	23.6	14.9	15.9
Checkcode	655-227-JXK	330-979-WCH	396-389-CHX					569-252-XKL	608-454-GVH
Lab ID	MB1_8600-RJ_DF_SDS	A3118_8600_DF_003-RJ	A3118_8600_DF_004-RJ					A3118_8600_DF_004A-RJ	A3118_8600_DF_004B-RJ

() = DL
[] = EMPC

A3118 - TEQ
Project ID: 11182NB

Sample Summary		 ANALYTICAL PERSPECTIVES				Method 23	
Part 1							
Analyte	MB1_8600- RJ_DF_SDS	Unit 3 FF Outlet- Run 2	Unit 3 FF Outlet- Run 3	Unit 3 FF Outlet- Run 2 Adjusted	Unit 3 FF Outlet- Run 3 Adjusted	004A	004B
	pg	pg	pg			pg	pg
2,3,7,8-TCDD	(1.29)	[2.11]	[1.93]	[2.11]	[1.93]	(2.41)	(3.45)
1,2,3,7,8-PeCDD	(1.45)	9.78	7.15	9.78	7.15	(4.86)	(6.86)
1,2,3,4,7,8-HxCDD	(1.44)	13.4	16.6	13.4	22.5	5.94	(4.9)
1,2,3,6,7,8-HxCDD	(1.49)	43.7	56.3	43.7	72.6	16.3	(4.91)
1,2,3,7,8,9-HxCDD	(1.66)	22.2	26.5	22.2	43.9	[10.5]	(5.9)
1,2,3,4,6,7,8-HpCDD	(2.32)	276	419	276	625	178	28.2
OCDD	(3.25)	245	480	245	763	238	44.5
2,3,7,8-TCDF	(0.826)	4.4	5.31	4.40	5.31	(1.46)	(2.1)
1,2,3,7,8-PeCDF	(0.796)	6.61	[5.36]	6.61	8.98	[2.16]	(2.97)
2,3,4,7,8-PeCDF	(0.822)	18.4	16.2	19.6	26.7	4.19	7.5
1,2,3,4,7,8-HxCDF	(1.01)	9.09	9.96	9.09	16.2	(4.1)	[6.22]
1,2,3,6,7,8-HxCDF	(0.967)	[10.6]	12.3	[10.6]	19.9	(5.01)	[7.57]
2,3,4,6,7,8-HxCDF	(1.09)	20.7	23.1	28.1	31.4	[7.47]	8.22
1,2,3,7,8,9-HxCDF	(1.35)	(1.86)	(1.94)	(1.86)	(1.94)	(4.79)	(5.99)
1,2,3,4,6,7,8-HpCDF	(1.22)	26.3	32.6	26.3	48.4	15.8	(10.4)
1,2,3,4,7,8,9-HpCDF	(1.87)	4.6	[5.31]	4.6	[5.31]	(8.54)	(13.9)
OCDF	(2.88)	8.2	10.5	8.2	10.5	(5.9)	(11.5)
ITEF TEQ (ND=0; EMPC=0)	0.0	29.1	31.7	29.1	46.1	6.5	4.9
ITEF TEQ (ND=0; EMPC=EMPC)	0.0	32.3	34.0	32.3	48.0	8.4	6.3
ITEF TEQ (ND=DL/2; EMPC=0)	1.8	30.1	32.6	30.8	47.1	10.2	10.3
ITEF TEQ (ND=DL/2; EMPC=EMPC)	1.8	32.4	34.1	32.4	48.1	11.6	11.1
ITEF TEQ (ND=DL; EMPC=EMPC)	3.5	32.6	34.2	32.4	48.2	14.9	16.9
Checkcode	655-227-JXK	330-979-WCH	396-389-CHX			569-252-XKL	608-454-GVH
Lab ID	MB1_8600-RJ_DF_SDS	A3118_8600_DF_003-RJ	A3118_8600_DF_004-RJ			A3118_8600_DF_004A-RJ	A3118_8600_DF_004B-RJ

H - 108

() = DL
[] = EMPC

A3118 - WHO-2005-TEQ

Project ID: 11182NB

Sample Summary Part 1



Method 23

Analyte	MB1_8600- RJ_DF_SDS	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	(1.29)	(1.16)	2.5	[2.11]	[1.93]
1,2,3,7,8-PeCDD	(1.45)	(1.37)	15.6	9.78	7.15
1,2,3,4,7,8-HxCDD	(1.44)	(1.29)	22.9	13.4	16.6
1,2,3,6,7,8-HxCDD	(1.49)	(1.42)	72.3	43.7	56.3
1,2,3,7,8,9-HxCDD	(1.66)	(1.54)	37.3	22.2	26.5
1,2,3,4,6,7,8-HpCDD	(2.32)	[1.9]	581	276	419
OCDD	(3.25)	10.9	688	245	480
2,3,7,8-TCDF	(0.826)	(0.692)	6.11	4.4	5.31
1,2,3,7,8-PeCDF	(0.796)	(0.816)	9.43	6.61	[5.36]
2,3,4,7,8-PeCDF	(0.822)	(0.76)	22.7	18.4	16.2
1,2,3,4,7,8-HxCDF	(1.01)	(0.867)	15.5	9.09	9.96
1,2,3,6,7,8-HxCDF	(0.967)	(0.821)	17.9	[10.6]	12.3
2,3,4,6,7,8-HxCDF	(1.09)	(0.863)	31	20.7	23.1
1,2,3,7,8,9-HxCDF	(1.35)	(1.16)	(1.77)	(1.86)	(1.94)
1,2,3,4,6,7,8-HpCDF	(1.22)	(0.873)	50.8	26.3	32.6
1,2,3,4,7,8,9-HpCDF	(1.87)	(1.27)	8.73	4.6	[5.31]
OCDF	(2.88)	(2.4)	13.6	8.2	10.5
WHO-2005 TEQ (ND=0; EMPC=0)	0.00	0.00327	52.1	30.0	31.7
WHO-2005 TEQ (ND=0; EMPC=EMPC)	0.00	0.0223	52.1	33.2	33.8
WHO-2005 TEQ (ND=DL/2; EMPC=0)	2.03	1.85	52.2	31.0	32.6
WHO-2005 TEQ (ND=DL/2; EMPC=EMPC)	2.03	1.86	52.2	33.3	33.9
WHO-2005 TEQ (ND=DL; EMPC=EMPC)	4.05	3.69	52.3	33.4	34.0
Checkcode	655-227-JXK	918-817-GLL	058-193-GPW	330-979-WCH	396-389-CHX
Lab ID	MB1_8600-RJ_DF_SDS	A3118_8600_DF_001-RJ	A3118_8600_DF_002-RJ	A3118_8600_DF_003-RJ	A3118_8600_DF_004-RJ

() = DL
[] = EMPC

A3118 - Totals

Project ID: 11182NB

Sample Summary Part 2



Method 23

Analyte	MB1_8600- RJ_DF_SDS	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	0	0	409	417	414
PeCDDs	0	0	721	586	604
HxCDDs	0	0	1560	1020	1180
HpCDDs	0	0	1200	572	858
OCDD	0	10.9	688	245	480
TCDFs	0	0	290	199	180
PeCDFs	0	0	212	179	148
HxCDFs	0	0	204	112	121
HpCDFs	0	0	90.1	39.4	42.6
OCDF	0	0	13.6	8.2	10.5
Total PCDD/Fs (ND=0; EMPC=0)	0.000	10.9	5,390	3,380	4,040
Total PCDD/Fs (ND=0; EMPC=EMPC)	2.23	15.1	5,480	3,500	4,200
Total PCDD/Fs (2378-X ND=DL; EMPC=EMPC)	28.0	32.4	5,480	3,500	4,200
Total 2378s (ND=0; EMPC=0)	0.000	10.9	1,600	709	1,120
Total 2378s (ND=0.5; EMPC=0)	12.9	20.6	1,600	711	1,120
Total 2378s (ND=1; EMPC=0)	25.7	30.2	1,600	714	1,120
Total 2378s (ND=0; EMPC=1)	0.000	12.8	1,600	722	1,130
Total 2378s (ND=0.5; EMPC=1)	12.900	21.5	1,600	723	1,130
Total 2378s (ND=1; EMPC=1)	25.7	30.1	1,600	724	1,130
Checkcode	655-227-JXK	918-817-GLL	058-193-GPW	330-979-WCH	396-389-CHX
Lab ID	MB1_8600-RJ_DF_SDS	A3118_8600_DF_001-RJ	A3118_8600_DF_002-RJ	A3118_8600_DF_003-RJ	A3118_8600_DF_004-RJ

() = DL
[] = EMPC

A3118 - Totals
Project ID: 11182NB

Sample Summary Part 2		ANALYTICAL PERSPECTIVES						Method 23	
Analyte	MB1_8600- RJ_DF_SDS	Unit 3 FF Outlet- Run 2	Unit 3 FF Outlet- Run 3	High Totals - Unit 3 FF Outlet-Run 2	Low Totals - Unit 3 FF Outlet-Run 2	High Totals - Unit 3 FF Outlet - Run 3	Low Totals - Unit 3 FF Outlet - Run 3	004A	004B
	pg	pg	pg					pg	pg
Totals									
TCDDs	0	417	414					12.4	0
PeCDDs	0	586	604					73.9	0
HxCDDs	0	1020	1180					299	40.7
HpCDDs	0	572	858					303	53.7
OCDD	0	245	480					238	44.5
TCDFs	0	199	180					0	30.3
PeCDFs	0	179	148					17	44.8
HxCDFs	0	112	121					0	19.1
HpCDFs	0	39.4	42.6					15.8	0
OCDF	0	8.2	10.5					0	0
Total PCDD/Fs (ND=0; EMPC=0)	0.00	3,380	4,040	4,360	2,400	5,212	2,868	960	233
Total PCDD/Fs (ND=0; EMPC=EMPC)	2.23	3,500	4,200	4,515	2,485	5,418	2,982	1,060	343
Total PCDD/Fs (2378-X ND=DL; EMPC=EMPC)	28	3,500	4,200	4,515	2,485	5,418	2,982	1,090	416
Total 2378s (ND=0; EMPC=0)	0.00	709	1,120	915	503	1,445	795	458	88.4
Total 2378s (ND=0.5; EMPC=0)	12.9	711	1,120	917	505	1,445	795	482	130
Total 2378s (ND=1; EMPC=0)	25.7	714	1,120	921	507	1,445	795	506	172
Total 2378s (ND=0; EMPC=1)	0.00	722	1,130	931	513	1,458	802	479	102
Total 2378s (ND=0.5; EMPC=1)	12.9	723	1,130	933	513	1,458	802	497	139
Total 2378s (ND=1; EMPC=1)	25.7	724	1,130	934	514	1,458	802	516	175
Checkcode	655-227-JXK	330-979-WCH	396-389-CHX					569-252-XKL	608-454-GVH
Lab ID	MB1_8600-RJ_DF_SDS	A3118_8600_DF_003-RJ	A3118_8600_DF_004-RJ					A3118_8600_DF_004A-RJ	A3118_8600_DF_004B-RJ

Total 2378s = Sum of 17 2378-substituted PCDD/PCDF congeners (SARA 313)

() = DL
[] = EMPC

A3118 - Totals
Project ID: 11182NB

Sample Summary Part 2		ANALYTICAL PERSPECTIVES				Method 23	
Analyte	MB1_8600- RJ_DF_SDS	Unit 3 FF Outlet- Run 2	Unit 3 FF Outlet- Run 3	Unit 3 FF Outlet- Run 2 Adjusted	Unit 3 FF Outlet- Run 3 Adjusted	004A	004B
	pg	pg	pg	pg	pg	pg	pg
Totals							
TCDDs	0	417	414	417	427	12.4	0
PeCDDs	0	586	604	586	678	73.9	0
HxCDDs	0	1020	1180	1020	1520	299	40.7
HpCDDs	0	572	858	572	1215	303	53.7
OCDD	0	245	480	245	762	238	44.5
TCDFs	0	199	180	199	210	0	30.3
PeCDFs	0	179	148	180	209	17	44.8
HxCDFs	0	112	121	119	133	0	19.1
HpCDFs	0	39.4	42.6	39.4	58.7	15.8	0
OCDF	0	8.2	10.5	8.2	10.5	0	0
			4038.1				
Total PCDD/Fs (ND=0; EMPC=0)	0.00	3,380	4,040	3,388	5,220	960	233
Total PCDD/Fs (ND=0; EMPC=EMPC)	2.23	3,500	4,200	3,610	5,500	1,060	343
Total PCDD/Fs (2378-X ND=DL; EMPC=EMPC)	28	3,500	4,200	3,650	5,560	1,090	416
Total 2378s (ND=0; EMPC=0)	0.00	709	1,120	717	1,700	458	88.4
Total 2378s (ND=0.5; EMPC=0)	12.9	711	1,120	719	1,710	482	130
Total 2378s (ND=1; EMPC=0)	25.7	714	1,120	722	1,710	506	172
Total 2378s (ND=0; EMPC=1)	0.00	722	1,130	729	1,710	479	102
Total 2378s (ND=0.5; EMPC=1)	12.9	723	1,130	730	1,710	497	139
Total 2378s (ND=1; EMPC=1)	25.7	724	1,130	731	1,710	516	175
Checkcode	655-227-JXK	330-979-WCH	396-389-CHX			569-252-XKL	608-454-GVH
Lab ID	MB1_8600-RJ_DF_SDS	A3118_8600_DF_003-RJ	A3118_8600_DF_004-RJ			A3118_8600_DF_004A-RJ	A3118_8600_DF_004B-RJ

Total 2378s = Sum of 17 2378-substituted PCDD/PCDF congeners (SARA 313)

() = DL
[] = EMPC

A3118 - Others
Project ID: 11182NB

Sample Summary		 ANALYTICAL PERSPECTIVES			Method 23	
Part 3						
Analyte	MB1_8600- RJ_DF_SDS	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	0	0	407	417	414	
Other PeCDD	0	0	706	576	597	
Other HxCDD	0	0	1430	942	1080	
Other HpCDD	0	0	614	295	439	
Other TCDF	0	0	284	195	175	
Other PeCDF	0	0	180	154	132	
Other HxCDF	0	0	140	82.6	71.1	
Other HpCDF	0	0	30.6	8.54	9.96	
Other PCDD/Fs (ND=0, EMPC=EMPC)						
Other TCDD	2.23	2.28	436	430	418	
Other PeCDD	0	0	711	576	603	
Other HxCDD	0	0	1430	942	1090	
Other HpCDD	0	0	614	295	439	
Other TCDF	0	0	301	250	240	
Other PeCDF	0	0	213	166	153	
Other HxCDF	0	0	140	96.8	94.7	
Other HpCDF	0	0	30.6	15.2	20.6	
Checkcode	655-227-JXK	918-817-GLL	058-193-GPW	330-979-WCH	396-389-CHX	
Lab ID	MB1_8600-RJ_DF_SDS	A3118_8600_DF_001-RJ	A3118_8600_DF_002-RJ	A3118_8600_DF_003-RJ	A3118_8600_DF_004-RJ	

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() = DL
 [] = EMPC

A3118 - DLs
Project ID: 11182NB

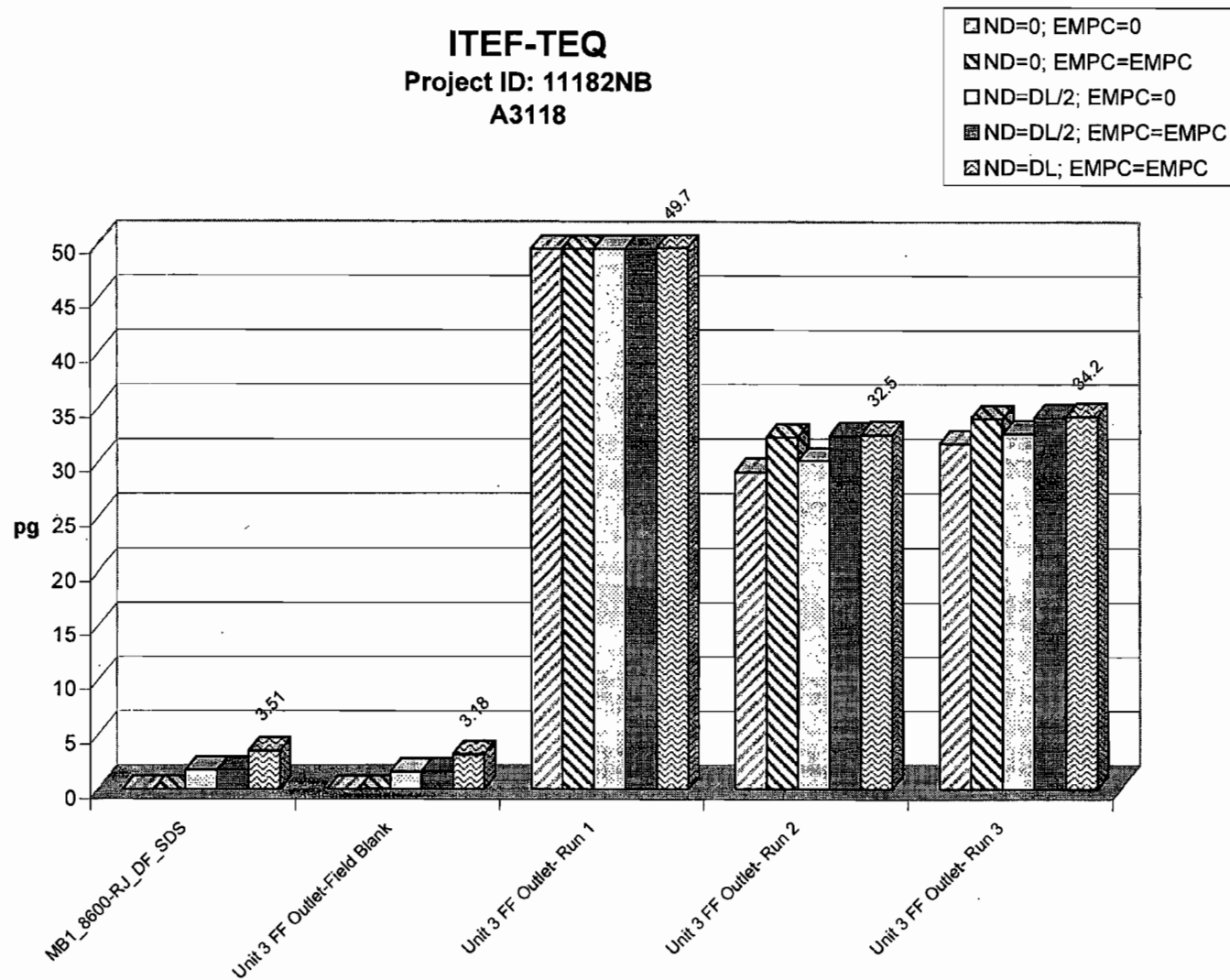
Sample Summary
Part 5 (DLs)



Method 23

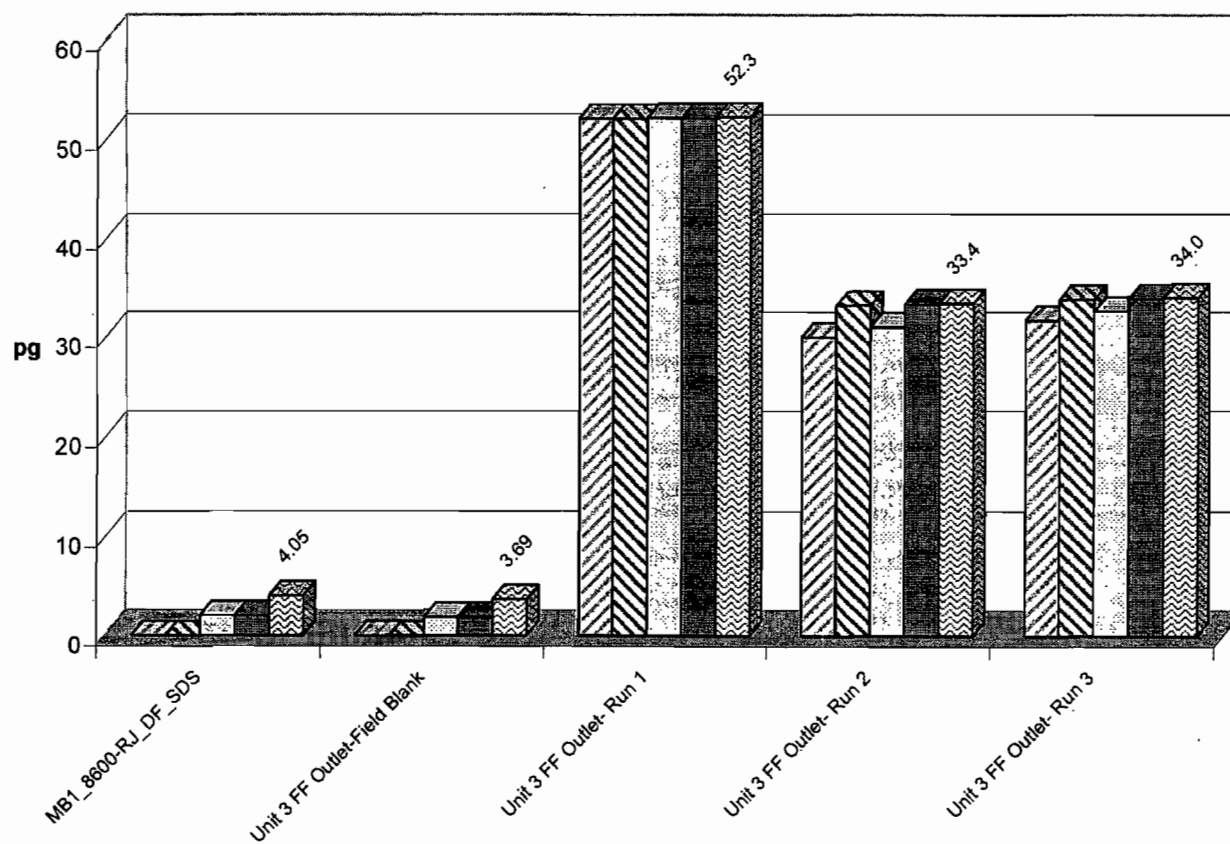
Analyte	MB1_8600- RJ_DF_SDS	Unit 3 FF Outlet- Field Blank	Unit 3 FF Outlet- Run 1	Unit 3 FF Outlet- Run 2	Unit 3 FF Outlet- Run 3
	pg	pg	pg	pg	pg
2,3,7,8-TCDD	1.29	1.16	1.39	1.64	1.56
1,2,3,7,8-PeCDD	1.45	1.37	1.4	1.65	1.43
1,2,3,4,7,8-HxCDD	1.44	1.29	1.55	1.51	2.02
1,2,3,6,7,8-HxCDD	1.49	1.42	1.53	1.61	1.93
1,2,3,7,8,9-HxCDD	1.66	1.54	1.72	1.83	2.33
1,2,3,4,6,7,8-HpCDD	2.32	2.03	1.65	2.81	2.09
OCDD	3.25	3.71	3.09	4.23	3.66
2,3,7,8-TCDF	0.826	0.692	0.753	0.752	0.905
1,2,3,7,8-PeCDF	0.796	0.816	1.2	1.2	1.23
2,3,4,7,8-PeCDF	0.822	0.76	1.21	1.13	1.13
1,2,3,4,7,8-HxCDF	1.01	0.867	1.2	1.39	1.45
1,2,3,6,7,8-HxCDF	0.967	0.821	1.26	1.38	1.4
2,3,4,6,7,8-HxCDF	1.09	0.863	1.39	1.47	1.49
1,2,3,7,8,9-HxCDF	1.35	1.16	1.77	1.86	1.94
1,2,3,4,6,7,8-HpCDF	1.22	0.873	1.26	1.44	1.43
1,2,3,4,7,8,9-HpCDF	1.87	1.27	1.76	1.97	2.11
OCDF	2.88	2.4	2.17	3.16	2.5
Total TCDD	1.29	1.16	1.39	1.64	1.56
Total PeCDD	1.45	1.37	1.4	1.65	1.43
Total HxCDD	1.53	1.41	1.59	1.64	2.08
Total HpCDD	2.32	2.03	1.65	2.81	2.09
Total TCDF	0.826	0.692	0.753	0.752	0.905
Total PeCDF	0.807	0.787	1.2	1.16	1.18
Total HxCDF	1.09	0.919	1.39	1.51	1.56
Total HpCDF	1.51	1.05	1.49	1.68	1.74
Checkcode	655-227-JXK	918-817-GLL	058-193-GPW	330-979-WCH	396-389-CHX
Lab ID	MB1_8600-RJ_DF_SDS	A3118_8600_DF_001-RJ	A3118_8600_DF_002-RJ	A3118_8600_DF_003-RJ	A3118_8600_DF_004-RJ

ITEF-TEQ
Project ID: 11182NB
A3118



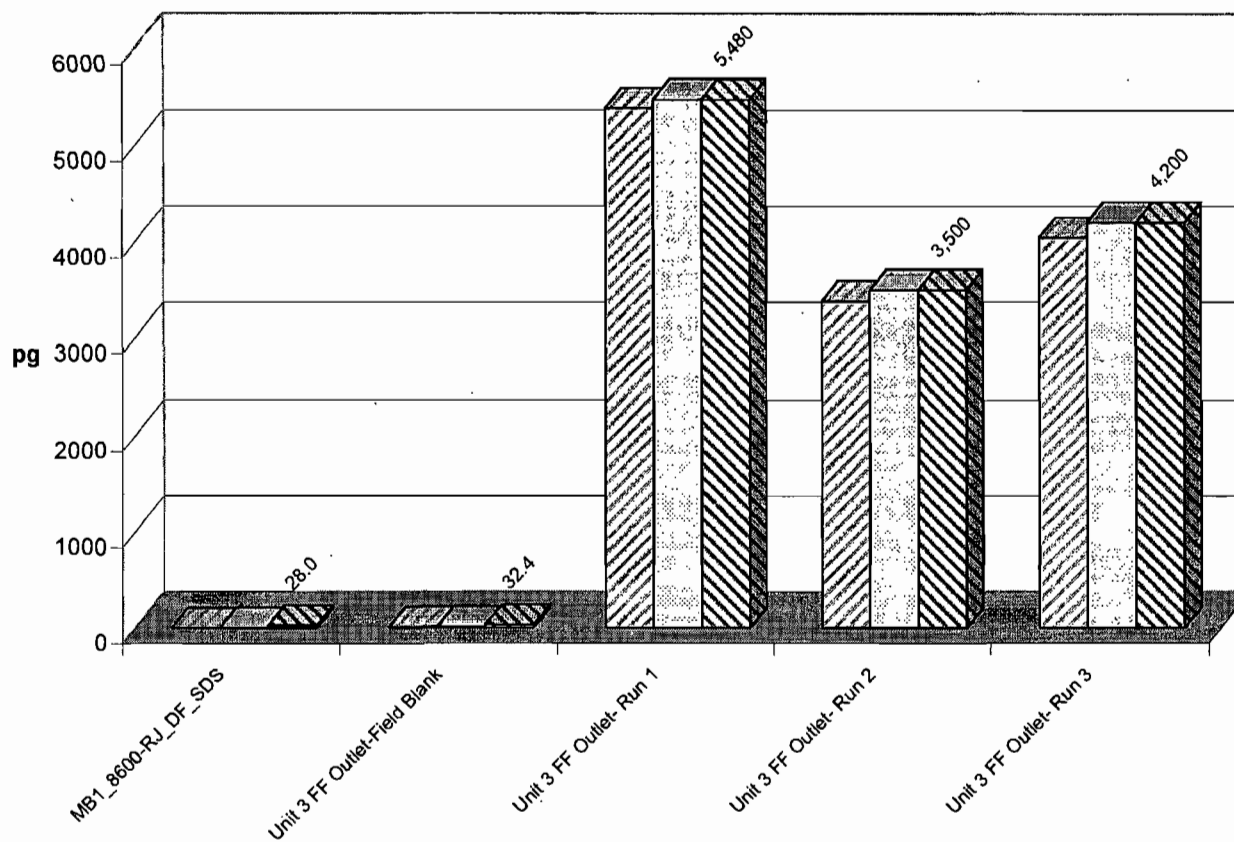
WHO-2005-TEQ
Project ID: 11182NB
A3118

ND=0; EMPC=0
ND=0; EMPC=EMPC
ND=DL/2; EMPC=0
ND=DL/2; EMPC=EMPC
ND=DL; EMPC=EMPC



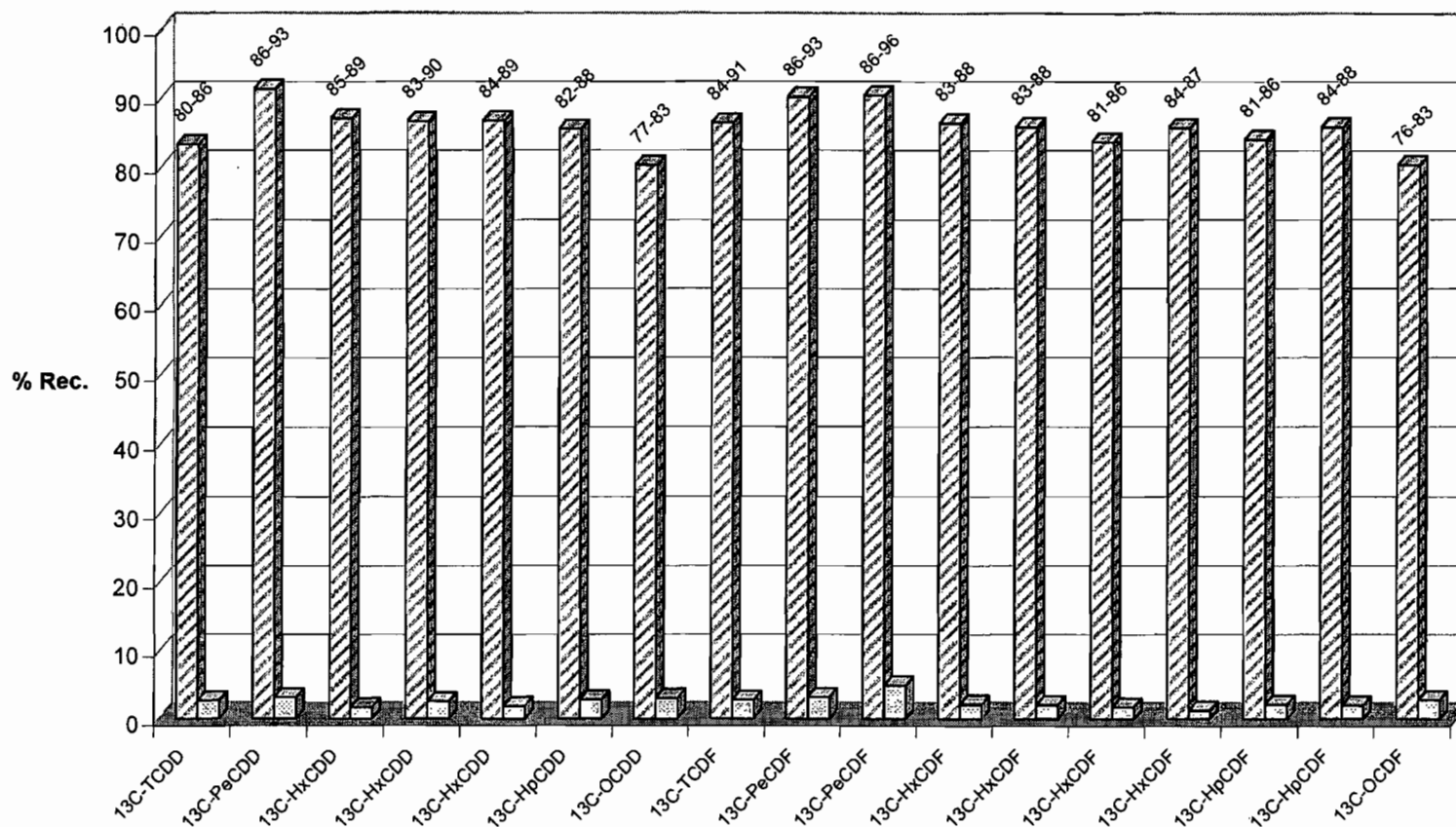
Totals
Project ID: 11182NB
A3118

- ▣ Total PCDD/Fs (ND=0; EMPC=0)
□ Total PCDD/Fs (ND=0; EMPC=EMPC)
▨ Total PCDD/Fs (2378-X ND=DL; EMPC=EMPC)



Mean Recoveries of Extraction Standards (N=5)
Project ID: 11182NB
A3118

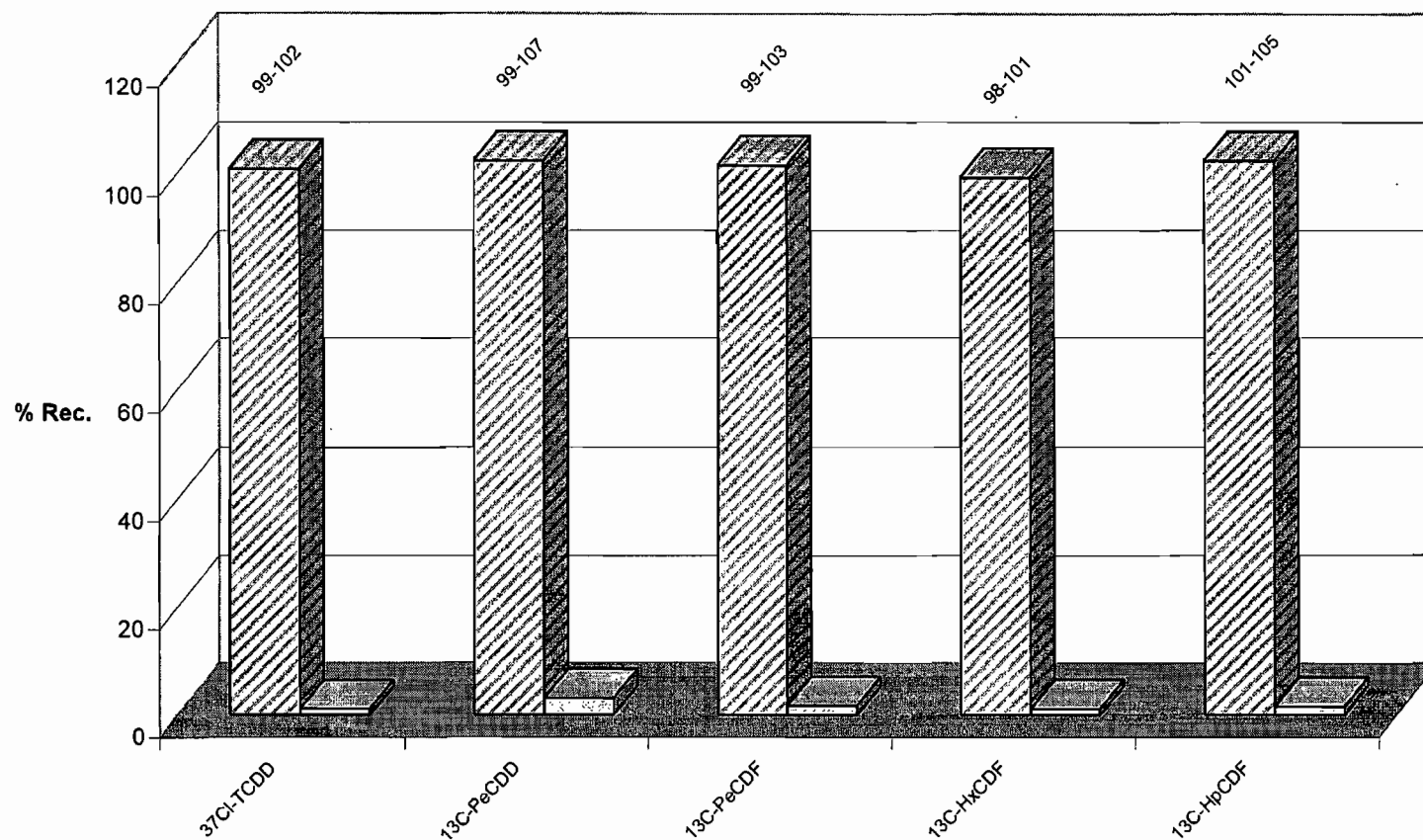
Mean Std. Dev.



Method Specification Limits: Tetra-Hexa ES: 40-130%, Hepta-Octa ES: 25-130% (F = fail)

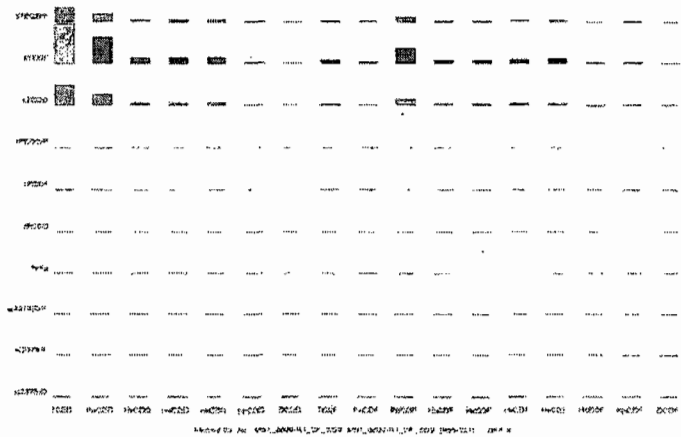
Mean Recoveries of Sampling Standards (N=5)
Project ID: 11182NB
A3118

Mean Std. Dev.

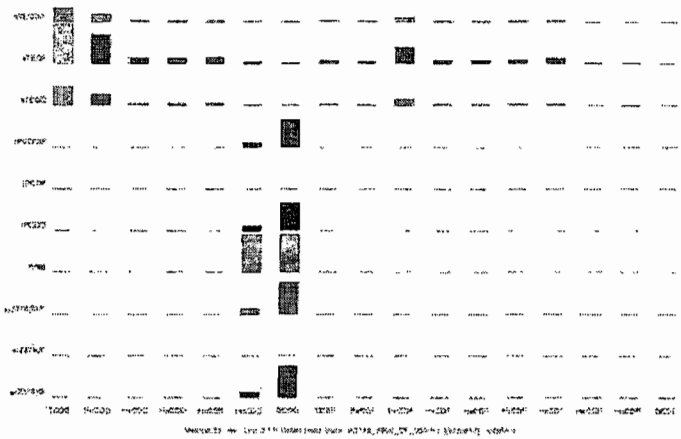


Method Specification Limits: Tetra-Octa SS: 70-130% (F = fail)

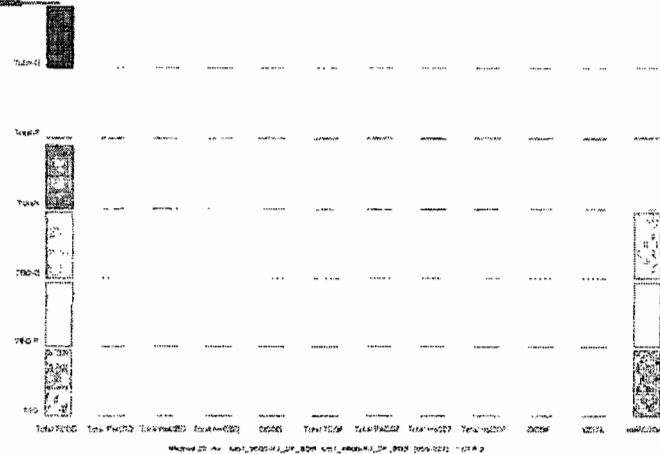
ANALYTICAL PERSPECTIVES



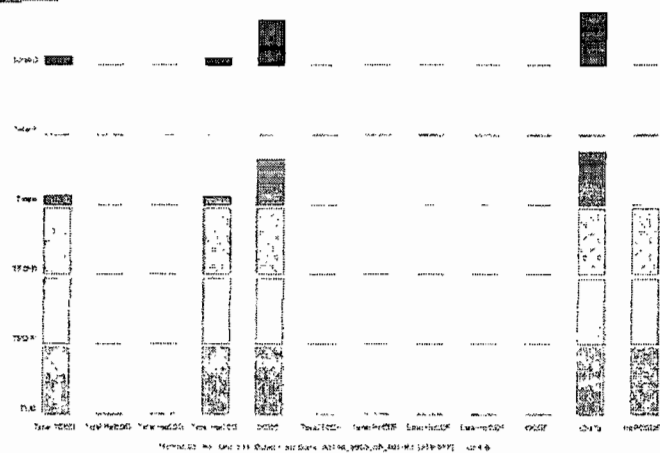
ANALYTICAL PERSPECTIVES



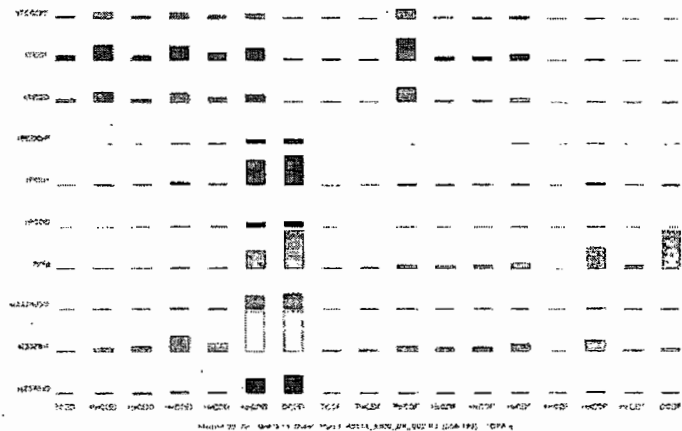
ANALYTICAL PERSPECTIVES



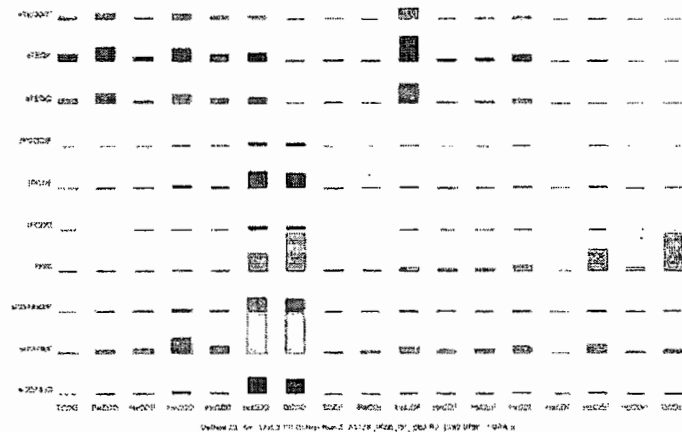
ANALYTICAL PERSPECTIVES



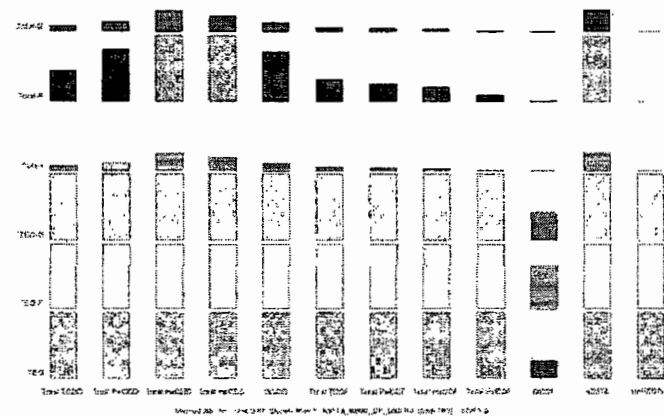
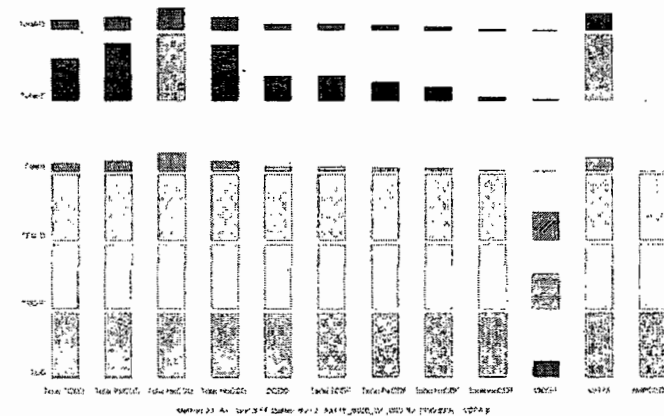
ANALYTICAL PERSPECTIVES



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ANALYTICAL PERSPECTIVES

 **ANALYTICAL PERSPECTIVES**
ANALYTICAL PERSPECTIVES

[illegible]

Sample ID: MB1_8600-RJ_DF_SDS**Method 23**

Client Data		Sample Data		Laboratory Data			
Name:	Clean Air Engineering	Matrix:	Air	Lab Project ID:	A3118	Date Received:	n/a
Project ID:	11182NB	Weight/Volume:	1	Lab Sample ID MB1_8600-RJ_DF_SDS		Date Extracted:	06-Apr-2011
Date Collected:	n/a	Split:	2	QC Batch No:	8600	Date Analyzed:	17-Apr-2011
				Dilution:	-	Time Analyzed:	17:32:47
Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	1.29			ES 2378-TCDD	83.6	
12378-PeCDD	ND	1.45			ES 12378-PeCDD	92.4	
123478-HxCDD	ND	1.44			ES 123478-HxCDD	85.3	
123678-HxCDD	ND	1.49			ES 123678-HxCDD	83.2	
123789-HxCDD	ND	1.66			ES 123789-HxCDD	84.5	
1234678-HpCDD	ND	2.32			ES 1234678-HpCDD	82.9	
OCDD	ND	3.25			ES OCDD	77	
2378-TCDF	ND	0.826			ES 2378-TCDF	86.1	
12378-PeCDF	ND	0.796			ES 12378-PeCDF	90.1	
23478-PeCDF	ND	0.822			ES 23478-PeCDF	85.6	
123478-HxCDF	ND	1.01			ES 123478-HxCDF	83.2	
123678-HxCDF	ND	0.967			ES 123678-HxCDF	83.1	
234678-HxCDF	ND	1.09			ES 234678-HxCDF	81.4	
123789-HxCDF	ND	1.35			ES 123789-HxCDF	84.1	
1234678-HpCDF	ND	1.22			ES 1234678-HpCDF	83.1	
1234789-HpCDF	ND	1.87			ES 1234789-HpCDF	83.6	
OCDF	ND	2.88			ES OCDF	76.3	
Totals					Standard	SS/AS Recoveries	
Total TCDD	ND		2.23		SS 37Cl-2378-TCDD	102	
Total PeCDD	ND	1.45	ND		SS 12347-PeCDD	99	
Total HxCDD	ND	1.53	ND		SS 12346-PeCDF	101	
Total HpCDD	ND	2.32	ND		SS 123469-HxCDF	99.2	
					SS 1234689-HpCDF	102	
Total TCDF	ND	0.826	ND		AS 1368-TCDD	86.7	
Total PeCDF	ND	0.807	ND		AS 1368-TCDF	84.2	
Total HxCDF	ND	1.09	ND				
Total HpCDF	ND	1.51	ND				
Total PCDD/Fs	ND		2.23				
ITEF TEQs							
TEQ: ND=0	0		0				
TEQ: ND=DL/2	1.76	1.76	1.76				
TEQ: ND=DL	3.51	3.51	3.51				

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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:	A3118
Project ID:	11182NB	Weight/Volume:	1	Lab Sample ID	A3118_8600_DF_001-RJ
Date Collected:	22-Mar-2011	Split:	2	QC Batch No:	8600
				Dilution:	-
				Date Received:	26-Mar-2011
				Date Extracted:	06-Apr-2011
				Date Analyzed:	17-Apr-2011
				Time Analyzed:	18:23:52

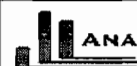
Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	1.16			ES 2378-TCDD	81	
12378-PeCDD	ND	1.37			ES 12378-PeCDD	92.6	
123478-HxCDD	ND	1.29			ES 123478-HxCDD	86	
123678-HxCDD	ND	1.42			ES 123678-HxCDD	87	
123789-HxCDD	ND	1.54			ES 123789-HxCDD	85.2	
1234678-HpCDD	EMPC		1.9	J	ES 1234678-HpCDD	86.1	
OCDD	10.9			J	ES OCDD	83	
2378-TCDF	ND	0.692			ES 2378-TCDF	84.4	
12378-PeCDF	ND	0.816			ES 12378-PeCDF	93.4	
23478-PeCDF	ND	0.76			ES 23478-PeCDF	96	
123478-HxCDF	ND	0.867			ES 123478-HxCDF	85.1	
123678-HxCDF	ND	0.821			ES 123678-HxCDF	85.3	
234678-HxCDF	ND	0.863			ES 234678-HxCDF	84.4	
123789-HxCDF	ND	1.16			ES 123789-HxCDF	85.4	
1234678-HpCDF	ND	0.873			ES 1234678-HpCDF	84.3	
1234789-HpCDF	ND	1.27			ES 1234789-HpCDF	85.3	
OCDF	ND	2.4			ES OCDF	81.3	

Totals					Standard	SS/AS Recoveries	
Total TCDD	ND		2.28		SS 37Cl-2378-TCDD	100	
Total PeCDD	ND	1.37	ND		SS 12347-PeCDD	101	
Total HxCDD	ND	1.41	ND		SS 12346-PeCDF	98.9	
Total HpCDD	ND		1.9		SS 123469-HxCDF	98.1	
					SS 1234689-HpCDF	102	
Total TCDF	ND	0.692	ND		AS 1368-TCDD	84.9	
Total PeCDF	ND	0.787	ND		AS 1368-TCDF	81.4	
Total HxCDF	ND	0.919	ND				
Total HpCDF	ND	1.05	ND				
Total PCDD/Fs	10.9		15.1				
ITEF TEQs							
TEQ: ND=0	0.0109		0.0299				
TEQ: ND=DL/2	1.6	1.59	1.61				
TEQ: ND=DL	3.18	3.18	3.18				



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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:	A3118	Date Received:	26-Mar-2011
Project ID:	11182NB	Weight/Volume:	1	Lab Sample ID	A3118_8600_DF_002-RJ	Date Extracted:	06-Apr-2011
Date Collected:	22-Mar-2011	Split:	2	QC Batch No:	8600	Date Analyzed:	17-Apr-2011
				Dilution:	-	Time Analyzed:	19:14:57
Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	2.5			J	ES 2378-TCDD	85.9	
12378-PeCDD	15.6			J	ES 12378-PeCDD	92.4	
123478-HxCDD	22.9			J	ES 123478-HxCDD	88.5	
123678-HxCDD	72.3				ES 123678-HxCDD	86.8	
123789-HxCDD	37.3			J	ES 123789-HxCDD	88.8	
1234678-HpCDD	581				ES 1234678-HpCDD	87.5	
OCDD	688				ES OCDD	82.3	
2378-TCDF	6.11			J	ES 2378-TCDF	85.3	
12378-PeCDF	9.43			J	ES 12378-PeCDF	88	
23478-PeCDF	22.7			J	ES 23478-PeCDF	88.2	
123478-HxCDF	15.5			J	ES 123478-HxCDF	87.4	
123678-HxCDF	17.9			J	ES 123678-HxCDF	86.8	
234678-HxCDF	31			J	ES 234678-HxCDF	84.4	
123789-HxCDF	ND	1.77			ES 123789-HxCDF	86.3	
1234678-HpCDF	50.8				ES 1234678-HpCDF	85	
1234789-HpCDF	8.73			J	ES 1234789-HpCDF	87.4	
OCDF	13.6			J	ES OCDF	82.3	
Totals					Standard	SS/AS Recoveries	
Total TCDD	409		439		SS 37Cl-2378-TCDD	101	
Total PeCDD	721		726		SS 12347-PeCDD	101	
Total HxCDD	1560		1560		SS 12346-PeCDF	103	
Total HpCDD	1200		1200		SS 123469-HxCDF	98.7	
					SS 1234689-HpCDF	102	
Total TCDF	290		307		AS 1368-TCDD	89.3	
Total PeCDF	212		245		AS 1368-TCDF	86.1	
Total HxCDF	204		209				
Total HpCDF	90.1		90.1				
Total PCDD/Fs	5390		5480				
ITEF TEQs							
TEQ: ND=0.	49.6		49.6				
TEQ: ND=DL/2	49.6	1.96	49.6				
TEQ: ND=DL	49.7	3.92	49.7				



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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:	A3118	Date Received:	26-Mar-2011
Project ID:	11182NB	Weight/Volume:	1	Lab Sample ID:	A3118_8600_DF_003-RJ	Date Extracted:	06-Apr-2011
Date Collected:	23-Mar-2011	Split:	2	QC Batch No:	8600	Date Analyzed:	17-Apr-2011
				Dilution:	-	Time Analyzed:	20:05:56
Analyte	Conc. (pg)	DL (pg)	EMRC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	EMPC		2.11	J	ES 2378-TCDD	85.8	
12378-PeCDD	9.78			J	ES 12378-PeCDD	93.1	
123478-HxCDD	13.4			J	ES 123478-HxCDD	89	
123678-HxCDD	43.7			J	ES 123678-HxCDD	90.1	
123789-HxCDD	22.2			J	ES 123789-HxCDD	87.7	
1234678-HpCDD	276				ES 1234678-HpCDD	88.5	
OCDD	245				ES OCDD	81.7	
2378-TCDF	4.4			J	ES 2378-TCDF	91	
12378-PeCDF	6.61			J	ES 12378-PeCDF	93	
23478-PeCDF	18.4			J	ES 23478-PeCDF	95.1	
123478-HxCDF	9.09			J	ES 123478-HxCDF	88.1	
123678-HxCDF	EMPC		10.6	J	ES 123678-HxCDF	88.4	
234678-HxCDF	20.7			J	ES 234678-HxCDF	85.5	
123789-HxCDF	ND	1.86			ES 123789-HxCDF	87.2	
1234678-HpCDF	26.3			J	ES 1234678-HpCDF	86.5	
1234789-HpCDF	4.6			J	ES 1234789-HpCDF	88.1	
OCDF	8.2			J	ES OCDF	82.7	
Totals					Standard	SS/AS Recoveries	
Total TCDD	417		432		SS 37Cl-2378-TCDD	99.4	
Total PeCDD	586		586		SS 12347-PeCDD	104	
Total HxCDD	1020		1020		SS 12346-PeCDF	103	
Total HpCDD	572		572		SS 123469-HxCDF	99.7	
					SS 1234689-HpCDF	101	
Total TCDF	199		255		AS 1368-TCDD	95.4	
Total PeCDF	179		191		AS 1368-TCDF	93	
Total HxCDF	112		141				
Total HpCDF	39.4		46.1				
Total PCDD/Fs	3380		3500				
ITEF TEQs							
TEQ: ND=0	29.1		32.3				
TEQ: ND=DL/2	30.1	2.17	32.4				
TEQ: ND=DL	31.1	4.34	32.5				


ANALYTICAL PERSPECTIVES
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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:	A3118	Date Received:	26-Mar-2011
Project ID:	11182NB	Weight/Volume:	1	Lab Sample ID:	A3118_8600_DF_004-RJ	Date Extracted:	06-Apr-2011
Date Collected:	23-Mar-2011	Split:	2	QC Batch No:	8600	Date Analyzed:	17-Apr-2011
				Dilution:	-	Time Analyzed:	20:56:55
Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	EMPC		1.93	J	ES 2378-TCDD	80.3	
12378-PeCDD	7.15			J	ES 12378-PeCDD	85.7	
123478-HxCDD	16.6			J	ES 123478-HxCDD	86.3	
123678-HxCDD	56.3				ES 123678-HxCDD	85.7	
123789-HxCDD	26.5			J	ES 123789-HxCDD	87.3	
1234678-HpCDD	419				ES 1234678-HpCDD	82.3	
OCDD	480				ES OCDD	76.8	
2378-TCDF	5.31			J	ES 2378-TCDF	84.8	
12378-PeCDF	EMPC		5.36	J	ES 12378-PeCDF	86.1	
23478-PeCDF	16.2			J	ES 23478-PeCDF	86.7	
123478-HxCDF	9.96			J	ES 123478-HxCDF	87.7	
123678-HxCDF	12.3			J	ES 123678-HxCDF	85.1	
234678-HxCDF	23.1			J	ES 234678-HxCDF	82.1	
123789-HxCDF	ND	1.94			ES 123789-HxCDF	85	
1234678-HpCDF	32.6			J	ES 1234678-HpCDF	80.9	
1234789-HpCDF	EMPC		5.31	J	ES 1234789-HpCDF	84.3	
OCDF	10.5			J	ES OCDF	78.5	
Totals					Standard	SS/AS Recoveries	
Total TCDD	414		420		SS 37Cl-2378-TCDD	102	
Total PeCDD	604		611		SS 12347-PeCDD	107	
Total HxCDD	1180		1190		SS 12346-PeCDF	102	
Total HpCDD	858		858		SS 123469-HxCDF	101	
					SS 1234689-HpCDF	105	
Total TCDF	180		245		AS 1368-TCDD	88.7	
Total PeCDF	148		175		AS 1368-TCDF	86	
Total HxCDF	121		144				
Total HpCDF	42.6		58.5				
Total PCDD/Fs	4040		4200				
ITEF TEQs							
TEQ: ND=0	31.7		34				
TEQ: ND=DL/2	32.6	2.15	34.1				
TEQ: ND=DL	33.5	4.31	34.2				



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Sample ID: 004A**Method 23**

<u>Client Data</u>		<u>Sample Data</u>		<u>Laboratory Data</u>			
Name:	Clean Air Engineering	Matrix:	Air	Lab Project ID:	A3118	Date Received:	n/a
Project ID:	11182NB	Weight/Volume:	1	Lab Sample ID	A3118_8600_DF_004A-RJ	Date Extracted:	06-Apr-2011
Date Collected:	n/a	Split:	2	QC Batch No:	8600	Date Analyzed:	17-Apr-2011
				Dilution:	#N/A	Time Analyzed:	21:47:54
Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	2.41			ES 2378-TCDD	98	
12378-PeCDD	ND	4.86			ES 12378-PeCDD	85.9	
123478-HxCDD	5.94			J	ES 123478-HxCDD	136	V
123678-HxCDD	16.3			J	ES 123678-HxCDD	128	
123789-HxCDD	EMPC		10.5	J	ES 123789-HxCDD	111	
1234678-HpCDD	178				ES 1234678-HpCDD	146	V
OCDD	238				ES OCDD	158	V
2378-TCDF	ND	1.46			ES 2378-TCDF	100	
12378-PeCDF	EMPC		2.16	J	ES 12378-PeCDF	79.4	
23478-PeCDF	4.19			J	ES 23478-PeCDF	86.6	
123478-HxCDF	ND	4.1			ES 123478-HxCDF	110	
123678-HxCDF	ND	5.01			ES 123678-HxCDF	91	
234678-HxCDF	EMPC		7.47	J	ES 234678-HxCDF	119	
123789-HxCDF	ND	4.79			ES 123789-HxCDF	130	
1234678-HpCDF	15.8			J	ES 1234678-HpCDF	151	V
1234789-HpCDF	ND	8.54			ES 1234789-HpCDF	160	V
OCDF	ND	5.9			ES OCDF	154	V
Totals					Standard	SS/AS Recoveries	
Total TCDD	12.4		12.4		SS 37Cl-2378-TCDD	n/a	
Total PeCDD	73.9		98.9		SS 12347-PeCDD	n/a	
Total HxCDD	299		323		SS 12346-PeCDF	n/a	
Total HpCDD	303		303		SS 123469-HxCDF	n/a	
					SS 1234689-HpCDF	n/a	
Total TCDF	ND		6.77		AS 1368-TCDD	n/a	
Total PeCDF	17		29.4		AS 1368-TCDF	n/a	
Total HxCDF	ND		23.6				
Total HpCDF	15.8		21.1				
Total PCDD/Fs	960		1060				
ITEF TEQs							
TEQ: ND=0	6.49		8.4				
TEQ: ND=DL/2	10.2	4.56	11.6				
TEQ: ND=DL	13.9	9.13	14.9				

**ANALYTICAL PERSPECTIVES**

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Sample ID: 004B					Method 23		
Client Data		Sample Data		Laboratory Data			
Name:	Clean Air Engineering	Matrix:	Air	Lab Project ID:	A3118	Date Received:	n/a
Project ID:	11182NB	Weight/Volume:	1	Lab Sample ID	A3118_8600_DF_004B-RJ	Date Extracted:	06-Apr-2011
Date Collected:	n/a			QC Batch No:	8600	Date Analyzed:	17-Apr-2011
		Split:	2	Dilution:	#N/A	Time Analyzed:	22:38:58
Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	3.45			ES 2378-TCDD	93.7	
12378-PeCDD	ND	6.86			ES 12378-PeCDD	83.1	
123478-HxCDD	ND	4.9			ES 123478-HxCDD	101	
123678-HxCDD	ND	4.91			ES 123678-HxCDD	99.8	
123789-HxCDD	ND	5.9			ES 123789-HxCDD	97.2	
1234678-HpCDD	28.2			J	ES 1234678-HpCDD	95	
OCDD	44.5			J	ES OCDD	101	
2378-TCDF	ND	2.1			ES 2378-TCDF	100	
12378-PeCDF	ND	2.97			ES 12378-PeCDF	78.4	
23478-PeCDF	7.5			J	ES 23478-PeCDF	81.1	
123478-HxCDF	EMPC		6.22	J	ES 123478-HxCDF	93.2	
123678-HxCDF	EMPC		7.57	J	ES 123678-HxCDF	82.3	
234678-HxCDF	8.22			J	ES 234678-HxCDF	90.6	
123789-HxCDF	ND	5.99			ES 123789-HxCDF	94.6	
1234678-HpCDF	ND	10.4			ES 1234678-HpCDF	94.3	
1234789-HpCDF	ND	13.9			ES 1234789-HpCDF	97.5	
OCDF	ND	11.5			ES OCDF	96.5	
Totals					Standard	SS/AS Recoveries	
Total TCDD	ND		9.83		SS 37Cl-2378-TCDD	n/a	
Total PeCDD	ND		36.4		SS 12347-PeCDD	n/a	
Total HxCDD	40.7		49.8		SS 12346-PeCDF	n/a	
Total HpCDD	53.7		53.7		SS 123469-HxCDF	n/a	
					SS 1234689-HpCDF	n/a	
Total TCDF	30.3		51.3		AS 1368-TCDD	n/a	
Total PeCDF	44.8		50.5		AS 1368-TCDF	n/a	
Total HxCDF	19.1		46.8				
Total HpCDF	ND	12	ND				
Total PCDD/Fs	233		343				
ITEF TEQs							
TEQ: ND=0	4.9		6.28				
TEQ: ND=DL/2	10.3	6.34	11.1				
TEQ: ND=DL	15.6	12.7	15.9				

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Wheelabrator North Broward, Inc.
 Clean Air Project No: 11182
 Unit 1 FF Outlet

USEPA Method 26A Chloride Laboratory Data Summary

Run No.	Blank	1	2	3
Date (2011)		Mar 22	Mar 22	Mar 22
Start Time (approx.)		07:36	09:40	11:02
Stop Time (approx.)		08:36	10:40	12:02

☐ DRAFT LAB DATA

MDL Min. detectable limit (mg Cl⁻/liter) 0.0180

HCl as Total Chloride

B_{Cl} Blank concentration (mg Cl⁻/liter) <0.0920

S _{Cl-1}	Fraction 1 concentration (mg Cl ⁻ /liter)	27.4000	34.3700	28.3800
S _{Cl-2}	Fraction 2 concentration (mg Cl ⁻ /liter)			
v ₁	Fraction 1 sample volume (ml)	828.0	824.0	824.0
v ₂	Fraction 2 sample volume (ml)			
m _{HCl}	HCl collected before blank subtraction (mg)	23.3224	29.1139	24.0399
m _b	Allowable blank subtraction (mg)	0.0000	0.0000	0.0000
m _{nb}	HCl collected after blank subtraction (mg)	23.3224	29.1139	24.0399
m _{MDL}	Minimum detectable HCl (mg)	0.0153	0.0152	0.0152
m _n	Total HCl used in emission calculations (mg)	23.3224	29.1139	24.0399

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 2 SDA Inlet

USEPA Method 26A Chloride Laboratory Data Summary

Run No.	Blank	1	2	3
Date (2011)		Mar 23	Mar 23	Mar 23
Start Time (approx.)		07:12	08:38	09:59
Stop Time (approx.)		08:12	09:38	10:59

☐ DRAFT LAB DATA

MDL Min. detectable limit (mg Cl⁻/liter) 0.0180

HCl as Total Chloride
B_{Cl} Blank concentration (mg Cl⁻/liter) <0.0920

S _{Cl-1}	Fraction 1 concentration (mg Cl ⁻ /liter)	1001.6900	923.9800	867.7600	
S _{Cl-2}	Fraction 2 concentration (mg Cl ⁻ /liter)				
v ₁	Fraction 1 sample volume (ml)	736.0	695.0	746.0	
v ₂	Fraction 2 sample volume (ml)				
m _{HCl}	HCl collected before blank subtraction (mg)	757.8867	660.1468	665.4747	
m _b	Allowable blank subtraction (mg)	0.0000	0.0000	0.0000	
m _{nb}	HCl collected after blank subtraction (mg)	757.8867	660.1468	665.4747	
m _{MDL}	Minimum detectable HCl (mg)	0.0136	0.0129	0.0138	
m _n	Total HCl used in emission calculations (mg)	757.8867	660.1468	665.4747	

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Wheelabrator North Broward, Inc.
 Clean Air Project No: 11182
 Unit 2 FF Outlet

USEPA Method 26A Chloride Laboratory Data Summary

Run No.	Blank	1	2	3
Date (2011)		Mar 23	Mar 23	Mar 23
Start Time (approx.)		07:12	08:38	09:59
Stop Time (approx.)		08:12	09:38	10:59

☐ DRAFT LAB DATA

MDL Min. detectable limit (mg Cl⁻/liter) 0.0180

HCl as Total Chloride

B_{Cl} Blank concentration (mg Cl⁻/liter) <0.0920

S _{Cl-1}	Fraction 1 concentration (mg Cl ⁻ /liter)	14.0500	14.3400	12.2100
S _{Cl-2}	Fraction 2 concentration (mg Cl ⁻ /liter)			
v ₁	Fraction 1 sample volume (ml)	835.0	779.0	782.0
v ₂	Fraction 2 sample volume (ml)			
m _{HCl}	HCl collected before blank subtraction (mg)	12.0602	11.4836	9.8156
m _b	Allowable blank subtraction (mg)	0.0000	0.0000	0.0000
m _{nb}	HCl collected after blank subtraction (mg)	12.0602	11.4836	9.8156
m _{MDL}	Minimum detectable HCl (mg)	0.0155	0.0144	0.0145
m _n	Total HCl used in emission calculations (mg)	12.0602	11.4836	9.8156

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 3 SDA Inlet

USEPA Method 26A Chloride Laboratory Data Summary

Run No.	Blank	1	2	3
Date (2011)		Mar 24	Mar 24	Mar 24
Start Time (approx.)		06:57	08:25	10:24
Stop Time (approx.)		07:57	09:25	11:24

☐ DRAFT LAB DATA

MDL Min. detectable limit (mg Cl⁻/liter) 0.0180

HCl as Total Chloride
B_{Cl} Blank concentration (mg Cl⁻/liter) <0.0920

S _{Cl-1}	Fraction 1 concentration (mg Cl ⁻ /liter)	1036.1900	1001.3800	831.7300	
S _{Cl-2}	Fraction 2 concentration (mg Cl ⁻ /liter)				
v ₁	Fraction 1 sample volume (ml)	697.0	734.0	709.0	
v ₂	Fraction 2 sample volume (ml)				
m _{HCl}	HCl collected before blank subtraction (mg)	742.4467	755.5933	606.2081	
m _b	Allowable blank subtraction (mg)	0.0000	0.0000	0.0000	
m _{nb}	HCl collected after blank subtraction (mg)	742.4467	755.5933	606.2081	
m _{MDL}	Minimum detectable HCl (mg)	0.0129	0.0136	0.0131	
m _n	Total HCl used in emission calculations (mg)	742.4467	755.5933	606.2081	

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Wheelabrator North Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

USEPA Method 26A Chloride Laboratory Data Summary

Run No.	Blank	1	2	3
Date (2011)		Mar 24	Mar 24	Mar 24
Start Time (approx.)		06:57	08:25	10:24
Stop Time (approx.)		07:57	09:25	11:24

☐ DRAFT LAB DATA

MDL Min. detectable limit (mg Cl⁻/liter) 0.0180

HCl as Total Chloride

B_{Cl} Blank concentration (mg Cl⁻/liter) <0.0920

S _{Cl-1}	Fraction 1 concentration (mg Cl ⁻ /liter)	23.6700	24.3500	14.8300
S _{Cl-2}	Fraction 2 concentration (mg Cl ⁻ /liter)			
v ₁	Fraction 1 sample volume (ml)	830.0	803.0	787.0
v ₂	Fraction 2 sample volume (ml)			
m _{HCl}	HCl collected before blank subtraction (mg)	20.1962	20.1005	11.9980
m _b	Allowable blank subtraction (mg)	0.0000	0.0000	0.0000
m _{nb}	HCl collected after blank subtraction (mg)	20.1962	20.1005	11.9980
m _{MDL}	Minimum detectable HCl (mg)	0.0154	0.0149	0.0146
m _n	Total HCl used in emission calculations (mg)	20.1962	20.1005	11.9980

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DESCRIPTION OF INSTALLATION
PROCESS DESCRIPTION (CONTINUED)

3-3

Table 3-1:
Unit 1 Compliance Test Process Data

PLANT NAME: NORTH BROWARD 2011				Data from DCS Printouts								Calculated		Lime Feed Rate			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	
M-26A HCI	1	1	3/22/2011	0736	0836	184.1	303.9	6.6	527.8	47.8	41.9	5.9	11.2	1.110	1.212	426.9	All times based on CEMS time
		2	3/22/2011	0940	1040	184.9	303.4	6.7	523.4	44.1	37.3	6.9	12.2	1.115	1.211	499.2	
		3	3/22/2011	1102	1202	183.8	303.0	6.6	521.8	44.6	36.4	8.1	12.1	1.115	1.206	589.0	
		Avg				184.3	303.4	6.6	524.3	45.5	38.5	7.0	11.8	1.113	1.210	505.0	
M-29/5 Metals PM	1	1	3/23/2011	0634	0845	184.2	300.1	6.8	518.6	47.1	43.0	4.2	10.8	1.122	1.287	322.0	All times based on CEMS time
		2	3/23/2011	0905	1117	184.4	299.3	6.7	518.8	45.5	42.1	3.5	11.2	1.121	1.282	266.9	
		3	3/23/2011	1141	1352	183.4	300.1	6.7	525.1	47.8	41.8	6.1	10.7	1.121	1.277	463.6	
		Avg				184.0	299.8	6.8	520.8	46.8	42.3	4.6	10.9	1.121	1.282	350.8	
M-13B HF	1	1	3/22/2011	1231	1341	184.2	299.1	6.7	521.3	44.7	37.4	7.2	11.9	1.116	1.219	529.5	All times based on CEMS time
		2	3/22/2011	1408	1517	182.9	299.4	6.7	530.1	49.0	43.0	6.0	10.9	1.116	1.226	441.4	
		3	3/22/2011	1539	1647	182.4	304.6	6.8	537.5	50.9	42.7	8.2	10.6	1.115	1.215	594.9	
		Avg				183.1	301.0	6.7	529.6	48.2	41.0	7.1	11.1	1.116	1.220	521.9	

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DESCRIPTION OF INSTALLATION

PROCESS DESCRIPTION (CONTINUED)

3-4

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

PLANT NAME: NORTH BROWARD 2011						Data From DCS Printouts						Calculated		Lime Feed Rate			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	Dilution H2O flow gpm	Slurry Flow gpm	Slurry Conc. %	Slurry Specific Gravity	Slurry CaO Density lb/gal	CaO Flow lbs/hr	
M-26A HCI	2	1		0712	0812	183.7	295.3	5.9	496.9	34.2	29.7	4.5	14.9	1.122	1.289	351.1	All times based on CEMS time
		2		0838	0938	183.8	294.9	5.9	502.3	35.4	31.3	4.1	14.4	1.121	1.285	316.9	
		3		0959	1059	184.7	295.3	5.7	506.1	36.1	32.1	4.0	14.2	1.121	1.281	304.4	
				Avg		184.0	295.2	5.8	501.8	35.2	31.0	4.2	14.5	1.121	1.285	324.1	
M-29/5 Metals PM	2	1		0628	0838	183.3	293.9	5.8	498.5	32.9	27.3	5.6	15.5	1.121	1.285	433.3	All times based on CEMS time
		2		0853	1103	184.1	294.7	5.8	506.7	35.1	31.0	4.0	15.0	1.117	1.238	300.1	
		3		1119	1430	184.1	293.7	5.8	504.2	33.8	29.6	4.2	16.0	1.113	1.191	300.1	
				Avg		183.8	294.1	5.8	503.1	33.9	29.3	4.6	15.5	1.117	1.238	344.5	
M-13B HF	2	1		1132	1245	183.8	296.1	5.7	511.6	37.7	33.9	3.8	13.6	1.120	1.275	293.8	All times based on CEMS time
		2		1307	1417	183.5	295.9	5.8	515.1	38.5	34.4	4.1	13.2	1.121	1.279	317.7	
		3		1439	1545	184.1	295.7	5.8	511.0	36.3	30.1	6.2	14.1	1.121	1.282	477.7	
				Avg		183.8	295.9	5.8	512.6	37.5	32.8	4.7	13.6	1.121	1.279	363.0	

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DESCRIPTION OF INSTALLATION
PROCESS DESCRIPTION (CONTINUED)

3-5

Table 3-3:
Unit 3 Compliance Test Process Data

PLANT NAME: NORTH BROWARD 2011						Data From DCS Printouts						Calculated		Lime Feed Rate			Test Run Comments
Test	Unit No.	Run No.	Date	Time		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	
				Start	Stop												
M-26A	3	1	3/24/2011	0657	0757	184.6	308.9	6.3	503.1	35.9	32.0	4.0	14.2	1.122	1.286	304.8	All times based on CEMS time
HCI		2	3/24/2011	0825	0925	183.4	309.6	6.4	508.6	38.3	34.2	4.1	13.3	1.121	1.285	318.4	
		3	3/24/2011	1024	1124	183.3	310.0	6.4	515.3	41.0	36.9	4.1	13.1	1.115	1.206	293.1	
				Avg		183.8	309.5	6.4	509.0	38.4	34.4	4.0	13.5	1.119	1.259	305.4	
M-29/5	3	1	3/22/2011	0657	0910	183.7	310.0	6.4	503.8	38.1	33.2	5.0	14.1	1.115	1.209	359.8	All times based on CEMS time
Metals		2	3/22/2011	0935	1150	184.2	309.9	6.4	503.6	37.7	32.4	5.4	14.2	1.115	1.208	389.9	
PM		3	3/22/2011	1216	1430	183.5	310.3	6.4	507.5	38.8	34.0	4.8	13.7	1.116	1.221	350.2	
				Avg		183.8	310.1	6.4	504.9	38.2	33.2	5.0	14.0	1.115	1.213	366.6	
M-23	3	1	03/22/11	0937	1358	184.0	310.0	6.4	504.7	38.0	32.9	5.1	14.1	1.115	1.213	370.5	All times based on CEMS time
dioxins		2	03/23/11	0640	1105	183.7	309.5	6.4	506.9	39.6	35.0	4.6	12.9	1.121	1.284	351.3	
		3	03/23/11	1136	1558	184.2	310.0	6.4	509.8	39.1	35.3	3.9	13.1	1.121	1.279	297.8	
				Avg		183.9	309.8	6.4	507.1	38.9	34.4	4.5	13.3	1.119	1.259	339.8	
M-13B	3	1	03/24/11	1140	1255	183.1	310.9	6.4	525.9	46.3	41.2	5.1	11.7	1.114	1.192	364.0	All times based on CEMS time
HF		2	03/24/11	1311	1419	184.7	310.2	6.4	522.3	43.9	39.6	4.3	12.4	1.113	1.190	308.4	
		3	03/24/11	1438	1544	184.7	310.4	6.4	516.7	41.7	37.8	3.9	13.1	1.112	1.177	276.1	
				Avg		184.2	310.5	6.4	521.6	44.0	39.5	4.4	12.4	1.113	1.186	316.2	



Laboratory Analysis for Anions

Performed For:
Palatine Engineering Group
500 West Wood Street
Palatine, IL 60067

Customer Reference No: 11182
Laboratory Project No: 28691

Revision 0 - Dated: 04/08/2011

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: 2011.04.08
16:53:39 -05'00'

Eric Ewing
Title: Analyst
email: eewing@cleanair.com
Ph: 847-654-4519

Digitally signed by
Douglas D. Rhoades
Date: 2011.04.08
17:03:10 -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:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
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					
28691-11	DI H2O Blank	300	<	0.018	0.092
28691-12	0.1N H2SO4 Blank	300	<	0.018	0.092
Unit 1 SDA Inlet					
28691-13	Imp C&R R1	704	660.31	0.018	0.092
28691-14	Imp C&R R2	758	640.58	0.018	0.092
28691-15	Imp C&R R3	763	742.92	0.018	0.092
Unit 2 SDA Inlet					
28691-16	Imp C&R R1	736	1,001.69	0.018	0.092
28691-17	Imp C&R R2	695	923.98	0.018	0.092
28691-18	Imp C&R R3	746	867.76	0.018	0.092
Unit 3 SDA Inlet					
28691-19	Imp C&R R1	697	1,036.19	0.018	0.092
28691-20	Imp C&R R2	734	1,001.38	0.018	0.092
28691-21	Imp C&R R3	709	831.73	0.018	0.092
Unit 1 FF Outlet					
28691-22	Imp C&R R1	828	27.40	0.018	0.092
28691-23	Imp C&R R2	824	34.37	0.018	0.092
28691-24	Imp C&R R3	824	28.38	0.018	0.092
Unit 2 FF Outlet					
28691-25	Imp C&R R1	835	14.05	0.018	0.092
28691-26	Imp C&R R2	779	14.34	0.018	0.092
28691-27	Imp C&R R3	782	12.21	0.018	0.092
Unit 3 FF Outlet					
28691-28	Imp C&R R1	830	23.67	0.018	0.092
28691-29	Imp C&R R2	803	24.35	0.018	0.092
28691-30	Imp C&R R3	787	14.83	0.018	0.092

Analysis Case Narrative

Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
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: 03/29/11
 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 AS22 column, 4.5mM/1.4mM sodium carbonate/bicarbonate eluent 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
4/4/2011	04041102-64-00000-01	1051-64-00000-01
4/5/2011	04041102-64-00000-01	1051-64-00000-01
4/6/2011	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:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
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:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
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	681.27	54.30	7.97%
Imp C&R	Unit 2 SDA Inlet	931.14	87.25	7.22%
Imp C&R	Unit 3 SDA Inlet	956.43	109.39	11.44%
Imp C&R	Unit 1 FF Outlet	30.05	3.77	12.56%
Imp C&R	Unit 2 FF Outlet	13.54	1.16	8.54%
Imp C&R	Unit 3 FF Outlet	20.95	5.31	25.34%

CHROMATOGRAPHIC DATA REDUCTION
Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
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	04/04/2011	0.0000	0.1010	0.2578	0.5137	0.8292	1.3074	1.6848
Cal 1 Trial 2		0.0000	0.1017	0.2588	0.5158	0.8338	1.3017	1.6781
Cal 2 Trial 1	04/05/2011			0.2492				
Cal 2 Trial 2				0.2576				
Cal 3 Trial 1	04/06/2011				0.4992			
Cal 3 Trial 2					0.4997			
Cal 4 Trial 1	04/06/2011		0.1021	0.2488	0.5198	0.8050	1.2939	1.6249
Cal 4 Trial 2			0.1028	0.2545	0.5124	0.8103	1.2983	1.6567
n		2	4	6	6	4	4	4
Average		0.0000	0.1019	0.2545	0.5101	0.8196	1.3003	1.6611
Standard Deviation		0.0000	0.0008	0.0045	0.0086	0.0141	0.0057	0.0270
%RSD		0.00	0.74	1.75	1.69	1.72	0.44	1.62

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	0.010	-0.38%	Yes	0.00%	Yes	
0.1019	0.152	0.166	-0.55%	Yes	-9.15%	Yes	
0.2545	0.404	0.399	0.22%	Yes	1.35%	Yes	
0.5101	0.809	0.790	0.74%	Yes	2.31%	Yes	
0.8196	1.264	1.263	0.01%	Yes	0.01%	Yes	
1.3003	2.022	1.999	0.90%	Yes	1.13%	Yes	
1.6611	2.527	2.551	-0.94%	Yes	-0.94%	Yes	
Regression Constants			Is Coefficient of Regression > 0.995?				
Slope	m =	1.5298	Yes				
Intercept	b =	0.0096					
Coeff.	R ² =	0.9997					

Stock Solution Standard Mixing Recipe (Anions)

Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
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%	84.66%

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**

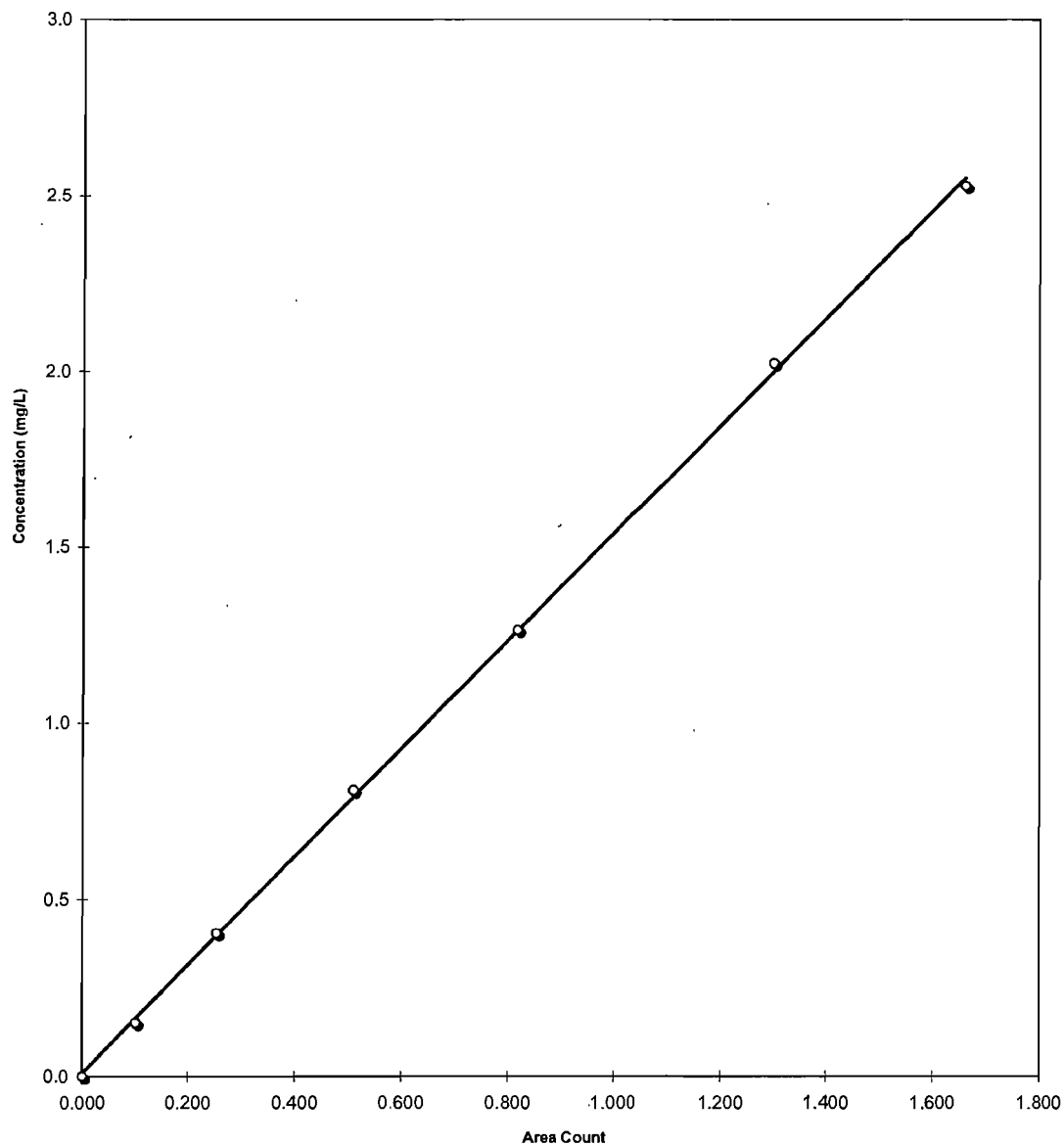
200	3	0.0754	0.1516	0.4503
250	10	0.2010	0.4043	1.2009
250	20	0.4020	0.8087	2.4019
200	20	0.5025	1.0108	3.0023
200	25	0.6282	1.2636	3.7529
100	20	1.0051	2.0217	6.0047
200	50	1.2563	2.5271	7.5058

1
2
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CCV
4
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6

CHROMATOGRAPHIC DATA REDUCTION
Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Chloride

Chloride Calibration Curve



Sample Information

Customer:	Palatine Engineering Group	Lab Project No:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Chloride

Sample Identification Number	Sample Location	Run No.	Sample Identification	Sample Recovery Date	Field Tech	Sample Volume (mL)
28691-11	Reagent Blank	RB	DI H2O Blank	3/21/2011	DL	300
28691-12	Reagent Blank	RB	0.1N H2SO4 Blank	3/21/2011	DL	300
28691-13	Unit 1 SDA Inlet	1	Imp C&R R1	3/22/2011	DL	704
28691-14	Unit 1 SDA Inlet	2	Imp C&R R2	3/22/2011	DL	758
28691-15	Unit 1 SDA Inlet	3	Imp C&R R3	3/22/2011	DL	763
28691-16	Unit 2 SDA Inlet	1	Imp C&R R1	3/23/2011	DL	736
28691-17	Unit 2 SDA Inlet	2	Imp C&R R2	3/23/2011	DL	695
28691-18	Unit 2 SDA Inlet	3	Imp C&R R3	3/23/2011	DL	746
28691-19	Unit 3 SDA Inlet	1	Imp C&R R1	3/24/2011	DL	697
28691-20	Unit 3 SDA Inlet	2	Imp C&R R2	3/24/2011	DL	734
28691-21	Unit 3 SDA Inlet	3	Imp C&R R3	3/24/2011	DL	709
28691-22	Unit 1 FF Outlet	1	Imp C&R R1	3/22/2011	RV	828
28691-23	Unit 1 FF Outlet	2	Imp C&R R2	3/22/2011	RV	824
28691-24	Unit 1 FF Outlet	3	Imp C&R R3	3/22/2011	RV	824
28691-25	Unit 2 FF Outlet	1	Imp C&R R1	3/23/2011	RV	835
28691-26	Unit 2 FF Outlet	2	Imp C&R R2	3/23/2011	RV	779
28691-27	Unit 2 FF Outlet	3	Imp C&R R3	3/23/2011	RV	782
28691-28	Unit 3 FF Outlet	1	Imp C&R R1	3/24/2011	RV	830
28691-29	Unit 3 FF Outlet	2	Imp C&R R2	3/24/2011	RV	803
28691-30	Unit 3 FF Outlet	3	Imp C&R R3	3/24/2011	RV	787

CHROMATOGRAPHIC DATA REDUCTION
Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	26691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Chloride

MDL=	0.018 mg/L	Average Flow Rate 0.70 mL/min
MRL=	0.092 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 _{anals} Total Amount of Analyte (mg)
Reagent Blank	28691-11	DI H2O Blank	04/04/11	0.0000	0.0000	0.0000	1	300.0	<	<0.028
Reagent Blank	28691-12	0.1N H2SO4 Blank	04/04/11	0.0000	0.0000	0.0000	1	300.0	<	<0.028
Unit 1 SDA Inlet	28691-13	Imp C&R R1	04/05/11	0.4220	0.4287	0.4254	1000	704.0	660.31	464.86
Unit 1 SDA Inlet	28691-14	Imp C&R R2	04/05/11	0.4098	0.4151	0.4125	1000	758.0	640.58	485.56
Unit 1 SDA Inlet	28691-15	Imp C&R R3	04/05/11	0.4722	0.4865	0.4794	1000	783.0	742.52	566.85
Unit 2 SDA Inlet	28691-16	Imp C&R R1	04/05/11	0.6442	0.6528	0.6485	1000	736.0	1,001.69	737.24
Unit 2 SDA Inlet	28691-17	Imp C&R R2	04/05/11	0.5997	0.5957	0.5977	1000	895.0	923.98	642.16
Unit 2 SDA Inlet	28691-18	Imp C&R R3	04/05/11	0.5593	0.5626	0.5610	1000	746.0	867.76	647.35
Unit 3 SDA Inlet	28691-19	Imp C&R R1	04/05/11	0.6789	0.6632	0.6711	1000	697.0	1,036.19	722.22
Unit 3 SDA Inlet	28691-20	Imp C&R R2	04/05/11	0.6524	0.6442	0.6483	1000	734.0	1,001.38	735.02
Unit 3 SDA Inlet	28691-21	Imp C&R R3	04/05/11	0.5388	0.5360	0.5374	1000	709.0	831.73	589.70
Unit 1 FF Outlet	28691-22	Imp C&R R1	04/05/11	0.3539	0.3500	0.3520	50	828.0	27.40	22.69
Unit 1 FF Outlet	28691-23	Imp C&R R2	04/05/11	0.4451	0.4411	0.4431	50	824.0	34.37	28.32
Unit 1 FF Outlet	28691-24	Imp C&R R3	04/06/11	0.3637	0.3658	0.3648	50	824.0	28.38	23.39
Unit 2 FF Outlet	28691-25	Imp C&R R1	04/06/11	0.4578	0.4483	0.4531	20	835.0	14.05	11.73
Unit 2 FF Outlet	28691-26	Imp C&R R2	04/06/11	0.4621	0.4628	0.4625	20	779.0	14.34	11.17
Unit 2 FF Outlet	28691-27	Imp C&R R3	04/06/11	0.4014	0.3843	0.3929	20	782.0	12.21	9.55
Unit 3 FF Outlet	28691-28	Imp C&R R1	04/06/11	0.6139	0.6111	0.6125	25	830.0	23.67	19.64
Unit 3 FF Outlet	28691-29	Imp C&R R2	04/06/11	0.6357	0.6249	0.6303	25	803.0	24.35	19.55
Unit 3 FF Outlet	28691-30	Imp C&R R3	04/06/11	0.3774	0.3856	0.3815	25	787.0	14.83	11.67

CHROMATOGRAPHIC DATA REDUCTION
Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
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%?
Reagent Blank	28691-11	DI H2O Blank	04/04/11	0.0000	0.0000	0.0000	na	na	Yes
Reagent Blank	28691-12	0.1N H2SO4 Blank	04/04/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 1-SDA Inlet	28691-13	Imp C&R R1	04/05/11	0.4220	0.4287	0.4254	0.0067	1.6%	Yes
Unit 1 SDA Inlet	28691-14	Imp C&R R2	04/05/11	0.4098	0.4151	0.4125	0.0053	1.3%	Yes
Unit 1 SDA Inlet	28691-15	Imp C&R R3	04/05/11	0.4722	0.4865	0.4794	0.0143	3.0%	Yes
Unit 2 SDA Inlet	28691-16	Imp C&R R1	04/05/11	0.6442	0.6528	0.6485	0.0086	1.3%	Yes
Unit 2 SDA Inlet	28691-17	Imp C&R R2	04/05/11	0.5997	0.5957	0.5977	0.0040	0.7%	Yes
Unit 2 SDA Inlet	28691-18	Imp C&R R3	04/05/11	0.5593	0.5626	0.5610	0.0033	0.6%	Yes
Unit 3 SDA Inlet	28691-19	Imp C&R R1	04/05/11	0.6789	0.6632	0.6711	0.0157	2.3%	Yes
Unit 3 SDA Inlet	28691-20	Imp C&R R2	04/05/11	0.6524	0.6442	0.6483	0.0082	1.3%	Yes
Unit 3 SDA Inlet	28691-21	Imp C&R R3	04/05/11	0.5388	0.5360	0.5374	0.0028	0.5%	Yes
Unit 1 FF Outlet	28691-22	Imp C&R R1	04/05/11	0.3539	0.3500	0.3520	0.0039	1.1%	Yes
Unit 1 FF Outlet	28691-23	Imp C&R R2	04/05/11	0.4451	0.4411	0.4431	0.0040	0.9%	Yes
Unit 1 FF Outlet	28691-24	Imp C&R R3	04/06/11	0.3637	0.3658	0.3648	0.0021	0.6%	Yes
Unit 2 FF Outlet	28691-25	Imp C&R R1	04/06/11	0.4578	0.4483	0.4531	0.0095	2.1%	Yes
Unit 2 FF Outlet	28691-26	Imp C&R R2	04/06/11	0.4621	0.4628	0.4625	0.0007	0.2%	Yes
Unit 2 FF Outlet	28691-27	Imp C&R R3	04/06/11	0.4014	0.3843	0.3929	0.0171	4.4%	Yes
Unit 3 FF Outlet	28691-28	Imp C&R R1	04/06/11	0.6139	0.6111	0.6125	0.0028	0.5%	Yes
Unit 3 FF Outlet	28691-29	Imp C&R R2	04/06/11	0.6357	0.6249	0.6303	0.0108	1.7%	Yes
Unit 3 FF Outlet	28691-30	Imp C&R R3	04/06/11	0.3774	0.3856	0.3815	0.0082	2.1%	Yes

CHROMATOGRAPHIC DATA REDUCTION

Customer:	Palatine Engineering Group	Lab Project No:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Chloride

CCV Concentration: 1.01 mg/L
 QC Concentration: 183.56 mg/L

MDL=	0.018 mg/L
MRL=	0.092 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	28691-00	CCB	04/04/11	0.0000	0.0000	0.0000	na	na	<		
CleanAir	28691-990	CCV	04/04/11	0.6387	0.6546	0.6467	0.0159	2.5%	1.00	1.19%	Yes
CleanAir	28691-991	QC	04/05/11	0.5905	0.5926	0.5916	0.0021	0.4%	182.91	0.35%	Yes
CleanAir	28691-00	CCB	04/05/11	0.0000	0.0000	0.0000	na	na	<		
CleanAir	28691-992	CCV	04/05/11	0.6246	0.6318	0.6282	0.0072	1.1%	0.97	3.98%	Yes
CleanAir	28691-993	QC	04/06/11	0.5845	0.5682	0.5764	0.0163	2.8%	178.26	2.89%	Yes
CleanAir	28691-00	CCB	04/06/11	0.0000	0.0000	0.0000	na	na	<		
CleanAir	28691-994	CCV	04/06/11	0.6267	0.6331	0.6299	0.0064	1.0%	0.97	3.72%	Yes
CleanAir	28691-995	QC	04/08/11	0.5574	0.5611	0.5593	0.0037	0.7%	173.03	5.74%	Yes
CleanAir	28691-00	CCB	04/08/11	0.0000	0.0000	0.0000	na	na	<		
CleanAir	28691-996	CCV	04/08/11	0.6378	0.6321	0.6350	0.0057	0.9%	0.98	2.96%	Yes

Sample Duplicate Analysis Area Count Check

									Precision	Is Precision <5%
Unit 1 SDA Inlet	28691-15	Imp C&R R3	04/05/11	0.4722	0.4865	0.4794	0.0143	3.0%		
Unit 1 SDA Inlet	28691-15	Imp C&R R3	04/08/11	0.4639	0.4727	0.4683	0.0088	1.9%	2.3%	Yes
Unit 1 FF Outlet	28691-24	Imp C&R R3	04/06/11	0.3637	0.3658	0.3648	0.0021	0.6%		
Unit 1 FF Outlet	28691-24	Imp C&R R3	04/08/11	0.3731	0.3759	0.3745	0.0028	0.7%	2.6%	Yes

Matrix Spike Recoveries

									Precision	Spike Recovery	Is Spike Recovery Between 80-110%
Matrix Spike	28691-19	Imp C&R R1	04/06/11	1.2264	1.2258	1.2261	0.0006	0.0%		107.7%	Yes
Matrix Spike	28691-19	Imp C&R R1	04/06/11	1.1557	1.1456	1.1507	0.0101	0.9%	6.3%	98.6%	Yes
Matrix Spike	28691-29	Imp C&R R2	04/06/11	1.1216	1.1154	1.1185	0.0062	0.6%		97.0%	Yes

Determination of Method Detection Limit
Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Chloride

MDL Reference		40 CFR 136, Appendix B	Non-Iterative Study		
CleanAir Reference		SOP EPA5-11	No. of Replicates		$t_{(n-1,0.99)}$
Matrix		Deionized Water	7		3.143
			8		2.998
			9		2.896
			10		2.821
			11		2.764
			16		2.602
Analyte		Chloride	21		2.528
Spike Concentration		0.1516 mg/L			
Slope		1.5298			
Intercept		0.0096			
Coefficient of Corr.		0.9997			

Spike Aliquots	Spike Result Area Count	Measured Concentration (mg/L)
1	0.1010	0.164
2	0.1017	0.165
3	0.0999	0.162
4	0.0923	0.151
5	0.0953	0.155
6	0.0947	0.154
7	0.1021	0.166
8	0.1028	0.167

Average Spike Concentration: 0.161
Recovery (R_R): 105.95%
Standard Deviation (S_R): 0.00614
RMS Deviation: 3.8%
 $t_{(n-1,0.99)}$: 2.998
MDL: 0.018
MRL: 0.092

Is the spike level higher than the MDL? Yes
Does the spike level exceed ten times the MDL? No
Is the Avg Recovery between 90% < R_R < 110%? Yes

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Chloride	

Calibration Point No: 3
Sample No: 28691-13
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

$\Delta_{Injection}$ = 0.0010

$Area_{Trial2}$ = 0.2588

$Area_{Trial1}$ = 0.2578

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} = 0.2583

$Area_{Trial2}$ = 0.2588

$Area_{Trial1}$ = 0.2578

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Chloride	

Calibration Point No: 3
Sample No: 28691-13
Sample Location: Unit 1 SDA Inlet

3. Difference between individual injection and average area count for pre-test calibration.

$$\Delta_{PreMean\%} = \frac{|Area_{Trial2} - Avg_{PreInj}|}{Avg_{PreInj}} 100$$

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)

$\Delta_{PreMean\%}$ = 0.1932
 Avg_{PreInj} = 0.2583
 $Area_{Trial2}$ = 0.2588

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.

$\bar{X}$ = 0.2545
 x_1 = 0.2578
 x_2 = 0.2588
n = 6

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Chloride	

Calibration Point No: 3
Sample No: 28691-13
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.

$\overline{X}_{All}$ = 0.6706
 x_1 = 0.2578
 x_2 = 0.2588
 n = 30

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Chloride	

Calibration Point No: 3
Sample No: 28691-13
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 = 1.52980
 x_1 = 0.2578
 x_2 = 0.2588
 $\bar{x}$ = 0.6706
 y_1 = 0.0000
 y_2 = 0.1516
 $\bar{y}$ = 1.0253
 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 = 0.00961
 m = 1.52980
 $\bar{x}$ = 0.6706
 $\bar{y}$ = 1.0253

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Chloride	

Calibration Point No: 3
Sample No: 28691-13
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	=	0.99969
r	=	0.99984
x_1	=	0.2578
x_2	=	0.2588
$\bar{x}$	=	0.6706
y_1	=	0.0000
y_2	=	0.1516
$\bar{y}$	=	1.0253
n	=	30

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Chloride	

Calibration Point No: 3
Sample No: 28691-13
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} = 0.4254

$Area_{Trial2}$ = 0.4287

$Area_{Trial1}$ = 0.4220

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

$\Delta_{Injection}$ = 0.0067

$Area_{Trial2}$ = 0.4287

$Area_{Trial1}$ = 0.4220

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Chloride	

Calibration Point No: 3
Sample No: 28691-13
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)

$$\Delta_{Injection} = 0.8\%$$

$$Avg_{Inj} = 0.4254$$

$$Area_{Trial2} = 0.4287$$

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.

$$C_{Reg} = 660.31$$

$$DF = 1000$$

$$Avg_{Inj} = 0.4254$$

$$m = 1.5298$$

$$b = 0.0096$$

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Chloride	

Calibration Point No: 3
Sample No: 28691-13
Sample Location: Unit 1 SDA Inlet

14. Determination of total amount of analyte in sample (total mg).

$$M_{Analyte} = \frac{(C_{Reg})(V_{Soln})}{1000}$$

Where:

$M_{Analyte}$ = Amount of analyte in sample (total mg)
 C_{Reg} = Sample concentration determined using the response factor (mg/L)
 V_{Soln} = Sample volume (ml)
1000 = Conversion constant (ml to L)

$M_{Analyte}$ = 464.86
 C_{Reg} = 660.3148
 V_{Soln} = 704.0

15. Determination of Detection Limits.

15a. Determination of average spike result.

$$AvgM_{f-i} = \frac{\sum_{i=1}^n M_{f-i}}{n}$$

Where:

$AvgM_{f-i}$ = Average of spike result (mg/L)
 M_{f-i} = Net results recorded for each iteration (mg/L)
n = Number of iterations.
i = Placeholder for iteration.

$AvgM_{f-i}$	=	0.161		
M_{f-1}	=	0.164	M_{f-5}	= 0.155
M_{f-2}	=	0.165	M_{f-6}	= 0.154
M_{f-3}	=	0.162	M_{f-7}	= 0.166
M_{f-4}	=	0.151	M_{f-8}	= 0.167
n	=	8		

Sample Calculations

Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28691	Analyst:	Eric Ewing
Plant:	Wheelabrator North Broward	Customer Reference No:	11182	Received:	3/29/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Chloride

Calibration Point No: 3
Sample No: 28691-13
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.
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}	=	0.0061		
Avg M_{f-i}	=	0.161		
M_{f-1}	=	0.164	M_{f-5}	= 0.155
M_{f-2}	=	0.165	M_{f-6}	= 0.154
M_{f-3}	=	0.162	M_{f-7}	= 0.166
M_{f-4}	=	0.151	M_{f-8}	= 0.167
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}	=	3.77E-05
σ_{f-i}	=	0.0061

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Chloride	

Calibration Point No: 3
Sample No: 28691-13
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} = 0.0382
 σ_{f-i} = 0.0061
 $AvgM_{f-i}$ = 0.1606

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 = 105.9%
 $AvgM_{f-i}$ = 0.16064
RA = 0.15163

Sample Calculations Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method:	U.S. EPA Method 26A	Analyte: Chloride

Calibration Point No: 3
Sample No: 28691-13
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 = 0.018

$t_{(n-1, 0.99)}$ = 2.998

σ_{f_i} = 0.0061

Sample Calculations
Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28691	Analyst: Eric Ewing
Plant: Wheelabrator North Broward	Customer Reference No: 11182	Received: 3/29/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Chloride	

Calibration Point No: 3
Sample No: 28691-13
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 = 0.092
MDL = 0.018

AS40 Log Sheet

Customer: 66
 Plant: Whisperbrook North Branch
 Customer Project No: 11182
 Lab Project No: 28691
 Date: 8/9/11
 Analyst: Ric Gibbs

Analyte(s): CI

Date Received: 8/29/11
 Shipping Person: Scott Brown

Inj Type: Loop Conc

Inj Mode: Prop Const

Inj / Vial: 1 2 / 3

Serial Dilution Data

Cartridge ID: 1B

Pos	Sample #	Identification	Volume	Dilution Ratio
1		Blank		
2		Cal 01		
3		Cal 01		
4		Cal 02		
5		Cal 03		
6		Cal 04		

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Cartridge ID: 2B

Pos	Sample #	Identification	Volume	Dilution Ratio
1		Cal 05		
2		Cal 06		
3		Blank		
4		Cal		
5		Blank		
6	-11	DE H ₂ O Blank	300	

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Cartridge ID: 3B

Pos	Sample #	Identification	Volume	Dilution Ratio
1	-12	0.1 N H ₂ SO ₄ Blank	300	
2	-22	v1 FF outlet Eng CER R1	828	
3	-23	" " " " R2	824	
4	-24	" " " " R3	824	
5	-25	" " " " R1	835	
6	-26	" " " " R2	779	

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Analyst Signature

Ric Gibbs

Page: 1 of 5

AS40 Log Sheet

Customer: 66
 Plant: Wheelabrator North Branch
 Customer Project No: 11182
 Lab Project No: 28691
 Date: 8/4/11
 Analyst: Eric Enz

Analyte(s): CI

Date Received:
 Shipping Person:

Inj Type: Loop Conc

Inj Mode: Prop/ Const

Inj / Vial: 1 2 3

Serial Dilution Data

Cartridge ID: 4B

Pos	Sample #	Identification	Volume	Dilution Ratio
1	-27	V2 FF Outlet Imp CBR R3	782	1
2	-28	V3 " " " " R1	890	1
3	-29	" " " " " R2	803	1
4	-30	" " " " " R3	787	1
5	Blank			200
6				

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Cartridge ID: 5D

Pos	Sample #	Identification	Volume	Dilution Ratio
1	Blank			
2				
3				
4				
5				
6				

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Cartridge ID: 1B

Pos	Sample #	Identification	Volume	Dilution Ratio
1	Blank			
2		Co1 O2		
3	Blank			
4		QC		200
5	Blank			
6	-15	V1 SPA Inlet Imp CBR R1	704	1000

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size
7850	1	4927	1000

Analyst Signature

Eric Enz

AS40 Log Sheet

Customer: 66 Analyte(s): CI
 Plant: Wheelabrator North Broward
 Customer Project No: 11182
 Lab Project No: 28691
 Date: 4/5/11
 Analyst: Eric Ewing

Date Received: _____
 Shipping Person: _____

Inj Type: Loop/ConcInj Mode: Prop/CnstInj / Vial: 2/3

Serial Dilution Data

Cartridge ID: 2B

Pos	Sample #	Identification	Volume	Dilution Ratio
1	-14	VI SDA Inlet Inj CR R2	758	1000
2	-15	" " " " " R3	753	1000
3	-16	" " " " " R1	756	1000
4	-17	" " " " " R2	695	1000
5	-18	" " " " " R3	746	1000
6	-19	" " " " " R1	677	1000

Cartridge ID: 3B

Pos	Sample #	Identification	Volume	Dilution Ratio
1	-20	VI SDA Inlet Inj CR R3	737	1000
2	-21	" " " " " R2	709	1000
3	-22			50
4	Blank			
5		CCV		
6	Blank			

Cartridge ID: 4B

Pos	Sample #	Identification	Volume	Dilution Ratio
1	-23			50
2	-24			50
3	-25			20
4	-26			20
5	-27			20
6	-28			25

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size
7850	1	0255	1000
7850	1	0242	1000
7850	1	4943	1000
7850	1	4872	1000
7850	1	0257	1000
9402	2	9402	2000

2462 CAC

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size
9902	2	8772	2000
4402	2	8374	2000
2407	5	1062	250

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size
2977	5	4273	250
2977	5	4289	250
4827	10	0788	200
4827	10	1450	200
4827	10	1358	200
4827	10	1050	250

Analyst Signature

Eric EwingPage: 3 of 5

AS40 Log Sheet

Customer: CB
 Plant: Wheelabrator North Broward
 Customer Project No: 11182
 Lab Project No: 28691
 Date: 2/7/11
 Analyst: Eric Gung

Analyte(s): CI

Date Received: _____
 Shipping Person: _____

Inj Type: Loop / Conc

Inj Mode: Prop Cns

Inj / Vial: 1/3

Serial Dilution Data

Cartridge ID: 5D

Pos	Sample #	Identification	Volume	Dilution Ratio
1	-29			25
2	-70			35
3	Blank			
4		QC		200
5	Blank			
6		On CI		

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size
4627	10	0183	250
4827	10	0183	250

Cartridge ID: 6B

Pos	Sample #	Identification	Volume	Dilution Ratio
1	Blank			
2				
3				
4				
5				
6				

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Cartridge ID: 1B

Pos	Sample #	Identification	Volume	Dilution Ratio
1	Blank			
2		CCV		
3	Blank			
4	-19	Matrix Spike		1000
5	-19	Spike Matrix Spike		1000
6	-25	Matrix Spike		25

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Analyst Signature

Eric Gung

Page: 4 of 5

AS40 Log Sheet

Customer: 06
 Plant: Wheelabrator North Broward
 Customer Project No: 1187
 Lab Project No: 25691
 Date: 4/8/11
 Analyst: Eric Ewing

Analyte(s): CT

Date Received:
 Shipping Person:

Inj Type: Loop/Conc

Inj Mode: Prop/Cnst

Inj/Vial: 1/23

Serial Dilution Data

Cartridge ID: 28

Pos	Sample #	Identification	Volume	Dilution Ratio
1	<u>Blank</u>			
2		<u>Cal 01</u>		
3		<u>Cal 02</u>		
4		<u>Cal 03</u>		
5		<u>Cal 04</u>		
6		<u>Cal 05</u>		

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Cartridge ID: 38

Pos	Sample #	Identification	Volume	Dilution Ratio
1		<u>Cal 06</u>		
2	<u>Blank</u>			
3		<u>Cal 01</u>		
4	<u>Blank</u>			
5				
6				

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Cartridge ID: 18

Pos	Sample #	Identification	Volume	Dilution Ratio
1	<u>Blank</u>			
2		<u>CCV</u>		
3	<u>Blank</u>			
4	<u>-13</u>	<u>Duplicate</u>		<u>1000</u>
5	<u>-24</u>	<u>Duplicate</u>		<u>50</u>
6	<u>Blank</u>			

Blank QC

200

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Analyst Signature

Eric Ewing

Page: 5 of 5

Lab Project No.: 28691

Date Received: 3/29/2011

CleanAir No.: 11182

66

Customer : 66

Contact : Scott Brown

Phone :

Fax :

Email : sbrown@cleanair.com

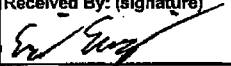
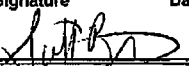
Requested Analysis

Due	Analyst	Status	Sample	Type	Container	Method
4/12/2011	EE	In Queue	1-10	Imp C&R	Nalgene	EPA Method 26A Fluoride
4/12/2011	EE	In Queue	11-30	Imp C&R	Nalgene	EPA Method 26A Chloride

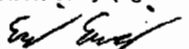
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CleanAir
ENGINEERING

CLIENT <u>Wheelabrator</u>		PROJECT <u>11182NB</u>		66-11182NB-7	
PLANT <u>North 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)			
ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION		ANALYSIS REQUESTED	
USEPA M-26	1	ACIDIC IMPINGER CATCH AND RINSE 1000 mL HDPE		Chloride	Bromide
				Archive	FORWARDING LAB
					CleanAir Analytical Services
					500 West Wood Street Palatine, IL 60067
					800-627-0033 (phone) 847-991-3385 (fax)
					ADDITIONAL INFORMATION
LAB ID NUMBER	DATE (2011)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	
	3/22	Unit 1 FF Outlet	1	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/22	Unit 1 FF Outlet	2	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/22	Unit 1 FF Outlet	3	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/22	Unit 1 SDA Inlet	1	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/22	Unit 1 SDA Inlet	2	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/22	Unit 1 SDA Inlet	3	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/23	Unit 2 FF Outlet	1	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/23	Unit 2 FF Outlet	2	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/23	Unit 2 FF Outlet	3	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/23	Unit 2 SDA Inlet	1	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/23	Unit 2 SDA Inlet	2	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
	3/23	Unit 2 SDA Inlet	3	Acidic Impinger Catch and Rinse, 1000 mL HDPE	X
Relinquished By: (signature)		Date / Time	Relinquished By: (signature)		Date / Time
S. Brown		3/28/2011 18:00			
Received By: (signature)		Date / Time	Received By: (signature)		Date / Time
		3/28/11 1100			
Relinquished By: (signature)		Date / Time	Relinquished By: (signature)		Date / Time
This form completed by:					
S. Brown					
Signature		Date			
		3/28/11			

RRR

CLIENT <u>Wheelabrator</u>		PROJECT <u>11182NB</u>		66-11182NB-4	
PLANT <u>North 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)			
ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION		ANALYSIS REQUESTED	
USEPA M-13B	1	FILTER, IMPINGER CATCH, AND SAMPLE TRAIN RINSE 1000 mL HDPE		Total Fluorides Archive	
LAB ID NUMBER		DATE (2011)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX
		3/22	Unit 1 FF Outlet	1	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE
		3/22	Unit 1 FF Outlet	2	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE
		3/22	Unit 1 FF Outlet	3	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE
		3/23	Unit 2 FF Outlet	1	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE
		3/23	Unit 2 FF Outlet	2	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE
		3/23	Unit 2 FF Outlet	3	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE
		3/24	Unit 3 FF Outlet	1	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE
		3/24	Unit 3 FF Outlet	2	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE
		3/24	Unit 3 FF Outlet	3	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE
		3/21	Reagent Blank	All	DI Water (~500 mL) and Filter, 1000 mL HDPE
Relinquished By: (signature)		Date / Time	Relinquished By: (signature)		Date / Time
S. Brown		3/28/2011 18:00			
Received By: (signature)		Date / Time	Received By: (signature)		Date / Time
		3/29/11 1100			
Relinquished By: (signature)		Date / Time	Relinquished By: (signature)		Date / Time
This form completed by:					
S. Brown					
Signature		Date			
		3/28/11			

PLEASE FOLD THIS SHIPPING DOCUMENT IN HALF AND PLACE IT IN A WAYBILL POUCH AFFIXED TO YOUR SHIPMENT SO THAT THE BARCODE PORTION OF THE LABEL CAN BE READ AND SCANNED. ***WARNING: USE ONLY THE PRINTED ORIGINAL LABEL FOR SHIPPING. USING A PHOTOCOPY OF THIS LABEL FOR SHIPPING PURPOSES IS FRAUDULENT AND COULD RESULT IN ADDITIONAL BILLING CHARGES, ALONG WITH THE CANCELLATION OF YOUR FEDEX ACCOUNT NUMBER.

From: Origin ID: NOHA (847) 612-0561
SCOTT BROWN
CLEAN AIR ENGINEERING
500 WEST WOOD STREET
PALATINE, IL 600674975



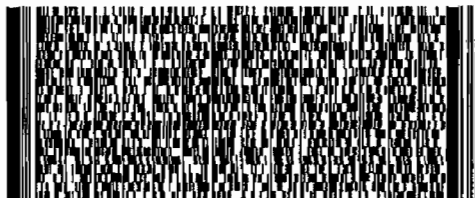
Ship Date: 28MAR11
Act/Wgt: 45.0 LB MAN
CAD: 822520/CAFE2472
Dims: 18 X 16 X 16 IN

Delivery Address Bar Code



SHIP TO: (800) 991-3300 BILL SENDER
DOUG RHOADES
CLEAN AIR ENGINEERING
500 WEST WOOD STREET
PALATINE, IL 60067

Ref # 11182
Invoice #
PO #
Dept # Palatine Source



1 of 2
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MASTER

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PRIORITY OVERNIGHT

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WHEELABRATOR NORTH BROWARD, INC.
POMPANO BEACH, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-1

PERTINENT CERTIFICATIONS

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: NK

Date: 5/4/11



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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:

Foster Schlieder

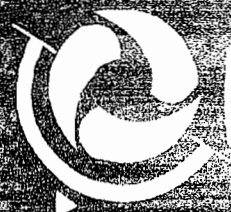
573.636.6393

www.aeromet.org

AeroMet Public School
GIFT CARD DRAWING

- To see if you have won:
1. Go to www.aeromet.org
 2. Click on Smoke School
 3. Click on Gift Card Drawing
 4. Look for your location on the list

The winner from each eligible location will be announced online / at a school / community event. To date, all locations registered with the contest have won.



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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WHEELABRATOR NORTH BROWARD, INC.
POMPANO BEACH, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-1

CORRESPONDENCE AND CLARIFICATIONS

J

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: *mk*

Date: 5/4/11



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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