Wheelabrator South Broward Inc.
A Waste Management Company
4400 South State Road 7
Ft. Lauderdale, FL 33314
(954) 581-6606
(954) 581-6705 Fax

May 8, 2008 Sent UPS

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

Re: Wheelabrator South Broward
2008 Annual Compliance Stack Test and RATA Reports

Dear Mr. Hoefert:

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 24-26 of this year by Clean Air Engineering, Inc.

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

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

Sincerely,

Jairaj Gosine
Plant Manager

cc: USEPA, Region IV, Pesticides and Toxics Management Division, Air & EPCRA Enforcement Branch, Air Enforcement Section (with) sent UPS
FDEP, Tallahassee, Bureau of Air Regulation, New Source Review Section, (with) sent UPS
B/County Dept of Planning and Environmental Protection, Air Quality Division (with) UPS
Chuck Faller (with)
Ram Tewari – BCWRS (without)
Tim Porter (without)
Sandy Gutner – MPI (with)
File: 3.7.2 (without)
5.1.3.2 (without)
3.8.2 (without)

JG/jlb080508

WM WASTE MANAGEMENT

CleanAir.

CleanAir Engineering
500 W. Wood Street
Palatine, IL 60067-4975
800-627-0033
www.cleanair.com

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

REPORT ON COMPLIANCE TESTING

Performed for:

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

Client Reference No: 11800237
CleanAir Project No: 10455-4
Revision 0: May 7, 2008

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.

Submitted by,

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

Reviewed by,

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

REVISION HISTORY

REPORT ON COMPLIANCE TESTING

DRAFT REPORT REVISION HISTORY

Revision:	Date	Pages	Comments
D0a	04/24/08	All	Draft version of original document.

FINAL REPORT REVISION HISTORY

Revision:	Date	Pages	Comments
0	05/07/08	All	Final version of original document.

CONTENTS

CONTENTS

PROJECT OVERVIEW

INTRODUCTION

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

The visual emissions were determined by the facilities continuous opacity monitor system (COMS) data as allowed under Title V Conditions B.53(6), B.76 and B.81. The lime silo fabric filter vent was observed for visual emissions (VE) and the ash handling system was observed for fugitive emissions. Testing was conducted in accordance with the Wheelabrator North and South Broward Protocol on Compliance Revision 1 dated February 22, 2008, 40 CFR 60 Subpart Cb, and applicable sections of the facilities Title V Permit No. 0112119-009-AV.

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

Key Project Participants

Individuals responsible for coordinating and conducting the test program were:

C. Faller – Wheelabrator South Broward
S. Brown – CleanAir

Lee C Hoefert and William Forrest of the FDEP were present for portions of the test program.

The CleanAir test crew consisted of the following individuals:

A. Vella
I. Lopez
P. Bihun
J. May
D. Nunez
M. Spoto
R. Vicere

PROJECT OVERVIEW

Test Program Parameters

The sampling was conducted at the Units 1, 2 and 3 Spray Dry Absorption (SDA) Inlet and Fabric Filter (FF) Outlets from March 24 through 26, 2008 included the following emissions measurements:

- beryllium;
- cadmium;
- lead;
- mercury;
- PCDDs and PCDFs (Unit 3 only);
- total suspended particulate (TSP);
- hydrogen chloride;
- fluoride;
- visual emissions;
- fugitive emissions.

TEST PROGRAM SYNOPSIS

Test Schedule

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

Table 1-1:
Schedule of Activities

Run Number	Location	Method	Analyte	Date	Start Time	End Time
1	Unit 1 SDA Inlet	USEPA Method 26A	HCl	03/24/08	06:19	07:19
1	Unit 1 FF Outlet	USEPA Method 26A	HCl	03/24/08	06:19	07:19
1	Unit 2 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/24/08	06:19	09:47
1	Unit 3 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/24/08	06:22	08:36
2	Unit 1 SDA Inlet	USEPA Method 26A	HCl	03/24/08	07:55	08:55
2	Unit 1 FF Outlet	USEPA Method 26A	HCl	03/24/08	07:55	08:55
2	Unit 3 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/24/08	09:12	11:26
1	Unit 1 FF Outlet	USEPA Method 13B	Total Fluorides	03/24/08	09:24	10:39
3	Unit 1 SDA Inlet	USEPA Method 26A	HCl	03/24/08	09:54	10:56
3	Unit 1 FF Outlet	USEPA Method 26A	HCl	03/24/08	09:54	10:56
1	Unit 3 FF Outlet	USEPA Method 23	PCDD/F	03/24/08	10:37	15:22
2	Unit 1 FF Outlet	USEPA Method 13B	Total Fluorides	03/24/08	11:17	12:27
2	Unit 2 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/24/08	11:22	13:33
3	Unit 3 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/24/08	12:08	14:24
3	Unit 1 FF Outlet	USEPA Method 13B	Total Fluorides	03/24/08	12:45	14:06
1	Lime Silo	USEPA Method 9	Opacity	03/24/08	12:51	14:05
3	Unit 2 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/24/08	14:00	16:11
2	Unit 3 FF Outlet	USEPA Method 23	PCDD/F	03/25/08	06:03	10:38
1	Unit 1 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/25/08	06:06	08:19
4	Unit 2 FF Outlet	USEPA Method 29	Mercury	03/25/08	06:13	08:28
1	Unit 3 SDA Inlet	USEPA Method 26A	HCl	03/25/08	06:17	07:28
1	Unit 3 FF Outlet	USEPA Method 26A	HCl	03/25/08	06:17	07:28
2	Unit 3 SDA Inlet	USEPA Method 26A	HCl	03/25/08	07:54	08:54
2	Unit 3 FF Outlet	USEPA Method 26A	HCl	03/25/08	07:54	08:54
2	Unit 1 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/25/08	08:41	10:52
5	Unit 2 FF Outlet	USEPA Method 29	Mercury	03/25/08	08:51	11:07
3	Unit 3 SDA Inlet	USEPA Method 26A	HCl	03/25/08	09:22	10:22
3	Unit 3 FF Outlet	USEPA Method 26A	HCl	03/25/08	09:22	10:22
3	Unit 3 FF Outlet	USEPA Method 23	PCDD/F	03/25/08	10:58	15:34
1	Unit 2 FF Outlet	USEPA Method 13B	Total Fluorides	03/25/08	11:03	12:12
3	Unit 1 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/25/08	11:16	13:30
6	Unit 2 FF Outlet	USEPA Method 29	Mercury	03/25/08	11:34	13:49
2	Unit 2 FF Outlet	USEPA Method 13B	Total Fluorides	03/25/08	12:36	13:47
3	Unit 2 FF Outlet	USEPA Method 13B	Total Fluorides	03/25/08	14:20	15:31
4	Unit 3 FF Outlet	USEPA Method 29	Mercury	03/26/08	05:45	07:59
4	Unit 1 FF Outlet	USEPA Method 29	Mercury	03/26/08	05:46	08:22
1	Unit 2 SDA Inlet	USEPA Method 26A	HCl	03/26/08	06:06	07:06
1	Unit 2 FF Outlet	USEPA Method 26A	HCl	03/26/08	06:06	07:06
1	Unit 3 FF Outlet	USEPA Method 13B	Total Fluorides	03/26/08	06:30	07:41
2	Unit 2 SDA Inlet	USEPA Method 26A	HCl	03/26/08	07:32	08:32
2	Unit 2 FF Outlet	USEPA Method 26A	HCl	03/26/08	07:32	08:32
2	Unit 3 FF Outlet	USEPA Method 13B	Total Fluorides	03/26/08	07:57	09:07
NA	Ash Handling System	USEPA Method 22	Fugitive Emissions	03/26/08	08:00	14:31
5	Unit 3 FF Outlet	USEPA Method 29	Mercury	03/26/08	08:17	10:30
5	Unit 1 FF Outlet	USEPA Method 29	Mercury	03/26/08	08:59	11:41
3	Unit 2 SDA Inlet	USEPA Method 26A	HCl	03/26/08	09:21	10:21
3	Unit 2 FF Outlet	USEPA Method 26A	HCl	03/26/08	09:21	10:21
3	Unit 3 FF Outlet	USEPA Method 13B	Total Fluorides	03/26/08	09:26	10:36
6	Unit 3 FF Outlet	USEPA Method 29	Mercury	03/26/08	10:55	13:06
6	Unit 1 FF Outlet	USEPA Method 29	Mercury	03/26/08	12:03	14:13

TEST PROGRAM SYNOPSIS (CONTINUED)

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 2-23 on pages 2-1 through 2-21. 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)	2.5	6.3	3.0	27
Visual Emissions (%, by COMS)[2]	0	0	0	10
Fluoride (lb/MMBtu as HF)[3]	<0.0000015	<0.0000017	<0.0000018	0.0040
Total PCCD/PCDF (ng/dscm @ 7% O_2)	NA	NA	4.0	30
HCl - CleanAir Lab Analysis				
Hydrogen Chloride (ppmdv @ 7% O_2) or	5.5	6.0	4.6	29
Hydrogen Chloride Removal (%)[4]	99%	99%	99%	>95
HCl - ALS Analytical Lab Analysis				
Hydrogen Chloride (ppmdv @ 7% O_2) or	6.5	6.4	4.5	29
Hydrogen Chloride Removal (%)[4]	98%	99%	99%	>95
Beryllium (mg/dscm @ 7% O_2)	<0.000028	<0.000031	<0.000027	0.001
Cadmium (mg/dscm @ 7% O_2)	<0.00014	<0.00050	0.00023	0.040
Lead (mg/dscm @ 7% O_2)	0.00050	0.0067	0.0013	0.44
Mercury (µg/dscm @ 7% O_2)	16	14	5.0	70
Average Steam Flow (Klbs/hr)[5]	184.4	184.0	183.8	NA
Average FF Inlet Temperature (^{O}F)[5]	315	319	316	NA

[1] Limits obtained the 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% O_2). The hydrogen chloride limit is 29 ppmdv @ 7% O2 or 95% removal, whichever is less stringent.

[5] From all compliance test runs.

Table 1-3:
Subpart Cb Required Operating Data

Process Condition	
Unit 1 Maximum Demonstrated Combustor Load (Klbs/hr)[1]	184.1 [3]
Unit 2 Maximum Demonstrated Combustor Load (Klbs/hr)[1]	184.5 [3]
Unit 3 Maximum Demonstrated Combustor Load (Klbs/hr)[1]	184.0
Unit 1 Maximum Particulate Control Device Inlet Temperature (°F)[2]	321 [3]
Unit 2 Maximum Particulate Control Device Inlet Temperature (°F)[2]	322 [3]
Unit 3 Maximum Particulate Control Device Inlet Temperature (°F)[2]	319

[1] From 40CFR60.58b (i) (8) the maximum demonstrated load during PCDD/PCDF testing, four hour average.

[2] From 40CFR60.58b (i) (9) the highest four hour average during PCDD/PCDF testing.

[3] From CleanAir Cb test report dated April 24, 2007.

Table 1-4:
Opacity and Fugitive Emission Test Results

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

[1] Limits obtained from 40 Code of Federal Register part 60 Subpart Cb - Emission Guidelines and Compliance Times for Large Municipal Waste Combustors That Are Constructed on or Before September 20, 1994 published in Federal Register as 62 FR 45123 on December 19, 1995 as modifed on August 25, 1997, Florida's Rule 62-296.416, F.A.C. and PSD-FL-105.

[2] The Ash Handling System was observed at various locations for a total of 3 hours.

[3] The Lime Silo was observed for one complete truck unloading.

Discussion of Test Program

All test methods were done in triplicate. 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 Clean Air Engineering except for the Servomex O_2/CO_2 analyzer utilized for all of the integrated gas sample bag analysis.

PROJECT OVERVIEW

During compliance testing, all three boilers were operated within 10% of the 192,000 lb/hr maximum steam flow rating. The result tables present each boilers steam output for every test run.

Isauro Lopez performed the fugitive emission readings (per EPA Method 22) on the ash handling system. Mr. Lopez conducted the VE readings (per EPA Method 9) on the Lime Silo during one entire truck unloading. Mr. Lopez'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 fraction detected in that run. The beryllium, cadmium and lead front- and back-half fractions were combined proportionately for analysis per EPA Method 29, Section 5.4.

Field blanks were collected for the Method 23 and 29 testing by assembling a used set of glassware, taking the complete train to the outlet location and performing a leak check. These samples were treated exactly as the other samples. The results for the Method field blanks are presented in Table 2-22 on page 2-20 as well as Appendix H. The results of the Method 29 reagent blank analysis were used to correct any data as outlined in Method 29.

All Method 23 samples were analyzed with the DB-5S column with modified calibration and additional quality assurance procedures as a direct substitute for the DB-5 and DB-225 columns. Confirmation of the 2,3,7,8 TCDF and TCDD 2,3,7,8 isomers was performed on the DB-5S column. The DB-5S column and modified calibration procedures meets the column separation requirement and can be used as a direct substitute for the DB-5 and DB-225 columns in accordance with Method 23 as approved by the USEPA. 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 Runs 1 and 3 each contained at least one estimated maximum possible concentration (EMPC) value. EMPC results do not meet all the identification criteria required by Method 23 to be positively identified as a dioxin or furan. Specifically, the integrated ion abundance ratios were not within 15% of the theoretical value limits specified in Method 23 Section 5.3.2.5, Table 4. The laboratory reports EMPC results as zero and, for this reason, all EMPC results are enclosed in brackets and are considered zero when calculating total dioxin/furans.

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

PROJECT OVERVIEW

Chuck Faller of Wheelabrator South Broward Inc. provided the process (operating) data. This data is presented in its entirety in Appendix C. All process data and CleanAir run times are based on facility CEM time which is 86 minutes earlier than actual Eastern Standard Time (EST) and the plant's Bailey Computer Time. The Lime Silo opacity start and stop times are based on EST since the initial and final truck weights were recorded using "real" time.

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

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

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

The FDEP supplied audit samples for PCDD/PCDF, metals, HF and HCl to CleanAir by the FDEP. The analytical results of these samples are presented in Appendix H along with each respective lab report.

During the initial analysis of the HCl audit samples the CleanAir laboratory was informed that they passed the low audit and failed the high audit. In an effort to report the most accurate results possible the lab reran the Modified Method 26A HCl samples and sent an aliquot of the samples, blanks and audits to ALS Environmental in Burlington, Ontario Canada for analysis. The results from the CleanAir analysis and the ALS analysis are presented in Table 1-2. A more detailed presentation of the HCl results based on the two separate analyses can be found following results section. The ALS full (160 page) data package is not included in this report but is available electronically upon request. Lee Hoefert verified that CleanAir's high HCl audit value based on the final analysis was within the acceptable tolerance of the actual value.

End of Section 1 – Project Overview

WHEELABRATOR SOUTH BROWARD
FT. LAUDERDALE, FL

Client Reference No: 11800237
CleanAir Project No: 10455-4

RESULTS

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

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		06:06	08:41	11:16	
Stop Time (approx.)		08:19	10:52	13:30	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	186.6	184.3	184.1	**185.0**
P_1	Fabric Filter Inlet Temperature (°F)	318	315	316	**316**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.1	9.3	9.9	**9.4**
CO_2	Carbon dioxide (dry volume %)	10.3	10.2	9.6	**10.1**
T_s	Sample temperature (°F)	302	299	300	**300**
B_w	Actual water vapor in gas (% by volume)	20.6	20.9	20.9	**20.8**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	183,901	178,588	185,393	**182,627**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	99,540	96,648	100,133	**98,773**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	76.60	73.66	77.08	**75.78**
%I	Isokinetic sampling (%)	99.9	98.9	99.9	**99.6**
Particulate Lab Data					
m_n	Net matter collected (g)	0.0050	0.0042	0.0043	
Particulate Results					
C_{sd}	Particulate Concentration (mg/dscm)	2.3	2.0	2.0	**2.1**
C_{sd7}	Particulate Concentration @7% O_2 (mg/dscm)	2.7	2.4	2.5	**2.5**
Mercury Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	28.6714	27.4239	28.5413	
Mercury Results - Total					
C_{sd}	Concentration (µg/dscm)	13	13	13	**13**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	16	16	17	**16**
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	<0.000024	<0.000023	**<0.000023**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<0.000027	<0.000029	<0.000029	**<0.000028**
Cadmium Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	<0.2000	<0.2000	0.3630	
Cadmium Results - Total					
C_{sd}	Concentration (mg/dscm)	<0.000092	<0.000096	0.00017	**<0.00012**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<0.00011	<0.00011	0.00021	**<0.00014**
Lead Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	0.5073	1.2879	0.8338	
Lead Results - Total					
C_{sd}	Concentration (mg/dscm)	0.00023	0.00062	0.00038	**0.00041**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	0.00028	0.00074	0.00048	**0.00050**

RESULTS

Table 2-2:
Unit 1 FF Outlet - Fluorides

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		09:24	11:17	12:45	
Stop Time (approx.)		10:39	12:27	14:06	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	183.8	184.3	184.6	**184.2**
P_1	Fabric Filter Inlet Temperature (°F)	315	315	315	**315**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.1	8.6	8.2	**8.6**
CO_2	Carbon dioxide (dry volume %)	10.6	11.0	11.2	**10.9**
T_s	Sample temperature (°F)	301	301	300	**301**
B_w	Actual water vapor in gas (% by volume)	20.8	21.5	21.9	**21.4**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	170,560	167,026	161,846	**166,477**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	91,493	88,849	85,786	**88,709**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	35.15	34.31	33.28	**34.25**
%I	Isokinetic sampling (%)	102.8	103.3	103.8	**103.3**
Laboratory Data					
m_n	Total HF collected (mg)	<0.00144	<0.00143	<0.00148	
Hydrogen Fluoride (HF) Results					
C_{sd}	HF Concentration (ppmdv)	<0.0017	<0.0018	<0.0019	**<0.0018**
C_{sd7}	HF Concentration @7% O_2 (ppmdv)	<0.0020	<0.0020	<0.0021	**<0.0020**
C_{sd}	HF Concentration (mg/dscm)	<0.0014	<0.0015	<0.0016	**<0.0015**
C_{sd7}	HF Concentration @7% O_2 (mg/dscm)	<0.0017	<0.0017	<0.0017	**<0.0017**
$E_{lb/hr}$	HF Rate (lb/hr)	<0.00049	<0.00049	<0.00051	**<0.00050**
E_{Fd}	HF Rate - Fd-based (lb/MMBtu)	<0.0000015	<0.0000015	<0.0000015	**<0.0000015**

RESULTS

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

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:19	07:55	09:54	
Stop Time (approx.)		07:19	08:55	10:56	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	184.5	183.6	184.2	**184.1**
P_1	Fabric Filter Inlet Temperature (°F)	315	315	315	**315**
SDA Inlet Gas Conditions					
O_2	Oxygen (dry volume %)	9.0	8.8	8.3	**8.7**
CO_2	Carbon dioxide (dry volume %)	10.5	10.8	11.4	**10.9**
T_s	Sample temperature (°F)	491	493	489	**491**
B_w	Actual water vapor in gas (% by volume)	17.7	17.5	17.8	17.7
SDA Inlet Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	33.36	33.99	33.08	**33.48**
SDA Inlet Laboratory Data					
m_n	Total HCl collected (mg)	558.8656	665.2492	609.9161	
SDA Inlet Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (ppmdv)	391	456	430	**426**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	457	523	473	**484**
FF Outlet Gas Conditions					
O_2	Oxygen (dry volume %)	10.5	9.9	9.5	**10.0**
CO_2	Carbon dioxide (dry volume %)	9.9	9.8	10.3	**10.0**
T_s	Sample temperature (°F)	299	300	300	**299**
B_w	Actual water vapor in gas (% by volume)	20.0	21.0	20.9	**20.6**
FF Outlet Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	34.04	33.65	33.32	**33.67**
FF Outlet Laboratory Data					
m_n	Total HCl collected (mg)	6.0361	6.4968	6.1982	
FF Outlet Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (ppmdv)	4.1	4.5	4.3	**4.3**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	5.5	5.7	5.3	**5.5**
RE	Reduction Efficiency (% Removal)	98.8%	98.9%	98.9%	**98.9%**

RESULTS

Table 2-4:
Unit 1 FF Outlet and SDA Inlet - Hydrogen Chloride (ALS)

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:19	07:55	09:54	
Stop Time (approx.)		07:19	08:55	10:56	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	184.5	183.6	184.2	**184.1**
P_1	Fabric Filter Inlet Temperature (°F)	315	315	315	**315**
SDA Inlet Gas Conditions					
O_2	Oxygen (dry volume %)	9.0	8.8	8.3	**8.7**
CO_2	Carbon dioxide (dry volume %)	10.5	10.8	11.4	**10.9**
T_s	Sample temperature (°F)	491	493	489	**491**
B_w	Actual water vapor in gas (% by volume)	17.7	17.5	17.8	**17.7**
SDA Inlet Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	33.36	33.99	33.08	**33.48**
SDA Inlet Laboratory Data					
m_n	Total HCl collected (mg)	525.0	559.0	535.0	
SDA Inlet Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (ppmdv)	367	383	377	**376**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	429	439	415	**428**
FF Outlet Gas Conditions					
O_2	Oxygen (dry volume %)	10.5	9.9	9.5	**10.0**
CO_2	Carbon dioxide (dry volume %)	9.9	9.8	10.3	**10.0**
T_s	Sample temperature (°F)	299	300	300	**299**
B_w	Actual water vapor in gas (% by volume)	20.0	21.0	20.9	**20.6**
FF Outlet Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	34.04	33.65	33.32	**33.67**
FF Outlet Laboratory Data					
m_n	Total HCl collected (mg)	7.17	7.24	7.61	
FF Outlet Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (ppmdv)	4.9	5.0	5.3	**5.1**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	6.6	6.4	6.5	**6.5**
RE	Reduction Efficiency (% Removal)	98.5%	98.6%	98.4%	**98.5%**

RESULTS

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

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:19	11:22	14:00	
Stop Time (approx.)		09:47	13:33	16:11	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	182.3	184.5	183.0	**183.3**
P_1	Fabric Filter Inlet Temperature (°F)	315	328	327	**323**
Gas Conditions					
O_2	Oxygen (dry volume %)	10.1	9.3	9.9	**9.8**
CO_2	Carbon dioxide (dry volume %)	9.4	10.2	9.7	**9.8**
T_s	Sample temperature (°F)	299	308	311	**306**
B_w	Actual water vapor in gas (% by volume)	23.4	22.6	22.5	**22.8**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	218,066	191,047	198,043	**202,385**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	112,223	98,299	101,911	**104,144**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	84.81	64.67	67.08	**72.19**
%I	Isokinetic sampling (%)	98.1	100.5	100.5	**99.7**
Particulate Lab Data					
m_n	Net matter collected (g)	0.0129	0.0132	0.0048	
Particulate Results					
C_{sd}	Particulate Concentration (mg/dscm)	5.4	7.2	2.5	**5.0**
C_{sd7}	Particulate Concentration @7% O_2 (mg/dscm)	6.9	8.7	3.2	**6.3**
Mercury Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	13.8999	31.2619	21.3987	
Mercury Results - Total					
C_{sd}	Concentration (µg/dscm)	5.8	17	11	**11**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	7.5	21	14	**14**
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)	<0.000021	<0.000027	<0.000026	**<0.000025**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<0.000027	<0.000033	<0.000033	**<0.000031**
Cadmium Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	<0.2000	1.1426	0.9742	
Cadmium Results - Total					
C_{sd}	Concentration (mg/dscm)	<0.000083	0.00062	0.00051	**<0.00041**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<0.00011	0.00075	0.00065	**<0.00050**
Lead Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	1.1567	12.2516	17.2174	
Lead Results - Total					
C_{sd}	Concentration (mg/dscm)	0.00048	0.0067	0.0091	**0.0054**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	0.00062	0.0080	0.011	**0.0067**

RESULTS

Table 2-6:
Unit 2 FF Outlet - Fluorides

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		11:03	12:36	14:20	
Stop Time (approx.)		12:12	13:47	15:31	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	183.1	184.4	184.5	**184.0**
P_1	Fabric Filter Inlet Temperature (°F)	322	319	317	**319**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.5	9.4	9.4	**9.5**
CO_2	Carbon dioxide (dry volume %)	10.0	10.1	10.1	**10.1**
T_s	Sample temperature (°F)	301	301	299	**301**
B_w	Actual water vapor in gas (% by volume)	20.9	21.2	21.5	**21.2**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	173,781	174,214	168,564	**172,186**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	93,906	93,666	90,586	**92,720**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	34.36	34.64	33.59	**34.20**
%I	Isokinetic sampling (%)	97.9	98.9	99.2	**98.7**
Laboratory Data					
m_n	Total HF collected (mg)	<0.00163	<0.00152	<0.00140	
Hydrogen Fluoride (HF) Results					
C_{sd}	HF Concentration (ppmdv)	<0.0020	<0.0019	<0.0018	**<0.0019**
C_{sd7}	HF Concentration @7% O_2 (ppmdv)	<0.0025	<0.0023	<0.0021	**<0.0023**
C_{sd}	HF Concentration (mg/dscm)	<0.0017	<0.0015	<0.0015	**<0.0016**
C_{sd7}	HF Concentration @7% O_2 (mg/dscm)	<0.0020	<0.0019	<0.0018	**<0.0019**
$E_{lb/hr}$	HF Rate (lb/hr)	<0.00059	<0.00054	<0.00050	**<0.00054**
E_{Fd}	HF Rate - Fd-based (lb/MMBtu)	<0.0000018	<0.0000017	<0.0000016	**<0.0000017**

RESULTS

Table 2-7:
Unit 2 FF Outlet and SDA Inlet - Hydrogen Chloride (CleanAir)

Run No.		1	2	3	Average
Date (2008)		Mar 26	Mar 26	Mar 26	
Start Time (approx.)		06:06	07:32	09:21	
Stop Time (approx.)		07:06	08:32	10:21	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	183.4	185.8	185.2	**184.8**
P_1	Fabric Filter Inlet Temperature (°F)	315	315	315	**315**
SDA Inlet Gas Conditions					
O_2	Oxygen (dry volume %)	9.3	9.1	9.1	**9.1**
CO_2	Carbon dioxide (dry volume %)	10.2	10.3	10.3	**10.3**
T_s	Sample temperature (°F)	523	524	523	**523**
B_w	Actual water vapor in gas (% by volume)	16.3	16.4	16.0	**16.2**
SDA Inlet Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	34.17	33.34	33.68	**33.73**
SDA Inlet Laboratory Data					
m_n	Total HCl collected (mg)	635.2111	682.5215	708.7028	
SDA Inlet Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (ppmdv)	433	477	490	**467**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	518	562	576	**552**
FF Outlet Gas Conditions					
O_2	Oxygen (dry volume %)	10.4	9.9	10.2	**10.1**
CO_2	Carbon dioxide (dry volume %)	9.1	9.6	9.4	**9.3**
T_s	Sample temperature (°F)	300	299	300	**300**
B_w	Actual water vapor in gas (% by volume)	21.1	21.1	20.4	**20.9**
FF Outlet Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	35.69	35.73	36.44	**35.96**
FF Outlet Laboratory Data					
m_n	Total HCl collected (mg)	6.3487	8.1574	7.1067	
FF Outlet Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (ppmdv)	4.1	5.3	4.5	**4.7**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	5.5	6.7	5.9	**6.0**
RE	Reduction Efficiency (% Removal)	98.9%	98.8%	99.0%	**98.9%**

RESULTS

Table 2-8:
Unit 2 FF Outlet and SDA Inlet - Hydrogen Chloride (ALS)

Run No.		1	2	3	Average
Date (2008)		Mar 26	Mar 26	Mar 26	
Start Time (approx.)		06:06	07:32	09:21	
Stop Time (approx.)		07:06	08:32	10:21	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	183.4	185.8	185.2	**184.8**
P_1	Fabric Filter Inlet Temperature (°F)	315	315	315	**315**
SDA Inlet Gas Conditions					
O_2	Oxygen (dry volume %)	9.3	9.1	9.1	**9.1**
CO_2	Carbon dioxide (dry volume %)	10.2	10.3	10.3	**10.3**
T_s	Sample temperature (°F)	523	524	523	**523**
B_w	Actual water vapor in gas (% by volume)	16.3	16.4	16.0	**16.2**
SDA Inlet Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	34.17	33.34	33.68	**33.73**
SDA Inlet Laboratory Data					
m_n	Total HCl collected (mg)	592	601	567	
SDA Inlet Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (ppmdv)	404	420	392	**406**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	483	495	461	**480**
FF Outlet Gas Conditions					
O_2	Oxygen (dry volume %)	10.4	9.9	10.2	**10.1**
CO_2	Carbon dioxide (dry volume %)	9.1	9.6	9.4	**9.3**
T_s	Sample temperature (°F)	300	299	300	**300**
B_w	Actual water vapor in gas (% by volume)	21.1	21.1	20.4	**20.9**
FF Outlet Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	35.69	35.73	36.44	**35.96**
FF Outlet Laboratory Data					
m_n	Total HCl collected (mg)	7.59	8.25	6.89	
FF Outlet Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (ppmdv)	5.0	5.4	4.4	**4.9**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	6.5	6.8	5.7	**6.4**
RE	Reduction Efficiency (% Removal)	98.6%	98.6%	98.8%	**98.7%**

RESULTS

Table 2-9:
Unit 3 FF Outlet – Particulate, Metals and Mercury

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:22	09:12	12:08	
Stop Time (approx.)		08:36	11:26	14:24	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	184.1	184.3	184.3	**184.2**
P_1	Fabric Filter Inlet Temperature (°F)	319	315	320	**318**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.7	9.9	9.3	**9.6**
CO_2	Carbon dioxide (dry volume %)	9.7	9.5	10.2	**9.8**
T_s	Sample temperature (°F)	292	290	293	**292**
B_w	Actual water vapor in gas (% by volume)	20.8	21.2	20.2	**20.7**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	189,763	198,114	188,069	**191,982**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	103,533	107,837	103,123	**104,831**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	79.86	83.27	79.81	**80.98**
%I	Isokinetic sampling (%)	101.6	101.7	102.0	**101.8**
Particulate Lab Data					
m_n	Net matter collected (g)	0.0020	0.00135	0.0134	
Particulate Results					
C_{sd}	Particulate Concentration (mg/dscm)	0.89	0.57	5.9	**2.5**
C_{sd7}	Particulate Concentration @7% O_2 (mg/dscm)	1.1	0.73	7.1	**3.0**
Mercury Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	10.4108	7.7484	9.5656	
Mercury Results - Total					
C_{sd}	Concentration (µg/dscm)	4.6	3.3	4.2	**4.0**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	5.7	4.2	5.1	**5.0**
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	<0.000021	<0.000022	**<0.000022**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<0.000027	<0.000027	<0.000027	**<0.000027**
Cadmium Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	0.5544	0.3275	0.3846	
Cadmium Results - Total					
C_{sd}	Concentration (mg/dscm)	0.00025	0.00014	0.00017	**0.00018**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	0.00030	0.00018	0.00020	**0.00023**
Lead Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	2.7326	1.7422	2.5653	
Lead Results - Total					
C_{sd}	Concentration (mg/dscm)	0.0012	0.00074	0.0011	**0.0010**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	0.0015	0.00094	0.0014	**0.0013**

RESULTS

Table 2-10:
Unit 3 FF Outlet - Fluorides

Run No.		1	2	3	Average
Date (2008)		Mar 26	Mar 26	Mar 26	
Start Time (approx.)		06:30	07:57	09:26	
Stop Time (approx.)		07:41	09:07	10:36	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	184.1	184.3	184.3	**184.2**
P_1	Fabric Filter Inlet Temperature (°F)	315	315	315	**315**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.4	10.2	10.6	**10.1**
CO_2	Carbon dioxide (dry volume %)	10.0	9.2	9.0	**9.4**
T_s	Sample temperature (°F)	288	289	289	**289**
B_w	Actual water vapor in gas (% by volume)	20.7	20.4	19.2	**20.1**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	174,037	184,346	194,395	**184,259**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	96,348	102,349	109,495	**102,731**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	35.61	38.22	40.33	**38.06**
%I	Isokinetic sampling (%)	99.6	100.7	99.3	**99.9**
Laboratory Data					
m_n	Total HF collected (mg)	<0.00159	<0.00167	<0.00175	
Hydrogen Fluoride (HF) Results					
C_{sd}	HF Concentration (ppmdv)	<0.0019	<0.0019	<0.0018	**<0.0019**
C_{sd7}	HF Concentration @7% O_2 (ppmdv)	<0.0023	<0.0024	<0.0025	**<0.0024**
C_{sd}	HF Concentration (mg/dscm)	<0.0016	<0.0015	<0.0015	**<0.0016**
C_{sd7}	HF Concentration @7% O_2 (mg/dscm)	<0.0019	<0.0020	<0.0021	**<0.0020**
$E_{lb/hr}$	HF Rate (lb/hr)	<0.00057	<0.00059	<0.00063	**<0.00060**
E_{Fd}	HF Rate - Fd-based (lb/MMBtu)	<0.0000017	<0.0000018	<0.0000019	**<0.0000018**

RESULTS

Table 2-11:
Unit 3 FF Outlet - PCDDs/PCDFs

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 25	Mar 25	
Start Time (approx.)		10:37	06:03	10:58	
Stop Time (approx.)		15:22	10:38	15:34	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	184.0	183.1	181.9	**183.0**
P_1	Fabric Filter Inlet Temperature (°F)	319	315	316	**317**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.8	9.8	10.6	**10.1**
CO_2	Carbon dioxide (dry volume %)	9.8	9.8	9.1	**9.6**
T_s	Sample temperature (°F)	293	293	291	**293**
B_w	Actual water vapor in gas (% by volume)	20.4	20.9	21.2	**20.8**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	186,099	190,726	186,452	**187,759**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	101,712	103,905	101,550	**102,389**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	132.09	136.16	131.42	**133.23**
%I	Isokinetic sampling (%)	100.8	101.7	100.4	**101.0**
Results (ND and EMPC = 0)					
Laboratory Data from USEPA Method 23					
m_n	Total PCDDs & PCDFs (ng)	11.9000	11.4000	12.0000	
m_{n_TEQ}	Total TEQ PCDDs & PCDFs (ng)	0.0953	0.0996	0.0921	
Total PCDD/F Results (TEF=1)					
C_{sd}	PCDD/F Concentration (ng/dscm)	3.2	3.0	3.2	**3.1**
C_{sd7}	PCDD/F Concentration @7% O_2 (ng/dscm)	4.0	3.7	4.4	**4.0**
$E_{lb/hr}$	PCDD/F Rate (lb/hr)	1.2E-06	1.2E-06	1.2E-06	**1.2E-06**
E_{Fd}	PCDD/F Rate - F_d-based (lb/MMBtu)	3.6E-09	3.3E-09	3.9E-09	**3.6E-09**
Total PCDD/F TEQ Results (using USEPA/INTL 1989 TEFs)					
C_{sdTEQ}	TEQ Concentration (ng/dscm)	0.025	0.026	0.025	**0.025**
C_{sd7TEQ}	TEQ Concentration @7% O_2 (ng/dscm)	0.032	0.032	0.033	**0.033**
$E_{lb/hrTEQ}$	TEQ Rate (lb/hr)	9.7E-09	1.0E-08	9.4E-09	**9.7E-09**
E_{FdTEQ}	TEQ Rate - F_d-based (lb/MMBtu)	2.9E-11	2.9E-11	3.0E-11	**2.9E-11**
Results (ND and EMPC = actual value)					
Laboratory Data from USEPA Method 23, including NDs and EMPCs					
m_n	Total PCDDs & PCDFs (ng)	12.2000	11.4000	12.1000	
m_{n_TEQ}	Total TEQ PCDDs & PCDFs (ng)	0.1090	0.0996	0.1050	
Total PCDD/F Results (TEF=1)					
C_{sd}	PCDD/F Concentration (ng/dscm)	3.3	3.0	3.3	**3.2**
C_{sd7}	PCDD/F Concentration @7% O_2 (ng/dscm)	4.1	3.7	4.4	**4.1**
$E_{lb/hr}$	PCDD/F Rate (lb/hr)	1.2E-06	1.2E-06	1.2E-06	**1.2E-06**
E_{Fd}	PCDD/F Rate - F_d-based (lb/MMBtu)	3.7E-09	3.3E-09	3.9E-09	**3.6E-09**
Total PCDD/F TEQ Results (using USEPA/INTL 1989 TEFs)					
C_{sdTEQ}	TEQ Concentration (ng/dscm)	0.029	0.026	0.028	**0.028**
C_{sd7TEQ}	TEQ Concentration @7% O_2 (ng/dscm)	0.036	0.032	0.038	**0.036**
$E_{lb/hrTEQ}$	TEQ Rate (lb/hr)	1.1E-08	1.0E-08	1.1E-08	**1.1E-08**
E_{FdTEQ}	TEQ Rate - F_d-based (lb/MMBtu)	3.3E-11	2.9E-11	3.4E-11	**3.2E-11**

RESULTS

Table 2-12:
Unit 3 FF Outlet and SDA Inlet - Hydrogen Chloride (CleanAir)

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		06:17	07:54	09:22	
Stop Time (approx.)		07:28	08:54	10:22	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	182.8	183.6	184.4	**183.6**
P_1	Fabric Filter Inlet Temperature (°F)	316	314	314	**315**
SDA Inlet Gas Conditions					
O_2	Oxygen (dry volume %)	9.0	8.6	9.2	**8.9**
CO_2	Carbon dioxide (dry volume %)	10.5	10.8	10.3	**10.5**
T_s	Sample temperature (°F)	486	482	486	**485**
B_w	Actual water vapor in gas (% by volume)	17.5	17.9	17.0	**17.5**
SDA Inlet Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	34.44	34.39	34.68	**34.50**
SDA Inlet Laboratory Data					
m_n	Total HCl collected (mg)	691.2912	680.9064	585.8155	
SDA Inlet Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (ppmdv)	468	462	394	**441**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	548	521	467	**512**
FF Outlet Gas Conditions					
O_2	Oxygen (dry volume %)	10.5	9.5	9.8	**9.9**
CO_2	Carbon dioxide (dry volume %)	9.2	10.0	9.8	**9.7**
T_s	Sample temperature (°F)	290	287	289	**289**
B_w	Actual water vapor in gas (% by volume)	19.4	20.6	20.6	**20.2**
FF Outlet Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	36.82	36.48	36.79	**36.70**
FF Outlet Laboratory Data					
m_n	Total HCl collected (mg)	5.3698	5.6297	6.2167	
FF Outlet Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (ppmdv)	3.4	3.6	3.9	**3.6**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	4.6	4.4	4.9	**4.6**
RE	Reduction Efficiency (% Removal)	99.2%	99.2%	98.9%	**99.1%**

RESULTS

Table 2-13:
Unit 3 FF Outlet and SDA Inlet - Hydrogen Chloride (ALS)

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		06:17	07:54	09:22	
Stop Time (approx.)		07:28	08:54	10:22	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	182.8	183.6	184.4	**183.6**
P_1	Fabric Filter Inlet Temperature (°F)	316	314	314	**315**
SDA Inlet Gas Conditions					
O_2	Oxygen (dry volume %)	9.0	8.6	9.2	**8.9**
CO_2	Carbon dioxide (dry volume %)	10.5	10.8	10.3	**10.5**
T_s	Sample temperature (°F)	486	482	486	**485**
B_w	Actual water vapor in gas (% by volume)	17.5	17.9	17.0	**17.5**
SDA Inlet Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	34.44	34.39	34.68	**34.50**
SDA Inlet Laboratory Data					
m_n	Total HCl collected (mg)	644.0	644.0	567.0	
SDA Inlet Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (ppmdv)	436	437	381	**418**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	511	493	452	**485**
FF Outlet Gas Conditions					
O_2	Oxygen (dry volume %)	10.5	9.5	9.8	**9.9**
CO_2	Carbon dioxide (dry volume %)	9.2	10.0	9.8	**9.7**
T_s	Sample temperature (°F)	290	287	289	**289**
B_w	Actual water vapor in gas (% by volume)	19.4	20.6	20.6	**20.2**
FF Outlet Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	36.82	36.48	36.79	**36.70**
FF Outlet Laboratory Data					
m_n	Total HCl collected (mg)	5.34	5.32	6.11	
FF Outlet Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (ppmdv)	3.4	3.4	3.9	**3.6**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	4.5	4.1	4.8	**4.5**
RE	Reduction Efficiency (% Removal)	99.1%	99.2%	98.9%	**99.1%**

RESULTS

Table 2-14:
Units 1, 2 and 3 FF Outlets – Opacity by COMS

Run No.	1	2	3	Average
Unit 1				
Date (2008)	Mar 25	Mar 25	Mar 25	
Start Time (approx.)	06:06	08:41	11:16	
Stop Time (approx.)	08:19	10:52	13:30	
Visible Emissions (%)[1]				
Average Opacity	0	0	0	**0**
Maximum Reading	0	0	0	**0**
Minimum Reading	0	0	0	**0**
Unit 2				
Date (2008)	Mar 24	Mar 24	Mar 24	
Start Time (approx.)	06:19	11:22	14:00	
Stop Time (approx.)	09:47	13:33	16:11	
Visible Emissions (%)[1]				
Average Opacity	0	0	0	**0**
Maximum Reading	0	0	0	**0**
Minimum Reading	0	0	0	**0**
Unit 3				
Date (2008)	Mar 24	Mar 24	Mar 24	
Start Time (approx.)	06:22	09:12	12:08	
Stop Time (approx.)	08:36	11:26	14:24	
Visible Emissions (%)[1]				
Average Opacity	0	0	0	**0**
Maximum Reading	0	0	0	**0**
Minimum Reading	0	0	0	**0**

[1] Readings 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

Table 2-15:
Ash Handling System - Fugitive Emissions

Source / Constituent	Date (2008)	Start Time (approx.)	Stop Time (approx.)	Observation Duration (minutes)	Accumulated Emission Duration (seconds)	
Ash Unloading/Conveyor						
Visual Opacity (%)	March 26	8:00	9:12	60	0	
Ash Conveyor/Doors to Baghouse						
Visual Opacity (%)	March 26	11:57	13:07	60	0	
Rolling Door/Door to Baghouse						
Visual Opacity (%)	March 26	13:19	14:31	60	0	Permit Limit
				Total (% of observation time)		< 5% of observation Time
				Total (minutes)		< 9 minutes

Table 2-16:
Lime Silo Fabric Filter Outlet - Visible Emissions

Run No.	**1**
Date (2008)	Mar 24
Start Time (approx.)	12:51
Stop Time (approx.)	14:05
Process Conditions	
Total lime unloaded (tons)	25.57
Rate of unloading (tons/hr)	20.7
Visible Emissions	
Average (percent opacity)	0
Maximum reading (percent opacity)	0

RESULTS

Table 2-17:
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	3/25/2008	6:06-8:19	186.6	302	183,901	9.1	10.3	99,540	84,215
1-O-M5/29-2	3/25/2008	8:41-10:52	184.3	299	178,588	9.3	10.2	96,648	80,892
1-O-M5/29-3	3/25/2008	11:16-13:30	184.1	300	185,393	9.9	9.6	100,133	79,220
1-O-M13B-1	3/24/2008	9:24-10:39	183.8	301	170,560	9.1	10.6	91,493	77,921
1-O-M13B-2	3/24/2008	11:17-12:27	184.3	301	167,026	8.6	11.0	88,849	78,750
1-O-M13B-3	3/24/2008	12:45-14:06	184.6	300	161,846	8.2	11.2	85,786	78,380
		Average	**184.6**	**301**	**174,552**	**9.0**	**10.5**	**93,741**	**79,896**
2-O-M5/29-1	3/24/2008	6:19-9:47	182.3	299	218,066	10.1	9.4	112,223	87,114
2-O-M5/29-2	3/24/2008	11:22-13:33	184.5	308	191,047	9.3	10.2	98,299	81,786
2-O-M5/29-3	3/24/2008	14:00-16:11	183.0	311	198,043	9.9	9.7	101,911	80,561
2-O-M13B-1	3/25/2008	11:03-12:12	183.1	301	173,781	9.5	10.0	93,906	76,861
2-O-M13B-2	3/25/2008	12:36-13:47	184.4	301	174,214	9.4	10.1	93,666	77,325
2-O-M13B-3	3/25/2008	14:20-15:31	184.5	299	168,564	9.4	10.1	90,586	74,698
		Average	**183.6**	**303**	**187,286**	**9.6**	**9.9**	**98,432**	**79,724**
3-O-M5/29-1	3/24/2008	6:22-8:36	184.1	292	189,763	9.7	9.7	103,533	83,705
3-O-M5/29-2	3/24/2008	9:12-11:26	184.3	290	198,114	9.9	9.5	107,837	85,106
3-O-M5/29-3	3/24/2008	12:08-14:24	184.3	293	188,069	9.3	10.2	103,123	85,800
3-O-M13B-1	3/26/2008	6:30-7:41	184.1	288	174,037	9.4	10.0	96,348	79,997
3-O-M13B-2	3/26/2008	7:57-9:07	184.3	289	184,346	10.2	9.2	102,349	78,654
3-O-M13B-3	3/26/2008	9:26-10:36	184.3	289	194,395	10.6	9.0	109,495	80,971
3-O-M23-1	3/24/2008	10:37-15:22	184.0	293	186,099	9.8	9.8	101,712	81,231
3-O-M23-2	3/25/2008	6:03-10:38	183.1	293	190,726	9.8	9.8	103,905	83,258
3-O-M23-3	3/25/2008	10:58-15:34	181.9	291	186,452	10.6	9.1	101,550	75,220
		Average	**183.8**	**290.9**	**188,000**	**9.9**	**9.6**	**103,317**	**81,549**
Facility Average			**184.0**	**298**	**183,279**	**9.5**	**10.0**	**98,497**	**80,390**

Table 2-18:
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
0_5735_MB001	86.7	92.2	93.4	92.9	93.4	89.5	80.1
0_5776_MB001	90.6	86.2	85.4	86.4	87.1	80	69.5
Field Blank	89.7	99.9	96.5	93.2	95	91.1	81.2
Unit 3 FF Outlet-Run 1	88.9	91	83.6	86.3	92	92.2	82
Unit 3 FF Outlet-Run 2	85.9	94.1	91.8	89.3	90.3	88.5	77.2
Unit 3 FF Outlet-Run 3	93.7	101	97.3	95.6	99.7	92.8	82.1
Average	89	94	91	91	93	89	79
SD	3	6	6	4	4	5	5

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
0_5735_MB001	92	93.9	95.3	94.7	95	92.6	81.5	87.3	89.1	82.1
0_5776_MB001	90.3	86.8	85.2	70.9	74.5	74.6	82.9	75.7	76.5	67.4
Field Blank	95.9	98.9	101	97.4	96.7	95.8	84.2	90.7	91.3	84.5
Unit 3 FF Outlet-Run 1	89.1	87.5	87.7	81.4	83.2	79.1	82.8	86	88.7	81.3
Unit 3 FF Outlet-Run 2	91.7	95.9	95.7	93.6	91.8	90.2	79.4	84.9	86.9	79.9
Unit 3 FF Outlet-Run 3	99.2	103	102	103	101	96.4	85.2	93.5	91.2	83.8
Average	93	94	94	90	90	88	83	86	87	80
SD	4	6	7	12	10	9	2	6	6	6

Table 2-19:
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
0_5735_MB001	102	105	103	102	108
0_5776_MB001	-	-	-	-	-
Field Blank	100	101	99.7	98.8	102
Unit 3 FF Outlet-Run 1	98.7	94	94.2	91.4	102
Unit 3 FF Outlet-Run 2	97.7	99.9	97.1	95.8	103
Unit 3 FF Outlet-Run 3	99.1	101	97	96.9	102
Average	100	100	98	97	103
SD	2	4	3	4	3

RESULTS

Table 2-20:
Quality Control and Quality Assurance - Metals

	RPD RESULTS				
Run Number	FH Front Half	BH H_2O_2/HNO_4	A Empty Impinger	B $KMnO_4$	C HCl
U1 FF Outlet R1	NA	1.4%	NA	NA	NA
U1 FF Outlet R2	NA	0.6%	NA	NA	NA
U1 FF Outlet R1	NA	2.0%	NA	NA	NA
U2 FF Outlet R1	NA	0.7%	NA	NA	NA
U2 FF Outlet R2	NA	0.4%	NA	NA	NA
U2 FF Outlet R3	NA	3.2%	NA	NA	NA
U3 FF Outlet R1	NA	2.8%	NA	NA	NA
U3 FF Outlet R2	NA	1.1%	NA	NA	NA
U3 FF Outlet R3	NA	0.4%	NA	NA	NA
Field Blank	NA	NA	NA	NA	NA
Reagent Blank	NA	NA	NA	NA	NA

Element	U1 FF O R2 RPD	U2 FF O R2 RPD	U3 FF O R2 RPD
	10609-2	10609-5	10609-8
Beryllium	NA	NA	NA
Cadmium	NA	2.0%	0.1%
Lead	3.0%	3.0%	3.4%

Table 2-21:
Quality Control and Quality Assurance – Metals (Continued)

Sample Spike and Recovery

Run Number		FH Front Half	BH H_2O_2/HNO_4	A Empty Impinger	B $KMnO_4$	C HCl
U1 FF Outlet R1	#1	100%	103%	93%	119%	111%
	#2	100%	105%	90%	119%	112%
U2 FF Outlet R3	#1	99%	98%	93%	116%	109%
	#2	100%	104%	92%	109%	111%
U3 FF Outlet R3	#1	100%	113%	95%	118%	109%
	#2	100%	114%	94%	117%	108%

Element	U1 FF O R3 Recovery	U2 FF O R3 Recovery	U3 FF O R3 Recovery
	10609-3	10609-6	10609-9
Beryllium	83%	88%	96%
Cadmium	87%	93%	101%
Lead	100%	98%	103%

Second Source Calibration Verification

Element	.25 ppb	1 ppb	100 ppb	250 ppb
	QC Std 8	QC Std 2	QC Std 4	QC Std 3
Beryllium	103%	104%	101%	99%
Cadmium		101%	99%	98%
Lead		113%	103%	92%

Table 2-22:
Quality Control and Quality Assurance – Method and Field Blanks

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

Element	Field Blank Total µg	Reagent Blank Total µg
	10609-10	10609-11
Beryllium	< 0.05	< 0.05
Cadmium	< 0.2	< 0.2
Lead	0.924	0.266

Method 23	0_5735_MB001 pg	0_5776_MB001 pg	Field Blank pg
2,3,7,8-TCDD	(1.45)	(3.98)	(1.65)
1,2,3,7,8-PeCDD	(2.32)	(5.02)	(2.79)
1,2,3,4,7,8-HxCDD	(3.01)	(4.85)	(3.53)
1,2,3,6,7,8-HxCDD	(3.03)	(4.75)	(3.66)
1,2,3,7,8,9-HxCDD	(3.32)	(5.36)	(3.79)
1,2,3,4,6,7,8-HpCDD	(2.84)	(4.87)	6.67
OCDD	12.5	(16.9)	20.2
2,3,7,8-TCDF	(1.09)	(2.64)	(1.73)
1,2,3,7,8-PeCDF	(1.71)	(4.1)	(1.91)
2,3,4,7,8-PeCDF	(1.54)	(3.75)	(1.67)
1,2,3,4,7,8-HxCDF	(0.945)	(3.1)	(1.1)
1,2,3,6,7,8-HxCDF	(0.92)	(2.86)	(1.12)
2,3,4,6,7,8-HxCDF	(1.07)	(2.62)	(1.21)
1,2,3,7,8,9-HxCDF	(1.44)	(3.57)	(1.68)
1,2,3,4,6,7,8-HpCDF	(1.35)	(2.91)	(2.06)
1,2,3,4,7,8,9-HpCDF	(2.02)	(4.9)	(3.29)
OCDF	(4.37)	(14.3)	(5.5)
ITEF TEQ (ND=0; EMPC=0)	0.0125	0.00	0.0869
ITEF TEQ (ND=0; EMPC=EMPC)	0.0125	0.00	0.0869
ITEF TEQ (ND=DL/2; EMPC=0)	2.52	5.85	3
ITEF TEQ (ND=DL/2; EMPC=EMPC)	2.52	5.85	3
ITEF TEQ (ND=DL; EMPC=EMPC)	5.03	11.7	5.9

Table 2-23:
Quality Control and Quality Assurance - Miscellaneous

Blanks	Result	
Acetone (g)	<0.00106	
	Inlet	**Outlet**
HCl DI H_2O (mg/l)	<0.009	<0.003
HCl 0.1 N H_2SO_4 (mg/l)	<0.009	<0.003
HF DI H_2O (mg/l)	<0.002	

Meters - Post Cal	Result	Limit
61-8	-0.6%	</= ± 5%
61-11	-0.8%	</= ± 5%
66-10	-3.2%	</= ± 5%
66-14	0.7%	</= ± 5%
66-16	2.4%	</= ± 5%
66-18	0.5%	</= ± 5%
85-4	1.0%	</= ± 5%

End of Section 2 – Results

DESCRIPTION OF INSTALLATION

PROCESS DESCRIPTION

The South Broward Resource Recovery Facilities operate three 750 tons per day municipal refuse fired, water wall boiler trains. The trains were manufactured by Babcock and Wilcox to produce electricity for sale to a local utility company. The boilers are rated at a maximum steam flow of 192,000 lbs/hr. Each boiler is equipped a spray dryer absorber (SDA) for acid gas removal, followed by a fabric filter (FF) baghouse for the control of particulate emissions and selective non-catalytic reduction for NO_X control. The control equipment is manufactured by Wheelabrator Air Pollution Control, Inc. Each fabric filter 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.

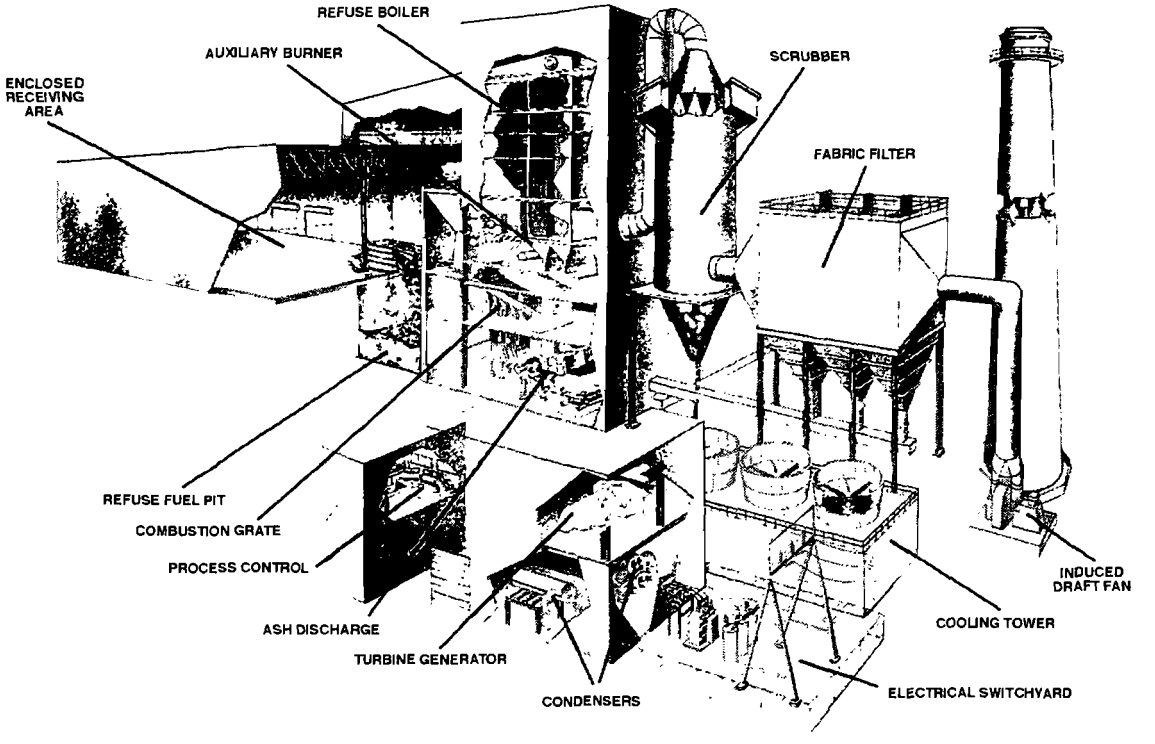


Figure 3-1: General Process Schematic

DESCRIPTION OF INSTALLATION

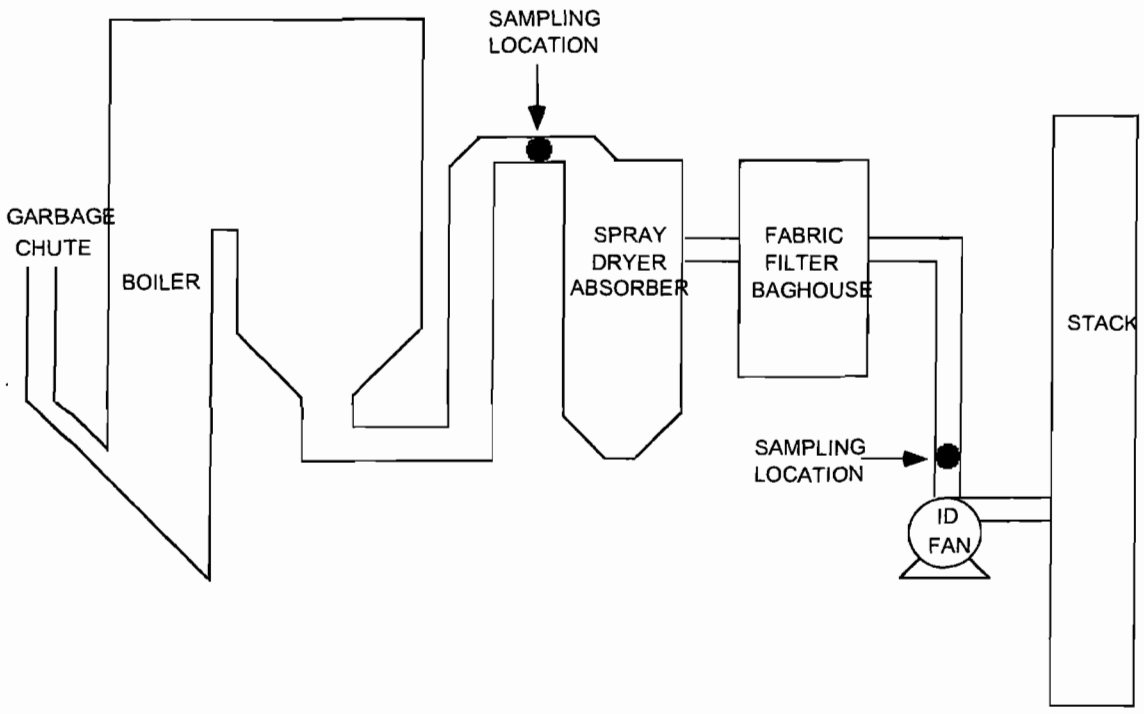


Figure 3-2: Process Schematic

DESCRIPTION OF INSTALLATION

Table 3-1:
Unit 1 Compliance Test Process Data

PLANT NAME: SOUTH BROWARD						Data from DCS Printouts						Calculated		Lime Feed Rate			
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	Test Run Comments
M-26A	1	1	3/24/2008	0619	0719	184.5	315.0	5.7	493.0	36.0	29.0	7.1	19.8	1.090	0.941	398.6	All times based on CEMS time
HCl		2	3/24/2008	0755	0855	183.6	314.8	5.8	495.1	36.3	29.0	7.3	19.8	1.090	0.941	411.0	
		3	3/24/2008	0954	1056	184.2	315.1	5.8	490.7	34.8	27.5	7.3	20.7	1.090	0.941	409.9	
					Avg	184.1	315.0	5.7	492.9	35.7	28.5	7.2	20.1	1.090	0.941	406.5	
M-29/5	1	1	3/25/2008	0606	0819	186.6	318.2	5.7	493.7	35.5	29.7	5.8	20.5	1.090	0.941	329.2	All times based on CEMS time
Metals		2	3/25/2008	0841	1052	184.3	315.2	5.8	492.6	34.9	28.4	6.5	20.6	1.090	0.941	368.7	
PM		3	3/25/2008	1116	1330	184.1	315.8	5.8	503.0	38.4	32.7	5.7	16.0	1.099	1.039	357.2	
					Avg	185.0	316.4	5.8	496.4	36.3	30.2	6.0	19.0	1.093	0.974	351.7	
M-13B	1	1	3/24/2008	0924	1039	183.8	315.1	5.8	489.6	34.2	26.9	7.3	21.0	1.090	0.941	411.6	All times based on CEMS time
HF		2	3/24/2008	1117	1227	184.3	315.0	5.6	489.5	33.5	26.3	7.2	21.4	1.090	0.941	408.2	
		3	3/24/2008	1245	1406	184.6	314.9	5.7	486.9	32.1	24.8	7.4	22.4	1.090	0.941	415.5	
					Avg	184.2	315.0	5.7	488.7	33.3	26.0	7.3	21.6	1.090	0.941	411.8	
M-29	1	4	3/26/2008	0546	0822	176.1	315.0	5.7	500.3	38.9	31.9	7.0	17.7	1.094	0.985	413.1	All times based on CEMS time
Mercury		5	3/26/2008	0859	1141	184.1	315.0	5.7	497.4	36.3	28.7	7.6	20.9	1.094	0.985	450.3	
		6	3/26/2008	1203	1413	183.8	315.0	5.9	501.6	37.6	27.5	10.1	26.7	1.094	0.985	596.3	
					Avg	181.3	315.0	5.8	499.8	37.6	29.4	8.2	21.7	1.094	0.985	486.6	

DESCRIPTION OF INSTALLATION

Table 3-2:
Unit 2 Compliance Test Process Data

PLANT NAME: SOUTH BROWARD						Data From DCS Printouts						Calculated		Lime Feed Rate			
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	Test Run Comments
M-26A	2	1	3/26/2008	0606	0706	183.4	314.9	7.3	517.4	41.7	34.9	6.9	16.5	1.093	0.974	400.9	All times based on CEMS time
HCl		2	3/26/2008	0732	0832	185.8	314.8	7.2	518.2	41.2	34.5	6.8	16.5	1.094	0.985	400.1	
		3	3/26/2008	0921	1021	185.2	314.5	7.0	518.1	40.8	33.7	7.1	17.1	1.094	0.985	419.0	
					Avg	184.8	314.7	7.1	517.9	41.3	34.3	6.9	16.7	1.094	0.981	406.7	
M-29/5	2	1	3/24/2008	0619	0947	182.3	315.2	8.4	525.0	36.3	29.2	7.2	15.5	1.090	0.941	404.3	All times based on CEMS time
Metals		2	3/24/2008	1122	1333	184.5	327.7	7.3	517.6	38.0	34.2	3.8	20.9	1.090	0.941	215.1	
PM		3	3/24/2008	1400	1611	183.0	326.6	7.8	528.1	41.3	41.5	-0.1	17.6	1.090	0.941	-6.2	
					Avg	183.3	323.2	7.8	523.6	38.5	34.9	3.6	18.0	1.090	0.941	204.4	
M-13B	2	1	3/25/2008	1103	1212	183.1	322.1	7.0	505.8	34.5	30.0	4.6	18.5	1.090	0.941	256.9	All times based on CEMS time
HF		2	3/25/2008	1236	1347	184.4	319.4	7.0	509.2	36.3	31.7	4.6	17.7	1.099	1.039	283.6	
		3	3/25/2008	1420	1531	184.5	316.5	7.0	511.5	36.8	32.6	4.2	16.5	1.099	1.039	258.7	
					Avg	184.0	319.3	7.0	508.8	35.9	31.4	4.4	17.6	1.096	1.006	266.4	
M-29	2	4	3/25/2008	0613	0820	186.6	317.9	7.2	512.4	39.1	32.0	7.0	18.6	1.090	0.941	395.8	All times based on CEMS time
Mercury		5	3/25/2008	0851	1107	184.3	315.5	6.9	502.8	35.5	29.2	6.3	20.2	1.090	0.941	352.9	
		6	3/25/2008	1134	1349	183.7	321.2	7.0	509.0	36.0	31.4	4.6	18.0	1.099	1.039	283.6	
					Avg	184.9	318.2	7.0	508.1	36.8	30.9	5.9	18.9	1.093	0.974	344.1	

DESCRIPTION OF INSTALLATION

Table 3-3:
Unit 3 Compliance Test Process Data

PLANT NAME: SOUTH BROWARD						Data From DCS Printouts						Calculated		Lime Feed Rate			
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	Test Run Comments
M-26A	3	1	3/25/2008	0617	0728	182.8	315.5	6.4	485.0	37.4	31.1	6.3	22.6	1.090	0.941	356.3	All times based on CEMS time
HCl		2	3/25/2008	0754	0854	183.6	314.3	6.5	480.7	35.0	27.5	7.5	23.9	1.090	0.941	422.9	
		3	3/25/2008	0922	1022	184.4	313.8	6.2	484.4	36.6	28.9	7.6	23.7	1.090	0.941	430.2	
					Avg	183.6	314.5	6.4	483.3	36.3	29.1	7.1	23.4	1.090	0.941	403.1	
M-29/5	3	1	3/24/2008	0622	0836	184.1	318.5	6.4	477.5	46.2	39.1	7.1	23.7	1.090	0.941	399.7	All times based on CEMS time
Metals		2	3/24/2008	0912	1126	184.3	315.2	6.2	480.4	37.0	31.5	5.5	21.8	1.090	0.941	310.0	
PM		3	3/24/2008	1208	1424	184.3	320.3	6.3	479.4	32.7	30.1	2.7	24.3	1.090	0.941	149.6	
					Avg	184.2	318.0	6.3	479.1	38.6	33.6	5.1	23.3	1.090	0.941	286.4	
M-23	3	1	3/24/2008	1037	1522	184.0	318.6	6.3	482.7	34.8	30.0	4.8	22.6	1.090	0.941	268.7	All times based on CEMS time
dioxins		2	3/25/2008	0603	1038	183.1	315.4	6.4	483.7	36.6	30.3	6.3	23.0	1.090	0.941	358.0	
		3	3/25/2008	1058	1534	181.9	316.1	6.4	487.7	37.4	33.4	4.0	20.2	1.099	1.039	251.2	
					Avg	183.0	316.7	6.4	484.7	36.3	31.2	5.0	22.0	1.093	0.974	292.6	
M-13B	3	1	3/26/2008	0630	0741	184.1	315.0	6.3	466.2	31.0	23.6	7.4	23.8	1.093	0.974	431.3	All times based on CEMS time
HF		2	3/26/2008	0757	0907	184.3	315.4	6.5	478.4	35.5	28.2	7.3	21.2	1.094	0.985	433.2	
		3	3/26/2008	0926	1036	184.3	314.8	6.2	490.9	39.4	31.8	7.6	19.3	1.094	0.985	447.4	
					Avg	184.2	315.1	6.3	478.5	35.3	27.9	7.4	21.4	1.094	0.981	437.3	
M-29	3	4	3/26/2008	0545	0759	185.5	314.9	6.3	469.0	31.8	24.4	7.4	23.2	1.093	0.974	430.7	All times based on CEMS time
Mercury		5	3/26/2008	0817	1030	184.0	315.1	6.4	488.8	39.2	31.8	7.4	19.2	1.094	0.985	438.5	
		6	3/26/2008	1055	1306	184.0	314.9	6.4	478.8	33.9	24.8	9.2	27.3	1.904	0.985	542.5	
					Avg	184.5		6.4	478.9	35.0	27.0	8.0	23.2	1.364	0.981	470.6	

DESCRIPTION OF INSTALLATION

DESCRIPTION OF SAMPLING LOCATIONS

Sampling point locations were determined according to EPA Method 1.

Table 3-4 outlines the sampling point configurations. Figure 3-3 and 3-4 illustrate the sampling points and orientation of sampling ports for each of the sources that were tested in the program.

Table 3-4:
Sampling Points

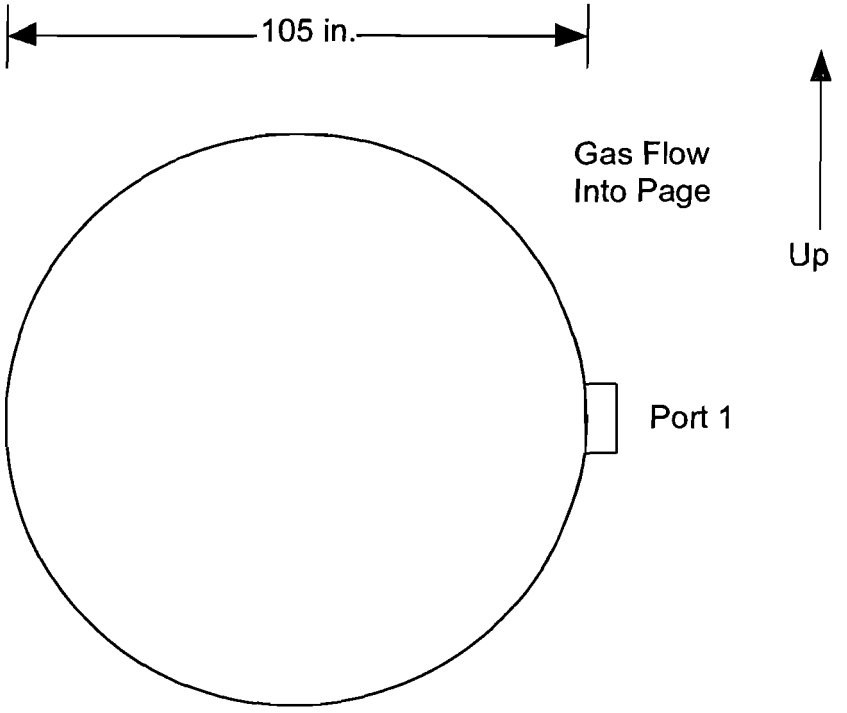
Location / Constituent	Method	Run No.	Ports	Points per Port	Minutes per Point	Total Minutes	Figure
Units 1,2 and 3 SDA Inlets							
Hydrogen Chloride	26A[1]	1-3	1	1	60	60	3-3
Units 1,2 and 3 FF Outlets							
Particulate, Be, Cd, Pb and Hg	5/29[2]	1-3	5	5	5	125	3-4
Hydrogen Chloride	26A[1]	1-3	1	1	60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

DESCRIPTION OF SAMPLING LOCATIONS (CONTINUED)



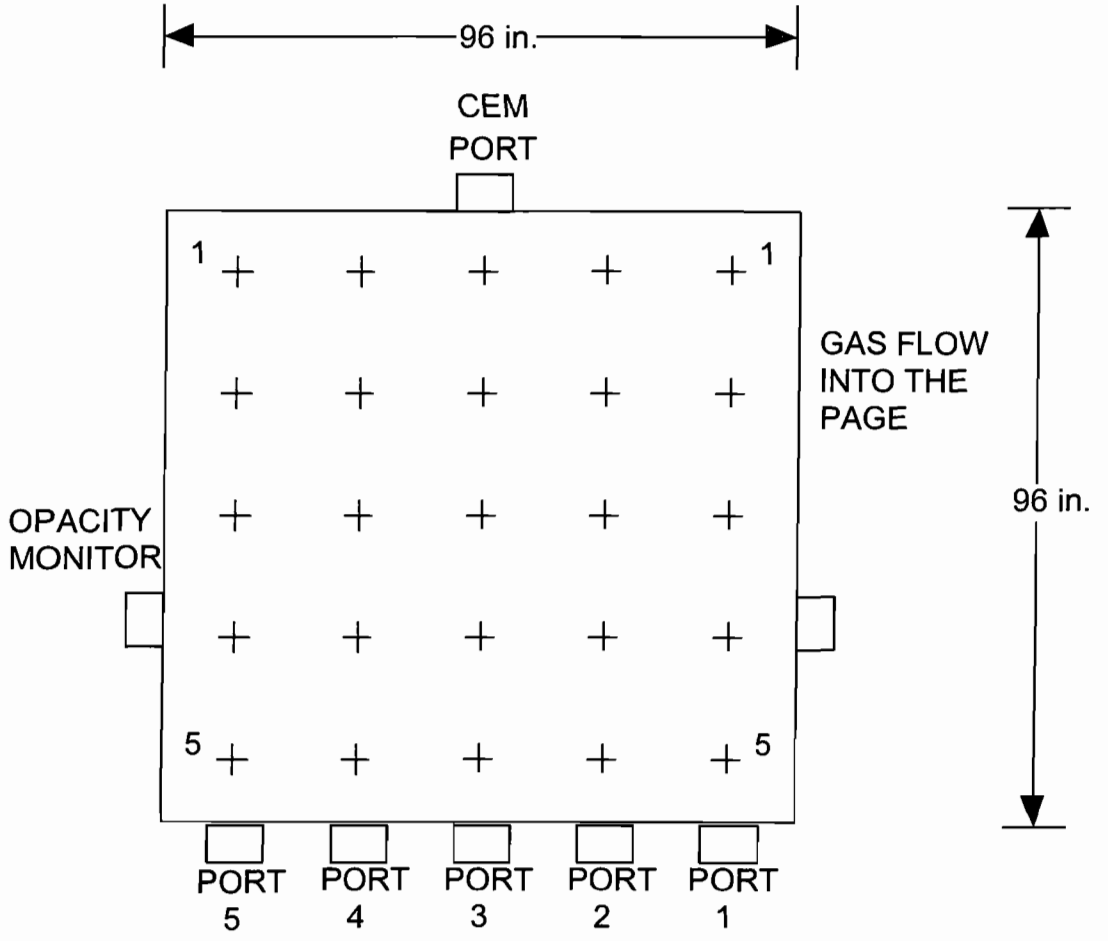
Sampling Point	Port to Point Distance (in.)
1	approximate center

Equivalent diameters to upstream disturbance: 2.0 Limit: 2.0
Equivalent diameters to downstream disturbance: 0.5 Limit: 0.5

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

DESCRIPTION OF INSTALLATION

DESCRIPTION OF SAMPLING LOCATIONS (CONTINUED)



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

Equivalent diameters to upstream disturbance: 2.0 Limit: 2.0
Equivalent diameters to downstream disturbance: 0.5 Limit: 0.5

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

End of Section 3 – Description of Installation

METHODOLOGY

Clean Air Engineering followed procedures as detailed in USEPA Methods 1, 2, 3, 3A, 3B, 4, 5, 9, 13B, 22, 23, mod. 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] Method 26A was modified at the inlet using single point constant sampling rate and at the outlet it was done in conjunction with Method 5.

These methods appear in detail in Title 40 of the Code of Federal Regulations (CFR) and on the World Wide Web at http://www.cleanair.com.

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 in USEPA "Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III Stationary Source-Specific Methods", EPA/600/R-94/038C. Additional QA/QC methods as prescribed in CleanAir's internal Quality Manual were also followed. Results of all QA/QC activities performed by CleanAir are summarized in Appendix E.

End of Section 4 – Methodology

APPENDIX

TEST METHOD SPECIFICATIONS

A

This Page Intentionally Left Blank

Specification Sheet for EPA Method 5/29

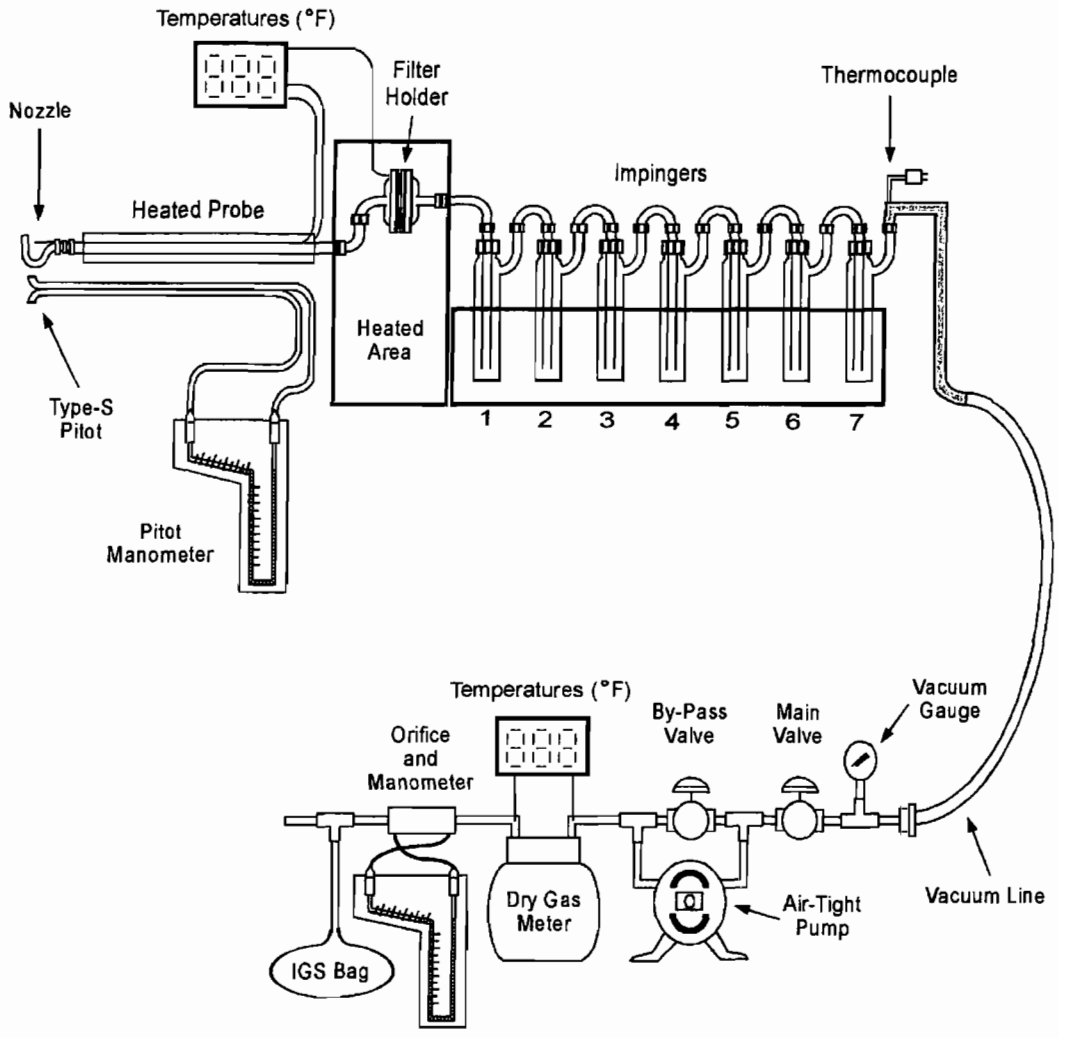
Source Location Name(s)	Units 1, 2 and 3 FF Outlets
Pollutant(s) to be Determined	Particulate Matter (PM) and Trace Metals (including Mercury)
Other Parameters to be Determined from Train	Gas Density, Moisture, Flow Rate

	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	0.84
Pitot Tube Calibration by	Geometric or Wind Tunnel	Geometric
Pitot Tube Attachment	Attached to Probe	Attached to Probe
Metering System Console		
Meter Type	Dry Gas Meter	Dry Gas Meter
Meter Accuracy	±2%	±1%
Meter Resolution	N/A	0.01 cubic feet
Meter Size	N/A	0.1 dcf/revolution
Meter Calibrated Against	Wet Test Meter or Standard DGM	Wet Test Meter
Pump Type	N/A	Rotary Vane
Temperature Measurements	N/A	Type K Thermocouple/Pyrometer
Temperature Resolution	5.4°F	1.0°F
ΔP Differential Pressure Gauge	Inclined Manometer or Equivalent	Inclined Manometer
ΔH Differential Pressure Gauge	Inclined Manometer or Equivalent	Inclined Manometer
Barometer	Mercury or Aneroid	Digital Barometer calibrated w/Mercury Aneroid
Filter Description		
Filter Location	After Probe	Exit of Probe
Filter Holder Material	Borosilicate Glass	Borosilicate Glass
Filter Support Material	Teflon (or other non-metallic material)	Teflon
Cyclone Material	N/A	None
Filter Heater Set-Point	248°F±25°F	248°F±25°F
Filter Material	Quartz or Fiberglass Fiber	Quartz Fiber
Other Components		
Description	N/A	N/A
Location	N/A	N/A
Operating Temperature	N/A	N/A

Specification Sheet for EPA Method 5/29

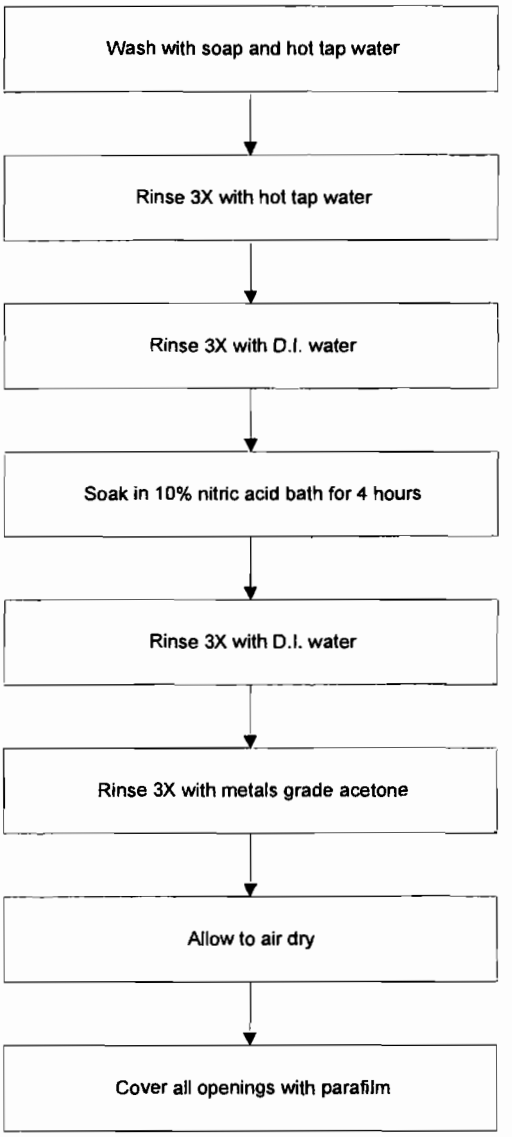
	Standard Method Specification	Actual Specification Used
Impinger Train Description		
Type of Glassware Connections	Ground Glass or Equivalent	Screw Joint with Silicone Gasket
Connection to Probe or Filter by	Direct Glass Connection	Direct Glass Connection
Number of Impingers	7	7
Impinger Stem Types	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

EPA Method 5/29
Sampling Train Configuration



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

EPA Method 29
Glassware Preparation Procedures



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

Container 1
Tared Quartz Filter
Petri Dish

Remove with acid washed polypropylene or Teflon tweezers to plastic container.

Remove any particulate or filter fiber to sample container

If necessary, fold the filter and transfer to the container.

Container 2
Acetone Rinse
250 ml Glass

Probe liner, nozzle, cyclone bypass and front half (FH) filter housing

Brush/rinse 3X with a total of 100 ml acetone

Visual Inspection

Label container and measure volume by weight

Container 3
Probe Rinse
250 ml Polyethylene

Probe liner, nozzle, cyclone bypass and front half (FH) filter housing

Rinse 3X with a total of 100 ml 0.1N HNO_3

Visual Inspection

Label container and measure volume by weight

Container 7
Acetone Blank
250 ml Glass

100 ml of acetone

Container 8A
Nitric Acid Blank
1000 ml Plastic

300 ml of 0.1N HNO_3

Container 8B
Water Blank
250 ml Plastic

100 ml of water

Container 4
1000 ml Polyethylene

Back half (BH) filter housing, Z-piece, impingers 1, 2, 3 and U-bends

Measure impinger volume by weight

Transfer to sample container

Rinse each piece 3X with a total of 100 ml 0.1N HNO_3

Visual Inspection

Label container and measure volume by weight

Container 9
5%HNO_3/10%H_2O_2 Blank
500 ml Plastic

200 ml of absorbing solution

Container 5A
250 ml Polyethylene

Impinger 4 and U-bend

Measure impinger volume by weight

Transfer to sample container

Rinse with 100 ml of 0.1N HNO_3

Visual Inspection

Label container and measure volume by weight

Container 10
Permanganate Blank
500 ml Glass

100 ml $KMnO_4$ solution

Container 5B
950 ml Glass

Impingers 5, 6 and U-bends

Measure impinger volume by weight

Transfer to sample container

Rinse each piece 3X with 100 ml of acidic permanganate solution

Rinse 3X with 100 ml of water

Visual Inspection

Label container and measure volume by weight

Container 5C
250 ml Glass

If brown spots remain in impingers, remove residue with 25 ml of 8N HCl total for both impingers

Pour HCl rinse into bottle containing 200 ml of water

Label container and measure volume by weight

Container 6
Silica Gel

Measure and record impinger, volume by weight, record condition of indicating gel

Recycle silica gel

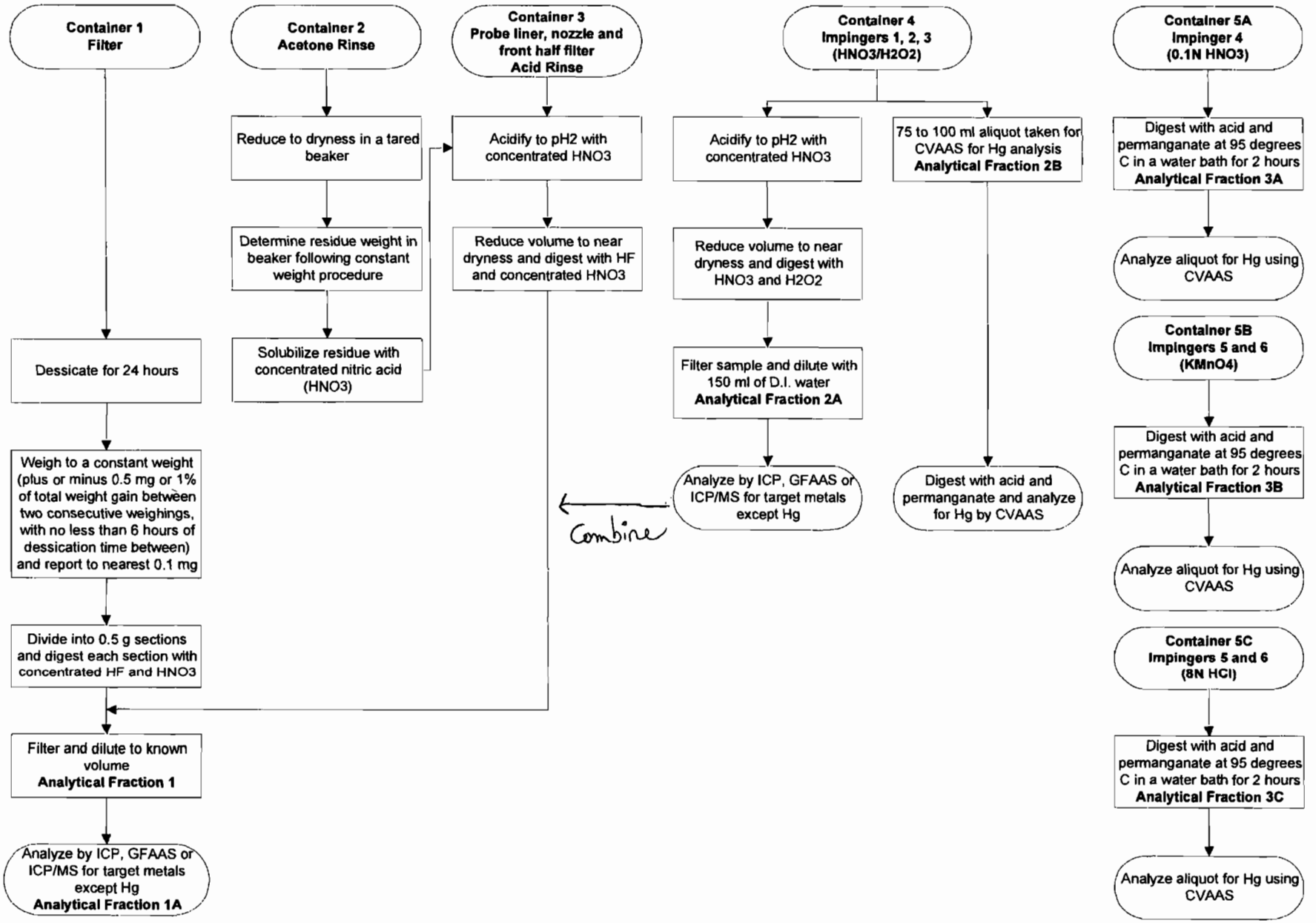
Container 11
HCl Rinse Blank
250 ml Glass

200 ml water, add 25 ml of 8N HCl. Mix well and seal

Container 12
Filter Blanks
Petri Dish

3 clean, unused filters

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



Specification Sheet for EPA Method 13B

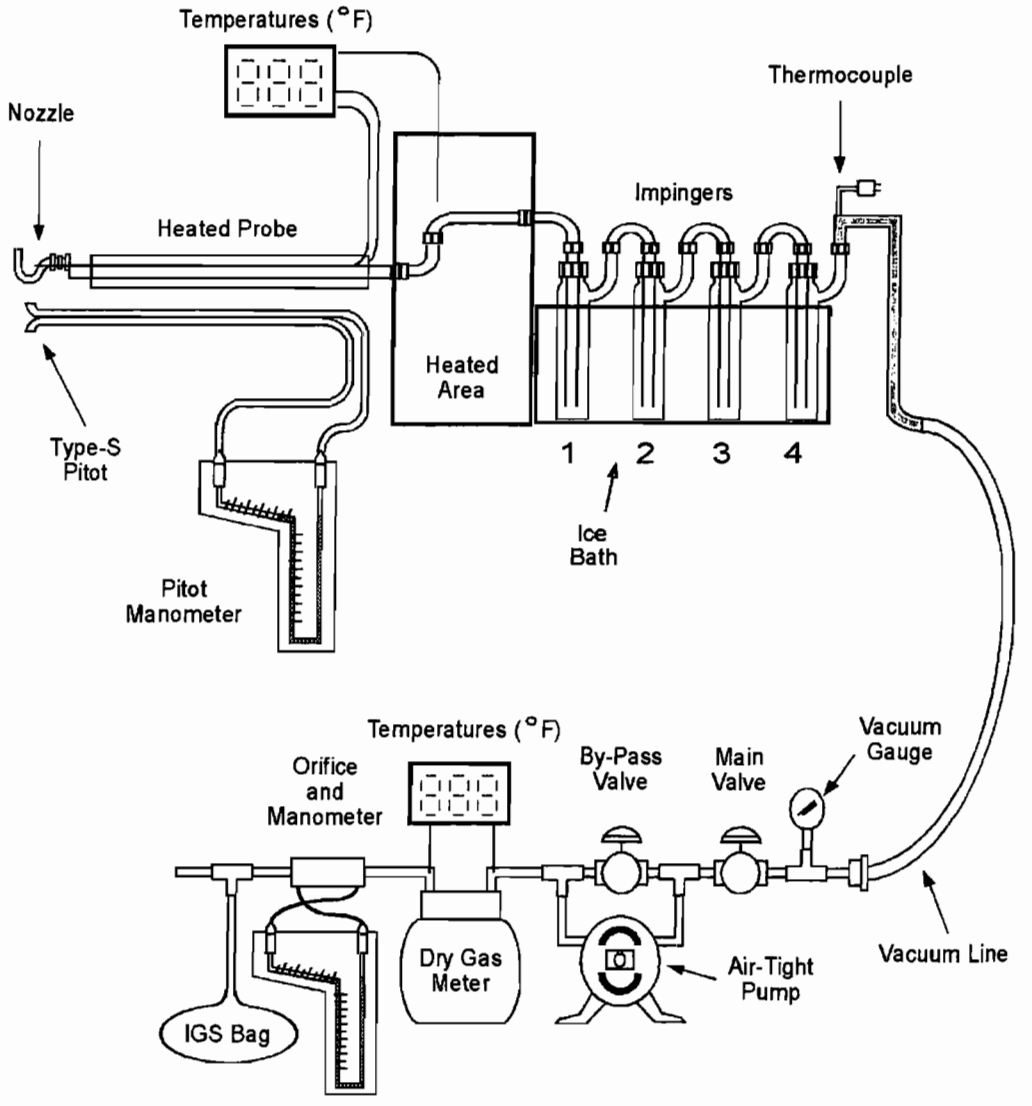
Source Location Name(s)	Units 1 ,2 and 3 FF Outlets
Pollutant(s) to be Determined	Total Fluoride (F)
Other Parameters to be Determined from Trai	Gas Density, Moisture, Flow Rate

	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	0.84
Pitot Tube Calibration by	Geometric or Wind Tunnel	Geometric
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 Quartz or Fiberglass if after probe, Whatman No. 1 if after 3rd impinger	Whatman No. 1 (Ashless)
Other Components		
Description	N/A	N/A
Location	N/A	N/A
Operating Temperature	N/A	N/A

Specification Sheet for EPA Method 13B

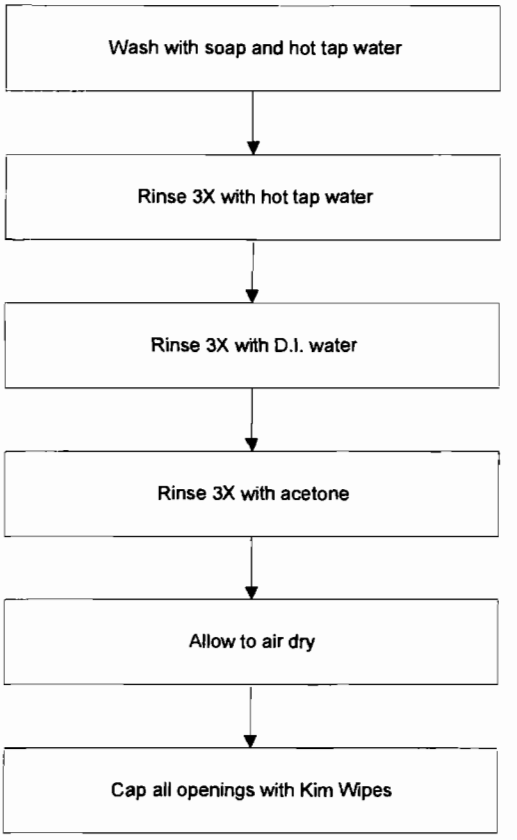
	Standard Method Specification	Actual Specification Used
Impinger Train Description		
Type of Glassware Connections	Ground Glass or Equivalent	Screw Joint with Silicone Gasket
Connection to Probe or Filter by	Direct Glass Connection	Direct Glass Connection
Number of Impingers	4	4
Impinger Stem Types		
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_2O 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



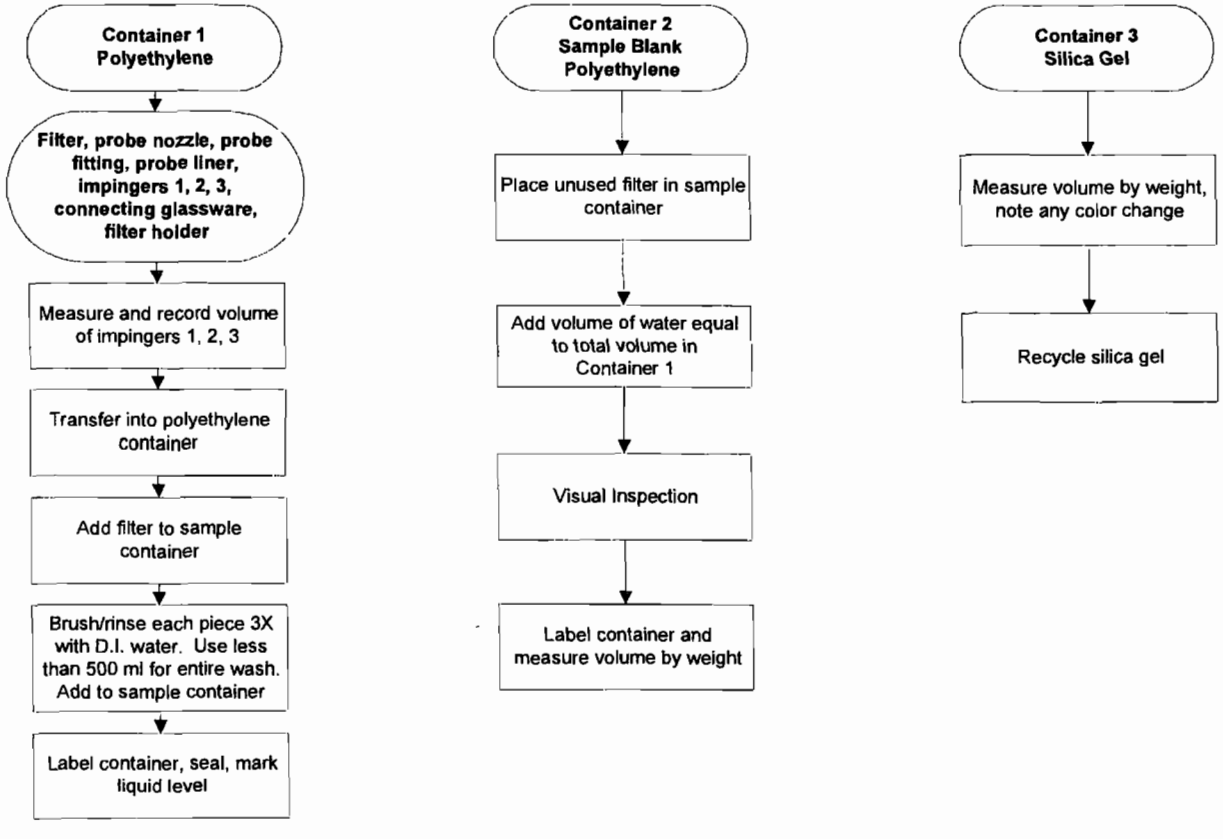
Impinger Contents	
Impinger 1	100 ml DI H_2O
Impinger 2	100 ml DI H_2O
Impinger 3	Empty
Impinger 4	Silica Gel

EPA Method 13B
Glassware Preparation Procedures

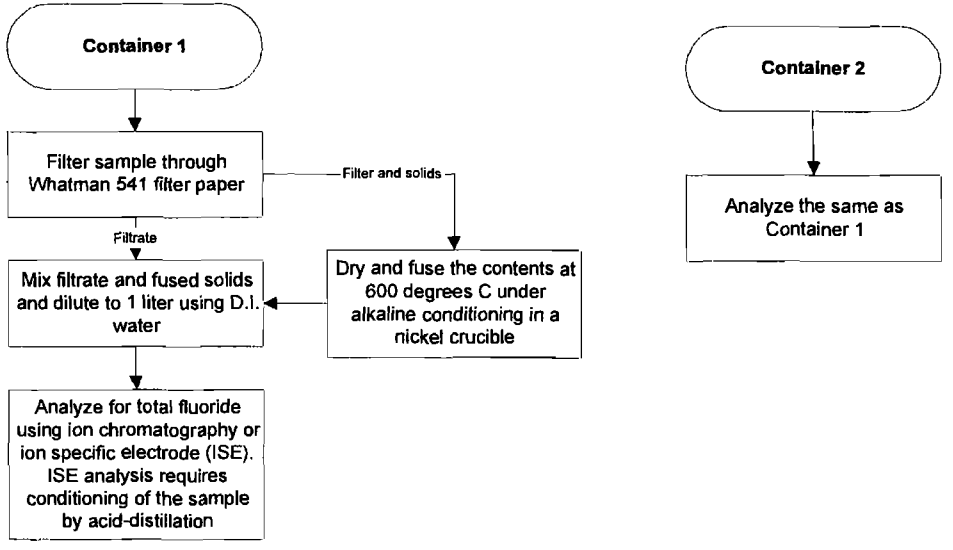


EPA Method 13B
Sample Recovery Flowchart

- 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

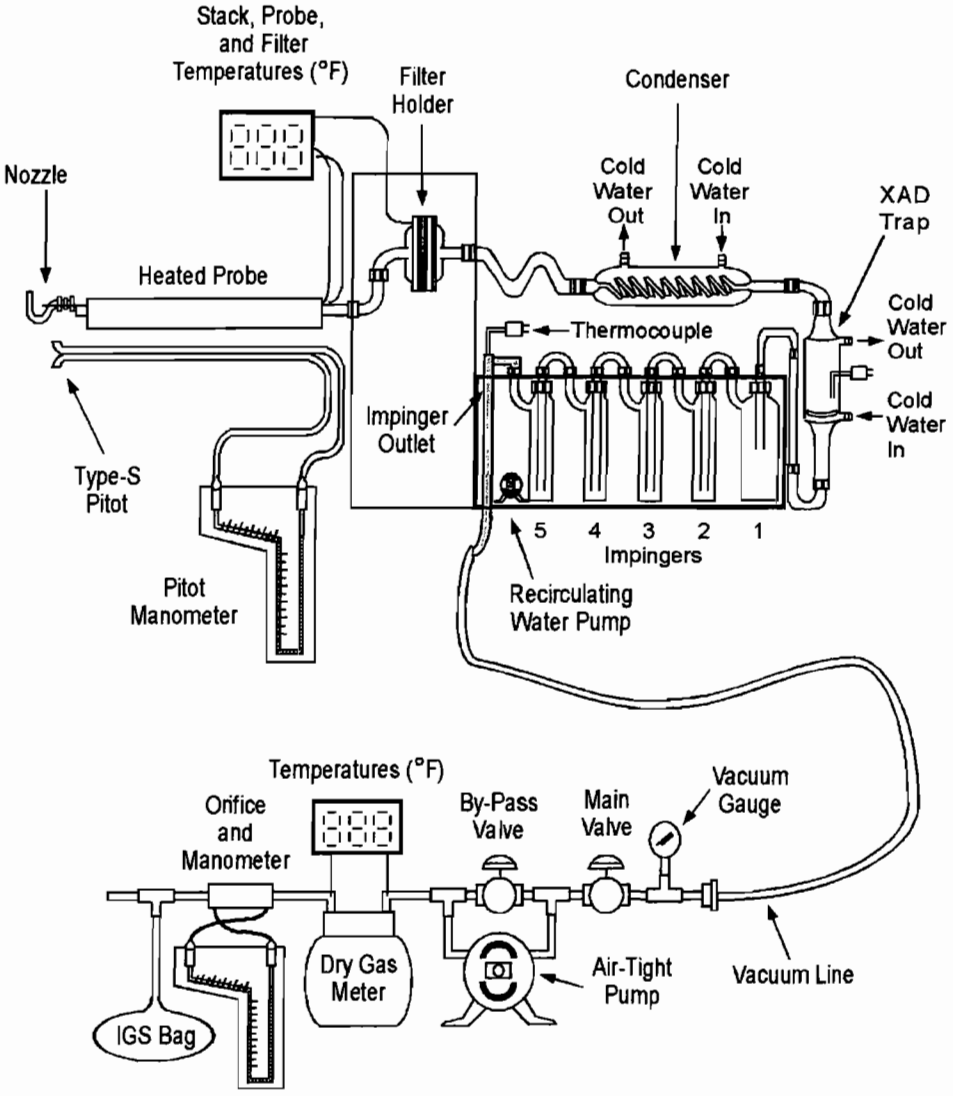
Source Location Name(s)	Unit 3 FF Outlet
Pollutant(s) to be Determined	Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans (PCDD/PCDF)
Other Parameters to be Determined from Train	Gas Density, Moisture, Flow Rate

	Standard Method Specification	Actual Specification Used
Pollutant Sampling Information		
Duration of Run	N/A	250 minutes
No. of Sample Traverse Points	N/A	25
Sample Time per Point	N/A	10 minutes
Sampling Rate	Isokinetic (90-110%)	Isokinetic (90-110%)
Sampling Probe		
Nozzle Material	Nickel, Quartz, Stainless Steel or Glass	Borosilicate Glass
Nozzle Design	Button-Hook or Elbow	Button-Hook
Probe Liner Material	Borosilicate or Quartz Glass	Borosilicate Glass
Effective Probe Length	N/A	8 feet
Probe Temperature Set-Point	248°F±25°F	248°F±25°F
Velocity Measuring Equipment		
Pitot Tube Design	Type S	Type S
Pitot Tube Coefficient	N/A	0.84
Pitot Tube Calibration by	Geometric or Wind Tunnel	Geometric
Pitot Tube Attachment	Attached to Probe	Attached to Probe
Metering System Console		
Meter Type	Dry Gas Meter	Dry Gas Meter
Meter Accuracy	±2%	±1%
Meter Resolution	N/A	0.01 cubic feet
Meter Size	N/A	0.1 dcf/revolution
Meter Calibrated Against	Wet Test Meter or Standard DGM	Wet Test Meter
Pump Type	N/A	Rotary Vane
Temperature Measurements	N/A	Type K Thermocouple/Pyrometer
Temperature Resolution	5.4°F	1.0°F
ΔP Differential Pressure Gauge	Inclined Manometer or Equivalent	Inclined Manometer
ΔH Differential Pressure Gauge	Inclined Manometer or Equivalent	Inclined Manometer
Barometer	Mercury or Aneroid	Digital Barometer calibrated w/Mercury Aneroid
Filter Description		
Filter Location	After Probe	Exit of Probe
Filter Holder Material	Borosilicate Glass	Borosilicate Glass
Filter Support Material	Glass Frit	Teflon
Cyclone Material	N/A	None
Filter Heater Set-Point	248°F±25°F	248°F±25°F
Filter Material	Glass Fiber - Toluene Extracted	Glass Fiber - Toluene Extracted
Other Components		
Adsorbent Module	XAD-2 Trap	XAD-II Adsorbent Trap
Location	After filter and condenser	After filter and condenser
Operating Temperature	< 68°F	<68°F

Specification Sheet for EPA Method 23

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

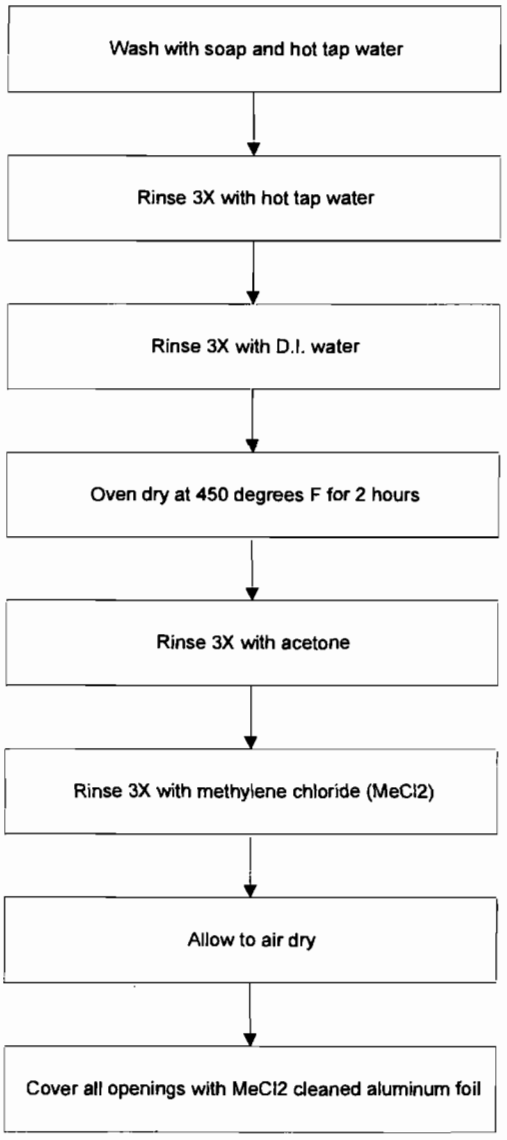
EPA Method 23
Sampling Train Configuration



Impinger Contents

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

EPA Method 23
Glassware Preparation Procedures



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)

Container 1
Glass fiber MeCl2 extracted filter
250 ml Glass

Remove with tweezers to plastic container. Remove any particulate or filter fiber into sample container.

Visual Inspection

Container 4
Impinger water
1000 ml Glass

Measure and record weight

Transfer to sample container, label, mark liquid volume and seal

Archive

XAD-II Resin Adsorbent Module

Measure and record weight

Tightly cap both ends, label and cover with aluminum foil

Store at ice temperature. Transport to laboratory with ice packs

Container 2
500 ml Glass

Probe liner, nozzle, cyclone bypass and filter holder

Brush/rinse each piece 3X with acetone

Z-piece, condenser and any other connecting lines to adsorbent module

Rinse each piece 3X with acetone

Visual Inspection

Label container and measure volume by weight

Container 3
250 ml Glass

Probe liner, nozzle, cyclone bypass and filter holder

Rinse each piece 3X with toluene

Z-piece, condenser and any other connecting lines to adsorbent module

Soak with 3 separate portions of toluene for 5 minutes each

Visual Inspection

Label container and measure volume by weight

Container 5
Filter Blank
250 ml Glass

Clean, unused filter

Container 6
Acetone Blank
250 ml Glass

200 ml of acetone from rinse bottle

Container 7
Toluene
250 ml Glass

100 ml of toluene from rinse bottle

Silica Gel

Measure volume by weight, note any change in color

Recycle silica gel

EPA Method 23
Analytical Flowchart

- Log each sample in shipment and verify against chain-of-custody sheet
- Note liquid levels in the sample containers and confirm on the chain-of-custody sheet condition
- All samples must be extracted within 30 days of collection
- All samples must be analyzed within 45 days of extraction
- All laboratory glassware must be cleaned as described in Section 3A of the "Manual of Analytical Methods for the Analysis of Pesticides"

Container 1
Glass fiber filter

Transfer to extraction thimble

XAD-II Resin Absorbent Module

Transfer to extraction thimble

Container 2
acetone/methylene chloride (MeCl2)

Concentrate sample to volume of 1 to 5 ml and add to extraction thimble

Container 3
Toluene

Add internal standard solution and concentrate to 1 - 5 ml

Dissolve sample in 5 ml of hexane and analyze by GC/MS

Add internal standard solution

Place thimble in extractor and extract for 16 hours

Concentrate to approximately 10 ml (split sample into two 5 ml portions for future use, optional)

Dissolve sample in 5 ml of hexane and analyze by gas chromatography coupled to a mass spectrometer (GC/MS)
DB-5 capillary column

If tetra-chlorinated dibenzofurans are detected, analyze separate aliquot using DB-225 capillary column

Containers 5, 6, 7, 8
Reagent blanks

Glass fiber filter
acetone
MeCl2
toluene
XAD-II Resin

Analysis by GC/MS, DB-5 capillary column

If tetra-chlorinated dibenzofurans are detected, analyze separate aliquot using DB-225 capillary column

Audit Sample

Audit samples must be analyzed subject to availability

Specification Sheet for EPA Method 26A (modified)

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

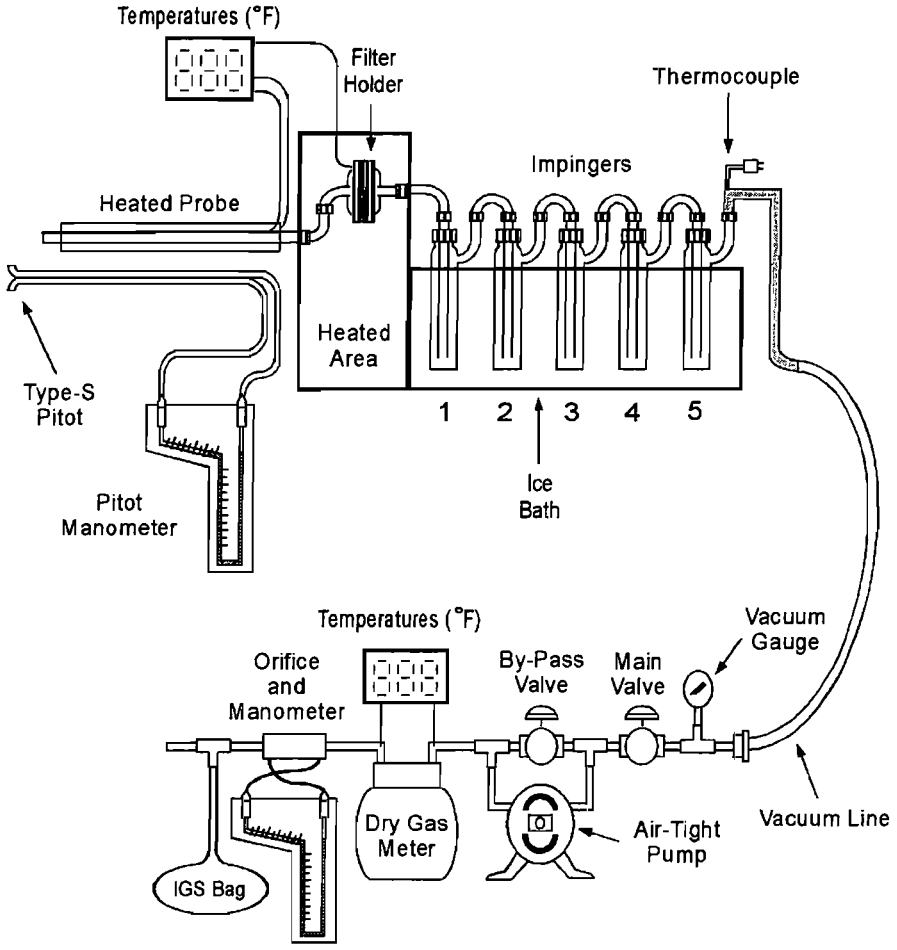
Source Location Name(s)	Units 1-3 SDA Inlets and Units 1-3 FF Outlets
Pollutant(s) to be Determined	Hydrogen Chloride (HCl)
Other Parameters to be Determined from Train	Gas Density, Moisture

	Standard Method Specification	Actual Specification Used
Pollutant Sampling Information		
Duration of Run	N/A	60 minutes
No. of Sample Traverse Points	N/A	1
Sample Time per Point	N/A	60 minutes
Sampling Rate	Constant Rate (±10%)	Constant Rate (±10%)
Sampling Probe		
Nozzle Material	N/A	None
Nozzle Design	N/A	N/A
Probe Liner Material	Borosilicate Glass	Borosilicate Glass
Effective Probe Length	N/A	5 feet
Probe Temperature Set-Point	>248°F	350°F @ Inlet, Stack Temp @ FF Outlet
Velocity Measuring Equipment		
Pitot Tube Design	None	None
Pitot Tube Coefficient	N/A	N/A
Pitot Tube Calibration by	N/A	N/A
Pitot Tube Attachment	N/A	N/A
Metering System Console		
Meter Type	Dry Gas Meter or Critical Orifice	Dry Gas Meter
Meter Accuracy	±2%	±1%
Meter Resolution	N/A	0.01 cubic feet
Meter Size	2 liters/minute	0.1 dcf/revolution
Meter Calibrated Against	Wet Test Meter	Wet Test Meter
Pump Type	Diaphragm or equivalent	Rotary Vane
Temperature Measurements	Dial Thermometer or equivalent	Type K Thermocouple/Pyrometer
Temperature Resolution	2°F-5.4°F	1.0°F
ΔP Differential Pressure Gauge	N/A	N/A
ΔH Differential Pressure Gauge	N/A	Inclined Manometer
Barometer	Mercury, aneroid or other.	Digital Barometer calibrated w/Mercury Aneroid
Filter Description		
Filter Location	After Probe	Exit of Probe
Filter Holder Material	Teflon or Quartz	Borosilicate Glass
Filter Support Material	Teflon Frit	Teflon
Cyclone Material	N/A	None
Filter Heater Set-Point	>248°F	350°F @ Inlet, Stack Temp @ FF Outlet
Filter Material	Teflon/Glass Mat (Quartz, Optional High Temp>410F)	Quartz Fiber @ Inlet, Teflon on Glass @ Outlet
Other Components		
Description	N/A	N/A
Location	N/A	N/A
Operating Temperature	N/A	N/A

Specification Sheet for EPA Method 26A (modified)

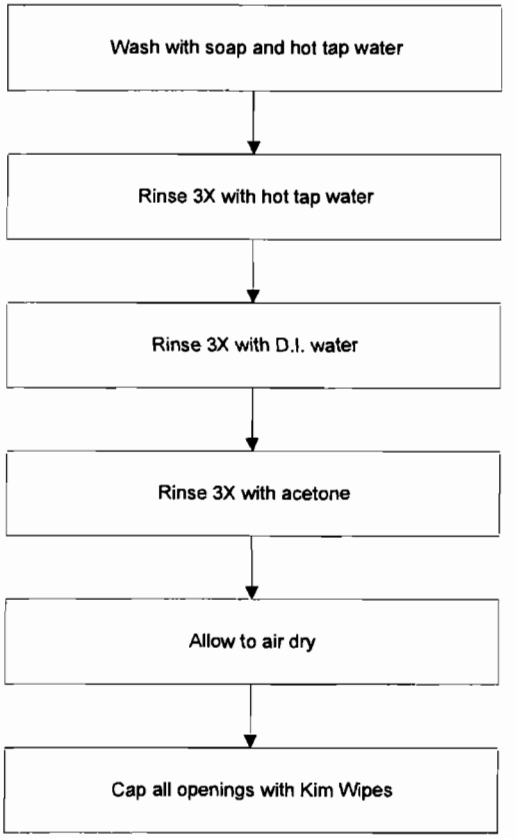
	Standard Method Specification	Actual Specification Used
Impinger Train Description		
Type of Glassware Connections	Ground Glass or Equivalent	Screw Joint with Silicone Gasket
Connection to Probe or Filter by	Direct Glass Connection	Direct Glass Connection
Number of Impingers	5 or 6 (Midget Impingers)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

Modified EPA Method 26A
Sampling Train Configuration



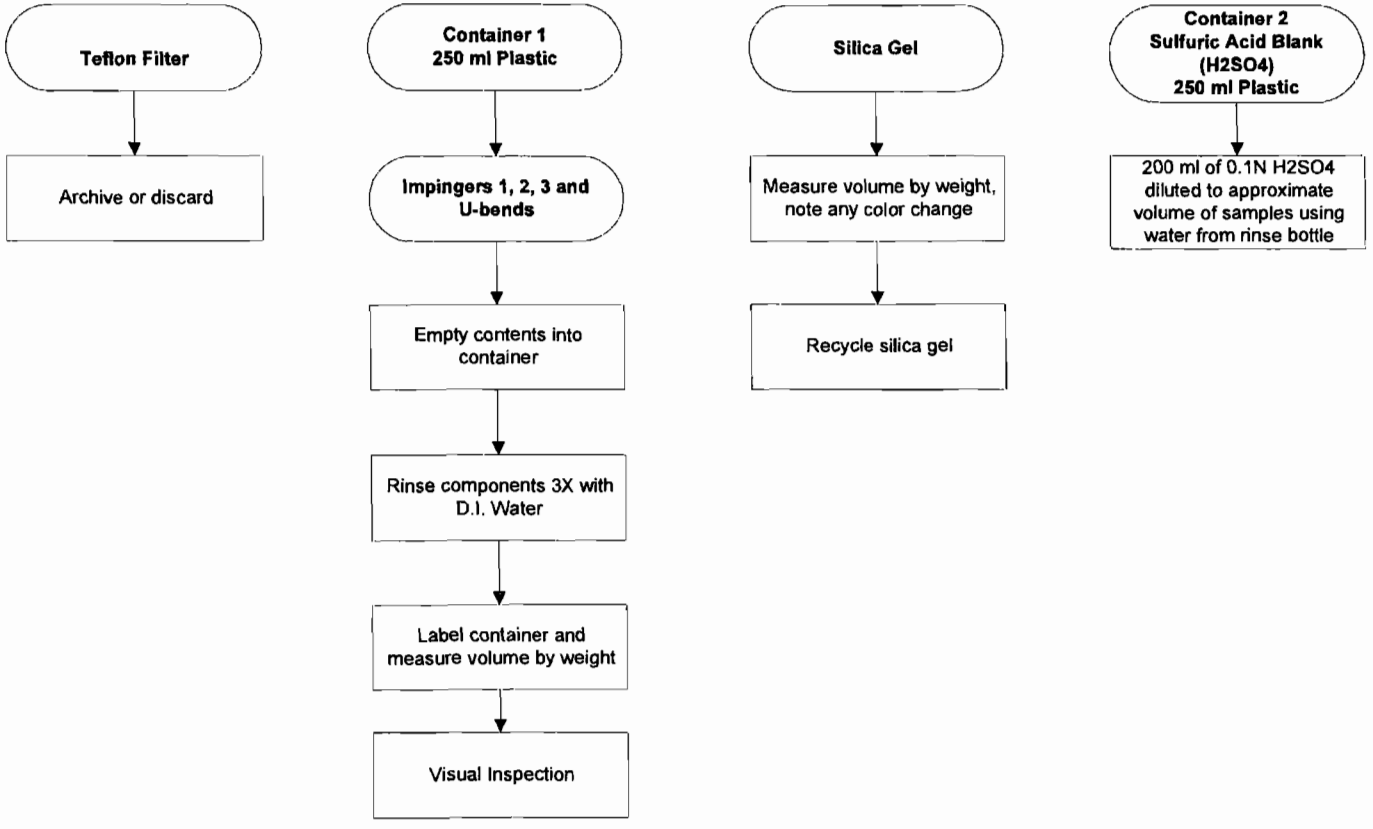
Impinger Contents	
Impinger 1	50 ml 0.1 N H_2SO_4
Impinger 2	100 ml 0.1 N H_2SO_4
Impinger 3	100 ml 0.1 N H_2SO_4
Impinger 4	Empty
Impinger 5	Silica Gel

EPA Method 26A
Glassware Preparation Procedures



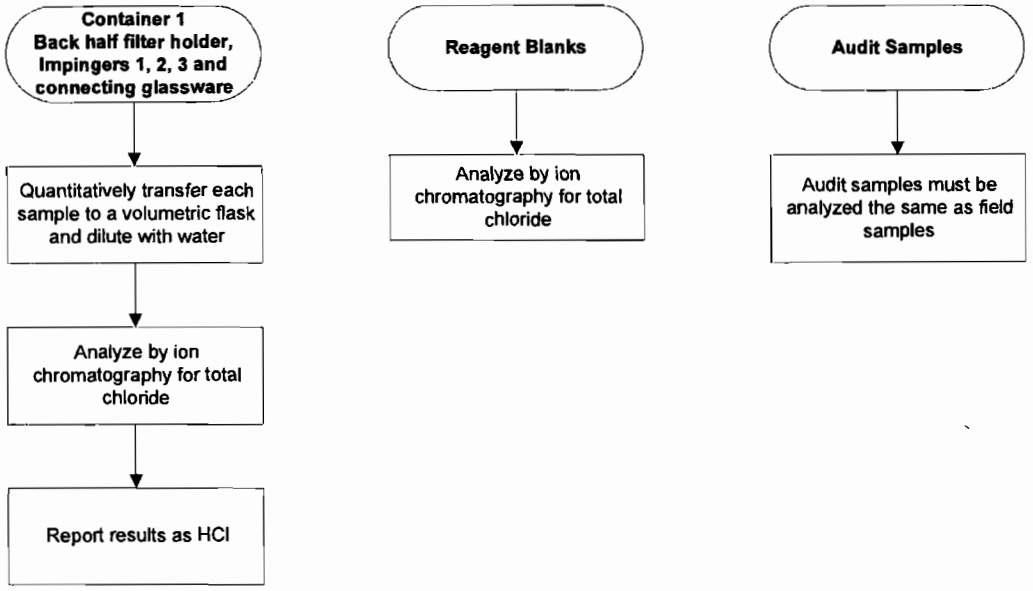
EPA Method 26
Sample Recovery Flowchart
(without Cl2)
(Modified)

- 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)

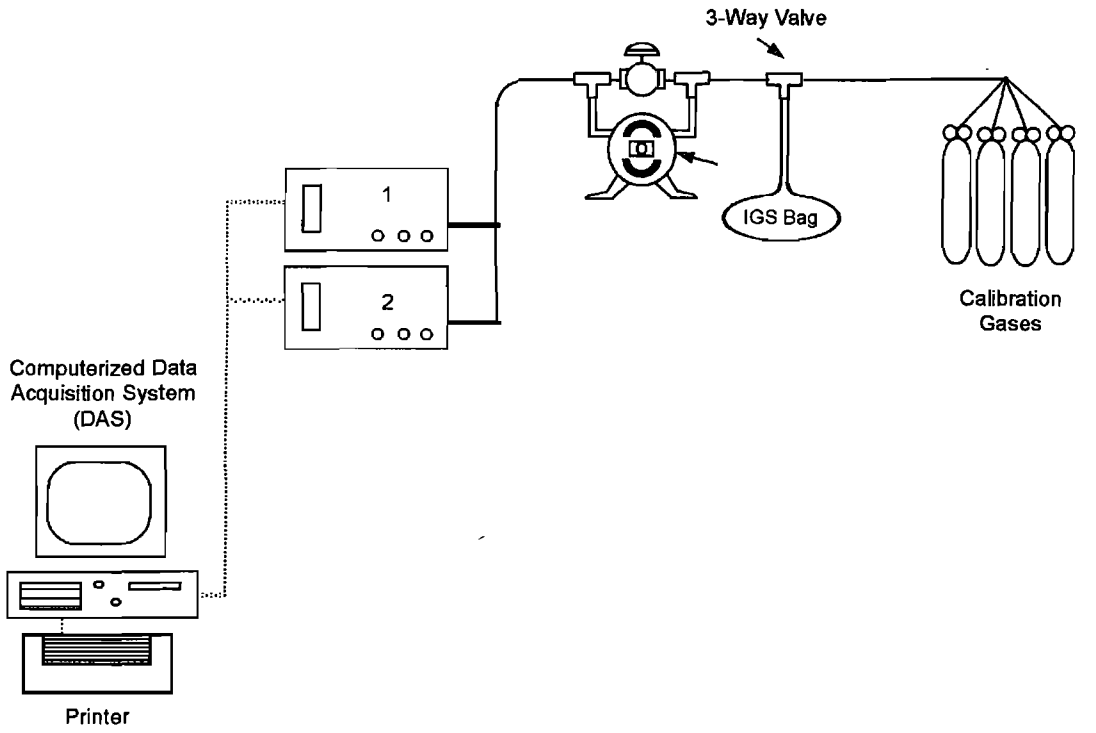


EPA Method 26
Analytical Flowchart
(without Cl2)
(Modified)

- 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



EPA Method 3A
IGS Bag Analysis
Sampling Configuration



Number	Gas	Monitor	Range Used	Calibration Gas Concentrations
1	O2	Servomex 1420 C	0-14.02	0, 5.986, 14.02
2	CO2	Servomex 1415 C	0-14.03	0, 6.058, 14.03

This Page Intentionally Left Blank

SAMPLE CALCULATIONS

B

This Page Intentionally Left Blank

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

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.

042208 124828
L

1. Volume of water collected (wscf)

$$V_{wstd} = (0.04707)(V_{lc})$$

Where:

V_{lc}	= total volume of liquid collected in impingers and silica gel (ml)	=	421.8	ml
0.04707	= ideal gas conversion factor (ft^3 water vapor/ml or gm)	=	0.04707	ft^3/ml
V_{wstd}	= volume of water vapor collected at standard conditions (ft^3)	=	19.85	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)	=	30.25	in. Hg
T_m	= average dry gas meter temperature (°F)	=	67.20	°F
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	75.91	dcf
Y_d	= gas meter correction factor (dimensionless)	=	0.9937	
ΔH	= average pressure drop across meter box orifice (in. H_2O)	=	1.34	in. H_2O
17.64	= standard temperature to pressure ratio (°R/in. Hg)	=	17.64	°R/in. Hg
13.6	= conversion factor (in. H_2O/in. Hg)	=	13.6	in.H_2O/in. Hg
460	= °F to °R conversion constant	=	460	
V_{mstd}	= volume of gas sampled through the dry gas meter at standard conditions (dscf)	=	76.598	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)	=	30.25	in. Hg
P_g	= sample gas static pressure (in. H_2O)	=	-11.30	in. H_2O
13.6	= conversion factor (in. H_2O/in. Hg)	=	13.6	in. H_2O/in. Hg
P_s	= absolute sample gas pressure (in. Hg)	=	29.42	in. Hg

QA/QC _____
Date _____

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

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

Where:

T_s	= average sample gas temperature (°F)	=	301.72	°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)	=	29.42	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)	=	29.42	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.42	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)	=	76.598	dscf
V_{wstd}	= volume of water collected at standard conditions (scf)	=	19.85	scf
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2058	
		=	20.58	%

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

7. Saturated moisture content (% by volume)

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

Where:

P_s	= absolute sample gas pressure (in. Hg)	=	29.42	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.42	in. Hg
B_{ws}	= proportion of water vapor in the gas stream by volume at saturated conditions		1.0000	
		=	100.00	%

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

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

Where:

B_{ws}	= proportion of water vapor in the gas stream by volume at saturated conditions	=	1.0000	
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2058	
B_w	= actual water vapor in gas	=	0.2058	
		=	20.58	%

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 (%)	=	10.3	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.1	%
100	= conversion factor (%)	=	100	%
N_2+CO	= proportion of nitrogen and CO in the gas stream by volume (%)	=	80.57	%

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

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

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

Where:

M_{CO2}	= molecular weight of carbon dioxide (lb/lb·mole)	=	44.00	lb/lb·mole
M_{O2}	= molecular weight of oxygen (lb/lb·mole)	=	32.00	lb/lb·mole
M_{N2+CO}	= molecular weight of nitrogen and carbon monoxide (lb/lb·mole)	=	28.00	lb/lb·mole
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	10.3	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.1	%
N_2+CO	= proportion of nitrogen and CO in the gas stream by volume (%)	=	80.6	%
100	= conversion factor (%)	=	100	%
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	30.01	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	=	0.2058	
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	30.01	lb/lb·mole
M_{H2O}	= molecular weight of water (lb/lb·mole)	=	18.00	lb/lb·mole
M_s	= molecular weight of sample gas, wet basis (lb/lb·mole)	=	27.54	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	=	0.84	
M_s	= wet molecular weight of sample gas, wet basis (lb/lb·mole)	=	27.54	lb/lb·mole
P_s	= absolute sample gas pressure (in. Hg)	=	29.42	in. Hg
T_s	= average sample gas temperature (°F)	=	301.72	°F
√ΔP	= average square roots of velocity heads of sample gas (in. H_2O)	=	0.688	√in. H_2O
460	= °F to °R conversion constant	=	460	
V_s	= sample gas velocity (ft/sec)	=	47.89	ft/sec

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

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)	=	47.89	ft/sec
60	conversion factor (sec/min)	=	60	sec/min
Q_a	= volumetric flow rate at actual conditions (acfm)	=	183,901	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)	=	183,901	acfm
P_s	= absolute sample gas pressure (in. Hg)	=	29.42	in. Hg
29.92	= standard pressure (in. Hg)	=	29.92	in. Hg
T_s	= average sample gas temperature (°F)	=	301.7	°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)	=	125,340	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	=	0.2058	
Q_s	= volumetric flow rate at standard conditions, wet basis (scfm)	=	125,340	scfm
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	99,540	dscfm

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

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

Where:

Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	99,540	dscfm
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
7	= oxygen content of corrected gas (%)	=	7.0	%
Q_{std7}	= volumetric flow rate at STP and 7%O_2, dry basis (dscfm)	=	84,215	dscfm

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

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)	=	99,540	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
Q_{std-hr}	= volumetric flow rate, hourly basis (dscf/hr)	=	5,972,389	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)	=	99,540	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)	=	169,142	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)	=	169,142	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)	=	157,609	dry Nm^3/hr

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

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)	=	0.269	in.
B_w	= proportion of water vapor in the gas stream by volume	=	0.2058	
P_s	= absolute sample gas pressure (in. Hg)	=	29.42	in. Hg
T_s	= average sample gas temperature (°F)	=	301.7	°F
V_{mstd}	= volume of gas sample through the dry gas meter at standard conditions (dscf)	=	76.598	dscf
V_s	= sample gas velocity (ft/sec)	=	47.89	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 (%)	=	99.89	%

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)	=	125	min
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	75.91	dcf
T_m	= average dry gas meter temperature (°F)	=	67.20	°F
$\Delta H_@$	= dry gas meter orifice coefficient	=	1.9150	
P_{bar}	= barometric pressure (in. Hg)	=	30.25	in. Hg
ΔH	= average pressure drop across meter box orifice (in. H_2O)	=	1.344	in. H_2O
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	30.01	lb/lb·mole
$\sqrt{\Delta H_{avg}}$	= average of square root of pressure drop across meter orifice	=	1.155	√in. H_2O
0.0319	= conversion constant	=	0.0319	
28.96	= molecular weight of ambient air (lb/lb-mole)	=	28.96	lb/lb-mole
13.6	= conversion factor (in. H_2O/in. Hg)	=	13.6	in.H_2O/in. Hg
460	= °F to °R conversion constant	=	460	
Y_{qa}	= alternative Method 5 post-test meter calibration factor	=	1.0054	

QA/QC _____
Date _____

USEPA Method 5/29
Filterable Particulate Gravimetric Analysis 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.

042208 125000
N

1. Total residue from gravimetric analysis of filters (g)

$$m_{fr} = \sum_{i=1}^{n} m_{fi}$$

Where:

m_{f1}	= residual mass of filter "1" from gravimetric analysis (g)	=	<0.00030	g
m_{f2}	= residual mass of filter "2" from gravimetric analysis (g)	=	0.00000	g
m_{f3}	= residual mass of filter "3" from gravimetric analysis (g)	=	0.00000	g
m_{f4}	= residual mass of filter "4" from gravimetric analysis (g)	=	0.00000	g
m_{fr}	= total filter residue from gravimetric analysis (g)	=	<0.00030	g

2. Total particulate collected on filters (g)

$$m_{filter} = m_{fr} \text{ if } m_{fr} \geq 0$$
$$m_{filter} = 0 \quad \text{if } m_{fr} < 0$$

Where:

m_{fr}	= total filter residue from gravimetric analysis (g)	=	<0.00030	g
m_{filter}	= total particulate collected on filters (g)	=	<0.00030	g

3. Solvent rinse - sample residue mass (g)

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

Where:

			Acetone	
r_{ai}	= aliquot residue mass for solvent "i" (g)	=	0.00468	g
v_{si}	= sample liquid volume for solvent rinse "i" (ml)	=	85.0	ml
v_{ai}	= aliquot liquid volume for solvent rinse "i" (ml)	=	85.0	ml
r_{si}	= solvent rinse "i" - sample residue mass (g)	=	0.00468	g

4. Solvent rinse - blank residue (g)

$$m_{i-blank} = r_{ai-blank} \text{ if } r_{ai-blank} \geq 0$$
$$m_{i-blank} = 0 \quad \text{if } r_{ai-blank} < 0$$

Where:

			Acetone	
$r_{ai\text{-}blank}$	= blank residue for solvent "i" from gravimetric analysis (g)	=	<0.00106	g
$m_{i\text{-}blank}$	= solvent rinse - blank residue (g)	=	0.00000	g

QA/QC _____
Date _____

5. Solvent rinse - maximum allowable blank correction (g)

$$m_{bi} = MINIMUM\left[\left(\frac{(m_{i-blank})(v_{si})}{v_{ai-blank}}\right) \; or \; (0.00001)(\rho_i)(v_{si}) \; or \; (r_{si})\right] \text{ if } r_{si} \geq 0$$

$$m_{bi} = 0 \quad \text{if } r_{si} < 0$$

Where:			Acetone	
$m_{i\text{-blank}}$	= solvent rinse - blank residue (g)	=	0.00000	g
v_{si}	= sample liquid volume for solvent rinse "i" (ml)	=	85.0	ml
$v_{ai\text{-blank}}$	= blank liquid volume for solvent rinse "i" (ml)	=	200.0	ml
0.00001	= EPA M5 fraction of total rinse that can be subtracted (g)	=	0.00001	g
ρ_i	= density of solvent rinse "i" (g/ml)	=	0.7845	g/ml
r_{si}	= solvent rinse "i" - sample residue mass (g)	=	0.00468	g
m_{bi}	= solvent rinse "i" - maximum allowable blank correction (g)	=	0.00000	g

6. Solvent rinse - net residue (g)

$$m_i = (r_{si} - m_{bi}) \text{ if } r_{si} \geq m_{bi}$$

$$m_i = 0 \quad \text{if } r_{si} < m_{bi}$$

Where:			Acetone	
r_{si}	= solvent rinse "i" - sample residue mass (g)	=	0.00468	g
m_{bi}	= solvent rinse "i" - maximum allowable blank correction (g)	=	0.00000	g
m_i	= solvent rinse "i" - net residue (g)	=	0.00468	g

7. Total solvent residue - (g)

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

Where:				
m_1	= solvent rinse "1" - net residue (g)	=	0.00468	g
m_2	= solvent rinse "2" - net residue (g)	=	N/A	g
m_3	= solvent rinse "3" - net residue (g)	=	N/A	g
m_s	= total solvent residue (g)	=	0.00468	g

8. Total gravimetric result (g)

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

Where:				
m_{filter}	= total particulate collected on filters (g)	=	<0.00030	g
m_s	= total solvent residue (g)	=	0.00468	g
m_T	= total gravimetric result (g)	=	0.00498	g

QA/QC _____
Date _____

9. Total gravimetric detection limit (g)

$$m_D = (MDL_{filter})(n_f) + (MDL_{rinse})(n_r)$$

Where:

MDL_{filter}	= minimum detection limit for single filter analysis (g)	=	0.00030	g
n_f	= number of filters in analysis	=	1	
MDL_{rinse}	= minimum detection limit for single rinse analysis (g)	=	0.00106	g
n_r	= number of rinses in analysis	=	1	
m_D	= total gravimetric detection limit (g)	=	0.00136	g

10. Total particulate matter (g)

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

Where:

m_T	= total gravimetric result (g)	=	0.00498	g
m_D	= total gravimetric detection limit (g)	=	0.00136	g
m_n	= total particulate matter (g)	=	0.00498	g

QA/QC _____
Date _____

USEPA Method 5/29
Filterable Particulate 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.

042208 125023
L_N

1. Particulate concentration (lb/dscf)

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

Where:

m_n	= total particulate matter (g)	=	0.00498	g
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
C_{sd}	= particulate concentration (lb/dscf)	=	1.4336E-07	lb/dscf

2. Particulate concentration (gr/dscf)

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

Where:

m_n	= total particulate matter (g)	=	0.00498	g
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
15.43	= conversion factor (gr/g)	=	15.43	gr/g
C_{sd}	= particulate concentration (gr/dscf)	=	0.00100	gr/dscf

3. Particulate concentration (mg/dscm)

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

Where:

m_n	= total particulate matter (g)	=	0.00498	g
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
1,000	= conversion factor (mg/g)	=	1,000	mg/g
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= particulate concentration (mg/dscm)	=	2.29566	mg/dscm

QA/QC _____
Date _____

4. Particulate concentration (mg/Nm^3 dry)

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

Where:

m_n	= total particulate matter (g)	=	0.00498	g
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
1,000	= conversion factor (mg/g)	=	1,000	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}	= particulate concentration (mg/Nm^3 dry)	=	2.46364	mg/Nm^3 dry

5. Particulate concentration corrected to x% O_2 (gr/dscf example)

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

Where:

C_{sd}	= particulate concentration (gr/dscf)	=	0.00100	gr/dscf
x	= oxygen content of corrected gas (%)	=	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
C_{sdx}	= particulate concentration corrected to x%O_2 (gr/dscf)	=	0.00119	gr/dscf @ x%O_2

6. Particulate concentration corrected to y% CO_2 (gr/dscf example)

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

Where:

C_{sd}	= particulate concentration (gr/dscf)	=	0.00100	gr/dscf
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	10.3	%
C_{sdy}	= particulate concentration corrected to y%CO_2 (gr/dscf)	=	0.00117	gr/dscf @ y%CO_2

7. Particulate concentration at actual gas conditions (gr/acf example)

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

Where:

C_{sd}	= particulate concentration (gr/dscf)	=	0.00100	gr/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	99,540	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	=	183,901	acfm
C_a	= particulate concentration at actual gas conditions (gr/acf)	=	0.00054	gr/acf

QA/QC _____
Date _____

8. Particulate 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 particulate matter (g)	=	0.00498	g
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	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)	=	99,540	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
$E_{lb/hr}$	= particulate rate (lb/hr)	=	0.8562	lb/hr

9. Particulate rate (kg/hr)

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

Where:

m_n	= total particulate matter (g)	=	0.00498	g
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	99,540	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
1,000	= conversion factor (g/kg)	=	1,000	g/kg
$E_{kg/hr}$	= particulate rate (kg/hr)	=	0.3883	kg/hr

10. Particulate 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 particulate matter (g)	=	0.00498	g
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	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)	=	99,540	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
Cap	= capacity factor for process (hours operated/year)	=	8,760	hours/yr
2,000	= conversion factor (lb/Ton)	=	2,000	lb/Ton
$E_{T/yr}$	= particulate rate (Ton/yr)	=	3.7501	Ton/yr

QA/QC _____
Date _____

11. Particulate rate - F_d-based (lb/MMBtu)

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

Where:

m_n	= total particulate matter (g)	=	0.00498	g
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	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 (%)	=	9.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= particulate rate - F_d - based (lb/MMBtu)	=	0.00244	lb/MMBtu

12. Particulate rate - F_c-based (lb/MMBtu)

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

Where:

m_n	= total particulate matter (g)	=	0.00498	g
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
F_c	= ratio of gas volume to heat content of fuel (dscf/MMBtu)	=	1,820	dscf/MMBtu
CO_2	= proportion of oxygen in the gas stream by volume (%)	=	10.3	%
100	= conversion factor	=	100	
E_{Fc}	= particulate rate - F_c - based (lb/MMBtu)	=	0.00254	lb/MMBtu

QA/QC _____
Date _____

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	$m_{Total-B}$ = Sum D, 1-5	$m_{Total-B}$ = Sum D	$m_{Total-B}$ = < Sum ND
ND=1x	$m_{Total-B}$ = Sum D, 1-5	$m_{Total-B}$ = Sum D	$m_{Total-B}$ = < Sum ND
ND=0.5x	$m_{Total-B}$ = Sum D, 1-5	$m_{Total-B}$ = Sum D	$m_{Total-B}$ = < 0.5 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	$m_{Total-S}$ = Sum D, 1-5	$m_{Total-S}$ = Sum D	$m_{Total-S}$ = < Sum ND
ND=1x	$m_{Total-S}$ = Sum D, 1-5	$m_{Total-S}$ = < [Sum D + Sum ND]	$m_{Total-S}$ = < Sum ND
ND=0.5x	$m_{Total-S}$ = Sum D, 1-5	$m_{Total-S}$ = < [SumD+0.5 SumND]	$m_{Total-S}$ = < 0.5 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	$m_{T-B-allow}$ = M29 Rule	$m_{T-B-allow}$ = M29 Rule*	$m_{T-B-allow}$ = 0	$m_{T-B-allow}$ = 0
ND=1x	$m_{T-B-allow}$ = M29 Rule	$m_{T-B-allow}$ = M29 Rule*	$m_{T-B-allow}$ = 0	$m_{T-B-allow}$ = 0
ND=0.5x	$m_{T-B-allow}$ = M29 Rule	$m_{T-B-allow}$ = 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. $m_{Total-S} - m_{T-B-allow} \geq$ MIN(MDL)	CASE 2 1 to 4 sample fractions are ND $m_{Total-S} - m_{T-B-allow} \geq$ MIN(MDL)	CASE 3 All 5 fractions are ND $m_{Total-S}$ and $m_{T-B-allow}$ anything	CASE 4 Any type of fractions $m_{Total-S} - m_{T-B-allow} <$ MIN(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 = < MIN[MDL]
ND=1x	$m_n = m_{Total-S} - m_{T-B-allow}$	m_n = < [$m_{Total-S} - m_{T-B-allow}$]	m_n = < $m_{Total-S}$	m_n = < MIN[MDL]
ND=0.5x	$m_n = m_{Total-S} - m_{T-B-allow}$	m_n = < [$m_{Total-S} - m_{T-B-allow}$]	m_n = < $m_{Total-S}$	m_n = < MIN[MDL]

Definitions and Notes

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

USEPA Method 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.

042208 125042
0

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	=	28.6714	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	=	28.6714	µg

3. Allowable blank correction (µg)

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

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

Where:

$m_{total-B}$	= total amount of mercury in blank	=	<1.4000	µg
$m_{total-S}$	= total amount of mercury in sample	=	28.6714	µg
0.05 x $m_{total-S}$	= 5% of $m_{total-S}$	=	1.4336	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.

QA/QC _____
Date _____

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	=	28.6714	µg
$m_{T-B-allow}$	= total allowable blank correction	=	0.0000	µg
m_n	= total mercury in sample corrected for allowable blank	=	28.6714	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	=	28.6714	µg
m_{1b-S}	= mercury amount in sample for Fraction 1b	=	<0.1000	µg
m_{2b-S}	= mercury amount in sample for Fraction 2b	=	28.6714	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	=	28.6714	µg
m_{n-1b}	= mercury corrected for blank - prorated for Fraction 1b	=	<0.1000	µg
m_{n-2b}	= mercury corrected for blank - prorated for Fraction 2b	=	28.6714	µg
m_{n-3a}	= mercury corrected for blank - prorated for Fraction 3a	=	<0.2000	µg
m_{n-3b}	= mercury corrected for blank - prorated for Fraction 3b	=	<0.5000	µg
m_{n-3c}	= mercury corrected for blank - prorated for Fraction 3c	=	<0.4000	µg

QA/QC _____
Date _____

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.

042208 125123
L_O

1. Mercury concentration (lb/dscf)

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

Where:

m_n	= mercury collected in sample (total µg)	=	28.6714	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
C_{sd}	= mercury concentration (lb/dscf)	=	8.2535E-10	lb/dscf

2. Mercury concentration (µg/dscm)

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

Where:

m_n	= mercury collected in sample (total µg)	=	28.6714	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= mercury concentration (µg/dscm)	=	1.3217E+01	µg/dscm

3. Mercury concentration (mg/dscm)

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

Where:

m_n	= mercury collected in sample (total µg)	=	28.6714	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
1000	= conversion factor (µg/mg)	=	1000	µg/mg
C_{sd}	= mercury concentration (mg/dscm)	=	1.3217E-02	mg/dscm

QA/QC _____
Date _____

4. Mercury concentration (µg/Nm3 dry)

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

Where:

m_n	= mercury collected in sample (total µg)	=	28.6714	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
68	= standard temperature (°F)	=	68	°F
32	= normal temperature (°F)	=	32	°F
460	= °F to °R conversion constant	=	460	
C_{sd}	= mercury concentration (µg/Nm3 dry)	=	1.4184E+01	µg/Nm^3 dry

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

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

Where:

C_{sd}	= mercury concentration (lb/dscf)	=	8.2535E-10	lb/dscf
x	= oxygen content of corrected gas (%)	=	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
C_{sdx}	= mercury concentration corrected to x% oxygen (lb/dscf)	=	9.7554E-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)	=	8.2535E-10	lb/dscf
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	10.3	%
C_{sdy}	= mercury conc. corrected to y% carbon dioxide (lb/dscf)	=	9.6288E-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)	=	8.2535E-10	lb/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	99,540	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	=	183,901	acfm
C_a	= mercury concentration at actual gas conditions (lb/acf)	=	4.4674E-10	lb/acf

QA/QC _____
Date _____

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)	=	28.6714	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	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)	=	99,540	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
$E_{lb/hr}$	= mercury emission rate (lb/hr)	=	4.9293E-03	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)	=	28.6714	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	99,540	dscfm
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
60	= conversion factor (sec/min)	=	60	sec/min
$E_{g/s}$	= mercury emission rate (g/s)	=	6.2098E-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)	=	28.6714	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	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)	=	99,540	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
Cap	= capacity factor for process (hours operated/year)	=	8,760	hours/yr
2000	= conversion factor (lb/Ton)	=	2000	lb/Ton
$E_{T/yr}$	= mercury emission rate (Ton/yr)	=	2.1590E-02	Ton/yr

QA/QC _____
Date _____

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)	=	28.6714	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	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 (%)	=	9.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= mercury emission rate - Fd-based (lb/MMBtu)	=	1.4037E-05	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)	=	28.6714	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
F_c	= ratio of gas volume to heat content of fuel (dscf/MMBtu)	=	1,820	dscf/MMBtu
CO_2	= proportion of oxygen in the gas stream by volume (%)	=	10.3	%
100	= conversion factor	=	100	
E_{Fc}	= mercury emission rate - Fc-based (lb/MMBtu)	=	1.4604E-05	lb/MMBtu

QA/QC _____
Date _____

LOGIC FOR TREATING DETECTION LIMITS

(all metals except mercury)

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

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

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

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

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

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

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

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

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

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

Definitions and Notes

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

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.

042208 125123
L

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

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

Where:

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

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

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

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

QA/QC _____
Date _____

USEPA Method 5/29
Beryllium Sample Calculations

Sample data taken from Run 1

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

042208 125154
L_L

1. Beryllium concentration (lb/dscf)

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

Where:

m_n	= beryllium collected in sample (total µg)	=	<0.0500	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	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)	=	<1.4393E-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)	=	76.5983	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= beryllium concentration (µg/dscm)	=	<2.3049E-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)	=	76.5983	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)	=	<2.3049E-05	mg/dscm

QA/QC _____
Date _____

4. Beryllium concentration (µg/Nm3 dry)

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

Where:

m_n	= beryllium collected in sample (total µg)	=	<0.0500	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	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}	= beryllium concentration (µg/Nm3 dry)	=	<2.4735E-02	µg/Nm^3 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)	=	<1.4393E-12	lb/dscf
x	= oxygen content of corrected gas (%)	=	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
C_{sdx}	= beryllium concentration corrected to x% oxygen (lb/dscf)	=	<1.7012E-12	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)	=	<1.4393E-12	lb/dscf
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	10.3	%
C_{sdy}	= beryllium conc. corrected to y% carbon dioxide (lb/dscf)	=	<1.6792E-12	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)	=	<1.4393E-12	lb/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	99,540	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	=	183,901	acfm
C_a	= beryllium concentration at actual gas conditions (lb/acf)	=	<7.7906E-13	lb/acf

QA/QC _____
Date _____

8. Beryllium emission rate (lb/hr)

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

Where:

m_n	= beryllium collected in sample (total µg)	=	<0.0500	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	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)	=	99,540	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
$E_{lb/hr}$	= beryllium emission rate (lb/hr)	=	<8.5962E-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)	=	76.5983	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	99,540	dscfm
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
60	= conversion factor (sec/min)	=	60	sec/min
$E_{g/s}$	= beryllium emission rate (g/s)	=	<1.0829E-06	g/s

10. Beryllium emission rate (Ton/yr)

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

Where:

m_n	= beryllium collected in sample (total µg)	=	<0.0500	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	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)	=	99,540	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)	=	<3.7651E-05	Ton/yr

QA/QC _____
Date _____

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)	=	76.5983	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 (%)	=	9.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= beryllium emission rate - Fd-based (lb/MMBtu)	=	<2.4480E-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)	=	76.5983	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
F_c	= ratio of gas volume to heat content of fuel (dscf/MMBtu)	=	1,820	dscf/MMBtu
CO_2	= proportion of oxygen in the gas stream by volume (%)	=	10.3	%
100	= conversion factor	=	100	
E_{Fc}	= beryllium emission rate - Fc-based (lb/MMBtu)	=	<2.5467E-08	lb/MMBtu

QA/QC _____
Date _____

USEPA Method 5/29
Cadmium Analyte Calculations

Sample data taken from Run 1

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

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

042208 125209
L

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

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

Where:

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

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

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

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

Where:

m_{FB}	= cadmium amount in combined front- and back-half blank	=	<0.2000	µg
m_{FS}	= cadmium amount in combined front- and back-half sample	=	<0.2000	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	=	<0.0100	µg
MAX	= arithmetic operator that returns the maximum of two values			
MIN	= arithmetic operator that returns the minimum of two values			
$m_{FB-allow}$	= allowable combined Cadmium blank correction	=	0.0000	µg

NOTE: In this case, the first criteria applies.

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

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

Where:

m_{FS}	= cadmium amount in combined front- and back-half sample	=	<0.2000	µg
$m_{FB-allow}$	= allowable combined cadmium blank correction	=	0.0000	µg
m_n	= blank-corrected cadmium in combined sample	=	<0.2000	µg

QA/QC _____
Date _____

USEPA Method 5/29
Cadmium Sample Calculations

Sample data taken from Run 1

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

042208 125220
L_L

1. Cadmium concentration (lb/dscf)

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

Where:

m_n	= cadmium collected in sample (total µg)	=	<0.2000	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
C_{sd}	= cadmium concentration (lb/dscf)	=	<5.7573E-12	lb/dscf

2. Cadmium concentration (µg/dscm)

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

Where:

m_n	= cadmium collected in sample (total µg)	=	<0.2000	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= cadmium concentration (µg/dscm)	=	<9.2195E-02	µg/dscm

3. Cadmium concentration (mg/dscm)

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

Where:

m_n	= cadmium collected in sample (total µg)	=	<0.2000	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
1000	= conversion factor (µg/mg)	=	1000	µg/mg
C_{sd}	= cadmium concentration (mg/dscm)	=	<9.2195E-05	mg/dscm

QA/QC _____
Date _____

4. Cadmium concentration (µg/Nm3 dry)

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

Where:

m_n	= cadmium collected in sample (total µg)	=	<0.2000	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
68	= standard temperature (°F)	=	68	°F
32	= normal temperature (°F)	=	32	°F
460	= °F to °R conversion constant	=	460	
C_{sd}	= cadmium concentration (µg/Nm3 dry)	=	<9.8941E-02	µg/Nm^3 dry

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

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

Where:

C_{sd}	= cadmium concentration (lb/dscf)	=	<5.7573E-12	lb/dscf
x	= oxygen content of corrected gas (%)	=	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
C_{sdx}	= cadmium concentration corrected to x% oxygen (lb/dscf)	=	<6.8050E-12	lb/dscf @ x%O_2

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

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

Where:

C_{sd}	= cadmium concentration (lb/dscf)	=	<5.7573E-12	lb/dscf
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	10.3	%
C_{sdy}	= cadmium conc. corrected to y% carbon dioxide (lb/dscf)	=	<6.7167E-12	lb/dscf @ y%CO_2

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

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

Where:

C_{sd}	= cadmium concentration (lb/dscf)	=	<5.7573E-12	lb/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	99,540	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	=	183,901	acfm
C_a	= cadmium concentration at actual gas conditions (lb/acf)	=	<3.1162E-12	lb/acf

QA/QC _____
Date _____

8. Cadmium emission rate (lb/hr)

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

Where:

m_n	= cadmium collected in sample (total µg)	=	<0.2000	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	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)	=	99,540	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
$E_{lb/hr}$	= cadmium emission rate (lb/hr)	=	<3.4385E-05	lb/hr

9. Cadmium emission rate (g/s)

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

Where:

m_n	= cadmium collected in sample (total µg)	=	<0.2000	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	99,540	dscfm
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
60	= conversion factor (sec/min)	=	60	sec/min
$E_{g/s}$	= cadmium emission rate (g/s)	=	<4.3317E-06	g/s

10. Cadmium emission rate (Ton/yr)

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

Where:

m_n	= cadmium collected in sample (total µg)	=	<0.2000	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	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)	=	99,540	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
Cap	= capacity factor for process (hours operated/year)	=	8,760	hours/yr
2000	= conversion factor (lb/Ton)	=	2000	lb/Ton
$E_{Ton/yr}$	= cadmium emission rate (Ton/yr)	=	<1.5061E-04	Ton/yr

QA/QC _____
Date _____

11. Cadmium 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	= cadmium collected in sample (total µg)	=	<0.2000	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	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 (%)	=	9.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= cadmium emission rate - Fd-based (lb/MMBtu)	=	<9.7920E-08	lb/MMBtu

12. Cadmium 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	= cadmium collected in sample (total µg)	=	<0.2000	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
F_c	= ratio of gas volume to heat content of fuel (dscf/MMBtu)	=	1,820	dscf/MMBtu
CO_2	= proportion of oxygen in the gas stream by volume (%)	=	10.3	%
100	= conversion factor	=	100	
E_{Fc}	= cadmium emission rate - Fc-based (lb/MMBtu)	=	<1.0187E-07	lb/MMBtu

QA/QC _____
Date _____

USEPA Method 5/29
Lead 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.

042208 125234
L

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

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

Where:

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

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

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

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

Where:

m_{FB}	= lead amount in combined front- and back-half blank	=	0.2661	µg
m_{FS}	= lead amount in combined front- and back-half sample	=	0.7734	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	=	0.0387	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 Lead blank correction	=	0.2661	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}	= lead amount in combined front- and back-half sample	=	0.7734	µg
$m_{FB-allow}$	= allowable combined lead blank correction	=	0.2661	µg
m_n	= blank-corrected lead in combined sample	=	0.5073	µg

QA/QC _____
Date _____

USEPA Method 5/29
Lead 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.

042208 125242

1. Lead concentration (lb/dscf)

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

Where:

m_n	= lead collected in sample (total µg)	=	0.5073	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	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}	= lead concentration (lb/dscf)	=	1.4604E-11	lb/dscf

2. Lead concentration (µg/dscm)

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

Where:

m_n	= lead collected in sample (total µg)	=	0.5073	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= lead concentration (µg/dscm)	=	2.3387E-01	µg/dscm

3. Lead concentration (mg/dscm)

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

Where:

m_n	= lead collected in sample (total µg)	=	0.5073	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
1000	= conversion factor (µg/mg)	=	1000	µg/mg
C_{sd}	= lead concentration (mg/dscm)	=	2.3387E-04	mg/dscm

QA/QC _____
Date _____

4. Lead concentration (µg/Nm3 dry)

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

Where:

m_n	= lead collected in sample (total µg)	=	0.5073	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	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}	= lead concentration (µg/Nm3 dry)	=	2.5098E-01	µg/Nm^3 dry

5. Lead 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}	= lead concentration (lb/dscf)	=	1.4604E-11	lb/dscf
x	= oxygen content of corrected gas (%)	=	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
C_{sdx}	= lead concentration corrected to x% oxygen (lb/dscf)	=	1.7262E-11	lb/dscf @ x%O_2

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

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

Where:

C_{sd}	= lead concentration (lb/dscf)	=	1.4604E-11	lb/dscf
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	10.3	%
C_{sdy}	= lead conc. corrected to y% carbon dioxide (lb/dscf)	=	1.7038E-11	lb/dscf @ y%CO_2

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

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

Where:

C_{sd}	= lead concentration (lb/dscf)	=	1.4604E-11	lb/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	99,540	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	=	183,901	acfm
C_a	= lead concentration at actual gas conditions (lb/acf)	=	7.9048E-12	lb/acf

QA/QC _____
Date _____

8. Lead emission rate (lb/hr)

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

Where:

m_n	= lead collected in sample (total µg)	=	0.5073	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	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)	=	99,540	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
$E_{lb/hr}$	= lead emission rate (lb/hr)	=	8.7222E-05	lb/hr

9. Lead 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	= lead collected in sample (total µg)	=	0.5073	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	99,540	dscfm
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
60	= conversion factor (sec/min)	=	60	sec/min
$E_{g/s}$	= lead emission rate (g/s)	=	1.0988E-05	g/s

10. Lead emission rate (Ton/yr)

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

Where:

m_n	= lead collected in sample (total µg)	=	0.5073	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	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)	=	99,540	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
$E_{Ton/yr}$	= lead emission rate (Ton/yr)	=	3.8203E-04	Ton/yr

QA/QC _____
Date _____

11. Lead 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	= lead collected in sample (total µg)	=	0.5073	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	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 (%)	=	9.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= lead emission rate - Fd-based (lb/MMBtu)	=	2.4839E-07	lb/MMBtu

12. Lead 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	= lead collected in sample (total µg)	=	0.5073	µg
V_{mstd}	= volume metered, standard (dscf)	=	76.5983	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
F_c	= ratio of gas volume to heat content of fuel (dscf/MMBtu)	=	1,820	dscf/MMBtu
CO_2	= proportion of oxygen in the gas stream by volume (%)	=	10.3	%
100	= conversion factor	=	100	
E_{Fc}	= lead emission rate - Fc-based (lb/MMBtu)	=	2.5841E-07	lb/MMBtu

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

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.

041808 140820
M

1. Volume of water collected (wscf)

$$V_{wstd} = (0.04707)(V_{lc})$$

Where:

V_{lc}	= total volume of liquid collected in impingers and silica gel (ml)	=	196.2	ml
0.04707	= ideal gas conversion factor (ft^3 water vapor/ml or gm)	=	0.04707	ft^3/ml
V_{wstd}	= volume of water vapor collected at standard conditions (ft^3)	=	9.24	ft^3

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

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

Where:

P_{bar}	= barometric pressure (in. Hg)	=	30.00	in. Hg
T_m	= average dry gas meter temperature (°F)	=	82.02	°F
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	36.18	dcf
Y_d	= gas meter correction factor (dimensionless)	=	0.9927	
ΔH	= average pressure drop across meter box orifice (in. H_2O)	=	1.03	in. H_2O
17.64	= standard temperature to pressure ratio (°R/in. Hg)	=	17.64	°R/in. Hg
13.6	= conversion factor (in. H_2O/in. Hg)	=	13.6	in.H_2O/in. Hg
460	= °F to °R conversion constant	=	460	
V_{mstd}	= volume of gas sampled through the dry gas meter at standard conditions (dscf)	=	35.155	dscf

3. Sample gas pressure (in. Hg)

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

Where:

P_{bar}	= barometric pressure (in. Hg)	=	30.00	in. Hg
P_g	= sample gas static pressure (in. H_2O)	=	-10.50	in. H_2O
13.6	= conversion factor (in. H_2O/in. Hg)	=	13.6	in. H_2O/in. Hg
P_s	= absolute sample gas pressure (in. Hg)	=	29.23	in. Hg

QA/QC _____
Date _____

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

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

Where:

T_s	= average sample gas temperature (°F)	=	301.48	°F
18.3036	= Antoine coefficient	=	18.3036	°K
3816.44	= Antoine coefficient	=	3816.44	°K
273.15	= temperature conversion factor	=	273.15	°K
46.13	= Antoine coefficient	=	46.13	°K
25.4	= conversion factor	=	25.4	mm Hg/in. Hg
5/9	= Fahrenheit to Celsius conversion factor	=	5/9	°C/°F
32	= temperature conversion (°F)	=	32	°F
P_v	= vapor pressure, actual (in. Hg)	=	29.23	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)	=	29.23	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.23	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)	=	35.155	dscf
V_{wstd}	= volume of water collected at standard conditions (scf)	=	9.24	scf
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2080	
		=	20.80	%

QA/QC _____
Date _____

7. Saturated moisture content (% by volume)

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

Where:

P_s	= absolute sample gas pressure (in. Hg)	=	29.23	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.23	in. Hg
B_{ws}	= proportion of water vapor in the gas stream by volume at saturated conditions		1.0000	
		=	100.00	%

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

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

Where:

B_{ws}	= proportion of water vapor in the gas stream by volume at saturated conditions	=	1.0000	
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2080	
B_w	= actual water vapor in gas	=	0.2080	
		=	20.80	%

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 (%)	=	10.6	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.1	%
100	= conversion factor (%)	=	100	%
N_2+CO	= proportion of nitrogen and CO in the gas stream by volume (%)	=	80.34	%

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

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

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

Where:

M_{CO2}	= molecular weight of carbon dioxide (lb/lb·mole)	=	44.00	lb/lb·mole
M_{O2}	= molecular weight of oxygen (lb/lb·mole)	=	32.00	lb/lb·mole
M_{N2+CO}	= molecular weight of nitrogen and carbon monoxide (lb/lb·mole)	=	28.00	lb/lb·mole
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	10.6	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.1	%
N_2+CO	= proportion of nitrogen and CO in the gas stream by volume (%)	=	80.3	%
100	= conversion factor (%)	=	100	%
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	30.06	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	=	0.2080	
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	30.06	lb/lb·mole
M_{H2O}	= molecular weight of water (lb/lb·mole)	=	18.00	lb/lb·mole
M_s	= molecular weight of sample gas, wet basis (lb/lb·mole)	=	27.55	lb/lb·mole

12. Velocity of sample gas (ft/sec)

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

Where:

K_p	= velocity pressure constant	=	85.49	
C_p	= pitot tube coefficient	=	0.84	
M_s	= wet molecular weight of sample gas, wet basis (lb/lb·mole)	=	27.55	lb/lb·mole
P_s	= absolute sample gas pressure (in. Hg)	=	29.23	in. Hg
T_s	= average sample gas temperature (°F)	=	301.48	°F
$\sqrt{\Delta P}$	= average square roots of velocity heads of sample gas (in. H_2O)	=	0.636	$\sqrt{}$in. H_2O
460	= °F to °R conversion constant	=	460	
V_s	= sample gas velocity (ft/sec)	=	44.42	ft/sec

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

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

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

Where:

A_s	= cross sectional area of sampling location (ft^2)	=	64.00	ft^2
V_s	= sample gas velocity (ft/sec)	=	44.42	ft/sec
60	conversion factor (sec/min)	=	60	sec/min
Q_a	= volumetric flow rate at actual conditions (acfm)	=	170,560	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)	=	170,560	acfm
P_s	= absolute sample gas pressure (in. Hg)	=	29.23	in. Hg
29.92	= standard pressure (in. Hg)	=	29.92	in. Hg
T_s	= average sample gas temperature (°F)	=	301.5	°F
68	= standard temperature (°F)	=	68	°F
460	= °F to °R conversion constant	=	460	
Q_s	= volumetric flow rate at standard conditions, wet basis (scfm)	=	115,528	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	=	0.2080	
Q_s	= volumetric flow rate at standard conditions, wet basis (scfm)	=	115,528	scfm
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	91,493	dscfm

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

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

Where:

Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	91,493	dscfm
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
7	= oxygen content of corrected gas (%)	=	7.0	%
Q_{std7}	= volumetric flow rate at STP and 7%O_2, dry basis (dscfm)	=	77,921	dscfm

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

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)	=	91,493	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
Q_{std-hr}	= volumetric flow rate, hourly basis (dscf/hr)	=	5,489,590	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)	=	91,493	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)	=	155,468	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)	=	155,468	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)	=	144,868	dry Nm^3/hr

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

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)	=	0.265	in.
B_w	= proportion of water vapor in the gas stream by volume	=	0.2080	
P_s	= absolute sample gas pressure (in. Hg)	=	29.23	in. Hg
T_s	= average sample gas temperature (°F)	=	301.5	°F
V_{mstd}	= volume of gas sample through the dry gas meter at standard conditions (dscf)	=	35.155	dscf
V_s	= sample gas velocity (ft/sec)	=	44.42	ft/sec
θ	= total sampling time (min)	=	63	min
0.0945	= conversion constant	=	0.0945	
460	= °F to °R conversion constant	=	460	
I	= percent of isokinetic sampling (%)	=	102.78	%

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)	=	36.18	dcf
T_m	= average dry gas meter temperature (°F)	=	82.02	°F
$\Delta H_@$	= dry gas meter orifice coefficient	=	1.7949	
P_{bar}	= barometric pressure (in. Hg)	=	30.00	in. Hg
ΔH	= average pressure drop across meter box orifice (in. H_2O)	=	1.026	in. H_2O
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	30.06	lb/lb·mole
$\sqrt{\Delta H_{avg}}$	= average of square root of pressure drop across meter orifice	=	1.010	√in. H_2O
0.0319	= conversion constant	=	0.0319	
28.96	= molecular weight of ambient air (lb/lb-mole)	=	28.96	lb/lb-mole
13.6	= conversion factor (in. H_2O/in. Hg)	=	13.6	in.H_2O/in. Hg
460	= °F to °R conversion constant	=	460	
Y_{qa}	= alternative Method 5 post-test meter calibration factor	=	0.9692	

QA/QC _____
Date _____

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.

041808 140820
Q

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)	=	<0.0020	mg/liter
v_1	= liquid volume of sample fraction 1 (ml)	=	682.0	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)	=	<0.0014	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)

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

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

Where:

K_{HF}	= conversion factor to convert mass F to mass HF	=	1.053	
B_F	= fluoride concentration of blank (mg/liter)	=	<0.0020	mg/liter
v_1	= liquid volume of sample fraction 1 (ml)	=	682.0	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

QA/QC _____
Date _____

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

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

Where:

m_{HF}	= total HF collected in sample (mg)	=	<0.0014	mg
m_b	= allowable blank subtraction (mg)	=	0.0000	mg
m_{nb}	= total HF collected, corrected for blank (mg)	=	<0.0014	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	=	0.002	mg/liter
v_1	= liquid volume of sample fraction 1 (ml)	=	682.0	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)	=	0.0014	mg

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

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

Where:

m_{nb}	= total HF collected, corrected for blank (mg)	=	<0.0014	mg
m_{MDL}	= minimum detectable HF (mg)	=	0.0014	mg
m_n	= total HF value used in emission calculations (mg)	=	<0.0014	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)	=	<0.0014	mg
1000	= conversion factor (ml/liter)	=	1000	ml/liter
100	= conversion factor	=	100	%
EFF	= Collection QC check (% mass collected in second fraction)	=	0.00	%

QA/QC _____
Date _____

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.

041808 140820
M_Q

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)	=	<0.0014	mg
V_{mstd}	= volume metered, standard (dscf)	=	35.1546	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)	=	<9.0089E-11	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)	=	<0.0014	mg
V_{mstd}	= volume metered, standard (dscf)	=	35.1546	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)	=	<0.0017	ppmdv

3. HF concentration (ppmwv)

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

Where:

C_{sd}	= HF concentration (ppmdv)	=	<0.0017	ppmdv
B_w	= actual water vapor in gas (% v/v)	=	20.8047	% v/v
100	= conversion factor (%)	=	100	%
C_w	= HF concentration (ppmwv)	=	<0.0014	ppmwv

QA/QC _____
Date _____

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)	=	<0.0014	mg
V_{mstd}	= volume metered, standard (dscf)	=	35.1546	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= HF concentration (mg/dscm)	=	<0.0014	mg/dscm

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

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

Where:

m_n	= total HF collected, corrected for applicable blank (mg)	=	<0.0014	mg
V_{mstd}	= volume metered, standard (dscf)	=	35.1546	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)	=	<0.0015	mg/Nm^3 dry

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

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

Where:

C_{sd}	= HF concentration (ppmdv)	=	<0.0017	ppmdv
x	= oxygen content of corrected gas (%)	=	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
C_{sdx}	= HF concentration corrected to x%O_2 (ppmdv)	=	<0.0020	ppmdv @ x%O_2

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

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

Where:

C_{sd}	= HF concentration (ppmdv)	=	<0.0017	ppmdv
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	10.6	%
C_{sdy}	= HF concentration corrected to y%CO_2 (ppmdv)	=	<0.0020	ppmdv @ y%CO_2

QA/QC _____
Date _____

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)	=	<9.0089E-11	lb/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	91,493	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	=	170,560	acfm
C_a	= HF concentration at actual gas conditions (lb/acf)	=	<4.8326E-11	lb/acf

9. HF rate (lb/hr)

$$E_{lb/hr} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{2.205\times10^{-3}}{1000}\right)(Q_{std})(60)$$

Where:

m_n	= total HF collected, corrected for applicable blank (mg)	=	<0.0014	mg
V_{mstd}	= volume metered, standard (dscf)	=	35.1546	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)	=	91,493	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
$E_{lb/hr}$	= HF rate (lb/hr)	=	<0.0005	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)	=	<0.0014	mg
V_{mstd}	= volume metered, standard (dscf)	=	35.1546	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	91,493	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)	=	<0.0002	kg/hr

11. HF rate (Ton/yr)

$$E_{T/yr} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{2.205\times10^{-3}}{1000}\right)(Q_{std})(60)\left(\frac{Cap}{2000}\right)$$

Where:

m_n	= total HF collected, corrected for applicable blank (mg)	=	<0.0014	mg
V_{mstd}	= volume metered, standard (dscf)	=	35.1546	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)	=	91,493	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)	=	<0.0022	Ton/yr

QA/QC _____
Date _____

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)	=	<0.0014	mg
V_{mstd}	= volume metered, standard (dscf)	=	35.1546	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)	=	9,570	dscf/MMBtu
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= HF rate (lb/MMBtu)	=	<1.5221E-06	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)	=	<0.0014	mg
V_{mstd}	= volume metered, standard (dscf)	=	35.1546	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 (%)	=	10.6	%
100	= conversion factor	=	100	
E_{Fc}	= HF rate (lb/MMBtu)	=	<1.5468E-06	lb/MMBtu

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 FF Outlet

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.

042208 125414
K

1. Volume of water collected (wscf)

$$V_{wstd} = (0.04707)(V_{lc})$$

Where:

V_{lc}	= total volume of liquid collected in impingers and silica gel (ml)	=	720.1	ml
0.04707	= ideal gas conversion factor (ft^3 water vapor/ml or gm)	=	0.04707	ft^3/ml
V_{wstd}	= volume of water vapor collected at standard conditions (ft^3)	=	33.90	ft^3

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

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

Where:

P_{bar}	= barometric pressure (in. Hg)	=	30.00	in. Hg
T_m	= average dry gas meter temperature (°F)	=	86.66	°F
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	136.51	dcf
Y_d	= gas meter correction factor (dimensionless)	=	0.9973	
ΔH	= average pressure drop across meter box orifice (in. H_2O)	=	0.92	in. H_2O
17.64	= standard temperature to pressure ratio (°R/in. Hg)	=	17.64	°R/in. Hg
13.6	= conversion factor (in. H_2O/in. Hg)	=	13.6	in.H_2O/in. Hg
460	= °F to °R conversion constant	=	460	
V_{mstd}	= volume of gas sampled through the dry gas meter at standard conditions (dscf)	=	132.092	dscf

3. Sample gas pressure (in. Hg)

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

Where:

P_{bar}	= barometric pressure (in. Hg)	=	30.00	in. Hg
P_g	= sample gas static pressure (in. H_2O)	=	-9.20	in. H_2O
13.6	= conversion factor (in. H_2O/in. Hg)	=	13.6	in. H_2O/in. Hg
P_s	= absolute sample gas pressure (in. Hg)	=	29.32	in. Hg

QA/QC _____
Date _____

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

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

Where:

T_s	= average sample gas temperature (°F)	=	293.46	°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)	=	29.32	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)	=	29.32	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.32	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)	=	132.092	dscf
V_{wstd}	= volume of water collected at standard conditions (scf)	=	33.90	scf
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2042	
		=	20.42	%

QA/QC _____
Date _____

7. Saturated moisture content (% by volume)

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

Where:

P_s	= absolute sample gas pressure (in. Hg)	=	29.32	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.32	in. Hg
B_{ws}	= proportion of water vapor in the gas stream by volume at saturated conditions	=	1.0000 100.00	 %

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

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

Where:

B_{ws}	= proportion of water vapor in the gas stream by volume at saturated conditions	=	1.0000	
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2042	
B_w	= actual water vapor in gas	=	0.2042	
		=	20.42	%

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 (%)	=	9.8	%
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 (%)	=	80.40	%

QA/QC _____
Date _____

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

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

Where:

M_{CO2}	= molecular weight of carbon dioxide (lb/lb·mole)	=	44.00	lb/lb·mole
M_{O2}	= molecular weight of oxygen (lb/lb·mole)	=	32.00	lb/lb·mole
M_{N2+CO}	= molecular weight of nitrogen and carbon monoxide (lb/lb·mole)	=	28.00	lb/lb·mole
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	9.8	%
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 (%)	=	80.4	%
100	= conversion factor (%)	=	100	%
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	29.96	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	=	0.2042	
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	29.96	lb/lb·mole
M_{H2O}	= molecular weight of water (lb/lb·mole)	=	18.00	lb/lb·mole
M_s	= molecular weight of sample gas, wet basis (lb/lb·mole)	=	27.52	lb/lb·mole

12. Velocity of sample gas (ft/sec)

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

Where:

K_p	= velocity pressure constant	=	85.49	
C_p	= pitot tube coefficient	=	0.84	
M_s	= wet molecular weight of sample gas, wet basis (lb/lb·mole)	=	27.52	lb/lb·mole
P_s	= absolute sample gas pressure (in. Hg)	=	29.32	in. Hg
T_s	= average sample gas temperature (°F)	=	293.46	°F
$\sqrt{\Delta P}$	= average square roots of velocity heads of sample gas (in. H_2O)	=	0.698	$\sqrt{}$in. H_2O
460	= °F to °R conversion constant	=	460	
V_s	= sample gas velocity (ft/sec)	=	48.46	ft/sec

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 FF Outlet

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)	=	48.46	ft/sec
60	conversion factor (sec/min)	=	60	sec/min
Q_a	= volumetric flow rate at actual conditions (acfm)	=	186,099	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)	=	186,099	acfm
P_s	= absolute sample gas pressure (in. Hg)	=	29.32	in. Hg
29.92	= standard pressure (in. Hg)	=	29.92	in. Hg
T_s	= average sample gas temperature (°F)	=	293.5	°F
68	= standard temperature (°F)	=	68	°F
460	= °F to °R conversion constant	=	460	
Q_s	= volumetric flow rate at standard conditions, wet basis (scfm)	=	127,812	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	=	0.2042	
Q_s	= volumetric flow rate at standard conditions, wet basis (scfm)	=	127,812	scfm
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	101,712	dscfm

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

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

Where:

Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	101,712	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)	=	81,231	dscfm

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 FF Outlet

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)	=	101,712	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
Q_{std-hr}	= volumetric flow rate, hourly basis (dscf/hr)	=	6,102,738	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)	=	101,712	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)	=	172,833	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)	=	172,833	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)	=	161,049	dry Nm^3/hr

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 FF Outlet

20. Percent isokinetic (%)

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

Where:

D_n	= diameter of nozzle (in)	=	0.246	in.
B_w	= proportion of water vapor in the gas stream by volume	=	0.2042	
P_s	= absolute sample gas pressure (in. Hg)	=	29.32	in. Hg
T_s	= average sample gas temperature (°F)	=	293.5	°F
V_{mstd}	= volume of gas sample through the dry gas meter at standard conditions (dscf)	=	132.092	dscf
V_s	= sample gas velocity (ft/sec)	=	48.46	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 (%)	=	100.79	%

21. Alternative Method 5 Post-Test Meter Calibration Factor

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

Where:

θ	= total sampling time (min)	=	250	min
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	136.51	dcf
T_m	= average dry gas meter temperature (°F)	=	86.66	°F
$\Delta H_@$	= dry gas meter orifice coefficient	=	1.7825	
P_{bar}	= barometric pressure (in. Hg)	=	30.00	in. Hg
ΔH	= average pressure drop across meter box orifice (in. H_2O)	=	0.924	in. H_2O
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	29.96	lb/lb·mole
$\sqrt{\Delta H_{avg}}$	= average of square root of pressure drop across meter orifice	=	0.970	√in. H_2O
0.0319	= conversion constant	=	0.0319	
28.96	= molecular weight of ambient air (lb/lb-mole)	=	28.96	lb/lb-mole
13.6	= conversion factor (in. H_2O/in. Hg)	=	13.6	in.H_2O/in. Hg
460	= °F to °R conversion constant	=	460	
Y_{qa}	= alternative Method 5 post-test meter calibration factor	=	0.9961	

QA/QC _____
Date _____

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.

042208 125444
K_P

			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)	=	9.5300E-02	ng	1.0900E-01	ng
V_{mstd}	= volume metered, standard (dscf)	=	132.0917	dscf	132.0917	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm	35.31	dscf/dscm
C_{sd}	= PCDD/F TEQ concentration (ng/dscm)	=	2.5475E-02	ng/dscm	2.9137E-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)	=	9.5300E-02	ng	1.0900E-01	ng
V_{mstd}	= volume metered, standard (dscf)	=	132.0917	dscf	132.0917	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/Nm3 dry)	=	2.7339E-02	ng/Nm^3 dry	3.1269E-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)	=	2.5475E-02	ng/dscm	2.9137E-02	ng/dscm
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscm/h)	=	172,833	dry std m^3/hr	172,833	dry std m^3/hr
Q_a	= volumetric flow rate at actual conditions (acm/h)	=	316,225	actual m^3/hr	316,225	actual m^3/hr
C_a	= PCDD/F TEQ concentration at actual gas conditions (ng/acm)	=	1.3923E-02	ng/acm	1.5925E-02	ng/acm

QA/QC _____
Date _____

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

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

Where:

C_{sd}	= PCDD/F TEQ concentration (ng/dscm)	=	2.5475E-02	ng/dscm	2.9137E-02	ng/dscm
x	= oxygen content of corrected gas (%)	=	7.0	%	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.8	%	9.8	%
20.9	= oxygen content of ambient air (%)	=	20.9	%	20.9	%
C_{sdx}	= PCDD/F TEQ concentration (ng/dscm corrected to x% O_2)	=	3.1898E-02	ng/dscm @ x% O_2	3.6484E-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)	=	2.5475E-02	ng/dscm	2.9137E-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 (%)	=	9.8	%	9.8	%
C_{sdy}	= PCDD/F TEQ concentration (ng/dscm corrected to y% CO_2)	=	3.1197E-02	ng/dscm @ y% CO_2	3.5682E-02	ng/dscm @ y% CO_2

6. TEQ Emission rate (lb/hr)

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

Where:

m_{n_TEQ}	= total TEQ mass for PCDDs and PCDFs (ng)	=	9.5300E-02	ng	1.0900E-01	ng
V_{mstd}	= volume metered, standard (dscf)	=	132.0917	dscf	132.0917	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)	=	101,712	dscfm	101,712	dscfm
60	= conversion factor (min/hr)	=	60	min/hr	60	min/hr
10^9	= conversion factor to convert from ng to grams	=	1.0E+09	ng/g	1.0E+09	ng/g
$E_{lb/hr}$	= PCDDF TEQ Emission rate (lb/hr)	=	9.7085E-09	lb/hr	1.1104E-08	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)	=	9.5300E-02	ng	1.0900E-01	ng
V_{mstd}	= volume metered, standard (dscf)	=	132.0917	dscf	132.0917	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	101,712	dscfm	101,712	dscfm
60	= conversion factor (sec/min)	=	60	sec/min	60	sec/min
10^9	= conversion factor to convert from ng to grams	=	1.0E+09	ng/g	1.0E+09	ng/g
$E_{g/sec}$	= PCDDF TEQ Emission rate (g/sec)	=	1.2230E-09	g/sec	1.3989E-09	g/sec

QA/QC _____
Date _____

8. TEQ emission rate (Ton/yr)

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

Where:

m_{n_TEQ}	= total TEQ mass for PCDDs and PCDFs (ng)	=	9.5300E-02	ng	1.0900E-01	ng
V_{mstd}	= volume metered, standard (dscf)	=	132.0917	dscf	132.0917	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)	=	101,712	dscfm	101,712	dscfm
60	= conversion factor (min/hr)	=	60	min/hr	60	min/hr
Cap	= capacity factor for process (hours operated/year)	=	8,760	hours/yr	8,760	hours/yr
2000	= conversion factor (lb/Ton)	=	2,000	lb/Ton	2,000	lb/Ton
10^9	= conversion factor to convert from ng to grams	=	1.0E+09	ng/g	1.0E+09	ng/g
$E_{T/yr}$	= PCDDF TEQ Emission rate (Ton/yr)	=	4.2523E-08	Ton/yr	4.8636E-08	Ton/yr

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

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

Where:

m_{n_TEQ}	= total TEQ mass for PCDDs and PCDFs (ng)	=	9.5300E-02	ng	1.0900E-01	ng
V_{mstd}	= volume metered, standard (dscf)	=	132.0917	dscf	132.0917	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g	2.205E-03	lb/g
F_d	= ratio of gas volume to heat content of fuel (dscf/MMBtu)	=	9,570	dscf/MMBtu	9,570	dscf/MMBtu
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.8	%	9.8	%
20.9	= oxygen content of ambient air (%)	=	20.9	%	20.9	%
10^9	= conversion factor to convert from ng to grams	=	1.0E+09	ng/g	1.0E+09	ng/g
E_{Fd}	= PCDDF TEQ Emission rate (lb/MMBtu)	=	2.8663E-11	lb/MMBtu	3.2784E-11	lb/MMBtu

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

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

Where:

m_{n_TEQ}	= total TEQ mass for PCDDs and PCDFs (ng)	=	9.5300E-02	ng	1.0900E-01	ng
V_{mstd}	= volume metered, standard (dscf)	=	132.0917	dscf	132.0917	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 (%)	=	9.8	%	9.8	%
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)	=	2.9547E-11	lb/MMBtu	3.3795E-11	lb/MMBtu

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

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.

042208 125532
Q

1. Volume of water collected (wscf)

$$V_{wstd} = (0.04707)(V_{lc})$$

Where:

V_{lc}	= total volume of liquid collected in impingers and silica gel (ml)	=	180.9	ml
0.04707	= ideal gas conversion factor (ft^3 water vapor/ml or gm)	=	0.04707	ft^3/ml
V_{wstd}	= volume of water vapor collected at standard conditions (ft^3)	=	8.51	ft^3

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

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

Where:

P_{bar}	= barometric pressure (in. Hg)	=	30.00	in. Hg
T_m	= average dry gas meter temperature (°F)	=	78.29	°F
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	34.75	dcf
Y_d	= gas meter correction factor (dimensionless)	=	0.9937	
ΔH	= average pressure drop across meter box orifice (in. H_2O)	=	1.20	in. H_2O
17.64	= standard temperature to pressure ratio (°R/in. Hg)	=	17.64	°R/in. Hg
13.6	= conversion factor (in. H_2O/in. Hg)	=	13.6	in.H_2O/in. Hg
460	= °F to °R conversion constant	=	460	
V_{mstd}	= volume of gas sampled through the dry gas meter at standard conditions (dscf)	=	34.043	dscf

3. Sample gas pressure (in. Hg)

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

Where:

P_{bar}	= barometric pressure (in. Hg)	=	30.00	in. Hg
P_g	= sample gas static pressure (in. H_2O)	=	-10.50	in. H_2O
13.6	= conversion factor (in. H_2O/in. Hg)	=	13.6	in. H_2O/in. Hg
P_s	= absolute sample gas pressure (in. Hg)	=	29.23	in. Hg

QA/QC _____
Date _____

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

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

Where:

T_s	= average sample gas temperature (°F)	=	299.08	°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)	=	29.23	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)	=	29.23	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.23	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)	=	34.043	dscf
V_{wstd}	= volume of water collected at standard conditions (scf)	=	8.51	scf
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2001	
		=	20.01	%

QA/QC _____
Date _____

7. Saturated moisture content (% by volume)

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

Where:

P_s	= absolute sample gas pressure (in. Hg)	=	29.23	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.23	in. Hg
B_{ws}	= proportion of water vapor in the gas stream by volume at saturated conditions		1.0000	
		=	100.00	%

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

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

Where:

B_{ws}	= proportion of water vapor in the gas stream by volume at saturated conditions	=	1.0000	
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2001	
B_w	= actual water vapor in gas	=	0.2001	
		=	20.01	%

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 (%)	=	9.9	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	10.5	%
100	= conversion factor (%)	=	100	%
N_2+CO	= proportion of nitrogen and CO in the gas stream by volume (%)	=	79.56	%

QA/QC _____
Date _____

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

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

Where:

M_{CO2}	= molecular weight of carbon dioxide (lb/lb·mole)	=	44.00	lb/lb·mole
M_{O2}	= molecular weight of oxygen (lb/lb·mole)	=	32.00	lb/lb·mole
M_{N2+CO}	= molecular weight of nitrogen and carbon monoxide (lb/lb·mole)	=	28.00	lb/lb·mole
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	9.9	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	10.5	%
N_2+CO	= proportion of nitrogen and CO in the gas stream by volume (%)	=	79.6	%
100	= conversion factor (%)	=	100	%
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	30.01	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	=	0.2001	
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	30.01	lb/lb·mole
M_{H2O}	= molecular weight of water (lb/lb·mole)	=	18.00	lb/lb·mole
M_s	= molecular weight of sample gas, wet basis (lb/lb·mole)	=	27.60	lb/lb·mole

QA/QC _____
Date _____

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.

050608 144640
@

1. Chloride to HCl conversion factor

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

Where:

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

2. Total HCl collected (mg)

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

Where:

K_{HCl}	= conversion factor to convert mass Cl^- to mass HCl	=	1.028	
$S_{Cl\text{-}1}$	= chloride concentration of sample fraction 1 (mg/liter)	=	9.6100	mg/liter
v_1	= liquid volume of sample fraction 1 (ml)	=	611.0	ml
$S_{Cl\text{-}2}$	= chloride concentration of sample fraction 2 (mg/liter)	=	0.0000	mg/liter
v_2	= liquid volume of sample fraction 2 (ml)	=	0.0	ml
1000	= conversion factor (ml/liter)	=	1000	ml/liter
m_{HCl}	= total HCl collected in sample (mg)	=	6.0361	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)	=	<0.0	mg/liter
v_1	= liquid volume of sample fraction 1 (ml)	=	611.0	ml
v_2	= liquid volume of sample fraction 2 (ml)	=	0	ml
1000	= conversion factor (ml/liter)	=	1000.0000	ml/liter
m_b	= *allowable blank subtraction (mg)*	=	0.0000	mg

QA/QC _____
Date _____

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

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

Where:

m_{HCl}	= total HCl collected in sample (mg)	=	6.0361	mg
m_b	= allowable blank subtraction (mg)	=	0.0000	mg
m_{nb}	= *total HCl collected, corrected for blank (mg)*	=	6.03611788	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)	=	611.0	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)	=	0.008165404	mg

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

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

Where:

m_{nb}	= total HCl collected, corrected for blank (mg)	=	6.0361	mg
m_{MDL}	= minimum detectable HCl (mg)	=	0.008165404	mg
m_n	= total HCl value used in emission calculations (mg)	=	6.03611788	mg

QA/QC _____
Date _____

USEPA Method 26A
HCl Sample Calculations

Sample data taken from Run 1

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

050508 14454D

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)	=	6.0361	mg
V_{mstd}	= volume metered, standard (dscf)	=	34.0428	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)	=	3.9097E-07	lb/dscf

2. HCl concentration (ppmdv)

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

Where:

m_n	= total HCl collected, corrected for applicable blank (mg)	=	6.0361	mg
V_{mstd}	= volume metered, standard (dscf)	=	34.0428	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)	=	4.1335	ppmdv

3. HCl concentration (ppmwv)

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

Where:

C_{sd}	= HCl concentration (ppmdv)	=	4.1335	ppmdv
B_w	= actual water vapor in gas (% v/v)	=	20.0080	% v/v
100	= conversion factor (%)	=	100	%
C_w	= HCl concentration (ppmwv)	=	3.3065	ppmwv

QA/QC _____
Date _____

4. HCl concentration (mg/dscm)

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

Where:

m_n	= total HCl collected, corrected for applicable blank (mg)	=	6.0361	mg
V_{mstd}	= volume metered, standard (dscf)	=	34.0428	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= HCl concentration (mg/dscm)	=	6.2608	mg/dscm

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

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

Where:

m_n	= total HCl collected, corrected for applicable blank (mg)	=	6.0361	mg
V_{mstd}	= volume metered, standard (dscf)	=	34.0428	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)	=	6.7189	mg/Nm^3 dry

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

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

Where:

C_{sd}	= HCl concentration (ppmdv)	=	4.1335	ppmdv
x	= oxygen content of corrected gas (%)	=	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	10.5	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
C_{sdx}	= HCl concentration corrected to x%O_2 (ppmdv)	=	5.5406	ppmdv @ x%O_2

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

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

Where:

C_{sd}	= HCl concentration (ppmdv)	=	4.1335	ppmdv
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	9.9	%
C_{sdy}	= HCl concentration corrected to y%CO2 (ppmdv)	=	5.0057	ppmdv @ y%CO_2

QA/QC _____
Date _____

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

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

Where:

m_n	= total HCl collected, corrected for applicable blank (mg)	=	6.0361	mg
V_{mstd}	= volume metered, standard (dscf)	=	34.0428	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)	=	9,570	dscf/MMBtu
O_2	= proportion of oxygen in the gas stream by volume (%)	=	10.5	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= HCl rate (lb/MMBtu)	=	7.5409E-03	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)	=	6.0361	mg
V_{mstd}	= volume metered, standard (dscf)	=	34.0428	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 (%)	=	9.9	%
100	= conversion factor	=	100	
E_{Fc}	= HCl rate (lb/MMBtu)	=	7.1808E-03	lb/MMBtu

QA/QC _____
Date _____

This Page Intentionally Left Blank

PLANT DATA

C

This Page Intentionally Left Blank

WHEELABRATOR SOUTH BROWARD
TONS OF REFUSE PROCESSED PER STACK TEST RUN LOG (2008)

UNIT #1

Date	Test	Method #	Run #	Steam (kb/hr)	Run Length (hr)	Trash Processed (tons)
3/24/2008	HCl	26A	1	184.5	1.00	34.4
3/24/2008	HCl	26A	2	183.6	1.00	34.3
3/24/2008	HCl	26A	3	184.2	1.03	35.4
3/25/2008	Particulate/Metals	5/29	1	186.6	2.22	77.3
3/25/2008	Particulate/Metals	5/29	2	184.3	2.18	75.0
3/25/2008	Particulate/Metals	5/29	3	184.1	2.23	76.6
3/26/2008	(Hg only)	29	4	176.1	2.60	85.4
3/26/2008	(Hg only)	29	5	184.1	2.70	92.7
3/26/2008	(Hg only)	29	6	183.8	2.33	79.9
3/24/2008	Fluorides	13B	1	183.8	1.25	42.9
3/24/2008	Fluorides	13B	2	184.3	1.17	40.2
3/24/2008	Fluorides	13B	3	184.6	1.35	46.5
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 #2

Date	Test	Method #	Run #	Steam (kb/hr)	Run Length (hr)	Trash Processed (tons)
3/26/2008	HCl	26A	1	183.4	1.00	34.2
3/26/2008	HCl	26A	2	185.8	1.00	34.7
3/26/2008	HCl	26A	3	185.2	1.00	34.6
3/24/2008	Particulate/Metals	5/29	1	182.3	2.47	84.0
3/24/2008	Particulate/Metals	5/29	2	184.5	2.18	75.0
3/24/2008	Particulate/Metals	5/29	3	183.0	2.18	74.4
3/25/2008	(Hg only)	29	4	186.6	2.25	78.3
3/25/2008	(Hg only)	29	5	184.3	2.27	78.1
3/25/2008	(Hg only)	29	6	183.7	2.25	77.1
3/25/2008	Fluorides	13B	1	183.1	1.15	39.3
3/25/2008	Fluorides	13B	2	184.4	1.18	40.6
3/25/2008	Fluorides	13B	3	184.5	1.18	40.6
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 (kb/hr)	Run Length (hr)	Trash Processed (tons)
3/25/2008	HCl	26A	1	182.8	1.18	40.2
3/25/2008	HCl	26A	2	183.6	1.00	34.3
3/25/2008	HCl	26A	3	184.4	1.00	34.4
3/24/2008	Particulate/Metals	5/29	1	184.1	2.57	88.3
3/24/2008	Particulate/Metals	5/29	2	184.3	2.23	76.7
3/24/2008	Particulate/Metals	5/29	3	184.3	2.27	78.1
3/26/2008	(Hg only)	29	4	185.5	2.23	77.2
3/26/2008	(Hg only)	29	5	184.0	2.22	76.2
3/26/2008	(Hg only)	29	6	184.0	2.18	74.8
3/26/2008	Fluorides	13B	1	184.1	1.18	40.5
3/26/2008	Fluorides	13B	2	184.3	1.17	40.2
3/26/2008	Fluorides	13B	3	184.3	1.17	40.2
3/24/2008	Dioxins/Furans	23	1	184.0	4.58	157.2
3/25/2008	Dioxins/Furans	23	2	183.1	4.58	156.5
3/25/2008	Dioxins/Furans	23	3	181.9	4.60	156.1

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

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/24/2008
Start Time: 7:45:00
End Time: 8:45:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	26A run 1	492.95	314.99	36.03	28.97	19.83	299.50	5.67	-10.35	184.53
Unit 2		523.41	315.03	45.89	38.74	15.64	299.94	8.27	-13.38	184.84
Unit 3		475.84	315.37	34.03	27.15	22.45	294.00	6.42	-9.90	184.06

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	187.39	901.97	828.28	83.43	-0.10	442.21	1037.70	8.04	6.84	8.92
Unit 2	189.30	900.66	830.13	83.88	-0.11	429.68	1105.20	5.20	6.74	9.57
Unit 3	191.29	901.30	832.93	81.67	-0.10	393.31	1067.92	7.26	6.30	9.15

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/24/2008
Start Time: 9:21:00
End Time: 10:21:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	26A run 2	495.13	314.83	36.30	29.02	19.83	300.64	5.76	-10.50	183.63
Unit 2		527.00	315.44	47.07	40.15	15.41	300.07	8.37	-13.59	180.08
Unit 3		477.60	314.97	34.02	26.39	22.50	296.86	6.26	-9.82	184.43

		FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
		KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1		186.62	901.07	829.96	82.56	-0.10	442.92	1055.64	5.48	6.85	8.92
Unit 2		183.38	898.39	826.74	81.21	-0.12	432.26	1096.35	4.03	6.87	9.76
Unit 3		191.13	900.10	829.61	82.13	-0.10	392.43	1079.94	5.43	6.45	9.36

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/24/2008
Start Time: 11:20:00
End Time: 12:22:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	26A run 3	490.74	315.05	34.79	27.53	20.67	299.72	5.80	-10.34	184.24
Unit 2		504.97	316.20	38.58	32.08	18.97	299.05	7.06	-11.49	158.92
Unit 3		476.40	315.54	34.60	27.20	22.62	293.18	6.22	-9.94	184.97

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	187.15	899.43	831.58	81.57	-0.10	434.67	1038.61	6.34	6.64	8.60
Unit 2	164.36	891.95	840.24	74.44	-0.10	429.24	1053.49	2.53	7.06	9.98
Unit 3	191.03	897.74	830.36	82.05	-0.10	385.27	1096.47	4.87	6.12	8.96

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/25/2008
Start Time: 7:32:00
End Time: 9:45:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	5/29 run 1	493.67	318.21	35.49	29.66	20.51	300.51	5.74	-10.60	186.56
Unit 2		513.33	317.91	39.56	32.57	18.34	300.68	7.30	-12.49	186.54
Unit 3		483.57	315.22	36.56	29.77	23.17	294.62	6.36	-9.95	182.58

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	188.99	899.54	829.80	83.03	-0.10	439.39	1060.40	3.83	7.20	9.01
Unit 2	190.89	899.74	829.96	77.68	-0.10	421.36	1066.32	2.94	6.75	9.53
Unit 3	186.91	900.29	831.21	82.85	-0.10	400.70	1078.84	6.79	6.44	9.43

C - 7

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/25/2008
Start Time: 10:07:00
End Time: 12:18:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	5/29 run 2	492.55	315.16	34.90	28.37	20.60	298.56	5.78	-10.43	184.27
Unit 2		502.68	315.47	35.35	29.09	20.40	297.37	6.83	-11.30	184.27
Unit 3		483.67	315.64	36.01	30.27	23.44	296.63	6.39	-10.22	183.91

		FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
		KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1		187.31	900.04	830.00	77.01	-0.09	434.58	1060.50	3.32	7.10	8.94
Unit 2		188.84	898.79	830.18	74.64	-0.11	412.43	1087.29	2.58	6.49	9.12
Unit 3		188.29	900.24	829.53	83.52	-0.10	398.87	1070.40	7.85	6.65	9.61

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/25/2008
Start Time: 12:42:00
End Time: 14:56:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	5/29 run 3	502.97	315.76	38.41	32.68	16.01	300.66	5.83	-10.75	184.14
Unit 2		508.28	321.20	35.67	31.10	18.10	302.18	6.98	-11.33	183.78
Unit 3		481.69	316.91	34.30	32.95	21.82	299.19	6.27	-10.01	183.43

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	186.72	900.21	829.39	76.58	-0.09	440.54	1055.27	3.64	7.46	9.39
Unit 2	188.12	898.52	829.81	75.49	-0.10	414.19	1114.40	2.74	6.46	9.06
Unit 3	188.02	899.98	831.29	77.46	-0.10	395.96	1077.55	13.26	6.25	9.31

C-9

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/26/2008
Start Time: 7:12:00
End Time: 9:48:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	29 run 4	500.29	314.95	38.89	31.90	17.66	300.92	5.69	-10.69	176.11
Unit 2		517.94	314.96	41.71	34.92	16.28	300.47	7.20	-11.85	184.24
Unit 3		468.82	315.04	31.73	24.38	23.23	293.15	6.29	-9.69	185.49

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	178.54	898.43	831.49	83.11	-0.10	446.10	1045.26	5.26	7.89	9.63
Unit 2	188.87	898.06	829.83	82.09	-0.10	423.92	1117.79	2.75	7.08	9.73
Unit 3	190.80	899.76	830.19	77.87	-0.10	390.32	1054.32	3.52	6.33	9.16

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/26/2008
Start Time: 10:25:00
End Time: 13:07:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	29 run 5	497.38	314.98	36.34	28.72	20.91	300.23	5.70	-10.34	184.05
Unit 2		514.18	314.84	39.23	31.63	19.40	299.53	7.01	-11.34	184.71
Unit 3		488.06	314.95	38.34	30.47	20.83	294.74	6.34	-10.37	184.21

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	186.57	900.62	827.74	80.89	-0.10	437.06	1076.18	3.91	7.12	9.05
Unit 2	189.53	899.19	830.56	76.03	-0.10	419.30	1119.57	3.30	6.79	9.41
Unit 3	188.82	900.25	826.49	82.78	-0.10	402.00	1052.73	5.63	7.49	10.23

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/26/2008
Start Time: 13:29:00
End Time: 15:49:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	29 run 6	501.59	315.00	37.62	27.53	26.66	300.54	5.90	-10.66	183.82
Unit 2		517.49	316.72	39.84	32.37	25.24	300.65	7.12	-11.47	183.53
Unit 3		481.16	315.15	35.00	24.94	28.95	294.37	6.46	-10.16	183.75

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	186.24	900.70	829.25	83.70	-0.10	438.78	1091.74	6.52	6.70	8.73
Unit 2	188.37	898.85	830.10	78.53	-0.11	420.11	1129.78	3.70	6.44	9.15
Unit 3	188.64	900.26	829.80	79.13	-0.10	393.13	1064.01	4.62	6.55	9.45

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/24/2008
Start Time: 10:50:00
End Time: 12:05:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	13B run 1	489.60	315.06	34.15	26.86	21.03	299.34	5.80	-10.29	183.82
Unit 2		495.57	314.83	33.96	27.11	21.82	297.78	6.48	-10.48	142.81
Unit 3		475.04	315.02	33.64	26.11	23.09	294.19	6.05	-9.66	184.80

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	186.83	896.95	831.65	81.66	-0.09	434.30	1044.47	5.65	6.74	8.66
Unit 2	146.82	886.51	827.53	69.56	-0.10	431.20	1023.60	2.54	7.73	10.65
Unit 3	191.99	895.20	831.05	80.15	-0.10	386.75	1092.95	5.52	5.80	8.72

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/24/2008
Start Time: 12:43:00
End Time: 13:53:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	13B run 2	489.50	314.96	33.50	26.27	21.35	298.96	5.55	-9.91	184.26
Unit 2		520.62	320.69	40.92	36.83	17.56	304.46	7.26	-11.79	185.76
Unit 3		492.40	318.94	38.53	32.43	20.11	298.97	6.24	-10.21	183.68

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	186.95	902.95	830.83	78.74	-0.10	433.82	1048.29	8.25	6.30	8.23
Unit 2	190.93	901.22	838.97	79.25	-0.11	423.82	1112.09	3.42	6.09	8.82
Unit 3	190.02	901.15	827.39	88.47	-0.10	401.31	1068.82	5.51	7.20	10.04

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/24/2008
Start Time: 14:11:00
End Time: 15:32:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	13B run 3	486.88	314.88	32.14	24.78	22.38	297.44	5.72	-9.95	184.57
Unit 2		516.50	333.22	36.81	32.72	22.57	312.97	7.38	-11.70	184.48
Unit 3		478.32	320.57	31.58	30.18	25.35	296.67	6.38	-9.88	184.26

		FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
		KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1		187.58	902.58	830.21	77.96	-0.10	430.95	1043.00	5.93	5.92	7.87
Unit 2		188.49	900.29	828.25	79.20	-0.10	420.21	1104.50	3.23	6.43	9.18
Unit 3		191.11	901.30	832.04	78.85	-0.10	391.38	1073.58	5.49	6.06	9.00

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/26/2008
Start Time: 7:32:00
End Time: 8:32:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1		499.81	314.75	39.55	32.59	17.73	300.55	5.61	-10.71	161.40
Unit 2	26A run 1	517.39	314.88	41.74	34.88	16.50	300.22	7.25	-11.93	183.41
Unit 3		466.70	314.87	31.10	23.64	23.86	292.64	6.23	-9.56	184.25

		FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
		KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1		162.98	893.35	823.43	84.49	-0.10	456.14	1013.69	7.52	8.75	10.26
Unit 2		188.51	895.52	830.54	83.21	-0.09	423.84	1128.86	2.86	7.07	9.64
Unit 3		189.95	897.12	831.27	77.59	-0.10	390.34	1067.52	3.66	6.18	9.09

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/26/2008
Start Time: 8:58:00
End Time: 9:58:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	499.73	314.88	37.57	30.45	18.26	301.56	5.69	-10.48	186.53
Unit 2 26A run 2	518.19	314.82	41.23	34.46	16.54	300.91	7.18	-11.74	185.79
Unit 3	470.83	315.27	32.41	25.08	22.99	293.91	6.32	-9.82	187.64

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	190.53	902.59	840.67	79.65	-0.10	439.15	1058.60	4.02	7.03	8.97
Unit 2	190.71	900.38	828.90	79.58	-0.10	423.49	1107.90	2.66	6.92	9.66
Unit 3	192.34	902.36	829.66	78.32	-0.11	389.72	1037.29	2.83	6.36	9.25

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/26/2008
Start Time: 10:47:00
End Time: 11:47:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	502.51	314.88	38.76	31.68	18.10	299.74	5.76	-10.61	184.00
Unit 2 26A run 3	518.06	314.49	40.78	33.69	17.12	299.97	6.97	-11.41	185.19
Unit 3	492.60	314.83	40.36	32.92	18.62	295.23	6.27	-10.50	184.08

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	186.21	900.44	826.16	80.02	-0.11	441.14	1065.00	4.18	7.41	9.38
Unit 2	190.23	899.16	830.00	74.81	-0.10	422.21	1131.69	3.06	6.98	9.58
Unit 3	188.50	899.95	823.79	83.82	-0.10	406.44	1046.47	7.54	7.99	10.65

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/24/2008
Start Time: 7:45:00
End Time: 10:13:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	494.21	314.97	36.31	29.15	19.78	300.28	5.73	-10.46	183.39
Unit 2 5/29 run 1	525.03	315.23	46.41	39.31	15.54	299.86	8.37	-13.55	182.26
Unit 3	477.59	318.13	33.64	27.91	23.58	297.30	6.36	-9.91	184.34

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	186.40	901.32	829.02	83.19	-0.10	442.48	1044.64	6.24	7.00	9.06
Unit 2	186.27	899.43	828.66	82.79	-0.11	430.41	1103.67	4.43	6.91	9.71
Unit 3	191.01	900.64	830.68	82.66	-0.10	393.52	1073.05	6.13	6.51	9.34

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/24/2008
Start Time: 12:48:00
End Time: 14:59:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	488.06	314.98	32.88	25.67	21.80	298.12	5.62	-9.92	184.28
Unit 2 5/29 run 2	517.64	327.67	37.97	34.16	20.85	306.33	7.29	-11.65	184.52
Unit 3	485.77	317.14	36.41	29.43	21.23	297.55	6.27	-10.02	183.92

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROI AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	187.21	902.51	829.79	78.57	-0.10	432.67	1045.84	7.30	6.12	8.06
Unit 2	189.96	900.46	834.35	79.31	-0.10	421.07	1110.48	3.00	6.37	9.04
Unit 3	190.71	900.98	828.94	84.21	-0.10	396.61	1065.59	5.02	6.76	9.62

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/24/2008
Start Time: 15:26:00
End Time: 17:37:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	488.60	317.81	31.46	25.33	22.97	300.09	5.78	-10.05	183.30
Unit 2 5/29 run 3	528.12	326.58	41.34	41.45	17.55	310.43	7.84	-12.61	182.99
Unit 3	479.69	319.26	33.70	28.80	23.48	299.50	6.47	-10.02	183.58

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	185.96	902.31	829.07	79.05	-0.10	430.00	1062.53	3.93	6.17	8.09
Unit 2	187.13	899.75	829.17	84.21	-0.09	425.42	1097.18	3.99	6.89	9.59
Unit 3	187.73	900.80	830.95	80.59	-0.10	391.45	1078.62	3.13	6.39	9.30

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/25/2008
Start Time: 7:39:00
End Time: 9:54:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	492.50	318.20	34.90	29.03	20.86	300.38	5.70	-10.50	186.63
Unit 2 29 run 4	512.43	317.85	39.05	32.04	18.57	300.55	7.22	-12.36	186.61
Unit 3	483.48	315.22	36.64	29.82	23.10	294.60	6.34	-9.91	183.63

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	189.20	899.79	829.78	82.38	-0.10	438.32	1065.57	3.80	7.11	8.92
Unit 2	190.90	899.91	830.06	77.20	-0.10	420.62	1066.36	2.93	6.68	9.47
Unit 3	187.62	900.74	831.21	82.54	-0.11	400.31	1080.40	6.63	6.44	9.40

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/25/2008
Start Time: 10:17:00
End Time: 12:33:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	493.12	315.26	34.90	29.03	20.51	298.87	5.78	-10.44	184.35
Unit 2 29 run 5	502.77	315.48	35.46	29.21	20.24	297.37	6.86	-11.31	184.25
Unit 3	484.08	315.45	36.24	30.35	23.24	296.94	6.34	-10.21	184.12

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	187.38	900.16	829.83	76.77	-0.10	434.93	1064.44	3.43	7.09	8.93
Unit 2	188.86	898.84	830.49	74.55	-0.11	412.24	1093.01	2.59	6.47	9.08
Unit 3	188.20	900.28	828.97	83.41	-0.10	398.77	1070.50	7.92	6.65	9.62

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/25/2008
Start Time: 13:00:00
End Time: 15:15:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	503.58	315.17	38.58	32.73	15.92	300.08	5.84	-10.78	184.12
Unit 2 29 run 6	509.01	321.21	35.96	31.41	17.96	302.62	7.02	-11.40	183.71
Unit 3	481.67	315.94	34.49	31.89	21.81	298.40	6.29	-10.02	184.25

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	186.55	900.16	828.98	76.49	-0.09	440.87	1061.20	3.63	7.49	9.41
Unit 2	187.94	898.52	829.30	75.75	-0.10	414.63	1106.85	2.76	6.40	9.07
Unit 3	188.62	900.18	830.85	76.90	-0.10	395.37	1077.64	14.35	6.16	9.23

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/25/2008
Start Time: 12:29:00
End Time: 13:38:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	500.35	317.68	37.04	34.09	16.75	301.30	5.90	-10.79	183.68
Unit 2 13B run 1	505.78	322.09	34.52	29.97	18.48	300.43	7.01	-11.36	183.07
Unit 3	484.05	319.80	34.16	36.57	21.22	301.20	6.35	-10.24	182.73

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	185.82	900.12	830.76	77.14	-0.09	438.59	1042.80	4.09	7.24	9.23
Unit 2	187.20	898.18	829.78	75.37	-0.10	412.94	1122.10	2.65	6.50	9.08
Unit 3	187.36	899.76	832.13	79.78	-0.09	398.62	1077.09	14.57	6.35	9.39

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/25/2008
Start Time: 14:02:00
End Time: 15:13:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1		503.05	315.02	37.98	32.29	16.01	299.83	5.80	-10.67	184.28
Unit 2	13B run 2	509.18	319.39	36.25	31.70	17.74	301.90	6.97	-11.29	184.43
Unit 3		483.04	313.23	35.90	30.72	21.50	295.32	6.36	-10.12	183.67

		FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
		KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1		186.86	900.02	827.85	75.96	-0.10	440.60	1081.87	3.08	7.52	9.38
Unit 2		188.82	898.64	829.69	74.89	-0.09	414.27	1105.46	2.74	6.34	9.01
Unit 3		187.80	899.90	828.66	78.54	-0.11	395.37	1078.27	15.26	6.45	9.50

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/25/2008
Start Time: 15:46:00
End Time: 16:57:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	504.06	314.92	38.25	32.27	15.74	300.21	5.87	-10.74	184.54
Unit 2 13B run 3	511.46	316.45	36.79	32.64	16.47	299.50	7.03	-11.46	184.53
Unit 3	497.70	315.61	41.86	35.24	17.36	295.87	6.60	-10.87	177.12

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	187.26	898.96	829.29	75.17	-0.10	440.04	1061.01	4.09	7.36	9.19
Unit 2	189.04	897.63	830.31	72.32	-0.11	414.38	1104.51	2.70	6.41	9.04
Unit 3	180.74	897.20	823.42	88.32	-0.10	409.36	1063.77	8.50	7.60	10.50

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/25/2008
Start Time: 7:43:00
End Time: 8:54:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	498.30	321.07	36.83	32.08	19.83	302.37	5.77	-10.84	186.95
Unit 2	518.72	320.37	41.26	34.43	17.57	303.45	7.48	-12.91	186.53
Unit 3 26A run 1	484.96	315.52	37.36	31.05	22.64	295.31	6.39	-10.03	182.81

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	189.53	899.49	830.26	84.21	-0.10	443.77	1047.18	4.45	7.38	9.24
Unit 2	190.78	899.70	828.67	78.28	-0.10	425.85	1066.28	3.16	6.92	9.81
Unit 3	187.15	900.33	830.54	83.72	-0.11	402.58	1086.25	6.42	6.65	9.54

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/25/2008
Start Time: 9:20:00
End Time: 10:20:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	485.00	315.11	32.10	24.85	22.39	297.52	5.58	-10.00	185.30
Unit 2	504.30	315.02	36.00	29.04	19.86	297.53	6.89	-11.56	186.14
Unit 3 26A run 2	480.71	314.25	34.95	27.46	23.89	293.85	6.50	-10.02	183.61

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	187.77	900.09	831.82	78.52	-0.10	430.11	1065.58	3.03	6.72	8.52
Unit 2	190.24	899.72	830.79	75.76	-0.10	413.67	1070.47	2.57	6.44	9.11
Unit 3	187.99	900.84	832.35	80.47	-0.10	396.17	1068.28	6.06	6.33	9.30

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/25/2008
Start Time: 10:48:00
End Time: 11:48:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	491.88	315.17	34.50	27.50	20.93	298.52	5.80	-10.45	184.31
Unit 2	502.95	314.52	36.02	28.45	19.98	297.71	6.86	-11.31	184.56
Unit 3 26A run 3	484.35	313.84	36.55	28.93	23.68	297.10	6.19	-10.00	184.35

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	186.71	900.00	827.13	76.57	-0.09	433.94	1074.25	2.93	7.20	8.99
Unit 2	188.92	898.86	829.59	74.41	-0.11	412.44	1083.54	2.60	6.34	9.07
Unit 3	188.07	900.14	825.82	83.46	-0.10	399.89	1072.19	8.19	6.66	9.65

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/24/2008
Start Time: 7:48:00
End Time: 10:02:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	494.56	314.99	36.47	29.32	19.69	300.36	5.73	-10.48	183.26
Unit 2	524.61	315.15	46.19	39.11	15.61	299.72	8.31	-13.46	182.16
Unit 3 5/29 run 1	477.46	318.48	33.53	28.01	23.74	297.46	6.39	-9.95	184.06

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	186.15	901.16	828.43	83.14	-0.10	442.67	1040.30	6.25	7.04	9.10
Unit 2	186.70	899.34	828.86	82.72	-0.11	430.04	1104.20	4.40	6.96	9.73
Unit 3	190.94	900.50	830.72	82.93	-0.10	393.41	1073.90	5.68	6.57	9.38

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/24/2008
Start Time: 10:38:00
End Time: 12:52:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	490.21	315.01	34.22	27.02	20.98	299.63	5.79	-10.28	184.55
Unit 2	504.97	317.01	37.00	31.51	20.05	299.37	6.80	-11.11	150.97
Unit 3 5/29 run 2	480.42	315.21	35.56	28.70	21.84	294.19	6.23	-9.98	184.31

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	187.40	898.01	829.67	80.97	-0.09	435.10	1050.93	5.02	6.67	8.59
Unit 2	155.50	888.98	827.92	72.55	-0.10	432.10	1044.10	2.85	7.52	10.47
Unit 3	191.47	896.09	830.07	83.24	-0.10	391.35	1086.58	5.70	6.30	9.20

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/24/2008
Start Time: 13:34:00
End Time: 15:50:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	486.77	314.85	32.19	24.98	22.31	297.82	5.71	-9.95	184.22
Unit 2	515.97	326.32	37.51	31.44	20.99	308.36	7.26	-11.54	184.01
Unit 3 5/29 run 3	479.41	320.29	32.72	30.07	24.29	298.36	6.27	-9.79	184.30

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	187.12	902.37	828.82	78.15	-0.10	431.29	1047.08	6.06	6.00	7.95
Unit 2	188.63	900.15	830.05	79.04	-0.10	419.21	1113.54	3.00	6.57	9.18
Unit 3	190.93	901.24	832.61	79.73	-0.10	392.18	1073.43	4.77	6.24	9.13

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/26/2008
Start Time: 7:11:00
End Time: 9:25:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	500.36	314.98	39.15	32.17	17.53	300.78	5.71	-10.75	174.24
Unit 2	518.19	314.98	41.95	35.16	16.17	300.42	7.22	-11.90	183.90
Unit 3 29 run 4	468.98	314.89	31.77	24.40	23.17	293.08	6.30	-9.70	185.49

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	176.28	897.71	829.93	83.89	-0.10	447.43	1045.42	5.46	8.04	9.74
Unit 2	188.40	897.67	829.75	82.79	-0.10	424.38	1118.87	2.78	7.13	9.76
Unit 3	190.43	899.45	829.91	77.88	-0.11	391.25	1058.66	3.68	6.26	9.12

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/26/2008
Start Time: 9:43:00
End Time: 11:56:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	497.58	314.93	36.68	29.61	19.10	300.06	5.68	-10.36	184.19
Unit 2	517.73	314.80	40.93	33.84	17.16	300.09	7.13	-11.64	184.69
Unit 3 29 run 5	488.78	315.07	39.22	31.80	19.16	294.92	6.44	-10.56	183.98

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	186.41	900.41	826.19	79.37	-0.11	438.57	1066.27	3.84	7.21	9.16
Unit 2	189.61	899.00	829.99	76.56	-0.10	422.63	1125.96	2.90	7.01	9.65
Unit 3	188.04	899.96	824.50	84.75	-0.10	403.36	1043.63	5.67	7.68	10.45

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/26/2008
Start Time: 12:21:00
End Time: 14:32:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	499.46	315.03	36.93	27.70	24.68	300.83	5.78	-10.48	184.03
Unit 2	514.31	315.43	39.09	31.17	23.31	299.27	7.01	-11.30	183.89
Unit 3 29 run 6	478.79	314.92	33.94	24.76	27.31	293.87	6.37	-9.97	184.02

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	186.52	900.81	829.81	82.82	-0.10	437.31	1091.84	5.13	6.73	8.74
Unit 2	188.55	899.04	830.15	77.90	-0.11	418.28	1105.67	3.96	6.47	9.16
Unit 3	189.35	900.48	830.24	78.59	-0.10	392.68	1068.62	3.25	6.61	9.45

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/26/2008
Start Time: 7:56:00
End Time: 9:07:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	499.61	315.35	38.48	31.50	18.09	300.53	5.67	-10.62	180.51
Unit 2	518.87	315.12	42.36	35.57	16.20	300.69	7.27	-11.99	183.63
Unit 3 13B run 1	466.22	315.02	31.02	23.64	23.84	293.46	6.25	-9.61	184.12

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	178.03	899.42	831.32	83.75	-0.10	448.45	1064.66	4.58	7.26	9.26
Unit 2	187.94	898.39	829.26	83.57	-0.10	424.26	1124.97	2.68	7.28	9.85
Unit 3	189.04	899.97	830.56	77.32	-0.10	388.44	1064.91	2.92	6.14	8.91

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/26/2008
Start Time: 9:23:00
End Time: 10:33:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	495.16	314.94	35.68	28.71	19.27	300.90	5.63	-10.24	185.09
Unit 2	518.14	315.11	41.34	34.51	16.70	300.58	7.25	-11.85	184.77
Unit 3 13B run 2	478.40	315.43	35.49	28.16	21.17	294.16	6.45	-10.26	184.25

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	187.74	900.90	829.86	78.60	-0.10	437.10	1059.38	3.66	7.03	8.96
Unit 2	189.31	899.24	829.93	78.60	-0.10	423.53	1111.18	2.70	6.96	9.69
Unit 3	189.67	900.37	826.61	83.07	-0.10	395.15	1035.36	3.23	7.11	9.97

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/26/2008
Start Time: 10:52:00
End Time: 12:02:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	500.78	314.87	37.86	30.69	18.97	299.97	5.65	-10.40	183.83
Unit 2	515.25	314.52	39.53	32.29	18.10	299.65	6.91	-11.23	184.84
Unit 3 13B run 3	490.90	314.78	39.41	31.84	19.31	295.12	6.23	-10.38	184.27

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	186.31	900.57	827.97	80.38	-0.11	440.02	1064.89	4.23	7.27	9.22
Unit 2	189.93	899.20	830.71	74.70	-0.10	420.23	1133.62	2.99	6.85	9.47
Unit 3	188.64	900.15	825.05	83.70	-0.10	404.91	1049.34	7.29	7.85	10.50

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/24/2008
Start Time: 12:03:00
End Time: 16:48:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1		488.06	314.98	32.70	25.45	21.99	298.40	5.70	-9.98	184.23
Unit 2		518.44	322.74	39.56	34.76	19.11	305.80	7.35	-11.82	180.04
Unit 3	23 run 1	482.73	318.59	34.80	30.04	22.64	298.05	6.34	-10.00	183.97

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	187.17	902.06	829.95	78.60	-0.10	431.91	1049.05	5.57	6.18	8.11
Unit 2	184.54	898.86	831.51	79.55	-0.10	423.40	1098.93	3.28	6.57	9.33
Unit 3	190.18	900.47	830.54	82.49	-0.10	394.26	1073.00	4.72	6.55	9.43

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/25/2008
Start Time: 7:29:00
End Time: 12:04:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	492.27	316.63	34.96	28.48	20.73	299.28	5.73	-10.46	185.43
Unit 2	508.14	316.64	37.54	30.92	19.32	299.07	7.07	-11.92	185.50
Unit 3 23 run 2	483.66	315.41	36.61	30.27	23.04	295.54	6.37	-10.05	183.12

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	188.11	899.73	830.03	80.13	-0.10	436.41	1058.85	3.48	7.13	8.95
Unit 2	189.90	899.26	829.98	76.28	-0.10	417.05	1074.44	2.76	6.60	9.32
Unit 3	187.48	900.24	830.23	83.14	-0.10	399.97	1074.14	7.33	6.55	9.52

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/25/2008
Start Time: 12:24:00
End Time: 17:00:00

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
	DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	503.02	315.99	37.98	33.23	16.17	300.56	5.86	-10.76	184.14
Unit 2	509.08	318.79	36.09	31.05	17.58	300.93	6.99	-11.36	184.28
Unit 3 23 run 3	487.70	316.13	37.44	33.41	20.19	297.39	6.40	-10.35	181.86

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	186.76	899.86	829.72	76.06	-0.10	440.04	1059.49	3.60	7.41	9.31
Unit 2	188.62	898.37	829.81	74.21	-0.10	414.17	1103.99	3.15	6.36	9.01
Unit 3	186.01	899.25	828.31	81.68	-0.10	400.47	1073.47	11.40	6.71	9.72

Plant Name: SBWD
General Average Report
Reporting Period: 03/25/2008 to 03/25/2008

Site Name: UNIT1
Data Averaging Type: 6m

Time of Report: 03/26/08 08:14
Rolling Average Interval: 1

Date	Time	OPACITY1 (PERCENT)
03/25/08	06:06	0
	06:12	0
	06:18	0
	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

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: SBWD
General Average Report
Reporting Period: 03/25/2008 to 03/25/2008

Site Name: UNIT1
Data Averaging Type: 6m

Time of Report: 03/26/08 08:14
Rolling Average Interval: 1

Date	Time	OPACITY1 (PERCENT)
03/25/08	08:42	0
	08:48	0
	08:54	0
	09:00	0
	09:06	0
	09:12	0
	09:18	0
	09:24	0
	09:30	0
	09:36	0
	09:42	0
	09:48	0
	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

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

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

Plant Name: SBWD
General Average Report
Reporting Period: 03/25/2008 to 03/25/2008

Site Name: UNIT1
Data Averaging Type: 6m

Time of Report: 03/26/08 08:14
Rolling Average Interval: 1

Date	Time	OPACITY1 (PERCENT)
03/25/08	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

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: SBWD
General Average Report
Reporting Period: 03/24/2008 to 03/24/2008

Site Name: UNIT2
Data Averaging Type: 6m

Time of Report: 03/26/08 08:15
Rolling Average Interval: 1

Date	Time	OPACITY2 (PERCENT)
03/24/08	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
	08:42	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

Plant Name: SBWD
General Average Report
Reporting Period: 03/24/2008 to 03/24/2008

Site Name: UNIT2
Data Averaging Type: 6m

Time of Report: 03/26/08 08:15
Rolling Average Interval: 1

Date	Time	OPACITY2 (PERCENT)
03/24/08	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

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

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

Plant Name: SBWD
General Average Report
Reporting Period: 03/24/2008 to 03/24/2008

Site Name: UNIT2
Data Averaging Type: 6m

Time of Report: 03/26/08 08:15
Rolling Average Interval: 1

Date	Time	OPACITY2 (PERCENT)
03/24/08	14:00	0
	14:06	0
	14:12	0
	14:18	0
	14:24	0
	14:30	0
	14:36	0
	14:42	0
	14:48	0
	14:54	0
	15:00	0
	15:06	0
	15:12	0
	15:18	0
	15:24	0
	15:30	0
	15:36	0
	15:42	0
	15:48	0
	15:54	0
	16:00	0
	16:06	0

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

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

Plant Name: SBWD
General Average Report
Reporting Period: 03/24/2008 to 03/24/2008

Site Name: UNIT3
Data Averaging Type: 6m

Time of Report: 03/26/08 08:15
Rolling Average Interval: 1

Date	Time	OPACITY3 (PERCENT)
03/24/08	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: SBWD
General Average Report
Reporting Period: 03/24/2008 to 03/24/2008

Site Name: UNIT3
Data Averaging Type: 6m

Time of Report: 03/26/08 08:16
Rolling Average Interval: 1

Date	Time	OPACITY3 (PERCENT)
03/24/08	09:12	0
	09:18	0
	09:24	0
	09:30	0
	09:36	0
	09:42	0
	09:48	0
	09:54	0
	10:00	0
	10:06	0
	10:12	0
	10:18	0
	10:24	0
	10:30	0
	10:36	0
	10:42	0
	10:48	0
	10:54	0
	11:00	0
	11:06	0
	11:12	0
	11:18	0
	11:24	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: SBWD
General Average Report
Reporting Period: 03/24/2008 to 03/24/2008

Site Name: UNIT3
Data Averaging Type: 6m

Time of Report: 03/26/08 08:16
Rolling Average Interval: 1

Date	Time	OPACITY3 (PERCENT)
03/24/08	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

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

Wheelabrator - S. Broward

4400 South State Road 7
Fort Lauderdale, FL 33314
Tel: (954) 581-6606 Fax: (954) 581-6705

Ticket 606550

3/24/2008

In 12:28:30PM
Out 2:20:32PM

Account	623030
Customer	Chemical Lime Chemical Lime PO Box 7247-8945 Philadelphia, PA
Decal #	LIME2
Vehicle #	LIME2
Auto ID	0
Other	2055660
Product	9020 Lime
Qty	**25.57 Ton**
Origin	Wheelabrator So
Operator	Joyce

Price	0.00
Total	0.00

	Pounds	Tons
Gross	78120	39.06
Tare	26980	13.49
Net	51140	25.57

UNIFORM STRAIGHT BILL OF LADING

ORIGINAL - NOT NEGOTIABLE

Chemical Lime
A Lhoist Group Company

BILL OF LADING NO. 1038534092

DATE 03/24/2008 07:20:19

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading:

SHIPPER CLC Yelvington Terminal

FROM CLC Yelvington Terminal, 708 West McNab Road, POMPANO BEACH, FL

"Customer hereby acknowledges its responsibility to remove the product tendered on the delivery vehicle. Due to the nature of the product and the delivery mode and situs, a quantity of the product may remain in the delivery vehicle following distribution. Customer may remove such quantity, but if not removed, it agrees, by the signature below to pay for the entire quantity indicated hereon which is tendered and thus available for removal."

CONSIGNED TO 23162 WHEELABRATOR SOUTH BROWARD INC

DESTINATION 14366+ WHEELABRATOR SO BROWARD-FT LAUDERDL COUNTY OF BROWARD

ROUTE 4400 SOUTH STATE ROAD 441 / FORT LAUDERDALE FL 33314

DELIVERY CARRIER 39957 COMMERCIAL CARRIER LOGISTICS LLC CHICAGO IL UNIT ID USFLC341815

DESCRIPTION OF ARTICLES, SPECIAL MARKS, AND EXCEPTIONS	*WEIGHT (Subject to Correction)	
1102 Hi Cal Quicklime - Pebble - Medium	25.410	TON
03/24/2008 07:20:19 Gross weight:	77,640	LB
03/24/2008 07:20:19 Tare weight:	26,820	LB
Net weight:	50,820	LB

Customer shipping instructions:
LOADING PRESSURE IS NOT TO EXCEED 13 POUNDS PER SQUARE INCH Rail Car #: _____
Available Cap: _____ Residue: _____ Temperature Rise: _____

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The Carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of consignor)

If the charges are to be prepaid, write or stamp here. "To be Prepaid."

Freight prepaid

Sales Ref. #: 10065176

Seal #:

P.O.: 1160204

Contract# 0070040323
Mileage 0

US16 2055654
CONTROL NUMBER

39957 COMMERCIAL CARRIER LOGIST CHICAGO IL
RECEIVED BY

SHIPPER

DRIVER/AGENT

RECEIVED BY CONSIGNEE

PER

CLC Yelvington Terminal, 708 West McNab Road, POMPANO BEACH, FL 33060
PERMANENT ADDRESS OF SHIPPER

CUSTOMER

This Page Intentionally Left Blank

PARAMETERS

D

This Page Intentionally Left Blank

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

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

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		06:06	08:41	11:16	
Stop Time (approx.)		08:19	10:52	13:30	
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.9937	0.9937	0.9937	
C_p	Pitot tube coefficient	0.84	0.84	0.84	
P_g	Static pressure (in. H_2O)	-11.3000	-11.2000	-11.2000	
A_s	Sample location area (ft^2)	64.0000	64.0000	64.0000	
P_{bar}	Barometric pressure (in. Hg)	30.25	30.25	30.25	**30.2500**
D_n	Nozzle diameter (in.)	0.2690	0.2690	0.2690	
O_2	Oxygen (dry volume %)	9.1400	9.2660	9.9030	**9.4363**
CO_2	Carbon dioxide (dry volume %)	10.2860	10.2340	9.6310	**10.0503**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.5740	80.5000	80.4660	**80.5133**
V_{lc}	Total Liquid collected (ml)	421.80	413.70	433.20	
V_m	Volume metered, meter conditions (ft^3)	75.9100	74.4700	78.5200	
T_m	Dry gas meter temperature (°F)	67.2000	77.7400	81.9600	
T_s	Sample temperature (°F)	301.7200	298.9200	300.3200	**300.3200**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.3440	1.2664	1.3724	
θ	Total sampling time (min)	125.0	125.0	125.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	19.8541	19.4729	20.3907	**19.9059**
V_{mstd}	Volume metered, standard (dscf)	76.5983	73.6585	77.0795	**75.7788**
P_s	Sample gas pressure, absolute (in. Hg)	29.4191	29.4265	29.4265	**29.4240**
P_v	Vapor pressure, actual (in. Hg)	29.4191	29.4265	29.4265	**29.4240**
B_{wo}	Moisture measured in sample (% by volume)	20.5844	20.9090	20.9200	**20.8044**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	20.5844	20.9090	20.9200	**20.8044**
$\sqrt{\Delta P}$	Velocity head ($\sqrt{in.}$ H_2O)	0.6878	0.6687	0.6928	**0.6831**
M_d	MW of sample gas, dry (lb/lb-mole)	30.0114	30.0081	29.9371	**29.9855**
M_s	MW of sample gas, wet (lb/lb-mole)	27.5389	27.4973	27.4398	**27.4920**
V_s	Velocity of sample (ft/sec)	47.8909	46.5072	48.2795	**47.5592**
%I	Isokinetic sampling (%)	99.8886	98.9289	99.9210	**99.5795**
Q_a	Volumetric flow rate, actual (acfm)	183,901	178,588	185,393	**182,627**
Q_s	Volumetric flow rate, standard (scfm)	125,340	122,199	126,622	**124,720**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	99,540	96,648	100,133	**98,773**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	84,215	80,892	79,220	**81,442**
Q_a	Volumetric flow rate, actual (acf/hr)	11,034,064	10,715,267	11,123,607	**10,957,646**
Q_s	Volumetric flow rate, standard (scf/hr)	7,520,420	7,331,916	7,597,308	**7,483,215**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,972,389	5,798,885	6,007,954	**5,926,409**
Q_a	Volumetric flow rate, actual (m^3/hr)	312,491	303,463	315,027	**310,327**
Q_s	Volumetric flow rate, standard (m^3/hr)	212,983	207,644	215,160	**211,929**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	169,142	164,228	170,149	**167,839**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	143,101	137,455	134,613	**138,390**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	198,461	193,487	200,490	**197,479**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	157,609	153,030	158,548	**156,396**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	133,344	128,083	125,435	**128,954**

Comments:

Average includes 3 runs.

042208 134156
RQL@

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

USEPA Method 5/29
Filterable Particulate Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		06:06	08:41	11:16	
Stop Time (approx.)		08:19	10:52	13:30	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	186.6	184.3	184.1	**185.0**
P_1	Fabric Filter Inlet Temperature (°F)	318	315	316	**316**
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 %)	9.1400	9.2660	9.9030	**9.4363**
CO_2	Carbon dioxide (dry volume %)	10.2860	10.2340	9.6310	**10.0503**
T_s	Sample temperature (°F)	301.7200	298.9200	300.3200	**300.3200**
B_w	Actual water vapor in gas (% by volume)	20.5844	20.9090	20.9200	**20.8044**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	183,901	178,588	185,393	**182,627**
Q_s	Volumetric flow rate, standard (scfm)	125,340	122,199	126,622	**124,720**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	99,540	96,648	100,133	**98,773**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	84,215	80,892	79,220	**81,442**
Q_a	Volumetric flow rate, actual (acf/hr)	11,034,064	10,715,267	11,123,607	**10,957,646**
Q_s	Volumetric flow rate, standard (scf/hr)	7,520,420	7,331,916	7,597,308	**7,483,215**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,972,389	5,798,885	6,007,954	**5,926,409**
Q_a	Volumetric flow rate, actual (m^3/hr)	312,491	303,463	315,027	**310,327**
Q_s	Volumetric flow rate, standard (m^3/hr)	212,983	207,644	215,160	**211,929**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	169,142	164,228	170,149	**167,839**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	143,101	137,455	134,613	**138,390**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	198,461	193,487	200,490	**197,479**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	157,609	153,030	158,548	**156,396**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	133,344	128,083	125,435	**128,954**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	76.5983	73.6585	77.0795	**75.7788**
%I	Isokinetic sampling (%)	99.8886	98.9289	99.9210	**99.5795**
Laboratory Data					
m_{filter}	Matter collected on filter(s) (g)	0.00030	0.00030	0.00030	
m_s	Matter collected in solvent rinse(s) (g)	0.00468	0.00392	0.00402	
m_n	Total particulate matter collected (g)	0.00498	0.00422	0.00432	
Filterable Particulate Results					
C_{sd}	Particulate Concentration (lb/dscf)	1.4336E-07	1.2633E-07	1.2358E-07	**1.3109E-07**
C_{sd7}	Particulate Concentration @7% O_2 (lb/dscf)	1.6944E-07	1.5093E-07	1.5620E-07	**1.5886E-07**
C_{sd12}	Particulate Concentration @12% CO_2 (lb/dscf)	1.6725E-07	1.4813E-07	1.5398E-07	**1.5645E-07**
C_a	Particulate Concentration (lb/acf)	7.7595E-08	6.8366E-08	6.6747E-08	**7.0903E-08**
C_{sd}	Particulate Concentration (gr/dscf)	0.0010	0.0009	0.0009	**0.0009**
C_{sd7}	Particulate Concentration @7% O_2 (gr/dscf)	0.0012	0.0011	0.0011	**0.0011**
C_{sd12}	Particulate Concentration @12% CO_2 (gr/dscf)	0.0012	0.0010	0.0011	**0.0011**
C_a	Particulate Concentration (gr/acf)	0.0005	0.0005	0.0005	**0.0005**
C_{sd}	Particulate Concentration (mg/dscm)	2.2957	2.0230	1.9790	**2.0992**
C_{sd7}	Particulate Concentration @7% O_2 (mg/dscm)	2.7134	2.4170	2.5014	**2.5439**
C_{sd12}	Particulate Concentration @12% CO_2 (mg/dscm)	2.6782	2.3720	2.4658	**2.5053**
C_a	Particulate Concentration (mg/m^3 (actual,wet))	1.2426	1.0948	1.0689	**1.1354**
C_{sd}	Particulate Concentration (mg/Nm^3 dry)	2.4636	2.1710	2.1238	**2.2528**
C_{sd7}	Particulate Concentration @7% O_2 (mg/Nm^3 dry)	2.9120	2.5938	2.6844	**2.7301**
C_{sd12}	Particulate Concentration @12% CO_2 (mg/Nm^3 dry)	2.8742	2.5456	2.6462	**2.6887**
$E_{lb/hr}$	Particulate Rate (lb/hr)	0.8562	0.7326	0.7425	**0.7771**
$E_{kg/hr}$	Particulate Rate (kg/hr)	0.3883	0.3322	0.3367	**0.3524**
$E_{T/yr}$	Particulate Rate (Ton/yr)	3.7501	3.2086	3.2520	**3.4036**
E_{Fd}	Particulate Rate - F_d-based (lb/MMBtu)	0.0024	0.0022	0.0022	**0.0023**
E_{Fc}	Particulate Rate - F_c-based (lb/MMBtu)	0.0025	0.0022	0.0023	**0.0024**

Program by Clean Air Engineering Proprietary Software
S5-EPA 5-1 Version 2006-08b

042208 134156
RQL@_N

QA/QC _____
Date _____

Comments:
Average includes 3 runs.

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

USEPA Method 5/29
Mercury (Hg) Emission Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		06:06	08:41	11:16	
Stop Time (approx.)		08:19	10:52	13:30	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	186.6	184.3	184.1	**185.0**
P_1	Fabric Filter Inlet Temperature (°F)	318	315	316	**316**
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 %)	9.1400	9.2660	9.9030	**9.4363**
CO_2	Carbon dioxide (dry volume %)	10.2860	10.2340	9.6310	**10.0503**
T_s	Sample temperature (°F)	301.7200	298.9200	300.3200	**300.3200**
B_w	Actual water vapor in gas (% by volume)	20.5844	20.9090	20.9200	**20.8044**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	183,901	178,588	185,393	**182,627**
Q_s	Volumetric flow rate, standard (scfm)	125,340	122,199	126,622	**124,720**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	99,540	96,648	100,133	**98,773**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	84,215	80,892	79,220	**81,442**
Q_a	Volumetric flow rate, actual (acf/hr)	11,034,064	10,715,267	11,123,607	**10,957,646**
Q_s	Volumetric flow rate, standard (scf/hr)	7,520,420	7,331,916	7,597,308	**7,483,215**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,972,389	5,798,885	6,007,954	**5,926,409**
Q_a	Volumetric flow rate, actual (m^3/hr)	312,491	303,463	315,027	**310,327**
Q_s	Volumetric flow rate, standard (m^3/hr)	212,983	207,644	215,160	**211,929**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	169,142	164,228	170,149	**167,839**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	143,101	137,455	134,613	**138,390**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	198,461	193,487	200,490	**197,479**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	157,609	153,030	158,548	**156,396**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	133,344	128,083	125,435	**128,954**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	76.5983	73.6585	77.0795	**75.7788**
%I	Isokinetic sampling (%)	99.8886	98.9289	99.9210	**99.5795**
Laboratory Data					
m_{n-1b}	Fraction 1B (µg)	<0.1000	<0.1000	<0.1000	**<0.1000**
m_{n-2b}	Fraction 2B (µg)	28.6714	27.4239	28.5413	**28.2122**
m_{n-3a}	Fraction 3A (µg)	<0.2000	<0.2000	<0.2000	**<0.2000**
m_{n-3b}	Fraction 3B (µg)	<0.5000	<0.5000	<0.5000	**<0.5000**
m_{n-3c}	Fraction 3C (µg)	<0.4000	<0.4000	<0.4000	**<0.4000**
m_n	Total matter corrected for allowable blanks (µg)	28.6714	27.4239	28.5413	**28.2122**
Mercury Results - Total					
C_{sd}	Concentration (lb/dscf)	8.2535E-10	8.2095E-10	8.1648E-10	**8.2092E-10**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	9.7554E-10	9.8085E-10	1.0320E-09	**9.9613E-10**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	9.6288E-10	9.6261E-10	1.0173E-09	**9.8093E-10**
C_a	Concentration (lb/acf)	4.4674E-10	4.4428E-10	4.4099E-10	**4.4400E-10**
C_{sd}	Concentration (µg/dscm)	1.3217E+01	1.3146E+01	1.3075E+01	**1.3146E+01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	1.5622E+01	1.5707E+01	1.6526E+01	**1.5952E+01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	1.5419E+01	1.5415E+01	1.6291E+01	**1.5708E+01**
C_{sd}	Concentration (mg/dscm)	1.3217E-02	1.3146E-02	1.3075E-02	**1.3146E-02**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	1.5622E-02	1.5707E-02	1.6526E-02	**1.5952E-02**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	1.5419E-02	1.5415E-02	1.6291E-02	**1.5708E-02**
C_a	Concentration (µg/m^3 (actual,wet))	7.1539E+00	7.1145E+00	7.0618E+00	**7.1100E+00**
C_{sd}	Concentration (µg/Nm^3 dry)	1.4184E+01	1.4108E+01	1.4031E+01	**1.4108E+01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	1.6765E+01	1.6856E+01	1.7735E+01	**1.7119E+01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	1.6547E+01	1.6543E+01	1.7483E+01	**1.6858E+01**
$E_{lb/hr}$	Rate (lb/hr)	4.9293E-03	4.7606E-03	4.9054E-03	**4.8651E-03**
$E_{g/s}$	Rate (g/s)	6.2098E-04	5.9972E-04	6.1796E-04	**6.1288E-04**
$E_{T/yr}$	Rate (Ton/yr)	2.1590E-02	2.0851E-02	2.1485E-02	**2.1309E-02**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.4037E-05	1.4114E-05	1.4850E-05	**1.4334E-05**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	1.4604E-05	1.4600E-05	1.5429E-05	**1.4878E-05**

042208 134158
RQL@_O

Prepared by Clean Air Engineering Proprietary Software
SS Metals-1 Version 2008-12a

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

USEPA Method 5/29
Mercury (Hg) Emission Parameters (continued)
Separate Front Half Results

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		06:06	08:41	11:16	
Stop Time (approx.)		08:19	10:52	13:30	
Mercury Results - Front Half					
C_{sd}	Concentration (lb/dscf)	<2.8787E-12	<2.9935E-12	<2.8607E-12	**<2.9110E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<3.4025E-12	<3.5766E-12	<3.6159E-12	**<3.5316E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<3.3583E-12	<3.5101E-12	<3.5643E-12	**<3.4776E-12**
C_a	Concentration (lb/acf)	<1.5581E-12	<1.6200E-12	<1.5451E-12	**<1.5744E-12**
C_{sd}	Concentration (µg/dscm)	<4.6098E-02	<4.7937E-02	<4.5810E-02	**<4.6615E-02**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<5.4486E-02	<5.7274E-02	<5.7903E-02	**<5.6554E-02**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<5.3779E-02	<5.6210E-02	<5.7078E-02	**<5.5689E-02**
C_{sd}	Concentration (mg/dscm)	<4.6098E-05	<4.7937E-05	<4.5810E-05	**<4.6615E-05**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<5.4486E-05	<5.7274E-05	<5.7903E-05	**<5.6554E-05**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<5.3779E-05	<5.6210E-05	<5.7078E-05	**<5.5689E-05**
C_a	Concentration (µg/m^3 (actual,wet))	<2.4951E-02	<2.5943E-02	<2.4742E-02	**<2.5212E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<4.9471E-02	<5.1445E-02	<4.9162E-02	**<5.0026E-02**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<5.8473E-02	<6.1465E-02	<6.2140E-02	**<6.0693E-02**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<5.7714E-02	<6.0322E-02	<6.1254E-02	**<5.9764E-02**
$E_{lb/hr}$	Rate (lb/hr)	<1.7192E-05	<1.7359E-05	<1.7187E-05	**<1.7246E-05**
$E_{g/s}$	Rate (g/s)	<2.1658E-06	<2.1868E-06	<2.1651E-06	**<2.1726E-06**
$E_{T/yr}$	Rate (Ton/yr)	<7.5303E-05	<7.6033E-05	<7.5278E-05	**<7.5538E-05**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<4.8960E-08	<5.1465E-08	<5.2030E-08	**<5.0818E-08**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<5.0935E-08	<5.3237E-08	<5.4059E-08	**<5.2744E-08**

042208 134158
RQL@_O

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
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 (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		06:06	08:41	11:16	
Stop Time (approx.)		08:19	10:52	13:30	
Mercury Results - Impingers 1-3 Solution					
C_{sd}	Concentration (lb/dscf)	8.2535E-10	8.2095E-10	8.1648E-10	**8.2092E-10**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	9.7554E-10	9.8085E-10	1.0320E-09	**9.9613E-10**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	9.6288E-10	9.6261E-10	1.0173E-09	**9.8093E-10**
C_a	Concentration (lb/acf)	4.4674E-10	4.4428E-10	4.4099E-10	**4.4400E-10**
C_{sd}	Concentration (µg/dscm)	1.3217E+01	1.3146E+01	1.3075E+01	**1.3146E+01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	1.5622E+01	1.5707E+01	1.6526E+01	**1.5952E+01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	1.5419E+01	1.5415E+01	1.6291E+01	**1.5708E+01**
C_{sd}	Concentration (mg/dscm)	1.3217E-02	1.3146E-02	1.3075E-02	**1.3146E-02**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	1.5622E-02	1.5707E-02	1.6526E-02	**1.5952E-02**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	1.5419E-02	1.5415E-02	1.6291E-02	**1.5708E-02**
C_a	Concentration (µg/m^3 (actual,wet))	7.1539E+00	7.1145E+00	7.0618E+00	**7.1100E+00**
C_{sd}	Concentration (µg/Nm^3 dry)	1.4184E+01	1.4108E+01	1.4031E+01	**1.4108E+01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	1.6765E+01	1.6856E+01	1.7735E+01	**1.7119E+01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	1.6547E+01	1.6543E+01	1.7483E+01	**1.6858E+01**
$E_{lb/hr}$	Rate (lb/hr)	4.9293E-03	4.7606E-03	4.9054E-03	**4.8651E-03**
$E_{g/s}$	Rate (g/s)	6.2098E-04	5.9972E-04	6.1796E-04	**6.1288E-04**
$E_{T/yr}$	Rate (Ton/yr)	2.1590E-02	2.0851E-02	2.1485E-02	**2.1309E-02**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.4037E-05	1.4114E-05	1.4850E-05	**1.4334E-05**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	1.4604E-05	1.4600E-05	1.5429E-05	**1.4878E-05**

042208 134156
ROL@_0

Prepared by Clean Air Engineering Proprietary Software
SS Metals-1 Version 2008-12a

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

USEPA Method 5/29
Mercury (Hg) Emission Parameters (continued)
Separate Impinger 4 Results

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		06:06	08:41	11:16	
Stop Time (approx.)		08:19	10:52	13:30	
Mercury Results - Impinger 4 Solution					
C_{sd}	Concentration (lb/dscf)	<5.7573E-12	<5.9871E-12	<5.7214E-12	**<5.8219E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<6.8050E-12	<7.1532E-12	<7.2317E-12	**<7.0633E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<6.7167E-12	<7.0202E-12	<7.1287E-12	**<6.9552E-12**
C_a	Concentration (lb/acf)	<3.1162E-12	<3.2401E-12	<3.0902E-12	**<3.1488E-12**
C_{sd}	Concentration (µg/dscm)	<9.2195E-02	<9.5875E-02	<9.1620E-02	**<9.3230E-02**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<1.0897E-01	<1.1455E-01	<1.1581E-01	**<1.1311E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<1.0756E-01	<1.1242E-01	<1.1416E-01	**<1.1138E-01**
C_{sd}	Concentration (mg/dscm)	<9.2195E-05	<9.5875E-05	<9.1620E-05	**<9.3230E-05**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<1.0897E-04	<1.1455E-04	<1.1581E-04	**<1.1311E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<1.0756E-04	<1.1242E-04	<1.1416E-04	**<1.1138E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<4.9902E-02	<5.1886E-02	<4.9485E-02	**<5.0424E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<9.8941E-02	<1.0289E-01	<9.8324E-02	**<1.0005E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<1.1695E-01	<1.2293E-01	<1.2428E-01	**<1.2139E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<1.1543E-01	<1.2064E-01	<1.2251E-01	**<1.1953E-01**
$E_{lb/hr}$	Rate (lb/hr)	<3.4385E-05	<3.4718E-05	<3.4374E-05	**<3.4492E-05**
$E_{g/s}$	Rate (g/s)	<4.3317E-06	<4.3737E-06	<4.3303E-06	**<4.3452E-06**
$E_{T/yr}$	Rate (Ton/yr)	<1.5061E-04	<1.5207E-04	<1.5056E-04	**<1.5108E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<9.7920E-08	<1.0293E-07	<1.0406E-07	**<1.0164E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<1.0187E-07	<1.0647E-07	<1.0812E-07	**<1.0549E-07**

042208 134156
RQL@_O

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
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 (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		06:06	08:41	11:16	
Stop Time (approx.)		08:19	10:52	13:30	
Mercury Results - Filtered Permanganate Solution					
C_{sd}	Concentration (lb/dscf)	<1.4393E-11	<1.4968E-11	<1.4303E-11	**<1.4555E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<1.7012E-11	<1.7883E-11	<1.8079E-11	**<1.7658E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<1.6792E-11	<1.7551E-11	<1.7822E-11	**<1.7388E-11**
C_a	Concentration (lb/acf)	<7.7906E-12	<8.1002E-12	<7.7254E-12	**<7.8721E-12**
C_{sd}	Concentration (µg/dscm)	<2.3049E-01	<2.3969E-01	<2.2905E-01	**<2.3307E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<2.7243E-01	<2.8637E-01	<2.8951E-01	**<2.8277E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<2.6890E-01	<2.8105E-01	<2.8539E-01	**<2.7844E-01**
C_{sd}	Concentration (mg/dscm)	<2.3049E-04	<2.3969E-04	<2.2905E-04	**<2.3307E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<2.7243E-04	<2.8637E-04	<2.8951E-04	**<2.8277E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<2.6890E-04	<2.8105E-04	<2.8539E-04	**<2.7844E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<1.2476E-01	<1.2971E-01	<1.2371E-01	**<1.2606E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	<2.4735E-01	<2.5723E-01	<2.4581E-01	**<2.5013E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<2.9236E-01	<3.0733E-01	<3.1070E-01	**<3.0346E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<2.8857E-01	<3.0161E-01	<3.0627E-01	**<2.9882E-01**
$E_{lb/hr}$	Rate (lb/hr)	<8.5962E-05	<8.6796E-05	<8.5934E-05	**<8.6231E-05**
$E_{g/s}$	Rate (g/s)	<1.0829E-05	<1.0934E-05	<1.0826E-05	**<1.0863E-05**
$E_{T/yr}$	Rate (Ton/yr)	<3.7651E-04	<3.8017E-04	<3.7639E-04	**<3.7769E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<2.4480E-07	<2.5733E-07	<2.6015E-07	**<2.5409E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<2.5467E-07	<2.6618E-07	<2.7030E-07	**<2.6372E-07**
Mercury Results - HCl Rinse + HCl/MnO2 Precipitate					
C_{sd}	Concentration (lb/dscf)	<1.1515E-11	<1.1974E-11	<1.1443E-11	**<1.1644E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<1.3610E-11	<1.4306E-11	<1.4463E-11	**<1.4127E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<1.3433E-11	<1.4040E-11	<1.4257E-11	**<1.3910E-11**
C_a	Concentration (lb/acf)	<6.2325E-12	<6.4802E-12	<6.1803E-12	**<6.2977E-12**
C_{sd}	Concentration (µg/dscm)	<1.8439E-01	<1.9175E-01	<1.8324E-01	**<1.8646E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<2.1794E-01	<2.2910E-01	<2.3161E-01	**<2.2622E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<2.1512E-01	<2.2484E-01	<2.2831E-01	**<2.2276E-01**
C_{sd}	Concentration (mg/dscm)	<1.8439E-04	<1.9175E-04	<1.8324E-04	**<1.8646E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<2.1794E-04	<2.2910E-04	<2.3161E-04	**<2.2622E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<2.1512E-04	<2.2484E-04	<2.2831E-04	**<2.2276E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<9.9805E-02	<1.0377E-01	<9.8969E-02	**<1.0085E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	<1.9788E-01	<2.0578E-01	<1.9665E-01	**<2.0010E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<2.3389E-01	<2.4586E-01	<2.4856E-01	**<2.4277E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<2.3086E-01	<2.4129E-01	<2.4502E-01	**<2.3905E-01**
$E_{lb/hr}$	Rate (lb/hr)	<6.8770E-05	<6.9437E-05	<6.8747E-05	**<6.8985E-05**
$E_{g/s}$	Rate (g/s)	<8.6634E-06	<8.7474E-06	<8.6605E-06	**<8.6904E-06**
$E_{T/yr}$	Rate (Ton/yr)	<3.0121E-04	<3.0413E-04	<3.0111E-04	**<3.0215E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<1.9584E-07	<2.0586E-07	<2.0812E-07	**<2.0327E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<2.0374E-07	<2.1295E-07	<2.1624E-07	**<2.1097E-07**

042208 134158
RQL@_O

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

USEPA Method 5/29
Beryllium (Be) Emission Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		06:06	08:41	11:16	
Stop Time (approx.)		08:19	10:52	13:30	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	186.6	184.3	184.1	**185.0**
P_1	Fabric Filter Inlet Temperature (°F)	318	315	316	**316**
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 %)	9.1400	9.2660	9.9030	**9.4363**
CO_2	Carbon dioxide (dry volume %)	10.2860	10.2340	9.6310	**10.0503**
T_s	Sample temperature (°F)	301.7200	298.9200	300.3200	**300.3200**
B_w	Actual water vapor in gas (% by volume)	20.5844	20.9090	20.9200	**20.8044**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	183,901	178,588	185,393	**182,627**
Q_s	Volumetric flow rate, standard (scfm)	125,340	122,199	126,622	**124,720**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	99,540	96,648	100,133	**98,773**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	84,215	80,892	79,220	**81,442**
Q_a	Volumetric flow rate, actual (acf/hr)	11,034,064	10,715,267	11,123,607	**10,957,646**
Q_s	Volumetric flow rate, standard (scf/hr)	7,520,420	7,331,916	7,597,308	**7,483,215**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,972,389	5,798,885	6,007,954	**5,926,409**
Q_a	Volumetric flow rate, actual (m^3/hr)	312,491	303,463	315,027	**310,327**
Q_s	Volumetric flow rate, standard (m^3/hr)	212,983	207,644	215,160	**211,929**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	169,142	164,228	170,149	**167,839**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	143,101	137,455	134,613	**138,390**
Q_a	Volumetric flow rate, normal (Nm^3/hr)	198,461	193,487	200,490	**197,479**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	157,609	153,030	158,548	**156,396**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	133,344	128,083	125,435	**128,954**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	76.5983	73.6585	77.0795	**75.7788**
%I	Isokinetic sampling (%)	99.8886	98.9289	99.9210	**99.5795**
Laboratory Data					
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)	<1.4393E-12	<1.4968E-12	<1.4303E-12	**<1.4555E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<1.7012E-12	<1.7883E-12	<1.8079E-12	**<1.7658E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<1.6792E-12	<1.7551E-12	<1.7822E-12	**<1.7388E-12**
C_a	Concentration (lb/acf)	<7.7906E-13	<8.1002E-13	<7.7254E-13	**<7.8721E-13**
C_{sd}	Concentration (µg/dscm)	<2.3049E-02	<2.3969E-02	<2.2905E-02	**<2.3307E-02**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<2.7243E-02	<2.8637E-02	<2.8951E-02	**<2.8277E-02**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<2.6890E-02	<2.8105E-02	<2.8539E-02	**<2.7844E-02**
C_{sd}	Concentration (mg/dscm)	<2.3049E-05	<2.3969E-05	<2.2905E-05	**<2.3307E-05**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<2.7243E-05	<2.8637E-05	<2.8951E-05	**<2.8277E-05**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<2.6890E-05	<2.8105E-05	<2.8539E-05	**<2.7844E-05**
C_a	Concentration (µg/m^3 (actual,wet))	<1.2476E-02	<1.2971E-02	<1.2371E-02	**<1.2606E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<2.4735E-02	<2.5723E-02	<2.4581E-02	**<2.5013E-02**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<2.9236E-02	<3.0733E-02	<3.1070E-02	**<3.0346E-02**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<2.8857E-02	<3.0161E-02	<3.0627E-02	**<2.9882E-02**
$E_{lb/hr}$	Rate (lb/hr)	<8.5962E-06	<8.6796E-06	<8.5934E-06	**<8.6231E-06**
$E_{g/s}$	Rate (g/s)	<1.0829E-06	<1.0934E-06	<1.0826E-06	**<1.0863E-06**
$E_{T/yr}$	Rate (Ton/yr)	<3.7651E-05	<3.8017E-05	<3.7639E-05	**<3.7769E-05**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<2.4480E-08	<2.5733E-08	<2.6015E-08	**<2.5409E-08**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<2.5467E-08	<2.6618E-08	<2.7030E-08	**<2.6372E-08**

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

USEPA Method 5/29
Cadmium (Cd) Emission Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		06:06	08:41	11:16	
Stop Time (approx.)		08:19	10:52	13:30	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	186.6	184.3	184.1	**185.0**
P_1	Fabric Filter Inlet Temperature (°F)	318	315	316	**316**
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 %)	9.1400	9.2660	9.9030	**9.4363**
CO_2	Carbon dioxide (dry volume %)	10.2860	10.2340	9.6310	**10.0503**
T_s	Sample temperature (°F)	301.7200	298.9200	300.3200	**300.3200**
B_w	Actual water vapor in gas (% by volume)	20.5844	20.9090	20.9200	**20.8044**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	183,901	178,588	185,393	**182,627**
Q_s	Volumetric flow rate, standard (scfm)	125,340	122,199	126,622	**124,720**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	99,540	96,648	100,133	**98,773**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	84,215	80,892	79,220	**81,442**
Q_a	Volumetric flow rate, actual (acf/hr)	11,034,064	10,715,267	11,123,607	**10,957,646**
Q_s	Volumetric flow rate, standard (scf/hr)	7,520,420	7,331,916	7,597,308	**7,483,215**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,972,389	5,798,885	6,007,954	**5,926,409**
Q_a	Volumetric flow rate, actual (m^3/hr)	312,491	303,463	315,027	**310,327**
Q_s	Volumetric flow rate, standard (m^3/hr)	212,983	207,644	215,160	**211,929**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	169,142	164,228	170,149	**167,839**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	143,101	137,455	134,613	**138,390**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	198,461	193,487	200,490	**197,479**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	157,609	153,030	158,548	**156,396**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	133,344	128,083	125,435	**128,954**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	76.5983	73.6585	77.0795	**75.7788**
%I	Isokinetic sampling (%)	99.8886	98.9289	99.9210	**99.5795**
Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	<0.2000	<0.2000	0.3630	**<0.2543**
Cadmium Results - Total					
C_{sd}	Concentration (lb/dscf)	<5.7573E-12	<5.9871E-12	1.0384E-11	**<7.3761E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<6.8050E-12	<7.1532E-12	1.3125E-11	**<9.0278E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<6.7167E-12	<7.0202E-12	1.2938E-11	**<8.8917E-12**
C_a	Concentration (lb/acf)	<3.1162E-12	<3.2401E-12	5.6085E-12	**<3.9883E-12**
C_{sd}	Concentration (µg/dscm)	<9.2195E-02	<9.5875E-02	1.6629E-01	**<1.1812E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<1.0897E-01	<1.1455E-01	2.1018E-01	**<1.4457E-01**
C_{ed12}	Concentration @12% CO_2 (µg/dscm)	<1.0756E-01	<1.1242E-01	2.0719E-01	**<1.4239E-01**
C_{sd}	Concentration (mg/dscm)	<9.2195E-05	<9.5875E-05	1.6629E-04	**<1.1812E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<1.0897E-04	<1.1455E-04	2.1018E-04	**<1.4457E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<1.0756E-04	<1.1242E-04	2.0719E-04	**<1.4239E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<4.9902E-02	<5.1886E-02	8.9813E-02	**<6.3867E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<9.8941E-02	<1.0289E-01	1.7845E-01	**<1.2676E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<1.1695E-01	<1.2293E-01	2.2556E-01	**<1.5515E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<1.1543E-01	<1.2064E-01	2.2235E-01	**<1.5281E-01**
$E_{lb/hr}$	Rate (lb/hr)	<3.4385E-05	<3.4718E-05	6.2387E-05	**<4.3830E-05**
$E_{g/s}$	Rate (g/s)	<4.3317E-06	<4.3737E-06	7.8593E-06	**<5.5216E-06**
$E_{T/yr}$	Rate (Ton/yr)	<1.5061E-04	<1.5207E-04	2.7325E-04	**<1.9198E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<9.7920E-08	<1.0293E-07	1.8886E-07	**<1.2991E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<1.0187E-07	<1.0647E-07	1.9623E-07	**<1.3486E-07**

042208 134156

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

USEPA Method 5/29
Lead (Pb) Emission Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		06:06	08:41	11:16	
Stop Time (approx.)		08:19	10:52	13:30	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	186.6	184.3	184.1	**185.0**
P_1	Fabric Filter Inlet Temperature (°F)	318	315	316	**316**
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 %)	9.1400	9.2660	9.9030	**9.4363**
CO_2	Carbon dioxide (dry volume %)	10.2860	10.2340	9.6310	**10.0503**
T_s	Sample temperature (°F)	301.7200	298.9200	300.3200	**300.3200**
B_w	Actual water vapor in gas (% by volume)	20.5844	20.9090	20.9200	**20.8044**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	183,901	178,588	185,393	**182,627**
Q_s	Volumetric flow rate, standard (scfm)	125,340	122,199	126,622	**124,720**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	99,540	96,648	100,133	**98,773**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	84,215	80,892	79,220	**81,442**
Q_a	Volumetric flow rate, actual (acf/hr)	11,034,064	10,715,267	11,123,607	**10,957,646**
Q_s	Volumetric flow rate, standard (scf/hr)	7,520,420	7,331,916	7,597,308	**7,483,215**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,972,389	5,798,885	6,007,954	**5,926,409**
Q_a	Volumetric flow rate, actual (m^3/hr)	312,491	303,463	315,027	**310,327**
Q_s	Volumetric flow rate, standard (m^3/hr)	212,983	207,644	215,160	**211,929**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	169,142	164,228	170,149	**167,839**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	143,101	137,455	134,613	**138,390**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	198,461	193,487	200,490	**197,479**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	157,609	153,030	158,548	**156,396**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	133,344	128,083	125,435	**128,954**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	76.5983	73.6585	77.0795	**75.7788**
%I	Isokinetic sampling (%)	99.8886	98.9289	99.9210	**99.5795**
Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	0.5073	1.2879	0.8338	**0.8764**
Lead Results - Total					
C_{sd}	Concentration (lb/dscf)	1.4604E-11	3.8555E-11	2.3854E-11	**2.5671E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	1.7262E-11	4.6064E-11	3.0151E-11	**3.1159E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	1.7038E-11	4.5208E-11	2.9721E-11	**3.0656E-11**
C_a	Concentration (lb/acf)	7.9048E-12	2.0865E-11	1.2884E-11	**1.3884E-11**
C_{sd}	Concentration (µg/dscm)	2.3387E-01	6.1740E-01	3.8198E-01	**4.1108E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	2.7642E-01	7.3765E-01	4.8282E-01	**4.9897E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	2.7284E-01	7.2394E-01	4.7594E-01	**4.9091E-01**
C_{sd}	Concentration (mg/dscm)	2.3387E-04	6.1740E-04	3.8198E-04	**4.1108E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	2.7642E-04	7.3765E-04	4.8282E-04	**4.9897E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	2.7284E-04	7.2394E-04	4.7594E-04	**4.9091E-04**
C_a	Concentration (µg/m^3 (actual,wet))	1.2658E-01	3.3412E-01	2.0631E-01	**2.2234E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	2.5098E-01	6.6257E-01	4.0993E-01	**4.4116E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	2.9665E-01	7.9163E-01	5.1815E-01	**5.3548E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	2.9280E-01	7.7691E-01	5.1077E-01	**5.2683E-01**
$E_{lb/hr}$	Rate (lb/hr)	8.7222E-05	2.2357E-04	1.4331E-04	**1.5137E-04**
$E_{g/s}$	Rate (g/s)	1.0988E-05	2.8165E-05	1.8054E-05	**1.9069E-05**
$E_{T/yr}$	Rate (Ton/yr)	3.8203E-04	9.7925E-04	6.2771E-04	**6.6300E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	2.4839E-07	6.6284E-07	4.3385E-07	**4.4836E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	2.5841E-07	6.8565E-07	4.5077E-07	**4.6494E-07**

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

042208 134156

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

USEPA Method 13B (Total Fluorides)
Sampling, Velocity and Moisture Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		09:24	11:17	12:45	
Stop Time (approx.)		10:39	12:27	14:06	
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.9927	0.9927	0.9927	
C_p	Pitot tube coefficient	0.84	0.84	0.84	
P_g	Static pressure (in. H_2O)	-10.5000	-10.5000	-10.5000	
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.)	0.2650	0.2650	0.2650	
O_2	Oxygen (dry volume %)	9.0620	8.5800	8.2000	**8.6140**
CO_2	Carbon dioxide (dry volume %)	10.6000	10.9600	11.2490	**10.9363**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.3380	80.4600	80.5510	**80.4497**
V_{lc}	Total Liquid collected (ml)	196.20	199.80	198.60	
V_m	Volume metered, meter conditions (ft^3)	36.1800	35.1100	34.1600	
T_m	Dry gas meter temperature (°F)	82.0200	78.8200	80.3800	
T_s	Sample temperature (°F)	301.4800	301.0400	299.7200	**300.7467**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.0260	0.9792	0.9164	
θ	Total sampling time (min)	62.5	62.5	62.5	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	9.2351	9.4046	9.3481	**9.3293**
V_{mstd}	Volume metered, standard (dscf)	35.1546	34.3136	33.2836	**34.2506**
P_s	Sample gas pressure, absolute (in. Hg)	29.2279	29.2279	29.2279	**29.2279**
P_v	Vapor pressure, actual (in. Hg)	29.2279	29.2279	29.2279	**29.2279**
B_{wo}	Moisture measured in sample (% by volume)	20.8047	21.5118	21.9276	**21.4147**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	20.8047	21.5118	21.9276	**21.4147**
$\sqrt{\Delta P}$	Velocity head ($\sqrt{in.\ H_2O}$)	0.6360	0.6224	0.6033	**0.6206**
M_d	MW of sample gas, dry (lb/lb-mole)	30.0585	30.0968	30.1278	**30.0944**
M_s	MW of sample gas, wet (lb/lb-mole)	27.5498	27.4946	27.4685	**27.5043**
V_s	Velocity of sample (ft/sec)	44.4167	43.4965	42.1473	**43.3535**
%I	Isokinetic sampling (%)	102.7849	103.3118	103.7890	**103.2952**
Q_a	Volumetric flow rate, actual (acfm)	170,560	167,026	161,846	**166,477**
Q_s	Volumetric flow rate, standard (scfm)	115,528	113,200	109,880	**112,870**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	91,493	88,849	85,786	**88,709**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	77,921	78,750	78,380	**78,350**
Q_a	Volumetric flow rate, actual (acf/hr)	10,233,597	10,021,587	9,710,734	**9,988,639**
Q_s	Volumetric flow rate, standard (scf/hr)	6,931,709	6,792,030	6,592,787	**6,772,175**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,489,590	5,330,939	5,147,149	**5,322,559**
Q_a	Volumetric flow rate, actual (m^3/hr)	289,821	283,817	275,014	**282,884**
Q_s	Volumetric flow rate, standard (m^3/hr)	196,310	192,354	186,712	**191,792**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	155,468	150,975	145,770	**150,738**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	132,405	133,814	133,186	**133,135**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	182,925	179,239	173,981	**178,715**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	144,868	140,682	135,831	**140,460**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	123,378	124,690	124,105	**124,058**

Comments:
Average includes 3 runs.

042208 125405
MHI@

Prepared by Clean Air Engineering Proprietary Software
SS ISOKINETIC Version 2008-13a

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

USEPA Method 13B
HF Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		09:24	11:17	12:45	
Stop Time (approx.)		10:39	12:27	14:06	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	183.8	184.3	184.6	**184.2**
P_1	Fabric Filter Inlet Temperature (°F)	315	315	315	**315**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.0620	8.5800	8.2000	**8.6140**
CO_2	Carbon dioxide (dry volume %)	10.6000	10.9600	11.2490	**10.9363**
T_s	Sample temperature (°F)	301.4800	301.0400	299.7200	**300.7467**
B_w	Actual water vapor in gas (% by volume)	20.8047	21.5118	21.9276	**21.4147**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	170,560	167,026	161,846	**166,477**
Q_s	Volumetric flow rate, standard (scfm)	115,528	113,200	109,880	**112,870**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	91,493	88,849	85,786	**88,709**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	77,921	78,750	78,380	**78,350**
Q_a	Volumetric flow rate, actual (acf/hr)	10,233,597	10,021,587	9,710,734	**9,988,639**
Q_s	Volumetric flow rate, standard (scf/hr)	6,931,709	6,792,030	6,592,787	**6,772,175**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,489,590	5,330,939	5,147,149	**5,322,559**
Q_a	Volumetric flow rate, actual (m^3/hr)	289,821	283,817	275,014	**282,884**
Q_s	Volumetric flow rate, standard (m^3/hr)	196,310	192,354	186,712	**191,792**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	155,468	150,975	145,770	**150,738**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	132,405	133,814	133,186	**133,135**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	182,925	179,239	173,981	**178,715**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	144,868	140,682	135,831	**140,460**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	123,378	124,690	124,105	**124,058**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	35.1546	34.3136	33.2836	**34.2506**
%I	Isokinetic sampling (%)	102.7849	103.3118	103.7890	**103.2952**
Laboratory Data					
m_n	Total HF collected (mg)	<0.0014	<0.0014	<0.0015	
Hydrogen Fluoride (HF) Results					
C_{sd}	HF Concentration (lb/dscf)	<9.0089E-11	<9.2161E-11	<9.8362E-11	**<9.3537E-11**
C_{sd7}	HF Concentration @7% O_2 (lb/dscf)	<1.0578E-10	<1.0398E-10	<1.0766E-10	**<1.0581E-10**
C_{sd12}	HF Concentration @12% CO_2 (lb/dscf)	<1.0199E-10	<1.0091E-10	<1.0493E-10	**<1.0261E-10**
C_a	HF Concentration (lb/acf)	<4.8326E-11	<4.9025E-11	<5.2136E-11	**<4.9829E-11**
C_{sd}	HF Concentration (ppmdv)	<0.0017	<0.0018	<0.0019	**<0.0018**
C_{sd7}	HF Concentration @7% O_2 (ppmdv)	<0.0020	<0.0020	<0.0021	**<0.0020**
C_{sd12}	HF Concentration @12% CO_2 (ppmdv)	<0.0020	<0.0019	<0.0020	**<0.0020**
C_w	HF Concentration (ppmwv)	<0.0014	<0.0014	<0.0015	**<0.0014**
C_{sd}	HF Concentration (mg/dscm)	<0.0014	<0.0015	<0.0016	**<0.0015**
C_{sd7}	HF Concentration @7% O_2 (mg/dscm)	<0.0017	<0.0017	<0.0017	**<0.0017**
C_{sd12}	HF Concentration @12% CO_2 (mg/dscm)	<0.0016	<0.0016	<0.0017	**<0.0016**
C_a	HF Concentration (mg/m^3 (actual,wet))	<0.0008	<0.0008	<0.0008	**<0.0008**
C_{sd}	HF Concentration (mg/Nm^3 dry)	<0.0015	<0.0016	<0.0017	**<0.0016**
C_{sd7}	HF Concentration @7% O_2 (mg/Nm^3 dry)	<0.0018	<0.0018	<0.0019	**<0.0018**
C_{sd12}	HF Concentration @12% CO_2 (mg/Nm^3 dry)	<0.0018	<0.0017	<0.0018	**<0.0018**
$E_{lb/hr}$	HF Rate (lb/hr)	<0.00049	<0.00049	<0.00051	**<0.00050**
$E_{kg/hr}$	HF Rate (kg/hr)	<0.00022	<0.00022	<0.00023	**<0.00023**
$E_{T/yr}$	HF Rate (Ton/yr)	<0.0022	<0.0022	<0.0022	**<0.0022**
E_{Fd}	HF Rate - Fd-based (lb/MMBtu)	<0.0000015	<0.0000015	<0.0000015	**<0.0000015**
E_{Fc}	HF Rate - Fc-based (lb/MMBtu)	<0.0000015	<0.0000015	<0.0000016	**<0.0000016**

042208 125405
M H I @_Q

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

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

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:19	07:55	09:54	
Stop Time (approx.)		07:19	08:55	10:56	
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.9937	0.9937	0.9937	
C_p	Pitot tube coefficient	0.84	0.84	0.84	
P_g	Static pressure (in. H_2O)	-10.5000	-10.5000	-10.5000	
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.)	NA	NA	NA	
O_2	Oxygen (dry volume %)	10.5300	9.9330	9.5160	**9.9930**
CO_2	Carbon dioxide (dry volume %)	9.9092	9.7660	10.2850	**9.9867**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	79.5608	80.3010	80.1990	**80.0203**
V_{lc}	Total Liquid collected (ml)	180.90	190.20	186.50	
V_m	Volume metered, meter conditions (ft^3)	34.7450	34.5600	34.3800	
T_m	Dry gas meter temperature (°F)	78.2917	81.6250	84.1250	
T_s	Sample temperature (°F)	299.0833	299.7500	299.5000	**299.4444**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.2000	1.2000	1.2000	
θ	Total sampling time (min)	60.0	60.0	60.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	8.5150	8.9527	8.7786	**8.7487**
V_{mstd}	Volume metered, standard (dscf)	34.0428	33.6531	33.3241	**33.6733**
P_s	Sample gas pressure, absolute (in. Hg)	29.2279	29.2279	29.2279	**29.2279**
P_v	Vapor pressure, actual (in. Hg)	29.2279	29.2279	29.2279	**29.2279**
B_{wo}	Moisture measured in sample (% by volume)	20.0080	21.0129	20.8504	**20.6238**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	20.0080	21.0129	20.8504	**20.6238**
M_d	MW of sample gas, dry (lb/lb-mole)	30.0067	29.9599	30.0262	**29.9976**
M_s	MW of sample gas, wet (lb/lb-mole)	27.6044	27.4468	27.5187	**27.5233**

Comments:
Average includes 3 runs.

042208 135120
QJP@

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

USEPA Method 26A
HCl Parameters (CleanAir)

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:19	07:55	09:54	
Stop Time (approx.)		07:19	08:55	10:56	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	184.5	183.6	184.2	**184.1**
P_1	Fabric Filter Inlet Temperature (°F)	315	315	315	**315**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	10.5300	9.9330	9.5160	**9.9930**
CO_2	Carbon dioxide (dry volume %)	9.9092	9.7660	10.2850	**9.9867**
T_s	Sample temperature (°F)	299.0833	299.7500	299.5000	**299.4444**
B_w	Actual water vapor in gas (% by volume)	20.0080	21.0129	20.8504	**20.6238**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	34.0428	33.6531	33.3241	**33.6733**
Laboratory Data					
m_n	Total HCl collected (mg)	6.0361	6.4968	6.1982	
Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (lb/dscf)	3.9097E-07	4.2568E-07	4.1012E-07	**4.0892E-07**
C_{sd7}	HCl Concentration @7% O_2 (lb/dscf)	5.2406E-07	5.3952E-07	5.0076E-07	**5.2145E-07**
C_{sd12}	HCl Concentration @12% CO_2 (lb/dscf)	4.7346E-07	5.2305E-07	4.7851E-07	**4.9167E-07**
C_{sd}	HCl Concentration (ppmdv)	4.1335	4.5005	4.3361	**4.3234**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	5.5406	5.7041	5.2944	**5.5130**
C_{sd12}	HCl Concentration @12% CO_2 (ppmdv)	5.0057	5.5300	5.0591	**5.1983**
C_w	HCl Concentration (ppmwv)	3.3065	3.5548	3.4320	**3.4311**
C_{sd}	HCl Concentration (mg/dscm)	6.2608	6.8166	6.5675	**6.5483**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	8.3920	8.6397	8.0190	**8.3502**
C_{sd12}	HCl Concentration @12% CO_2 (mg/dscm)	7.5818	8.3759	7.6627	**7.8735**
C_{sd}	HCl Concentration (mg/Nm^3 dry)	6.7189	7.3154	7.0481	**7.0275**
C_{sd7}	HCl Concentration @7% O_2 (mg/Nm^3 dry)	9.0061	9.2718	8.6058	**8.9612**
C_{sd12}	HCl Concentration @12% CO_2 (mg/Nm^3 dry)	8.1366	8.9888	8.2233	**8.4496**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.0075	0.0078	0.0072	**0.0075**
E_{Fc}	HCl Rate - Fc-based (lb/MMBtu)	0.0072	0.0079	0.0073	**0.0075**

050508 121102
Q J P @_@

Prepared by Clean Air Engineering Proprietary Software
SS EPA26-1 Version 2006-10a (CI)

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

USEPA Method 26A
HCl Parameters (ALS Analysis)

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:19	07:55	09:54	
Stop Time (approx.)		07:19	08:55	10:56	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	184.5	183.6	184.2	**184.1**
P_1	Fabric Filter Inlet Temperature (°F)	315	315	315	**315**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	10.5300	9.9330	9.5160	**9.9930**
CO_2	Carbon dioxide (dry volume %)	9.9092	9.7660	10.2850	**9.9867**
T_s	Sample temperature (°F)	299.0833	299.7500	299.5000	**299.4444**
B_w	Actual water vapor in gas (% by volume)	20.0080	21.0129	20.8504	**20.6238**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	34.0428	33.6531	33.3241	**33.6733**
Laboratory Data					
m_n	Total HCl collected (mg)	7.1700	7.2400	7.6100	
Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (lb/dscf)	4.6441E-07	4.7437E-07	5.0354E-07	**4.8078E-07**
C_{sd7}	HCl Concentration @7% O_2 (lb/dscf)	6.2250E-07	6.0124E-07	6.1483E-07	**6.1286E-07**
C_{sd12}	HCl Concentration @12% CO_2 (lb/dscf)	5.6240E-07	5.8289E-07	5.8751E-07	**5.7760E-07**
C_{sd}	HCl Concentration (ppmdv)	4.9100	5.0154	5.3237	**5.0830**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	6.5814	6.3567	6.5004	**6.4795**
C_{sd12}	HCl Concentration @12% CO_2 (ppmdv)	5.9460	6.1627	6.2115	**6.1067**
C_w	HCl Concentration (ppmwv)	3.9276	3.9615	4.2137	**4.0343**
C_{sd}	HCl Concentration (mg/dscm)	7.4369	7.5964	8.0635	**7.6990**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	9.9685	9.6280	9.8457	**9.8140**
C_{sd12}	HCl Concentration @12% CO_2 (mg/dscm)	9.0060	9.3342	9.4081	**9.2494**
C_{sd}	HCl Concentration (mg/Nm^3 dry)	7.9811	8.1523	8.6535	**8.2623**
C_{sd7}	HCl Concentration @7% O_2 (mg/Nm^3 dry)	10.6978	10.3325	10.5661	**10.5321**
C_{sd12}	HCl Concentration @12% CO_2 (mg/Nm^3 dry)	9.6650	10.0171	10.0965	**9.9262**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.0090	0.0087	0.0088	**0.0088**
E_{Fc}	HCl Rate - Fc-based (lb/MMBtu)	0.0085	0.0088	0.0089	**0.0088**

050508 112040
QJP@_@

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 SDA Inlet

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

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:19	07:55	09:54	
Stop Time (approx.)		07:19	08:55	10:56	
Sampling Conditions					
Y_d	Dry gas meter correction factor	1.0083	1.0083	1.0083	
C_p	Pitot tube coefficient	0.84	0.84	0.84	
P_g	Static pressure (in. H_2O)	-1.5000	-1.5000	-1.5000	
A_s	Sample location area (ft^2)				
P_{bar}	Barometric pressure (in. Hg)	30.00	30.00	30.00	**30.0000**
D_n	Nozzle diameter (in.)	NA	NA	NA	
O_2	Oxygen (dry volume %)	9.0140	8.7670	8.2590	**8.6800**
CO_2	Carbon dioxide (dry volume %)	10.5090	10.8030	11.4160	**10.9093**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.4770	80.4300	80.3250	**80.4107**
V_{lc}	Total Liquid collected (ml)	152.50	153.70	152.20	
V_m	Volume metered, meter conditions (ft^3)	33.6300	34.2700	33.9800	
T_m	Dry gas meter temperature (°F)	79.5417	79.5417	89.6667	
T_s	Sample temperature (°F)	491.0000	492.9167	488.8333	**490.9167**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.2000	1.2000	1.2000	
θ	Total sampling time (min)	60.0	60.0	60.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	7.1782	7.2347	7.1641	**7.1923**
V_{mstd}	Volume metered, standard (dscf)	33.3570	33.9918	33.0833	**33.4774**
P_s	Sample gas pressure, absolute (in. Hg)	29.8897	29.8897	29.8897	**29.8897**
P_v	Vapor pressure, actual (in. Hg)	29.8897	29.8897	29.8897	**29.8897**
B_{wo}	Moisture measured in sample (% by volume)	17.7085	17.5486	17.8001	**17.6857**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	17.7085	17.5486	17.8001	**17.6857**
M_d	MW of sample gas, dry (lb/lb-mole)	30.0420	30.0792	30.1569	**30.0927**
M_s	MW of sample gas, wet (lb/lb-mole)	27.9095	27.9594	27.9930	**27.9540**

Comments:

Average includes 3 runs.

042208 135148
K Q J @

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 SDA Inlet

USEPA Method 26A
HCl Parameters (CleanAir)

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:19	07:55	09:54	
Stop Time (approx.)		07:19	08:55	10:56	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	184.5	183.6	184.2	**184.1**
P_1	Fabric Filter Inlet Temperature (°F)	315	315	315	**315**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.0140	8.7670	8.2590	**8.6800**
CO_2	Carbon dioxide (dry volume %)	10.5090	10.8030	11.4160	**10.9093**
T_s	Sample temperature (°F)	491.0000	492.9167	488.8333	**490.9167**
B_w	Actual water vapor in gas (% by volume)	17.7085	17.5486	17.8001	**17.6857**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	33.3570	33.9918	33.0833	**33.4774**
Laboratory Data					
m_n	Total HCl collected (mg)	558.8656	665.2492	609.9161	
Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (lb/dscf)	3.6943E-05	4.3154E-05	4.0651E-05	**4.0249E-05**
C_{sd7}	HCl Concentration @7% O_2 (lb/dscf)	4.3202E-05	4.9439E-05	4.4700E-05	**4.5780E-05**
C_{sd12}	HCl Concentration @12% CO_2 (lb/dscf)	4.2184E-05	4.7935E-05	4.2730E-05	**4.4283E-05**
C_{sd}	HCl Concentration (ppmdv)	390.5807	456.2475	429.7851	**425.5378**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	456.7619	522.6935	472.5902	**484.0152**
C_{sd12}	HCl Concentration @12% CO_2 (ppmdv)	445.9957	506.8009	451.7713	**468.1893**
C_w	HCl Concentration (ppmwv)	321.4147	376.1825	353.2831	**350.2935**
C_{sd}	HCl Concentration (mg/dscm)	591.5864	691.0475	650.9667	**644.5335**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	691.8266	791.6887	715.8007	**733.1053**
C_{sd12}	HCl Concentration @12% CO_2 (mg/dscm)	675.5197	767.6173	684.2677	**709.1349**
C_{sd}	HCl Concentration (mg/Nm^3 dry)	634.8732	741.6119	698.5984	**691.6945**
C_{sd7}	HCl Concentration @7% O_2 (mg/Nm^3 dry)	742.4480	849.6172	768.1764	**786.7472**
C_{sd12}	HCl Concentration @12% CO_2 (mg/Nm^3 dry)	724.9480	823.7844	734.3361	**761.0228**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.6217	0.7114	0.6432	**0.6588**
E_{Fc}	HCl Rate - Fc-based (lb/MMBtu)	0.6398	0.7270	0.6481	**0.6716**

050508 121144
K Q J @_@

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 SDA Inlet

USEPA Method 26A
HCl Parameters (ALS Analysis)

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:19	07:55	09:54	
Stop Time (approx.)		07:19	08:55	10:56	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	184.5	183.6	184.2	**184.1**
P_1	Fabric Filter Inlet Temperature (°F)	315	315	315	**315**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.0140	8.7670	8.2590	**8.6800**
CO_2	Carbon dioxide (dry volume %)	10.5090	10.8030	11.4160	**10.9093**
T_s	Sample temperature (°F)	491.0000	492.9167	488.8333	**490.9167**
B_w	Actual water vapor in gas (% by volume)	17.7085	17.5486	17.8001	**17.6857**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	33.3570	33.9918	33.0833	**33.4774**
Laboratory Data					
m_n	Total HCl collected (mg)	525.0000	559.0000	535.0000	
Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (lb/dscf)	3.4704E-05	3.6262E-05	3.5658E-05	**3.5541E-05**
C_{sd7}	HCl Concentration @7% O_2 (lb/dscf)	4.0584E-05	4.1543E-05	3.9209E-05	**4.0445E-05**
C_{sd12}	HCl Concentration @12% CO_2 (lb/dscf)	3.9628E-05	4.0279E-05	3.7482E-05	**3.9130E-05**
C_{sd}	HCl Concentration (ppmdv)	366.9127	383.3787	376.9946	**375.7620**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	429.0835	439.2124	414.5419	**427.6126**
C_{sd12}	HCl Concentration @12% CO_2 (ppmdv)	418.9697	425.8580	396.2802	**413.7026**
C_w	HCl Concentration (ppmwv)	301.9379	316.1012	309.8893	**309.3095**
C_{sd}	HCl Concentration (mg/dscm)	555.7380	580.6780	571.0084	**569.1414**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	649.9039	665.2455	627.8788	**647.6761**
C_{sd12}	HCl Concentration @12% CO_2 (mg/dscm)	634.5852	645.0186	600.2190	**626.6076**
C_{sd}	HCl Concentration (mg/Nm^3 dry)	596.4017	623.1666	612.7895	**610.7859**
C_{sd7}	HCl Concentration @7% O_2 (mg/Nm^3 dry)	697.4579	713.9220	673.8212	**695.0670**
C_{sd12}	HCl Concentration @12% CO_2 (mg/Nm^3 dry)	681.0183	692.2150	644.1375	**672.4569**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.5840	0.5978	0.5642	**0.5820**
E_{Fc}	HCl Rate - Fc-based (lb/MMBtu)	0.6010	0.6109	0.5685	**0.5935**

050508 112040
K Q J @_@

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 2 FF Outlet

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

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:19	11:22	14:00	
Stop Time (approx.)		09:47	13:33	16:11	
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.9950	0.9950	0.9950	
C_p	Pitot tube coefficient	0.84	0.84	0.84	
P_g	Static pressure (in. H_2O)	-15.0000	-14.2000	-13.4000	
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.)	0.2690	0.2480	0.2480	
O_2	Oxygen (dry volume %)	10.1100	9.3350	9.9120	**9.7857**
CO_2	Carbon dioxide (dry volume %)	9.3810	10.2050	9.7120	**9.7660**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.5090	80.4600	80.3760	**80.4483**
V_{lc}	Total Liquid collected (ml)	549.90	401.80	413.40	
V_m	Volume metered, meter conditions (ft^3)	86.5900	66.3250	69.1450	
T_m	Dry gas meter temperature (°F)	79.7400	81.1800	83.9800	
T_s	Sample temperature (°F)	299.2000	308.4000	311.2800	**306.2933**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.6184	0.8660	0.9264	
θ	Total sampling time (min)	125.0	125.0	125.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	25.8838	18.9127	19.4587	**21.4184**
V_{mstd}	Volume metered, standard (dscf)	84.8097	64.6695	67.0820	**72.1870**
P_s	Sample gas pressure, absolute (in. Hg)	28.8971	28.9559	29.0147	**28.9559**
P_v	Vapor pressure, actual (in. Hg)	28.8971	28.9559	29.0147	**28.9559**
B_{wo}	Moisture measured in sample (% by volume)	23.3833	22.6277	22.4851	**22.8320**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	23.3833	22.6277	22.4851	**22.8320**
$\sqrt{\Delta P}$	Velocity head ($\sqrt{in.}$ H_2O)	0.8035	0.7026	0.7273	**0.7445**
M_d	MW of sample gas, dry (lb/lb-mole)	29.9054	30.0062	29.9504	**29.9540**
M_s	MW of sample gas, wet (lb/lb-mole)	27.1215	27.2895	27.2633	**27.2248**
V_s	Velocity of sample (ft/sec)	56.7881	49.7519	51.5737	**52.7045**
%I	Isokinetic sampling (%)	98.0973	100.4722	100.5258	**99.6984**
Q_a	Volumetric flow rate, actual (acfm)	218,066	191,047	198,043	**202,385**
Q_s	Volumetric flow rate, standard (scfm)	146,473	127,046	131,473	**134,998**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	112,223	98,299	101,911	**104,144**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	87,114	81,786	80,561	**83,154**
Q_a	Volumetric flow rate, actual (acf/hr)	13,083,978	11,462,832	11,882,572	**12,143,127**
Q_s	Volumetric flow rate, standard (scf/hr)	8,788,395	7,622,785	7,888,399	**8,099,860**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	6,733,377	5,897,925	6,114,687	**6,248,663**
Q_a	Volumetric flow rate, actual (m^3/hr)	370,546	324,634	336,521	**343,901**
Q_s	Volumetric flow rate, standard (m^3/hr)	248,893	215,882	223,404	**229,393**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	190,693	167,033	173,172	**176,966**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	148,027	138,974	136,893	**141,298**
Q_a	Volumetric flow rate, normal (Nm^3/hr)	231,923	201,163	208,172	**213,752**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	177,691	155,644	161,364	**164,900**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	137,935	129,498	127,559	**131,664**

Comments:

Average includes 3 runs.

042208 135323
OKK@

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 2 FF Outlet

USEPA Method 5/29
Filterable Particulate Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:19	11:22	14:00	
Stop Time (approx.)		09:47	13:33	16:11	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	182.3	184.5	183.0	**183.3**
P_1	Fabric Filter Inlet Temperature (°F)	315	328	327	**323**
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 %)	10.1100	9.3350	9.9120	**9.7857**
CO_2	Carbon dioxide (dry volume %)	9.3810	10.2050	9.7120	**9.7660**
T_s	Sample temperature (°F)	299.2000	308.4000	311.2800	**306.2933**
B_w	Actual water vapor in gas (% by volume)	23.3833	22.6277	22.4851	**22.8320**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	218,066	191,047	198,043	**202,385**
Q_s	Volumetric flow rate, standard (scfm)	146,473	127,046	131,473	**134,998**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	112,223	98,299	101,911	**104,144**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	87,114	81,786	80,561	**83,154**
Q_a	Volumetric flow rate, actual (acf/hr)	13,083,978	11,462,832	11,882,572	**12,143,127**
Q_s	Volumetric flow rate, standard (scf/hr)	8,788,395	7,622,785	7,888,399	**8,099,860**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	6,733,377	5,897,925	6,114,687	**6,248,663**
Q_a	Volumetric flow rate, actual (m^3/hr)	370,546	324,634	336,521	**343,901**
Q_s	Volumetric flow rate, standard (m^3/hr)	248,893	215,882	223,404	**229,393**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	190,693	167,033	173,172	**176,966**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	148,027	138,974	136,893	**141,298**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	231,923	201,163	208,172	**213,752**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	177,691	155,644	161,364	**164,900**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	137,935	129,498	127,559	**131,664**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	84.8097	64.6695	67.0820	**72.1870**
%I	Isokinetic sampling (%)	98.0973	100.4722	100.5258	**99.6984**
Laboratory Data					
m_{filter}	Matter collected on filter(s) (g)	0.00269	0.00120	0.00092	
m_s	Matter collected in solvent rinse(s) (g)	0.01022	0.01204	0.00383	
m_n	Total particulate matter collected (g)	0.01291	0.01324	0.00475	
Filterable Particulate Results					
C_{sd}	Particulate Concentration (lb/dscf)	3.3565E-07	4.5130E-07	1.5613E-07	**3.1436E-07**
C_{sd7}	Particulate Concentration @7% O_2 (lb/dscf)	4.3240E-07	5.4242E-07	1.9751E-07	**3.9078E-07**
C_{sd12}	Particulate Concentration @12% CO_2 (lb/dscf)	4.2936E-07	5.3068E-07	1.9292E-07	**3.8432E-07**
C_a	Particulate Concentration (lb/acf)	1.7274E-07	2.3221E-07	8.0345E-08	**1.6176E-07**
C_{sd}	Particulate Concentration (gr/dscf)	0.0023	0.0032	0.0011	**0.0022**
C_{sd7}	Particulate Concentration @7% O_2 (gr/dscf)	0.0030	0.0038	0.0014	**0.0027**
C_{sd12}	Particulate Concentration @12% CO_2 (gr/dscf)	0.0030	0.0037	0.0013	**0.0027**
C_a	Particulate Concentration (gr/acf)	0.0012	0.0016	0.0006	**0.0011**
C_{sd}	Particulate Concentration (mg/dscm)	5.3750	7.2270	2.5003	**5.0341**
C_{sd7}	Particulate Concentration @7% O_2 (mg/dscm)	6.9242	8.6861	3.1629	**6.2577**
C_{sd12}	Particulate Concentration @12% CO_2 (mg/dscm)	6.8756	8.4981	3.0893	**6.1543**
C_a	Particulate Concentration (mg/m^3 (actual,wet))	2.7661	3.7185	1.2866	**2.5904**
C_{sd}	Particulate Concentration (mg/Nm^3 dry)	5.7683	7.7558	2.6832	**5.4024**
C_{sd7}	Particulate Concentration @7% O_2 (mg/Nm^3 dry)	7.4309	9.3217	3.3943	**6.7156**
C_{sd12}	Particulate Concentration @12% CO_2 (mg/Nm^3 dry)	7.3787	9.1199	3.3153	**6.6047**
$E_{lb/hr}$	Particulate Rate (lb/hr)	2.2601	2.6617	0.9547	**1.9588**
$E_{kg/hr}$	Particulate Rate (kg/hr)	1.0250	1.2071	0.4330	**0.8884**
$E_{T/yr}$	Particulate Rate (Ton/yr)	9.8991	11.6584	4.1816	**8.5797**
E_{Fd}	Particulate Rate - F_d-based (lb/MMBtu)	0.0062	0.0078	0.0028	**0.0056**
E_{Fc}	Particulate Rate - F_c-based (lb/MMBtu)	0.0065	0.0080	0.0029	**0.0058**

042208 135323
OKK@_N

Comments:
Average includes 3 runs.

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 2 FF Outlet

USEPA Method 5/29
Mercury (Hg) Emission Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:19	11:22	14:00	
Stop Time (approx.)		09:47	13:33	16:11	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	182.3	184.5	183.0	**183.3**
P_1	Fabric Filter Inlet Temperature (°F)	315	328	327	**323**
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 %)	10.1100	9.3350	9.9120	**9.7857**
CO_2	Carbon dioxide (dry volume %)	9.3810	10.2050	9.7120	**9.7660**
T_s	Sample temperature (°F)	299.2000	308.4000	311.2800	**306.2933**
B_w	Actual water vapor in gas (% by volume)	23.3833	22.6277	22.4851	**22.8320**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	218,066	191,047	198,043	**202,385**
Q_s	Volumetric flow rate, standard (scfm)	146,473	127,046	131,473	**134,998**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	112,223	98,299	101,911	**104,144**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	87,114	81,786	80,561	**83,154**
Q_a	Volumetric flow rate, actual (acf/hr)	13,083,978	11,462,832	11,882,572	**12,143,127**
Q_s	Volumetric flow rate, standard (scf/hr)	8,788,395	7,622,785	7,888,399	**8,099,860**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	6,733,377	5,897,925	6,114,687	**6,248,663**
Q_a	Volumetric flow rate, actual (m^3/hr)	370,546	324,634	336,521	**343,901**
Q_s	Volumetric flow rate, standard (m^3/hr)	248,893	215,882	223,404	**229,393**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	190,693	167,033	173,172	**176,966**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	148,027	138,974	136,893	**141,298**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	231,923	201,163	208,172	**213,752**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	177,691	155,644	161,364	**164,900**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	137,935	129,498	127,559	**131,664**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	84.8097	64.6695	67.0820	**72.1870**
%I	Isokinetic sampling (%)	98.0973	100.4722	100.5258	**99.6984**
Laboratory Data					
m_{n-1b}	Fraction 1B (µg)	<0.1000	<0.1000	<0.1000	**<0.1000**
m_{n-2b}	Fraction 2B (µg)	13.8999	31.2619	21.3987	**22.1868**
m_{n-3a}	Fraction 3A (µg)	<0.2000	<0.2000	<0.2000	**<0.2000**
m_{n-3b}	Fraction 3B (µg)	<0.5000	<0.5000	<0.5000	**<0.5000**
m_{n-3c}	Fraction 3C (µg)	<0.4000	<0.4000	<0.4000	**<0.4000**
m_n	Total matter corrected for allowable blanks (µg)	13.8999	31.2619	21.3987	**22.1868**
Mercury Results - Total					
C_{sd}	Concentration (lb/dscf)	3.6139E-10	1.0659E-09	7.0338E-10	**7.1023E-10**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	4.6555E-10	1.2811E-09	8.8979E-10	**8.7882E-10**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	4.6228E-10	1.2534E-09	8.6909E-10	**8.6159E-10**
C_a	Concentration (lb/acf)	1.8598E-10	5.4844E-10	3.6195E-10	**3.6546E-10**
C_{sd}	Concentration (µg/dscm)	5.7872E+00	1.7069E+01	1.1264E+01	**1.1373E+01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	7.4552E+00	2.0516E+01	1.4249E+01	**1.4073E+01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	7.4028E+00	2.0072E+01	1.3917E+01	**1.3797E+01**
C_{sd}	Concentration (mg/dscm)	5.7872E-03	1.7069E-02	1.1264E-02	**1.1373E-02**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	7.4552E-03	2.0516E-02	1.4249E-02	**1.4073E-02**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	7.4028E-03	2.0072E-02	1.3917E-02	**1.3797E-02**
C_a	Concentration (µg/m^3 (actual,wet))	2.9782E+00	8.7826E+00	5.7962E+00	**5.8523E+00**
C_{sd}	Concentration (µg/Nm^3 dry)	6.2106E+00	1.8318E+01	1.2088E+01	**1.2206E+01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	8.0007E+00	2.2017E+01	1.5291E+01	**1.5103E+01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	7.9445E+00	2.1540E+01	1.4936E+01	**1.4807E+01**
$E_{lb/hr}$	Rate (lb/hr)	2.4334E-03	6.2867E-03	4.3009E-03	**4.3403E-03**
$E_{g/s}$	Rate (g/s)	3.0655E-04	7.9198E-04	5.4182E-04	**5.4678E-04**
$E_{T/yr}$	Rate (Ton/yr)	1.0658E-02	2.7536E-02	1.8838E-02	**1.9011E-02**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	6.6990E-06	1.8435E-05	1.2804E-05	**1.2646E-05**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	7.0113E-06	1.9010E-05	1.3181E-05	**1.3067E-05**

042208 135323
OKK @_L

Prepared by Clean Air Engineering Proprietary Software
SS Metals-1 Version 2008-12a

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 2 FF Outlet

USEPA Method 5/29
Mercury (Hg) Emission Parameters (continued)
Separate Front Half Results

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:19	11:22	14:00	
Stop Time (approx.)		09:47	13:33	16:11	
Mercury Results - Front Half					
C_{sd}	Concentration (lb/dscf)	<2.5999E-12	<3.4096E-12	<3.2870E-12	**<3.0989E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<3.3493E-12	<4.0981E-12	<4.1581E-12	**<3.8685E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<3.3258E-12	<4.0094E-12	<4.0614E-12	**<3.7989E-12**
C_a	Concentration (lb/acf)	<1.3380E-12	<1.7544E-12	<1.6915E-12	**<1.5946E-12**
C_{sd}	Concentration (µg/dscm)	<4.1634E-02	<5.4601E-02	<5.2637E-02	**<4.9624E-02**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<5.3635E-02	<6.5625E-02	<6.6587E-02	**<6.1949E-02**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<5.3258E-02	<6.4205E-02	<6.5038E-02	**<6.0833E-02**
C_{sd}	Concentration (mg/dscm)	<4.1634E-05	<5.4601E-05	<5.2637E-05	**<4.9624E-05**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<5.3635E-05	<6.5625E-05	<6.6587E-05	**<6.1949E-05**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<5.3258E-05	<6.4205E-05	<6.5038E-05	**<6.0833E-05**
C_a	Concentration (µg/m^3 (actual,wet))	<2.1426E-02	<2.8093E-02	<2.7087E-02	**<2.5535E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<4.4681E-02	<5.8596E-02	<5.6489E-02	**<5.3255E-02**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<5.7559E-02	<7.0427E-02	<7.1459E-02	**<6.6482E-02**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<5.7155E-02	<6.8903E-02	<6.9796E-02	**<6.5285E-02**
$E_{lb/hr}$	Rate (lb/hr)	<1.7506E-05	<2.0110E-05	<2.0099E-05	**<1.9238E-05**
$E_{g/s}$	Rate (g/s)	<2.2054E-06	<2.5334E-06	<2.5320E-06	**<2.4236E-06**
$E_{T/yr}$	Rate (Ton/yr)	<7.6678E-05	<8.8081E-05	<8.8034E-05	**<8.4264E-05**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<4.8195E-08	<5.8969E-08	<5.9833E-08	**<5.5666E-08**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<5.0441E-08	<6.0809E-08	<6.1598E-08	**<5.7616E-08**

042208 135323
OKK@_L

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
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 (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:19	11:22	14:00	
Stop Time (approx.)		09:47	13:33	16:11	
Mercury Results - Impingers 1-3 Solution					
C_{sd}	Concentration (lb/dscf)	3.6139E-10	1.0659E-09	7.0338E-10	**7.1023E-10**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	4.6555E-10	1.2811E-09	8.8979E-10	**8.7882E-10**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	4.6228E-10	1.2534E-09	8.6909E-10	**8.6159E-10**
C_a	Concentration (lb/acf)	1.8598E-10	5.4844E-10	3.6195E-10	**3.6546E-10**
C_{sd}	Concentration (µg/dscm)	5.7872E+00	1.7069E+01	1.1264E+01	**1.1373E+01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	7.4552E+00	2.0516E+01	1.4249E+01	**1.4073E+01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	7.4028E+00	2.0072E+01	1.3917E+01	**1.3797E+01**
C_{sd}	Concentration (mg/dscm)	5.7872E-03	1.7069E-02	1.1264E-02	**1.1373E-02**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	7.4552E-03	2.0516E-02	1.4249E-02	**1.4073E-02**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	7.4028E-03	2.0072E-02	1.3917E-02	**1.3797E-02**
C_a	Concentration (µg/m^3 (actual,wet))	2.9782E+00	8.7826E+00	5.7962E+00	**5.8523E+00**
C_{sd}	Concentration (µg/Nm^3 dry)	6.2106E+00	1.8318E+01	1.2088E+01	**1.2206E+01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	8.0007E+00	2.2017E+01	1.5291E+01	**1.5103E+01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	7.9445E+00	2.1540E+01	1.4936E+01	**1.4807E+01**
$E_{lb/hr}$	Rate (lb/hr)	2.4334E-03	6.2867E-03	4.3009E-03	**4.3403E-03**
$E_{g/s}$	Rate (g/s)	3.0655E-04	7.9198E-04	5.4182E-04	**5.4678E-04**
$E_{T/yr}$	Rate (Ton/yr)	1.0658E-02	2.7536E-02	1.8838E-02	**1.9011E-02**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	6.6990E-06	1.8435E-05	1.2804E-05	**1.2646E-05**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	7.0113E-06	1.9010E-05	1.3181E-05	**1.3067E-05**

042208 135323
OKK@_L

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 2 FF Outlet

USEPA Method 5/29
Mercury (Hg) Emission Parameters (continued)
Separate Impinger 4 Results

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:19	11:22	14:00	
Stop Time (approx.)		09:47	13:33	16:11	
Mercury Results - Impinger 4 Solution					
C_{sd}	Concentration (lb/dscf)	<5.1999E-12	<6.8193E-12	<6.5740E-12	**<6.1977E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<6.6986E-12	<8.1961E-12	<8.3163E-12	**<7.7370E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<6.6516E-12	<8.0188E-12	<8.1228E-12	**<7.5977E-12**
C_a	Concentration (lb/acf)	<2.6760E-12	<3.5087E-12	<3.3830E-12	**<3.1892E-12**
C_{sd}	Concentration (µg/dscm)	<8.3269E-02	<1.0920E-01	<1.0527E-01	**<9.9248E-02**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<1.0727E-01	<1.3125E-01	<1.3317E-01	**<1.2390E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<1.0652E-01	<1.2841E-01	<1.3008E-01	**<1.2167E-01**
C_{sd}	Concentration (mg/dscm)	<8.3269E-05	<1.0920E-04	<1.0527E-04	**<9.9248E-05**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<1.0727E-04	<1.3125E-04	<1.3317E-04	**<1.2390E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<1.0652E-04	<1.2841E-04	<1.3008E-04	**<1.2167E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<4.2852E-02	<5.6187E-02	<5.4173E-02	**<5.1071E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<8.9362E-02	<1.1719E-01	<1.1298E-01	**<1.0651E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<1.1512E-01	<1.4085E-01	<1.4292E-01	**<1.3296E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<1.1431E-01	<1.3781E-01	<1.3959E-01	**<1.3057E-01**
$E_{lb/hr}$	Rate (lb/hr)	<3.5013E-05	<4.0220E-05	<4.0198E-05	**<3.8477E-05**
$E_{g/s}$	Rate (g/s)	<4.4108E-06	<5.0667E-06	<5.0640E-06	**<4.8472E-06**
$E_{T/yr}$	Rate (Ton/yr)	<1.5336E-04	<1.7616E-04	<1.7607E-04	**<1.6853E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<9.6390E-08	<1.1794E-07	<1.1967E-07	**<1.1133E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<1.0088E-07	<1.2162E-07	<1.2320E-07	**<1.1523E-07**

042208 135323
OKK@_L

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
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 (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:19	11:22	14:00	
Stop Time (approx.)		09:47	13:33	16:11	
Mercury Results - Filtered Permanganate Solution					
C_{sd}	Concentration (lb/dscf)	<1.3000E-11	<1.7048E-11	<1.6435E-11	**<1.5494E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<1.6747E-11	<2.0490E-11	<2.0791E-11	**<1.9343E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<1.6629E-11	<2.0047E-11	<2.0307E-11	**<1.8994E-11**
C_a	Concentration (lb/acf)	<6.6900E-12	<8.7718E-12	<8.4574E-12	**<7.9731E-12**
C_{sd}	Concentration (µg/dscm)	<2.0817E-01	<2.7300E-01	<2.6319E-01	**<2.4812E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<2.6817E-01	<3.2812E-01	<3.3293E-01	**<3.0974E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<2.6629E-01	<3.2102E-01	<3.2519E-01	**<3.0417E-01**
C_{sd}	Concentration (mg/dscm)	<2.0817E-04	<2.7300E-04	<2.6319E-04	**<2.4812E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<2.6817E-04	<3.2812E-04	<3.3293E-04	**<3.0974E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<2.6629E-04	<3.2102E-04	<3.2519E-04	**<3.0417E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<1.0713E-01	<1.4047E-01	<1.3543E-01	**<1.2768E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	<2.2340E-01	<2.9298E-01	<2.8244E-01	**<2.6628E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<2.8780E-01	<3.5213E-01	<3.5730E-01	**<3.3241E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<2.8577E-01	<3.4451E-01	<3.4898E-01	**<3.2642E-01**
$E_{lb/hr}$	Rate (lb/hr)	<8.7532E-05	<1.0055E-04	<1.0050E-04	**<9.6192E-05**
$E_{g/s}$	Rate (g/s)	<1.1027E-05	<1.2667E-05	<1.2660E-05	**<1.2118E-05**
$E_{T/yr}$	Rate (Ton/yr)	<3.8339E-04	<4.4041E-04	<4.4017E-04	**<4.2132E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<2.4097E-07	<2.9484E-07	<2.9917E-07	**<2.7833E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<2.5221E-07	<3.0404E-07	<3.0799E-07	**<2.8808E-07**
Mercury Results - HCl Rinse + HCl/MnO2 Precipitate					
C_{sd}	Concentration (lb/dscf)	<1.0400E-11	<1.3639E-11	<1.3148E-11	**<1.2395E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<1.3397E-11	<1.6392E-11	<1.6633E-11	**<1.5474E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<1.3303E-11	<1.6038E-11	<1.6246E-11	**<1.5195E-11**
C_a	Concentration (lb/acf)	<5.3520E-12	<7.0174E-12	<6.7659E-12	**<6.3784E-12**
C_{sd}	Concentration (µg/dscm)	<1.6654E-01	<2.1840E-01	<2.1055E-01	**<1.9850E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<2.1454E-01	<2.6250E-01	<2.6635E-01	**<2.4779E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<2.1303E-01	<2.5682E-01	<2.6015E-01	**<2.4333E-01**
C_{sd}	Concentration (mg/dscm)	<1.6654E-04	<2.1840E-04	<2.1055E-04	**<1.9850E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<2.1454E-04	<2.6250E-04	<2.6635E-04	**<2.4779E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<2.1303E-04	<2.5682E-04	<2.6015E-04	**<2.4333E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<8.5705E-02	<1.1237E-01	<1.0835E-01	**<1.0214E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	<1.7872E-01	<2.3438E-01	<2.2595E-01	**<2.1302E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<2.3024E-01	<2.8171E-01	<2.8584E-01	**<2.6593E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<2.2862E-01	<2.7561E-01	<2.7919E-01	**<2.6114E-01**
$E_{lb/hr}$	Rate (lb/hr)	<7.0025E-05	<8.0439E-05	<8.0396E-05	**<7.6954E-05**
$E_{g/s}$	Rate (g/s)	<8.8216E-06	<1.0133E-05	<1.0128E-05	**<9.6944E-06**
$E_{T/yr}$	Rate (Ton/yr)	<3.0671E-04	<3.5232E-04	<3.5214E-04	**<3.3706E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<1.9278E-07	<2.3587E-07	<2.3933E-07	**<2.2266E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<2.0176E-07	<2.4324E-07	<2.4639E-07	**<2.3046E-07**

042208 135323
OKK@_L

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 2 FF Outlet

USEPA Method 5/29
Beryllium (Be) Emission Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:19	11:22	14:00	
Stop Time (approx.)		09:47	13:33	16:11	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	182.3	184.5	183.0	**183.3**
P_1	Fabric Filter Inlet Temperature (°F)	315	328	327	**323**
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 %)	10.1100	9.3350	9.9120	**9.7857**
CO_2	Carbon dioxide (dry volume %)	9.3810	10.2050	9.7120	**9.7660**
T_s	Sample temperature (°F)	299.2000	308.4000	311.2800	**306.2933**
B_w	Actual water vapor in gas (% by volume)	23.3833	22.6277	22.4851	**22.8320**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	218,066	191,047	198,043	**202,385**
Q_s	Volumetric flow rate, standard (scfm)	146,473	127,046	131,473	**134,998**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	112,223	98,299	101,911	**104,144**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	87,114	81,786	80,561	**83,154**
Q_a	Volumetric flow rate, actual (acf/hr)	13,083,978	11,462,832	11,882,572	**12,143,127**
Q_s	Volumetric flow rate, standard (scf/hr)	8,788,395	7,622,785	7,888,399	**8,099,860**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	6,733,377	5,897,925	6,114,687	**6,248,663**
Q_a	Volumetric flow rate, actual (m^3/hr)	370,546	324,634	336,521	**343,901**
Q_s	Volumetric flow rate, standard (m^3/hr)	248,893	215,882	223,404	**229,393**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	190,693	167,033	173,172	**176,966**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	148,027	138,974	136,893	**141,298**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	231,923	201,163	208,172	**213,752**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	177,691	155,644	161,364	**164,900**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	137,935	129,498	127,559	**131,664**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	84.8097	64.6695	67.0820	**72.1870**
%I	Isokinetic sampling (%)	98.0973	100.4722	100.5258	**99.6984**
Laboratory Data					
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)	<1.3000E-12	<1.7048E-12	<1.6435E-12	**<1.5494E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<1.6747E-12	<2.0490E-12	<2.0791E-12	**<1.9343E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<1.6629E-12	<2.0047E-12	<2.0307E-12	**<1.8994E-12**
C_a	Concentration (lb/acf)	<6.6900E-13	<8.7718E-13	<8.4574E-13	**<7.9731E-13**
C_{sd}	Concentration (µg/dscm)	<2.0817E-02	<2.7300E-02	<2.6319E-02	**<2.4812E-02**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<2.6817E-02	<3.2812E-02	<3.3293E-02	**<3.0974E-02**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<2.6629E-02	<3.2102E-02	<3.2519E-02	**<3.0417E-02**
C_{sd}	Concentration (mg/dscm)	<2.0817E-05	<2.7300E-05	<2.6319E-05	**<2.4812E-05**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<2.6817E-05	<3.2812E-05	<3.3293E-05	**<3.0974E-05**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<2.6629E-05	<3.2102E-05	<3.2519E-05	**<3.0417E-05**
C_a	Concentration (µg/m^3 (actual,wet))	<1.0713E-02	<1.4047E-02	<1.3543E-02	**<1.2768E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<2.2340E-02	<2.9298E-02	<2.8244E-02	**<2.6628E-02**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<2.8780E-02	<3.5213E-02	<3.5730E-02	**<3.3241E-02**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<2.8577E-02	<3.4451E-02	<3.4898E-02	**<3.2642E-02**
$E_{lb/hr}$	Rate (lb/hr)	<8.7532E-06	<1.0055E-05	<1.0050E-05	**<9.6192E-06**
$E_{g/s}$	Rate (g/s)	<1.1027E-06	<1.2667E-06	<1.2660E-06	**<1.2118E-06**
$E_{T/yr}$	Rate (Ton/yr)	<3.8339E-05	<4.4041E-05	<4.4017E-05	**<4.2132E-05**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<2.4097E-08	<2.9484E-08	<2.9917E-08	**<2.7833E-08**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<2.5221E-08	<3.0404E-08	<3.0799E-08	**<2.8808E-08**

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

042208 135323

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 2 FF Outlet

USEPA Method 5/29
Cadmium (Cd) Emission Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:19	11:22	14:00	
Stop Time (approx.)		09:47	13:33	16:11	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	182.3	184.5	183.0	**183.3**
P_1	Fabric Filter Inlet Temperature (°F)	315	328	327	**323**
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 %)	10.1100	9.3350	9.9120	**9.7857**
CO_2	Carbon dioxide (dry volume %)	9.3810	10.2050	9.7120	**9.7660**
T_s	Sample temperature (°F)	299.2000	308.4000	311.2800	**306.2933**
B_w	Actual water vapor in gas (% by volume)	23.3833	22.6277	22.4851	**22.8320**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	218,066	191,047	198,043	**202,385**
Q_s	Volumetric flow rate, standard (scfm)	146,473	127,046	131,473	**134,998**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	112,223	98,299	101,911	**104,144**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	87,114	81,786	80,561	**83,154**
Q_a	Volumetric flow rate, actual (acf/hr)	13,083,978	11,462,832	11,882,572	**12,143,127**
Q_s	Volumetric flow rate, standard (scf/hr)	8,788,395	7,622,785	7,888,399	**8,099,860**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	6,733,377	5,897,925	6,114,687	**6,248,663**
Q_a	Volumetric flow rate, actual (m^3/hr)	370,546	324,634	336,521	**343,901**
Q_s	Volumetric flow rate, standard (m^3/hr)	248,893	215,882	223,404	**229,393**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	190,693	167,033	173,172	**176,966**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	148,027	138,974	136,893	**141,298**
Q_a	Volumetric flow rate, normal (Nm^3/hr)	231,923	201,163	208,172	**213,752**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	177,691	155,644	161,364	**164,900**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	137,935	129,498	127,559	**131,664**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	84.8097	64.6695	67.0820	**72.1870**
%I	Isokinetic sampling (%)	98.0973	100.4722	100.5258	**99.6984**
Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	<0.2000	1.1426	0.9742	**<0.7723**
Cadmium Results - Total					
C_{sd}	Concentration (lb/dscf)	<5.1999E-12	3.8957E-11	3.2023E-11	**<2.5393E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<6.6986E-12	4.6823E-11	4.0510E-11	**<3.1344E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<6.6516E-12	4.5810E-11	3.9567E-11	**<3.0676E-11**
C_a	Concentration (lb/acf)	<2.6760E-12	2.0045E-11	1.6479E-11	**<1.3066E-11**
C_{sd}	Concentration (µg/dscm)	<8.3269E-02	6.2385E-01	5.1280E-01	**<4.0664E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<1.0727E-01	7.4980E-01	6.4870E-01	**<5.0193E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<1.0652E-01	7.3358E-01	6.3361E-01	**<4.9124E-01**
C_{sd}	Concentration (mg/dscm)	<8.3269E-05	6.2385E-04	5.1280E-04	**<4.0664E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<1.0727E-04	7.4980E-04	6.4870E-04	**<5.0193E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<1.0652E-04	7.3358E-04	6.3361E-04	**<4.9124E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<4.2852E-02	3.2099E-01	2.6388E-01	**<2.0924E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	<8.9362E-02	6.6950E-01	5.5032E-01	**<4.3639E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<1.1512E-01	8.0467E-01	6.9617E-01	**<5.3865E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<1.1431E-01	7.8726E-01	6.7997E-01	**<5.2718E-01**
$E_{lb/hr}$	Rate (lb/hr)	<3.5013E-05	2.2977E-04	1.9581E-04	**<1.5353E-04**
$E_{g/s}$	Rate (g/s)	<4.4108E-06	2.8945E-05	2.4667E-05	**<1.9341E-05**
$E_{T/yr}$	Rate (Ton/yr)	<1.5336E-04	1.0064E-03	8.5765E-04	**<6.7246E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<9.6390E-08	6.7376E-07	5.8291E-07	**<4.5102E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<1.0088E-07	6.9478E-07	6.0010E-07	**<4.6525E-07**

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 2 FF Outlet

USEPA Method 5/29
Lead (Pb) Emission Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:19	11:22	14:00	
Stop Time (approx.)		09:47	13:33	16:11	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	182.3	184.5	183.0	**183.3**
P_1	Fabric Filter Inlet Temperature (°F)	315	328	327	**323**
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 %)	10.1100	9.3350	9.9120	**9.7857**
CO_2	Carbon dioxide (dry volume %)	9.3810	10.2050	9.7120	**9.7660**
T_s	Sample temperature (°F)	299.2000	308.4000	311.2800	**306.2933**
B_w	Actual water vapor in gas (% by volume)	23.3833	22.6277	22.4851	**22.8320**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	218,066	191,047	198,043	**202,385**
Q_s	Volumetric flow rate, standard (scfm)	146,473	127,046	131,473	**134,998**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	112,223	98,299	101,911	**104,144**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	87,114	81,786	80,561	**83,154**
Q_a	Volumetric flow rate, actual (acf/hr)	13,083,978	11,462,832	11,882,572	**12,143,127**
Q_s	Volumetric flow rate, standard (scf/hr)	8,788,395	7,622,785	7,888,399	**8,099,860**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	6,733,377	5,897,925	6,114,687	**6,248,663**
Q_a	Volumetric flow rate, actual (m^3/hr)	370,546	324,634	336,521	**343,901**
Q_s	Volumetric flow rate, standard (m^3/hr)	248,893	215,882	223,404	**229,393**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	190,693	167,033	173,172	**176,966**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	148,027	138,974	136,893	**141,298**
Q_a	Volumetric flow rate, normal (Nm^3/hr)	231,923	201,163	208,172	**213,752**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	177,691	155,644	161,364	**164,900**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	137,935	129,498	127,559	**131,664**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	84.8097	64.6695	67.0820	**72.1870**
%I	Isokinetic sampling (%)	98.0973	100.4722	100.5258	**99.6984**
Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	1.1567	12.2516	17.2174	**10.2086**
Lead Results - Total					
C_{sd}	Concentration (lb/dscf)	3.0074E-11	4.1774E-10	5.6594E-10	**3.3792E-10**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	3.8742E-11	5.0208E-10	7.1592E-10	**4.1891E-10**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	3.8470E-11	4.9121E-10	6.9926E-10	**4.0965E-10**
C_a	Concentration (lb/acf)	1.5477E-11	2.1494E-10	2.9123E-10	**1.7388E-10**
C_{sd}	Concentration (µg/dscm)	4.8159E-01	6.6895E+00	9.0627E+00	**5.4113E+00**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	6.2040E-01	8.0401E+00	1.1464E+01	**6.7083E+00**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	6.1605E-01	7.8661E+00	1.1198E+01	**6.5600E+00**
C_{sd}	Concentration (mg/dscm)	4.8159E-04	6.6895E-03	9.0627E-03	**5.4113E-03**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	6.2040E-04	8.0401E-03	1.1464E-02	**6.7083E-03**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	6.1605E-04	7.8661E-03	1.1198E-02	**6.5600E-03**
C_a	Concentration (µg/m^3 (actual,wet))	2.4784E-01	3.4419E+00	4.6636E+00	**2.7845E+00**
C_{sd}	Concentration (µg/Nm^3 dry)	5.1683E-01	7.1789E+00	9.7258E+00	**5.8072E+00**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	6.6580E-01	8.6284E+00	1.2303E+01	**7.1992E+00**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	6.6112E-01	8.4417E+00	1.2017E+01	**7.0400E+00**
$E_{lb/hr}$	Rate (lb/hr)	2.0250E-04	2.4638E-03	3.4605E-03	**2.0423E-03**
$E_{g/s}$	Rate (g/s)	2.5510E-05	3.1038E-04	4.3595E-04	**2.5728E-04**
$E_{T/yr}$	Rate (Ton/yr)	8.8695E-04	1.0791E-02	1.5157E-02	**8.9451E-03**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	5.5748E-07	7.2246E-06	1.0302E-05	**6.0279E-06**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	5.8346E-07	7.4501E-06	1.0606E-05	**6.2130E-06**

042208 135323

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 2 FF Outlet

USEPA Method 13B (Total Fluorides)
Sampling, Velocity and Moisture Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		11:03	12:36	14:20	
Stop Time (approx.)		12:12	13:47	15:31	
Sampling Conditions					
Y_d	Dry gas meter correction factor	1.0034	1.0034	1.0034	
C_p	Pitot tube coefficient	0.84	0.84	0.84	
P_g	Static pressure (in. H_2O)	-11.0000	-11.0000	-11.0000	
A_s	Sample location area (ft^2)	64.0000	64.0000	64.0000	
P_{bar}	Barometric pressure (in. Hg)	30.25	30.25	30.25	**30.2500**
D_n	Nozzle diameter (in.)	0.2650	0.2650	0.2650	
O_2	Oxygen (dry volume %)	9.5230	9.4250	9.4380	**9.4620**
CO_2	Carbon dioxide (dry volume %)	10.0090	10.1000	10.1410	**10.0833**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.4680	80.4750	80.4210	**80.4547**
V_{lc}	Total Liquid collected (ml)	192.40	198.10	195.10	
V_m	Volume metered, meter conditions (ft^3)	34.1150	34.5450	33.4500	
T_m	Dry gas meter temperature (°F)	72.8800	75.2400	74.4000	
T_s	Sample temperature (°F)	300.9200	301.4000	299.2400	**300.5200**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.0032	1.0388	0.9868	
θ	Total sampling time (min)	62.5	62.5	62.5	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	9.0563	9.3246	9.1834	**9.1881**
V_{mstd}	Volume metered, standard (dscf)	34.3615	34.6442	33.5945	**34.2000**
P_s	Sample gas pressure, absolute (in. Hg)	29.4412	29.4412	29.4412	**29.4412**
P_v	Vapor pressure, actual (in. Hg)	29.4412	29.4412	29.4412	**29.4412**
B_{wo}	Moisture measured in sample (% by volume)	20.8585	21.2073	21.4675	**21.1778**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	20.8585	21.2073	21.4675	**21.1778**
$\sqrt{\Delta P}$	Velocity head ($\sqrt{in.}$ H_2O)	0.6499	0.6509	0.6304	**0.6437**
M_d	MW of sample gas, dry (lb/lb-mole)	29.9824	29.9930	30.0001	**29.9918**
M_s	MW of sample gas, wet (lb/lb-mole)	27.4830	27.4496	27.4240	**27.4522**
V_s	Velocity of sample (ft/sec)	45.2555	45.3682	43.8968	**44.8402**
%I	Isokinetic sampling (%)	97.8841	98.9425	99.2070	**98.6779**
Q_a	Volumetric flow rate, actual (acfm)	173,781	174,214	168,564	**172,186**
Q_s	Volumetric flow rate, standard (scfm)	118,656	118,877	115,349	**117,627**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	93,906	93,666	90,586	**92,720**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	76,861	77,325	74,698	**76,295**
Q_a	Volumetric flow rate, actual (acf/hr)	10,426,867	10,452,825	10,113,831	**10,331,175**
Q_s	Volumetric flow rate, standard (scf/hr)	7,119,382	7,132,607	6,920,925	**7,057,638**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,634,390	5,619,976	5,435,172	**5,563,179**
Q_a	Volumetric flow rate, actual (m^3/hr)	295,295	296,030	286,430	**292,585**
Q_s	Volumetric flow rate, standard (m^3/hr)	201,625	202,000	196,005	**199,876**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	159,569	159,161	153,927	**157,553**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	130,606	131,394	126,929	**129,643**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	187,878	188,227	182,641	**186,249**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	148,690	148,309	143,432	**146,810**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	121,701	122,435	118,275	**120,804**

Comments:
Average includes 3 runs.

042208 135517
PLN@

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

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 2 FF Outlet

USEPA Method 13B
HF Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		11:03	12:36	14:20	
Stop Time (approx.)		12:12	13:47	15:31	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	183.1	184.4	184.5	**184.0**
P_1	Fabric Filter Inlet Temperature (°F)	322	319	317	**319**
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 %)	9.5230	9.4250	9.4380	**9.4620**
CO_2	Carbon dioxide (dry volume %)	10.0090	10.1000	10.1410	**10.0833**
T_s	Sample temperature (°F)	300.9200	301.4000	299.2400	**300.5200**
B_w	Actual water vapor in gas (% by volume)	20.8585	21.2073	21.4675	**21.1778**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	173,781	174,214	168,564	**172,186**
Q_s	Volumetric flow rate, standard (scfm)	118,656	118,877	115,349	**117,627**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	93,906	93,666	90,586	**92,720**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	76,861	77,325	74,698	**76,295**
Q_a	Volumetric flow rate, actual (acf/hr)	10,426,867	10,452,825	10,113,831	**10,331,175**
Q_s	Volumetric flow rate, standard (scf/hr)	7,119,382	7,132,607	6,920,925	**7,057,638**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,634,390	5,619,976	5,435,172	**5,563,179**
Q_a	Volumetric flow rate, actual (m^3/hr)	295,295	296,030	286,430	**292,585**
Q_s	Volumetric flow rate, standard (m^3/hr)	201,625	202,000	196,005	**199,876**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	159,569	159,161	153,927	**157,553**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	130,606	131,394	126,929	**129,643**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	187,878	188,227	182,641	**186,249**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	148,690	148,309	143,432	**146,810**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	121,701	122,435	118,275	**120,804**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	34.3615	34.6442	33.5945	**34.2000**
%I	Isokinetic sampling (%)	97.8841	98.9425	99.2070	**98.6779**
Laboratory Data					
m_n	Total HF collected (mg)	<0.0016	<0.0015	<0.0014	
Hydrogen Fluoride (HF) Results					
C_{sd}	HF Concentration (lb/dscf)	<1.0474E-10	<9.6509E-11	<9.1784E-11	**<9.7677E-11**
C_{sd7}	HF Concentration @7% O_2 (lb/dscf)	<1.2796E-10	<1.1690E-10	<1.1131E-10	**<1.1872E-10**
C_{sd12}	HF Concentration @12% CO_2 (lb/dscf)	<1.2557E-10	<1.1466E-10	<1.0861E-10	**<1.1628E-10**
C_a	HF Concentration (lb/acf)	<5.6597E-11	<5.1888E-11	<4.9325E-11	**<5.2603E-11**
C_{sd}	HF Concentration (ppmdv)	<0.0020	<0.0019	<0.0018	**<0.0019**
C_{sd7}	HF Concentration @7% O_2 (ppmdv)	<0.0025	<0.0023	<0.0021	**<0.0023**
C_{sd12}	HF Concentration @12% CO_2 (ppmdv)	<0.0024	<0.0022	<0.0021	**<0.0022**
C_w	HF Concentration (ppmwv)	<0.0016	<0.0015	<0.0014	**<0.0015**
C_{sd}	HF Concentration (mg/dscm)	<0.0017	<0.0015	<0.0015	**<0.0016**
C_{sd7}	HF Concentration @7% O_2 (mg/dscm)	<0.0020	<0.0019	<0.0018	**<0.0019**
C_{sd12}	HF Concentration @12% CO_2 (mg/dscm)	<0.0020	<0.0018	<0.0017	**<0.0019**
C_a	HF Concentration (mg/m^3 (actual,wet))	<0.0009	<0.0008	<0.0008	**<0.0008**
C_{sd}	HF Concentration (mg/Nm^3 dry)	<0.0018	<0.0017	<0.0016	**<0.0017**
C_{sd7}	HF Concentration @7% O_2 (mg/Nm^3 dry)	<0.0022	<0.0020	<0.0019	**<0.0020**
C_{sd12}	HF Concentration @12% CO_2 (mg/Nm^3 dry)	<0.0022	<0.0020	<0.0019	**<0.0020**
$E_{lb/hr}$	HF Rate (lb/hr)	<0.00059	<0.00054	<0.00050	**<0.00054**
$E_{kg/hr}$	HF Rate (kg/hr)	<0.00027	<0.00025	<0.00023	**<0.00025**
$E_{T/yr}$	HF Rate (Ton/yr)	<0.0026	<0.0024	<0.0022	**<0.0024**
E_{Fd}	HF Rate - Fd-based (lb/MMBtu)	<0.0000018	<0.0000017	<0.0000016	**<0.0000017**
E_{Fc}	HF Rate - Fc-based (lb/MMBtu)	<0.0000019	<0.0000017	<0.0000016	**<0.0000018**

042208 135517
PLN@_S

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 2 FF Outlet

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

Run No.		1	2	3	Average
Date (2008)		Mar 26	Mar 26	Mar 26	
Start Time (approx.)		06:06	07:32	09:21	
Stop Time (approx.)		07:06	08:32	10:21	
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.9950	0.9950	0.9950	
C_p	Pitot tube coefficient	0.84	0.84	0.84	
P_g	Static pressure (in. H_2O)	-10.4000	-10.4000	-10.4000	
A_s	Sample location area (ft^2)	64.0000	64.0000	64.0000	
P_{bar}	Barometric pressure (in. Hg)	30.30	30.30	30.30	**30.3000**
D_n	Nozzle diameter (in.)	NA	NA	NA	
O_2	Oxygen (dry volume %)	10.3660	9.9230	10.1560	**10.1483**
CO_2	Carbon dioxide (dry volume %)	9.1130	9.5570	9.3640	**9.3447**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.5210	80.5200	80.4800	**80.5070**
V_{lc}	Total Liquid collected (ml)	203.10	203.00	198.30	
V_m	Volume metered, meter conditions (ft^3)	35.6400	36.0800	36.9550	
T_m	Dry gas meter temperature (°F)	72.6250	78.5833	80.8333	
T_s	Sample temperature (°F)	299.9167	299.4167	299.8333	**299.7222**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.2000	1.2000	1.2000	
θ	Total sampling time (min)	60.0	60.0	60.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	9.5599	9.5552	9.3340	**9.4830**
V_{mstd}	Volume metered, standard (dscf)	35.6897	35.7306	36.4449	**35.9551**
P_s	Sample gas pressure, absolute (in. Hg)	29.5353	29.5353	29.5353	**29.5353**
P_v	Vapor pressure, actual (in. Hg)	29.5353	29.5353	29.5353	**29.5353**
B_{wo}	Moisture measured in sample (% by volume)	21.1271	21.0998	20.3893	**20.8720**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	21.1271	21.0998	20.3893	**20.8720**
M_d	MW of sample gas, dry (lb/lb-mole)	29.8727	29.9260	29.9045	**29.9011**
M_s	MW of sample gas, wet (lb/lb-mole)	27.3644	27.4097	27.4772	**27.4171**

Comments:

Average includes 3 runs.

042208 135607
K M K @

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 2 FF Outlet

USEPA Method 26A
HCl Parameters (CleanAir)

Run No.		1	2	3	Average
Date (2008)		Mar 26	Mar 26	Mar 26	
Start Time (approx.)		06:06	07:32	09:21	
Stop Time (approx.)		07:06	08:32	10:21	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	183.4	185.8	185.2	**184.8**
P_1	Fabric Filter Inlet Temperature (°F)	315	315	315	**315**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	10.3660	9.9230	10.1560	**10.1483**
CO_2	Carbon dioxide (dry volume %)	9.1130	9.5570	9.3640	**9.3447**
T_s	Sample temperature (°F)	299.9167	299.4167	299.8333	**299.7222**
B_w	Actual water vapor in gas (% by volume)	21.1271	21.0998	20.3893	**20.8720**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	35.6897	35.7306	36.4449	**35.9551**
Laboratory Data					
m_n	Total HCl collected (mg)	6.3487	8.1574	7.1067	
Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (lb/dscf)	3.9224E-07	5.0341E-07	4.2997E-07	**4.4187E-07**
C_{sd7}	HCl Concentration @7% O_2 (lb/dscf)	5.1758E-07	6.3745E-07	5.5627E-07	**5.7043E-07**
C_{sd12}	HCl Concentration @12% CO_2 (lb/dscf)	5.1650E-07	6.3209E-07	5.5101E-07	**5.6653E-07**
C_{sd}	HCl Concentration (ppmdv)	4.1470	5.3223	4.5459	**4.6717**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	5.4721	6.7395	5.8812	**6.0310**
C_{sd12}	HCl Concentration @12% CO_2 (ppmdv)	5.4608	6.6828	5.8256	**5.9897**
C_w	HCl Concentration (ppmwv)	3.2709	4.1993	3.6190	**3.6964**
C_{sd}	HCl Concentration (mg/dscm)	6.2812	8.0613	6.8854	**7.0760**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	8.2883	10.2079	8.9079	**9.1347**
C_{sd12}	HCl Concentration @12% CO_2 (mg/dscm)	8.2711	10.1220	8.8236	**9.0722**
C_{sd}	HCl Concentration (mg/Nm^3 dry)	6.7408	8.6512	7.3892	**7.5937**
C_{sd7}	HCl Concentration @7% O_2 (mg/Nm^3 dry)	8.8947	10.9549	9.5597	**9.8031**
C_{sd12}	HCl Concentration @12% CO_2 (mg/Nm^3 dry)	8.8763	10.8626	9.4693	**9.7361**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.0074	0.0092	0.0080	**0.0082**
E_{Fc}	HCl Rate - Fc-based (lb/MMBtu)	0.0078	0.0096	0.0084	**0.0086**

050508 121102
K M K @_@

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 2 FF Outlet

USEPA Method 26A
HCl Parameters (ALS Analysis)

Run No.		1	2	3	Average
Date (2008)		Mar 26	Mar 26	Mar 26	
Start Time (approx.)		06:06	07:32	09:21	
Stop Time (approx.)		07:06	08:32	10:21	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	183.4	185.8	185.2	**184.8**
P_1	Fabric Filter Inlet Temperature (°F)	315	315	315	**315**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	10.3660	9.9230	10.1560	**10.1483**
CO_2	Carbon dioxide (dry volume %)	9.1130	9.5570	9.3640	**9.3447**
T_s	Sample temperature (°F)	299.9167	299.4167	299.8333	**299.7222**
B_w	Actual water vapor in gas (% by volume)	21.1271	21.0998	20.3893	**20.8720**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	35.6897	35.7306	36.4449	**35.9551**
Laboratory Data					
m_n	Total HCl collected (mg)	7.5900	8.2500	6.8900	
Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (lb/dscf)	4.6893E-07	5.0912E-07	4.1686E-07	**4.6497E-07**
C_{sd7}	HCl Concentration @7% O_2 (lb/dscf)	6.1877E-07	6.4469E-07	5.3931E-07	**6.0092E-07**
C_{sd12}	HCl Concentration @12% CO_2 (lb/dscf)	6.1749E-07	6.3927E-07	5.3421E-07	**5.9699E-07**
C_{sd}	HCl Concentration (ppmdv)	4.9578	5.3827	4.4073	**4.9159**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	6.5420	6.8161	5.7019	**6.3533**
C_{sd12}	HCl Concentration @12% CO_2 (ppmdv)	6.5284	6.7587	5.6480	**6.3117**
C_w	HCl Concentration (ppmwv)	3.9104	4.2470	3.5087	**3.8887**
C_{sd}	HCl Concentration (mg/dscm)	7.5092	8.1529	6.6754	**7.4459**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	9.9087	10.3239	8.6363	**9.6230**
C_{sd12}	HCl Concentration @12% CO_2 (mg/dscm)	9.8882	10.2369	8.5546	**9.5599**
C_{sd}	HCl Concentration (mg/Nm^3 dry)	8.0587	8.7494	7.1639	**7.9907**
C_{sd7}	HCl Concentration @7% O_2 (mg/Nm^3 dry)	10.6338	11.0793	9.2682	**10.3271**
C_{sd12}	HCl Concentration @12% CO_2 (mg/Nm^3 dry)	10.6117	10.9860	9.1806	**10.2594**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.0089	0.0093	0.0078	**0.0086**
E_{Fc}	HCl Rate - Fc-based (lb/MMBtu)	0.0094	0.0097	0.0081	**0.0091**

050508 112040
K M K @_@

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 2 SDA Inlet

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

Run No.		1	2	3	Average
Date (2008)		Mar 26	Mar 26	Mar 26	
Start Time (approx.)		06:06	07:32	09:21	
Stop Time (approx.)		07:06	08:32	10:21	
Sampling Conditions					
Y_d	Dry gas meter correction factor	1.0083	1.0083	1.0083	
C_p	Pitot tube coefficient	0.84	0.84	0.84	
P_g	Static pressure (in. H_2O)	-2.0000	-2.0000	-2.0000	
P_{bar}	Barometric pressure (in. Hg)	30.30	30.30	30.30	**30.3000**
D_n	Nozzle diameter (in.)	NA	NA	NA	
O_2	Oxygen (dry volume %)	9.2740	9.1050	9.0610	**9.1467**
CO_2	Carbon dioxide (dry volume %)	10.1700	10.3010	10.3420	**10.2710**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.5560	80.5940	80.5970	**80.5823**
V_{lc}	Total Liquid collected (ml)	141.40	138.50	136.70	
V_m	Volume metered, meter conditions (ft^3)	34.3000	33.6500	34.1250	
T_m	Dry gas meter temperature (°F)	82.5833	85.4583	87.5833	
T_s	Sample temperature (°F)	522.8333	524.0000	523.1667	**523.3333**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.2000	1.2000	1.2000	
θ	Total sampling time (min)	60.0	60.0	60.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	6.6557	6.5192	6.4345	**6.5365**
V_{mstd}	Volume metered, standard (dscf)	34.1682	33.3440	33.6834	**33.7319**
P_s	Sample gas pressure, absolute (in. Hg)	30.1529	30.1529	30.1529	**30.1529**
P_v	Vapor pressure, actual (in. Hg)	30.1529	30.1529	30.1529	**30.1529**
B_{wo}	Moisture measured in sample (% by volume)	16.3035	16.3539	16.0389	**16.2321**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	16.3035	16.3539	16.0389	**16.2321**
M_d	MW of sample gas, dry (lb/lb-mole)	29.9982	30.0124	30.0172	**30.0092**
M_s	MW of sample gas, wet (lb/lb-mole)	28.0420	28.0479	28.0897	**28.0599**

Comments:

Average includes 3 runs.

042208 135714
NKP@

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 2 SDA Inlet

USEPA Method 26A
HCl Parameters (CleanAir)

Run No.		1	2	3	Average
Date (2008)		Mar 26	Mar 26	Mar 26	
Start Time (approx.)		06:06	07:32	09:21	
Stop Time (approx.)		07:06	08:32	10:21	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	183.4	185.8	185.2	**184.8**
P_1	Fabric Filter Inlet Temperature (°F)	315	315	315	**315**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.2740	9.1050	9.0610	**9.1467**
CO_2	Carbon dioxide (dry volume %)	10.1700	10.3010	10.3420	**10.2710**
T_s	Sample temperature (°F)	522.8333	524.0000	523.1667	**523.3333**
B_w	Actual water vapor in gas (% by volume)	16.3035	16.3539	16.0389	**16.2321**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	34.1682	33.3440	33.6834	**33.7319**
Laboratory Data					
m_n	Total HCl collected (mg)	635.2111	682.5215	708.7028	
Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (lb/dscf)	4.0993E-05	4.5134E-05	4.6393E-05	**4.4173E-05**
C_{sd7}	HCl Concentration @7% O_2 (lb/dscf)	4.9011E-05	5.3189E-05	5.4470E-05	**5.2223E-05**
C_{sd12}	HCl Concentration @12% CO_2 (lb/dscf)	4.8369E-05	5.2579E-05	5.3831E-05	**5.1593E-05**
C_{sd}	HCl Concentration (ppmdv)	433.3980	477.1879	490.4991	**467.0283**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	518.1690	562.3494	575.8880	**552.1354**
C_{sd12}	HCl Concentration @12% CO_2 (ppmdv)	511.3841	555.8931	569.1345	**545.4706**
C_w	HCl Concentration (ppmwv)	362.7392	399.1489	411.8285	**391.2388**
C_{sd}	HCl Concentration (mg/dscm)	656.4388	722.7644	742.9261	**707.3764**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	784.8357	851.7529	872.2588	**836.2825**
C_{sd12}	HCl Concentration @12% CO_2 (mg/dscm)	774.5591	841.9739	862.0298	**826.1876**
C_{sd}	HCl Concentration (mg/Nm^3 dry)	704.4710	775.6496	797.2865	**759.1357**
C_{sd7}	HCl Concentration @7% O_2 (mg/Nm^3 dry)	842.2627	914.0763	936.0826	**897.4739**
C_{sd12}	HCl Concentration @12% CO_2 (mg/Nm^3 dry)	831.2342	903.5817	925.1052	**886.6404**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.7052	0.7654	0.7838	**0.7515**
E_{Fc}	HCl Rate - Fc-based (lb/MMBtu)	0.7336	0.7974	0.8164	**0.7825**

050508 121144
N K P @_@

Prepared by Clean Air Engineering Proprietary Software
SS EPA26-1 Version 2006-10a (CI)

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 2 SDA Inlet

USEPA Method 26A
HCl Parameters (ALS Analysis)

Run No.		1	2	3	Average
Date (2008)		Mar 26	Mar 26	Mar 26	
Start Time (approx.)		06:06	07:32	09:21	
Stop Time (approx.)		07:06	08:32	10:21	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	183.4	185.8	185.2	**184.8**
P_1	Fabric Filter Inlet Temperature (°F)	315	315	315	**315**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.2740	9.1050	9.0610	**9.1467**
CO_2	Carbon dioxide (dry volume %)	10.1700	10.3010	10.3420	**10.2710**
T_s	Sample temperature (°F)	522.8333	524.0000	523.1667	**523.3333**
B_w	Actual water vapor in gas (% by volume)	16.3035	16.3539	16.0389	**16.2321**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	34.1682	33.3440	33.6834	**33.7319**
Laboratory Data					
m_n	Total HCl collected (mg)	592.0000	601.0000	567.0000	
Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (lb/dscf)	3.8204E-05	3.9743E-05	3.7117E-05	**3.8355E-05**
C_{sd7}	HCl Concentration @7% O_2 (lb/dscf)	4.5677E-05	4.6836E-05	4.3579E-05	**4.5364E-05**
C_{sd12}	HCl Concentration @12% CO_2 (lb/dscf)	4.5078E-05	4.6299E-05	4.3068E-05	**4.4815E-05**
C_{sd}	HCl Concentration (ppmdv)	403.9155	420.1917	392.4254	**405.5109**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	482.9198	495.1814	460.7411	**479.6141**
C_{sd12}	HCl Concentration @12% CO_2 (ppmdv)	476.5965	489.4962	455.3380	**473.8102**
C_w	HCl Concentration (ppmwv)	338.0633	351.4739	329.4847	**339.6740**
C_{sd}	HCl Concentration (mg/dscm)	611.7837	636.4362	594.3804	**614.2001**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	731.4462	750.0181	697.8535	**726.4393**
C_{sd12}	HCl Concentration @12% CO_2 (mg/dscm)	721.8687	741.4071	689.6698	**717.6485**
C_{sd}	HCl Concentration (mg/Nm^3 dry)	656.5484	683.0047	637.8717	**659.1416**
C_{sd7}	HCl Concentration @7% O_2 (mg/Nm^3 dry)	784.9667	804.8974	748.9160	**779.5934**
C_{sd12}	HCl Concentration @12% CO_2 (mg/Nm^3 dry)	774.6884	795.6564	740.1335	**770.1594**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.6573	0.6739	0.6271	**0.6528**
E_{Fc}	HCl Rate - Fc-based (lb/MMBtu)	0.6837	0.7022	0.6532	**0.6797**

050508 112040
NKP@_@

Prepared by Clean Air Engineering Proprietary Software
SS EPA26-1 Version 2006-10a (CI)

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 FF Outlet

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

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:22	09:12	12:08	
Stop Time (approx.)		08:36	11:26	14:24	
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.9871	0.9871	0.9871	
C_p	Pitot tube coefficient	0.84	0.84	0.84	
P_g	Static pressure (in. H_2O)	-8.6000	-9.2000	-9.2000	
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.)	0.2670	0.2670	0.2670	
O_2	Oxygen (dry volume %)	9.6620	9.9300	9.3350	**9.6423**
CO_2	Carbon dioxide (dry volume %)	9.7320	9.4560	10.2430	**9.8103**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.6060	80.6140	80.4220	**80.5473**
V_{lc}	Total Liquid collected (ml)	445.70	474.70	430.30	
V_m	Volume metered, meter conditions (ft^3)	81.9750	86.4600	82.5100	
T_m	Dry gas meter temperature (°F)	77.9000	84.2800	81.7400	
T_s	Sample temperature (°F)	292.2800	289.5600	292.7200	**291.5200**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.3000	1.4440	1.2960	
θ	Total sampling time (min)	125.0	125.0	125.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	20.9791	22.3441	20.2542	**21.1925**
V_{mstd}	Volume metered, standard (dscf)	79.8624	83.2738	79.8131	**80.9831**
P_s	Sample gas pressure, absolute (in. Hg)	29.3676	29.3235	29.3235	**29.3382**
P_v	Vapor pressure, actual (in. Hg)	29.3676	29.3235	29.3235	**29.3382**
B_{wo}	Moisture measured in sample (% by volume)	20.8040	21.1556	20.2406	**20.7334**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	20.8040	21.1556	20.2406	**20.7334**
$\sqrt{\Delta P}$	Velocity head ($\sqrt{}$in. H_2O)	0.7125	0.7437	0.7069	**0.7210**
M_d	MW of sample gas, dry (lb/lb-mole)	29.9436	29.9102	30.0123	**29.9553**
M_s	MW of sample gas, wet (lb/lb-mole)	27.4588	27.3905	27.5809	**27.4768**
V_s	Velocity of sample (ft/sec)	49.4175	51.5923	48.9764	**49.9954**
%I	Isokinetic sampling (%)	101.6344	101.7454	101.9753	**101.7850**
Q_a	Volumetric flow rate, actual (acfm)	189,763	198,114	188,069	**191,982**
Q_s	Volumetric flow rate, standard (scfm)	130,730	136,772	129,292	**132,265**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	103,533	107,837	103,123	**104,831**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	83,705	85,106	85,800	**84,870**
Q_a	Volumetric flow rate, actual (acf/hr)	11,385,793	11,886,865	11,284,152	**11,518,937**
Q_s	Volumetric flow rate, standard (scf/hr)	7,843,777	8,206,340	7,757,540	**7,935,886**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	6,211,956	6,470,237	6,187,367	**6,289,853**
Q_a	Volumetric flow rate, actual (m^3/hr)	322,452	336,643	319,574	**326,223**
Q_s	Volumetric flow rate, standard (m^3/hr)	222,140	232,408	219,698	**224,749**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	175,926	183,241	175,230	**178,132**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	142,234	144,615	145,794	**144,215**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	206,994	216,562	204,719	**209,425**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	163,931	170,747	163,282	**165,987**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	132,537	134,755	135,853	**134,382**

Comments:

Average includes 3 runs.

042208 135743
ONC@

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 FF Outlet

USEPA Method 5/29
Filterable Particulate Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:22	09:12	12:08	
Stop Time (approx.)		08:36	11:26	14:24	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	184.1	184.3	184.3	**184.2**
P_1	Fabric Filter Inlet Temperature (°F)	319	315	320	**318**
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 %)	9.6620	9.9300	9.3350	**9.6423**
CO_2	Carbon dioxide (dry volume %)	9.7320	9.4560	10.2430	**9.8103**
T_s	Sample temperature (°F)	292.2800	289.5600	292.7200	**291.5200**
B_w	Actual water vapor in gas (% by volume)	20.8040	21.1556	20.2406	**20.7334**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	189,763	198,114	188,069	**191,982**
Q_s	Volumetric flow rate, standard (scfm)	130,730	136,772	129,292	**132,265**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	103,533	107,837	103,123	**104,831**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	83,705	85,106	85,800	**84,870**
Q_a	Volumetric flow rate, actual (acf/hr)	11,385,793	11,886,865	11,284,152	**11,518,937**
Q_s	Volumetric flow rate, standard (scf/hr)	7,843,777	8,206,340	7,757,540	**7,935,886**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	6,211,956	6,470,237	6,187,367	**6,289,853**
Q_a	Volumetric flow rate, actual (m^3/hr)	322,452	336,643	319,574	**326,223**
Q_s	Volumetric flow rate, standard (m^3/hr)	222,140	232,408	219,698	**224,749**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	175,926	183,241	175,230	**178,132**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	142,234	144,615	145,794	**144,215**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	206,994	216,562	204,719	**209,425**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	163,931	170,747	163,282	**165,987**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	132,537	134,755	135,853	**134,382**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	79.8624	83.2738	79.8131	**80.9831**
%I	Isokinetic sampling (%)	101.6344	101.7454	101.9753	**101.7850**
Laboratory Data					
m_{filter}	Matter collected on filter(s) (g)	0.00031	<0.00030	<0.00030	
m_s	Matter collected in solvent rinse(s) (g)	0.00171	0.00135	0.01336	
m_n	Total particulate matter collected (g)	0.00202	0.00135	0.01336	
Filterable Particulate Results					
C_{sd}	Particulate Concentration (lb/dscf)	5.5772E-08	3.5747E-08	3.6910E-07	**1.5354E-07**
C_{sd7}	Particulate Concentration @7% O_2 (lb/dscf)	6.8983E-08	4.5294E-08	4.4362E-07	**1.8597E-07**
C_{sd12}	Particulate Concentration @12% CO_2 (lb/dscf)	6.8770E-08	4.5364E-08	4.3241E-07	**1.8218E-07**
C_a	Particulate Concentration (lb/acf)	3.0429E-08	1.9457E-08	2.0238E-07	**8.4090E-08**
C_{sd}	Particulate Concentration (gr/dscf)	0.0004	0.0003	0.0026	**0.0011**
C_{sd7}	Particulate Concentration @7% O_2 (gr/dscf)	0.0005	0.0003	0.0031	**0.0013**
C_{sd12}	Particulate Concentration @12% CO_2 (gr/dscf)	0.0005	0.0003	0.0030	**0.0013**
C_a	Particulate Concentration (gr/acf)	0.0002	0.0001	0.0014	**0.0006**
C_{sd}	Particulate Concentration (mg/dscm)	0.8931	0.5724	5.9106	**2.4587**
C_{sd7}	Particulate Concentration @7% O_2 (mg/dscm)	1.1047	0.7253	7.1039	**2.9780**
C_{sd12}	Particulate Concentration @12% CO_2 (mg/dscm)	1.1012	0.7264	6.9244	**2.9174**
C_a	Particulate Concentration (mg/m^3 (actual,wet))	0.4873	0.3116	3.2409	**1.3466**
C_{sd}	Particulate Concentration (mg/Nm^3 dry)	0.9585	0.6143	6.3431	**2.6386**
C_{sd7}	Particulate Concentration @7% O_2 (mg/Nm^3 dry)	1.1855	0.7784	7.6237	**3.1959**
C_{sd12}	Particulate Concentration @12% CO_2 (mg/Nm^3 dry)	1.1818	0.7796	7.4311	**3.1308**
$E_{lb/hr}$	Particulate Rate (lb/hr)	0.3465	0.2313	2.2837	**0.9538**
$E_{kg/hr}$	Particulate Rate (kg/hr)	0.1571	0.1049	1.0357	**0.4326**
$E_{T/yr}$	Particulate Rate (Ton/yr)	1.5175	1.0130	10.0028	**4.1778**
E_{Fd}	Particulate Rate - F_d-based (lb/MMBtu)	0.00099	0.00065	0.0064	**0.0027**
E_{Fc}	Particulate Rate - F_c-based (lb/MMBtu)	0.0010	0.00069	0.0066	**0.0028**

Prepared by Clean Air Engineering Proprietary Software
SS EPA Part Version:2006-08b

042408 080531
ONO8_L

Comments:
Average includes 3 runs.

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 FF Outlet

USEPA Method 5/29
Mercury (Hg) Emission Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:22	09:12	12:08	
Stop Time (approx.)		08:36	11:26	14:24	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	184.1	184.3	184.3	**184.2**
P_1	Fabric Filter Inlet Temperature (°F)	319	315	320	**318**
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 %)	9.6620	9.9300	9.3350	**9.6423**
CO_2	Carbon dioxide (dry volume %)	9.7320	9.4560	10.2430	**9.8103**
T_s	Sample temperature (°F)	292.2800	289.5600	292.7200	**291.5200**
B_w	Actual water vapor in gas (% by volume)	20.8040	21.1556	20.2406	**20.7334**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	189,763	198,114	188,069	**191,982**
Q_s	Volumetric flow rate, standard (scfm)	130,730	136,772	129,292	**132,265**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	103,533	107,837	103,123	**104,831**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	83,705	85,106	85,800	**84,870**
Q_a	Volumetric flow rate, actual (acf/hr)	11,385,793	11,886,865	11,284,152	**11,518,937**
Q_s	Volumetric flow rate, standard (scf/hr)	7,843,777	8,206,340	7,757,540	**7,935,886**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	6,211,956	6,470,237	6,187,367	**6,289,853**
Q_a	Volumetric flow rate, actual (m^3/hr)	322,452	336,643	319,574	**326,223**
Q_s	Volumetric flow rate, standard (m^3/hr)	222,140	232,408	219,698	**224,749**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	175,926	183,241	175,230	**178,132**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	142,234	144,615	145,794	**144,215**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	206,994	216,562	204,719	**209,425**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	163,931	170,747	163,282	**165,987**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	132,537	134,755	135,853	**134,382**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	79.8624	83.2738	79.8131	**80.9831**
%I	Isokinetic sampling (%)	101.6344	101.7454	101.9753	**101.7850**
Laboratory Data					
m_{n-1b}	Fraction 1B (µg)	<0.1000	<0.1000	<0.1000	**<0.1000**
m_{n-2b}	Fraction 2B (µg)	10.4108	7.7484	9.5656	**9.2416**
m_{n-3a}	Fraction 3A (µg)	<0.2000	<0.2000	<0.2000	**<0.2000**
m_{n-3b}	Fraction 3B (µg)	<0.5000	<0.5000	<0.5000	**<0.5000**
m_{n-3c}	Fraction 3C (µg)	<0.4000	<0.4000	<0.4000	**<0.4000**
m_n	Total matter corrected for allowable blanks (µg)	10.4108	7.7484	9.5656	**9.2416**
Mercury Results - Total					
C_{sd}	Concentration (lb/dscf)	2.8744E-10	2.0517E-10	2.6427E-10	**2.5229E-10**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	3.5553E-10	2.5997E-10	3.1763E-10	**3.1104E-10**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	3.5443E-10	2.6037E-10	3.0960E-10	**3.0813E-10**
C_a	Concentration (lb/acf)	1.5683E-10	1.1168E-10	1.4491E-10	**1.3780E-10**
C_{sd}	Concentration (µg/dscm)	4.6030E+00	3.2855E+00	4.2319E+00	**4.0401E+00**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	5.6933E+00	4.1630E+00	5.0864E+00	**4.9809E+00**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	5.6757E+00	4.1694E+00	4.9578E+00	**4.9343E+00**
C_{sd}	Concentration (mg/dscm)	4.6030E-03	3.2855E-03	4.2319E-03	**4.0401E-03**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	5.6933E-03	4.1630E-03	5.0864E-03	**4.9809E-03**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	5.6757E-03	4.1694E-03	4.9578E-03	**4.9343E-03**
C_a	Concentration (µg/m^3 (actual,wet))	2.5113E+00	1.7884E+00	2.3205E+00	**2.2067E+00**
C_{sd}	Concentration (µg/Nm^3 dry)	4.9398E+00	3.5259E+00	4.5416E+00	**4.3358E+00**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	6.1099E+00	4.4677E+00	5.4585E+00	**5.3454E+00**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	6.0910E+00	4.4745E+00	5.3206E+00	**5.2954E+00**
$E_{lb/hr}$	Rate (lb/hr)	1.7856E-03	1.3275E-03	1.6351E-03	**1.5827E-03**
$E_{g/s}$	Rate (g/s)	2.2494E-04	1.6723E-04	2.0599E-04	**1.9939E-04**
$E_{T/yr}$	Rate (Ton/yr)	7.8209E-03	5.8144E-03	7.1619E-03	**6.9324E-03**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	5.1159E-06	3.7408E-06	4.5705E-06	**4.4757E-06**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	5.3755E-06	3.9489E-06	4.6956E-06	**4.6734E-06**

042208 135904
ONO@_K

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

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 FF Outlet

USEPA Method 5/29
Mercury (Hg) Emission Parameters (continued)
Separate Front Half Results

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:22	09:12	12:08	
Stop Time (approx.)		08:36	11:26	14:24	
Mercury Results - Front Half					
C_{sd}	Concentration (lb/dscf)	<2.7610E-12	<2.6479E-12	<2.7627E-12	**<2.7239E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<3.4150E-12	<3.3551E-12	<3.3205E-12	**<3.3635E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<3.4044E-12	<3.3603E-12	<3.2366E-12	**<3.3338E-12**
C_a	Concentration (lb/acf)	<1.5064E-12	<1.4413E-12	<1.5149E-12	**<1.4875E-12**
C_{sd}	Concentration (µg/dscm)	<4.4214E-02	<4.2402E-02	<4.4241E-02	**<4.3619E-02**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<5.4687E-02	<5.3728E-02	<5.3173E-02	**<5.3862E-02**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<5.4517E-02	<5.3810E-02	<5.1830E-02	**<5.3386E-02**
C_{sd}	Concentration (mg/dscm)	<4.4214E-05	<4.2402E-05	<4.4241E-05	**<4.3619E-05**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<5.4687E-05	<5.3728E-05	<5.3173E-05	**<5.3862E-05**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<5.4517E-05	<5.3810E-05	<5.1830E-05	**<5.3386E-05**
C_a	Concentration (µg/m^3 (actual,wet))	<2.4122E-02	<2.3080E-02	<2.4258E-02	**<2.3820E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<4.7449E-02	<4.5505E-02	<4.7478E-02	**<4.6811E-02**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<5.8688E-02	<5.7659E-02	<5.7064E-02	**<5.7804E-02**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<5.8506E-02	<5.7747E-02	<5.5622E-02	**<5.7292E-02**
$E_{lb/hr}$	Rate (lb/hr)	<1.7151E-05	<1.7132E-05	<1.7094E-05	**<1.7126E-05**
$E_{g/s}$	Rate (g/s)	<2.1606E-06	<2.1583E-06	<2.1534E-06	**<2.1575E-06**
$E_{T/yr}$	Rate (Ton/yr)	<7.5122E-05	<7.5040E-05	<7.4871E-05	**<7.5011E-05**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<4.9140E-08	<4.8278E-08	<4.7780E-08	**<4.8399E-08**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<5.1634E-08	<5.0964E-08	<4.9088E-08	**<5.0562E-08**

042208 135904
ONO@_K

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
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 (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:22	09:12	12:08	
Stop Time (approx.)		08:36	11:26	14:24	
Mercury Results - Impingers 1-3 Solution					
C_{sd}	Concentration (lb/dscf)	2.8744E-10	2.0517E-10	2.6427E-10	**2.5229E-10**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	3.5553E-10	2.5997E-10	3.1763E-10	**3.1104E-10**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	3.5443E-10	2.6037E-10	3.0960E-10	**3.0813E-10**
C_a	Concentration (lb/acf)	1.5683E-10	1.1168E-10	1.4491E-10	**1.3780E-10**
C_{sd}	Concentration (µg/dscm)	4.6030E+00	3.2855E+00	4.2319E+00	**4.0401E+00**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	5.6933E+00	4.1630E+00	5.0864E+00	**4.9809E+00**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	5.6757E+00	4.1694E+00	4.9578E+00	**4.9343E+00**
C_{sd}	Concentration (mg/dscm)	4.6030E-03	3.2855E-03	4.2319E-03	**4.0401E-03**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	5.6933E-03	4.1630E-03	5.0864E-03	**4.9809E-03**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	5.6757E-03	4.1694E-03	4.9578E-03	**4.9343E-03**
C_a	Concentration (µg/m^3 (actual,wet))	2.5113E+00	1.7884E+00	2.3205E+00	**2.2067E+00**
C_{sd}	Concentration (µg/Nm^3 dry)	4.9398E+00	3.5259E+00	4.5416E+00	**4.3358E+00**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	6.1099E+00	4.4677E+00	5.4585E+00	**5.3454E+00**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	6.0910E+00	4.4745E+00	5.3206E+00	**5.2954E+00**
$E_{lb/hr}$	Rate (lb/hr)	1.7856E-03	1.3275E-03	1.6351E-03	**1.5827E-03**
$E_{g/s}$	Rate (g/s)	2.2494E-04	1.6723E-04	2.0599E-04	**1.9939E-04**
$E_{T/yr}$	Rate (Ton/yr)	7.8209E-03	5.8144E-03	7.1619E-03	**6.9324E-03**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	5.1159E-06	3.7408E-06	4.5705E-06	**4.4757E-06**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	5.3755E-06	3.9489E-06	4.6956E-06	**4.6734E-06**

042208 135904
ONO@_K

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 FF Outlet

USEPA Method 5/29
Mercury (Hg) Emission Parameters (continued)
Separate Impinger 4 Results

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:22	09:12	12:08	
Stop Time (approx.)		08:36	11:26	14:24	
Mercury Results - Impinger 4 Solution					
C_{sd}	Concentration (lb/dscf)	<5.5220E-12	<5.2958E-12	<5.5254E-12	**<5.4477E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<6.8300E-12	<6.7102E-12	<6.6410E-12	**<6.7271E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<6.8089E-12	<6.7205E-12	<6.4732E-12	**<6.6675E-12**
C_a	Concentration (lb/acf)	<3.0127E-12	<2.8826E-12	<3.0297E-12	**<2.9750E-12**
C_{sd}	Concentration (µg/dscm)	<8.8427E-02	<8.4805E-02	<8.8482E-02	**<8.7238E-02**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<1.0937E-01	<1.0746E-01	<1.0635E-01	**<1.0772E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<1.0903E-01	<1.0762E-01	<1.0366E-01	**<1.0677E-01**
C_{sd}	Concentration (mg/dscm)	<8.8427E-05	<8.4805E-05	<8.8482E-05	**<8.7238E-05**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<1.0937E-04	<1.0746E-04	<1.0635E-04	**<1.0772E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<1.0903E-04	<1.0762E-04	<1.0366E-04	**<1.0677E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<4.8245E-02	<4.6161E-02	<4.8517E-02	**<4.7641E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<9.4897E-02	<9.1010E-02	<9.4956E-02	**<9.3621E-02**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<1.1738E-01	<1.1532E-01	<1.1413E-01	**<1.1561E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<1.1701E-01	<1.1549E-01	<1.1124E-01	**<1.1458E-01**
$E_{lb/hr}$	Rate (lb/hr)	<3.4302E-05	<3.4265E-05	<3.4188E-05	**<3.4252E-05**
$E_{g/s}$	Rate (g/s)	<4.3213E-06	<4.3166E-06	<4.3068E-06	**<4.3149E-06**
$E_{T/yr}$	Rate (Ton/yr)	<1.5024E-04	<1.5008E-04	<1.4974E-04	**<1.5002E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<9.8280E-08	<9.6557E-08	<9.5560E-08	**<9.6799E-08**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<1.0327E-07	<1.0193E-07	<9.8177E-08	**<1.0112E-07**

042208 135904
ONO@_K

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
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 (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:22	09:12	12:08	
Stop Time (approx.)		08:36	11:26	14:24	
Mercury Results - Filtered Permanganate Solution					
C_{sd}	Concentration (lb/dscf)	<1.3805E-11	<1.3239E-11	<1.3814E-11	**<1.3619E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<1.7075E-11	<1.6776E-11	<1.6603E-11	**<1.6818E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<1.7022E-11	<1.6801E-11	<1.6183E-11	**<1.6669E-11**
C_a	Concentration (lb/acf)	<7.5318E-12	<7.2065E-12	<7.5743E-12	**<7.4375E-12**
C_{sd}	Concentration (µg/dscm)	<2.2107E-01	<2.1201E-01	<2.2120E-01	**<2.1809E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<2.7343E-01	<2.6864E-01	<2.6587E-01	**<2.6931E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<2.7259E-01	<2.6905E-01	<2.5915E-01	**<2.6693E-01**
C_{sd}	Concentration (mg/dscm)	<2.2107E-04	<2.1201E-04	<2.2120E-04	**<2.1809E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<2.7343E-04	<2.6864E-04	<2.6587E-04	**<2.6931E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<2.7259E-04	<2.6905E-04	<2.5915E-04	**<2.6693E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<1.2061E-01	<1.1540E-01	<1.2129E-01	**<1.1910E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	<2.3724E-01	<2.2752E-01	<2.3739E-01	**<2.3405E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<2.9344E-01	<2.8829E-01	<2.8532E-01	**<2.8902E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<2.9253E-01	<2.8874E-01	<2.7811E-01	**<2.8646E-01**
$E_{lb/hr}$	Rate (lb/hr)	<8.5756E-05	<8.5662E-05	<8.5469E-05	**<8.5629E-05**
$E_{g/s}$	Rate (g/s)	<1.0803E-05	<1.0791E-05	<1.0767E-05	**<1.0787E-05**
$E_{T/yr}$	Rate (Ton/yr)	<3.7561E-04	<3.7520E-04	<3.7436E-04	**<3.7506E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<2.4570E-07	<2.4139E-07	<2.3890E-07	**<2.4200E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<2.5817E-07	<2.5482E-07	<2.4544E-07	**<2.5281E-07**
Mercury Results - HCl Rinse + HCl/MnO2 Precipitate					
C_{sd}	Concentration (lb/dscf)	<1.1044E-11	<1.0592E-11	<1.1051E-11	**<1.0895E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<1.3660E-11	<1.3420E-11	<1.3282E-11	**<1.3454E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<1.3618E-11	<1.3441E-11	<1.2946E-11	**<1.3335E-11**
C_a	Concentration (lb/acf)	<6.0255E-12	<5.7652E-12	<6.0594E-12	**<5.9500E-12**
C_{sd}	Concentration (µg/dscm)	<1.7685E-01	<1.6961E-01	<1.7696E-01	**<1.7448E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<2.1875E-01	<2.1491E-01	<2.1269E-01	**<2.1545E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<2.1807E-01	<2.1524E-01	<2.0732E-01	**<2.1354E-01**
C_{sd}	Concentration (mg/dscm)	<1.7685E-04	<1.6961E-04	<1.7696E-04	**<1.7448E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<2.1875E-04	<2.1491E-04	<2.1269E-04	**<2.1545E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<2.1807E-04	<2.1524E-04	<2.0732E-04	**<2.1354E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<9.6490E-02	<9.2321E-02	<9.7033E-02	**<9.5281E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<1.8979E-01	<1.8202E-01	<1.8991E-01	**<1.8724E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<2.3475E-01	<2.3064E-01	<2.2826E-01	**<2.3121E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<2.3403E-01	<2.3099E-01	<2.2249E-01	**<2.2917E-01**
$E_{lb/hr}$	Rate (lb/hr)	<6.8605E-05	<6.8530E-05	<6.8375E-05	**<6.8503E-05**
$E_{g/s}$	Rate (g/s)	<8.6426E-06	<8.6332E-06	<8.6137E-06	**<8.6298E-06**
$E_{T/yr}$	Rate (Ton/yr)	<3.0049E-04	<3.0016E-04	<2.9948E-04	**<3.0004E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<1.9656E-07	<1.9311E-07	<1.9112E-07	**<1.9360E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<2.0654E-07	<2.0386E-07	<1.9635E-07	**<2.0225E-07**

042208 135904
ONO@_K

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 FF Outlet

USEPA Method 5/29
Beryllium (Be) Emission Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:22	09:12	12:08	
Stop Time (approx.)		08:36	11:26	14:24	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	184.1	184.3	184.3	**184.2**
P_1	Fabric Filter Inlet Temperature (°F)	319	315	320	**318**
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 %)	9.6620	9.9300	9.3350	**9.6423**
CO_2	Carbon dioxide (dry volume %)	9.7320	9.4560	10.2430	**9.8103**
T_s	Sample temperature (°F)	292.2800	289.5600	292.7200	**291.5200**
B_w	Actual water vapor in gas (% by volume)	20.8040	21.1556	20.2406	**20.7334**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	189,763	198,114	188,069	**191,982**
Q_s	Volumetric flow rate, standard (scfm)	130,730	136,772	129,292	**132,265**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	103,533	107,837	103,123	**104,831**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	83,705	85,106	85,800	**84,870**
Q_a	Volumetric flow rate, actual (acf/hr)	11,385,793	11,886,865	11,284,152	**11,518,937**
Q_s	Volumetric flow rate, standard (scf/hr)	7,843,777	8,206,340	7,757,540	**7,935,886**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	6,211,956	6,470,237	6,187,367	**6,289,853**
Q_a	Volumetric flow rate, actual (m^3/hr)	322,452	336,643	319,574	**326,223**
Q_s	Volumetric flow rate, standard (m^3/hr)	222,140	232,408	219,698	**224,749**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	175,926	183,241	175,230	**178,132**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	142,234	144,615	145,794	**144,215**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	206,994	216,562	204,719	**209,425**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	163,931	170,747	163,282	**165,987**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	132,537	134,755	135,853	**134,382**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	79.8624	83.2738	79.8131	**80.9831**
%I	Isokinetic sampling (%)	101.6344	101.7454	101.9753	**101.7850**
Laboratory Data					
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)	<1.3805E-12	<1.3239E-12	<1.3814E-12	**<1.3619E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<1.7075E-12	<1.6776E-12	<1.6603E-12	**<1.6818E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<1.7022E-12	<1.6801E-12	<1.6183E-12	**<1.6669E-12**
C_a	Concentration (lb/acf)	<7.5318E-13	<7.2065E-13	<7.5743E-13	**<7.4375E-13**
C_{sd}	Concentration (µg/dscm)	<2.2107E-02	<2.1201E-02	<2.2120E-02	**<2.1809E-02**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<2.7343E-02	<2.6864E-02	<2.6587E-02	**<2.6931E-02**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<2.7259E-02	<2.6905E-02	<2.5915E-02	**<2.6693E-02**
C_{sd}	Concentration (mg/dscm)	<2.2107E-05	<2.1201E-05	<2.2120E-05	**<2.1809E-05**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<2.7343E-05	<2.6864E-05	<2.6587E-05	**<2.6931E-05**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<2.7259E-05	<2.6905E-05	<2.5915E-05	**<2.6693E-05**
C_a	Concentration (µg/m^3 (actual,wet))	<1.2061E-02	<1.1540E-02	<1.2129E-02	**<1.1910E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<2.3724E-02	<2.2752E-02	<2.3739E-02	**<2.3405E-02**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<2.9344E-02	<2.8829E-02	<2.8532E-02	**<2.8902E-02**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<2.9253E-02	<2.8874E-02	<2.7811E-02	**<2.8646E-02**
$E_{lb/hr}$	Rate (lb/hr)	<8.5756E-06	<8.5662E-06	<8.5469E-06	**<8.5629E-06**
$E_{g/s}$	Rate (g/s)	<1.0803E-06	<1.0791E-06	<1.0767E-06	**<1.0787E-06**
$E_{T/yr}$	Rate (Ton/yr)	<3.7561E-05	<3.7520E-05	<3.7436E-05	**<3.7506E-05**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<2.4570E-08	<2.4139E-08	<2.3890E-08	**<2.4200E-08**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<2.5817E-08	<2.5482E-08	<2.4544E-08	**<2.5281E-08**

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 FF Outlet

USEPA Method 5/29
Cadmium (Cd) Emission Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:22	09:12	12:08	
Stop Time (approx.)		08:36	11:26	14:24	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	184.1	184.3	184.3	**184.2**
P_1	Fabric Filter Inlet Temperature (°F)	319	315	320	**318**
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 %)	9.6620	9.9300	9.3350	**9.6423**
CO_2	Carbon dioxide (dry volume %)	9.7320	9.4560	10.2430	**9.8103**
T_s	Sample temperature (°F)	292.2800	289.5600	292.7200	**291.5200**
B_w	Actual water vapor in gas (% by volume)	20.8040	21.1556	20.2406	**20.7334**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	189,763	198,114	188,069	**191,982**
Q_s	Volumetric flow rate, standard (scfm)	130,730	136,772	129,292	**132,265**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	103,533	107,837	103,123	**104,831**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	83,705	85,106	85,800	**84,870**
Q_a	Volumetric flow rate, actual (acf/hr)	11,385,793	11,886,865	11,284,152	**11,518,937**
Q_s	Volumetric flow rate, standard (scf/hr)	7,843,777	8,206,340	7,757,540	**7,935,886**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	6,211,956	6,470,237	6,187,367	**6,289,853**
Q_a	Volumetric flow rate, actual (m^3/hr)	322,452	336,643	319,574	**326,223**
Q_s	Volumetric flow rate, standard (m^3/hr)	222,140	232,408	219,698	**224,749**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	175,926	183,241	175,230	**178,132**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	142,234	144,615	145,794	**144,215**
Q_a	Volumetric flow rate, normal (Nm^3/hr)	206,994	216,562	204,719	**209,425**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	163,931	170,747	163,282	**165,987**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	132,537	134,755	135,853	**134,382**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	79.8624	83.2738	79.8131	**80.9831**
%I	Isokinetic sampling (%)	101.6344	101.7454	101.9753	**101.7850**
Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	0.5544	0.3275	0.3846	**0.4222**
Cadmium Results - Total					
C_{sd}	Concentration (lb/dscf)	1.5306E-11	8.6707E-12	1.0626E-11	**1.1534E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	1.8932E-11	1.0987E-11	1.2771E-11	**1.4230E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	1.8873E-11	1.1003E-11	1.2449E-11	**1.4109E-11**
C_a	Concentration (lb/acf)	8.3509E-12	4.7196E-12	5.8265E-12	**6.2990E-12**
C_{sd}	Concentration (µg/dscm)	2.4511E-01	1.3885E-01	1.7016E-01	**1.8471E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	3.0317E-01	1.7593E-01	2.0452E-01	**2.2787E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	3.0223E-01	1.7620E-01	1.9935E-01	**2.2593E-01**
C_{sd}	Concentration (mg/dscm)	2.4511E-04	1.3885E-04	1.7016E-04	**1.8471E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	3.0317E-04	1.7593E-04	2.0452E-04	**2.2787E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	3.0223E-04	1.7620E-04	1.9935E-04	**2.2593E-04**
C_a	Concentration (µg/m^3 (actual,wet))	1.3373E-01	7.5578E-02	9.3303E-02	**1.0087E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	2.6304E-01	1.4901E-01	1.8261E-01	**1.9822E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	3.2535E-01	1.8881E-01	2.1948E-01	**2.4455E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	3.2435E-01	1.8910E-01	2.1394E-01	**2.4246E-01**
$E_{lb/hr}$	Rate (lb/hr)	9.5082E-05	5.6102E-05	6.5747E-05	**7.2310E-05**
$E_{g/s}$	Rate (g/s)	1.1978E-05	7.0675E-06	8.2826E-06	**9.1094E-06**
$E_{T/yr}$	Rate (Ton/yr)	4.1646E-04	2.4572E-04	2.8797E-04	**3.1672E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	2.7242E-07	1.5809E-07	1.8377E-07	**2.0476E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	2.8625E-07	1.6689E-07	1.8881E-07	**2.1398E-07**

042208 135935

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 FF Outlet

USEPA Method 5/29
Lead (Pb) Emission Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 24	Mar 24	
Start Time (approx.)		06:22	09:12	12:08	
Stop Time (approx.)		08:36	11:26	14:24	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	184.1	184.3	184.3	**184.2**
P_1	Fabric Filter Inlet Temperature (°F)	319	315	320	**318**
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 %)	9.6620	9.9300	9.3350	**9.6423**
CO_2	Carbon dioxide (dry volume %)	9.7320	9.4560	10.2430	**9.8103**
T_s	Sample temperature (°F)	292.2800	289.5600	292.7200	**291.5200**
B_w	Actual water vapor in gas (% by volume)	20.8040	21.1556	20.2406	**20.7334**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	189,763	198,114	188,069	**191,982**
Q_s	Volumetric flow rate, standard (scfm)	130,730	136,772	129,292	**132,265**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	103,533	107,837	103,123	**104,831**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	83,705	85,106	85,800	**84,870**
Q_a	Volumetric flow rate, actual (acf/hr)	11,385,793	11,886,865	11,284,152	**11,518,937**
Q_s	Volumetric flow rate, standard (scf/hr)	7,843,777	8,206,340	7,757,540	**7,935,886**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	6,211,956	6,470,237	6,187,367	**6,289,853**
Q_a	Volumetric flow rate, actual (m^3/hr)	322,452	336,643	319,574	**326,223**
Q_s	Volumetric flow rate, standard (m^3/hr)	222,140	232,408	219,698	**224,749**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	175,926	183,241	175,230	**178,132**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	142,234	144,615	145,794	**144,215**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	206,994	216,562	204,719	**209,425**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	163,931	170,747	163,282	**165,987**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	132,537	134,755	135,853	**134,382**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	79.8624	83.2738	79.8131	**80.9831**
%I	Isokinetic sampling (%)	101.6344	101.7454	101.9753	**101.7850**
Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	2.7326	1.7422	2.5653	**2.3467**
Lead Results - Total					
C_{sd}	Concentration (lb/dscf)	7.5447E-11	4.6131E-11	7.0872E-11	**6.4150E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	9.3318E-11	5.8452E-11	8.5181E-11	**7.8984E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	9.3030E-11	5.8541E-11	8.3028E-11	**7.8200E-11**
C_a	Concentration (lb/acf)	4.1163E-11	2.5110E-11	3.8861E-11	**3.5044E-11**
C_{sd}	Concentration (µg/dscm)	1.2082E+00	7.3872E-01	1.1349E+00	**1.0273E+00**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	1.4944E+00	9.3602E-01	1.3641E+00	**1.2648E+00**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	1.4897E+00	9.3746E-01	1.3296E+00	**1.2523E+00**
C_{sd}	Concentration (mg/dscm)	1.2082E-03	7.3872E-04	1.1349E-03	**1.0273E-03**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	1.4944E-03	9.3602E-04	1.3641E-03	**1.2648E-03**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	1.4897E-03	9.3746E-04	1.3296E-03	**1.2523E-03**
C_a	Concentration (µg/m^3 (actual,wet))	6.5917E-01	4.0210E-01	6.2230E-01	**5.6119E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	1.2966E+00	7.9277E-01	1.2180E+00	**1.1024E+00**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	1.6037E+00	1.0045E+00	1.4639E+00	**1.3574E+00**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	1.5987E+00	1.0061E+00	1.4269E+00	**1.3439E+00**
$E_{lb/hr}$	Rate (lb/hr)	4.6867E-04	2.9848E-04	4.3851E-04	**4.0189E-04**
$E_{g/s}$	Rate (g/s)	5.9042E-05	3.7601E-05	5.5242E-05	**5.0628E-05**
$E_{T/yr}$	Rate (Ton/yr)	2.0528E-03	1.3073E-03	1.9207E-03	**1.7603E-03**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.3428E-06	8.4109E-07	1.2257E-06	**1.1365E-06**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	1.4109E-06	8.8788E-07	1.2593E-06	**1.1860E-06**

042208 135949

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 FF Outlet

USEPA Method 13B (Total Fluorides)
Sampling, Velocity and Moisture Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 26	Mar 26	Mar 26	
Start Time (approx.)		06:30	07:57	09:26	
Stop Time (approx.)		07:41	09:07	10:36	
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.9973	0.9973	0.9973	
C_p	Pitot tube coefficient	0.84	0.84	0.84	
P_g	Static pressure (in. H_2O)	-9.6000	-9.6000	-9.6000	
A_s	Sample location area (ft^2)	64.0000	64.0000	64.0000	
P_{bar}	Barometric pressure (in. Hg)	30.30	30.30	30.30	**30.3000**
D_n	Nozzle diameter (in.)	0.2640	0.2640	0.2640	
O_2	Oxygen (dry volume %)	9.3590	10.2180	10.6210	**10.0660**
CO_2	Carbon dioxide (dry volume %)	9.9800	9.2000	9.0280	**9.4027**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.6610	80.5820	80.3510	**80.5313**
V_{lc}	Total Liquid collected (ml)	197.20	208.20	203.80	
V_m	Volume metered, meter conditions (ft^3)	35.7100	38.8600	41.2650	
T_m	Dry gas meter temperature (°F)	75.8600	83.6000	87.2000	
T_s	Sample temperature (°F)	288.3200	288.6800	289.0400	**288.6800**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.0648	1.2284	1.3840	
θ	Total sampling time (min)	62.5	62.5	62.5	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	9.2822	9.8000	9.5929	**9.5583**
V_{mstd}	Volume metered, standard (dscf)	35.6145	38.2193	40.3329	**38.0555**
P_s	Sample gas pressure, absolute (in. Hg)	29.5941	29.5941	29.5941	**29.5941**
P_v	Vapor pressure, actual (in. Hg)	29.5941	29.5941	29.5941	**29.5941**
B_{wo}	Moisture measured in sample (% by volume)	20.6746	20.4084	19.2143	**20.0991**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	20.6746	20.4084	19.2143	**20.0991**
$\sqrt{\Delta P}$	Velocity head ($\sqrt{in.}$ H_2O)	0.6581	0.6964	0.7360	**0.6969**
M_d	MW of sample gas, dry (lb/lb-mole)	29.9712	29.8807	29.8693	**29.9071**
M_s	MW of sample gas, wet (lb/lb-mole)	27.4962	27.4561	27.5887	**27.5136**
V_s	Velocity of sample (ft/sec)	45.3221	48.0068	50.6237	**47.9842**
%I	Isokinetic sampling (%)	99.6329	100.6515	99.2856	**99.8567**
Q_a	Volumetric flow rate, actual (acfm)	174,037	184,346	194,395	**184,259**
Q_s	Volumetric flow rate, standard (scfm)	121,459	128,593	135,537	**128,530**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	96,348	102,349	109,495	**102,731**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	79,997	78,654	80,971	**79,874**
Q_a	Volumetric flow rate, actual (acf/hr)	10,442,204	11,060,775	11,663,709	**11,055,563**
Q_s	Volumetric flow rate, standard (scf/hr)	7,287,567	7,715,553	8,132,225	**7,711,782**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,780,892	6,140,932	6,569,677	**6,163,833**
Q_a	Volumetric flow rate, actual (m^3/hr)	295,729	313,248	330,323	**313,100**
Q_s	Volumetric flow rate, standard (m^3/hr)	206,388	218,509	230,309	**218,402**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	163,718	173,915	186,057	**174,563**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	135,933	133,652	137,589	**135,724**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	192,316	203,611	214,606	**203,511**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	152,556	162,057	173,371	**162,661**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	126,665	124,539	128,208	**126,471**

Comments:

Average includes 3 runs.

042208 140015
LRR@

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

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 FF Outlet

USEPA Method 13B
HF Parameters

Run No.		1	2	3	Average
Date (2008)		Mar 26	Mar 26	Mar 26	
Start Time (approx.)		06:30	07:57	09:26	
Stop Time (approx.)		07:41	09:07	10:36	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	184.1	184.3	184.3	**184.2**
P_1	Fabric Filter Inlet Temperature (°F)	315	315	315	**315**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.3590	10.2180	10.6210	**10.0660**
CO_2	Carbon dioxide (dry volume %)	9.9800	9.2000	9.0280	**9.4027**
T_s	Sample temperature (°F)	288.3200	288.6800	289.0400	**288.6800**
B_w	Actual water vapor in gas (% by volume)	20.6746	20.4084	19.2143	**20.0991**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	174,037	184,346	194,395	**184,259**
Q_s	Volumetric flow rate, standard (scfm)	121,459	128,593	135,537	**128,530**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	96,348	102,349	109,495	**102,731**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	79,997	78,654	80,971	**79,874**
Q_a	Volumetric flow rate, actual (acf/hr)	10,442,204	11,060,775	11,663,709	**11,055,563**
Q_s	Volumetric flow rate, standard (scf/hr)	7,287,567	7,715,553	8,132,225	**7,711,782**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,780,892	6,140,932	6,569,677	**6,163,833**
Q_a	Volumetric flow rate, actual (m^3/hr)	295,729	313,248	330,323	**313,100**
Q_s	Volumetric flow rate, standard (m^3/hr)	206,388	218,509	230,309	**218,402**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	163,718	173,915	186,057	**174,563**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	135,933	133,652	137,589	**135,724**
Q_a	Volumetric flow rate, normal (Nm^3/hr)	192,316	203,611	214,606	**203,511**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	152,556	162,057	173,371	**162,661**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	126,665	124,539	128,208	**126,471**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	35.6145	38.2193	40.3329	**38.0555**
%I	Isokinetic sampling (%)	99.6329	100.6515	99.2856	**99.8567**
Laboratory Data					
m_n	Total HF collected (mg)	<0.0016	<0.0017	<0.0018	
Hydrogen Fluoride (HF) Results					
C_{sd}	HF Concentration (lb/dscf)	<9.8444E-11	<9.6108E-11	<9.5908E-11	**<9.6820E-11**
C_{sd7}	HF Concentration @7% O_2 (lb/dscf)	<1.1857E-10	<1.2506E-10	<1.2969E-10	**<1.2444E-10**
C_{sd12}	HF Concentration @12% CO_2 (lb/dscf)	<1.1837E-10	<1.2536E-10	<1.2748E-10	**<1.2374E-10**
C_a	HF Concentration (lb/acf)	<5.4499E-11	<5.3359E-11	<5.4021E-11	**<5.3960E-11**
C_{sd}	HF Concentration (ppmdv)	<0.0019	<0.0019	<0.0018	**<0.0019**
C_{sd7}	HF Concentration @7% O_2 (ppmdv)	<0.0023	<0.0024	<0.0025	**<0.0024**
C_{sd12}	HF Concentration @12% CO_2 (ppmdv)	<0.0023	<0.0024	<0.0025	**<0.0024**
C_w	HF Concentration (ppmwv)	<0.0015	<0.0015	<0.0015	**<0.0015**
C_{ad}	HF Concentration (mg/dscm)	<0.0016	<0.0015	<0.0015	**<0.0016**
C_{sd7}	HF Concentration @7% O_2 (mg/dscm)	<0.0019	<0.0020	<0.0021	**<0.0020**
C_{sd12}	HF Concentration @12% CO_2 (mg/dscm)	<0.0019	<0.0020	<0.0020	**<0.0020**
C_a	HF Concentration (mg/m^3 (actual,wet))	<0.0009	<0.0009	<0.0009	**<0.0009**
C_{ad}	HF Concentration (mg/Nm^3 dry)	<0.0017	<0.0017	<0.0016	**<0.0017**
C_{sd7}	HF Concentration @7% O_2 (mg/Nm^3 dry)	<0.0020	<0.0021	<0.0022	**<0.0021**
C_{sd12}	HF Concentration @12% CO_2 (mg/Nm^3 dry)	<0.0020	<0.0022	<0.0022	**<0.0021**
$E_{lb/hr}$	HF Rate (lb/hr)	<0.00057	<0.00059	<0.00063	**<0.00060**
$E_{kg/hr}$	HF Rate (kg/hr)	<0.00026	<0.00027	<0.00029	**<0.00027**
$E_{T/yr}$	HF Rate (Ton/yr)	<0.0025	<0.0026	<0.0028	**<0.0026**
E_{Fd}	HF Rate - Fd-based (lb/MMBtu)	<0.0000017	<0.0000018	<0.0000019	**<0.0000018**
E_{Fc}	HF Rate - Fc-based (lb/MMBtu)	<0.0000018	<0.0000019	<0.0000019	**<0.0000019**

042208 140015
L R R @_L

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 FF Outlet

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

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 25	Mar 25	
Start Time (approx.)		10:37	06:03	10:58	
Stop Time (approx.)		15:22	10:38	15:34	
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.9973	0.9973	0.9973	
C_p	Pitot tube coefficient	0.84	0.84	0.84	
P_g	Static pressure (in. H_2O)	-9.2000	-11.5000	-11.5000	
A_e	Sample location area (ft^2)	64.0000	64.0000	64.0000	
P_{bar}	Barometric pressure (in. Hg)	30.00	30.25	30.25	**30.1667**
D_n	Nozzle diameter (in.)	0.2460	0.2460	0.2460	
O_2	Oxygen (dry volume %)	9.7990	9.7620	10.6040	**10.0550**
CO_2	Carbon dioxide (dry volume %)	9.7990	9.7650	9.1240	**9.5627**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.4020	80.4730	80.2720	**80.3823**
V_{lc}	Total Liquid collected (ml)	720.10	764.80	750.00	
V_m	Volume metered, meter conditions (ft^3)	136.5100	135.0900	132.9400	
T_m	Dry gas meter temperature (°F)	86.6600	69.2000	79.5200	
T_s	Sample temperature (°F)	293.4600	293.3200	291.0000	**292.5933**
ΔH	Meter box orifice pressure drop (in. H_2O)	0.9244	0.9520	0.9168	
θ	Total sampling time (min)	250.0	250.0	250.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	33.8951	35.9991	35.3025	**35.0656**
V_{mstd}	Volume metered, standard (dscf)	132.0917	136.1623	131.4210	**133.2250**
P_s	Sample gas pressure, absolute (in. Hg)	29.3235	29.4044	29.4044	**29.3775**
P_v	Vapor pressure, actual (in. Hg)	29.3235	29.4044	29.4044	**29.3775**
B_{wo}	Moisture measured in sample (% by volume)	20.4204	20.9101	21.1743	**20.8349**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	20.4204	20.9101	21.1743	**20.8349**
$\sqrt{\Delta P}$	Velocity head ($\sqrt{in.}$ H_2O)	0.6984	0.7160	0.6999	**0.7048**
M_d	MW of sample gas, dry (lb/lb-mole)	29.9598	29.9529	29.8840	**29.9322**
M_s	MW of sample gas, wet (lb/lb-mole)	27.5176	27.4535	27.3676	**27.4462**
V_s	Velocity of sample (ft/sec)	48.4632	49.6681	48.5551	**48.8955**
%I	Isokinetic sampling (%)	100.7859	101.6996	100.4347	**100.9734**
Q_a	Volumetric flow rate, actual (acfm)	186,099	190,726	186,452	**187,759**
Q_s	Volumetric flow rate, standard (scfm)	127,812	131,376	128,828	**129,339**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	101,712	103,905	101,550	**102,389**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	81,231	83,258	75,220	**79,903**
Q_a	Volumetric flow rate, actual (acf/hr)	11,165,917	11,443,541	11,187,092	**11,265,517**
Q_s	Volumetric flow rate, standard (scf/hr)	7,668,718	7,882,533	7,729,690	**7,760,314**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	6,102,738	6,234,287	6,092,984	**6,143,336**
Q_a	Volumetric flow rate, actual (m^3/hr)	316,225	324,088	316,825	**319,046**
Q_s	Volumetric flow rate, standard (m^3/hr)	217,183	223,238	218,909	**219,777**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	172,833	176,559	172,557	**173,983**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	138,030	141,476	127,816	**135,774**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	202,375	208,017	203,984	**204,792**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	161,049	164,521	160,792	**162,120**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	128,619	131,830	119,101	**126,517**

Comments:
Average includes 3 runs.

042208 140228
K P M @

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 FF Outlet

USEPA Method 23 Parameters (NDs & EMPCs counted as Zero)
Total Tetra- through Octa-PCDD/F Results (using USEPA/INTL 1989 TEFs)

Run No.		1	2	3	Average
Date (2008)		Mar 24	Mar 25	Mar 25	
Start Time (approx.)		10:37	06:03	10:58	
Stop Time (approx.)		15:22	10:38	15:34	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	184.0	183.1	181.9	**183.0**
P_1	Fabric Filter Inlet Temperature (°F)	319	315	316	**317**
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 %)	9.7990	9.7620	10.6040	**10.0550**
CO_2	Carbon dioxide (dry volume %)	9.7990	9.7650	9.1240	**9.5627**
T_s	Sample temperature (°F)	293.5	293.3	291.0	**292.6**
B_w	*Actual water vapor in gas (% by volume)*	20.4204	20.9101	21.1743	**20.8349**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	186,099	190,726	186,452	**187,759**
Q_s	Volumetric flow rate, standard (scfm)	127,812	131,376	128,828	**129,339**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	101,712	103,905	101,550	**102,389**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	81,231	83,258	75,220	**79,903**
Q_a	Volumetric flow rate, actual (acf/hr)	11,165,917	11,443,541	11,187,092	**11,265,517**
Q_s	Volumetric flow rate, standard (scf/hr)	7,668,718	7,882,533	7,729,690	**7,760,314**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	6,102,738	6,234,287	6,092,984	**6,143,336**
Q_a	Volumetric flow rate, actual (m^3/hr)	316,225	324,088	316,825	**319,046**
Q_s	Volumetric flow rate, standard (m^3/hr)	217,183	223,238	218,909	**219,777**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	172,833	176,559	172,557	**173,983**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	138,030	141,476	127,816	**135,774**
Q_n	Volumetric flow rate, normal (Nm^3/hr)	202,375	208,017	203,984	**204,792**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	161,049	164,521	160,792	**162,120**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	128,619	131,830	119,101	**126,517**
Sampling Data					
V_{mstd}	*Volume metered, standard (dscf)*	132.0917	136.1623	131.4210	**133.2250**
%I	Isokinetic sampling (%)	100.7859	101.6996	100.4347	**100.9734**
Laboratory Data from USEPA Method 23					
	Total PCDDs (ng)	8.81900	8.86400	9.17600	
	Total PCDFs (ng)	3.11600	2.50550	2.80400	
m_n	Total PCDDs & PCDFs (ng)	11.90000	11.40000	12.00000	
m_{n_TEQ}	Total TEQ PCDDs & PCDFs (ng)	0.09530	0.09960	0.09210	
Total PCDD/F Results (TEF=1)					
C_{sd}	PCDD/F Concentration (ng/dscm)	3.1810E+00	2.9563E+00	3.2241E+00	**3.1205E+00**
C_{sd7}	PCDD/F Concentration @7% O_2 (ng/dscm)	3.9831E+00	3.6894E+00	4.3527E+00	**4.0084E+00**
C_{sd12}	PCDD/F Concentration @12% CO_2 (ng/dscm)	3.8955E+00	3.6329E+00	4.2404E+00	**3.9230E+00**
C_{sd}	PCDD/F Concentration (ng/Nm^3 dry)	3.4138E+00	3.1726E+00	3.4601E+00	**3.3488E+00**
C_{sd7}	PCDD/F Concentration @7% O_2 (ng/Nm^3 dry)	4.2746E+00	3.9593E+00	4.6712E+00	**4.3017E+00**
C_{sd12}	PCDD/F Concentration @12% CO_2 (ng/Nm^3 dry)	4.1806E+00	3.8987E+00	4.5507E+00	**4.2100E+00**
$E_{lb/hr}$	PCDD/F Rate (lb/hr)	1.2123E-06	1.1509E-06	1.2267E-06	**1.1966E-06**
$E_{g/s}$	PCDD/F Rate (g/s)	1.5272E-07	1.4499E-07	1.5454E-07	**1.5075E-07**
$E_{T/yr}$	PCDD/F Rate (Ton/yr)	5.3098E-06	5.0410E-06	5.3732E-06	**5.2413E-06**
E_{Fd}	PCDD/F Rate - F_d-based (lb/MMBtu)	3.5791E-09	3.3152E-09	3.9112E-09	**3.6018E-09**
E_{Fc}	PCDD/F Rate - F_c-based (lb/MMBtu)	3.6895E-09	3.4408E-09	4.0162E-09	**3.7155E-09**
Total PCDD/F TEQ Results (using USEPA/INTL 1989 TEFs)					
C_{sdTEQ}	TEQ Concentration (ng/dscm)	2.5475E-02	2.5829E-02	2.4745E-02	**2.5350E-02**
C_{sd7TEQ}	TEQ Concentration @7% O_2 (ng/dscm)	3.1898E-02	3.2234E-02	3.3407E-02	**3.2513E-02**
$C_{sd12TEQ}$	TEQ Concentration @12% CO_2 (ng/dscm)	3.1197E-02	3.1740E-02	3.2545E-02	**3.1828E-02**
C_{sdTEQ}	TEQ Concentration (ng/Nm^3 dry)	2.7339E-02	2.7718E-02	2.6556E-02	**2.7204E-02**
C_{sd7TEQ}	TEQ Concentration @7% O_2 (ng/Nm^3 dry)	3.4232E-02	3.4592E-02	3.5852E-02	**3.4892E-02**
$C_{sd12TEQ}$	TEQ Concentration @12% CO_2 (ng/Nm^3 dry)	3.3480E-02	3.4063E-02	3.4927E-02	**3.4156E-02**
$E_{lb/hrTEQ}$	TEQ Rate (lb/hr)	9.7085E-09	1.0055E-08	9.4153E-09	**9.7264E-09**
$E_{g/sTEQ}$	TEQ Rate (g/sec)	1.2230E-09	1.2667E-09	1.1861E-09	**1.2253E-09**
$E_{T/yrTEQ}$	TEQ Rate (Ton/yr)	4.2523E-08	4.4042E-08	4.1239E-08	**4.2602E-08**
E_{FdTEQ}	TEQ Rate - F_d-based (lb/MMBtu)	2.8663E-11	2.8964E-11	3.0019E-11	**2.9215E-11**
E_{FcTEQ}	TEQ Rate - F_c-based (lb/MMBtu)	2.9547E-11	3.0061E-11	3.0824E-11	**3.0144E-11**

042206 140256
K P M @_P

Prepared by Clean Air Engineering Proprietary Software
SS PCDD-F v2007-01s

QA/QC _____
Date _____

Wheelabrator South Broward, Inc. **Max**
Clean Air Project No: 10455
Unit 3 FF Outlet

USEPA Method 23 Maximum Emissions Parameters (NDs & EMPCs included)
Total Tetra- through Octa-PCDD/F Results (TEQ based on USEPA/INTL 1989 TEFs)

Run No.		**1**	**2**	**3**	**Average**
Date (2008)		Mar 24	Mar 25	Mar 25	
Start Time (approx.)		10:37	06:03	10:58	
Stop Time (approx.)		15:22	10:38	15:34	
Process Conditions					
R_P	Production rate - (units/hour)	184.0	183.1	181.9	**183.0**
P_1	Process data - (units)	319	315	316	**317**
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 %)	9.7990	9.7620	10.6040	**10.0550**
CO_2	Carbon dioxide (dry volume %)	9.7990	9.7650	9.1240	**9.5627**
T_s	Sample temperature (°F)	293.5	293.3	291.0	**292.6**
B_w	Actual water vapor in gas (% by volume)	20.4204	20.9101	21.1743	**20.8349**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	186,099	190,726	186,452	**187,759**
Q_s	Volumetric flow rate, standard (scfm)	127,812	131,376	128,828	**129,339**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	101,712	103,905	101,550	**102,389**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	81,231	83,258	75,220	**79,903**
Q_a	Volumetric flow rate, actual (acf/hr)	11,165,917	11,443,541	11,187,092	**11,265,517**
Q_s	Volumetric flow rate, standard (scf/hr)	7,668,718	7,882,533	7,729,690	**7,760,314**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	6,102,738	6,234,287	6,092,984	**6,143,336**
Q_a	Volumetric flow rate, actual (m^3/hr)	316,225	324,088	316,825	**319,046**
Q_s	Volumetric flow rate, standard (m^3/hr)	217,183	223,238	218,909	**219,777**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	172,833	176,559	172,557	**173,983**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	138,030	141,476	127,816	**135,774**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	202,375	208,017	203,984	**204,792**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	161,049	164,521	160,792	**162,120**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	128,619	131,830	119,101	**126,517**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	132.0917	136.1623	131.4210	**133.2250**
%I	Isokinetic sampling (%)	100.7859	101.6996	100.4347	**100.9734**
Laboratory Data from USEPA Method 23, including NDs and EMPCs					
m_n	Total PCDDs & PCDFs (ng)	12.20000	11.40000	12.10000	
m_{n_TEQ}	Total TEQ PCDDs & PCDFs (ng)	0.10900	0.09960	0.10500	
Total PCDD/F Results (TEF=1)					
C_{sd}	PCDD/F Concentration (ng/dscm)	3.2612E+00	2.9563E+00	3.2510E+00	**3.1562E+00**
C_{sd7}	PCDD/F Concentration @7% O_2 (ng/dscm)	4.0835E+00	3.6894E+00	4.3890E+00	**4.0540E+00**
C_{sd12}	PCDD/F Concentration @12% CO_2 (ng/dscm)	3.9938E+00	3.6329E+00	4.2758E+00	**3.9675E+00**
C_{sd}	PCDD/F Concentration (ng/Nm^3 dry)	3.4999E+00	3.1726E+00	3.4889E+00	**3.3871E+00**
C_{sd7}	PCDD/F Concentration @7% O_2 (ng/Nm^3 dry)	4.3823E+00	3.9593E+00	4.7101E+00	**4.3506E+00**
C_{sd12}	PCDD/F Concentration @12% CO_2 (ng/Nm^3 dry)	4.2860E+00	3.8987E+00	4.5886E+00	**4.2578E+00**
$E_{lb/hr}$	PCDD/F Rate (lb/hr)	1.2428E-06	1.1509E-06	1.2370E-06	**1.2102E-06**
$E_{g/s}$	PCDD/F Rate (g/s)	1.5657E-07	1.4499E-07	1.5583E-07	**1.5246E-07**
$E_{T/yr}$	PCDD/F Rate (Ton/yr)	5.4437E-06	5.0410E-06	5.4179E-06	**5.3009E-06**
E_{Fd}	PCDD/F - F_d-based (lb/MMBtu)	3.6693E-09	3.3152E-09	3.9438E-09	**3.6428E-09**
E_{Fc}	PCDD/F Rate - F_c-based (lb/MMBtu)	3.7825E-09	3.4408E-09	4.0496E-09	**3.7576E-09**
Total PCDD/F TEQ Results (using USEPA/INTL 1989 TEFs)					
C_{sdTEQ}	TEQ Concentration (ng/dscm)	2.9137E-02	2.5829E-02	2.8211E-02	**2.7726E-02**
C_{sd7TEQ}	TEQ Concentration @7% O_2 (ng/dscm)	3.6484E-02	3.2234E-02	3.8086E-02	**3.5601E-02**
$C_{sd12TEQ}$	TEQ Concentration @12% CO_2 (ng/dscm)	3.5682E-02	3.1740E-02	3.7104E-02	**3.4842E-02**
C_{sdTEQ}	TEQ Concentration (ng/Nm^3 dry)	3.1269E-02	2.7718E-02	3.0275E-02	**2.9754E-02**
C_{sd7TEQ}	TEQ Concentration @7% O_2 (ng/Nm^3 dry)	3.9153E-02	3.4592E-02	4.0873E-02	**3.8206E-02**
$C_{sd12TEQ}$	TEQ Concentration @12% CO_2 (ng/Nm^3 dry)	3.8293E-02	3.4063E-02	3.9819E-02	**3.7391E-02**
$E_{lb/hrTEQ}$	TEQ Rate (lb/hr)	1.1104E-08	1.0055E-08	1.0734E-08	**1.0631E-08**
$E_{g/sTEQ}$	TEQ Rate (g/sec)	1.3989E-09	1.2667E-09	1.3522E-09	**1.3393E-09**
$E_{T/yrTEQ}$	TEQ Rate (Ton/yr)	4.8636E-08	4.4042E-08	4.7015E-08	**4.6565E-08**
E_{FdTEQ}	TEQ Rate - F_d-based (lb/MMBtu)	3.2784E-11	2.8964E-11	3.4223E-11	**3.1990E-11**
E_{FcTEQ}	TEQ Rate - F_c-based (lb/MMBtu)	3.3795E-11	3.0061E-11	3.5141E-11	**3.2999E-11**

042208 140256
K P M @_P

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 FF Outlet

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

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		06:17	07:54	09:22	
Stop Time (approx.)		07:28	08:54	10:22	
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.9871	0.9871	0.9871	
C_p	Pitot tube coefficient	0.84	0.84	0.84	
P_g	Static pressure (in. H_2O)	-11.5000	-11.5000	-11.5000	
A_s	Sample location area (ft^2)	64.0000	64.0000	64.0000	
P_{bar}	Barometric pressure (in. Hg)	30.25	30.25	30.25	**30.2500**
D_n	Nozzle diameter (in.)	NA	NA	NA	
O_2	Oxygen (dry volume %)	10.5220	9.4890	9.7790	**9.9300**
CO_2	Carbon dioxide (dry volume %)	9.1550	10.0280	9.8040	**9.6623**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.3230	80.4830	80.4170	**80.4077**
V_{lc}	Total Liquid collected (ml)	188.50	200.60	203.20	
V_m	Volume metered, meter conditions (ft^3)	36.1600	36.2200	37.1550	
T_m	Dry gas meter temperature (°F)	58.7917	64.5417	73.5000	
T_s	Sample temperature (°F)	289.9167	286.9167	289.1667	**288.6667**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.2000	1.2000	1.2000	
θ	Total sampling time (min)	60.0	60.0	60.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	8.8727	9.4422	9.5646	**9.2932**
V_{mstd}	Volume metered, standard (dscf)	36.8201	36.4769	36.7903	**36.6958**
P_s	Sample gas pressure, absolute (in. Hg)	29.4044	29.4044	29.4044	**29.4044**
P_v	Vapor pressure, actual (in. Hg)	29.4044	29.4044	29.4044	**29.4044**
B_{wo}	Moisture measured in sample (% by volume)	19.4181	20.5627	20.6335	**20.2048**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	19.4181	20.5627	20.6335	**20.2048**
M_d	MW of sample gas, dry (lb/lb-mole)	29.8857	29.9840	29.9598	**29.9432**
M_s	MW of sample gas, wet (lb/lb-mole)	27.5777	27.5198	27.4921	**27.5299**

Comments:

Average includes 3 runs.

042208 140130
QNN@

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 FF Outlet

USEPA Method 26A
HCl Parameters (CleanAir)

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		06:17	07:54	09:22	
Stop Time (approx.)		07:28	08:54	10:22	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	182.8	183.6	184.4	**183.6**
P_1	Fabric Filter Inlet Temperature (°F)	316	314	314	**315**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	10.5220	9.4890	9.7790	**9.9300**
CO_2	Carbon dioxide (dry volume %)	9.1550	10.0280	9.8040	**9.6623**
T_s	Sample temperature (°F)	289.9167	286.9167	289.1667	**288.6667**
B_w	Actual water vapor in gas (% by volume)	19.4181	20.5627	20.6335	**20.2048**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	36.8201	36.4769	36.7903	**36.6958**
Laboratory Data					
m_n	Total HCl collected (mg)	5.3698	5.6297	6.2167	
Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (lb/dscf)	3.2157E-07	3.4031E-07	3.7259E-07	**3.4483E-07**
C_{sd7}	HCl Concentration @7% O_2 (lb/dscf)	4.3070E-07	4.1454E-07	4.6570E-07	**4.3698E-07**
C_{sd12}	HCl Concentration @12% CO_2 (lb/dscf)	4.2150E-07	4.0723E-07	4.5605E-07	**4.2826E-07**
C_{sd}	HCl Concentration (ppmdv)	3.3998	3.5980	3.9393	**3.6457**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	4.5537	4.3828	4.9237	**4.6200**
C_{sd12}	HCl Concentration @12% CO_2 (ppmdv)	4.4564	4.3055	4.8216	**4.5278**
C_w	HCl Concentration (ppmwv)	2.7397	2.8581	3.1265	**2.9081**
C_{sd}	HCl Concentration (mg/dscm)	5.1495	5.4496	5.9666	**5.5219**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	6.8971	6.6383	7.4575	**6.9976**
C_{sd12}	HCl Concentration @12% CO_2 (mg/dscm)	6.7498	6.5213	7.3030	**6.8580**
C_{sd}	HCl Concentration (mg/Nm^3 dry)	5.5263	5.8484	6.4031	**5.9259**
C_{sd7}	HCl Concentration @7% O_2 (mg/Nm^3 dry)	7.4018	7.1240	8.0032	**7.5097**
C_{sd12}	HCl Concentration @12% CO_2 (mg/Nm^3 dry)	7.2437	6.9984	7.8374	**7.3598**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.0062	0.0060	0.0067	**0.0063**
E_{Fc}	HCl Rate - Fc-based (lb/MMBtu)	0.0064	0.0062	0.0069	**0.0065**

050508 121102
Q N N @_@

Prepared by Clean Air Engineering Proprietary Software
SS EPA26-1 Version 2006-10a (CI)

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 FF Outlet

USEPA Method 26A
HCl Parameters (ALS Analysis)

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		06:17	07:54	09:22	
Stop Time (approx.)		07:28	08:54	10:22	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	182.8	183.6	184.4	**183.6**
P_1	Fabric Filter Inlet Temperature (°F)	316	314	314	**315**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	10.5220	9.4890	9.7790	**9.9300**
CO_2	Carbon dioxide (dry volume %)	9.1550	10.0280	9.8040	**9.6623**
T_s	Sample temperature (°F)	289.9167	286.9167	289.1667	**288.6667**
B_w	Actual water vapor in gas (% by volume)	19.4181	20.5627	20.6335	**20.2048**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	36.8201	36.4769	36.7903	**36.6958**
Laboratory Data					
m_n	Total HCl collected (mg)	5.3400	5.3200	6.1100	
Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (lb/dscf)	3.1979E-07	3.2159E-07	3.6620E-07	**3.3586E-07**
C_{sd7}	HCl Concentration @7% O_2 (lb/dscf)	4.2832E-07	3.9174E-07	4.5771E-07	**4.2592E-07**
C_{sd12}	HCl Concentration @12% CO_2 (lb/dscf)	4.1917E-07	3.8483E-07	4.4822E-07	**4.1741E-07**
C_{sd}	HCl Concentration (ppmdv)	3.3810	3.4000	3.8717	**3.5509**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	4.5284	4.1417	4.8392	**4.5031**
C_{sd12}	HCl Concentration @12% CO_2 (ppmdv)	4.4317	4.0687	4.7389	**4.4131**
C_w	HCl Concentration (ppmwv)	2.7245	2.7009	3.0728	**2.8327**
C_{sd}	HCl Concentration (mg/dscm)	5.1210	5.1498	5.8642	**5.3783**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	6.8589	6.2731	7.3295	**6.8205**
C_{sd12}	HCl Concentration @12% CO_2 (mg/dscm)	6.7124	6.1625	7.1777	**6.6842**
C_{sd}	HCl Concentration (mg/Nm^3 dry)	5.4957	5.5266	6.2932	**5.7719**
C_{sd7}	HCl Concentration @7% O_2 (mg/Nm^3 dry)	7.3608	6.7321	7.8659	**7.3196**
C_{sd12}	HCl Concentration @12% CO_2 (mg/Nm^3 dry)	7.2035	6.6134	7.7029	**7.1733**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.0062	0.0056	0.0066	**0.0061**
E_{Fc}	HCl Rate - Fc-based (lb/MMBtu)	0.0064	0.0058	0.0068	**0.0063**

050508 112040
Q N N @_@

Prepared by Clean Air Engineering Proprietary Software
SS EPA26-1 Version 2006-10a (Cl)

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 SDA Inlet

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

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		06:17	07:54	09:22	
Stop Time (approx.)		07:28	08:54	10:22	
Sampling Conditions					
Y_d	Dry gas meter correction factor	1.0083	1.0083	1.0083	
C_p	Pitot tube coefficient	0.84	0.84	0.84	
P_g	Static pressure (in. H_2O)	-1.5000	-1.5000	-1.5000	
P_{bar}	Barometric pressure (in. Hg)	30.25	30.25	30.25	**30.2500**
D_n	Nozzle diameter (in.)	NA	NA	NA	
O_2	Oxygen (dry volume %)	9.0400	8.5930	9.1690	**8.9340**
CO_2	Carbon dioxide (dry volume %)	10.5270	10.7670	10.3450	**10.5463**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.4330	80.6400	80.4860	**80.5197**
V_{lc}	Total Liquid collected (ml)	154.70	159.80	151.30	
V_m	Volume metered, meter conditions (ft^3)	33.6900	34.2250	34.9100	
T_m	Dry gas meter temperature (°F)	67.8750	76.9583	83.2500	
T_s	Sample temperature (°F)	486.1667	481.5833	486.1667	**484.6389**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.2000	1.2000	1.2000	
θ	Total sampling time (min)	60.0	60.0	60.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	7.2817	7.5218	7.1217	**7.3084**
V_{mstd}	Volume metered, standard (dscf)	34.4388	34.3939	34.6760	**34.5029**
P_s	Sample gas pressure, absolute (in. Hg)	30.1397	30.1397	30.1397	**30.1397**
P_v	Vapor pressure, actual (in. Hg)	30.1397	30.1397	30.1397	**30.1397**
B_{wo}	Moisture measured in sample (% by volume)	17.4536	17.9450	17.0385	**17.4790**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	17.4536	17.9450	17.0385	**17.4790**
M_d	MW of sample gas, dry (lb/lb-mole)	30.0459	30.0664	30.0220	**30.0448**
M_s	MW of sample gas, wet (lb/lb-mole)	27.9435	27.9011	27.9736	**27.9394**

Comments:

Average includes 3 runs.

042208 140155
JLO@

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 SDA Inlet

USEPA Method 26A
HCl Parameters (CleanAir)

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		06:17	07:54	09:22	
Stop Time (approx.)		07:28	08:54	10:22	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	182.8	183.6	184.4	**183.6**
P_1	Fabric Filter Inlet Temperature (°F)	316	314	314	**315**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.0400	8.5930	9.1690	**8.9340**
CO_2	Carbon dioxide (dry volume %)	10.5270	10.7670	10.3450	**10.5463**
T_s	Sample temperature (°F)	486.1667	481.5833	486.1667	**484.6389**
B_w	Actual water vapor in gas (% by volume)	17.4536	17.9450	17.0385	**17.4790**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	34.4388	34.3939	34.6760	**34.5029**
Laboratory Data					
m_n	Total HCl collected (mg)	691.2912	680.9064	585.8155	
Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (lb/dscf)	4.4261E-05	4.3653E-05	3.7251E-05	**4.1722E-05**
C_{sd7}	HCl Concentration @7% O_2 (lb/dscf)	5.1874E-05	4.9303E-05	4.4139E-05	**4.8439E-05**
C_{sd12}	HCl Concentration @12% CO_2 (lb/dscf)	5.0454E-05	4.8652E-05	4.3211E-05	**4.7439E-05**
C_{sd}	HCl Concentration (ppmdv)	467.9536	461.5260	393.8424	**441.1073**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	548.4448	521.2653	466.6617	**512.1240**
C_{sd12}	HCl Concentration @12% CO_2 (ppmdv)	533.4325	514.3784	456.8495	**501.5535**
C_w	HCl Concentration (ppmwv)	386.2790	378.7050	326.7376	**363.9072**
C_{sd}	HCl Concentration (mg/dscm)	708.7779	699.0425	596.5266	**668.1157**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	830.6925	789.5255	706.8212	**775.6798**
C_{sd12}	HCl Concentration @12% CO_2 (mg/dscm)	807.9543	779.0945	691.9593	**759.6694**
C_{sd}	HCl Concentration (mg/Nm^3 dry)	760.6397	750.1920	640.1749	**717.0022**
C_{sd7}	HCl Concentration @7% O_2 (mg/Nm^3 dry)	891.4749	847.2957	758.5398	**832.4368**
C_{sd12}	HCl Concentration @12% CO_2 (mg/Nm^3 dry)	867.0729	836.1014	742.5905	**815.2549**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.7464	0.7094	0.6351	**0.6970**
E_{Fc}	HCl Rate - Fc-based (lb/MMBtu)	0.7652	0.7379	0.6554	**0.7195**

050508 121144
JLO@_@

Prepared by Clean Air Engineering Proprietary Software
SS EPA26-1 Version 2006-10a (CI)

QA/QC _____
Date _____

Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 3 SDA Inlet

USEPA Method 26A
HCl Parameters (ALS Analysis)

Run No.		1	2	3	Average
Date (2008)		Mar 25	Mar 25	Mar 25	
Start Time (approx.)		06:17	07:54	09:22	
Stop Time (approx.)		07:28	08:54	10:22	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	182.8	183.6	184.4	**183.6**
P_1	Fabric Filter Inlet Temperature (°F)	316	314	314	**315**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.0400	8.5930	9.1690	**8.9340**
CO_2	Carbon dioxide (dry volume %)	10.5270	10.7670	10.3450	**10.5463**
T_s	Sample temperature (°F)	486.1667	481.5833	486.1667	**484.6389**
B_w	Actual water vapor in gas (% by volume)	17.4536	17.9450	17.0385	**17.4790**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	34.4388	34.3939	34.6760	**34.5029**
Laboratory Data					
m_n	Total HCl collected (mg)	644.0000	644.0000	567.0000	
Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (lb/dscf)	4.1233E-05	4.1287E-05	3.6055E-05	**3.9525E-05**
C_{sd7}	HCl Concentration @7% O_2 (lb/dscf)	4.8325E-05	4.6631E-05	4.2721E-05	**4.5893E-05**
C_{sd12}	HCl Concentration @12% CO_2 (lb/dscf)	4.7003E-05	4.6015E-05	4.1823E-05	**4.4947E-05**
C_{sd}	HCl Concentration (ppmdv)	435.9409	436.5105	381.1927	**417.8814**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	510.9257	493.0118	451.6733	**485.2036**
C_{sd12}	HCl Concentration @12% CO_2 (ppmdv)	496.9403	486.4982	442.1762	**475.2049**
C_w	HCl Concentration (ppmwv)	359.8537	358.1785	316.2433	**344.7585**
C_{sd}	HCl Concentration (mg/dscm)	660.2904	661.1531	577.3671	**632.9369**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	773.8648	746.7318	684.1192	**734.9053**
C_{sd12}	HCl Concentration @12% CO_2 (mg/dscm)	752.6822	736.8661	669.7346	**719.7610**
C_{sd}	HCl Concentration (mg/Nm^3 dry)	708.6044	709.5302	619.6134	**679.2493**
C_{sd7}	HCl Concentration @7% O_2 (mg/Nm^3 dry)	830.4891	801.3707	734.1767	**788.6788**
C_{sd12}	HCl Concentration @12% CO_2 (mg/Nm^3 dry)	807.7565	790.7831	718.7396	**772.4264**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.6954	0.6710	0.6147	**0.6604**
E_{Fc}	HCl Rate - Fc-based (lb/MMBtu)	0.7129	0.6979	0.6343	**0.6817**

050508 112040
JLO@_@

QA/QC _____
Date _____

This Page Intentionally Left Blank

QA/QC DATA

E

This Page Intentionally Left Blank

Nozzle Calibration Sheet

Client	Wheelabrator	Project Number	10455
Calibrated by	S Brown	Unit	1-3
Date	3/17/08	Runs	1-3

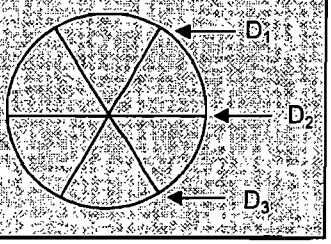
	Nozzle Identification	D_1 (inches)	D_2 (inches)	D_3 (inches)	ΔD (inches)	D_{ave} (inches)	
5/29	0.267-1	0.267	0.268	0.267	0.001	0.267	#3
5/29	0.270-1	0.270	0.270	0.269	0.001	0.270	
29	0.269-1	0.269	0.269	0.269	0.000	0.269	#2
13B	0.265-1	0.265	0.264	0.265	0.001	0.265	
28	0.246-1	0.246	0.247	0.246	0.001	0.246	
13B	0.271-1	0.271	0.271	0.271	0.000	0.271	
29	0.248-1	0.248	0.248	0.248	0.000	0.248	
13B	0.264-1	0.264	0.264	0.263	0.001	0.264	

D_1, D_2, D_3 = three nozzle diameter measurements

ΔD = maximum difference between any two diameters

$\Delta D = 0.004$ inches*

D_{ave} = average of D_1, D_2, D_3



* (40 CFR 60, Appendix A, Method 5, Section 5.1)

QA/QC_____

Date_____

CleanAir ENGINEERING

42

Meter Box Full Test Calibration

Meter Box No: 61-6

Date of Calibration: 1/18/2008

Meter Box Y_d: 1.0083

Calibration conducted by: O. Lavrov

Meter Box ΔH@: 1.8519

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	In	Out	T_{ds} Avg.	In	T_o Out	T_d Avg.	Θ	Y_d	ΔH@
0.942	3.00	-1.50	1.0000	0.000	10.000	10.000	891.658	901.786	10.128	66.0	66.0	66.00	85.0	77.0	81.00	10.38	1.0041	1.8212
0.942	3.00	-1.50	1.0000	0.000	10.000	10.000	901.786	911.945	10.159	66.0	66.0	66.00	86.0	78.0	82.00	10.39	1.0029	1.8214
0.377	0.50	-0.70	1.0000	0.000	5.000	5.000	929.130	934.152	5.022	66.0	66.0	66.00	77.0	76.0	76.50	12.96	1.0124	1.8963
0.378	0.50	-0.70	1.0000	0.000	5.000	5.000	934.152	939.169	5.017	66.0	66.0	66.00	77.0	76.0	76.50	12.95	1.0134	1.8933
0.664	1.50	-0.90	1.0000	0.000	10.000	10.000	941.128	951.202	10.074	66.5	66.5	66.50	81.0	76.0	78.50	14.72	1.0092	1.8382
0.663	1.50	-0.90	1.0000	0.000	10.000	10.000	951.202	961.292	10.090	66.5	66.5	66.50	81.0	76.0	78.50	14.73	1.0076	1.8407
																Averages	1.00826	1.85185

Nomenclature

P_b	Barometric Pressure (in. Hg)
Q	Flow Rate (cfm)
ΔH	Orifice Pressure differential (in. H_2O)
ΔP	Inlet Pressure Differential (in. H_2O)
V_d	Gas Meter Volume - Dry (ft^3)
V_{ds}	Standard Meter Volume - Dry (ft^3)
T_d	Average Meter Box Temperature (°F)
T_o	Outlet Meter Box Temperature (°F)
T_{ds}	Average Standard Meter Temperature (°F)
Y_d	Meter Correction Factor (unitless), $Y_i \leq Y_{avg} \pm 0.02$
Y_{ds}	Standard Meter Correction Factor (unitless)
ΔH@	Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H_2O) $\Delta H@_i \leq \Delta H@_{avg} \pm 0.2$
Θ	Duration of Run (minutes)

Equations

$$Y_d = (Y_{ds})\left[\frac{V_{ds}}{V_d}\right]\left[\frac{T_d + 460}{T_{ds} + 460}\right]\left[\frac{P_b + \Delta P/13.6}{P_b + \Delta H/13.6}\right]$$

$$\Delta H@ = \frac{(0.0319)(\Delta H)}{P_b(T_o + 460)}\left[\frac{(T_{ds} + 460)\Theta}{(V_{ds})(Y_{ds})}\right]^2$$

$$Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$$

Vacuum Gauge

Standard (in.Hg)	Gauge (in.Hg)
5.8	5.0
10.7	10.0
15.7	15.0
20.4	20.0
25.1	25.0

CleanAir ENGINEERING

Meter Box - Pyrometer Calibration Sheet

Meter Box No: 61-6 Office:

Calibrated by: O. Lavrov Client:

Date: 1/18/08 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	49	48				
100	98	99	98				
150	148	149	148				
200	198	199	198				
250	249	249	248				
300	299	299	298				
350	349	349	348				
400	398	399	398				
450	449	449	448				
500	499	499	498				
550	548	549	548				
600	599	599	598				

Tolerance = ±2°F difference from reference setting.

Calibration Reference Information

Reference Used: Omega CL23A Serial No: T-225950

Calibrated By: JH Metrology Date Calibrated: 10/7/2007

Calibration Report No: R044701

Meter Box Critical Orifice Post-Test Calibration Data

Project No.	10455	Meter No.	61-6	Orifice	B-3
Location	FF Outlet/SDA Inlet	Meter Yd	1.0083	Orifice K'	0.4380
Test Date	3/26/2008	Meter ΔH@	1.8519	Orifice Cal. Date	10/2/2007
Operator	D. Nunez	Full Test Cal. Date	1/18/2008		

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) 30.30 in. Hg

Run	Elapsed Time (minutes)	Meter Volume (Vm) (cf)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Ambient Temperature (°F)	Orifice ΔH (in. W.C.)	Vacuum (in. Hg)	Net Run Time (minutes)	Net Meter Volume Run (cf)	Average Meter Temperature (°F)	Meter Calibration Factor (Yi)	Percent Deviation (ΔYi)
	0.0	505.700	87	83								
1	5.0	508.63	87	83	76	1.10	21.5	5.0	2.93	85.0	0.9948	0.0%
2	10.0	511.54	86	83	78	1.10	21.5	5.0	2.91	84.8	0.9993	0.5%
3	15.0	514.480	85	83	76	1.10	21.5	5.0	2.94	84.3	0.9900	-0.5%
										Average Y_i	0.9947	
										Cal. Error	-1.3%	

Calculations and Specifications

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

$$\Delta Y_i = \frac{Y_i - \overline{Y}_i}{\overline{Y}_i} \times 100 \qquad \text{Spec.: } \Delta Y_i \le \pm 2\%$$

$$Cal.Error = \frac{\overline{Y}_i - Y_d}{Y_d} \times 100 \qquad \text{Spec.: } Cal.Error \le \pm 5\%$$

CleanAir ENGINEERING

Meter Box Critical Orifice Post-Test Calibration Data

Project No. 10455 Meter No. 61-6 Orifice ~~0.75"~~ 2" B-3

Location ~~SDA Exit~~ 3. Effluent Meter Y_d 1.0083 Orifice K' 0.438

Test Date 03/23/08 Meter $\Delta H_@$ 1.8579 Orifice Cal. Date 10/02/2007

Operator D. Nunez Full Test Cal. Date 01/18/08

Leak Checks

Negative Pressure: No movement of Manometer in one-minute	☒ Pass ☐ Fail
Positive Pressure: No movement of Manometer in one-minute	☐ Pass ☐ Fail

Important: All leak checks must pass in order for calibration to be valid.

Bar. Press. (P_b) 30.30 in. Hg

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Ambient Temp. - T_{amb} (°F)	Orifice ΔH (in. W.C.)	Vacuum (in. Hg)	Net Run Time - Θ (minutes)	Net Meter Volume for Run - V_m (dcf)	Avg Meter Temp. for Run - T_m (°F)	DGM Calibration Factor Y_i	Percent Variation ΔY_i
	0	505.700	87	83								
1	5	508.63	87	83	76	1.1	21.5	5	2.93	85		1.34
2	10	511.54	86	83	78	1.1	21.5	10	5.84	84.8		
3	15	514.48	85	83	76	1.1	21.5	10	8.78	84.6		
										Average Y_i		
										Cal. Error		

Calculations and Specifications

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

$$\Delta Y_i = \frac{Y_i - \overline{Y}_i}{\overline{Y}_i} \times 100 \qquad \text{Spec.: } \Delta Y_i \le \pm 2\%$$

$$Cal.Error = \frac{\overline{Y}_i - Y_d}{Y_d} \times 100 \qquad \text{Spec.: } Cal.Error \le \pm 5\%$$

CleanAir ENGINEERING

U3/U2South

Meter Box Full Test Calibration

Meter Box No: 66-4

Date of Calibration: 9/17/2007

Meter Box Y_d: 0.9950

Calibration conducted by: M.V.

Meter Box ΔH@: 1.7279

Signature

Barometric Pressure: 29.47

				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	ΔH@
0.967	3.00	-1.80	1.0000	0.000	10.000	10.000	544.040	554.261	10.221	72.5	72.5	72.50	92.0	85.0	88.50	10.10	0.9958	1.7235
0.968	3.00	-1.80	1.0000	0.000	10.000	10.000	574.717	584.951	10.234	72.5	72.5	72.50	92.0	85.0	88.50	10.09	0.9945	1.7201
0.391	0.50	-1.10	1.0000	0.000	5.000	5.000	588.504	593.630	5.126	73.0	73.0	73.00	87.0	85.0	86.00	12.47	0.9952	1.7548
0.391	0.50	-1.10	1.0000	0.000	5.000	5.000	593.630	598.741	5.111	73.0	73.0	73.00	86.0	84.0	85.00	12.46	0.9963	1.7552
0.687	1.50	-1.50	1.0000	0.000	10.000	10.000	603.430	613.662	10.232	73.5	73.5	73.50	89.0	84.0	86.50	14.19	0.9937	1.7106
0.688	1.50	-1.50	1.0000	0.000	10.000	10.000	613.662	623.889	10.227	73.5	73.5	73.50	89.0	84.0	86.50	14.16	0.9942	1.7033
																Averages	0.99495	1.72793

E - 8

Nomenclature

- P_b Barometric Pressure (in. Hg)
- Q Flow Rate (cfm)
- ΔH Orifice Pressure differential (in. H_2O)
- ΔP Inlet Pressure Differential (in. H_2O)
- V_d Gas Meter Volume - Dry (ft^3)
- V_{ds} Standard Meter Volume - Dry (ft^3)
- T_d Average Meter Box Temperature (°F)
- T_o Outlet Meter Box Temperature (°F)
- T_{ds} Average Standard Meter Temperature (°F)
- Y_d Meter Correction Factor (unitless), $Y_i \leq Y_{avg} \pm 0.02$
- Y_{ds} Standard Meter Correction Factor (unitless)
- ΔH@ Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H_2O) $\Delta H@_i \leq \Delta H@_{avg} \pm 0.2$
- Θ Duration of Run (minutes)

Equations

$$Y_d = (Y_{ds})\left[\frac{V_{ds}}{V_d}\right]\left[\frac{T_d + 460}{T_{ds} + 460}\right]\left[\frac{P_b + \Delta P/13.6}{P_b + \Delta H/13.6}\right]$$

$$\Delta H@ = \frac{(0.0319)(\Delta H)}{P_b(T_o + 460)}\left[\frac{(T_{ds} + 460)\Theta}{(V_{ds})(Y_{ds})}\right]^2$$

$$Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$$

Vacuum Gauge

Standard (in.Hg)	Gauge (in.Hg)
5.2	5.0
10.2	10.0
15.1	15.0
20.0	20.0
22.5	23.0

CleanAir ENGINEER

Meter Box - Pyrometer Calibration Sheet

Meter Box No: 66-4 | Office: Palatine

Calibrated by: M.V. | Client: Dept 66

Date: 9/17/07 | Job No: N/A

Temperature Scale Used: Fahrenheit | Type of Calibration: Full-Test

Calibration Reference Settings (°F)	Pyrometer Reading for each Channel (°F)						
	1 Stack	2 Probe	3 Filter	4 Imp Out	5 Aux	6 DGM In	7 DGM Out
50	51	48	52				
100	100	99	102				
150	150	149	152				
200	201	200	202				
250	252	250	252				
300	302	300	302				
350	351	350	352				
400	400	399	402				
450	449	449	452				
500	499	499	502				
550	549	549	552				
600	600	599	602				

Tolerance = ±2°F difference from reference setting.

Calibration Reference Information

Reference Used: Omega CL23A | Serial No: T-225950

Calibrated By: JH Metrology | Date Calibrated: 10/7/2007

Calibration Report No: R044701

CleanAir ENGINEERING

Meter Box Critical Orifice Post-Test Calibration Data

Project No.	10455	Meter No.	66-4	Orifice	C-4
Location	FF Outlet	Meter Yd	0.9950	Orifice K'	0.4780
Test Date	3/26/2008	Meter ΔH@	1.7297	Orifice Cal. Date	3/11/2008
Operator	Raina Vicere	Full Test Cal. Date	9/17/2007		

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) 30.30 in. Hg

Run	Elapsed Time (min.)	Dry Volume (dcf)	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Average (°F)	Orifice ΔH (in. H2O)	Average (in. H2O)	Net Reading Volume (dcf)	Net Reading Volume (dcm)	Average Temperature (°F)	Meter Yi (dcm/dcf)	Percent Variation ΔYi
	0.0	671.000	80	78								
1	5.0	674.13	80	77	72	1.20	20.0	5.0	3.13	78.8	1.0081	0.1%
2	10.0	677.25	80	77	74	1.20	20.0	5.0	3.12	78.5	1.0090	0.2%
3	15.0	680.385	80	78	76	1.20	20.0	5.0	3.13	78.8	1.0028	-0.4%
										Average Y_i	1.0066	
										Cal. Error	1.2%	

Calculations and Specifications

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

$$\Delta Y_i = \frac{Y_i - \overline{Y}_i}{\overline{Y}_i} \times 100 \qquad \text{Spec.: } \Delta Y_i \le \pm 2\%$$

$$Cal.Error = \frac{\overline{Y}_i - Y_d}{Y_d} \times 100 \qquad \text{Spec.: } Cal.Error \le \pm 5\%$$

CleanAir ENGINEERING

Meter Box Critical Orifice Post-Test Calibration Data

Project No. 12455-50 Meter No. 66-4 Orifice C-4

Location FF Outlet Unit 2 S. Bracon Meter Y_d 0.9950 Orifice K' 0.478

Test Date 3/26/08 Meter $\Delta H_@$ 1.9279 Orifice Cal. Date 3/11/08

Operator Rana Vieau Full Test Cal. Date 9/17/07

Leak Checks

Negative Pressure *No movement of Manometer in one-minute*	☒ Pass ☐ Fail
Positive Pressure *No movement of Manometer in one-minute*	☒ Pass ☐ Fail

Important: All leak checks must pass in order for calibration to be valid.

Bar. Press. (P_b) 30.30 in. Hg

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Ambient Temp. - T_{amb} (°F)	Orifice ΔH (in. W.C.)	Vacuum (in. Hg)	Net Run Time - Θ (minutes)	Net Meter Volume for Run - V_m (dcf)	Avg Meter Temp. for Run - T_m (°F)	DGM Calibration Factor - Y_i	Percent Variation - ΔY_i
	0	671.000	80	78								
1	5	674.13	80	77	72	1.2	20.0					
2	10	677.25	80	77	74	1.2	20.0					
3	15	680.385	80	78	76	1.2	20.0					
										Average Y_i		
										Cal. Error		

Calculations and Specifications

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

$$\Delta Y_i = \frac{Y_i - \overline{Y}_i}{\overline{Y}_i} \times 100 \qquad \text{Spec.: } \Delta Y_i \le \pm 2\%$$

$$Cal.Error = \frac{\overline{Y}_i - Y_d}{Y_d} \times 100 \qquad \text{Spec.: } Cal.Error \le \pm 5\%$$

CleanAir ENGINEERING

Meter Box Full Test Calibration

Meter Box No: 66-6

Date of Calibration: 7/18/2007

Meter Box Y_d: 1.0034

Calibration conducted by: M. V.

Meter Box ΔH@: 1.8096

Signature

Barometric Pressure: 29.25

				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	ΔH@
0.951	3.00	-2.20	1.0000	0.000	10.000	10.000	252.825	262.803	9.978	77.5	77.5	77.50	85.0	82.0	83.50	10.09	1.0002	1.7755
0.949	3.00	-2.20	1.0000	0.000	10.000	10.000	262.803	272.797	9.994	77.5	77.5	77.50	85.0	83.0	84.00	10.11	0.9996	1.7793
0.381	0.50	-1.60	1.0000	0.000	5.000	5.000	279.538	284.533	4.995	77.5	77.5	77.50	83.0	82.0	82.50	12.60	1.0050	1.8458
0.381	0.50	-1.60	1.0000	0.000	5.000	5.000	284.533	289.520	4.987	77.5	77.5	77.50	83.0	82.0	82.50	12.60	1.0066	1.8458
0.667	1.50	-1.70	1.0000	0.000	10.000	10.000	294.910	304.892	9.982	77.5	77.5	77.50	84.0	82.0	83.00	14.39	1.0039	1.8057
0.667	1.50	-1.70	1.0000	0.000	10.000	10.000	304.892	314.864	9.972	77.5	77.5	77.50	84.0	82.0	83.00	14.39	1.0050	1.8057
																Averages	1.00338	1.80963

Nomenclature

P_b	Barometric Pressure (in. Hg)
Q	Flow Rate (cfm)
ΔH	Orifice Pressure differential (in. H_2O)
ΔP	Inlet Pressure Differential (in. H_2O)
V_d	Gas Meter Volume - Dry (ft^3)
V_{ds}	Standard Meter Volume - Dry (ft^3)
T_d	Average Meter Box Temperature (°F)
T_o	Outlet Meter Box Temperature (°F)
T_{ds}	Average Standard Meter Temperature (°F)
Y_d	Meter Correction Factor (unitless), $Y_i \leq Y_{avg} \pm 0.02$
Y_{ds}	Standard Meter Correction Factor (unitless)
ΔH@	Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H_2O) $\Delta H@_i \leq \Delta H@_{avg} \pm 0.2$
Θ	Duration of Run (minutes)

Equations

$$Y_d = (Y_{ds})\left[\frac{V_{ds}}{V_d}\right]\left[\frac{T_d + 460}{T_{ds} + 460}\right]\left[\frac{P_b + \Delta P/13.6}{P_b + \Delta H/13.6}\right]$$

$$\Delta H@ = \frac{(0.0319)(\Delta H)}{P_b(T_o + 460)}\left[\frac{(T_{ds} + 460)\Theta}{(V_{ds})(Y_{ds})}\right]^2$$

$$Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$$

Vacuum Gauge

Standard (in.Hg)	Gauge (in.Hg)
5.0	5.0
10.0	10.3
15.0	15.4
20.0	20.4
25.0	24.9

CleanAir ENGINEERING

Meter Box - Pyrometer Calibration Sheet

Meter Box No: 66-6 | Office: Palatine

Calibrated by: M. V. | Client: Dept 66

Date: 7/18/07 | Job No: N/A

Temperature Scale Used: Fahrenheit | Type of Calibration: Full-Test

Calibration Reference Settings (°F)	Pyrometer Reading for each Channel (°F)						
	1 Stack	2 Probe	3 Filter	4 Imp Out	5 Aux	6 DGM In	7 DGM Out
50	50	50	51				
100	99	100	101				
150	150	151	149				
200	200	200	200				
250	250	251	251				
300	300	301	300				
350	349	350	351				
400	399	400	399				
450	448	448	448				
500	498	499	499				
550	548	548	548				
600	598	598	600				

Tolerance = ±2°F difference from reference setting.

Calibration Reference Information

Reference Used: Omega CL23A | Serial No: T-225950

Calibrated By: JH Metrology | Date Calibrated: 10/7/2007

Calibration Report No: R044701

CleanAir ENGINEERING

Meter Box Critical Orifice Post-Test Calibration Data

Project No.	10455	Meter No.	66-6	Orifice	C-4
Location	FF Outlet / SDA Inlet	Meter Yd	1.0034	Orifice K'	0.4780
Test Date	3/26/2008	Meter ΔH@	1.8096	Orifice Cal. Date	3/11/2008
Operator	Raina Vicere	Full Test Cal. Date	7/18/2007		

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) 30.30 in. Hg

Run	Elapsed Time (min.)	Meter Volume (ft³)	Meter Temperature		Ambient Temp. (°F)	Orifice ΔH (in. H2O)	Vacuum (in. Hg)	Elapsed Time (min.)	Meter Volume (ft³)	Average Meter Temp. (°F)	Yi	Cal. Error
			Inlet	Outlet								
	0.0	842.700	75	75								
1	5.0	845.89	76	75	73	1.30	17.5	5.0	3.19	75.3	0.9816	-0.5%
2	10.0	849.05	76	75	72	1.30	17.5	5.0	3.16	75.5	0.9923	0.6%
3	15.0	852.230	76	75	72	1.30	17.5	5.0	3.18	75.5	0.9861	-0.1%
										Average Y_i	0.9867	
										Cal. Error	-1.7%	

Calculations and Specifications

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

$$\Delta Y_i = \frac{Y_i - \overline{Y}_i}{\overline{Y}_i} \times 100 \qquad \text{Spec.: } \Delta Y_i \le \pm 2\%$$

$$Cal.Error = \frac{\overline{Y}_i - Y_d}{Y_d} \times 100 \qquad \text{Spec.: } Cal.Error \le \pm 5\%$$

CleanAir ENGINEERING

Meter Box Critical Orifice Post-Test Calibration Data

Project No. 1,455 Meter No. 66-6 Orifice C-4

Location FF outlet 2 S. Brunk Meter Y_d 1.0034 Orifice K' 0.479

Test Date 3/26/08 Meter $\Delta H_@$ 1.8096 Orifice Cal. Date 3/11/08

Operator Raine Vieve Full Test Cal. Date ~~9/4/07~~ SB 7/18/07

Bar. Press. (P_b) 30.30 in. Hg

Leak Checks

Negative Pressure *No movement of Manometer in one-minute*	☒ Pass ☐ Fail
Positive Pressure *No movement of Manometer in one-minute*	☒ Pass ☐ Fail

Important: All leak checks must pass in order for calibration to be valid.

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Ambient Temp. T_{amb} (°F)	Orifice ΔH (in. W.C.)	Vacuum (in. Hg)	Net Run Time - Θ (minutes)	Net Meter Volume for Run - V_m (dcf)	Avg Meter Temp. for Run - T_m (°F)	DGM Calibration Factor Y_i	Percent Variation ΔY_i
	0	842.700	75	75								
1	5	845.89	76	75	73	1.3	17.5					
2	10	849.05	76	75	72	1.3	17.5					
3	15	852.230	76	75	72	1.3	17.5					
										Average Y_i		
										Cal. Error		

Calculations and Specifications

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

$$\Delta Y_i = \frac{Y_i - \overline{Y}_i}{\overline{Y}_i} \times 100 \qquad \text{Spec.: } \Delta Y_i \le \pm 2\%$$

$$Cal.Error = \frac{\overline{Y}_i - Y_d}{Y_d} \times 100 \qquad \text{Spec.: } Cal.Error \le \pm 5\%$$

CleanAir ENGINEERING

Meter Box Full Test Calibration

42 W1 Stroutt

Meter Box No: 66-11

Date of Calibration: 7/24/2007

Meter Box Y_d: 0.9927

Calibration conducted by: M. V.

Meter Box ΔH@: 1.7949

Signature

Barometric Pressure: 29.42

				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	ΔH@
0.960	3.00	-1.90	1.0000	0.000	10.000	10.000	131.600	141.784	10.184	78.0	78.0	78.00	96.0	88.0	92.00	10.05	0.9952	1.7353
0.960	3.00	-1.90	1.0000	0.000	12.000	12.000	141.784	154.016	12.232	78.0	78.0	78.00	96.0	88.0	92.00	12.06	0.9943	1.7353
0.381	0.50	-1.20	1.0000	0.000	5.000	5.000	158.326	163.459	5.133	78.0	78.0	78.00	90.0	88.0	89.00	12.67	0.9898	1.8387
0.381	0.50	-1.20	1.0000	0.000	6.000	6.000	163.459	169.619	6.160	78.0	78.0	78.00	90.0	88.0	89.00	15.18	0.9897	1.8329
0.663	1.50	-1.40	1.0000	0.000	10.000	10.000	172.633	182.860	10.227	78.0	78.0	78.00	93.0	88.0	90.50	14.54	0.9933	1.8162
0.664	1.50	-1.40	1.0000	0.000	10.000	10.000	182.860	193.083	10.223	78.0	78.0	78.00	93.0	88.0	90.50	14.52	0.9937	1.8112
																Averages	0.99268	1.79494

E - 16

Nomenclature

- P_b Barometric Pressure (in. Hg)
- Q Flow Rate (cfm)
- ΔH Orifice Pressure differential (in. H_2O)
- ΔP Inlet Pressure Differential (in. H_2O)
- V_d Gas Meter Volume - Dry (ft^3)
- V_{ds} Standard Meter Volume - Dry (ft^3)
- T_d Average Meter Box Temperature (°F)
- T_o Outlet Meter Box Temperature (°F)
- T_{ds} Average Standard Meter Temperature (°F)
- Y_d Meter Correction Factor (unitless), $Y_i \leq Y_{avg} \pm 0.02$
- Y_{ds} Standard Meter Correction Factor (unitless)
- ΔH@ Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H_2O) $\Delta H@_i \leq \Delta H@_{avg} \pm 0.2$
- Θ Duration of Run (minutes)

Equations

$$Y_d = (Y_{ds})\left[\frac{V_{ds}}{V_d}\right]\left[\frac{T_d + 460}{T_{ds} + 460}\right]\left[\frac{P_b + \Delta P/13.6}{P_b + \Delta H/13.6}\right]$$

$$\Delta H@ = \frac{(0.0319)(\Delta H)}{P_b(T_o + 460)}\left[\frac{(T_{ds} + 460)\Theta}{(V_{ds})(Y_{ds})}\right]^2$$

$$Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$$

Vacuum Gauge

Standard (in.Hg)	Gauge (in.Hg)
4.5	5.0
9.8	10.0
14.9	15.0
10.2	20.0
25.4	25.0

CleanAir ENGINEE

Meter Box - Pyrometer Calibration Sheet

Meter Box No: 66-11 Office: Palatine

Calibrated by: M. V. Client: Dept 66

Date: 7/24/07 Job No: N/A

Temperature Scale Used: Fahrenheit Type of Calibration: Full-Test

Calibration Reference Settings (°F)	Pyrometer Reading for each Channel (°F)						
	1 Stack	2 Probe	3 Filter	4 Imp Out	5 Aux	6 DGM In	7 DGM Out
50	49						
100	99						
150	149						
200	199						
250	249						
300	299						
350	349						
400	399						
450	449						
500	499						
550	549						
600	599						

Tolerance = ±2°F difference from reference setting.

Calibration Reference Information

Reference Used: Omega CL23A Serial No: T-225950

Calibrated By: JH Metrology Date Calibrated: 10/7/2007

Calibration Report No: R044701

CleanAir ENGINEERING

Meter Box Critical Orifice Post-Test Calibration Data

Project No. 10455 Meter No. 66-11 Orifice C-4

Location Palatine warehouse Meter Yd 0.9927 Orifice K' 0.4780

Test Date 04/15/08 Meter ΔH@ 1.7949 Orifice Cal. Date 03/11/08

Operator A Vella Full Test Cal. Date 07/24/07

Barom. Press. (P_b) 29.53 in. Hg

Leak Checks

Negative Pressure ☑ Pass

No movement of manometer in one-minute

Positive Pressure ☑ Pass

No movement of manometer in one-minute

Important: All leak checks must pass in order for calibration to be valid.

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Ambient Temp. (°F)	Orifice ΔH (in. W.C.)	Vacuum (in. Hg)	Net Run Time (minutes)	Net Meter Volume for Run (dcf)	Avg Meter Temp. for Run (°F)	DGM Calibration Factor	Percent Variation
	0.0	941.50	70	68								
1	5.0	944.73	71	69	75	1.20	20	5.0	3.23	69.5	0.9574	0.2%
2	10.0	947.96	72	69	78	1.20	20	5.0	3.23	70.3	0.9561	0.1%
3	15.0	951.20	74	71	81	1.20	20	5.0	3.24	71.5	0.9527	-0.3%
										Average Y_i	0.9554	
										Cal. Error	-3.8%	

Calculations and Specifications

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

$$\Delta Y_i = \frac{Y_i - \overline{Y}_i}{\overline{Y}_i} \times 100 \qquad \text{Spec.: } \Delta Y_i \le \pm 2\%$$

$$Cal.Error = \frac{\overline{Y}_i - Y_d}{Y_d} \times 100 \qquad \text{Spec.: } Cal.Error \le \pm 5\%$$

CleanAir. ENGINEERING

U3

U3 south

Meter Box Full Test Calibration

Meter Box No: 66-14A

Date of Calibration: 7/26/2007

Meter Box Y_d: 0.9871

Calibration conducted by: M.V.

Meter Box ΔH@: 1.7935

Signature

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	In	Out	T_{ds} Avg.	In	T_o Out	T_d Avg.	Θ	Y_d	ΔH@
0.934	3.00	-1.80	1.0000	0.000	10.000	10.000	31.526	41.726	10.200	75.0	75.0	75.00	90.0	81.0	85.50	10.34	0.9877	1.8475
0.933	3.00	-1.80	1.0000	0.000	10.000	10.000	41.726	51.945	10.219	75.0	75.0	75.00	90.0	81.0	85.50	10.35	0.9858	1.8511
0.390	0.50	-1.20	1.0000	0.000	5.000	5.000	54.730	59.847	5.117	75.0	75.0	75.00	83.0	81.0	82.00	12.37	0.9857	1.7628
0.390	0.50	-1.20	1.0000	0.000	5.000	5.000	59.847	64.955	5.108	75.0	75.0	75.00	84.0	80.0	82.00	12.39	0.9874	1.7718
0.677	1.50	-1.40	1.0000	0.000	10.000	10.000	67.821	78.039	10.218	75.0	75.0	75.00	88.0	80.0	84.00	14.28	0.9879	1.7652
0.677	1.50	-1.40	1.0000	0.000	10.000	10.000	78.039	88.259	10.220	75.0	75.0	75.00	88.0	80.0	84.00	14.27	0.9877	1.7627
																Averages	0.98705	1.79352

E - 19

Nomenclature

- P_b Barometric Pressure (in. Hg)
- Q Flow Rate (cfm)
- ΔH Orifice Pressure differential (in. H_2O)
- ΔP Inlet Pressure Differential (in. H_2O)
- V_d Gas Meter Volume - Dry (ft^3)
- V_{ds} Standard Meter Volume - Dry (ft^3)
- T_d Average Meter Box Temperature (°F)
- T_o Outlet Meter Box Temperature (°F)
- T_{ds} Average Standard Meter Temperature (°F)
- Y_d Meter Correction Factor (unitless), $Y_i \leq Y_{avg} \pm 0.02$
- Y_{ds} Standard Meter Correction Factor (unitless)
- ΔH@ Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H_2O) $\Delta H@_i \leq \Delta H@_{avg} \pm 0.2$
- Θ Duration of Run (minutes)

Equations

$$Y_d = (Y_{ds})\left[\frac{V_{ds}}{V_d}\right]\left[\frac{T_d + 460}{T_{ds} + 460}\right]\left[\frac{P_b + \Delta P/13.6}{P_b + \Delta H/13.6}\right]$$

$$\Delta H@ = \frac{(0.0319)(\Delta H)}{P_b(T_o + 460)}\left[\frac{(T_{ds} + 460)\Theta}{(V_{ds})(Y_{ds})}\right]^2$$

$$Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$$

Vacuum Gauge

Standard (in.Hg)	Gauge (in.Hg)
5.2	5.0
10.5	10.0
15.8	15.0
20.5	20.0
24.1	23.5

66-4

CleanAir ENGINEERING

Meter Box - Pyrometer Calibration Sheet

Meter Box No: 66-14A

Office: Palatine

Calibrated by: M.V.

Client: Dept 66

Date: 7/26/07

Job No: N/A

Temperature Scale Used: Fahrenheit

Type of Calibration: Full-Test

Calibration Reference Settings (°F)	Pyrometer Reading for each Channel (°F)						
	1 Stack	2 Probe	3 Filter	4 Imp Out	5 Aux	6 DGM In	7 DGM Out
50	49						
100	99						
150	149						
200	199						
250	249						
300	299						
350	349						
400	399						
450	449						
500	499						
550	549						
600	599						

Tolerance = ±2°F difference from reference setting.

Calibration Reference Information

Reference Used: Omega CL23A

Serial No: T-225950

Calibrated By: JH Metrology

Date Calibrated: 10/7/2007

Calibration Report No: R044701

CleanAir ENGINEERING

Meter Box Critical Orifice Post-Test Calibration Data

Project No.	10455	Meter No.	66-14	Orifice	C-3
Location	FF Outlet	Meter Yd	0.9871	Orifice K'	0.4413
Test Date	3/26/2008	Meter ΔH@	1.7935	Orifice Cal. Date	3/11/2008
Operator	Raina Vicere	Full Test Cal. Date	7/26/2007		

Leak Checks

Negative Pressure ☑ Pass

No movement of manometer in one-minute

Positive Pressure ☑ Pass

No movement of manometer in one-minute

Important: All leak checks must pass in order for calibration to be valid.

Barom. Press. (P_b) 30.30 in. Hg

Run No.	Elapsed Time (minutes)	Meter Volume (V_m)	Meter Temp. (T_m) Inlet (°F)	Meter Temp. (T_m) Outlet (°F)	Ambient Temp. (T_{amb}) (°F)	Orifice ΔH (in. WC)	Orifice ΔP (in. H2O)	Vacuum Line Setting (in. Hg)	Stack Temp. (T_s) (°F)	Average Meter Temp. (°F)	Qcmm Flow Rate	Percent Isokinetic
	0.0	877.000	84	81								
1	5.0	880.05	83	81	75	1.10	20.5	5.0	3.05	82.3	0.9589	-0.5%
2	10.0	883.07	82	82	74	1.10	20.5	5.0	3.02	82.0	0.9689	0.5%
3	15.0	886.095	82	80	77	1.10	20.5	5.0	3.02	81.5	0.9637	0.0%
										Average Y_i	0.9638	
										Cal. Error	-2.4%	

Calculations and Specifications

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

$$\Delta Y_i = \frac{Y_i - \overline{Y}_i}{\overline{Y}_i} \times 100 \qquad \text{Spec.: } \Delta Y_i \le \pm 2\%$$

$$Cal.Error = \frac{\overline{Y}_i - Y_d}{Y_d} \times 100 \qquad \text{Spec.: } Cal.Error \le \pm 5\%$$

CleanAir ENGINEERING

Meter Box Critical Orifice Post-Test Calibration Data

Project No. 10455 Meter No. 6614 Orifice C-3

Location FF Outlet 3 S. Branch Meter Y_d 0.9871 Orifice K' 0.4413

Test Date 3/26/08 Meter $\Delta H_@$ 1.7935 Orifice Cal. Date 3/11/08

Operator Raina Vine Full Test Cal. Date ~~9/17/07~~ SB 5/26/07

Leak Checks

Negative Pressure *No movement of Manometer in one-minute*	☒ Pass ☐ Fail
Positive Pressure *No movement of Manometer in one-minute*	☒ Pass ☐ Fail

Important: All leak checks must pass in order for calibration to be valid.

Bar. Press. (P_b) 30.30 in. Hg

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Ambient Temp. - T_{amb} (°F)	Orifice ΔH (in. W.C.)	Vacuum (in. Hg)	Net Run Time - Θ (minutes)	Net Meter Volume for Run - V_m (dcf)	Avg Meter Temp. for Run - T_m (°F)	DGM Calibration Factor Y_i	Percent Variation ΔY_i
	0	877.000	84	81								
1	5	880.05	83	81	75	1.1	20.5					
2	10	883.07	82	82	74	1.1	20.5					
3	15	886.095	82	80	77	1.1	20.5					
										Average Y_i		
										Cal. Error		

Calculations and Specifications

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

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

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

CleanAir ENGINEERING

u3/43

Meter Box Full Test Calibration

Meter Box No: 66-16

Date of Calibration: 9/6/2007

Meter Box Y_d: 0.9973

Calibration conducted by: O.L

Meter Box ΔH@: 1.7825

Signature

Barometric Pressure: 29.25

				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	ΔH@
0.953	3.00	-1.70	1.0000	0.000	10.000	10.000	592.100	602.144	10.044	75.5	75.5	75.50	87.0	79.0	83.00	10.11	0.9977	1.7792
0.955	3.00	-1.70	1.0000	0.000	10.000	10.000	602.144	612.204	10.060	75.5	75.5	75.50	88.0	79.0	83.50	10.09	0.9971	1.7721
0.390	0.50	-1.20	1.0000	0.000	5.000	5.000	617.282	622.331	5.049	75.5	75.5	75.50	83.0	79.0	81.00	12.34	0.9962	1.7671
0.390	0.50	-1.20	1.0000	0.000	5.000	5.000	622.331	627.379	5.048	75.5	75.5	75.50	82.0	80.0	81.00	12.34	0.9964	1.7638
0.668	1.50	-1.70	1.0000	0.000	10.000	10.000	672.341	682.417	10.076	75.5	75.5	75.50	87.0	80.0	83.50	14.43	0.9992	1.8089
0.669	1.50	-1.70	1.0000	0.000	10.000	10.000	682.417	692.511	10.094	75.5	75.5	75.50	87.0	80.0	83.50	14.41	0.9974	1.8039
																Averages	0.99734	1.78250

E - 23

Nomenclature

- P_b Barometric Pressure (in. Hg)
- Q Flow Rate (cfm)
- ΔH Orifice Pressure differential (in. H_2O)
- ΔP Inlet Pressure Differential (in. H_2O)
- V_d Gas Meter Volume - Dry (ft^3)
- V_{ds} Standard Meter Volume - Dry (ft^3)
- T_d Average Meter Box Temperature (°F)
- T_o Outlet Meter Box Temperature (°F)
- T_{ds} Average Standard Meter Temperature (°F)
- Y_d Meter Correction Factor (unitless), $Y_i \leq Y_{avg} \pm 0.02$
- Y_{ds} Standard Meter Correction Factor (unitless)
- ΔH@ Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H_2O) $\Delta H@_i \leq \Delta H@_{avg} \pm 0.2$
- Θ Duration of Run (minutes)

Equations

$$Y_d = (Y_{ds})\left[\frac{V_{ds}}{V_d}\right]\left[\frac{T_d + 460}{T_{ds} + 460}\right]\left[\frac{P_b + \Delta P/13.6}{P_b + \Delta H/13.6}\right]$$

$$\Delta H@ = \frac{(0.0319)(\Delta H)}{P_b(T_o + 460)}\left[\frac{(T_{ds} + 460)\Theta}{(V_{ds})(Y_{ds})}\right]^2$$

$$Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$$

Vacuum Gauge

Standard (in.Hg)	Gauge (in.Hg)
5.0	5.4
10.0	10.2
15.0	15.3
20.0	20.4
25.0	24.7

6-23

CleanAir ENGINEERING

Meter Box - Pyrometer Calibration Sheet

Meter Box No: 66-16 Office: Palatine

Calibrated by: O.L Client: Dept 66

Date: 9/6/07 Job No: N/A

Temperature Scale Used: Fahrenheit Type of Calibration: Full-Test

Calibration Reference Settings (°F)	Pyrometer Reading for each Channel (°F)						
	1 Stack	2 Probe	3 Filter	4 Imp Out	5 Aux	6 DGM In	7 DGM Out
50	48	48	50				
100	98	98	99				
150	148	148	150				
200	198	198	200				
250	248	248	250				
300	298	298	300				
350	348	348	350				
400	398	398	399				
450	448	448	449				
500	498	498	500				
550	548	548	549				
600	598	598	600				

Tolerance = ±2°F difference from reference setting.

Calibration Reference Information

Reference Used: Omega CL23A Serial No: T-225950

Calibrated By: JH Metrology Date Calibrated: 10/7/2007

Calibration Report No: R044701

CleanAir ENGINEERING

Meter Box Critical Orifice Post-Test Calibration Data

Project No.	10455	Meter No.	66-16	Orifice	C-4
Location	FF Outlet	Meter Yd	0.9973	Orifice K'	0.4780
Test Date	3/26/2008	Meter ΔH@	1.7825	Orifice Cal. Date	3/11/2008
Operator	Raina Vicere	Full Test Cal. Date	9/6/2007		

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) 30.30 in. Hg

Run	Elapsed Time (min) (θ)	Meter Volume (cf)	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Ambient Temp. (°F)	Orifice ΔH (in WC)	Vacuum (in Hg)	Elapsed Time θ (min)	Net Meter Volume for Run V_m (cf)	Avg Meter Temperature T_m (°F)	ECMC Calibration Factor Y_i	Percent Variation ΔY_i
	0.0	274.800	79	79								
1	5.0	278.00	80	79	74	1.30	20.0	5.0	3.20	79.3	0.9849	0.0%
2	10.0	281.19	79	78	75	1.30	20.0	5.0	3.19	79.0	0.9866	0.2%
3	15.0	284.385	80	78	78	1.30	20.0	5.0	3.19	78.8	0.9819	-0.3%
										Average Y_i	0.9845	
										Cal. Error	-1.3%	

Calculations and Specifications

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

$$\Delta Y_i = \frac{Y_i - \overline{Y_i}}{\overline{Y_i}} \times 100 \qquad \text{Spec.: } \Delta Y_i \le \pm 2\%$$

$$Cal.Error = \frac{\overline{Y_i} - Y_d}{Y_d} \times 100 \qquad \text{Spec.: } Cal.Error \le \pm 5\%$$

CleanAir ENGINEERING

CDS005B-Meter Post-CO, October 2002

Meter Box Critical Orifice Post-Test Calibration Data

Project No. 10455 Meter No. 66-16 Orifice C-4

Location FF Outlet Unit 3 S. Brand Meter Y_d 0.9973 Orifice K' 0.478

Test Date 3/26/08 Meter $\Delta H_@$ 1.7825 Orifice Cal. Date 3/11/08

Operator Raina Vieira Full Test Cal. Date ~~9/17/07~~ SB 9/6/07

Bar. Press. (P_b) 30.30 in. Hg

Leak Checks

Negative Pressure *No movement of Manometer in one-minute*	☒ Pass ☐ Fail
Positive Pressure *No movement of Manometer in one-minute*	☒ Pass ☐ Fail

Important: All leak checks must pass in order for calibration to be valid.

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Ambient Temp. - T_{amb} (°F)	Orifice ΔH (in. W.C.)	Vacuum (in. Hg)	Net Run Time - Θ (minutes)	Net Meter Volume for Run - V_m (dcf)	Avg Meter Temp. for Run - T_m (°F)	DGM Calibration Factor Y_i	Percent Variation ΔY_i
	0	274.800	79	79								
1	5	278.00	80	79	74	1.3	20					
2	10	281.19	79	78	75	1.3	20					
3	15	284.385	80	78	78	1.3	20					
										Average Y_i		
										Cal. Error		

Calculations and Specifications

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

$$\Delta Y_i = \frac{Y_i - \overline{Y}_i}{\overline{Y}_i} \times 100 \qquad \text{Spec.: } \Delta Y_i \le \pm 2\%$$

$$Cal.Error = \frac{\overline{Y}_i - Y_d}{Y_d} \times 100 \qquad \text{Spec.: } Cal.Error \le \pm 5\%$$

CleanAir ENGINEERING

Meter Box Full Test Calibration

Meter Box No: 28-082707-1 (66-23)

Date of Calibration: 8/27/2007

Meter Box Y_d: 0.9937

Calibration conducted by: O. Lavrov

Meter Box ΔH@: 1.9415

Barometric Pressure: 29.43

				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	ΔH@
0.914	3.00	-1.80	1.0000	0.000	10.000	10.000	136.232	146.468	10.236	74.6	74.6	74.60	95.0	85.0	90.00	10.63	0.9931	1.9269
0.912	3.00	-1.80	1.0000	0.000	10.000	10.000	146.468	156.720	10.252	75.0	75.0	75.00	95.0	85.0	90.00	10.64	0.9908	1.9334
0.366	0.50	-1.00	1.0000	0.000	5.000	5.000	180.468	185.554	5.086	74.5	74.5	74.50	84.0	83.0	83.50	13.27	0.9959	2.0085
0.365	0.50	-1.10	1.0000	0.000	5.000	5.000	185.554	190.651	5.097	74.5	74.5	74.50	84.0	83.0	83.50	13.29	0.9935	2.0145
0.654	1.50	-1.60	1.0000	0.000	10.000	10.000	202.560	212.797	10.237	74.5	74.5	74.50	91.0	85.0	88.00	14.86	0.9938	1.8820
0.653	1.50	-1.50	1.0000	0.000	10.000	10.000	212.797	223.041	10.244	74.5	74.5	74.50	92.0	86.0	89.00	14.88	0.9952	1.8837
																Averages	0.99372	1.94149

Nomenclature

P_b	Barometric Pressure (in. Hg)
Q	Flow Rate (cfm)
ΔH	Orifice Pressure differential (in. H_2O)
ΔP	Inlet Pressure Differential (in. H_2O)
V_d	Gas Meter Volume - Dry (ft^3)
V_{ds}	Standard Meter Volume - Dry (ft^3)
T_d	Average Meter Box Temperature (°F)
T_o	Outlet Meter Box Temperature (°F)
T_{ds}	Average Standard Meter Temperature (°F)
Y_d	Meter Correction Factor (unitless), $Y_i \leq Y_{avg} \pm 0.02$
Y_{ds}	Standard Meter Correction Factor (unitless)
ΔH@	Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H_2O) $\Delta H@_i \leq \Delta H@_{avg} \pm 0.2$
Θ	Duration of Run (minutes)

Equations

$$Y_d = (Y_{ds})\left[\frac{V_{ds}}{V_d}\right]\left[\frac{T_d + 460}{T_{ds} + 460}\right]\left[\frac{P_b + \Delta P/13.6}{P_b + \Delta H/13.6}\right]$$

$$\Delta H@ = \frac{(0.0319)(\Delta H)}{P_b(T_o + 460)}\left[\frac{(T_{ds} + 460)\Theta}{(V_{ds})(Y_{ds})}\right]^2$$

$$Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$$

Vacuum Gauge

Standard (in.Hg)	Gauge (in.Hg)
5.0	5.6
10.0	10.6
15.0	15.4
20.0	19.9
25.0	24.7

CleanAir ENGINEERING

Meter Box - Pyrometer Calibration Sheet

Meter Box No: 28-082707-1 (66-23) Office: Palatine

Calibrated by: O. Lavrov Client: Dept 66

Date: 8/27/01 Job No: N/A

Temperature Scale Used: Fahrenheit Type of Calibration: Full-Test

Calibration Reference Settings (°F)	Pyrometer Reading for each Channel (°F)						
	1 Stack	2 Probe	3 Filter	4 Imp Out	5 Aux	6 DGM In	7 DGM Out
50	48	52	50				
100	98	102	100				
150	148	152	150				
200	198	202	200				
250	248	252	250				
300	298	302	300				
350	348	352	350				
400	399	402	400				
450	448	452	450				
500	498	502	500				
550	548	552	550				
600	598	602	600				

Tolerance = ±2°F difference from reference setting.

Calibration Reference Information

Reference Used: Omega CL23A Serial No: T-225950

Calibrated By: JH Metrology Date Calibrated: 10/7/2007

Calibration Report No: R044701

Meter Box Critical Orifice Post-Test Calibration Data

Project No.	10455	Meter No.	66-23	Orifice	C-4
Location	Palatine warehouse	Meter Yd	0.9937	Orifice K'	0.4780
Test Date	04/15/08	Meter ΔH@	1.9150	Orifice Cal. Date	03/11/08
Operator	A Vella	Full Test Cal. Date	08/27/07		

Barom. Press. (P_b) 29.53 in. Hg

Leak Checks

Negative Pressure ☑ Pass

No movement of manometer in one-minute

Positive Pressure ☑ Pass

No movement of manometer in one-minute

Important: All leak checks must pass in order for calibration to be valid.

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Ambient Temp. T_{amb} (°F)	Orifice ΔH (in. W.C.)	Vacuum (in. Hg)	Net Run Time - θ (minutes)	Net Meter Volume for Run - V_m (dcf)	Avg Meter Temp. for Run T_m (°F)	DGM Calibration Factor - Y_i	Percent Variation - ΔY_i
	0.0	583.60	73	72								
1	6.0	587.40	73	72	73	1.30	21	6.0	3.80	72.5	0.9837	-0.2%
2	10.0	589.92	73	72	75	1.30	21	4.0	2.52	72.5	0.9870	0.2%
3	15.0	593.07	74	72	77	1.30	21	5.0	3.15	72.8	0.9856	0.0%
										Average Y_i	0.9854	
										Cal. Error	-0.8%	

Calculations and Specifications

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

$$\Delta Y_i = \frac{Y_i - \overline{Y}_i}{\overline{Y}_i} \times 100 \qquad \text{Spec.: } \Delta Y_i \le \pm 2\%$$

$$Cal.Error = \frac{\overline{Y}_i - Y_d}{Y_d} \times 100 \qquad \text{Spec.: } Cal.Error \le \pm 5\%$$

CleanAir ENGINEERING

SAMPLE PROBE CALIBRATION DATA

Probe Type: M5 S-Type **I.D. number:** 07-8-18

Thermocouple Calibration

Reference Type: _____ Reference I.D. No: _____ Pyrometer I.D. No: _____ Degrees: F / C

Point No.	Target Temp.	Reference Temp	Indicated Temp	Temp Difference	% Difference	Specification
1	ice-32°F					
2	ambient-70°F					%Difference ≤ 1.5
3	hot oil-150°F					
4	boiling H_2O-212°F					
5	hot oil-320°F					

Does assembly meet specifications? [ ] → ***If "NO" thermocouple must be replaced.***

Geometric Pitot Calibration *diagrams on reverse*

Is pitot assembly in good repair? (YES) / NO If "NO" explain: _____

If repairs are required, pitot does not meet specification.

☒ **"S" Pitot**

Measurement		Specification
a1 = 2	a2 = 1	<10 °
b1 = 1	b2 = 0	<5°
γ = 2	θ = 1	
Pa = 0.355	Pb = 0.355	Pa + Pb = A
A = 0.710	Dt = 0.250	

Calculations

z = A sin γ = 0.0248	<0.125"
w = A sin θ = 0.0123	<0.03125"

Does assembly meet specifications? (YES) / NO

☐ **Standard Pitot**

Measurement	Specification
Tube O.D. _____	(D)
Static Hole I.D. _____	0.1 x D =
Length,	
Tip to Static _____	> 6xD =
Static to Bend _____	>8xD =

Does assembly meet specifications? YES / NO

If "YES" "S" pitot Cp=0.84; Std pitot Cp=0.99
If "NO" wind tunnel calibration is required.

Wind Tunnel Pitot Calibration

All specifications are from EPA-600/8-76-005, section 3.1

PROBE Cp = 0.84 **Calibrated by:** [signature] **Date:** 12/26/07

CleanAir. ENGINEERING

SAMPLE PROBE CALIBRATION DATA

Probe Type: M5 S-Type **I.D. number:** 67-8-22

Thermocouple Calibration

Reference Type: _____ Reference I.D. No: _____ Pyrometer I.D. No: _____ Degrees: F / C

Point No.	Target Temp.	Reference Temp	Indicated Temp	Temp Difference	% Difference	Specification
1	ice-32°F					
2	ambient-70°F					%Difference ≤ 1.5
3	hot oil-150°F					
4	boiling H_2O-212°F					
5	hot oil-320°F					

Does assembly meet specifications? [ ] → **If "NO" thermocouple must be replaced.**

Geometric Pitot Calibration *diagrams on reverse*

Is pitot assembly in good repair? YES / NO If "NO" explain: _____

If repairs are required, pitot does not meet specification.

[X] **"S" Pitot**

Measurement				Specification
a1 =	3	a2 =	0	<10 °
b1 =	1	b2 =	0	<5°
γ =	2	θ =	1	
Pa =	0.3585	Pb =	0.3585	Pa + Pb = A
A =	0.717	Dt =	0.25	

Calculations

z = A sin γ = 0.01251 <0.125"

w = A sin θ = 0.012501 <0.03125"

Does assembly meet specifications? YES / NO

[ ] **Standard Pitot**

Measurement		Specification
Tube O.D.	_____	(D)
Static Hole I.D.	_____	0.1 x D =
Length,		
Tip to Static	_____	> 6xD =
Static to Bend	_____	>8xD =

Does assembly meet specifications? YES / NO

If "YES" "S" pitot Cp=0.84; Std pitot Cp=0.99
If "NO" wind tunnel calibration is required.

Wind Tunnel Pitot Calibration

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

PROBE Cp = 0.84 **Calibrated by:** Jeff Thomas **Date:** 12/26/07

CleanAir ENGINEERING

SAMPLE PROBE CALIBRATION DATA

Probe Type: M5 8' E.L **I.D. number:** M-8-2

Thermocouple Calibration

Reference Type: _____ Reference I.D. No: _____ Pyrometer I.D. No: _____ Degrees: F / C

Point No.	Target Temp.	Reference Temp	Indicated Temp	Temp Difference	% Difference	Specification
1	ice-32°F					
2	ambient-70°F					%Difference ≤ 1.5
3	hot oil-150°F					
4	boiling H_2O-212°F					
5	hot oil-320°F					

Does assembly meet specifications? [ ] → **If "NO" thermocouple must be replaced.**

Geometric Pitot Calibration *diagrams on reverse*

Is pitot assembly in good repair? YES / NO If "NO" explain: _____

If repairs are required, pitot does not meet specification.

☒ **"S" Pitot**

Measurement				Specification
a1 =	3	a2 =	1	<10 °
b1 =	0	b2 =	0	<5°
γ =	2	θ =	1	
Pa =	.360	Pb =	.368	Pa + Pb = A
A =	.728	Dt =	.748	

Calculations

z = A sin γ = .0254 .0254 <0.125"

w = A sin θ = 0.012721 <0.03125"

Does assembly meet specifications? (YES) / NO

☐ **Standard Pitot**

Measurement		Specification
Tube O.D.		(D)
Static Hole I.D.		0.1 x D =
Length,		
Tip to Static		> 6xD =
Static to Bend		>8xD =

Does assembly meet specifications? YES / NO

If "YES" "S" pitot Cp=0.84; Std pitot Cp=0.99
If "NO" wind tunnel calibration is required.

Wind Tunnel Pitot Calibration

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

PROBE Cp = 0.84 **Calibrated by:** Jeff Thomas **Date:** 12/20/07

CleanAir ENGINEERING

SAMPLE PROBE CALIBRATION DATA

Probe Type: S-Type M-5 **I.D. number:** 67-8-20

Thermocouple Calibration

Reference Type: _____ Reference I.D. No: _____ Pyrometer I.D. No: _____ Degrees: F / C

Point No.	Target Temp.	Reference Temp	Indicated Temp	Temp Difference	% Difference	Specification
1	ice-32°F					
2	ambient-70°F					%Difference ≤ 1.5
3	hot oil-150°F					
4	boiling H_2O-212°F					
5	hot oil-320°F					

Does assembly meet specifications? [ ] → **If "NO" thermocouple must be replaced.**

Geometric Pitot Calibration *diagrams on reverse*

Is pitot assembly in good repair? (YES) / NO If "NO" explain: _____

If repairs are required, pitot does not meet specification.

[X] **"S" Pitot**

Measurement				Specification
a1 =	1	a2 =	1	<10 °
b1 =	3	b2 =	3	<5°
γ =	2	θ =	1	
Pa =	0.332	Pb =	0.332	Pa + Pb = A
A =	0.664	Dt =	0.25	

Calculations

z = A sin γ = 0.02314 <0.125"

w = A sin θ = 0.01158 <0.03125"

Does assembly meet specifications? (YES) / NO

[ ] **Standard Pitot**

Measurement		Specification
Tube O.D.		(D)
Static Hole I.D.		0.1 x D =
Length,		
Tip to Static		> 6xD =
Static to Bend		>8xD =

Does assembly meet specifications? YES / NO

If "YES" "S" pitot Cp=0.84; Std pitot Cp=0.99

If "NO" wind tunnel calibration is required.

Wind Tunnel Pitot Calibration

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

PROBE Cp = 0.84 **Calibrated by:** Jeff Thomas **Date:** 12/26/07

CDS302A-Pitots, Oct/04

CleanAir ENGINEERING

SAMPLE PROBE CALIBRATION DATA

Probe Type: S-Type M-5 **I.D. number:** 07-8-15

Thermocouple Calibration

Reference Type: _____ Reference I.D. No: _____ Pyrometer I.D. No: _____ Degrees: F / C

Point No.	Target Temp.	Reference Temp	Indicated Temp	Temp Difference	% Difference	Specification
1	ice-32°F					
2	ambient-70°F					%Difference ≤ 1.5
3	hot oil-150°F					
4	boiling H_2O-212°F					
5	hot oil-320°F					

Does assembly meet specifications? [ ] → **If "NO" thermocouple must be replaced.**

Geometric Pitot Calibration *diagrams on reverse*

Is pitot assembly in good repair? (YES) / NO If "NO" explain: _____

If repairs are required, pitot does not meet specification.

[X] **"S" Pitot**

Measurement				Specification
a1 =	1	a2 =	2	<10 °
b1 =	2	b2 =	0	<5°
γ =	89.2	θ =	1	
Pa =	0.358	Pb =	0.358	Pa + Pb = A
A =	0.715	Dt =	0.250	

Calculations

z = A sin γ =	0.0125	<0.125"
w = A sin θ =	0.01248	<0.03125"

Does assembly meet specifications? (YES) / NO

[ ] **Standard Pitot**

Measurement		Specification
Tube O.D.	_____	(D)
Static Hole I.D.	_____	0.1 x D =
Length,		
Tip to Static	_____	> 6xD =
Static to Bend	_____	>8xD =

Does assembly meet specifications? YES / NO

If "YES" "S" pitot Cp=0.84; Std pitot Cp=0.99
If "NO" wind tunnel calibration is required.

Wind Tunnel Pitot Calibration

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

PROBE Cp = 0.84 **Calibrated by:** Jeff Thurnes **Date:** 12/26/07

SAMPLE PROBE CALIBRATION DATA

Probe Type: M5 S-Type **I.D. number:** G7-8-19

Thermocouple Calibration

Reference Type: _____ Reference I.D. No: _____ Pyrometer I.D. No: _____ Degrees: F / C

Point No.	Target Temp.	Reference Temp	Indicated Temp	Temp Difference	% Difference	Specification
1	ice-32°F					
2	ambient-70°F					%Difference ≤ 1.5
3	hot oil-150°F					
4	boiling H_2O-212°F					
5	hot oil-320°F					

Does assembly meet specifications? [ ] → **If "NO" thermocouple must be replaced.**

Geometric Pitot Calibration *diagrams on reverse*

Is pitot assembly in good repair? (YES) / NO If "NO" explain: _____

If repairs are required, pitot does not meet specification.

☒ **"S" Pitot**

Measurement		Specification
a1 = 0	a2 = 0	<10 °
b1 = 0	b2 = 2	<5°
γ = 3	θ = 2	
Pa = 0.328	Pb = 0.329	Pa + Pb = A
A = 0.657	Dt = 0.25	

Calculations

z = A sin γ =	0.0344	<0.125"
w = A sin θ =	0.0229	<0.03125"

Does assembly meet specifications? (YES) / NO

☐ **Standard Pitot**

Measurement		Specification
Tube O.D.		(D)
Static Hole I.D.		0.1 x D =
Length,		
Tip to Static		> 6xD =
Static to Bend		>8xD =

Does assembly meet specifications? YES / NO

If "YES" "S" pitot Cp=0.84; Std pitot Cp=0.99
If "NO" wind tunnel calibration is required.

Wind Tunnel Pitot Calibration

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

PROBE Cp = 0.84 **Calibrated by:** _____ **Date:** 12/26/07

CleanAir. ENGINEERING

RATA CLASS

Scott Specialty Gases

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

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY,MI 48083

P.O. No.: 55647-71-65000
Project No.: 05-53475-001

Customer

CLEAN AIR ENGINEERING
DON ALLEN
500 W. WOOD STREET
PALATINE IL 60067

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: ALM026535 Certification Date: 05Apr2007 Exp. Date: 04Apr2010
Cylinder Pressure***: 1900 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
CARBON DIOXIDE	6.058	%	+/- 1%	Direct NIST and NMi
OXYGEN	14.02	%	+/- 1%	Direct NIST and NMi
NITROGEN		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2300	01Nov2010	1D002807	23.04 %	CARBON DIOXIDE
NTRM 2350	01May2009	K026542	23.48 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
VARIAN/3400/10693	04Apr2007	THERMAL CONDUCTIVITY
CALIFORNIA/110P/S02041	05Apr2007	PARAMAGNETIC

ANALYZER READINGS

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

First Triad Analysis | Second Triad Analysis | Calibration Curve

CARBON DIOXIDE

Date: 04Apr2007	Response Unit:AREA	
Z1 = 0.00000	R1 = 1165892.	T1 = 306033.0
R2 = 1166031.	Z2 = 0.00000	T2 = 305928.0
Z3 = 0.00000	T3 = 305959.0	R3 = 1166569.
Avg. Concentration:	6.058	%

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.999996

Constants:	A = 0.010560
B = 0.000020	C = 0
D = 0	E = 0

OXYGEN

Date: 05Apr2007	Response Unit:%	
Z1 = 0.00000	R1 = 23.48000	T1 = 14.03000
R2 = 23.48000	Z2 = 0.00000	T2 = 14.03000
Z3 = 0.00000	T3 = 14.02000	R3 = 23.49000
Avg. Concentration:	14.02	%

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.999999

Constants:	A = -0.002923
B = 0.999759	C = 0
D = 0	E = 0

APPROVED BY: _____

RATA CLASS

Scott Specialty Gases

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

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY,MI 48083

P.O. No.: 55647-71-65000
Project No.: 05-53475-002

Customer

CLEAN AIR ENGINEERING
DON ALLEN
500 W. WOOD STREET
PALATINE IL 60067

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: ALM015424 **Certification Date:** 05Apr2007 **Exp. Date:** 04Apr2010
Cylinder Pressure*:** 1900 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
CARBON DIOXIDE	14.03	%	+/- 1%	Direct NIST and NMi
OXYGEN	5.986	%	+/- 1%	Direct NIST and NMi
NITROGEN		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2300	01Nov2010	1D002807	23.04 %	CARBON DIOXIDE
NTRM 2350	01May2009	K026542	23.48 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
VARIAN/3400/10693	30Mar2007	THERMAL CONDUCTIVITY
CALIFORNIA/110P/S02041	22Mar2007	PARAMAGNETIC

ANALYZER READINGS

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

First Triad Analysis	Second Triad Analysis	Calibration Curve

CARBON DIOXIDE

Date: 03Apr2007	Response Unit:AREA	
Z1 = 0.00000	R1 = 1161725.	T1 = 706523.0
R2 = 116182.0	Z2 = 0.00000	T2 = 706670.0
Z3 = 0.00000	T3 = 706686.0	R3 = 1160799.
Avg. Concentration:	14.03	%

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.999993
Constants: A = -0.080082
B = 0.000020 C = 0
D = 0 E = 0

OXYGEN

Date: 05Apr2007	Response Unit:%	
Z1 = 0.00000	R1 = 23.48000	T1 = 5.99000
R2 = 23.48000	Z2 = 0.00000	T2 = 5.99000
Z3 = 0.00000	T3 = 5.99000	R3 = 23.48000
Avg. Concentration:	5.986	%

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.999999
Constants: A = -0.002923
B = 0.999759 C = 0
D = 0 E = 0

APPROVED BY: _____

Page 1 of 1

Scott Specialty Gases

1290 COMBERMERE STREET
Shipped From: TROY MI 48083
Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ANALYSIS

WAREHOUSE/STOCK
WAREHOUSE/STOCK/
CHICAGO WAREHOUSE
868 SIVERT
WOOD DALE IL 60191

PROJECT #: 05-59066-002
PO#: GEN STOCK
ITEM #: 0501813 AL
DATE: 17Sep2007

CYLINDER #: ALM021476
FILL PRESSURE: 02000 PSIG

PURE MATERIAL: NITROGEN CAS# 7727-37-9

GRADE: ZERO GAS

PURITY: 99.998%

IMPURITY	MAXIMUM CONCENTRATIONS
THC	0.5 PPM

ANALYST: _____