Wheelabrator North Broward Inc.
A Waste Management Company
2600 Wiles Road
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June 4, 2012

UPS #1Z26X1500396585636

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

Re: Wheelabrator North Broward
F.A.C. 62-296.416 Quarterly Mercury Stack Testing
Second Quarter of 2012, Report Submittal

Dear Mr. Anderson:

As required by F.A.C. 62-296.416, please find enclosed the 2012 second quarter report on mercury stack testing which was conducted on Unit #3.

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

If there are any questions, please contact this office at (954) 971-8701.

Sincerely,

Jim Epsilantis
Plant Manager

cc: USEPA, Region IV, Pesticides and Toxics Management Division, Air & EPCRA Enforcement Branch, Air Enforcement Section UPS #1Z26X1500397508048
FDEP, Tallahassee, Bureau of Air Regulation, New Source Review Section, UPS #1Z26X1500396529652
Broward County Department of Planning and Environmental Protection, Air Quality Division UPS#1Z26X1500399754466
Chuck Faller (with)
Tim Porter (without)
Rob French – MPI - (with)
Ram Tewari – BCWRS (without)

WM WASTE MANAGEMENT

CleanAir.

CleanAir Engineering
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Palatine, IL 60067-4975
www.cleanair.com

Wheelabrator North Broward, Inc.
2600 Wiles Road
Pompano Beach, FL 33073

REPORT ON MERCURY TESTING

Performed for:
WHEELABRATOR NORTH BROWARD, INC.
UNIT 3 FF OUTLET
POMPANO BEACH, FL

Client Reference No: Service Agreement
CleanAir Project No: 11414-5
Revision 0: May 31, 2012

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

Submitted by,

Scott Brown

Scott Brown
Project Manager
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Reviewed by,

Mark Roach

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Engineering Group Technical Leader
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REPORT ON MERCURY TESTING

DRAFT REPORT REVISION HISTORY

Revision:	Date	Pages	Comments
D0a	05/24/12	All	Draft version of original document.

FINAL REPORT REVISION HISTORY

Revision:	Date	Pages	Comments
0	05/31/12	All	Final version of original document.

CONTENTS

PROJECT OVERVIEW

INTRODUCTION

Wheelabrator North Broward, Inc. operates a refuse-to-energy facility, located in Pompano Beach, Florida. The facility's emission levels are regulated by the Florida Department of Environmental Protection (DEP). Wheelabrator North Broward contracted Clean Air Engineering (CleanAir) to perform a compliance test program at its municipal waste combustor (MWC) facility in Pompano Beach, Florida. Testing was conducted in accordance with 40 CFR 60, Subpart Cb, and applicable sections of PSD-FL-112(B) and PA86-22. The sampling was conducted at the Unit 3 Fabric Filter (FF) Outlet on May 3, 2012.

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 (DEP).

Key Project Participants

Individuals responsible for coordinating and conducting the test program were:

C. Faller – Wheelabrator North Broward, Inc.
L. Hoefert – DEP
S. Brown – CleanAir

Test Program Parameters

The testing included the following emissions measurements:

- flue gas composition (e.g., O_2, CO_2, H_2O)
- flue gas flow rate
- flue gas temperature
- mercury (Hg)

Chuck Faller of Wheelabrator North Broward provided all the process (operating) data. This data is presented in its entirety in Appendix H.

The CleanAir test crew consisted of Nic Hitchins and all equipment utilized for testing was manufactured by CleanAir.

TEST PROGRAM SYNOPSIS

Test Schedule

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

Table 1-1:
Schedule of Activities

Run Number	Location	Method	Analyte	Date	Start Time	End Time
1	Unit 3 FF Outlet	USEPA Method 29	Mercury	05/03/12	07:57	10:10
2	Unit 3 FF Outlet	USEPA Method 29	Mercury	05/03/12	10:35	12:48
3	Unit 3 FF Outlet	USEPA Method 29	Mercury	05/03/12	13:15	15:28

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 and 2-2 on pages 2-1 and 2-2.

Table 1-2:
Summary of Test Results

Source Constituent	Sampling Method	Average Emission	Permit Limit[1]
Unit 3 FF Outlet			
Mercury (µg/dscm @7% O_2)	EPA M29	6.3	50

[1] Limit obtained from the facility's Title V Permit No. 0112120-010-AV and Subpart Cb as of April 28, 2009.

End of Section 1 – Project Overview

RESULTS

Table 2-1:
Unit 3 FF Outlet – Mercury

Run No.		1	2	3	Average
Date (2012)		May 3	May 3	May 3	
Start Time (approx.)		07:57	10:35	13:15	
Stop Time (approx.)		10:10	12:48	15:28	
Process Conditions					
R_P	Steam Production Rate - (Klbs/hour)	185.0	184.0	184.2	**184.4**
P_1	Fabric Filter Inlet Temperature - (°F)	300	302	300	**301**
Gas Conditions					
O_2	Oxygen (dry volume %)	8.6	9.0	8.8	**8.8**
CO_2	Carbon dioxide (dry volume %)	10.6	9.8	10.2	**10.2**
T_s	Sample temperature (°F)	294	295	294	**294**
B_w	Actual water vapor in gas (% by volume)	25.8	25.1	25.7	**25.5**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	203,000	196,000	198,000	**199,000**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	103,000	101,000	101,000	**102,000**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	82.55	79.40	80.66	**80.87**
%I	Isokinetic sampling (%)	100.2	98.6	99.7	**99.5**
Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	14.0019	13.6990	10.1508	
Mercury Results - Total					
C_{sd}	Concentration (µg/dscm)	6.0	6.1	4.4	**5.5**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	6.7	7.1	5.1	**6.3**
$E_{lb/hr}$	Rate (lb/hr)	2.3E-03	2.3E-03	1.7E-03	**2.1E-03**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	6.1E-06	6.4E-06	4.6E-06	**5.7E-06**

RESULTS

Table 2-2:
Quality Assurance and Quality Control

Run Number		FH Front Half	BH H_2O_2/HNO4	A Empty Impinger	B KMnO4	C HCl
		RPD RESULTS				
U1 FF Outlet R3	#1	109%	97%	90%	103%	96%
	#2	109%	93%	90%	103%	96%
U2 FF Outlet R3	#1	115%	101%	99%	92%	86%
	#2	113%	97%	99%	93%	87%
U3 FF Outlet R3	#1	116%	88%	95%	94%	95%
	#2	116%	89%	98%	91%	94%
		Sample Spike and Recovery				
Run Number		FH Front Half	BH H_2O_2/HNO4	A Empty Impinger	B KMnO4	C HCl
U3 FF Outlet R3	#1	116%	88%	95%	94%	95%
	#2	116%	89%	98%	91%	94%
			Blank			
Reagent Blank	#1	< 0.1	< 0.2	< 0.2	< 0.5	< 0.4
	#2	< 0.1	< 0.2	< 0.2	< 0.5	< 0.4

End of Section 2 – Results

DESCRIPTION OF INSTALLATION

PROCESS DESCRIPTION

The North Broward Resource Recovery facility operates three (3) 750 tons-per-day municipal refuse-fired, water-wall boiler trains. The trains were manufactured by Babcock & Wilcox to produce electricity for sale to a local utility company.

Each boiler is equipped with the following air pollution controls (APCs):

1) A Selective Non-Catalytic Reduction (SNCR) for nitrogen oxides (NO_X) control;
2) A Spray Dry Absorber (SDA) for acid gas removal;
3) A Fabric Filter (FF) for the control of particulate emissions.

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

Figure 3-1 shows a general schematic for the facility. All of the testing reported in this document was performed at the Unit 3 FF Outlet as shown in Figure 3-2 (on page 3-2).

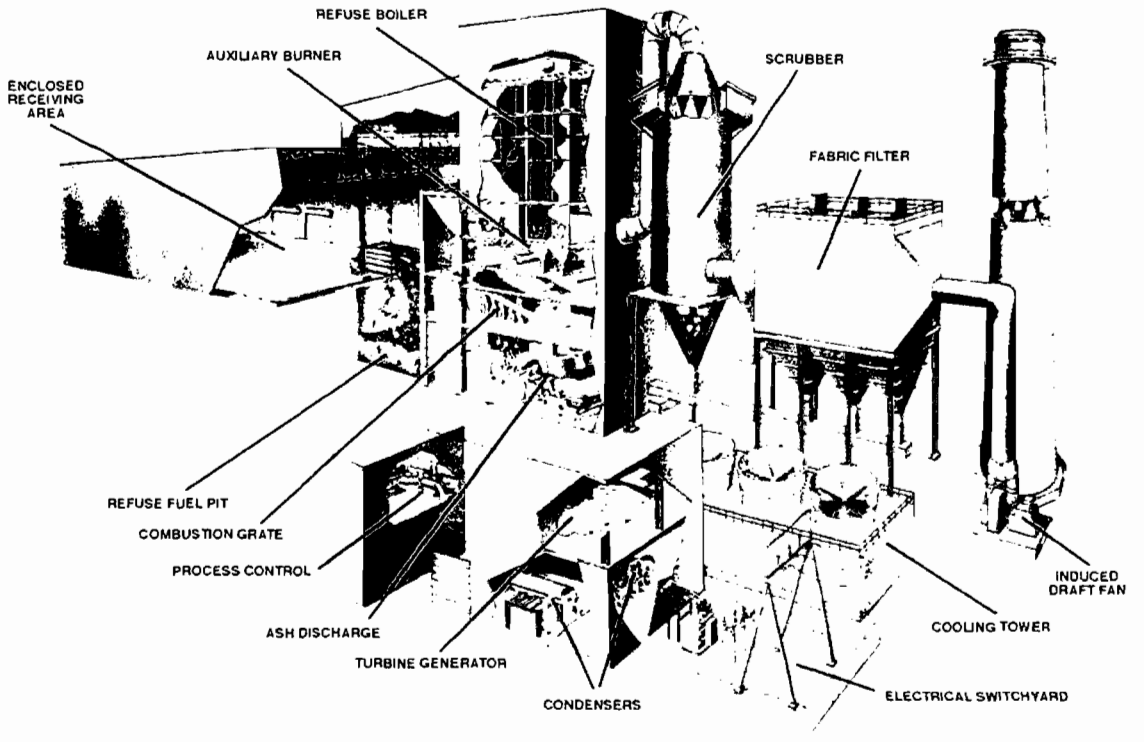


Figure 3-1: General Process Schematic

DESCRIPTION OF INSTALLATION

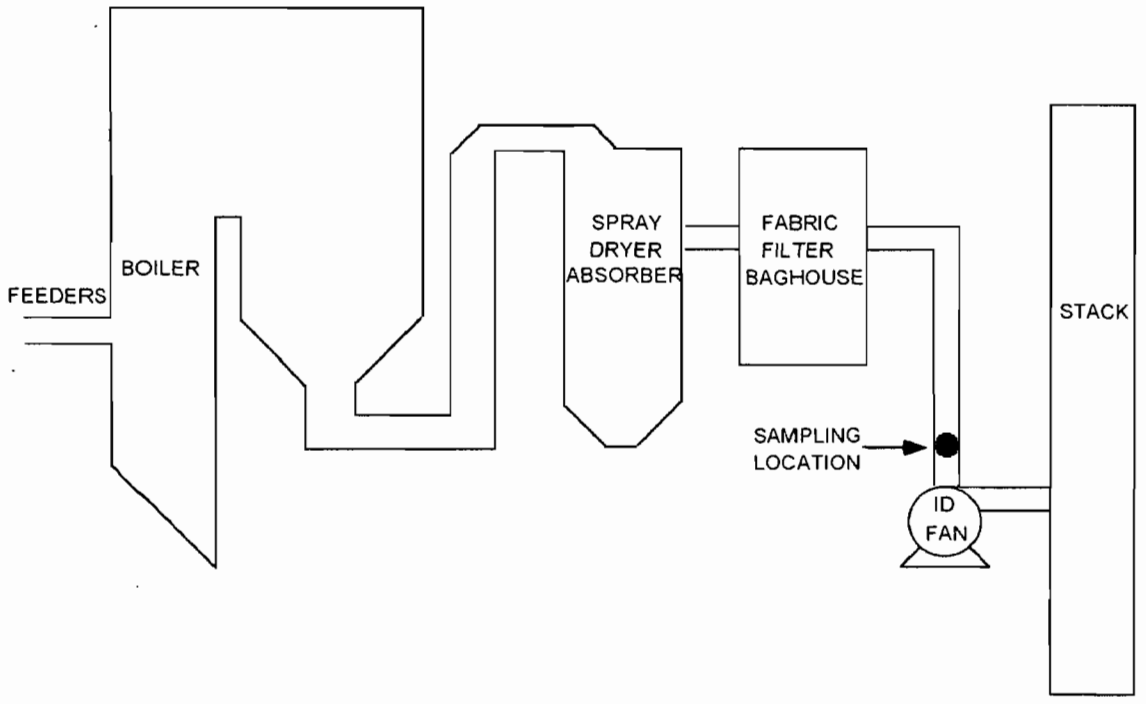


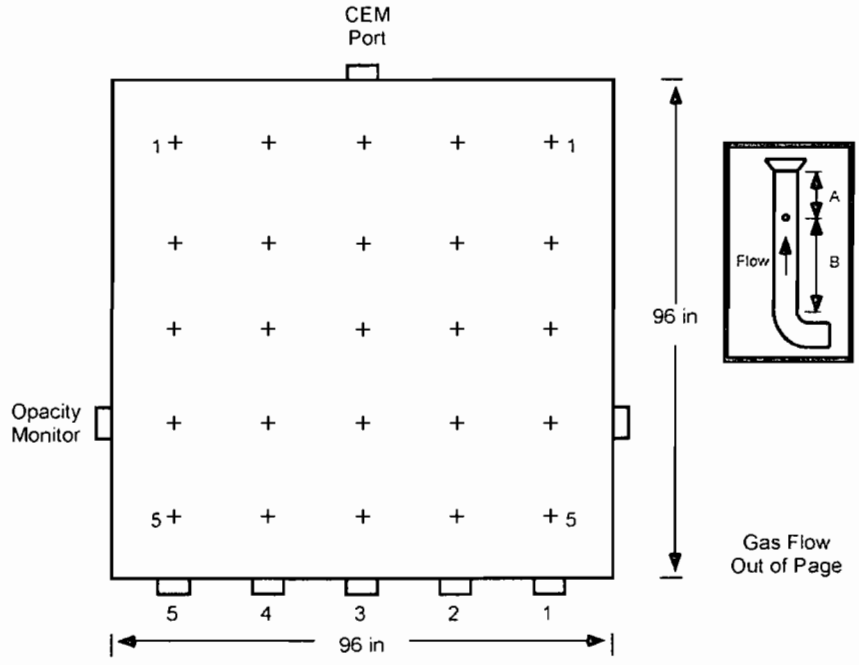
Figure 3-2: Process Schematic

DESCRIPTION OF SAMPLING LOCATION

Sampling point locations were determined according to EPA Method 1. Table 3-1 outlines the sampling point configurations. Figure 3-3 illustrates the sampling points and orientation of sampling ports for the source tested in the program.

Table 3-1:
Sampling Points

Location	Constituent	Method	Run No.	Ports	Points per Port	Minutes per Point	Total Minutes	Figure
Unit 3 FF Outlet	Mercury	29	1-3	5	5	5	125	3-3



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

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

Figure 3-3: Unit 3 FF Outlet Sampling Point Determination (EPA Method 1)

End of Section 3 – Description of Installation

METHODOLOGY

Clean Air Engineering followed procedures as detailed in U.S. Environmental Protection Agency (EPA) Methods 1, 2, 3, 3B, 4 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 3B	"Gas Analysis for the Determination of Emission Rate Correction Factor or Excess Air"
Method 4	"Determination of Moisture Content in Stack Gases"
Method 29	"Determination of Metals Emissions from Stationary Sources"

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

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

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

End of Section 4 – Methodology

APPENDIX

TEST METHOD SPECIFICATIONS

A

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

QA/QC Initials: MA

Date: 5/31/12

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Specification Sheet for EPA Method 29

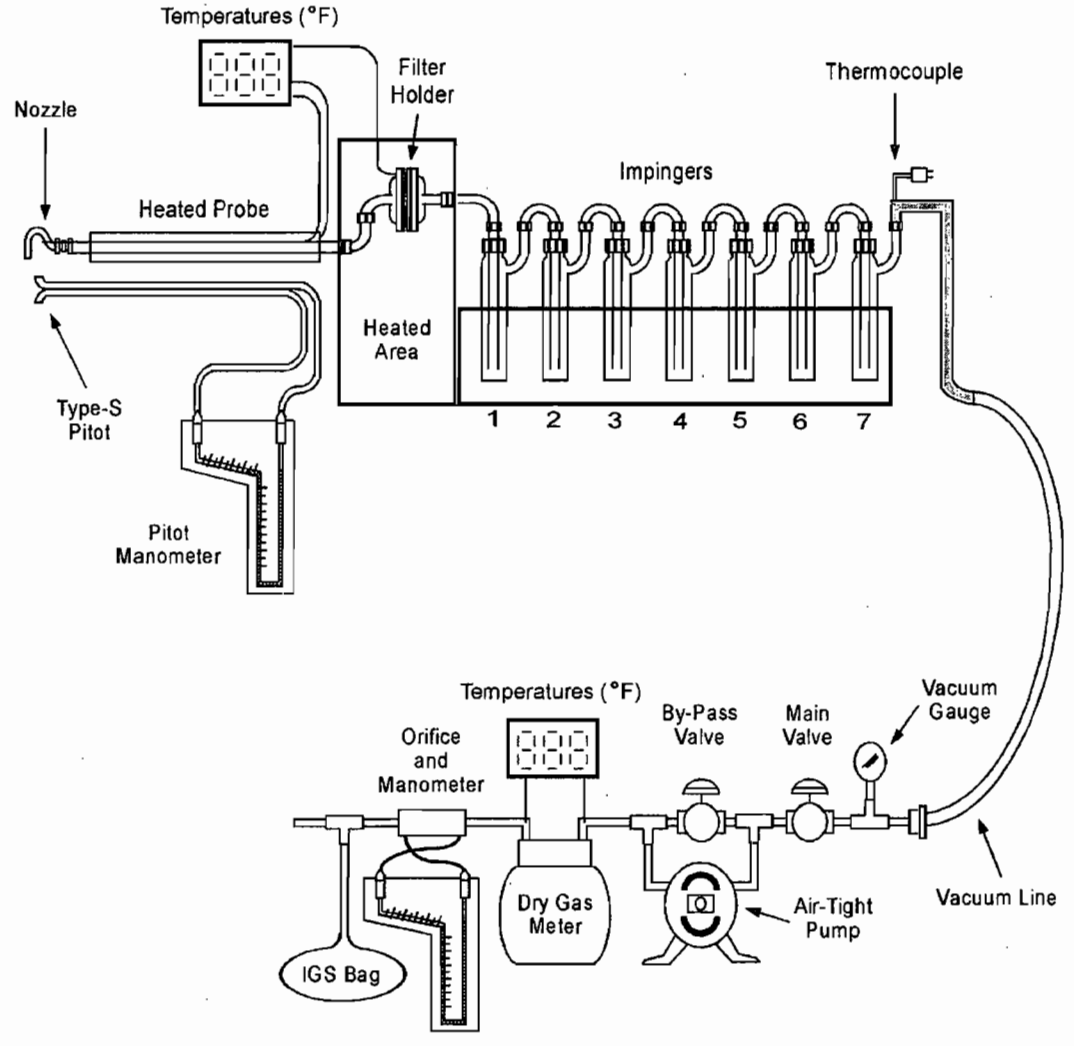
Source Location Name(s)	Unit 3 FF Outlet
Pollutant(s) to be Determined	Mercury
Other Parameters to be Determined from Train	Gas Density, Moisture, Flow Rate

	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	0.827
Pitot Tube Calibration by	Geometric or Wind Tunnel	Wind-Tunnel
Pitot Tube Attachment	Attached to Probe	Attached to Probe
Metering System Console		
Meter Type	Dry Gas Meter	Dry Gas Meter
Meter Accuracy	±2%	±1%
Meter Resolution	N/A	0.01 cubic feet
Meter Size	N/A	0.1 dcf/revolution
Meter Calibrated Against	Wet Test Meter or Standard DGM	Wet Test Meter
Pump Type	N/A	Rotary Vane
Temperature Measurements	N/A	Type K Thermocouple/Pyrometer
Temperature Resolution	5.4°F	1.0°F
ΔP Differential Pressure Gauge	Inclined Manometer or Equivalent	Inclined Manometer
ΔH Differential Pressure Gauge	Inclined Manometer or Equivalent	Inclined Manometer
Barometer	Mercury or Aneroid	Digital Barometer calibrated w/Mercury Aneroid
Filter Description		
Filter Location	After Probe	Exit of Probe
Filter Holder Material	Borosilicate Glass	Borosilicate Glass
Filter Support Material	Teflon (or other non-metallic)	Teflon
Cyclone Material	N/A	None
Filter Heater Set-Point	248°F±25°F	248°F±25°F
Filter Material	Quartz or Glass 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 29

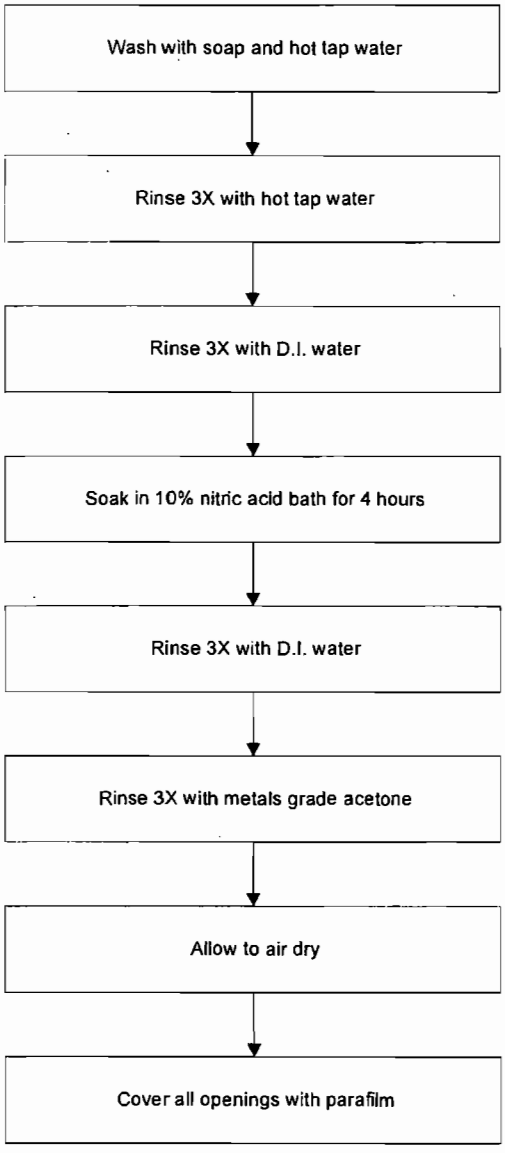
	Standard Method Specification	Actual Specification Used
Impinger Train Description		
Type of Glassware Connections	Ground Glass or Equivalent	Screw Joint with Silicone Gasket
Connection to Probe or Filter by	Direct Glass Connection	Direct Glass Connection
Number of Impingers	7	7
Impinger Stem Types		
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	Orsat
Sample Recovery Information		
Probe Brush Material	Non-metallic swab or bristle	Teflon Mat
Probe Rinse Reagent	0.1N Nitric Acid	0.1 N Nitric Acid
Probe Rinse Wash Bottle Material	Glass or Teflon	Teflon
Probe Rinse Storage Container	Polyethylene or glass	Polyethylene
Filter Recovered?	Yes	Yes
Filter Storage Container	Petri Dish - Glass or Polystyrene	Polyethylene
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	None	None

EPA Method 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)

- 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 3
Probe Rinse
250 ml Polyethylene

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

Brush/rinse 3X with a total of 100 ml 0.1N HNO3

Visual Inspection

Label container and measure volume by weight

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 HNO3

Visual Inspection

Label container and measure volume by weight

Container 5A
250 ml Polyethylene

Impinger 4 and U-bend

Measure impinger volume by weight to within 0.5 ml

Transfer to sample container

Rinse with 100 ml of 0.1N HNO3

Visual Inspection

Label container and measure volume by weight

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 6
Silica Gel

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

Recycle silica gel

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 8A
Nitric Acid Blank
1000 ml Plastic

300 ml of 0.1N HNO3

Container 8B
Water Blank
250 ml Plastic

100 ml of water

Container 9
5%HNO3/10%H2O2 Blank
500 ml Plastic

200 ml of absorbing solution

Container 10*
Permanganate Blank
500 ml Glass

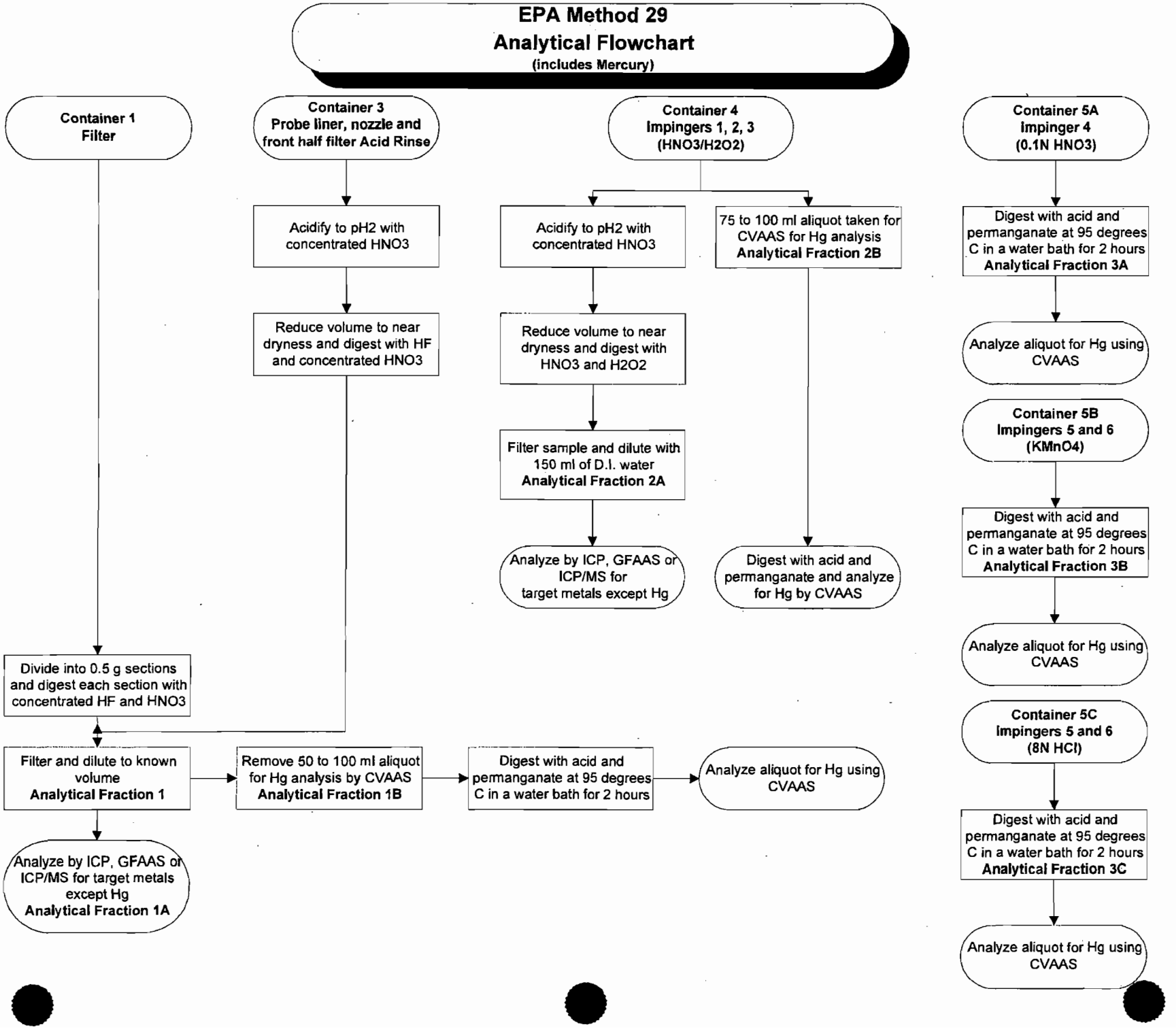
100 ml KMnO4 solution

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)
Container 1
Filter
Container 3
Probe liner, nozzle and
front half filter Acid Rinse
Container 4
Impingers 1, 2, 3
(HNO3/H2O2)
Container 5A
Impinger 4
(0.1N HNO3)
Acidify to pH2 with concentrated HNO3
Reduce volume to near dryness and digest with HF and concentrated HNO3
Acidify to pH2 with concentrated HNO3
Reduce volume to near dryness and digest with HNO3 and H2O2
Filter sample and dilute with 150 ml of D.I. water
Analytical Fraction 2A
Analyze by ICP, GFAAS or ICP/MS for target metals except Hg
75 to 100 ml aliquot taken for CVAAS for Hg analysis
Analytical Fraction 2B
Digest with acid and permanganate and analyze for Hg by CVAAS
Digest with acid and permanganate at 95 degrees C in a water bath for 2 hours
Analytical Fraction 3A
Analyze aliquot for Hg using CVAAS
Container 5B
Impingers 5 and 6
(KMnO4)
Digest with acid and permanganate at 95 degrees C in a water bath for 2 hours
Analytical Fraction 3B
Analyze aliquot for Hg using CVAAS
Container 5C
Impingers 5 and 6
(8N HCl)
Digest with acid and permanganate at 95 degrees C in a water bath for 2 hours
Analytical Fraction 3C
Analyze aliquot for Hg using CVAAS
Divide into 0.5 g sections and digest each section with concentrated HF and HNO3
Filter and dilute to known volume
Analytical Fraction 1
Remove 50 to 100 ml aliquot for Hg analysis by CVAAS
Analytical Fraction 1B
Digest with acid and permanganate at 95 degrees C in a water bath for 2 hours
Analyze aliquot for Hg using CVAAS
Analyze by ICP, GFAAS or ICP/MS for target metals except Hg
Analytical Fraction 1A

SAMPLE CALCULATIONS

B

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

QA/QC Initials: MK

Date: 5/31/12

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USEPA Method 29 (Mercury)
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.

051812 112414

1. Volume of water collected (wscf)

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

Where:

V_{lc}	= total volume of liquid collected in impingers and silica gel (ml)	=	609.4	ml
0.04706	= ideal gas conversion factor (ft^3 water vapor/ml or gm)	=	0.04706	ft^3/ml
V_{wstd}	= volume of water vapor collected at standard conditions (ft^3)	=	28.68	ft^3

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

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

Where:

P_{bar}	= barometric pressure (in. Hg)	=	30.10	in. Hg
T_m	= average dry gas meter temperature (°F)	=	92.06	°F
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	85.17	dcf
Y_d	= gas meter correction factor (dimensionless)	=	1.0041	
ΔH	= average pressure drop across meter box orifice (in. H_2O)	=	1.51	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)	=	82.550	dscf

3. Sample gas pressure (in. Hg)

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

Where:

P_{bar}	= barometric pressure (in. Hg)	=	30.10	in. Hg
P_g	= sample gas static pressure (in. H_2O)	=	-11.60	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)	=	29.25	in. Hg

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

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

Where:

T_s	= average sample gas temperature (°F)	=	293.56	°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)	=	29.25	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)	=	29.25	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.25	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)	=	82.550	dscf
V_{wstd}	= volume of water collected at standard conditions (scf)	=	28.68	scf
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2578	
		=	25.78	%

7. Saturated moisture content (% by volume)

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

Where:

P_s	= absolute sample gas pressure (in. Hg)	=	29.25	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.25	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	=	0.2578	
B_w	= actual water vapor in gas	=	0.2578	
		=	25.78	%

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 (%)	=	8.6	%
100	= conversion factor (%)	=	100	%
N_2+CO	= proportion of nitrogen and CO in the gas stream by volume (%)	=	80.80	%

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 (%)	=	8.6	%
N_2+CO	= proportion of nitrogen and CO in the gas stream by volume (%)	=	80.8	%
100	= conversion factor (%)	=	100	%
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	30.04	lb/lb·mole

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

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

Where:

B_w	= proportion of water vapor in the gas stream by volume	=	0.2578	
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	30.04	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)	=	26.94	lb/lb·mole

12. Velocity of sample gas (ft/sec)

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

Where:

K_p	= velocity pressure constant	=	85.49	
C_p	= pitot tube coefficient	=	0.83	
M_s	= wet molecular weight of sample gas, wet basis (lb/lb·mole)	=	26.94	lb/lb·mole
P_s	= absolute sample gas pressure (in. Hg)	=	29.25	in. Hg
T_s	= average sample gas temperature (°F)	=	293.56	°F
$\sqrt{\Delta P}$	= average square roots of velocity heads of sample gas (in. H_2O)	=	0.764	$\sqrt{}$in. H_2O
460	= °F to °R conversion constant	=	460	
V_s	= sample gas velocity (ft/sec)	=	52.82	ft/sec

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

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

Where:

A_s	= cross sectional area of sampling location (ft^2)	=	64.00	ft^2
V_s	= sample gas velocity (ft/sec)	=	52.82	ft/sec
60	conversion factor (sec/min)	=	60	sec/min
Q_a	= volumetric flow rate at actual conditions (acfm)	=	202,833	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)	=	202,833	acfm
P_s	= absolute sample gas pressure (in. Hg)	=	29.25	in. Hg
29.92	= standard pressure (in. Hg)	=	29.92	in. Hg
T_s	= average sample gas temperature (°F)	=	293.6	°F
68	= standard temperature (°F)	=	68	°F
460	= °F to °R conversion constant	=	460	
Q_s	= volumetric flow rate at standard conditions, wet basis (scfm)	=	138,923	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	=	0.2578	
Q_s	= volumetric flow rate at standard conditions, wet basis (scfm)	=	138,923	scfm
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	103,104	dscfm

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

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

Where:

Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	103,104	dscfm
O_2	= proportion of oxygen in the gas stream by volume (%)	=	8.6	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
7	= oxygen content of corrected gas (%)	=	7.0	%
Q_{std7}	= volumetric flow rate at STP and 7%O_2, dry basis (dscfm)	=	91,483	dscfm

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

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

Where

$Q_{std-min}$	= volumetric flow rate, english units (ft^3/min)	=	103,104	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
Q_{std-hr}	= volumetric flow rate, hourly basis (dscf/hr)	=	6,186,254	dscf/hr

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

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

Where:

$Q_{std-english}$	= volumetric flow rate, english units (ft^3/min)	=	103,104	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)	=	175,198	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)	=	175,198	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)	=	163,253	dry Nm^3/hr

20. Percent isokinetic (%)

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

Where:

D_n	= diameter of nozzle (in)	=	0.274	in.
B_w	= proportion of water vapor in the gas stream by volume	=	0.2578	
P_s	= absolute sample gas pressure (in. Hg)	=	29.25	in. Hg
T_s	= average sample gas temperature (°F)	=	293.6	°F
V_{mstd}	= volume of gas sample through the dry gas meter at standard conditions (dscf)	=	82.550	dscf
V_s	= sample gas velocity (ft/sec)	=	52.82	ft/sec
θ	= total sampling time (min)	=	125	min
0.0945	= conversion constant	=	0.0945	
460	= °F to °R conversion constant	=	460	
I	= percent of isokinetic sampling (%)	=	100.17	%

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)	=	85.17	dcf
T_m	= average dry gas meter temperature (°F)	=	92.06	°F
$\Delta H_@$	= dry gas meter orifice coefficient	=	1.7478	
P_{bar}	= barometric pressure (in. Hg)	=	30.10	in. Hg
ΔH	= average pressure drop across meter box orifice (in. H_2O)	=	1.512	in. H_2O
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	30.04	lb/lb·mole
$\sqrt{\Delta H_{avg}}$	= average of square root of pressure drop across meter orifice	=	1.226	√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	=	1.0202	

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.

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USEPA Method 29
Mercury Analyte Calculations

Sample data taken from Run 1

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

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

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P

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	=	14.0019	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	=	14.0019	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	=	14.0019	µg
$0.05 \times m_{total-S}$	= 5% of $m_{total-S}$	=	0.7001	µg
MAX	= arithmetic operator that returns the maximum of two values			
MIN	= arithmetic operator that returns the minimum of two values			
$m_{T-B-allow}$	= total allowable blank correction	=	0.0000	µg

NOTE: In this case, the second criteria applies.

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

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

Where:

$m_{total-S}$	= total amount of mercury in sample	=	14.0019	µg
$m_{T-B-allow}$	= total allowable blank correction	=	0.0000	µg
m_n	= total mercury in sample corrected for allowable blank	=	14.0019	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	=	14.0019	µg
m_{1b-S}	= mercury amount in sample for Fraction 1b	=	<0.1000	µg
m_{2b-S}	= mercury amount in sample for Fraction 2b	=	14.0019	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	=	14.0019	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	=	14.0019	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	=	0.0000	µg
m_{n-3c}	= mercury corrected for blank - prorated for Fraction 3c	=	0.0000	µg

USEPA Method 29
Mercury Sample Calculations

Sample data taken from Run 1

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I_P

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)	=	14.0019	µg
V_{mstd}	= volume metered, standard (dscf)	=	82.5502	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)	=	3.7400E-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)	=	14.0019	µg
V_{mstd}	= volume metered, standard (dscf)	=	82.5502	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= mercury concentration (µg/dscm)	=	5.9891E+00	µg/dscm

3. Mercury concentration (mg/dscm)

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

Where:

m_n	= mercury collected in sample (total µg)	=	14.0019	µg
V_{mstd}	= volume metered, standard (dscf)	=	82.5502	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)	=	5.9891E-03	mg/dscm

4. Mercury concentration (µg/Nm3 dry)

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

Where:

m_n	= mercury collected in sample (total µg)	=	14.0019	µg
V_{mstd}	= volume metered, standard (dscf)	=	82.5502	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)	=	6.4274E+00	µg/Nm^3 dry

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

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

Where:

C_{sd}	= mercury concentration (lb/dscf)	=	3.7400E-10	lb/dscf
x	= oxygen content of corrected gas (%)	=	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	8.6	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
C_{sdx}	= mercury concentration corrected to x% oxygen (lb/dscf)	=	4.2151E-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)	=	3.7400E-10	lb/dscf
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	10.6	%
C_{sdy}	= mercury conc. corrected to y% carbon dioxide (lb/dscf)	=	4.2207E-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)	=	3.7400E-10	lb/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	103,104	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	=	202,833	acfm
C_a	= mercury concentration at actual gas conditions (lb/acf)	=	1.9011E-10	lb/acf

8. Mercury emission rate (lb/hr)

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

Where:

m_n	= mercury collected in sample (total µg)	=	14.0019	µg
V_{mstd}	= volume metered, standard (dscf)	=	82.5502	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)	=	103,104	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
$E_{lb/hr}$	= mercury emission rate (lb/hr)	=	2.3137E-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)	=	14.0019	µg
V_{mstd}	= volume metered, standard (dscf)	=	82.5502	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	103,104	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)	=	2.9147E-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)	=	14.0019	µg
V_{mstd}	= volume metered, standard (dscf)	=	82.5502	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)	=	103,104	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
Cap	= capacity factor for process (hours operated/year)	=	8,760	hours/yr
2000	= conversion factor (lb/Ton)	=	2000	lb/Ton
$E_{T/yr}$	= mercury emission rate (Ton/yr)	=	1.0134E-02	Ton/yr

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

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

Where:

m_n	= mercury collected in sample (total µg)	=	14.0019	µg
V_{mstd}	= volume metered, standard (dscf)	=	82.5502	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
F_d	= ratio of gas volume to heat content of fuel (dscf/MMBtu)	=	9,570	dscf/MMBtu
O_2	= proportion of oxygen in the gas stream by volume (%)	=	8.6	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= mercury emission rate - Fd-based (lb/MMBtu)	=	6.0653E-06	lb/MMBtu

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

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

Where:

m_n	= mercury collected in sample (total µg)	=	14.0019	µg
V_{mstd}	= volume metered, standard (dscf)	=	82.5502	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 (%)	=	10.6	%
100	= conversion factor	=	100	
E_{Fc}	= mercury emission rate - Fc-based (lb/MMBtu)	=	6.4014E-06	lb/MMBtu

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PARAMETERS

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

QA/QC Initials: MK

Date: 5/31/12

CleanAir

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

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

Run No.		1	2	3	Average
Date (2012)		May 3	May 3	May 3	
Start Time (approx.)		07:57	10:35	13:15	
Stop Time (approx.)		10:10	12:48	15:28	
Sampling Conditions					
Y_d	Dry gas meter correction factor	1.0041	1.0041	1.0041	
C_p	Pitot tube coefficient	0.8270	0.8270	0.8270	
P_g	Static pressure (in. H_2O)	-11.6000	-10.8000	-10.6000	
A_s	Sample location area (ft^2)	64.0000	64.0000	64.0000	
P_{bar}	Barometric pressure (in. Hg)	30.10	30.10	30.10	**30.1000**
D_n	Nozzle diameter (in.)	0.2740	0.2740	0.2740	
O_2	Oxygen (dry volume %)	8.5667	9.0333	8.8333	**8.8111**
CO_2	Carbon dioxide (dry volume %)	10.6333	9.8000	10.2000	**10.2111**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.8000	81.1667	80.9667	**80.9778**
V_{lc}	Total Liquid collected (ml)	609.40	564.60	592.80	
V_m	Volume metered, meter conditions (ft^3)	85.1650	83.2300	84.7650	
T_m	Dry gas meter temperature (°F)	92.0600	100.8000	102.2800	
T_s	Sample temperature (°F)	293.5600	294.6400	293.5600	**293.9200**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.5120	1.4000	1.4600	
θ	Total sampling time (min)	125.0	125.0	125.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	28.6784	26.5701	27.8972	**27.7152**
V_{mstd}	Volume metered, standard (dscf)	82.5502	79.3956	80.6589	**80.8682**
P_s	Sample gas pressure, absolute (in. Hg)	29.2471	29.3059	29.3206	**29.2912**
P_v	Vapor pressure, actual (in. Hg)	29.2471	29.3059	29.3206	**29.2912**
B_{wo}	Moisture measured in sample (% by volume)	25.7833	25.0742	25.6984	**25.5186**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	25.7833	25.0742	25.6984	**25.5186**
$\sqrt{\Delta P}$	Velocity head ($\sqrt{}$in. H_2O)	0.7639	0.7391	0.7474	**0.7501**
M_d	MW of sample gas, dry (lb/lb-mole)	30.0440	29.9293	29.9853	**29.9862**
M_s	MW of sample gas, wet (lb/lb-mole)	26.9387	26.9381	26.9053	**26.9274**
V_s	Velocity of sample (ft/sec)	52.8210	51.0894	51.6446	**51.8517**
%I	Isokinetic sampling (%)	100.1702	98.6082	99.7397	**99.5060**
Q_a	Volumetric flow rate, actual (acfm)	202,833	196,183	198,315	**199,110**
Q_s	Volumetric flow rate, standard (scfm)	138,923	134,446	136,170	**136,513**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	103,104	100,735	101,177	**101,672**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	91,483	85,999	87,832	**88,438**
Q_a	Volumetric flow rate, actual (acf/hr)	12,169,963	11,771,000	11,898,906	**11,946,623**
Q_s	Volumetric flow rate, standard (scf/hr)	8,335,391	8,066,788	8,170,229	**8,190,803**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	6,186,254	6,044,104	6,070,610	**6,100,323**
Q_a	Volumetric flow rate, actual (m^3/hr)	344,661	333,362	336,984	**338,335**
Q_s	Volumetric flow rate, standard (m^3/hr)	236,063	228,456	231,386	**231,968**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	175,198	171,173	171,923	**172,765**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	155,452	146,133	149,248	**150,277**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	219,968	212,880	215,609	**216,152**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	163,253	159,502	160,201	**160,985**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2,(Nm^3/hr)	144,853	136,169	139,072	**140,031**

Comments:
Average includes 3 runs.

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

USEPA Method 29
Mercury (Hg) Emission Parameters

Run No.		1	2	3	Average
Date (2012)		May 3	May 3	May 3	
Start Time (approx.)		07:57	10:35	13:15	
Stop Time (approx.)		10:10	12:48	15:28	
Process Conditions					
R_P	Steam Production Rate - (Klbs/hour)	185.0	184.0	184.2	**184.4**
P_1	Fabric Filter Inlet Temperature - (°F)	300	302	300	**301**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	8.5667	9.0333	8.8333	**8.8111**
CO_2	Carbon dioxide (dry volume %)	10.6333	9.8000	10.2000	**10.2111**
T_s	Sample temperature (°F)	293.5600	294.6400	293.5600	**293.9200**
B_w	Actual water vapor in gas (% by volume)	25.7833	25.0742	25.6984	**25.5186**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	202,833	196,183	198,315	**199,110**
Q_s	Volumetric flow rate, standard (scfm)	138,923	134,446	136,170	**136,513**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	103,104	100,735	101,177	**101,672**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	82.5502	79.3956	80.6589	**80.8682**
%I	Isokinetic sampling (%)	100.1702	98.6082	99.7397	**99.5060**
Laboratory Data					
$m_{n\text{-}1b}$	Fraction 1B Prorated (µg)	<0.1000	<0.1000	<0.1000	**<0.1000**
$m_{n\text{-}2b}$	Fraction 2B Prorated (µg)	14.0019	13.6990	9.6929	**12.4646**
$m_{n\text{-}3a}$	Fraction 3A Prorated (µg)	<0.2000	<0.2000	<0.2000	**<0.2000**
$m_{n\text{-}3b}$	Fraction 3B Prorated (µg)	0.0000	<0.5000	<0.5000	**<0.3333**
$m_{n\text{-}3c}$	Fraction 3C Prorated (µg)	0.0000	<0.4000	0.4579	**<0.2860**
m_n	Total matter corrected for allowable blanks (µg)	14.0019	13.6990	10.1508	**12.6172**
Mercury Results - Total					
C_{sd}	Concentration (lb/dscf)	3.7400E-10	3.8045E-10	2.7750E-10	**3.4398E-10**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	4.2151E-10	4.4564E-10	3.1966E-10	**3.9560E-10**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	4.2207E-10	4.6586E-10	3.2647E-10	**4.0480E-10**
C_a	Concentration (lb/acf)	1.9011E-10	1.9535E-10	1.4157E-10	**1.7568E-10**
C_{sd}	Concentration (µg/dscm)	5.9891E+00	6.0924E+00	4.4437E+00	**5.5084E+00**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	6.7499E+00	7.1364E+00	5.1189E+00	**6.3351E+00**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	6.7589E+00	7.4601E+00	5.2279E+00	**6.4823E+00**
C_{sd}	Concentration (mg/dscm)	5.9891E-03	6.0924E-03	4.4437E-03	**5.5084E-03**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	6.7499E-03	7.1364E-03	5.1189E-03	**6.3351E-03**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	6.7589E-03	7.4601E-03	5.2279E-03	**6.4823E-03**
C_a	Concentration (µg/m^3 (actual,wet))	3.0444E+00	3.1283E+00	2.2671E+00	**2.8133E+00**
C_{sd}	Concentration (µg/Nm^3 dry)	6.4274E+00	6.5382E+00	4.7689E+00	**5.9115E+00**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	7.2438E+00	7.6585E+00	5.4934E+00	**6.7986E+00**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	7.2535E+00	8.0060E+00	5.6105E+00	**6.9566E+00**
$E_{lb/hr}$	Rate (lb/hr)	2.3137E-03	2.2995E-03	1.6846E-03	**2.0993E-03**
$E_{g/s}$	Rate (g/s)	2.9147E-04	2.8968E-04	2.1222E-04	**2.6446E-04**
$E_{T/yr}$	Rate (Ton/yr)	1.0134E-02	1.0072E-02	7.3785E-03	**9.1947E-03**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	6.0653E-06	6.4126E-06	4.5997E-06	**5.6925E-06**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	6.4014E-06	7.0656E-06	4.9514E-06	**6.1395E-06**

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

USEPA Method 29
Mercury (Hg) Emission Parameters

Run No.		1	2	3	Average
Date (2012)		May 3	May 3	May 3	
Start Time (approx.)		07:57	10:35	13:15	
Stop Time (approx.)		10:10	12:48	15:28	
Process Conditions					
R_P	Steam Production Rate - (Klbs/hour)	185.0	184.0	184.2	**184.4**
P_1	Fabric Filter Inlet Temperature - (°F)	300	302	300	**301**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	8.5667	9.0333	8.8333	**8.8111**
CO_2	Carbon dioxide (dry volume %)	10.6333	9.8000	10.2000	**10.2111**
T_s	Sample temperature (°F)	293.5600	294.6400	293.5600	**293.9200**
B_w	Actual water vapor in gas (% by volume)	25.7833	25.0742	25.6984	**25.5186**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	202,833	196,183	198,315	**199,110**
Q_s	Volumetric flow rate, standard (scfm)	138,923	134,446	136,170	**136,513**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	103,104	100,735	101,177	**101,672**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	82.5502	79.3956	80.6589	**80.8682**
%I	Isokinetic sampling (%)	100.1702	98.6082	99.7397	**99.5060**
Laboratory Data					
$m_{n\text{-}1b}$	Fraction 1B Prorated (µg)	<0.1000	<0.1000	<0.1000	**<0.1000**
$m_{n\text{-}2b}$	Fraction 2B Prorated (µg)	14.0019	13.6990	9.6929	**12.4646**
$m_{n\text{-}3a}$	Fraction 3A Prorated (µg)	<0.2000	<0.2000	<0.2000	**<0.2000**
$m_{n\text{-}3b}$	Fraction 3B Prorated (µg)	<0.5000	<0.5000	<0.5000	**<0.5000**
$m_{n\text{-}3c}$	Fraction 3C Prorated (µg)	<0.4000	<0.4000	0.4579	**<0.4193**
m_n	Total matter corrected for allowable blanks (µg)	14.0019	13.6990	10.1508	**12.6172**
Mercury Results - Total					
C_{sd}	Concentration (lb/dscf)	3.7400E-10	3.8045E-10	2.7750E-10	**3.4398E-10**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	4.2151E-10	4.4564E-10	3.1966E-10	**3.9560E-10**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	4.2207E-10	4.6586E-10	3.2647E-10	**4.0480E-10**
C_a	Concentration (lb/acf)	1.9011E-10	1.9535E-10	1.4157E-10	**1.7568E-10**
C_{sd}	Concentration (µg/dscm)	5.9891E+00	6.0924E+00	4.4437E+00	**5.5084E+00**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	6.7499E+00	7.1364E+00	5.1189E+00	**6.3351E+00**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	6.7589E+00	7.4601E+00	5.2279E+00	**6.4823E+00**
C_{sd}	Concentration (mg/dscm)	5.9891E-03	6.0924E-03	4.4437E-03	**5.5084E-03**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	6.7499E-03	7.1364E-03	5.1189E-03	**6.3351E-03**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	6.7589E-03	7.4601E-03	5.2279E-03	**6.4823E-03**
C_a	Concentration (µg/m^3 (actual,wet))	3.0444E+00	3.1283E+00	2.2671E+00	**2.8133E+00**
C_{sd}	Concentration (µg/Nm^3 dry)	6.4274E+00	6.5382E+00	4.7689E+00	**5.9115E+00**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	7.2438E+00	7.6585E+00	5.4934E+00	**6.7986E+00**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	7.2535E+00	8.0060E+00	5.6105E+00	**6.9566E+00**
$E_{lb/hr}$	Rate (lb/hr)	2.3137E-03	2.2995E-03	1.6846E-03	**2.0993E-03**
$E_{g/s}$	Rate (g/s)	2.9147E-04	2.8968E-04	2.1222E-04	**2.6446E-04**
$E_{T/yr}$	Rate (Ton/yr)	1.0134E-02	1.0072E-02	7.3785E-03	**9.1947E-03**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	6.0653E-06	6.4126E-06	4.5997E-06	**5.6925E-06**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	6.4014E-06	7.0656E-06	4.9514E-06	**6.1395E-06**

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SS Metals-1 Version 2006-12b

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

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

Run No.		1	2	3	Average
Date (2012)		May 3	May 3	May 3	
Start Time (approx.)		07:57	10:35	13:15	
Stop Time (approx.)		10:10	12:48	15:28	
Mercury Results - Front Half					
C_{sd}	Concentration (lb/dscf)	<2.6711E-12	<2.7772E-12	<2.7337E-12	**<2.7274E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<3.0104E-12	<3.2531E-12	<3.1491E-12	**<3.1375E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<3.0144E-12	<3.4007E-12	<3.2162E-12	**<3.2104E-12**
C_a	Concentration (lb/acf)	<1.3578E-12	<1.4260E-12	<1.3947E-12	**<1.3928E-12**
C_{sd}	Concentration (µg/dscm)	<4.2774E-02	<4.4473E-02	<4.3777E-02	**<4.3675E-02**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<4.8207E-02	<5.2094E-02	<5.0428E-02	**<5.0243E-02**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<4.8272E-02	<5.4457E-02	<5.1502E-02	**<5.1410E-02**
C_{sd}	Concentration (mg/dscm)	<4.2774E-05	<4.4473E-05	<4.3777E-05	**<4.3675E-05**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<4.8207E-05	<5.2094E-05	<5.0428E-05	**<5.0243E-05**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<4.8272E-05	<5.4457E-05	<5.1502E-05	**<5.1410E-05**
C_a	Concentration (µg/m^3 (actual,wet))	<2.1743E-02	<2.2836E-02	<2.2334E-02	**<2.2304E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<4.5904E-02	<4.7728E-02	<4.6980E-02	**<4.6871E-02**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<5.1735E-02	<5.5906E-02	<5.4118E-02	**<5.3919E-02**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<5.1804E-02	<5.8442E-02	<5.5271E-02	**<5.5172E-02**
$E_{lb/hr}$	Rate (lb/hr)	<1.6524E-05	<1.6786E-05	<1.6595E-05	**<1.6635E-05**
$E_{g/s}$	Rate (g/s)	<2.0816E-06	<2.1146E-06	<2.0906E-06	**<2.0956E-06**
$E_{T/yr}$	Rate (Ton/yr)	<7.2376E-05	<7.3522E-05	<7.2688E-05	**<7.2862E-05**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<4.3318E-08	<4.6810E-08	<4.5313E-08	**<4.5147E-08**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<4.5719E-08	<5.1577E-08	<4.8778E-08	**<4.8691E-08**

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

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

Run No.		1	2	3	Average
Date (2012)		May 3	May 3	May 3	
Start Time (approx.)		07:57	10:35	13:15	
Stop Time (approx.)		10:10	12:48	15:28	
Mercury Results - Impingers 1-3 Solution					
C_{sd}	Concentration (lb/dscf)	3.7400E-10	3.8045E-10	2.6498E-10	**3.3981E-10**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	4.2151E-10	4.4564E-10	3.0524E-10	**3.9080E-10**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	4.2207E-10	4.6586E-10	3.1174E-10	**3.9989E-10**
C_a	Concentration (lb/acf)	1.9011E-10	1.9535E-10	1.3519E-10	**1.7355E-10**
C_{sd}	Concentration (µg/dscm)	5.9891E+00	6.0924E+00	4.2433E+00	**5.4416E+00**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	6.7499E+00	7.1364E+00	4.8880E+00	**6.2581E+00**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	6.7589E+00	7.4601E+00	4.9921E+00	**6.4037E+00**
C_{sd}	Concentration (mg/dscm)	5.9891E-03	6.0924E-03	4.2433E-03	**5.4416E-03**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	6.7499E-03	7.1364E-03	4.8880E-03	**6.2581E-03**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	6.7589E-03	7.4601E-03	4.9921E-03	**6.4037E-03**
C_a	Concentration (µg/m^3 (actual,wet))	3.0444E+00	3.1283E+00	2.1648E+00	**2.7792E+00**
C_{sd}	Concentration (µg/Nm^3 dry)	6.4274E+00	6.5382E+00	4.5537E+00	**5.8398E+00**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	7.2438E+00	7.6585E+00	5.2456E+00	**6.7160E+00**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	7.2535E+00	8.0060E+00	5.3573E+00	**6.8723E+00**
$E_{lb/hr}$	Rate (lb/hr)	2.3137E-03	2.2995E-03	1.6086E-03	**2.0739E-03**
$E_{g/s}$	Rate (g/s)	2.9147E-04	2.8968E-04	2.0264E-04	**2.6127E-04**
$E_{T/yr}$	Rate (Ton/yr)	1.0134E-02	1.0072E-02	7.0456E-03	**9.0838E-03**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	6.0653E-06	6.4126E-06	4.3922E-06	**5.6234E-06**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	6.4014E-06	7.0656E-06	4.7280E-06	**6.0650E-06**

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

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

Run No.		1	2	3	Average
Date (2012)		May 3	May 3	May 3	
Start Time (approx.)		07:57	10:35	13:15	
Stop Time (approx.)		10:10	12:48	15:28	
Mercury Results - Impinger 4 Solution					
C_{sd}	Concentration (lb/dscf)	<5.3422E-12	<5.5545E-12	<5.4675E-12	**<5.4547E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<6.0208E-12	<6.5062E-12	<6.2982E-12	**<6.2751E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<6.0288E-12	<6.8014E-12	<6.4323E-12	**<6.4208E-12**
C_a	Concentration (lb/acf)	<2.7156E-12	<2.8521E-12	<2.7894E-12	**<2.7857E-12**
C_{sd}	Concentration (µg/dscm)	<8.5548E-02	<8.8947E-02	<8.7554E-02	**<8.7350E-02**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<9.6415E-02	<1.0419E-01	<1.0086E-01	**<1.0049E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<9.6543E-02	<1.0891E-01	<1.0300E-01	**<1.0282E-01**
C_{sd}	Concentration (mg/dscm)	<8.5548E-05	<8.8947E-05	<8.7554E-05	**<8.7350E-05**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<9.6415E-05	<1.0419E-04	<1.0086E-04	**<1.0049E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<9.6543E-05	<1.0891E-04	<1.0300E-04	**<1.0282E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<4.3486E-02	<4.5672E-02	<4.4668E-02	**<4.4609E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<9.1808E-02	<9.5455E-02	<9.3960E-02	**<9.3741E-02**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<1.0347E-01	<1.1181E-01	<1.0824E-01	**<1.0784E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<1.0361E-01	<1.1688E-01	<1.1054E-01	**<1.1034E-01**
$E_{lb/hr}$	Rate (lb/hr)	<3.3048E-05	<3.3572E-05	<3.3191E-05	**<3.3270E-05**
$E_{g/s}$	Rate (g/s)	<4.1633E-06	<4.2292E-06	<4.1813E-06	**<4.1913E-06**
$E_{T/yr}$	Rate (Ton/yr)	<1.4475E-04	<1.4704E-04	<1.4538E-04	**<1.4572E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<8.6636E-08	<9.3621E-08	<9.0627E-08	**<9.0295E-08**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<9.1437E-08	<1.0315E-07	<9.7557E-08	**<9.7383E-08**

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

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

Run No.		1	2	3	Average
Date (2012)		May 3	May 3	May 3	
Start Time (approx.)		07:57	10:35	13:15	
Stop Time (approx.)		10:10	12:48	15:28	
Mercury Results - Filtered Permanganate Solution					
C_{sd}	Concentration (lb/dscf)	<1.3356E-11	<1.3886E-11	<1.3669E-11	**<1.3637E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<1.5052E-11	<1.6266E-11	<1.5745E-11	**<1.5688E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<1.5072E-11	<1.7003E-11	<1.6081E-11	**<1.6052E-11**
C_a	Concentration (lb/acf)	<6.7889E-12	<7.1302E-12	<6.9735E-12	**<6.9642E-12**
C_{sd}	Concentration (µg/dscm)	<2.1387E-01	<2.2237E-01	<2.1888E-01	**<2.1837E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<2.4104E-01	<2.6047E-01	<2.5214E-01	**<2.5122E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<2.4136E-01	<2.7229E-01	<2.5751E-01	**<2.5705E-01**
C_{sd}	Concentration (mg/dscm)	<2.1387E-04	<2.2237E-04	<2.1888E-04	**<2.1837E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<2.4104E-04	<2.6047E-04	<2.5214E-04	**<2.5122E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<2.4136E-04	<2.7229E-04	<2.5751E-04	**<2.5705E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<1.0871E-01	<1.1418E-01	<1.1167E-01	**<1.1152E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	<2.2952E-01	<2.3864E-01	<2.3490E-01	**<2.3435E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<2.5867E-01	<2.7953E-01	<2.7059E-01	**<2.6960E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<2.5902E-01	<2.9221E-01	<2.7635E-01	**<2.7586E-01**
$E_{lb/hr}$	Rate (lb/hr)	<8.2621E-05	<8.3929E-05	<8.2977E-05	**<8.3176E-05**
$E_{g/s}$	Rate (g/s)	<1.0408E-05	<1.0573E-05	<1.0453E-05	**<1.0478E-05**
$E_{T/yr}$	Rate (Ton/yr)	<3.6188E-04	<3.6761E-04	<3.6344E-04	**<3.6431E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<2.1659E-07	<2.3405E-07	<2.2657E-07	**<2.2574E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<2.2859E-07	<2.5789E-07	<2.4389E-07	**<2.4346E-07**
Mercury Results - HCl Rinse + HCl/MnO2 Precipitate					
C_{sd}	Concentration (lb/dscf)	<1.0684E-11	<1.1109E-11	1.2519E-11	**<1.1437E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<1.2042E-11	<1.3012E-11	1.4421E-11	**<1.3158E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<1.2058E-11	<1.3603E-11	1.4728E-11	**<1.3463E-11**
C_a	Concentration (lb/acf)	<5.4311E-12	<5.7041E-12	6.3868E-12	**<5.8407E-12**
C_{sd}	Concentration (µg/dscm)	<1.7110E-01	<1.7789E-01	2.0047E-01	**<1.8315E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<1.9283E-01	<2.0838E-01	2.3093E-01	**<2.1071E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<1.9309E-01	<2.1783E-01	2.3585E-01	**<2.1559E-01**
C_{sd}	Concentration (mg/dscm)	<1.7110E-04	<1.7789E-04	2.0047E-04	**<1.8315E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<1.9283E-04	<2.0838E-04	2.3093E-04	**<2.1071E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<1.9309E-04	<2.1783E-04	2.3585E-04	**<2.1559E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<8.6972E-02	<9.1344E-02	1.0228E-01	**<9.3531E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<1.8362E-01	<1.9091E-01	2.1514E-01	**<1.9655E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<2.0694E-01	<2.2362E-01	2.4782E-01	**<2.2613E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<2.0721E-01	<2.3377E-01	2.5310E-01	**<2.3136E-01**
$E_{lb/hr}$	Rate (lb/hr)	<6.6096E-05	<6.7143E-05	7.5996E-05	**<6.9745E-05**
$E_{g/s}$	Rate (g/s)	<8.3266E-06	<8.4585E-06	9.5737E-06	**<8.7863E-06**
$E_{T/yr}$	Rate (Ton/yr)	<2.8950E-04	<2.9409E-04	3.3286E-04	**<3.0548E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<1.7327E-07	<1.8724E-07	2.0751E-07	**<1.8934E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<1.8287E-07	<2.0631E-07	2.2337E-07	**<2.0419E-07**

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QA/QC DATA

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

QA/QC Initials: MR

Date: 5/31/12

CleanAir

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

USEPA Method 29 (Mercury)
QA/QC Results

	Run No.	**1**	**2**	**3**	
	Date (2012)	May 3	May 3	May 3	
	Start Time (approx.)	07:57	10:35	13:15	
	Stop Time (approx.)	10:10	12:48	15:28	
	Total Duration of Test Run (min.)	133	133	133	
	Net Sampling Time (min.)	125	125	125	
	Sampling System Calibration Summary				
	Nozzle ID No:	274-1	274-1	274-1	
D_n	Nozzle Diameter (in):	0.274	0.274	0.274	
	Probe ID No:	67-8-10	67-8-10	67-8-10	
C_p	Pitot Coefficient:	0.8270	0.8270	0.8270	
	Meter Box ID. No:	66-13	66-13	66-13	
Y_d	Meter Box Yd - *Field Sheet*	1.0041	1.0041	1.0041	
	Meter Box Yd - Database	1.0041	1.0041	1.0041	
	Meter Box ΔH@ - Field Sheet	1.7478	1.7478	1.7478	
	Meter Box ΔH@ - Database	1.7478	1.7478	1.7478	
	QA/QC				
	Final Leak Check				
	(a) 4% of Sampling Rate (cfm)	0.0273	0.0266	0.0271	
	(b) Allowable Rate from Method (cfm)	0.0200	0.0200	0.0200	
	Allowable Limit - minimum of a and b (cfm)	0.0200	0.0200	0.0200	
	Actual Final Leak Rate (cfm)	0.0020	0.0020	0.0010	
	Sample Volume				
	Minimum Volume Required (dscf)	30.00	30.00	30.00	
V_{msld}	Actual Sample Volume (dscf)	82.550	79.396	80.659	
	Alternative Method 5 Post-Test Calibration (EPA ALT-009)				
$\sqrt{\Delta H_{avg}}$	Average of Square Root of ΔH (in. W.C.)	1.2259	1.1807	1.2063	
Y_{qa}	Alternative Meter Calibration Factor	1.0202	1.0155	1.0190	**Average**
	Variation from full-test Y_d (average ≤ ±5%)	1.6%	1.1%	1.5%	**1.4%**
	Mean Isokinetic Sampling Rate Variation				
	Minimum Allowable (%)	90	90	90	
	Maximum Allowable (%)	110	110	110	
%I	Actual Variation (%)	100.17	98.61	99.74	
	Point-by-Point Isokinetic Variation				
	Number of points <90%	0	0	0	
	Number of points >110%	0	0	0	
	Number of points <80%	0	0	0	
	Number of points >120%	0	0	0	

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Nozzle Calibration Sheet

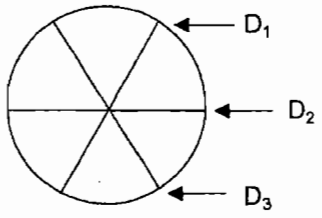
Client Wheelabrator North Broward	Project Number 11414
Calibrated by Scott Braun	Caliper ID 11679028
Date 4/30/12	Unit / Runs 1-3 Units 1 and 2

Nozzle Identification	D_1 (inches)	D_2 (inches)	D_3 (inches)	ΔD (inches)	D_{ave} (inches)
0.274-1	0.2740	0.2740	0.2745	0.0005	0.274

D_1, D_2, D_3 = three nozzle diameter measurements

ΔD = maximum difference between any two diameters
$\Delta D \leq 0.004$ inches*

D_{ave} = average of D_1, D_2, D_3



* (40 CFR 60, Appendix A, Method 5, Section 5.1)

QA/QC SB
Date 5/4

CleanAir ENGINEERING

Sample Probe Calibration

Probe Type: M5 with S-Type Pitot **I.D. Number:** 67-8-10
Project Number: 11414

Thermocouple Calibration

Reference Type: Thermocouple Reference I.D. No: 15-078-39 Pyrometer I.D. No: 80512890 Units: °F

Point No.	Target Temp.	Reference Temp.	Indicated Temp.	Temp. Difference	% Difference*	Specification
1	Ambient	73	73	0	0.00%	
2	200°F-250°F	255	255	0	0.00%	%Difference ≤ 1.5

* Based on Absolute Temperature (Rankine)

Does thermocouple assembly meet specifications? ⟶ **YES**

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

Reference Pitot I.D. No: Wind Tunnel Reference Pitot Cp: 0.99

Pitot Side 'A' :

Trial No.	Reference ΔP	Probe ΔP	Probe $C_{p(S)}$*	Abs. Deviation from Avg. $C_{p(A)}$**
1	0.543	0.774	0.829	0.001
2	0.546	0.774	0.832	0.002
3	0.542	0.772	0.829	0.001
		Side 'A' Average Probe $C_{p(A)}$=	0.8300	0.0011

Specification: Avg. C_p Deviations ≤ 0.01

Pitot Side 'B' :

Trial No.	Reference ΔP	Probe ΔP	Probe $C_{p(S)}$*	Abs. Deviation from Avg. $C_{p(B)}$**
1	0.540	0.782	0.823	0.000
2	0.537	0.777	0.823	0.001
3	0.541	0.781	0.825	0.001
		Side 'B' Average Probe $C_{p(B)}$=	0.8236	0.0006

Specification: Avg. C_p Deviations ≤ 0.01

'A' Average C_p		'B' Average C_p		Difference	Specification
0.830	—	0.824	=	0.006	|Difference| ≤ 0.01

Does assembly meet specifications? **YES** ⟶ **If "Yes", C_p= Average of Side 'A' and 'B' Cp values. If "No", Pitot must be replaced.**

$$^{*}C_{P(S)} = C_{P(STD)}\sqrt{\frac{\Delta p_{(STD)}}{\Delta p_{(S)}}} \qquad ^{**}Deviation = \left|C_{P(S)} - \overline{C}_{P(\text{A or B})}\right|$$

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

Probe Cp= 0.827 Calibrated by: B ARNOLD Date: 03/12/2012

CleanAir. ENGINEERING

Client:	Clean Air Source	**Reviewed By:**	O. Lavrov	**Calibration Signature:**	
ID No:	66-13	**Calibrated By:**	R. Redel	**Meter Box Yd:**	1.0041
Job No:	N/A	**Date of Calibration:**	03/14/12	**Meter Box ΔH@:**	1.7478
Meter Box Serial No:	07R-5004-63-M	**Due Date of Calibration:**	03/15/13	**Barometer Serial No:**	W12637
Manufacturer Part No:	0028	**Meter Box Vacuum:**	1.0 in. H_2O	**Barometric Pressure:**	29.22 in. Hg

				Standard Meter Gas Volume (ft^3)			Meter Box Gas Volume (ft^3)			Std. Meter Temperature (°F)			Meter Box Temperature (°F)			Time (min.)	Calibration Results	
Q	ΔH	ΔP	Y_{ds}	Initial	Final	V_{ds} Net	Initial	Final	V_d Net	T_{is} In	T_{os} Out	T_{ds} Avg.	T_i In	T_o Out	T_d Avg.	Θ	Y_d	ΔH@
0.393	0.50	-1.40	1.0000	0.000	5.000	5.000	178.900	183.938	5.038	69.0	69.0	69.00	82.0	76.0	79.00	12.39	1.0064	1.7500
0.393	0.50	-1.40	1.0000	0.000	5.000	5.000	183.938	188.998	5.060	69.0	69.0	69.00	83.0	78.0	80.50	12.39	1.0048	1.7435
0.687	1.50	-1.70	1.0000	0.000	10.000	10.000	192.300	202.453	10.153	69.0	69.0	69.00	89.0	80.0	84.50	14.18	1.0057	1.7064
0.688	1.50	-1.70	1.0000	0.000	10.000	10.000	202.453	212.650	10.197	69.0	69.0	69.00	90.0	81.0	85.50	14.16	1.0032	1.6984
0.955	3.00	-2.20	1.0000	0.000	10.000	10.000	155.002	165.013	10.011	69.0	69.0	69.00	83.0	72.0	77.50	10.20	1.0018	1.7924
0.952	3.00	-2.20	1.0000	0.000	10.000	10.000	165.013	175.062	10.049	69.0	69.0	69.00	86.0	74.0	80.00	10.23	1.0026	1.7962
																Averages	1.00407	1.74780

Nomenclature

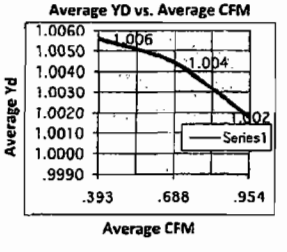
P_b	Barometric Pressure (in. Hg)
Q	Flow Rate (cfm)
ΔH	Orifice Pressure differential (in. H_2O)
ΔP	Inlet Pressure Differential (in. H_2O)
V_d	Gas Meter Volume - Dry (ft^3)
V_{ds}	Standard Meter Volume - Dry (ft^3)
T_d	Average Meter Box Temperature (°F)
T_o	Outlet Meter Box Temperature (°F)
T_{ds}	Average 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
10.1	10.0
15.3	15.0
20.1	20.0
25.3	25.0

Calibration Reference Information (Standard Meter)

Reference Used:	Wet Test Meter	Serial No:	11AH6
Calibrated By:	Martin Vaquero	Date Calibrated:	10/26/11
Percent Error:	0.230%	Calibration Due Date:	10/26/12

Meter Box Pre-Calibration Inspection

Positive Leak Check:	Pass	Electrical Check:	Pass
Negative Leak Check:	Pass	Pyrometer Check:	Pass
Vacuum Gauge Check:	Pass	YD Tolerance: ± 2% of 1.0000	Pass

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Meter Box - Pyrometer Calibration Sheet

Meter Box No: 66-13 Office: 66

Calibrated by: R. Redel Client: Clean Air Source

Date: 3/14/12 Job No: N/A

Temperature Scale Used: Fahrenheit Type of Calibration: Full-Test

Calibration Reference Settings (°F)	Pyrometer Reading for each Channel (°F)						
	1 Stack	2 Probe	3 Filter	4 Imp Out	5 Aux		
50	49	51	49	49	49		
100	99	101	99	99	99		
150	149	151	149	149	149		
200	199	201	199	199	199		
250	249	251	249	249	249		
300	299	301	299	299	299		
350	349	351	349	349	349		
400	399	401	399	399	399		
450	449	451	449	449	449		
500	499	501	499	499	499		
550	549	551	549	549	549		
600	599	601	599	599	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: 10/11/11

Calibration Report No: 1000157983 Calibration Due Date: 10/11/12

Caliper Calibration Sheet

Calibrated by	D. Leishman		
Calibration Date	3-12-12	Expiration Date	3-12-13

Caliper ID	11679028

Standard Caliper ID	1014600021

Inside Jaw Check		
Standard Caliper Setting (in)	Caliper Reading (in)	Deviation (ΔD)
0.150	0.150	0.000
0.300	0.300	0.000
0.500	0.500	0.000

Outside Jaw Check		
Standard Caliper Setting (in)	Caliper Reading (in)	Deviation (ΔD)
0.150	0.150	0.000
0.300	0.300	0.000
0.500	0.500	0.000

ΔD = maximum deviation between standard and caliper being calibrated
ΔD ≤ 0.001 inch for every reading

CleanAir ENGINEERING

CDS005G-Caliper.xls,

Calibration
Certificate No. 1750.01

Calibration complies with ISO/IEC 17025, ANSI/NCSL Z540-1, and 9001

Cert. No.: 3415-4158722

Traceable® Certificate of Calibration for Digital Calipers

Manufactured for and distributed by: Fisher Scientific, 300 Industry Drive, Pittsburgh, PA 15275-1001

Instrument Identification:

Clean Air Engineering, 500 West Wood Street, Attn. David Leishman, Palatine, IL 60067 U.S.A. (RMA:967540)

Model Numbers: 14-648-17, FB70250, 32599 S/N: 101460021 Manufacturer: Control Company

Standards/Equipment:

Description	Serial Number	Due Date	NIST Traceable Reference
Gage Set	99146223	10/03/12	1000305379

Certificate Information:

Technician: 57 Procedure: CAL-05 Cal Date: 2/02/12 **Cal Due: 2/02/13**

Test Conditions: 23.5°C 45.0 %RH 1018 mBar

Calibration Data:

Unit(s)	Nominal	As Found	In Tol	Nominal	As Left	In Tol	Min	Max	±U	TUR
in	0.0000	0.0000	Y	0.0000	0.0000	Y	-0.0010	0.0010	0.0003	3.3:1
in	0.1000	0.0995	Y	0.1000	0.1000	Y	0.0990	0.1010	0.0003	3.3:1
in	1.9995	1.9995	Y	1.9995	2.0000	Y	1.9975	2.0015	0.0003	>4:1
in	3.9990	3.9990	Y	3.9990	3.9995	Y	3.9950	4.0030	0.0004	>4:1
in	5.9995	5.9990	Y	5.9995	5.9995	Y	5.9935	6.0055	0.0004	>4:1
in depth	1.9995	1.9995	Y	1.9995	1.9995	Y	1.9975	2.0015	0.0003	>4:1
in step	1.9990	1.9995	Y	1.9990	2.0000	Y	1.9980	2.0000	0.0004	2.7:1
in inside	0.9995	1.0000	Y	0.9995	1.0000	Y	0.9985	1.0005	0.0003	3.1:1

This Instrument was calibrated using Instruments Traceable to National Institute of Standards and Technology.

A Test Uncertainty Ratio of at least 4:1 is maintained unless otherwise stated and is calculated using the expanded measurement uncertainty. Uncertainty evaluation includes the instrument under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level. In tolerance conditions are based on test results falling within specified limits with no reduction by the uncertainty of the measurement. The results contained herein relate only to the item calibrated. This certificate shall not be reproduced except in full, without written approval of Control Company.

Nominal=Standard's Reading; As Left=Instrument's Reading; In Tol=In Tolerance; Min/Max=Acceptance Range; ±U=Expanded Measurement Uncertainty; TUR=Test Uncertainty Ratio; Accuracy=±(Max-Min)/2; Min = Nominal(Rounded) - Tolerance; Max = Nominal(Rounded) + Tolerance; Date=MM/DD/YY

Nicol Rodriguez, Quality Manager

Wallace Berry, Technical Manager

Maintaining Accuracy:

In our opinion once calibrated your Digital Calipers should maintain its accuracy. There is no exact way to determine how long calibration will be maintained. Digital Caliperss change little, if any at all, but can be affected by aging, temperature, shock, and contamination.

Recalibration:

For factory calibration and re-certification traceable to National Institute of Standards and Technology contact Control Company.

CONTROL COMPANY 4455 Rex Road Friendswood, TX 77546 USA
Phone 281 482-1714 Fax 281 482-9448 service@control3.com www.control3.com

CARSTAN SCALE
ACCU-DATA SYSTEMS, INC.
214 E. HELLEN ST.
PALATINE, IL 60067
847-934-8666 FAX 847-934-9272

FIELD SERVICE ORDER # - 29479
DATE: 8/2
P.O.#:
CONTACT:

BILL TO:

CUST. ID:
CUSTOMER:
ADDRESS:
CITY/STATE/ZIP:
PHONE: ( ) X

( ) X

☐ CALL SERVICE ☐ INSPECTION ☐ WARRANTY ☐ INSTALLATION ☐ CALL BACK ☐ RENTAL

M	MOD	SERIAL #	DESCRIPTION
			Resisting

MATERIALS USED

QTY	PART NUMBER	DESCRIPTION	PRICE	EXTENSION

MATERIAL TOTAL:

TIME START	TIME STOP	JOB STATUS
:	:	☐ COMPLETE ☐ INCOMPLETE ☐ TO SHOP ☐ LOANER

MEMO

TO:

TECHNICIAN

REGULAR HOURS @
OVERTIME HOURS @
FREIGHT
☐ ZONE CHARGE ☐ MILEAGE
☐ I.M.E.
☐ RESALE # TAX
TOTAL THIS REPORT

X
CUSTOMER SIGNATURE

Date: 8/17/2011

Company: CLEANAI1

Carstan Scale/Accu Data Systems
214 E. Hellen Rd.
Palatine, IL 60067
(847) 934-6666

Standard Used: A: _____ B: _____ C: _____

Model: AP250D **Unit Number:** 1
Manufacturer: Ohaus
Serial Number: 1127211987
Capacity: 200 g
Resolution: .0001 g
Location:
Weight Standards Used: CTG2

Pass: Initial ☑ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
50	50.0000	—		
100	100.0000	—		
150	150.0000	—		
200	200.0000	—		

Comments: C.L.

Model: IR120 **Unit Number:** 2
Manufacturer: Denver Inst
Serial Number: 23103436
Capacity: 120 g
Resolution: .001 g
Location:
Weight Standards Used: CTG2

Pass: Initial ☑ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
10	10.000	—		
20	20.000	—		
50	50.000	—		
100	100.000	—		

Comments: C.L.

Model: GA200D **Unit Number:** 3
Manufacturer: Ohaus
Serial Number: 2204
Capacity: 40 g/200 g
Resolution: .0001 g
Location:
Weight Standards Used: CTG2

Pass: Initial ☑ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
50	50.0001	+.0001	50.0000	—
100	100.0003	+.0003	100.0000	—
150	150.0001	+.0001	150.0000	—
200	200.0023	+.0023	200.0000	—

Comments: Recal C.L.

Model: AV3102 **Unit Number:** 4
Manufacturer: Ohaus
Serial Number: 8029361053
Capacity: 3100 g
Resolution: .01 g
Location:
Weight Standards Used: CTG2

Pass: Initial ☑ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
500	500.00	—		
1000	1000.00	—		
2000	2000.00	—		
3100	3100.00	—		

Comments: C.L.

Model: AJ100 **Unit Number:** 5
Manufacturer: Mettler
Serial Number: M26013
Capacity: 100 g
Resolution: .0001 g
Location:
Weight Standards Used: CTG2

Pass: Initial ☑ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
10	10.0000	—		
20	20.0000	—		
50	50.0000	—		
100	100.0000	—		

Comments: Scale has a Int'l Adjustment
Recal C.L.

Scales were calibrated with certified test weights. Adjustments made to restore and/or maintain the accuracy of the scale conform to the tolerances established by NIST as specified in Handbook 44 or Manufacturers Specifications. Best measurement for uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%.

Calibrated by: _____

QMF12 1

Date: 8/17/2011

Company: CLEANAI1

Carstan Scale/Accu Data Systems
214 E. Hellen Rd.
Palatine, IL 60067
(847) 934-6666

Standard Used: A: _____ B: _____ C: _____

Model: GA200D **Unit Number:** 7
Manufacturer: Ohaus
Serial Number: 4139
Capacity: 200g
Resolution: .0001g
Location:
Weight Standards Used: _____

Pass
Initial ☐
Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: Discovery **Unit Number:** 11
Manufacturer: Ohaus
Serial Number: 1123173913
Capacity: 200g
Resolution: .01mg/.1m
Location: LAB6
Weight Standards Used: _____

Pass
Initial ☐
Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: Discovery **Unit Number:** 12
Manufacturer: Ohaus
Serial Number: 1123181459
Capacity: 200g
Resolution: .01mg/.1m
Location: LAB6
Weight Standards Used: _____

Pass
Initial ☐
Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: Adventurer **Unit Number:** 13
Manufacturer: Ohaus
Serial Number: 8028101133
Capacity: 4100 g
Resolution: .1
Location:
Weight Standards Used: _____

Pass
Initial ☐
Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: Adventurer **Unit Number:** 15
Manufacturer: Ohaus
Serial Number: 8028301069
Capacity: 4100 g
Resolution: .1
Location:
Weight Standards Used: _____

Pass
Initial ☐
Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Scales were calibrated with certified test weights. Adjustments made to restore and/or maintain the accuracy of the scale conform to the tolerances established by NIST as specified in Handbook 44 or Manufacturers Specifications. Best measurement for uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%.

Calibrated by: _____

QMF12 2

Date: 8/17/2011

Company: CLEANAI1

Carstan Scale/Accu Data Systems
214 E. Hellen Rd.
Palatine, IL 60067
(847) 934-6666

Standard Used: A: _____ B: _____ C: _____

Model: Adventurer **Unit Number:** 16
Manufacturer: Ohaus
Serial Number: 8028301068
Capacity: 4100 g
Resolution: .1
Location:
Weight Standards Used: _____

Pass
Initial ☑
Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: Adventurer **Unit Number:** 17
Manufacturer: Ohaus
Serial Number: 8028101135
Capacity: 4100 g
Resolution: .1
Location:
Weight Standards Used: _____

Pass
Initial ☑
Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: Discoverer **Unit Number:** 18
Manufacturer: Ohaus
Serial Number: 1129400331
Capacity: 210 g
Resolution: .0001
Location:
Weight Standards Used: _____

Pass
Initial ☐
Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: 1600 **Unit Number:** 19
Manufacturer: Ohaus
Serial Number: 3BB-10
Capacity: 2610 g
Resolution:
Location:
Weight Standards Used: _____

Pass
Initial ☐
Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: 1600 **Unit Number:** 20
Manufacturer: Ohaus
Serial Number: 3BB-09
Capacity: 2610 g
Resolution:
Location:
Weight Standards Used: _____

Pass
Initial ☐
Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
0				
0				
0				

Comments: _____

Scales were calibrated with certified test weights. Adjustments made to restore and/or maintain the accuracy of the scale conform to the tolerances established by NIST as specified in Handbook 44 or Manufacturers Specifications. Best measurement for uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%.

Calibrated by: _____

QMF12 3

Date: 8/17/2011

Company: CLEANAI1

Carstan Scale/Accu Data Systems
214 E. Hellen Rd.
Palatine, IL 60067
(847) 934-6666

Standard Used: A: _____ B: _____ C: _____

Model: 1600 **Unit Number:** 21
Manufacturer: Ohaus
Serial Number: 3BB-08
Capacity: 2610 g
Resolution:
Location:
Weight Standards Used: _____

Pass
Initial ☐
Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: 1600 **Unit Number:** 22
Manufacturer: Ohaus
Serial Number: 3BB-07
Capacity: 2610 g
Resolution:
Location:
Weight Standards Used: _____

Pass
Initial ☑
Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: Adventurer **Unit Number:** 23
Manufacturer: Ohaus
Serial Number:
Capacity:
Resolution:
Location: LAB 01
Weight Standards Used: _____

Pass
Initial ☐
Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Scales were calibrated with certified test weights. Adjustments made to restore and/or maintain the accuracy of the scale conform to the tolerances established by NIST as specified in Handbook 44 or Manufacturers Specifications. Best measurement for uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%.

Calibrated by: _____

QMF12 4

CARSTAN SCALE
ACCU-DATA SYSTEMS, INC.
214 E. HELLEN ST.
PALATINE, IL 60067
847-934-6666 FAX 847-934-9272

FIELD SERVICE ORDER # - 29471
DATE: 8/15
P.O.#:
CONTACT:

CUST. ID:
CUSTOMER:
ADDRESS:
CITY/STATE/ZIP:
PHONE: ( ) X

BILL TO:
( ) X

☐ CALL SERVICE ☐ INSPECTION ☐ WARRANTY ☐ INSTALLATION ☐ CALL BACK ☐ RENTAL

M	MOD	SERIAL #	DESCRIPTION
			Resetting

MATERIALS USED

QTY	PART NUMBER	DESCRIPTION	PRICE	EXTENSION

MATERIAL TOTAL:

TIME START	TIME STOP	JOB STATUS
:	:	☒ COMPLETE ☐ INCOMPLETE ☐ TO SHOP ☐ LOANER

MEMO
TO:

TECHNICIAN

REGULAR HOURS @
OVERTIME HOURS @
FREIGHT
☐ ZONE CHARGE ☐ MILEAGE
☐ I.M.E.
☐ RESALE # TAX
TOTAL THIS REPORT

X
CUSTOMER SIGNATURE

Date: 8/17/2011

Company: CLEANAI1

Carstan Scale/Accu Data Systems
214 E. Hellen Rd.
Palatine, IL 60067
(847) 934-6666

Standard Used: A: _____ B: _____ C: _____

Model: AP250D **Unit Number:** 1
Manufacturer: Ohaus
Serial Number: 1127211987
Capacity: 200 g
Resolution: .0001 g
Location:
Weight Standards Used: CTG2

Pass — Initial ☐ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
50	50.0000	—		
100	100.0000	—		
150	150.0000	—		
200	200.0000	—		

Comments: C.L.

Model: IR120 **Unit Number:** 2
Manufacturer: Denver Inst
Serial Number: 23103436
Capacity: 120 g
Resolution: .001 g
Location:
Weight Standards Used: CTG2

Pass — Initial ☐ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
10	10.000	—		
20	20.000	—		
50	50.000	—		
100	100.000	—		

Comments: C.L.

Model: GA200D **Unit Number:** 3
Manufacturer: Ohaus
Serial Number: 2204
Capacity: 40 g/200 g
Resolution: .0001 g
Location:
Weight Standards Used: CTG2

Pass — Initial ☐ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
50	50.0001	+.0001	50.0000	—
100	100.0002	+.0001	100.0000	—
150	150.0001	+.0001	150.0000	—
200	200.0023	+.0023	200.0000	—

Comments: Final C.L.

Model: AV3102 **Unit Number:** 4
Manufacturer: Ohaus
Serial Number: 8029361053
Capacity: 3100 g
Resolution: .01 g
Location:
Weight Standards Used: CTG2

Pass — Initial ☐ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
500	500.00	—		
1000	1000.00	—		
2000	2000.00	—		
3000	3000.00	—		

Comments: C.L.

Model: AJ100 **Unit Number:** 5
Manufacturer: Mettler
Serial Number: M26013
Capacity: 100 g
Resolution: .0001 g
Location:
Weight Standards Used: CTG2

Pass — Initial ☐ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
10	10.0000	—		
20	20.0000	—		
50	50.0000	—		
100	100.0000	—		

Comments: Scale has a Bad Adjust Motor Final C.L.

Scales were calibrated with certified test weights. Adjustments made to restore and/or maintain the accuracy of the scale conform to the tolerances established by NIST as specified in Handbook 44 or Manufacturers Specifications. Best measurement for uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%.

Calibrated by: _____

QMF12 1

Date: 8/17/2011

Company: CLEANAI1

Carstan Scale/Accu Data Systems
214 E. Hellen Rd.
Palatine, IL 60067
(847) 934-6666

Standard Used: A: _____ B: _____ C: _____

Model: GA200D **Unit Number:** 7
Manufacturer: Ohaus
Serial Number: 4139
Capacity: 200g
Resolution: .0001g
Location:
Weight Standards Used: _____

Pass
Initial ☐
Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: Discovery **Unit Number:** 11
Manufacturer: Ohaus
Serial Number: 1123173913
Capacity: 200g
Resolution: .01mg/.1m
Location: LAB6
Weight Standards Used: _____

Pass
Initial ☐
Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: Discovery **Unit Number:** 12
Manufacturer: Ohaus
Serial Number: 1123181459
Capacity: 200g
Resolution: .01mg/.1m
Location: LAB6
Weight Standards Used: _____

Pass
Initial ☐
Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: Adventurer **Unit Number:** 13
Manufacturer: Ohaus
Serial Number: 8028101133
Capacity: 4100 g
Resolution: .1
Location:
Weight Standards Used: _____

Pass
Initial ☐
Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: Adventurer **Unit Number:** 15
Manufacturer: Ohaus
Serial Number: 8028301069
Capacity: 4100 g
Resolution: .1
Location:
Weight Standards Used: _____

Pass
Initial ☐
Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Scales were calibrated with certified test weights. Adjustments made to restore and/or maintain the accuracy of the scale conform to the tolerances established by NIST as specified in Handbook 44 or Manufacturers Specifications. Best measurement for uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%.

Calibrated by: _____

QMF12 2

Date: 8/17/2011

Company: CLEANAI1

Carstan Scale/Accu Data Systems
214 E. Hellen Rd.
Palatine, IL 60067
(847) 934-6666

Standard Used: A: _____ B: _____ C: _____

Model: Adventurer **Unit Number:** 16
Manufacturer: Ohaus
Serial Number: 8028301068
Capacity: 4100 g
Resolution: .1
Location:
Weight Standards Used: _____

Pass: Initial ☑ Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: Adventurer **Unit Number:** 17
Manufacturer: Ohaus
Serial Number: 8028101135
Capacity: 4100 g
Resolution: .1
Location:
Weight Standards Used: _____

Pass: Initial ☑ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: Discoverer **Unit Number:** 18
Manufacturer: Ohaus
Serial Number: 1129400331
Capacity: 210 g
Resolution: .0001
Location:
Weight Standards Used: _____

Pass: Initial ☐ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: 1600 **Unit Number:** 19
Manufacturer: Ohaus
Serial Number: 3BB-10
Capacity: 2610 g
Resolution:
Location:
Weight Standards Used: _____

Pass: Initial ☐ Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: 1600 **Unit Number:** 20
Manufacturer: Ohaus
Serial Number: 3BB-09
Capacity: 2610 g
Resolution:
Location:
Weight Standards Used: _____

Pass: Initial ☐ Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
0				
0				
0				

Comments: _____

Scales were calibrated with certified test weights. Adjustments made to restore and/or maintain the accuracy of the scale conform to the tolerances established by NIST as specified in Handbook 44 or Manufacturers Specifications. Best measurement for uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%.

Calibrated by: _____

QMF12 3

Date: 8/17/2011

Company: CLEANAI1

Carstan Scale/Accu Data Systems
214 E. Hellen Rd.
Palatine, IL 60067
(847) 934-6666

Standard Used: A: _____ B: _____ C: _____

Model: 1600 Unit Number: 21
Manufacturer: Ohaus
Serial Number: 3BB-08
Capacity: 2610 g
Resolution:
Location:
Weight Standards Used: _____

Pass
Initial ☐
Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: 1600 Unit Number: 22
Manufacturer: Ohaus
Serial Number: 3BB-07
Capacity: 2610 g
Resolution:
Location:
Weight Standards Used: _____

Pass
Initial ☑
Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Model: Adventurer Unit Number: 23
Manufacturer: Ohaus
Serial Number:
Capacity:
Resolution:
Location: LAB 01
Weight Standards Used: _____

Pass
Initial ☐
Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error

Comments: _____

Scales were calibrated with certified test weights. Adjustments made to restore and/or maintain the accuracy of the scale conform to the tolerances established by NIST as specified in Handbook 44 or Manufacturers Specifications. Best measurement for uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%.

Calibrated by: _____

QMF12 4

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FIELD DATA

E

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

QA/QC Initials: MR

Date: 5/31/12

CleanAir.

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TEST LOCATION: FF OUT / METAL / Hg **TESTING** **METHOD:** 29 **PAGE** 1 **OF** 2

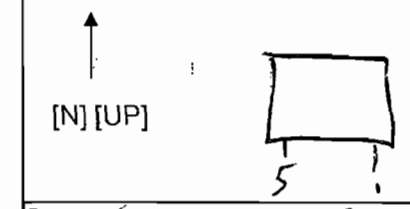
UNIT: 3 **RUN:** 1

FIELD DATA SHEET

Client Wheelabrator	Project No. 1144
Plant N BROWARD	Date 5-3-12
Meter Operator	NH
Probe Operator	NH

Meter Box 66-13	Sample Box No. M10
Meter Y_d 1.0041	Meter $\Delta H_@$ 1.7478
K Factor 2.6 → 2.55	Pitot C_p 0.827
Leak Rate Before 0.002 [cfm] [Lpm]	@ 15 (in. Hg)
Leak Rate After 0.002 [cfm] [Lpm]	@ 8 (in. Hg)
Pitot Leak Check Before: [X]	After: Good [X] Bad [ ]

Cross-Section of Test Location



Duct Dimensions (in.)	96×96		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-1.16	9		

Amb. Temp. (°F)	Bar. Press. 30.1 [in. Hg] [mbar]
Probe I.D. No.	67-8-10
Liner Material	GLASS

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

Start Time: 7:57	Stop Time: 10:10

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft^3] [L]	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points	Filter T_f (°F) Set Points	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	XAD Trap Temp. T_t (°F)	Notes
				209.945		250	250						
1-1	5	0.70	1.8	213.44	296	247	250	62	80	80	3	8.6	
2	10	0.48	1.2	216.43	295	245	255	54	85	80	3	8.9	
3	15	0.60	1.6	219.89	298	253	250	51	87	80	3	9.0	
4	20	0.60	1.6	223.37	297	250	251	50	90	81	3	8.9	
5	25	0.63	1.6	226.865	296	250	252	44	93	82	3	8.3	0.095
2-1	30	0.80	2.1	230.94	293	254	253	57	93	83	4	8.2	
2	35	0.70	1.8	234.66	294	244	248	48	96	84	4	8.2	
3	40	0.60	1.6	238.19	293	248	248	49	98	85	4	8.2	
4	45	0.53	1.4	241.50	292	250	248	53	98	86	4	8.6	
5	50	0.52	1.4	244.770	291	250	253	54	99	86	4	8.6	0.095
3-1	55	0.71	1.8	248.56	293	254	249	58	96	87	4	8.1	NH ok
2	60	0.63	1.6	252.11	292	245	249	58	99	88	4	8.3	~~K=2.65~~ K=2.55
3	65	0.57	1.5	~~255.53~~	292	252	253	59	100	88	4	7.6	
	Total	*19.0984	37.8000	85.1650	7339				2421	2182			
	Average	0.7639	1.5120		293.5600				92.0600				

Sum of square roots. 21.000

Circle correct bracketed units on data sheet.

3822 QA/QC NH Date 5-3-12

1214 1096

FDS005-General.xls, Feb 2002

CleanAir ENGINEERING

TEST LOCATION: FF OUT / METAL / Hg **TESTING** **METHOD:** 29 **PAGE** 2 **OF** 2

UNIT: 3 **RUN:** 1

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	N. Brunswick	Date	5-3-12
Meter Operator	NH		
Probe Operator	NH		

Meter Box	66-13	Sample Box No.	M10
Meter Y_d	1.0041	Meter $\Delta H_@$	1.7478
K Factor	2.6 → 7.55	Pitot C_p	0.827
Leak Rate Before	[cfm] [Lpm]	@	(in. Hg)
Leak Rate After	[cfm] [Lpm]	@	(in. Hg)
Pitot Leak Check Before: ☐	After: Good ☐ Bad ☐		

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.)

Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

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

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

Start Time:	Stop Time:

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft^3] [L]	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	XAD Trap Temp. T_x (°F)	Notes
3-4	70	0.57	1.5	258.94	295	250	249	61	101	89	4	7.8	
5	75	0.46	1.2	262.035	294	253	251	63	101	90	4	8.0	0.125
4-1	80	0.45	1.1	265.06	290	255	252	59	97	90	3	9.4	
2	85	0.64	1.7	268.66	292	245	250	57	99	90	4	8.4	
3	90	0.58	1.5	272.14	294	251	252	55	101	91	4	8.2	
4	95	0.55	1.4	275.46	293	251	247	56	101	91	4	8.2	
5	100	0.45	1.1	278.420	293	250	252	57	101	91	4	7.8	0.115
5-1	105	0.64	1.6	282.06	293	250	251	63	99	91	4	7.8	
2	110	0.64	1.6	285.59	293	245	251	59	101	92	4	7.8	
3	115	0.60	1.5	289.10	293	252	250	59	102	92	4	8.1	
4	120	0.55	1.4	292.42	294	252	250	60	102	92	4	8.8	
5	125	0.47	1.2	295.540	293	250	249	62	102	93	4	9.4	
	Total	*											
	Average												

* Sum of square roots. 16.8

Circle correct bracketed units on data sheet.

3507 QA/QC 58 1207 1092

Date

E-4

CleanAir ENGINEERING

TEST LOCATION: FF OUT METAL // Hg TESTING METHOD: 29 PAGE 1 OF 2

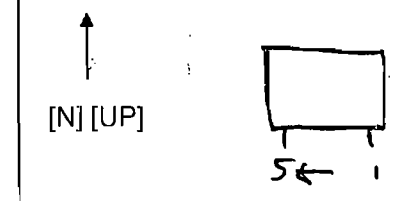
UNIT: 3 RUN: 2

FIELD DATA SHEET

Client WHEELABRATOR	Project No. 11414
Plant N BROWARD	Date 5-3-12
Meter Operator	NH
Probe Operator	NH

Meter Box ~~NH~~ 6613	Sample Box No. M11
Meter Y_d 1.0041	Meter $\Delta H_@$ 1.7478
K Factor NH ~~2.55~~ ~~3.62~~ 2.55	Pitot C_p 0.827
Leak Rate Before 0.003 (cfm) [Lpm]	@ 15 (in. Hg)
Leak Rate After 0.002 (cfm) [Lpm]	@ 8 (in. Hg)
Pitot Leak Check Before: ☒	After: Good ☒ Bad ☐

Cross-Section of Test Location



Duct Dimensions (in.)	96 x 96		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-10.8	9		

Amb. Temp. (°F) 80	Bar. Press. 30.1 [in. Hg] [mbar]
Probe I.D. No.	67-8-10
Liner Material	GLASS

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

Start Time: 10:35	Stop Time: 12:48

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [In] [L] 296.000	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	XAD Trap Temp. ~~T_t~~ (°F) 02	Notes
1-1	5	0.65	1.7	299.73	291	259	259	63	93	91	4	9.1	
2	10	0.46	1.2	302.93	290	254	256	56	97	91	3	8.9	
3	15	0.46	1.2	305.96	290	250	250	54	99	91	3	8.9	
4	20	0.52	1.3	309.17	293	252	251	54	100	91	3	8.6	
5	25	0.60	1.5	312.635	294	251	251	54	102	91	3	9.0	0.115
2-1	30	0.65	1.7	316.41	295	248	251	57	102	93	4	8.2	
2	35	0.56	1.4	319.76	295	248	250	57	103	93	4	8.4	
3	40	0.56	1.4	323.07	293	251	251	58	104	94	3	9.1	
4	45	0.49	1.2	326.17	294	251	249	58	105	94	3	9.1	
5	50	0.52	1.3	329.385	297	251	251	60	105	95	3	8.3	0.105
3-1	55	0.71	1.8	333.18	296	248	249	63	103	96	3	8.3	
2	60	0.65	1.7	336.86	295	249	251	57	107	96	4	7.9	
3	65	0.60	1.5	340.37	294	251	251	47	109	97	4	9.5	
	Total	*18.4714	35.0000	83.2300	7366				2624	~~1316~~ NH 2529			
	Average	0.7391	1.4000		294.6400				103.0600	58			

*Sum of square roots. 18.9

Circle ~~correct~~ bracketed units on data sheet.

3817 QA/QC NH Date 5-3-12

1327 1213 100.80

CleanAir ENGINEERING

m-5

TEST LOCATION: FF ONT | METAL / Hg **TESTING** **METHOD:** 29 **PAGE** 2 **OF** 2

UNIT: 3 **RUN:** 2

FIELD DATA SHEET

Client WHEELABRATOR	Project No. 11414
Plant N BROWARD	Date 5-3-12
Meter Operator NH	
Probe Operator NH	

Cross-Section of Test Location

[N] [UP]

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

Meter Box 46-13		Sample Box No. M11	
Meter Y_d 1.0041		Meter $\Delta H_@$ 1.7478	
K Factor		Pitot C_p 0.827	
Leak Rate Before	[cfm] [Lpm] @		(in. Hg)
Leak Rate After	[cfm] [Lpm] @		(in. Hg)
Pitot Leak Check Before: ☐	After: Good ☐ Bad ☐		

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

Duct Dimensions (in.)

Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Start Time:	Stop Time:

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [L]	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	XAD Trap Temp. T_x (°F)	Notes
3-4	70	0.53	1.4	343.70	293	250	250	48	108	98	3	8.8	
5	75	0.47	1.2	346.830	295	250	250	50	108	99	3	8.6	0.12
4-1	80	0.57	1.5	350.39	295	247	248	55	105	99	3	8.8	
2	85	0.57	1.5	353.77	297	248	257	54	108	99	3	8.8	
3	90	0.59	1.5	357.16	298	253	257	55	108	99	4	8.9	
4	95	0.59	1.5	360.50	298	257	250	56	109	100	4	8.8	
5	100	0.52	1.3	363.785	298	250	257	58	109	100	4	8.3	0.100
5-1	105	0.43	1.1	366.86	293	248	248	62	107	101	3	8.8	
2	110	0.52	1.3	370.10	297	247	250	63	108	102	3	8.4	
3	115	0.57	1.3	373.34	296	253	252	63	109	102	3	8.6	
4	120	0.57	1.3	376.56	295	252	250	64	109	102	3	9.0	
5	125	0.47	1.2	379.670	294	250	257	64	109	102	3	9.1	
	Total	*											
	Average												

* Sum of square roots. 16.1

Circle correct bracketed units on data sheet.

3549 QA/QC 5/3 Date 5/3

1297 1203

CleanAir ENGINEERING

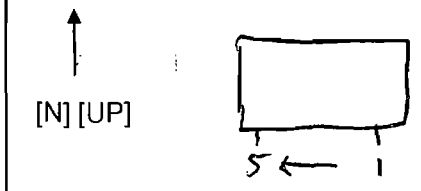
TEST LOCATION: EF OUT METAL | Hg TESTING METHOD: 29 PAGE 1 OF 2

UNIT: 3 RUN: 3

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	N Brownsville	Date	5-3-12
Meter Operator	NH		
Probe Operator	NH		

Cross-Section of Test Location



Amb. Temp. (°F)	80	Bar. Press. 30.1	[in. Hg] [mbar]
Probe I.D. No.	67-8-10		
Liner Material	GLASS		

Meter Box	66-13	Sample Box No.	M10
Meter Y_d	1.0041	Meter $\Delta H_@$	1.7478
K Factor	2.6	Pitot C_p	0.827
Leak Rate Before	0.005 (cfm) [Lpm]	@	15 (in. Hg)
Leak Rate After	0.001 (cfm) [Lpm]	@	7 (in. Hg)
Pitot Leak Check Before: ☒	After: Good ☒	Bad ☐	

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

Duct Dimensions (in.)	96 x 96		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow	First point all the way
-10.6	9	(IN) [Out] of page	(IN) [Out]

Start Time:	13:15	Stop Time:	15:28

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. (ft³) [L] 380.110	Stack Temp. Ts (°F)	ProbeT$_p$ (°F) Set Points 250	Filter T$_f$ (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	XAD Trap Temp. O_2 ✓ T_t (°F)	Notes
1-1	5	0.55	1.4	383.57	292	249	250	64	99	NH 99	3	9.3	
2	10	0.55	1.4	386.82	292	244	252	59	103	99	3	8.1	
3	15	0.46	1.2	389.96	292	253	253	57	105	99	3	8.6	
4	20	0.55	1.4	393.26	295	252	250	57	106	99	3	8.7	
5	25	0.56	1.5	396.710	292	249	249	57	106	98	3	9.0	0.105
2-1	30	0.76	2.0	400.76	291	255	250	55	106	99	4	9.4	
2	35	0.63	1.6	404.31	292	245	250	61	106	99	4	7.9	
3	40	0.56	1.5	407.78	295	246	250	61	107	99	4	9.0	
4	45	0.55	1.4	411.18	294	252	250	62	108	99	4	7.6	
5	50	0.56	1.5	414.560	292	249	250	53	107	99	3	8.3	0.130
3-1	55	0.56	1.5	418.10	294	255	250	53	105	99	3	9.2	
2	60	0.53	1.4	421.45	296	246	250	49	107	99	3	8.0	
3	65	0.53	1.4	424.74	294	245	250	49	107	99	4	8.0	
	Total	*18.1649	36.5000	84.765	7339				2651	2464			
	Average	0.7474	1.4600		293.56 00				102.3000				

*Sum of square roots. 19.2

Circle correct bracketed units on data sheet. 3811 1372 1487 102.28

QA/QC NH

Date 5-3-12

CleanAir ENGINEERING

E-7

TEST LOCATION: FF OUT | METALS / Hg **TESTING** **METHOD:** 29 **PAGE** 2 **OF** 2

UNIT: 3 **RUN:** 3

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	N. Broward	Date	5-3-12
Meter Operator	NH		
Probe Operator	NH		

Cross-Section of Test Location

[N] [UP]

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

Meter Box	66-13	Sample Box No.	M10
Meter Y_d	1.0041	Meter $\Delta H_@$	1.7478
K Factor		Pitot C_p	0.827
Leak Rate Before	[cfm] [Lpm]	@	(in. Hg)
Leak Rate After	[cfm] [Lpm]	@	(in. Hg)
Pitot Leak Check Before: ☐	After: Good ☐ Bad ☐		

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

Duct Dimensions (in.)

Static Pres ($in. H_2O$)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Start Time:	Stop Time:

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP ($in. H_2O$)	Orifice Setting ΔH ($in. H_2O$)	Gas Sample Volume V_m Init. Vol. (ft³) [L]	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	XAD Trap Temp. (°F) O_2	Notes
3-4	70	0.56	1.5	428.17	294	253	250	48	107	99	3	9.4	
5	75	0.56	1.5	431.560	295	251	250	49	107	98	3	8.5	0.115
4-1	80	0.50	1.3	434.93	293	249	250	54	105	98	3	9.6	
2	85	0.71	1.8	438.67	294	247	252	55	106	98	3	8.6	
3	90	0.56	1.5	442.10	294	246	251	55	107	98	4	8.3	
4	95	0.54	1.4	445.43	293	251	251	58	107	98	4	9.0	
5	100	0.43	1.1	448.440	294	250	250	58	107	98	3	8.2	0.095
5-1	105	0.55	1.4	451.81	294	254	250	62	104	98	3	9.0	
2	110	0.58	1.5	455.30	294	247	251	59	107	98	4	9.0	
3	115	0.59	1.5	458.66	294	248	249	59	107	98	4	8.8	
4	120	0.58	1.5	462.09	295	249	251	55	107	98	4	8.8	
5	125	0.50	1.3	465.320	294	251	251	55	108	98	4	9.3	
	Total	*											
	Average												

* Sum of square roots. 17.3

Circle correct bracketed units on data sheet. 3528 QA/QC 50 Date 5/3/12 1279 1177

CleanAir ENGINEERING

Impinger Weight Sheet

Client	Wheelabrator		Unit Name / Location 43 FF Outlet
Plant	North Broward	Job No. 11414	Method 29

Balance Calibration

Reference Weight ID	60152	Reference Weight Reading	499.6
Reference Weight Mass	500g	Reference Weight Mass must agree with Reference Weight Reading to within ±0.5 g.	

Run No.	1	Filter Type	quartz	Sample Box No.	M10
Date	5/2/12	Lot No.	NA	pH	NA
Analyst	S. Brown	Filter No.	NA	Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	848.0	466.3	381.7	
Impinger 2	5% HNO_3/10% H_2O_2 (100ml)	805.3	634.1	171.2	QA/QC SB
Impinger 3	↓	576.3	543.9	32.4	Date 5/3
Impinger 4	Empty	454.2	451.1	3.1	
Impinger 5	4% KMnO4/10% H_2SO_4 (100ml)	544.0	542.7	1.3	Total Weight (gm)
Impinger 6	↓	382.9	582.2	0.7	590.4
Impinger 7	Silica Gel	813.8	794.8	19.0	609.4

Run No.	2	Filter Type	quartz	Sample Box No.	M11
Date	5/3/12	Lot No.	NA	pH	NA
Analyst	S. Brown	Filter No.	NA	Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	793.9	442.8	351.1	
Impinger 2	5%/10% (100ml)	739.9	568.4	171.5	QA/QC SB
Impinger 3	↓	544.7	522.4	22.3	Date 5/3
Impinger 4	Empty	433.7	430.9	2.8	
Impinger 5	4%/10% (100ml)	556.8	556.7	0.1	Total Weight (gm)
Impinger 6	↓	524.2	522.8	1.4	549.2
Impinger 7	Silica Gel	764.0	748.6	15.4	564.6

Run No.		Filter Type		Sample Box No.	M10
Date		Lot No.		pH	
Analyst		Filter No.		Rinse	

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	898.4	~~587.1~~ SB	534.0 364.4	
Impinger 2	5%/10% (100ml)	753.4	587.1	166.3	QA/QC SB
Impinger 3	↓	579.2	543.7	35.5	Date 5/3
Impinger 4	Empty	457.8	451.6	6.2	
Impinger 5	4%/10% (100ml)	543.9	542.7	1.2	Total Weight (gm)
Impinger 6	↓	568.9	564.9	4.0	577.6
Impinger 7	Silica gel	829.0	813.8	15.1 15.2 SB SB	~~592.7~~ 592.8

QA/QC SB
Date 5/3

CleanAir ENGINEERING

ORSAT READINGS

TEST LOCATION: U3 FF Out **PAGE** 1 **OF** 1

Client	Wheelabrator	Project Number	11414	$Fo = \frac{20.9 - \%O_2}{\%CO_2}$
Plant	North Broward	Unit	3	
Orsat ID	#6	Fuel Type	MSW	Leak Check Passed ☒

Run Number	Method Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Fo	Analyst	Analysis Date	Analysis Time
1	29	1	10.6	19.2	8.6		S. Brown	5/3/12	11:15
		2	10.6	19.2	8.6				
		3	10.7	19.2	8.5				
		Avg.	(10.6)		(8.6)				
2	29	1	9.8	18.8	9.0	1.21	S. Brown	5/3/12	13:55
		2	9.8	18.9	9.1				
		3	9.8	18.8	9.0				
		Avg.	(9.8)		(9.0)				
3	29	1	10.2	19.1	8.9		S. Brown	5/3/12	14:48
		2	10.2	19.0	8.8				
		3	10.2	19.0	8.8				
		Avg.	(10.2)		(8.8)				
		1							
		2							
		3							
		Avg.							
		1							
		2							
		3							
		Avg.							
		1							
		2							
		3							
		Avg.							

Repeat the analysis procedure until the results of any three analyses differ by no more than 0.2 percent by volume
Average the three acceptable values and report the results to the nearest 0.1 percent. Calculate Fo to verify result

Acceptable ranges for Fo:

Coal:	Anthracite and lignite	1.016-1.130	Gas:	Natural	1.600-1.836
	Bituminous	1.083-1.230		Propane	1.434-1.586
Oil:	Distillate	1.260-1.413		Butane	1.405-1.553
	Residual	1.210-1.370	Wood:		1.000-1.120

QA/QC SB
Date 5/13

CleanAir ENGINEERING

FIELD DATA PRINTOUTS

F

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

QA/QC Initials: MR

Date: 5/31/12

CleanAir

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Field Data Printout

Test Method: USEPA Method 29
Analyte: Mercury

Location: Unit 3 FF Outlet
Test Run: 1
Client: Wheelabrator North Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator: N. Hitchins 569
Test Date: 5/03/12
Start Time: 07:57
Stop Time: 10:10
Leak Rate Before: 0.002 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 8 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -11.6
O_2 (dry volume %): 8.57
CO_2 (dry volume %): 10.63
N_2+CO (dry volume %): 80.80
H_2O (condensate, ml or gm): 590.4
H_2O (silica, g): 19.0
Actual Moisture (%): 25.78

Nozzle ID No: 274-1
Nozzle Diameter (D_n): 0.274
Probe ID No: 67-8-10
Pitot C_p: 0.827
Pitot Leak Check: ☑ Pass ☐ Fail
Meter Box ID. No: 66-13
Meter ΔH@: 1.74780
Meter Y_d: 1.00410

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter $T_{m\text{-}in}$ (°F)	Dry Gas Meter $T_{m\text{-}out}$ (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{}$in. H_2O)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			209.945						
1-01	5.0	0.70	1.80	213.440	296	80	80	0.84	3.50	96.2
1-02	10.0	0.48	1.20	216.430	295	85	80	0.69	2.99	98.7
1-03	15.0	0.60	1.60	219.890	298	87	80	0.77	3.46	102.2
1-04	20.0	0.60	1.60	223.370	297	90	81	0.77	3.48	102.4
1-05	25.0	0.63	1.60	226.865	296	93	82	0.79	3.50	99.9
LEAK CHECK	25.0			226.960						
2-01	30.0	0.80	2.10	230.940	293	93	83	0.89	3.98	100.8
2-02	35.0	0.70	1.80	234.660	294	96	84	0.84	3.72	100.4
2-03	40.0	0.60	1.60	238.190	293	98	85	0.77	3.53	102.5
2-04	45.0	0.53	1.40	241.500	292	98	86	0.73	3.31	102.0
2-05	50.0	0.52	1.40	244.770	291	99	86	0.72	3.27	101.6
LEAK CHECK	50.0			244.865						
3-01	55.0	0.71	1.80	248.560	293	96	87	0.84	3.69	98.6
3-02	60.0	0.63	1.60	252.110	292	99	88	0.79	3.55	100.1
3-03	65.0	0.57	1.50	255.530	292	100	88	0.75	3.42	101.3
3-04	70.0	0.57	1.50	258.940	295	101	89	0.75	3.41	101.0
3-05	75.0	0.46	1.20	262.035	294	101	90	0.68	3.10	101.8
LEAK CHECK	75.0			262.160						
4-01	80.0	0.45	1.10	265.060	290	97	90	0.67	2.90	96.5
4-02	85.0	0.64	1.70	268.660	292	99	90	0.80	3.60	100.6
4-03	90.0	0.58	1.50	272.140	294	101	91	0.76	3.48	101.9
4-04	95.0	0.55	1.40	275.460	293	101	91	0.74	3.32	99.8
4-05	100.0	0.45	1.10	278.420	293	101	91	0.67	2.96	98.3
LEAK CHECK	100.0			278.535						
5-01	105.0	0.64	1.60	282.060	293	99	91	0.80	3.52	98.4
5-02	110.0	0.64	1.60	285.590	293	101	92	0.80	3.53	98.3
5-03	115.0	0.60	1.50	289.100	293	102	92	0.77	3.51	100.8
5-04	120.0	0.55	1.40	292.420	294	102	92	0.74	3.32	99.7
5-05	125.0	0.47	1.20	295.540	293	102	93	0.69	3.12	101.1
Final	125.0		1.51200	85.16500	293.56000	92.06000		0.76393	85.16500	
25 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages		0.7639	1.5120	85.1650	293.5600	92.0600				
		☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK				

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Field Data Printout

Test Method: USEPA Method 29
Analyte: Mercury

Location: Unit 3 FF Outlet
Test Run: 2
Client: Wheelabrator North Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator: N. Hitchins 569
Test Date: 5/03/12
Start Time: 10:35
Stop Time: 12:48
Leak Rate Before: 0.003 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 8 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -10.8
O_2 (dry volume %): 9.03
CO_2 (dry volume %): 9.80
N_2+CO (dry volume %): 81.17
H_2O (condensate, ml or gm): 549.2
H_2O (silica, g): 15.4
Actual Moisture (%): 25.07

Nozzle ID No: 274-1
Nozzle Diameter (D_n): 0.274
Probe ID No: 67-8-10
Pitot C_p: 0.827
Pitot Leak Check: ☑Pass ☐Fail
Meter Box ID. No: 66-13
Meter ΔH@: 1.74780
Meter Y_d: 1.00410

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s	Sample ΔH	Metered (dcf)	Stack T_s	Dry Gas Meter $T_{m\text{-}in}$	Dry Gas Meter $T_{m\text{-}out}$	$\sqrt{\Delta P_s}$ (calculated)	Volume (calculated)	Isokinetics (calculated)
	0.0	(in. H_2O)	(in. H_2O)	296.000	(°F)	(°F)	(°F)	($\sqrt{in.}$ H_2O)	(ft^3)	(%)
1-01	5.0	0.65	1.70	299.730	291	93	91	0.81	3.73	102.7
1-02	10.0	0.46	1.20	302.930	290	97	91	0.68	3.20	104.2
1-03	15.0	0.46	1.20	305.960	290	99	91	0.68	3.03	98.5
1-04	20.0	0.52	1.30	309.170	293	100	91	0.72	3.21	98.2
1-05	25.0	0.60	1.50	312.635	294	102	91	0.77	3.46	98.7
LEAK CHECK	25.0			312.750						
2-01	30.0	0.65	1.70	316.410	295	102	93	0.81	3.66	100.1
2-02	35.0	0.56	1.40	319.760	295	103	93	0.75	3.35	98.5
2-03	40.0	0.56	1.40	323.070	293	104	94	0.75	3.31	97.0
2-04	45.0	0.49	1.20	326.170	294	105	94	0.70	3.10	97.1
2-05	50.0	0.52	1.30	329.385	297	105	95	0.72	3.21	97.9
LEAK CHECK	50.0			329.490						
3-01	55.0	0.71	1.80	333.180	296	103	96	0.84	3.69	96.3
3-02	60.0	0.65	1.70	336.860	295	107	96	0.81	3.68	99.9
3-03	65.0	0.60	1.50	340.370	294	107	97	0.77	3.51	99.0
3-04	70.0	0.53	1.40	343.700	293	108	98	0.73	3.33	99.6
3-05	75.0	0.47	1.20	346.830	295	108	99	0.69	3.13	99.4
LEAK CHECK	75.0			346.950						
4-01	80.0	0.57	1.50	350.390	295	105	99	0.75	3.44	99.6
4-02	85.0	0.57	1.50	353.770	297	108	99	0.75	3.38	97.7
4-03	90.0	0.59	1.50	357.160	298	108	99	0.77	3.39	96.4
4-04	95.0	0.59	1.50	360.500	298	109	100	0.77	3.34	94.8
4-05	100.0	0.52	1.30	363.785	298	109	100	0.72	3.29	99.3
LEAK CHECK	100.0			363.885						
5-01	105.0	0.43	1.10	366.860	293	107	101	0.66	2.98	98.6
5-02	110.0	0.52	1.30	370.100	297	108	102	0.72	3.24	97.8
5-03	115.0	0.51	1.30	373.340	296	109	102	0.71	3.24	98.6
5-04	120.0	0.51	1.30	376.560	295	109	102	0.71	3.22	97.9
5-05	125.0	0.47	1.20	379.670	294	109	102	0.69	3.11	98.4
Final	125.0		1.40000	83.23000	294.64000	100.80000		0.73910	83.23000	
25 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages		0.7391	1.4000	83.2300	294.6400	100.8000				
		☑Avg. OK	☑Avg. OK	☑Avg. OK	☑Avg. OK	☑Avg. OK				

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Field Data Printout

				Test Method:	**USEPA Method 29**
Location:	Unit 3 FF Outlet			**Analyte:**	**Mercury**
Test Run:	3				
Client:	Wheelabrator North Broward, Inc.		Bar. Press. (in. Hg):	30.10	Nozzle ID No: 274-1
Project No:	11414		Static P:	-10.6	Nozzle Diameter (D_n): 0.274
Source Area (ft^2):	64.00000		O_2 (dry volume %):	8.83	Probe ID No: 67-8-10
Meter Operator:	N. Hitchins	569	CO_2 (dry volume %):	10.20	Pitot C_p: 0.827
Probe Operator:	N. Hitchins	569	N_2+CO (dry volume %):	80.97	Pitot Leak Check: ☑ Pass ☐ Fail
Test Date:	5/03/12				
Start Time:	13:15				
Stop Time:	15:28		H_2O (condensate, ml or gm):	577.6	Meter Box ID. No: 66-13
Leak Rate Before:	0.005 cfm	@ 15 "Hg	H_2O (silica, g):	15.2	Meter ΔH@: 1.74780
Leak Rate After:	0.001 cfm	@ 7 "Hg	Actual Moisture (%):	25.70	Meter Y_d: 1.00410

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter $T_{m\text{-}in}$ (°F)	Dry Gas Meter $T_{m\text{-}out}$ (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{}$in. H_2O)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			380.110						
1-01	5.0	0.55	1.40	383.570	292	99	99	0.74	3.46	103.1
1-02	10.0	0.55	1.40	386.820	292	103	99	0.74	3.25	96.5
1-03	15.0	0.46	1.20	389.960	292	105	99	0.68	3.14	101.7
1-04	20.0	0.55	1.40	393.260	295	106	99	0.74	3.30	97.9
1-05	25.0	0.56	1.50	396.710	292	106	98	0.75	3.45	101.3
LEAK CHECK	25.0			396.815						
2-01	30.0	0.76	2.00	400.760	291	106	99	0.87	3.94	99.4
2-02	35.0	0.63	1.60	404.310	292	106	99	0.79	3.55	98.2
2-03	40.0	0.56	1.50	407.780	295	107	99	0.75	3.47	101.9
2-04	45.0	0.55	1.40	411.180	294	108	99	0.74	3.40	100.6
2-05	50.0	0.56	1.50	414.560	292	107	99	0.75	3.38	99.1
LEAK CHECK	50.0			414.690						
3-01	55.0	0.56	1.50	418.100	294	105	99	0.75	3.41	100.3
3-02	60.0	0.53	1.40	421.450	296	107	99	0.73	3.35	101.2
3-03	65.0	0.53	1.40	424.740	294	107	99	0.73	3.29	99.2
3-04	70.0	0.56	1.50	428.170	294	107	99	0.75	3.43	100.7
3-05	75.0	0.56	1.50	431.560	295	107	98	0.75	3.39	99.7
LEAK CHECK	75.0			431.675						
4-01	80.0	0.50	1.30	434.930	293	105	98	0.71	3.26	101.3
4-02	85.0	0.71	1.80	438.670	294	106	98	0.84	3.74	97.7
4-03	90.0	0.56	1.50	442.100	294	107	98	0.75	3.43	100.8
4-04	95.0	0.54	1.40	445.430	293	107	98	0.73	3.33	99.5
4-05	100.0	0.43	1.10	448.440	294	107	98	0.66	3.01	100.8
LEAK CHECK	100.0			448.535						
5-01	105.0	0.55	1.40	451.810	294	104	98	0.74	3.27	97.3
5-02	110.0	0.58	1.50	455.300	294	107	98	0.76	3.49	100.8
5-03	115.0	0.59	1.50	458.660	294	107	98	0.77	3.36	96.2
5-04	120.0	0.58	1.50	462.090	295	107	98	0.76	3.43	99.1
5-05	125.0	0.50	1.30	465.320	294	108	98	0.71	3.23	100.3
Final	125.0		1.46000	84.76500	293.56000	102.28000		0.74739	84.76500	
25 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages		0.7474	1.4600	84.7650	293.5600	102.2800				
		☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK				

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USEPA Method 3 Laboratory Data

Test Method: USEPA Method 29
Analyte: Mercury

Location: Unit 3 FF Outlet
Client: Wheelabrator North Broward, Inc.
Project No: 11414
Method: EPA Method 3
Fuel Type: Municipal Waste
F_o for Fuel: 1.03 to 1.3

Analyst: S. Brown
Analyst Emp No: 433

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: Orsat
1	1	10.6	19.2	8.6	80.8	30.04		
	2	10.6	19.2	8.6	80.8	30.04		
	3	10.7	19.2	8.5	80.8	30.05		
	Avg.	10.63333		8.56667	80.80000	30.04	1.15987	*All measurements in spec.*
CEM or Other Avg:								☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: Orsat
2	1	9.8	18.8	9.0	81.2	29.93		
	2	9.8	18.9	9.1	81.1	29.93		
	3	9.8	18.8	9.0	81.2	29.93		
	Avg.	9.80000		9.03333	81.16667	29.93	1.21088	*All measurements in spec.*
CEM or Other Avg:								☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: Orsat
3	1	10.2	19.1	8.9	80.9	29.99		
	2	10.2	19.0	8.8	81.0	29.98		
	3	10.2	19.0	8.8	81.0	29.98		
	Avg.	10.20000		8.83333	80.96667	29.99	1.18301	*All measurements in spec.*
CEM or Other Avg:								☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis:
	1							
	2							
	3							
	Avg.							
CEM or Other Avg:								☐ Fo value within expected range.

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USEPA Method 4 Laboratory Data

Location: Unit 3 FF Outlet
Client: Wheelabrator North Broward, Inc.
Project No: 11414

Test Method: USEPA Method 29
Analyte: Mercury
Analyst: S. Brown
Analyst Emp No: 433

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	848.0	466.3	381.7
Impinger 2	5%HNO3/10%H2O2	805.3	634.1	171.2
Impinger 3	5%HNO3/10%H2O2	576.3	543.9	32.4
Impinger 4	Empty	454.2	451.1	3.1
Impinger 5	4%KMnO4/10%H2SO4	544.0	542.7	1.3
Impinger 6	4%KMnO4/10%H2SO4	582.9	582.2	0.7
Impinger 7	Silica Gel	813.8	794.8	19.0
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
590.4	Liquid (gm)		
0.0	less rinse (gm)		
590.4	Net Liquid (gm)	590.4	☑ QA/QC OK
+ 19.0	Silica Gel (gm)	19.0	☑ QA/QC OK
609.4	Total Vlc (gm)	609.4	☑ QA/QC OK

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	793.9	442.8	351.1
Impinger 2	5%HNO3/10%H2O2	739.9	568.4	171.5
Impinger 3	5%HNO3/10%H2O2	544.7	522.4	22.3
Impinger 4	Empty	433.7	430.9	2.8
Impinger 5	4%KMnO4/10%H2SO4	556.8	556.7	0.1
Impinger 6	4%KMnO4/10%H2SO4	524.2	522.8	1.4
Impinger 7	Silica Gel	764.0	748.6	15.4
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
549.2	Liquid (gm)		
0.0	less rinse (gm)		
549.2	Net Liquid (gm)	549.2	☑ QA/QC OK
+ 15.4	Silica Gel (gm)	15.4	☑ QA/QC OK
564.6	Total Vlc (gm)	564.6	☑ QA/QC OK

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	898.4	534.0	364.4
Impinger 2	5%HNO3/10%H2O2	753.4	587.1	166.3
Impinger 3	5%HNO3/10%H2O2	579.2	543.7	35.5
Impinger 4	Empty	457.8	451.6	6.2
Impinger 5	4%KMnO4/10%H2SO4	543.9	542.7	1.2
Impinger 6	4%KMnO4/10%H2SO4	568.9	564.9	4.0
Impinger 7	Silica Gel	829.0	813.8	15.2
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
577.6	Liquid (gm)		
0.0	less rinse (gm)		
577.6	Net Liquid (gm)	577.6	☑ QA/QC OK
+ 15.2	Silica Gel (gm)	15.1	☐ QA/QC OK
592.8	Total Vlc (gm)	592.7	☐ QA/QC OK

Test Run:

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty			
Impinger 2	5%HNO3/10%H2O2			
Impinger 3	5%HNO3/10%H2O2			
Impinger 4	Empty			
Impinger 5	4%KMnO4/10%H2SO4			
Impinger 6	4%KMnO4/10%H2SO4			
Impinger 7	Silica Gel			
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
	Liquid (gm)		
	less rinse (gm)		
	Net Liquid (gm)		☐ QA/QC OK
	Silica Gel (gm)		☐ QA/QC OK
	Total Vlc (gm)		☐ QA/QC OK

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LABORATORY DATA

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

QA/QC Initials: MK

Date: 5/31/12

CleanAir.

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

USEPA Method 29
Mercury (Hg) Laboratory Parameters

Detection Limits		
$m_{1b\text{-}DL}$	Fraction 1B Detection Limit (µg)	0.1000
$m_{2b\text{-}DL}$	Fraction 2B Detection Limit (µg)	0.2000
$m_{3a\text{-}DL}$	Fraction 3A Detection Limit (µg)	0.2000
$m_{3b\text{-}DL}$	Fraction 3B Detection Limit (µg)	0.5000
$m_{3c\text{-}DL}$	Fraction 3C Detection Limit (µg)	0.4000
Blank Analysis		
$m_{1b\text{-}B}$	Fraction 1B Blank (µg)	<0.1000
$m_{2b\text{-}B}$	Fraction 2B Blank (µg)	<0.2000
$m_{3a\text{-}B}$	Fraction 3A Blank (µg)	<0.2000
$m_{3b\text{-}B}$	Fraction 3B Blank (µg)	<0.5000
$m_{3c\text{-}B}$	Fraction 3C Blank (µg)	<0.4000
$m_{total\text{-}B}$	Total Blank Amount (µg)	<1.4000

Run No.		**1**	**2**	**3**
Date (2012)		May 3	May 3	May 3
Start Time (approx.)		07:57	10:35	13:15
Stop Time (approx.)		10:10	12:48	15:28
Sample Analysis				
$m_{1b\text{-}S}$	Fraction 1B Sample (µg)	<0.1000	<0.1000	<0.1000
$m_{2b\text{-}S}$	Fraction 2B Sample (µg)	14.0019	13.6990	9.6929
$m_{3a\text{-}S}$	Fraction 3A Sample (µg)	<0.2000	<0.2000	<0.2000
$m_{3b\text{-}S}$	Fraction 3B Sample (µg)	<0.5000	<0.5000	<0.5000
$m_{3c\text{-}S}$	Fraction 3C Sample (µg)	<0.4000	<0.4000	0.4579
$m_{total\text{-}S}$	Total Sample Amount (µg)	14.0019	13.6990	10.1508
Allowable Blank				
$m_{T\text{-}B\text{-}allow}$	Total Allowable Blank (µg)	0.0000	0.0000	0.0000
Sample Corrected for Blank				
m_n	Total Sample Amount (µg)	14.0019	13.6990	10.1508
Sample Corrected for Blank - Fractions				
$m_{n\text{-}1b}$	Fraction 1B (µg)	<0.1000	<0.1000	<0.1000
$m_{n\text{-}2b}$	Fraction 2B (µg)	14.0019	13.6990	9.6929
$m_{n\text{-}3a}$	Fraction 3A (µg)	<0.2000	<0.2000	<0.2000
$m_{n\text{-}3b}$	Fraction 3B (µg)	<0.5000	<0.5000	<0.5000
$m_{n\text{-}3c}$	Fraction 3C (µg)	<0.4000	<0.4000	0.4579

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Clean Air Engineering, Inc.

500 West Wood Street
Palatine, IL 60067

Project Number: 11414NB

Mercury

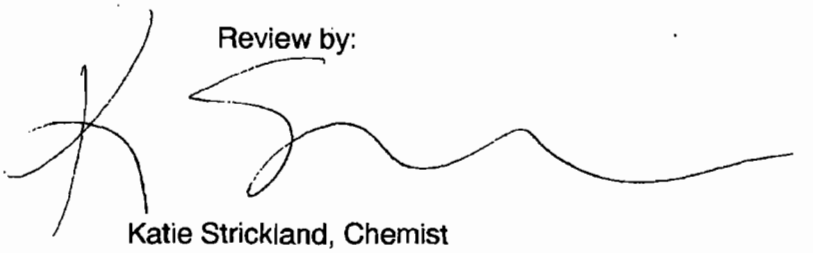
EPA Methods 29 Analysis

Analytical Report
18665

Element One, Inc.
5022-C Wrightsville Av., Wilmington, NC 28403
910-793-0128 FAX: 910-792-6853 e1lab@e1lab.com

The following data for Analytical Report 18665
has been reviewed for completeness, accuracy,
adherence to method protocol,
and compliance with quality assurance guidelines.

Review by:



Katie Strickland, Chemist
May 8, 2012

Report Reviewed and Finalized By:

Ken Smith, Laboratory Director
May 8, 2012

SUMMARY OF RESULTS

Summary of Analysis

Unit 3 - Summary of Method 29 Mercury Analysis

Run Number		Average Total Catch, µg	Front Half µg	H_2O_2 /HNO_3 µg	Empty Impinger µg	$KMnO_4$ µg	HCl µg
U3 FF Outlet R1	#1	14.0	< 0.1	14.2	< 0.2	< 0.5	< 0.4
	#2		< 0.1	13.8	< 0.2	< 0.5	< 0.4
U3 FF Outlet R2	#1	13.7	< 0.1	13.7	< 0.2	< 0.5	< 0.4
	#2		< 0.1	13.7	< 0.2	< 0.5	< 0.4
U3 FF Outlet R3	#1	10.2	< 0.1	9.73	< 0.2	< 0.5	0.460
	#2		< 0.1	9.65	< 0.2	< 0.5	0.456
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

ANALYTICAL NARRATIVE

Element One Analytical Narrative

Client:	Clean Air, IL	Element One #:	18665
Client ID:	11414NB – N Broward	Analyst:	KLS & LAL
Method:	Methods 29	Dates Received:	05.04.12
Analytes:	Hg	Dates Analyzed:	05.04-08.12

Summary of Analysis

The Method 29 samples were digested, prepared, and analyzed according to Method 29 protocol. Samples were analyzed for mercury on a PerkinElmer FIMS-100 CVAA mercury analyzer.

Detection Limits

The FIMS-100 CVAA instrument reporting limit for mercury was 0.004 µg per aliquot analyzed.

Analysis QA/QC

Duplicate analyses relative percent difference (RPD) and spike sample recovery data are summarized in the Quality Control Section. All QA/QC data was within the criteria of the method.

Additional Comments

The reported results have not been corrected for any blank values or spike recovery values.

QUALITY CONTROL SUMMARY

Summary of Quality Control Data

Mercury Duplicate Analysis RPD

(Method 29 QC limits: < 10% for RPD)

Run Number	Front Half	H_2O_2/HNO_3	Empty Imp	$KMnO_4$	HCl
U3 FF Outlet R1	NA	2.6%	NA	NA	NA
U3 FF Outlet R2	NA	0.5%	NA	NA	NA
U3 FF Outlet R3	NA	0.9%	NA	NA	0.7%
Reagent Blank	NA	NA	NA	NA	NA

Mercury Spike Recoveries

(Method 29 QC limits: ± 25% for Spike Recoveries)

Run Number		Front Half	H_2O_2/HNO_3	Empty Imp	$KMnO_4$	HCl
U3 FF Outlet R3	#1	116%	88%	95%	94%	95%
	#2	116%	89%	98%	91%	94%

SAMPLE CUSTODY

18665

66-11414NB-1

CLIENT	Wheelabrator			PROJECT	11414NB								
PLANT	North Broward			DEPT	66								
PROJECT MANAGER	S. Brown			CleanAir									
ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION		500 West Wood Street Palatine, IL 60067 800-627-0033 (phone) 847-991-3365 (fax)									
USEPA M-29	1	QUARTZ FILTER 250 mL HDLP											

LAB ID NUMBER	DATE (2012)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	ANALYSIS REQUESTED: Gravimetric	Metals	Mercury	Archive	ADDITIONAL INFORMATION
	5/2	Unit 1 FF Outlet	1	Quartz Filter	1				X		Expedite Unit 1 and 2 results (results 5/8)
	5/2	Unit 1 FF Outlet	2	Quartz Filter	1				X		Please report Unit 3 Separately
	5/2	Unit 1 FF Outlet	3	Quartz Filter	1				X		Include reagent balnk results
											in both reports
	5/3	FF Outlet	Field Blank	Quartz Filter	1					X	
	5/1	Unit 2 FF Outlet	1	Quartz Filter	1				X		
	5/1	Unit 2 FF Outlet	2	Quartz Filter	1				X		
	5/1	Unit 2 FF Outlet	3	Quartz Filter	1				X		
	5/3	Unit 3 FF Outlet	1	Quartz Filter	1				X		
	5/3	Unit 3 FF Outlet	2	Quartz Filter	1				X		
	5/3	Unit 3 FF Outlet	3	Quartz Filter	1				X		

FORWARDING LAB
Element One, Inc
5022-C Wrightsville Avenue
Wilmington, NC 28403
910-793-0128 (phone)
910-792-6853 (fax)

Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	This form completed by:
S. Brown	5/3/2012 16:00					S. Brown
Received By: (signature)	**Date / Time**	**Received By: (signature)**	**Date / Time**	**Relinquished By: (signature)**	**Date / Time**	**Signature / Date**
Leo Burton	5/4/12 0950					Scott Brown 5/3/2012

Samples received in good condition in Fisherbrand & QEC Level 2 containers. No empty containers.

18665

CLIENT: Wheelabrator				PROJECT: 11414NB									66-11414NB-2	
PLANT: North Broward				DEPT.: 66										
PROJECT MANAGER: S. Brown				CleanAir 500 West Wood Street Palatine, IL 60067 800-627-0033 (phone) 847-991-3385 (fax)									FORWARDING LAB Element One, Inc 5022-C Wrightsville Avenue Wilmington, NC 28403 910-793-0126 (phone) 910-792-6853 (fax)	
ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION							ANALYSIS REQUESTED					
USEPA M-29	3	FRONT HALF HNO_3 RINSE 250 mL HDLP							Gravimetric	Metals	Mercury	Archive		
LAB ID NUMBER	DATE (2012)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED?	LIQUID LEVEL MARKED?						ADDITIONAL INFORMATION	
	5/2	Unit 1 FF Outlet	1	Front Half HNO_3 Rinse, 250 mL HDLP	1					X			Expedite Unit 1 and 2 results (results 5/8)	
	5/2	Unit 1 FF Outlet	2	Front Half HNO_3 Rinse, 250 mL HDLP	1					X			Please report Unit 3 Separately	
	5/2	Unit 1 FF Outlet	3	Front Half HNO_3 Rinse, 250 mL HDLP	1					X			Include reagent balnk results	
													in both reports	
	5/3	FF Outlet	Field Blank	Front Half HNO_3 Rinse, 250 mL HDLP	1						X			
	5/1	Unit 2 FF Outlet	1	Front Half HNO_3 Rinse, 250 mL HDLP	1					X				
	5/1	Unit 2 FF Outlet	2	Front Half HNO_3 Rinse, 250 mL HDLP	1					X				
	5/1	Unit 2 FF Outlet	3	Front Half HNO_3 Rinse, 250 mL HDLP	1					X				
	5/3	Unit 3 FF Outlet	1	Front Half HNO_3 Rinse, 250 mL HDLP	1					X				
	5/3	Unit 3 FF Outlet	2	Front Half HNO_3 Rinse, 250 mL HDLP	1					X				
	5/3	Unit 3 FF Outlet	3	Front Half HNO_3 Rinse, 250 mL HDLP	1					X				
	4/30	Train Proof	NA	Front Half HNO_3 Rinse, 250 mL HDLP							X			

Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	This form completed by:	
S. Brown	5/3/2012 16:00					S. Brown	
Received By: (signature)	**Date / Time**	**Received By: (signature)**	**Date / Time**	**Relinquished By: (signature)**	**Date / Time**	**Signature**	**Date**
Lisa Bratton	5/4/12 0950					Scott Brown	5/3/2012

18665

66-11414NB-3

CLIENT Wheelabrator | PROJECT 11414NB
PLANT North Broward | DEPT. 66
PROJECT MANAGER S. Brown

CleanAir.
500 West Wood Street
Palatine, IL 60067
800-627-0033 (phone)
847-991-3385 (fax)

ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION
USEPA M-29	4	IMPINGERS 1-3 CATCH AND RINSE 1000 mL HDLP

FORWARDING LAB
Element One, Inc
5022-C Wrightsville Avenue
Wilmington, NC 28403
910-793-0128 (phone)
910-792-6853 (fax)

LAB ID NUMBER	DATE (2012)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	ANALYSIS REQUESTED: Gravimetric	Metals	Mercury	Archive	ADDITIONAL INFORMATION
	5/2	Unit 1 FF Outlet	1	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1				X		Expedite Unit 1 and 2 results (results 5/8)
	5/2	Unit 1 FF Outlet	2	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1				X		Please report Unit 3 Separately
	5/2	Unit 1 FF Outlet	3	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1				X		Include reagent balnk results
											in both reports
	5/3	FF Outlet	Field Blank	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1					X	
	5/1	Unit 2 FF Outlet	1	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1				X		
	5/1	Unit 2 FF Outlet	2	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1				X		
	5/1	Unit 2 FF Outlet	3	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1				X		
	5/3	Unit 3 FF Outlet	1	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1				X		
	5/3	Unit 3 FF Outlet	2	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1				X		
	5/3	Unit 3 FF Outlet	3	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1				X		

Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	This form completed by:
S. Brown	5/3/2012 16:00					S. Brown
Received By: (signature) Lisa Bruton	Date / Time 5/4/12 0930	Received By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Signature: Scott Brown Date: 5/3/2012

18665

56-11414NB-S

CLIENT: Wheelabrator
PLANT: North Broward
PROJECT MANAGER: S. Brown
PROJECT: 11414NB
DEPT.: 66

ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION
USEPA M-29	5B	IMPINGERS 5-6 CATCH AND RINSE 950 mL AMBER GLASS

CleanAir
500 West Wood Street
Palatine, IL 60067
800-627-9033 (phone)
847-991-3385 (fax)

FORWARDING LAB
Element One, Inc
5022-C Wrightsville Avenue
Wilmington, NC 28403
910-793-0126 (phone)
910-792-5283 (fax)

LAB ID NUMBER	DATE (2012)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	ANALYSIS REQUESTED: Gravimetric	Metals	Mercury	Archive	ADDITIONAL INFORMATION
	5/2	Unit 1 FF Outlet	1	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1				X		Expedite Unit 1 and 2 results (results 6/8)
	5/2	Unit 1 FF Outlet	2	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1				X		Please report Unit 3 Separately
	5/2	Unit 1 FF Outlet	3	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1				X		Include reagent balnk results
				Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1				X		in both reports
	5/3	FF Outlet	Field Blank	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1					X	
	5/1	Unit 2 FF Outlet	1	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1				X		
	5/1	Unit 2 FF Outlet	2	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1				X		
	5/1	Unit 2 FF Outlet	3	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1				X		
				Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1				X		
	5/3	Unit 3 FF Outlet	1	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1				X		
	5/3	Unit 3 FF Outlet	2	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1				X		
	5/3	Unit 3 FF Outlet	3	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1				X		
				Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1				X		

Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	This form completed by:
S. Brown	5/3/2012 18:00					S Brown
Received By: (signature)	**Date / Time**	**Received By: (signature)**	**Date / Time**	**Relinquished By: (signature)**	**Date / Time**	**Signature / Date**
Lisa Bratton	5/4/12 0930					Scott Brown 5/3/2012

18665

66-11414NB-6

CLIENT Wheelabrator
PLANT North Broward
PROJECT MANAGER S. Brown
PROJECT 11414NB
DEPT. 66

CleanAir
500 West Wood Street
Palatine, IL 60067
800-627-0033 (phone)
847-991-3385 (fax)

ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION
USEPA M-29	5C	IMPINGERS 5-6 8N HCL RINSE 250 mL AMBER GLASS

FORWARDING LAB
Element One, Inc
5022-C Wrightsville Avenue
Wilmington, NC 28403
910-793-0126 (phone)
910-792-6853 (fax)

LAB ID NUMBER	DATE (2012)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	ANALYSIS REQUESTED: Gravimetric	Metals	Mercury	Archive	ADDITIONAL INFORMATION
	5/2	Unit 1 FF Outlet	1	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X			Expedite Unit 1 and 2 results (results 5/8)
	5/2	Unit 1 FF Outlet	2	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X			Please report Unit 3 Separately
	5/2	Unit 1 FF Outlet	3	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X			Include reagent balnk results
				Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X			in both reports
	5/3	FF Outlet	Field Blank	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1				X		
	5/1	Unit 2 FF Outlet	1	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X			
	5/1	Unit 2 FF Outlet	2	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X			
	5/1	Unit 2 FF Outlet	3	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X			
				Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X			
	5/3	Unit 3 FF Outlet	1	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X			
	5/3	Unit 3 FF Outlet	2	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X			
	5/3	Unit 3 FF Outlet	3	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X			
				Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X			

Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	This form completed by:
S. Brown	5/3/2012 16:00					S. Brown
Received By: (signature)	Date / Time	Received By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Signature / Date
Lee Bratton	5/4/12 0930					Scott Brown 5/3/2012

18665

66-11414NB-7

CLIENT	Wheelabrator	PROJECT	11414NB
PLANT	North Broward	DEPT.	66
PROJECT MANAGER	S. Brown		

ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION
USEPA M-29	SEE BELOW (IF APPLICABLE)	REAGENT BLANKS

CleanAir
500 West Wood Street
Palatine, IL 60067
800-627-0033 (phone)
847-991-3385 (fax)

LAB ID NUMBER	DATE (2012)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	ANALYSIS REQUESTED: Gravimetric	Metals	Mercury	Archive	ADDITIONAL INFORMATION
	5/1	Reagent Blank	All	Acetone (200 mL), Container 7; 250 mL Clear Glass	1				X		Expedite Unit 1 and 2 results (results 5/8)
	5/1	Reagent Blank	All	0.1 N HNO_3 (300 mL), Container 8A: 1000 mL HDPE	1				X		Please report Unit 3 Separately
	5/1	Reagent Blank	All	DI Water (100 mL), Container 8B: 250 mL HDPE	1				X		Include reagent balnk results
	5/1	Reagent Blank	All	5% HNO_3 / 10% H_2O_2 (200 mL), Container 9: 250 mL HDPE	1				X		in both reports
	5/1	Reagent Blank	All	4% $KMnO_4$ / 10% H_2SO_4 (100 mL), Container 10: 250 mL Amber Glass	1				X		
	5/1	Reagent Blank	All	DI Water (200 mL) / 8N HCl (25 mL), Container 11: 250 mL Amber Glass	1				X		
	5/1	Reagent Blank	All	Quartz Filters (3), Container 12: 250 mL HDPE	1				X		

Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	This form completed by:
S. Brown	5/3/2012 16:00					S. Brown
Received By: (signature)	**Date / Time**	**Received By: (signature)**	**Date / Time**	**Relinquished By: (signature)**	**Date / Time**	**Signature / Date**
Lisa Bruton	5/4/12 0950					Scott Brown 5/3/2012

ANALYTICAL DATA

Analytical Calculations

Mercury-

$$\textbf{Mercury Results (µg)} = \frac{\textbf{CVAA Results (µg)}}{\textbf{Aliquot (ml)}} * \textbf{Final Volume (ml)}$$

Where-

CVAA Results= Raw sample reading (µg)--*Hg-Data Sheet*

Aliquot= Sample Aliquot (Alq.)--*Hg-Data Sheet*

Final Volume=Final Volume (FV)*--*Sample Submission*
* With the exception of the BH fraction where-
=Received Volume (BV)--*Sample Submission*

Analytical Calculations

Spike Recovery-

$$\textbf{Spike (\%)} = \frac{\textbf{(Spiked Result (µg/L) – Sample Result (µg/L))}}{\textbf{Spike Amount (µg/L)}} \quad \textbf{X100}$$

Where-

Spike Result = Raw sample concentration (ppb)—*Hg Data Sheet*

Sample Result = Raw sample concentration (ppb) -- *Hg Data Sheet*

Spike Amount-- *Hg Data Sheet*

Duplicate Analysis RPD-

$$\textbf{RPD (\%)} = \frac{\textbf{(Duplicate Result (µg/L) - Sample Result (µg/L))}}{\textbf{Average (µg/L)}} \quad \textbf{X100}$$

Where-

Sample Result =Raw sample concentration (ppb) -- *Hg Data Sheet*

Duplicate Results=Raw sample concentration (ppb) -- *Hg Data Sheet*

Average= $\frac{\textit{(Duplicate + Sample Results)}}{2}$

elementOne **AIR TESTING SAMPLE SUBMISSION FORM** **Lab ID** **18665**

FH/BH Combined **RUSH Samples 1-6, 10—Due 5.8.12**	Analysis Due Date	05.14.12
	QA/QC/Report Due Date	05.16.12

Client	Clean Air IL
Project No	11414NB—N Broward

Date Rec	05.04.12
Time Rec	0950

HNO_3 Lot: 111411	HF Lot: 511C050	HCl Lot: 4108116	**Ref. Method: 29**
Volume Marked Y / N	Volume Loss Y (N) ?		

Sample Identification

1	U1 FF Outlet R1	4	U2 FF Outlet R1	7	U3 FF Outlet R1
2	U1 FF Outlet R2	5	U2 FF Outlet R2	8	U3 FF Outlet R2
	U1 FF Outlet R2 Duplicate		U2 FF Outlet R2 Duplicate		U3 FF Outlet R2 Duplicate
3	U1 FF Outlet R3	6	U2 FF Outlet R3	9	U3 FF Outlet R3
	U1 FF Outlet R3 Spike		U2 FF Outlet R3 Spike		U3 FF Outlet R3 Spike
				10	Reagent Blank
				11	Field Blank and Train Proof

Analyses Requested	Samples 1-10 Hg
	NOTE: Archive Field Blank and Train Proof

Runs / FB	Fil / Ace (FH)		HNO_3 (FH)		5% HNO_3/10% H_2O_2 (BH)			HNO_3 (A)		$KMnO_4$ (B)		HCl (C)	
	pH <2.0 Y / N		pH <2.0 (Y) N		pH <2.0 Y / N			pH <2.0 (Y) N		pH <2.0 (Y) N		pH <2.0 (Y) N	
Lab ID	Fil ID	BV ml	BV ml	FV ml	BV ml	Used	FV ml	BV ml	FV ml	BV ml	FV ml	BV ml	FV ml
1			115	100	830			102	200	315	500	230	400
2.D			127		850			110		385		230	
3.S			112		900			110		380		230	
4			135		900			110		390		240	
5.D			125		750			105		350		235	
6.S			115		790			105		400		180	
7			107		900			110		380		230	
8.D			100		850			105		475		240	
9.S			113		880			112		485		230	

M-29 Reagent Blank

Lab ID	Fraction			BV, ml	FV, ml	Comments
10	C-7	FH	Acetone Blank			
	C-8A	FH	0.1N HNO_3	305	100	used 100mL
	C-8A	A	0.1N HNO_3	305	—	
	C-8B	B	DI H_2O	104	90+30	
	C-9	BH	5% HNO_3/10% H_2O_2	200		
	C-10	B	4% $KMnO_4$/10%H_2SO_4	90	90+30	
	C-11	C	8N HCl DI H_2O	225	400	
	C-12	FH	Filter			

Lab Communications

M29: Received C1, C3, C4, C5a, C5b, C5c; RB C12, C8a, C8b, C9, C10, C11—05.04.12 LLB

SS Page 1 of 1
5/4/2012 11:45:54 AM
SS by ZKB
Labeled By/Date UL 5.4.12

FH Prep By/Date KLS 5.7.12
BH Prep By/Date 5.4.12 LAL
BH/FH Prep By/Date —
PM Prep By / Date —

A Prep By/Date KLS 5.4.12
B Prep By/Date KLS 5.4.12
C Prep By/Date KLS 5.7.12
ID Verification By/Date KLS 5.4.12

elementOne **Method 29 Microwave Worksheet** Lab ID # e 18665

Client: CAE

Date Digested: 5.7.12 Initials: KLS Worksheet Prepared by: KLS

Auto Sample Loc.	Sample Lab ID	Sample Weight (g)	# of filters digested	Spike	Prep Volume (ml)	Weight In Micro / Weight Out Micro	Units
1	LRB+				100		
2	LRB						
3	18665-1		1				
4	-2						
5	-3						
6	-4						
7	-5						
8	-6						
9	-7						
10	-8						
11	-9						
12	-10		↓		↓		
13	BLK						
14	↓						
15							
16	↓						

HF lot: 5110090 2mLs

HNO3 lot: 111111 6mLs

Element One, Inc. Form 104 - Revision 1.0

PerkinElmer FIMS-100 CVAA Mercury Analyzer

Sample_ID	Date	Time	Mean_Sig	Mean_Rd	Mean_Rt	Units	Alq.	Vol.	Sig 1	Reading-1	Result-1	Sig 2	Reading-2	Result-2
Calib Blank	5/7/2012	11:46:14	0.0013471			µg			0.0013471					
STD1=.004ug	5/7/2012	11:47:29	0.00138			µg			0.00138					
STD2=.04ug	5/7/2012	11:48:45	0.0152015			µg			0.0152015					
STD3=.08ug	5/7/2012	11:50:02	0.0286929			µg			0.0286929					
STD4=.16ug	5/7/2012	11:51:20	0.0601498			µg			0.0601498					
STD5=.2ug	5/7/2012	11:52:40	0.0755916			µg			0.0755916					
Reagent Blank	5/7/2012	11:54:28	0.0002601	0.0006922	0.0006922	µg			0.0003058	0.000814	0.000814	0.0002143	0.0005704	0.0005704
0.004ug = DL	5/7/2012	11:55:42	0.0016224	0.0043185	0.0043185	µg			0.0016224	0.0043185	0.0043185			
0.080ug = STD.2	5/7/2012	11:56:59	0.0305941	0.0814341	0.0814341	µg			0.0305941	0.0814341	0.0814341			
0.080ug = QC STD 3	5/7/2012	11:58:19	0.0309796	0.0824601	0.0824601	µg			0.0309796	0.0824601	0.0824601			
REAGENT BLANK	5/7/2012	11:59:36	0.0002599	0.0006917	0.0006917	µg			0.0002599	0.0006917	0.0006917			
18665-1 BH	5/7/2012	12:14:06	0.0155411	0.0413666	8.5835623	µg	4	830	0.0159215	0.0423791	8.7936594	0.0151607	0.040354	8.3734651
18665-2 BH	5/7/2012	12:16:20	0.0137544	0.0366109	7.7798142	µg	4	850	0.013816	0.0367749	7.8146695	0.0136928	0.0364469	7.7449589
18665-2 BH DUP	5/7/2012	12:18:05	0.0137918	0.0367103	7.8009388	µg	4	850	0.0140741	0.0374618	7.9606428	0.0135094	0.0359588	7.6412348
0.004ug = DL	5/7/2012	12:19:19	0.0014924	0.0039725	0.0039725	µg	4	850	0.0014924	0.0039725	0.0039725			
0.080ug = STD.2	5/7/2012	12:20:36	0.0300996	0.0801179	0.0801179	µg	4	850	0.0300996	0.0801179	0.0801179			
REAGENT BLANK	5/7/2012	12:21:53	0.0001635	0.0004352	0.0004352	µg	4	850	0.0001635	0.0004352	0.0004352			
18665-3 BH	5/7/2012	12:23:39	0.0384381	0.102313	23.020419	µg	4	900	0.0386218	0.1028018	23.130402	0.0382545	0.1018242	22.910437
18665-4 BH	5/7/2012	12:27:12	0.0249955	0.0665318	14.969666	µg	4	900	0.0254854	0.067836	15.263099	0.0245055	0.0652277	14.676233
18665-5 BH	5/7/2012	12:29:00	0.0231202	0.0615403	11.538797	µg	4	750	0.0232897	0.0619915	11.623405	0.0229506	0.061089	11.454189
18665-5 BH DUP	5/7/2012	12:30:48	0.0227949	0.0606745	11.376467	µg	4	750	0.0230679	0.0614011	11.512702	0.0225219	0.0599479	11.240233
18665-6 BH	5/7/2012	12:32:36	0.02115	0.0562962	11.118491	µg	4	790	0.0210802	0.0561105	11.081819	0.0212198	0.0564818	11.155163
18665-7 BH	5/7/2012	12:36:17	0.0233795	0.0622305	14.001851	µg	4	900	0.0236811	0.0630334	14.182526	0.0230778	0.0614275	13.821177
18665-8 BH	5/7/2012	12:38:07	0.0242193	0.064466	13.699027	µg	4	850	0.0242806	0.064629	13.733665	0.0241581	0.064303	13.66439
18665-8 BH DUP	5/7/2012	12:39:57	0.023306	0.0620349	13.182426	µg	4	850	0.0235841	0.062775	13.339693	0.023028	0.0612949	13.02516
0.004ug = DL	5/7/2012	12:41:13	0.0015754	0.0041933	0.0041933	µg	4	850	0.0015754	0.0041933	0.0041933			
0.080ug = STD.2	5/7/2012	12:42:29	0.0303549	0.0807974	0.0807974	µg	4	850	0.0303549	0.0807974	0.0807974			
REAGENT BLANK	5/7/2012	12:43:46	0.0001723	0.0004585	0.0004585	µg	4	850	0.0001723	0.0004585	0.0004585			
18665-9 BH	5/7/2012	12:45:34	0.0165525	0.0440587	9.6929138	µg	4	880	0.0166232	0.0442469	9.7343167	0.0164818	0.0438705	9.651511
18665-10 BH	5/7/2012	12:49:18	-0.0000871	-0.0002318	-0.0115923	µg	4	200	-0.0000253	-0.0000675	-0.0033767	-0.0001488	-0.0003961	-0.0198079
18665-1A	5/7/2012	12:51:06	-0.0000359	-0.0000957	-0.0047876	µg	4	200	-0.0000246	-0.0000657	-0.003285	-0.0000472	-0.0001258	-0.0062902
18665-2A	5/7/2012	12:52:51	2.37E-06	6.31E-06	0.0003159	µg	4	200	2.002E-05	0.0000533	0.0026652	-0.0000152	-0.0000406	-0.0020334
18665-2A DUP	5/7/2012	12:54:42	3.11E-06	8.29E-06	0.0004149	µg	4	200	2.494E-05	6.638E-05	0.0033194	-0.0000187	-0.0000497	-0.0024896
18665-3A	5/7/2012	12:56:28	0.0003971	0.001057	0.0528514	µg	4	200	0.0003699	0.0009847	0.0492346	0.0004243	0.0011294	0.0564682
18665-4A	5/7/2012	13:00:00	0.0002024	0.0005387	0.0269358	µg	4	200	0.0002213	0.0005891	0.0294531	0.0001835	0.0004884	0.0244185
18665-5A	5/7/2012	13:01:46	-0.0000474	-0.0001263	-0.0063169	µg	4	200	-0.0000277	-0.0000738	-0.003691	-0.0000671	-0.0001788	-0.0089428
0.004ug = DL	5/7/2012	13:03:00	0.0014629	0.0038939	0.0038939	µg	4	200	0.0014629	0.0038939	0.0038939			
0.080ug = STD.2	5/7/2012	13:04:17	0.029607	0.0788065	0.0788065	µg	4	200	0.029607	0.0788065	0.0788065			
REAGENT BLANK	5/7/2012	13:05:34	0.0001495	0.000398	0.000398	µg	4	200	0.0001495	0.000398	0.000398			
18665-5A DUP	5/7/2012	13:07:21	-0.0008017	-0.0021339	-0.1066997	µg	4	200	-0.0000094	-0.0000251	-0.001259	-0.0015939	-0.0042428	-0.2121405
18665-6A	5/7/2012	13:09:09	0.0001403	0.0003734	0.0186719	µg	4	200	0.0001554	0.0004136	0.0206801	0.0001252	0.0003333	0.0166637
18665-7A	5/7/2012	13:12:46	0.0001491	0.000397	0.0198494	µg	4	200	0.0001699	0.0004521	0.0226063	0.0001284	0.0003418	0.0170925
18665-8A	5/7/2012	13:14:35	5.325E-05	0.0001417	0.0070873	µg	4	200	7.484E-05	0.0001992	0.0099608	3.166E-05	8.427E-05	0.0042138
18665-8A DUP	5/7/2012	13:16:25	-0.0000549	-0.0001463	-0.0073155	µg	4	200	-0.0000451	-0.00012	-0.0060023	-0.0000648	-0.0001725	-0.0086286
18665-9A	5/7/2012	13:18:15	-0.0001002	-0.0002669	-0.0133463	µg	4	200	-0.0000823	-0.000219	-0.0109548	-0.0001182	-0.0003147	-0.0157379
18665-1B	5/7/2012	13:23:48	0.0001607	0.0004278	0.0534787	µg	4	500	0.0001856	0.0004939	0.0617428	0.0001359	0.0003617	0.0452147
0.004ug = DL	5/7/2012	13:25:01	0.0015067	0.0040106	0.0040106	µg	4	500	0.0015067	0.0040106	0.0040106			
0.080ug = STD.2	5/7/2012	13:26:19	0.0301209	0.0801746	0.0801746	µg	4	500	0.0301209	0.0801746	0.0801746			
REAGENT BLANK	5/7/2012	13:27:36	0.0001481	0.0003943	0.0003943	µg	4	500	0.0001481	0.0003943	0.0003943			
18665-2B	5/7/2012	13:29:21	-0.0000092	-0.0000245	-0.0030662	µg	4	500	3.73E-06	9.94E-06	0.0012431	-0.0000221	-0.000059	-0.0073755
18665-2B DUP	5/7/2012	13:31:08	9.962E-05	0.0002652	0.0331486	µg	4	500	0.000115	0.000306	0.038253	8.428E-05	0.0002244	0.0280441
18665-3B	5/7/2012	13:32:54	0.0006387	0.0017001	0.2125172	µg	4	500	0.0006752	0.0017973	0.2246521	0.0006022	0.001603	0.2003723
18665-4B	5/7/2012	13:36:26	0.0016201	0.0043123	0.5390359	µg	4	500	0.0016026	0.0042657	0.5332185	0.0016376	0.0043588	0.5448533
18665-5B	5/7/2012	13:38:13	-0.0004894	-0.0013026	-0.1628361	µg	4	500	-0.0004819	-0.0012827	-0.1603383	-0.0004969	-0.0013226	-0.1653339
18665-5B DUP	5/7/2012	13:40:00	-0.0004978	-0.001325	-0.1656343	µg	4	500	-0.0004826	-0.0012847	-0.16059	-0.0005129	-0.0013654	-0.1706786
18665-6B	5/7/2012	13:41:48	-0.0005056	-0.0013459	-0.1682488	µg	4	500	-0.0004932	-0.0013128	-0.1641002	-0.0005181	-0.0013791	-0.1723974
18665-7B	5/7/2012	13:45:25	0.0006458	0.0017191	0.2148843	µg	4	500	0.0006734	0.0017925	0.2240628	0.0006183	0.0016456	0.2057057
0.004ug = DL	5/7/2012	13:46:40	0.0014638	0.0038962	0.0038962	µg	4	500	0.0014638	0.0038962	0.0038962			
0.080ug = STD.2	5/7/2012	13:47:57	0.0304026	0.0809244	0.0809244	µg	4	500	0.0304026	0.0809244	0.0809244			
REAGENT BLANK	5/7/2012	13:49:14	0.0001208	0.0003214	0.0003214	µg	4	500	0.0001208	0.0003214	0.0003214			
18665-8B	5/7/2012	13:51:01	-0.0007462	-0.0019862	-0.2482841	µg	4	500	-0.0007269	-0.001935	-0.2418832	-0.0007654	-0.0020374	-0.254685
18665-8B DUP	5/7/2012	13:52:51	-0.0007751	-0.0020633	-0.2579155	µg	4	500	-0.0007538	-0.0020065	-0.2508226	-0.0007964	-0.00212	-0.2650083
18665-9B	5/7/2012	13:54:41	-0.0006171	-0.0016426	-0.2053339	µg	4	500	-0.0006053	-0.0016113	-0.2014139	-0.0006289	-0.001674	-0.2092538
18665-10B	5/7/2012	13:58:19	-0.0007677	-0.0020436	-0.2554515	µg	4	500	-0.0007437	-0.0019795	-0.2474473	-0.0007918	-0.0021076	-0.2634556
0.004ug = DL	5/7/2012	14:08:21	0.0015431	0.0041073	0.0041073	µg	20	1	0.0015431	0.0041073	0.0041073			
0.080ug = STD.2	5/7/2012	14:09:38	0.0302503	0.0805191	0.0805191	µg	20	1	0.0302503	0.0805191	0.0805191			
REAGENT BLANK	5/7/2012	14:10:55	9.502E-05	0.0002529	0.0002529	µg	20	1	9.502E-05	0.0002529	0.0002529			
Calib Blank	5/7/2012	14:34:59	0.001447			µg	0.1	100	0.001447					
STD1=.004ug	5/7/2012	14:36:14	0.0016579			µg	0.1	100	0.0016579					
STD2=.04ug	5/7/2012	14:37:30	0.0157118			µg	0.1	100	0.0157118					
STD3=.08ug	5/7/2012	14:38:47	0.0297725			µg	0.1	100	0.0297725					
STD4=.16ug	5/7/2012	14:40:05	0.0618747			µg	0.1	100	0.0618747					
STD5=.2ug	5/7/2012	14:41:24	0.0760289			µg	0.1	100	0.0760289					
Reagent Blank	5/7/2012	14:43:12	0.0000042	1.101E-05	1.101E-05	µg	0.1	100	1.259E-05	3.295E-05	3.295E-05	-0.0000041	-0.0000109	-0.0000109
0.004ug = DL	5/7/2012	14:44:26	0.001659	0.0043421	0.0043421	µg	0.1	100	0.001659	0.0043421	0.0043421			
0.080ug = STD.2	5/7/2012	14:45:43	0.0300212	0.0785745	0.0785745	µg	0.1	100	0.0300212	0.0785745	0.0785745			
0.080ug = QC STD 3	5/7/2012	14:47:03	0.0317911	0.0832069	0.0832069	µg	0.1	100	0.0317911	0.0832069	0.0832069			
REAGENT BLANK	5/7/2012	14:48:20	0.0000054	1.415E-05	1.415E-05	µg	0.1	100	0.0000054	1.415E-05	1.415E-05			

PerkinElmer FIMS-100 CVAA Mercury Analyzer

Sample_ID	Date	Time	Mean_Sig	Mean_Rd	Mean_Rt	Units	Alq.	Vol.	Sig 1	Reading-1	Result-1	Sig 2	Reading-2	Result-2
0.004ug = DL	5/7/2012	15:08:53	0.001501	0.0039286	0.0039286	µg	0.1	100	0.001501	0.0039286	0.0039286			
0.080ug = STD.2	5/7/2012	15:10:10	0.0301857	0.0790052	0.0790052	µg	0.1	100	0.0301857	0.0790052	0.0790052			
REAGENT BLANK	5/7/2012	15:11:27	0.0001455	0.0003807	0.0003807	µg	0.1	100	0.0001455	0.0003807	0.0003807			
18665-1C	5/7/2012	15:21:57	4.682E-05	0.0001226	0.0122563	µg	4	400	0.0000457	0.0001196	0.011963	4.794E-05	0.0001255	0.0125496
18665-2C	5/7/2012	15:23:44	-0.0003955	-0.0010352	-0.1035252	µg	4	400	-0.0004031	-0.0010551	-0.1055129	-0.0003879	-0.0010153	-0.1015375
18665-2C DUP	5/7/2012	15:25:31	-0.0001849	-0.0004841	-0.048416	µg	4	400	-0.0001748	-0.0004576	-0.045765	-0.0001951	-0.0005106	-0.051067
18665-3C	5/7/2012	15:27:19	0.0005524	0.0014457	0.1445737	µg	4	400	0.0005369	0.0014051	0.1405125	0.0005679	0.0014863	0.1486349
0.004ug = DL	5/7/2012	15:30:22	0.0015054	0.0039401	0.0039401	µg	4	400	0.0015054	0.0039401	0.0039401			
0.080ug = STD.2	5/7/2012	15:31:39	0.0305775	0.0800305	0.0800305	µg	4	400	0.0305775	0.0800305	0.0800305			
REAGENT BLANK	5/7/2012	15:32:56	0.0001597	0.0004181	0.0004181	µg	4	400	0.0001597	0.0004181	0.0004181			
18665-4C	5/7/2012	15:34:43	0.0017712	0.0046359	0.4635867	µg	4	400	0.0017887	0.0046816	0.4681628	0.0017538	0.0045901	0.4590106
18665-5C	5/7/2012	15:36:33	-0.0002986	-0.0007817	-0.0781745	µg	4	400	-0.0002957	-0.000774	-0.0774073	-0.0003016	-0.0007894	-0.0789417
18665-5C DUP	5/7/2012	15:38:23	-0.0002852	-0.0007466	-0.074668	µg	4	400	-0.0002874	-0.0007522	-0.0752214	-0.0002831	-0.0007411	-0.0741147
18665-6C	5/7/2012	15:40:10	-0.0005473	-0.0014325	-0.1432508	µg	4	400	-0.0005471	-0.001432	-0.1432028	-0.0005475	-0.0014329	-0.1432987
18665-7C	5/7/2012	15:43:38	0.0003752	0.0009821	0.0982097	µg	4	400	0.0003789	0.0009916	0.0991585	0.0003716	0.0009726	0.097261
18665-8C	5/7/2012	15:45:23	0.0015086	0.0039484	0.3948446	µg	4	400	0.0015054	0.0039402	0.3940219	0.0015117	0.0039567	0.3956672
18665-8C DUP	5/7/2012	15:47:08	0.0014337	0.0037525	0.3752492	µg	4	400	0.0014328	0.0037501	0.375006	0.0014347	0.0037549	0.3754923
18665-9C	5/7/2012	15:48:53	0.0017496	0.0045793	0.4579335	µg	4	400	0.0017559	0.0045957	0.4595738	0.0017434	0.0045629	0.4562933
0.004ug = DL	5/7/2012	15:51:53	0.0015145	0.003964	0.003964	µg	4	400	0.0015145	0.003964	0.003964			
0.080ug = STD.2	5/7/2012	15:53:12	0.0298715	0.0781827	0.0781827	µg	4	400	0.0298715	0.0781827	0.0781827			
REAGENT BLANK	5/7/2012	15:54:28	0.000139	0.0003639	0.0003639	µg	4	400	0.000139	0.0003639	0.0003639			
18665-10C	5/7/2012	15:56:16	-0.0005477	-0.0014336	-0.1433624	µg	4	400	-0.0005528	-0.0014468	-0.144686	-0.0005426	-0.0014203	-0.1420388
0.004ug = DL	5/7/2012	15:57:29	0.001482	0.003879	0.003879	µg	4	400	0.001482	0.003879	0.003879			
0.080ug = QC STD 3	5/7/2012	15:58:46	0.0321911	0.084254	0.084254	µg	4	400	0.0321911	0.084254	0.084254			
REAGENT BLANK	5/7/2012	16:00:04	0.0001566	0.00041	0.00041	µg	4	400	0.0001566	0.00041	0.00041			
Calib Blank	5/8/2012	10:13:20	0.0009654			µg			0.0009654					
STD1=.004ug	5/8/2012	10:14:34	0.0012232			µg			0.0012232					
STD2=.04ug	5/8/2012	10:15:51	0.0141028			µg			0.0141028					
STD3=.08ug	5/8/2012	10:17:06	0.0259959			µg			0.0259959					
STD4=.16ug	5/8/2012	10:18:23	0.0520273			µg			0.0520273					
STD5=.2ug	5/8/2012	10:19:42	0.0607022			µg			0.0607022					
Reagent Blank	5/8/2012	10:21:28	-0.0000296	-0.0000943	-0.0000943	µg			-0.0000278	-0.0000885	-0.0000885	-0.0000315	-0.0001002	-0.0001002
0.004ug = DL	5/8/2012	10:22:40	0.0012885	0.0040978	0.0040978	µg			0.0012885	0.0040978	0.0040978			
0.080ug = STD.2	5/8/2012	10:23:57	0.0260016	0.0826921	0.0826921	µg			0.0260016	0.0826921	0.0826921			
0.080ug = QC STD 3	5/8/2012	10:25:16	0.025956	0.0825472	0.0825472	µg			0.025956	0.0825472	0.0825472			
REAGENT BLANK	5/8/2012	10:26:32	-0.0000167	-0.0000533	-0.0000533	µg			-0.0000167	-0.0000533	-0.0000533			
18665-LRB FH	5/8/2012	10:28:16	0.0001198	0.0003809	0.0095222	µg	4	100	0.0001293	0.0004111	0.0102769	0.0001103	0.0003507	0.0087675
18665-1 FH	5/8/2012	10:31:46	1.912E-05	6.082E-05	0.0015206	µg	4	100	2.414E-05	7.678E-05	0.0019196	0.0000141	4.486E-05	0.0011217
18665-2 FH	5/8/2012	10:33:33	0.0003084	0.0009808	0.0245199	µg	4	100	0.0003518	0.0011188	0.0279707	0.000265	0.0008428	0.0210692
18665-2 FH DUP	5/8/2012	10:35:20	0.000007	2.226E-05	0.0005566	µg	4	100	-0.000012	-0.0000382	-0.0009565	2.603E-05	8.278E-05	0.0020697
18665-3 FH	5/8/2012	10:37:08	3.408E-05	0.0001084	0.0027099	µg	4	100	1.642E-05	5.224E-05	0.0013061	5.174E-05	0.0001646	0.0041138
18665-4 FH	5/8/2012	10:40:47	0.0002839	0.000903	0.0225757	µg	4	100	0.0002901	0.0009224	0.0230611	0.0002778	0.0008836	0.0220902
18665-5 FH	5/8/2012	10:42:33	0.0001785	0.0005677	0.0141926	µg	4	100	0.000849	0.0027002	0.0675046	-0.000492	-0.0015647	-0.0391194
18665-5 FH DUP	5/8/2012	10:44:16	0.0001488	0.0004732	0.0118297	µg	4	100	0.0002152	0.0006845	0.0171137	8.233E-05	0.0002618	0.0065458
0.004ug = DL	5/8/2012	10:45:29	0.0012329	0.0039209	0.0039209	µg	4	100	0.0012329	0.0039209	0.0039209			
0.080ug = STD.2	5/8/2012	10:46:46	0.0256955	0.0817187	0.0817187	µg	4	100	0.0256955	0.0817187	0.0817187			
REAGENT BLANK	5/8/2012	10:48:02	-0.0001356	-0.0004313	-0.0004313	µg	4	100	-0.0001356	-0.0004313	-0.0004313			
18665-6 FH	5/8/2012	10:49:45	0.0002401	0.0007637	0.0190926	µg	4	100	0.0002825	0.0008984	0.0224596	0.0001978	0.000629	0.0157256
18665-7 FH	5/8/2012	10:53:14	-0.0000883	-0.0002809	-0.0070233	µg	4	100	-0.0000625	-0.0001989	-0.0049734	-0.0001141	-0.0003629	-0.0090733
18665-8 FH	5/8/2012	10:55:00	-0.0000902	-0.0002869	-0.007173	µg	4	100	-0.00012	-0.0003818	-0.0095458	-0.0000603	-0.000192	-0.0048001
18665-8 FH DUP	5/8/2012	10:56:45	6.375E-05	0.0002028	0.0050692	µg	4	100	9.131E-05	0.0002904	0.0072601	0.0000362	0.0001151	0.0028784
18665-9 FH	5/8/2012	10:58:33	-0.0000339	-0.000108	-0.0027021	µg	4	100	-0.0000109	-0.0000348	-0.0008707	-0.000057	-0.0001813	-0.0045334
18665-10 FH	5/8/2012	11:02:07	0.0001332	0.0004236	0.0105891	µg	4	100	0.0001363	0.0004335	0.0108374	0.0001301	0.0004136	0.0103407
0.004ug = DL	5/8/2012	11:06:58	0.0013009	0.0041373	0.0041373	µg	4	500	0.0013009	0.0041373	0.0041373			
0.080ug = STD.2	5/8/2012	11:08:15	0.0252666	0.0803547	0.0803547	µg	4	500	0.0252666	0.0803547	0.0803547			
REAGENT BLANK	5/8/2012	11:09:30	-0.0001229	-0.0003909	-0.0003909	µg	4	500	-0.0001229	-0.0003909	-0.0003909			
Calib Blank	5/8/2012	11:17:24	0.0008682			µg			0.0008682					
STD1=.004ug	5/8/2012	11:18:39	0.0013494			µg			0.0013494					
STD2=.04ug	5/8/2012	11:19:55	0.0147868			µg			0.0147868					
STD3=.08ug	5/8/2012	11:21:12	0.0308242			µg			0.0308242					
STD4=.16ug	5/8/2012	11:22:30	0.0612595			µg			0.0612595					
STD5=.2ug	5/8/2012	11:23:49	0.0760553			µg			0.0760553					
Reagent Blank	5/8/2012	11:25:37	-0.0000186	-0.0000488	-0.0000488	µg			2.824E-05	7.405E-05	7.405E-05	-0.0000655	-0.0001718	-0.0001718
0.004ug = DL	5/8/2012	11:26:52	0.0015213	0.0039889	0.0039889	µg			0.0015213	0.0039889	0.0039889			
0.080ug = STD.2	5/8/2012	11:28:09	0.0307355	0.0805877	0.0805877	µg			0.0307355	0.0805877	0.0805877			
REAGENT BLANK	5/8/2012	11:29:26	-0.0000191	-0.0000502	-0.0000502	µg			-0.0000191	-0.0000502	-0.0000502			
0.080ug = STD.2	5/8/2012	11:30:43	0.0308738	0.0809503	0.0809503	µg			0.0308738	0.0809503	0.0809503			
0.080ug = QC STD 3	5/8/2012	11:32:03	0.031442	0.0824402	0.0824402	µg			0.031442	0.0824402	0.0824402			
REAGENT BLANK	5/8/2012	11:33:20	-0.0000143	-0.0000375	-0.0000375	µg			-0.0000143	-0.0000375	-0.0000375			
0.004ug = DL	5/8/2012	13:00:41	0.001512	0.0039645	0.0039645	µg	10	1	0.001512	0.0039645	0.0039645			
0.080ug = STD.2	5/8/2012	13:01:59	0.029482	0.0773011	0.0773011	µg	10	1	0.029482	0.0773011	0.0773011			
REAGENT BLANK	5/8/2012	13:03:16	-0.0000818	-0.0002145	-0.0002145	µg	10	1	-0.0000818	-0.0002145	-0.0002145			
18665-10 A	5/8/2012	13:12:03	-0.0000785	-0.000206	-0.0103025	µg	4	200	-0.0000776	-0.0002036	-0.0101809	-0.0000795	-0.0002084	-0.0104241
0.004ug = DL	5/8/2012	13:13:17	0.0014274	0.0037426	0.0037426	µg	4	200	0.0014274	0.0037426	0.0037426			
0.080ug = QC STD 3	5/8/2012	13:14:35	0.0301467	0.0790438	0.0790438	µg	4	200	0.0301467	0.0790438	0.0790438			
REAGENT BLANK	5/8/2012	13:15:52	-0.0001083	-0.0002842	-0.0002842	µg	4	200	-0.0001083	-0.0002842	-0.0002842			

PLANT DATA

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

QA/QC Initials: MK

Date: 5/31/12

CleanAir.

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WHEELABRATOR NORTH BROWARD
TONS OF REFUSE PROCESSED PER STACK TEST RUN LOG

UNIT #3

Date	Test	Method #	Run #	Steam (klb/hr)	Run Length (hr)	Trash Processed (tons)
5/3/2012	Mercury	29	1	185.0	2.22	76.0
5/3/2012	Mercury	29	2	184.0	2.22	75.7
5/3/2012	Mercury	29	3	184.2	2.22	75.7

Wheelabrator
NORTH BROWARD
Emission Test Log

Date: 05/03/12
Start Time: 7:57
End Time: 10:10

	Test	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS
		DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1		492.41	300.14	37.49	33.69	3.80	16.52	284.03	6.04	-9.09
Unit 2		513.98	301.68	41.77	37.79	3.98	14.99	278.30	6.30	-10.24
Unit 3	29 run 1	529.43	300.32	51.68	47.95	3.73	11.97	290.43	6.16	-7.69

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	131.07	872.60	810.60	75.73	-0.10	251.07	1079.10	4.36	127.13
Unit 2	170.35	880.86	834.39	86.54	-0.06	259.84	1174.17	3.54	162.72
Unit 3	194.47	888.11	845.96	84.86	-0.09	269.70	1177.38	7.40	184.98

U1 lime (#/hr)	240.31
U2 lime (#/hr)	251.80
U3 lime (#/hr)	236.01
Specific Gravity	1.100

Wheelabrator
NORTH BROWARD
Emission Test Log

Date: 05/03/12
Start Time: 10:35
End Time: 12:48

	Test	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS
		DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1		531.01	309.47	52.01	43.78	8.23	12.24	291.11	6.21	-10.46
Unit 2		531.25	311.18	48.26	39.12	9.14	13.01	288.02	6.41	-10.93
Unit 3	29 run 2	533.21	301.84	52.35	48.56	3.79	11.97	291.95	6.25	-7.84

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	182.56	889.90	843.76	87.33	-0.07	259.22	1162.08	6.26	177.17
Unit 2	192.16	893.24	834.60	89.87	-0.11	267.96	1201.53	4.98	184.54
Unit 3	191.89	895.23	833.13	86.38	-0.10	277.86	1173.28	5.68	184.02

U1 lime (#/hr)	516.52
U2 lime (#/hr)	573.20
U3 lime (#/hr)	237.49
Specific Gravity	1.100

Wheelabrator
NORTH BROWARD
Emission Test Log

Date: 05/03/12
Start Time: 13:15
End Time: 15:28

	Test	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	TOTAL LIME	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS
		DEG F	DEG F	GPM	GPM	GPM	%	DEG F	" H2O	" H2O
Unit 1		541.37	310.06	54.73	44.88	9.85	11.41	294.87	6.29	-10.71
Unit 2		512.58	299.72	42.96	38.10	4.85	14.55	277.53	6.35	-10.30
Unit 3	29 run 3	532.32	299.97	51.72	47.94	3.78	12.09	290.47	6.19	-7.61

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	STEAM FLOW
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	KLBs/hr
Unit 1	190.94	890.99	836.86	89.32	-0.10	262.07	1155.46	7.86	184.27
Unit 2	191.46	893.16	830.54	85.79	-0.10	270.44	1187.84	3.05	184.33
Unit 3	192.34	895.37	832.82	84.77	-0.09	280.52	1162.48	9.07	184.20

U1 lime (#/hr)	619.00
U2 lime (#/hr)	304.93
U3 lime (#/hr)	237.52
Specific Gravity	1.100