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

August 4, 2008

Certified Mail # 70022030000385124409

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

Re: Wheelabrator South Broward
F.A.C. 62-296.416 Quarterly Mercury Stack Testing
Second Quarter of 2008, Report Submittal

Dear Mr. Hoefert:

As required by F.A.C. 62-296.416, please find enclosed the 2008 second quarter report on mercury stack testing which was conducted on Unit #1.

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

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

Sincerely,

Jairaj Gosine
Plant Manager

cc: USEPA, Region IV, Pesticides and Toxics Management Division, Air & EPCRA Enforcement Branch, Air Enforcement Section Certified Mail # 70022030000385124393
FDEP, Tallahassee, Bureau of Air Regulation, New Source Review Section, Certified Mail # 70022030000385124379
Broward County Department of Planning and Environmental Protection, Air Quality Division Certified Mail # 70022030000385124386
Chuck Faller (with)
Tim Porter (without)
Rob French Gutner – MPI - (with)
Ram Tewari – BCWRS (without)
Theodore S. Pytlar, Jr. (without)
File: 3.7.2 (without)
5.1.3.2 (without)

JG/jlb080804

WASTE MANAGEMENT

REPORT ON MERCURY TESTING

WHEELABRATOR SOUTH BROWARD, INC.
UNIT 1 FF OUTLET
FT. LAUDERDALE, FL

CLIENT REFERENCE NO: 11800237
CLEANAIR PROJECT NO: 10455-5
REVISION 0: AUGUST 1, 2008

CleanAir

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

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

REPORT ON MERCURY TESTING

Performed for:
WHEELABRATOR SOUTH BROWARD, INC.
UNIT 1 FF OUTLET
FT. LAUDERDALE, FL

Client Reference No: 11800237
CleanAir Project No: 10455-5
Revision 0: August 1, 2008

To the best of our knowledge, the data presented in this report are accurate, complete, error free, legible and representative of the actual emissions during the test program.

Submitted by,

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

Reviewed by,

Kevin O'Halloren
Project Manager
kohalloren@cleanair.com
(800) 627-0033

REVISION HISTORY

REPORT ON MERCURY TESTING

Revision History

DRAFT REPORT REVISION HISTORY

Revision:	Date	Pages	Comments
D0a	07/23/08	All	Draft version of original document.

FINAL REPORT REVISION HISTORY

Revision:	Date	Pages	Comments
0	08/01/08	All	Final version of original document.

CONTENTS

PROJECT OVERVIEW

Wheelabrator South Broward, Inc. operates a Refuse to Energy Facility located in Ft. Lauderdale, Florida. The facility's emission levels are regulated by the Florida Department of Environmental Protection. Wheelabrator South Broward, Inc. contracted Clean Air Engineering (CleanAir) to perform a compliance test program at their municipal waste combustor (MWC) facility in Ft. Lauderdale, Florida. Testing was conducted in accordance with 40 CFR 60 Subpart Cb and applicable sections of PSD–FL-105(B) and PA85-21. The sampling was conducted at the Unit 1 Fabric Filter (FF) Outlet on June 25, 2008.

The testing included the determination of the following constituents:

- moisture (H_2O);
- oxygen (O_2);
- carbon dioxide (CO_2);
- total flow (dscfm);
- mercury (Hg).

Coordinating and observing the field portion of the program were:

C. Faller - Wheelabrator South Broward, Inc.
E. Doak - CleanAir

Chuck Faller of Wheelabrator South Broward Inc. provided all the process (operating) data. This data is presented in its entirety in Appendix H. The facility's process data (Bailey) time is 5 minutes ahead of their CEM time. CleanAir's test runs are all based on CEM time.

Table 1-1 outlines the schedule adhered to during the test program. Table 1-2 summarizes the results of the test program.

Table 1-1:
Schedule of Activities

Run Number	Location	Method	Analyte	Date	Start Time	End Time
4	Unit 1 FF Outlet	USEPA Method 29	Trace Metals	06/25/08	07:28	09:41
5	Unit 1 FF Outlet	USEPA Method 29	Trace Metals	06/25/08	10:09	12:22
6	Unit 1 FF Outlet	USEPA Method 29	Trace Metals	06/25/08	12:40	14:53

Table 1-2:
Summary of Test Results

Source Constituent	Sampling Method	Average Emission	Permit Limit[1]
Unit 1 FF Outlet			
Mercury (µg/dscm @7% O_2)	EPA M29	12	70

[1] Limits obtained from 40 Code of Federal Register part 60 Subpart Cb - Emission Guidelines and Compliance Times for Large Municipal Waste Combustors That Are Constructed on or Before September 20, 1994 published in Federal Register as 62 FR 45123 on December 19, 1995 as modified on August 25, 1997, 40 CFR 60.33b (a) (3), Rule 62-296.416 (3) (b) and and PSD-FL-112.

Runs 1 through 3 performed on June 24 were thrown out due to problems with CleanAir's equipment. Three more test runs designated Runs 4 through 6 were performed. A copy of an e-mail notifying William Forrest of the FDEP of the loss of the first three test runs is presented in Appendix I. The data sheets from Runs 1-3 are included in Appendix E. The samples from Runs 1-3 were not analyzed.

The test conditions and results of analysis are presented in Table 2-1 on page 2-1 and the Quality Control and Quality Assurance Results are shown in Table 2-2 on page 2-2.

End of Section 1 – Project Overview

WHEELABRATOR SOUTH BROWARD, INC.
FT. LAUDERDALE, FL

Client Reference No: 11800237
CleanAir Project No: 10455-5

RESULTS

Table 2-1:
Unit 1 FF Outlet - Mercury

Run No.		4	5	6	Average
Date (2008)		Jun 25	Jun 25	Jun 25	
Start Time (approx.)		07:28	10:09	12:40	
Stop Time (approx.)		09:41	12:22	14:53	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	183	183	184	**183**
P_1	SDA Outlet Temperature (°F)	315	315	315	**315**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.8	9.6	9.4	**9.6**
CO_2	Carbon dioxide (dry volume %)	9.2	9.2	10.0	**9.5**
T_s	Sample temperature (°F)	299	300	300	**300**
B_w	Actual water vapor in gas (% by volume)	25.3	23.8	24.8	**24.6**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	175,644	175,780	178,653	**176,692**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	89,635	91,447	91,545	**90,875**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	61.88	69.47	70.44	**67.26**
%I	Isokinetic sampling (%)	106.3	102.4	103.7	**104.1**
Laboratory Data					
m_{n-1b}	Fraction 1B Prorated (µg)	<0.1000	<0.1000	<0.1000	
m_{n-2b}	Fraction 2B Prorated (µg)	18.4678	16.5236	19.3441	
m_{n-3a}	Fraction 3A Prorated (µg)	<0.2000	<0.2000	<0.2000	
m_{n-3b}	Fraction 3B Prorated (µg)	<0.5000	<0.5000	<0.5000	
m_{n-3c}	Fraction 3C Prorated (µg)	<0.4000	<0.4000	<0.4000	
m_n	Total matter corrected for allowable blanks (µg)	18.4678	16.5236	19.3441	
Mercury Results - Total					
C_{sd}	Concentration (lb/dscf)	6.6E-10	5.2E-10	6.1E-10	**6.0E-10**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	8.2E-10	6.5E-10	7.3E-10	**7.3E-10**
C_{sd}	Concentration (µg/dscm)	11	8.4	9.7	**9.5**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	13	10	12	**12**
$E_{lb/hr}$	Rate (lb/hr)	0.0035	0.0029	0.0033	**0.0032**

8,760
X .0032

28,032 lbs/yr

25.40 lbs/yr
To
30.66 lbs/yr

WHEELABRATOR SOUTH BROWARD, INC.
FT. LAUDERDALE, FL

Client Reference No: 11800237
CleanAir Project No: 10455-5

RESULTS

Meter Table 2-2:
Quality Assurance and Quality Control

Run Number		FH Front Half	BH H_2O_2/HNO_4	A Empty Impinger	B $KMnO_4$	C HCl
		RPD RESULTS				
U1 FF Outlet S R4		NA	0.0%	NA	NA	NA
U1 FF Outlet S R5		NA	0.2%	NA	NA	NA
U1 FF Outlet S R6		NA	0.0%	NA	NA	NA
S Field Blank		NA	NA	NA	NA	NA
S Reagent Blank		NA	NA	NA	NA	NA
		Sample Spike and Recovery				
U1 FF Outlet N R3	#1	108%	94%	97%	86%	91%
	#2	106%	94%	98%	86%	90%
U1 FF Outlet S R6	#1	108%	103%	96%	93%	94%
	#2	107%	104%	97%	94%	94%
		Blanks				
S Field Blank	#1	< 0.1	< 0.3	< 0.2	< 0.5	< 0.4
	#2	< 0.1	< 0.3	< 0.2	< 0.5	< 0.4
S Reagent Blank	#1	< 0.1	< 0.2	< 0.2	< 0.5	< 0.4
	#2	< 0.1	< 0.2	< 0.2	< 0.5	< 0.4

Meter Post Test Calibration Results = 1.3% **Limit = +/- 5%**

End of Section 2 – Results

DESCRIPTION OF INSTALLATION

PROCESS DESCRIPTION

The South Broward Resource Recovery Facility operates three 750 tons per day municipal refuse fired, water wall boiler trains. The trains were manufactured by Babcock and Wilcox to produce electricity for sale to a local utility company. Each boiler is equipped a spray dryer absorber (SDA) for acid gas removal, followed by a fabric filter (FF) baghouse for the control of particulate emissions. Wheelabrator Air Pollution Control, Inc supplies the control equipment. Each fabric filter baghouse is followed by an induced draft fan that directs the flue gas to a dedicated flue in a common stack.

Figure 3-1 shows a general schematic for the facility. The testing occurred at the Unit 1 FF Outlet as shown in Figure 3-2.

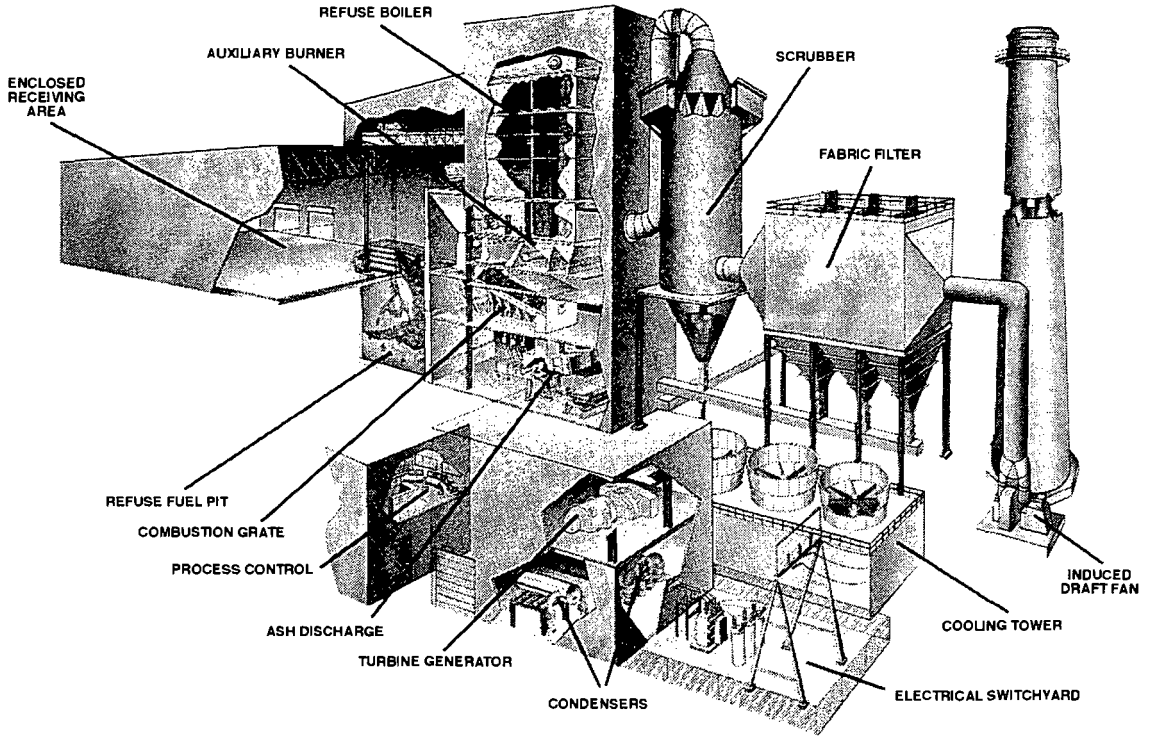


Figure 3-1: General Process Schematic

DESCRIPTION OF INSTALLATION

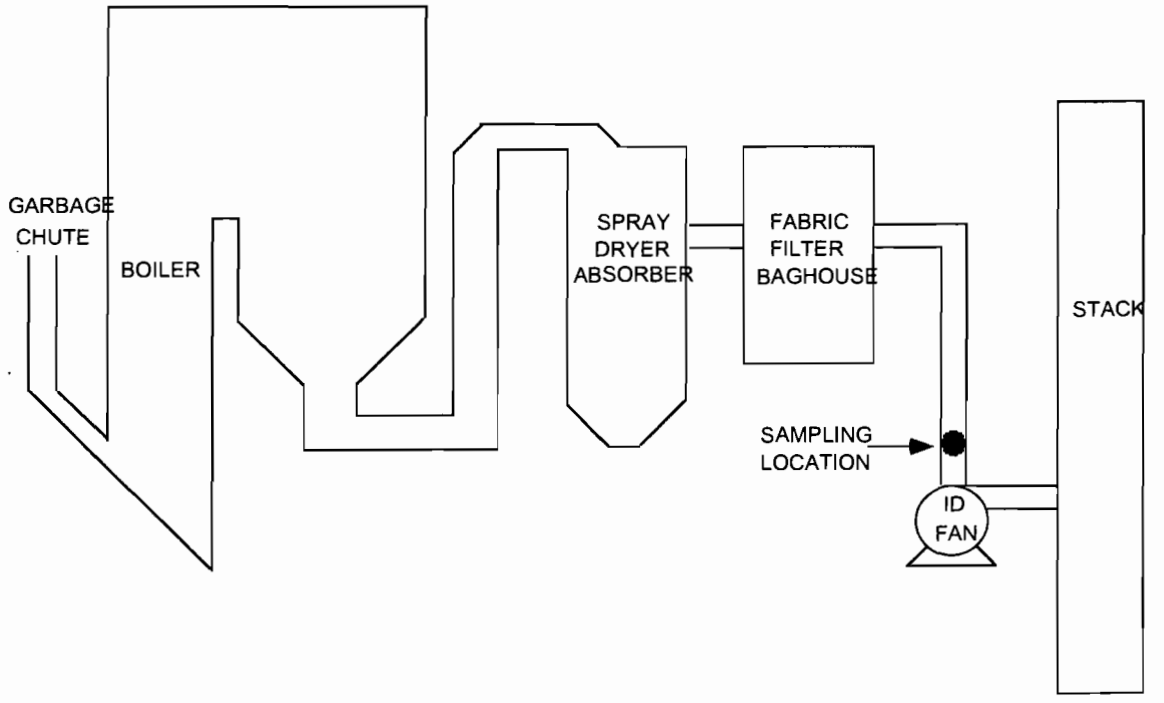


Figure 3-2: Process Schematic

DESCRIPTION OF INSTALLATION

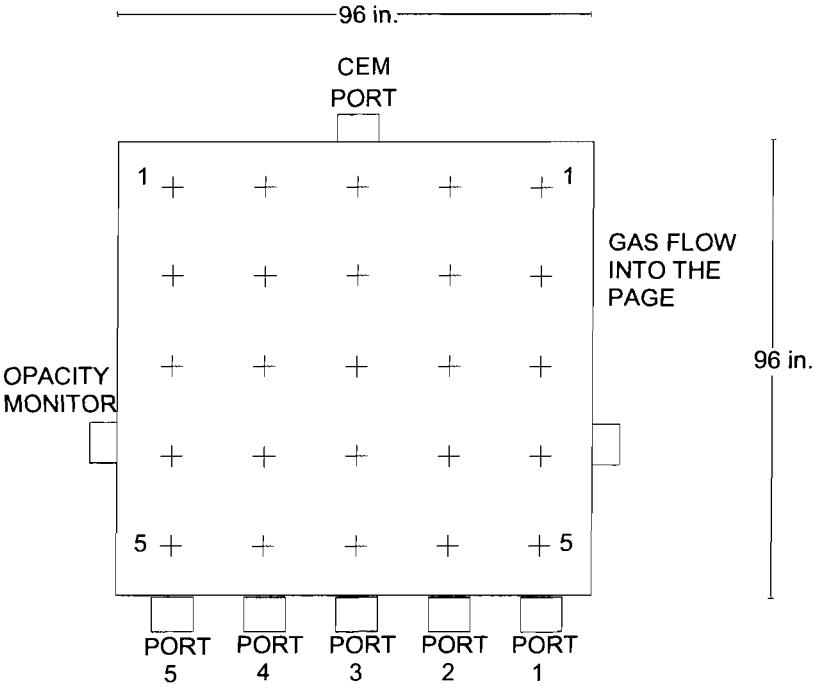
DESCRIPTION OF SAMPLING LOCATIONS

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 1 FF Outlet	Mercury	29	4-6	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 1 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 on the World Wide Web at http://www.cleanair.com.

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

Clean Air Engineering followed specific quality assurance and quality control (QA/QC) procedures as outlined in the individual methods and in USEPA "Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III Stationary Source-Specific Methods", EPA/600/R-94/038C. Additional QA/QC methods as prescribed in Clean Air's internal Quality Manual were also followed. Results of all QA/QC activities performed by Clean Air Engineering are summarized in Appendix D.

End of Section 4 – Methodology

APPENDIX

TEST METHOD SPECIFICATIONS

A

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Specification Sheet for EPA Method 29

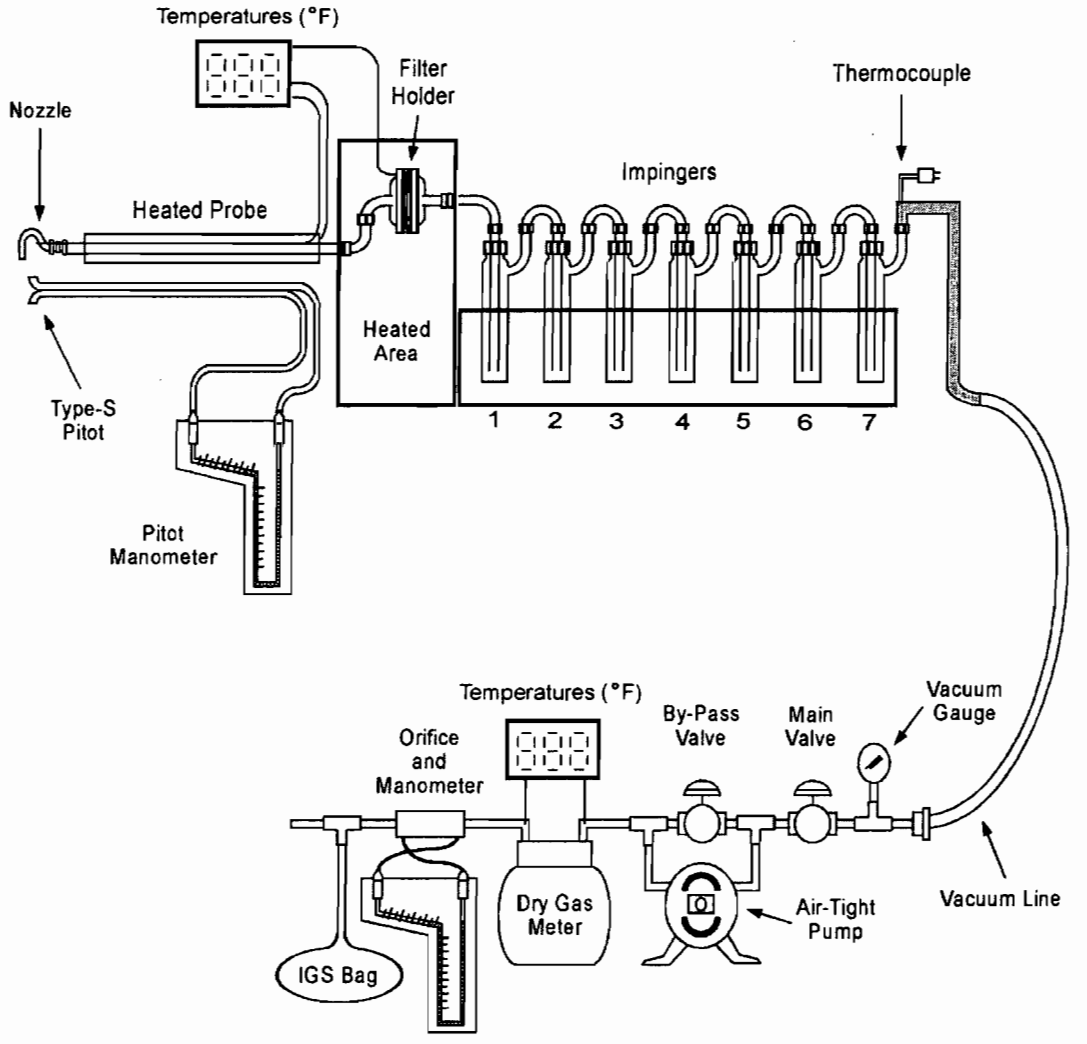
Source Location Name(s)	Unit 1 FF Outlet
Pollutant(s) to be Determined	Mercury
Other Parameters to be Determined from Train	Gas Density, Moisture, Flow Rate

	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	0.84
Pitot Tube Calibration by	Geometric or Wind Tunnel	Geometric
Pitot Tube Attachment	Attached to Probe	Attached to Probe
Metering System Console		
Meter Type	Dry Gas Meter	Dry Gas Meter
Meter Accuracy	±2%	±1%
Meter Resolution	N/A	0.01 cubic feet
Meter Size	N/A	0.1 dcf/revolution
Meter Calibrated Against	Wet Test Meter or Standard DGM	Wet Test Meter
Pump Type	N/A	Rotary Vane
Temperature Measurements	N/A	Type K Thermocouple/Pyrometer
Temperature Resolution	5.4°F	1.0°F
ΔP Differential Pressure Gauge	Inclined Manometer or Equivalent	Inclined Manometer
ΔH Differential Pressure Gauge	Inclined Manometer or Equivalent	Inclined Manometer
Barometer	Mercury or Aneroid	Digital Barometer calibrated w/Mercury Aneroid
Filter Description		
Filter Location	After Probe	Exit of Probe
Filter Holder Material	Borosilicate Glass	Borosilicate Glass
Filter Support Material	Teflon (or other non-metallic)	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

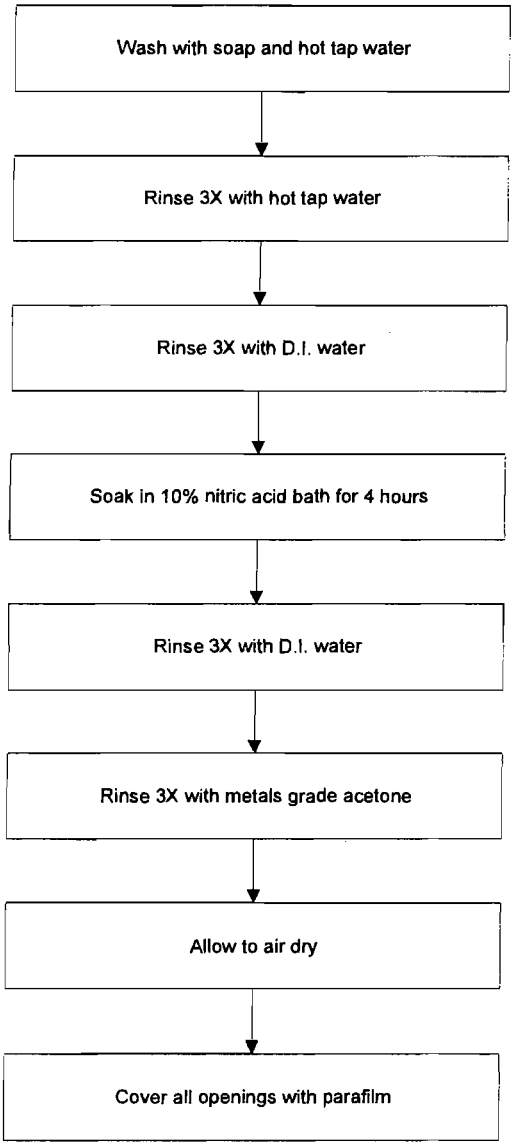
	Standard Method Specification	Actual Specification Used
Impinger Train Description		
Type of Glassware Connections	Ground Glass or Equivalent	Screw Joint with Silicone Gasket
Connection to Probe or Filter by	Direct Glass Connection	Direct Glass Connection
Number of Impingers	7	7
Impinger Stem Types		
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 HNO_3

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 HNO_3

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 HNO_3

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 HNO_3

Container 8B
Water Blank
250 ml Plastic

100 ml of water

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

200 ml of absorbing solution

Container 10*
Permanganate Blank
500 ml Glass

100 ml $KMnO_4$ solution

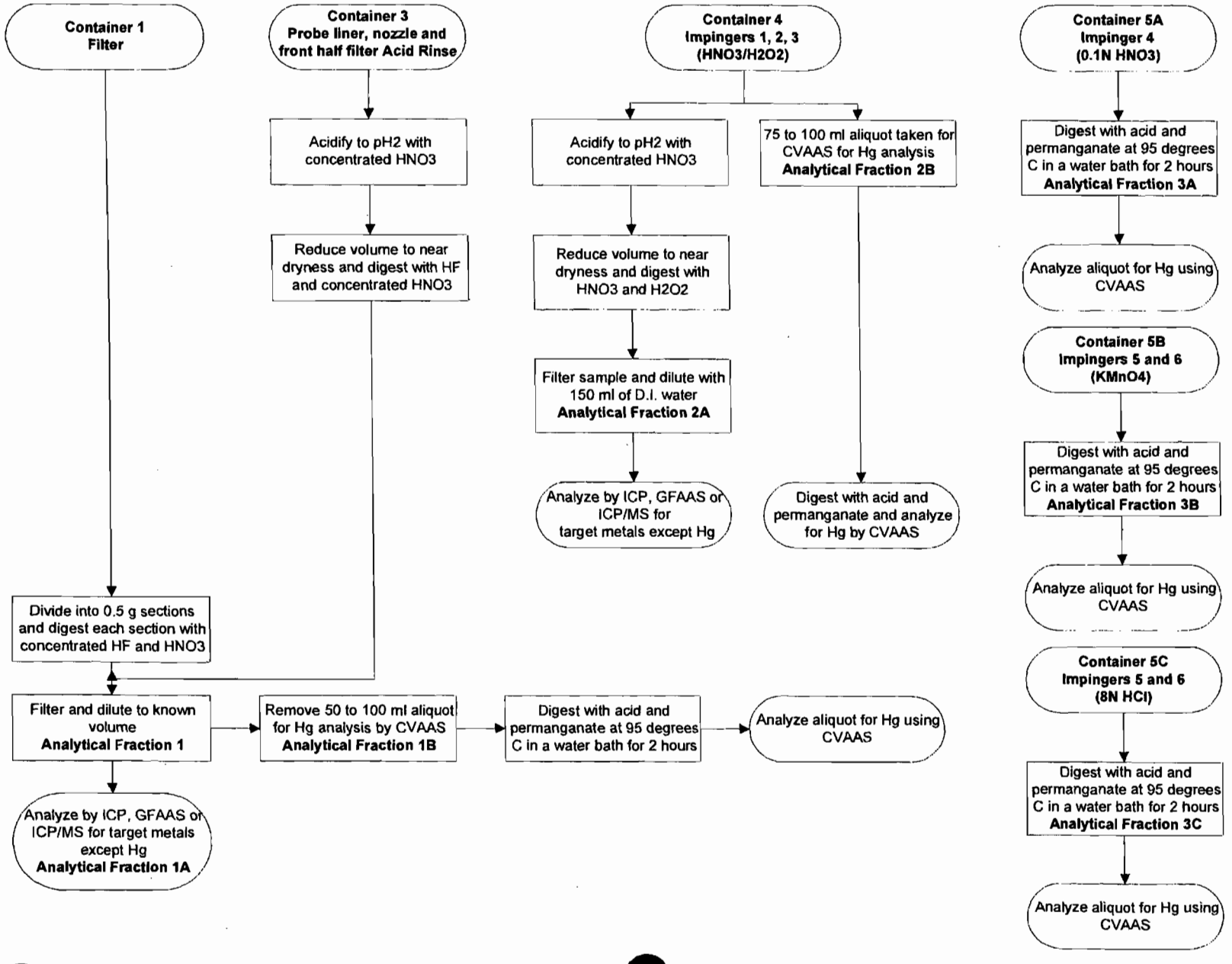
Container 11
HCl Rinse Blank
250 ml Glass

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)



SAMPLE CALCULATIONS

B

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

USEPA Method 29 (Trace Metals)
Sampling, Velocity and Moisture Sample Calculations

Sample data taken from Run 4

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.

072108 124557
N

1. Volume of water collected (wscf)

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

Where:

V_{lc}	= total volume of liquid collected in impingers and silica gel (ml)	=	445.3	ml
0.04707	= ideal gas conversion factor (ft^3 water vapor/ml or gm)	=	0.04707	ft^3/ml
V_{wstd}	= volume of water vapor collected at standard conditions (ft^3)	=	20.96	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)	=	30.18	in. Hg
T_m	= average dry gas meter temperature (°F)	=	87.86	°F
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	64.57	dcf
Y_d	= gas meter correction factor (dimensionless)	=	0.9842	
ΔH	= average pressure drop across meter box orifice (in. H_2O)	=	0.84	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)	=	61.879	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)	=	30.18	in. Hg
P_g	= sample gas static pressure (in. H_2O)	=	-11.00	in. H_2O
13.6	= conversion factor (in. H_2O/in. Hg)	=	13.6	in. H_2O/in. Hg
P_s	= absolute sample gas pressure (in. Hg)	=	29.37	in. Hg

QA/QC _____
Date _____

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

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

Where:

T_s	= average sample gas temperature (°F)	=	298.68	°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)	=	29.37	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)	=	29.37	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.37	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)	=	61.879	dscf
V_{wstd}	= volume of water collected at standard conditions (scf)	=	20.96	scf
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2530	
		=	25.30	%

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7. Saturated moisture content (% by volume)

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

Where:

P_s	= absolute sample gas pressure (in. Hg)	=	29.37	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.37	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	=	0.2530	
B_w	= actual water vapor in gas	=	0.2530	
		=	25.30	%

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

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

Where:

CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	9.2	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.8	%
100	= conversion factor (%)	=	100	%
N_2+CO	= proportion of nitrogen and CO in the gas stream by volume (%)	=	81.00	%

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

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

Where:

M_{CO2}	= molecular weight of carbon dioxide (lb/lb·mole)	=	44.00	lb/lb·mole
M_{O2}	= molecular weight of oxygen (lb/lb·mole)	=	32.00	lb/lb·mole
M_{N2+CO}	= molecular weight of nitrogen and carbon monoxide (lb/lb·mole)	=	28.00	lb/lb·mole
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	9.2	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.8	%
N_2+CO	= proportion of nitrogen and CO in the gas stream by volume (%)	=	81.0	%
100	= conversion factor (%)	=	100	%
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	29.86	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	=	0.2530	
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	29.86	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)	=	26.86	lb/lb·mole

12. Velocity of sample gas (ft/sec)

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

Where:

K_p	= velocity pressure constant	=	85.49	
C_p	= pitot tube coefficient	=	0.84	
M_s	= wet molecular weight of sample gas, wet basis (lb/lb·mole)	=	26.86	lb/lb·mole
P_s	= absolute sample gas pressure (in. Hg)	=	29.37	in. Hg
T_s	= average sample gas temperature (°F)	=	298.68	°F
$\sqrt{\Delta P}$	= average square roots of velocity heads of sample gas (in. H_2O)	=	0.650	$\sqrt{}$in. H_2O
460	= °F to °R conversion constant	=	460	
V_s	= sample gas velocity (ft/sec)	=	45.74	ft/sec

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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)	=	45.74	ft/sec
60	conversion factor (sec/min)	=	60	sec/min
Q_a	= volumetric flow rate at actual conditions (acfm)	=	175,644	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)	=	175,644	acfm
P_s	= absolute sample gas pressure (in. Hg)	=	29.37	in. Hg
29.92	= standard pressure (in. Hg)	=	29.92	in. Hg
T_s	= average sample gas temperature (°F)	=	298.7	°F
68	= standard temperature (°F)	=	68	°F
460	= °F to °R conversion constant	=	460	
Q_s	= volumetric flow rate at standard conditions, wet basis (scfm)	=	119,996	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	=	0.2530	
Q_s	= volumetric flow rate at standard conditions, wet basis (scfm)	=	119,996	scfm
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	89,635	dscfm

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

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

Where:

Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	89,635	dscfm
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.8	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
7	= oxygen content of corrected gas (%)	=	7.0	%
Q_{std7}	= volumetric flow rate at STP and 7%O_2, dry basis (dscfm)	=	71,579	dscfm

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

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

Where

$Q_{std-min}$	= volumetric flow rate, english units (ft^3/min)	=	89,635	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
Q_{std-hr}	= volumetric flow rate, hourly basis (dscf/hr)	=	5,378,075	dscf/hr

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

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

Where:

$Q_{std-english}$	= volumetric flow rate, english units (ft^3/min)	=	89,635	dscfm
35.31	= conversion factor (ft^3/m^3)	=	35.31	ft^3/m^3
60	= conversion factor (min/hr)	=	60	min/hr
$Q_{std-metric}$	= volumetric flow rate, metric units (m^3/hr)	=	152,310	dry std m^3/hr

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

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

Where:

$Q_{std-metric}$	= volumetric flow rate, metric units (dry std m^3/hr)	=	152,310	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)	=	141,925	dry Nm^3/hr

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20. Percent isokinetic (%)

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

Where:

D_n	= diameter of nozzle (in)	=	0.247	in.
B_w	= proportion of water vapor in the gas stream by volume	=	0.2530	
P_s	= absolute sample gas pressure (in. Hg)	=	29.37	in. Hg
T_s	= average sample gas temperature (°F)	=	298.7	°F
V_{mstd}	= volume of gas sample through the dry gas meter at standard conditions (dscf)	=	61.879	dscf
V_s	= sample gas velocity (ft/sec)	=	45.74	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 (%)	=	106.29	%

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)	=	64.57	dcf
T_m	= average dry gas meter temperature (°F)	=	87.86	°F
$\Delta H_@$	= dry gas meter orifice coefficient	=	1.8163	
P_{bar}	= barometric pressure (in. Hg)	=	30.18	in. Hg
ΔH	= average pressure drop across meter box orifice (in. H_2O)	=	0.836	in. H_2O
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	29.86	lb/lb·mole
$\sqrt{\Delta H_{avg}}$	= average of square root of pressure drop across meter orifice	=	0.911	√in. H_2O
0.0319	= conversion constant	=	0.0319	
28.96	= molecular weight of ambient air (lb/lb-mole)	=	28.96	lb/lb-mole
13.6	= conversion factor (in. H_2O/in. Hg)	=	13.6	in.H_2O/in. Hg
460	= °F to °R conversion constant	=	460	
Y_{qa}	= alternative Method 5 post-test meter calibration factor	=	0.9799	

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LOGIC FOR TREATING DETECTION LIMITS

(mercury only)

1. Logic for Determining Total Blank ($m_{Total\text{-}B}$) 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	$m_{Total\text{-}B}$ = Sum D, 1-5	$m_{Total\text{-}B}$ = Sum D	$m_{Total\text{-}B}$ = < Sum ND
ND=1x	$m_{Total\text{-}B}$ = Sum D, 1-5	$m_{Total\text{-}B}$ = Sum D	$m_{Total\text{-}B}$ = < Sum ND
ND=0.5x	$m_{Total\text{-}B}$ = Sum D, 1-5	$m_{Total\text{-}B}$ = Sum D	$m_{Total\text{-}B}$ = < 0.5 Sum ND

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

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

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

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

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

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

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

Definitions and Notes

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

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USEPA Method 29
Mercury Analyte Calculations

Sample data taken from Run 4

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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O

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	=	18.4678	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	=	18.4678	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	=	18.4678	µg
0.05 x $m_{total-S}$	= 5% of $m_{total-S}$	=	0.9234	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.

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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	=	18.4678	µg
$m_{T-B-allow}$	= total allowable blank correction	=	0.0000	µg
m_n	= total mercury in sample corrected for allowable blank	=	18.4678	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	=	18.4678	µg
m_{1b-S}	= mercury amount in sample for Fraction 1b	=	<0.1000	µg
m_{2b-S}	= mercury amount in sample for Fraction 2b	=	18.4678	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	=	18.4678	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	=	18.4678	µg
m_{n-3a}	= mercury corrected for blank - prorated for Fraction 3a	=	<0.2000	µg
m_{n-3b}	= mercury corrected for blank - prorated for Fraction 3b	=	<0.5000	µg
m_{n-3c}	= mercury corrected for blank - prorated for Fraction 3c	=	<0.4000	µg

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USEPA Method 29
Mercury Sample Calculations

Sample data taken from Run 4

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N_O

1. Mercury concentration (lb/dscf)

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

Where:

m_n	= mercury collected in sample (total µg)	=	18.4678	µg
V_{mstd}	= volume metered, standard (dscf)	=	61.8795	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)	=	6.5808E-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)	=	18.4678	µg
V_{mstd}	= volume metered, standard (dscf)	=	61.8795	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= mercury concentration (µg/dscm)	=	1.0538E+01	µg/dscm

3. Mercury concentration (mg/dscm)

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

Where:

m_n	= mercury collected in sample (total µg)	=	18.4678	µg
V_{mstd}	= volume metered, standard (dscf)	=	61.8795	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
1000	= conversion factor (µg/mg)	=	1000	µg/mg
C_{sd}	= mercury concentration (mg/dscm)	=	1.0538E-02	mg/dscm

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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)	=	18.4678	µg
V_{mstd}	= volume metered, standard (dscf)	=	61.8795	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
68	= standard temperature (°F)	=	68	°F
32	= normal temperature (°F)	=	32	°F
460	= °F to °R conversion constant	=	460	
C_{sd}	= mercury concentration (µg/Nm3 dry)	=	1.1309E+01	µg/Nm^3 dry

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

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

Where:

C_{sd}	= mercury concentration (lb/dscf)	=	6.5808E-10	lb/dscf
x	= oxygen content of corrected gas (%)	=	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.8	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
C_{sdx}	= mercury concentration corrected to x% oxygen (lb/dscf)	=	8.2408E-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)	=	6.5808E-10	lb/dscf
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	9.2	%
C_{sdy}	= mercury conc. corrected to y% carbon dioxide (lb/dscf)	=	8.5836E-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)	=	6.5808E-10	lb/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	89,635	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	=	175,644	acfm
C_a	= mercury concentration at actual gas conditions (lb/acf)	=	3.3583E-10	lb/acf

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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)	=	18.4678	µg
V_{mstd}	= volume metered, standard (dscf)	=	61.8795	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)	=	89,635	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
$E_{lb/hr}$	= mercury emission rate (lb/hr)	=	3.5392E-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)	=	18.4678	µg
V_{mstd}	= volume metered, standard (dscf)	=	61.8795	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	89,635	dscfm
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
60	= conversion factor (sec/min)	=	60	sec/min
$E_{g/s}$	= mercury emission rate (g/s)	=	4.4585E-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)	=	18.4678	µg
V_{mstd}	= volume metered, standard (dscf)	=	61.8795	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)	=	89,635	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)	=	1.5502E-02	Ton/yr

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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)	=	18.4678	µg
V_{mstd}	= volume metered, standard (dscf)	=	61.8795	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
F_d	= ratio of gas volume to heat content of fuel (dscf/MMBtu)	=	9,570	dscf/MMBtu
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.8	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= mercury emission rate - Fd-based (lb/MMBtu)	=	1.1858E-05	lb/MMBtu

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

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

Where:

m_n	= mercury collected in sample (total µg)	=	18.4678	µg
V_{mstd}	= volume metered, standard (dscf)	=	61.8795	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
F_c	= ratio of gas volume to heat content of fuel (dscf/MMBtu)	=	1,820	dscf/MMBtu
CO_2	= proportion of oxygen in the gas stream by volume (%)	=	9.2	%
100	= conversion factor	=	100	
E_{Fc}	= mercury emission rate - Fc-based (lb/MMBtu)	=	1.3018E-05	lb/MMBtu

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

USEPA Method 29 (Trace Metals)
Sampling, Velocity and Moisture Parameters

Run No.		4	5	6	Average
Date (2008)		Jun 25	Jun 25	Jun 25	
Start Time (approx.)		07:28	10:09	12:40	
Stop Time (approx.)		09:41	12:22	14:53	
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.9842	0.9842	0.9842	
C_p	Pitot tube coefficient	0.84	0.84	0.84	
P_g	Static pressure (in. H_2O)	-11.0000	-11.0000	-11.0000	
A_s	Sample location area (ft^2)	64.0000	64.0000	64.0000	
P_{bar}	Barometric pressure (in. Hg)	30.18	30.18	30.18	**30.1800**
D_n	Nozzle diameter (in.)	0.2470	0.2640	0.2640	
O_2	Oxygen (dry volume %)	9.8000	9.6000	9.4000	**9.6000**
CO_2	Carbon dioxide (dry volume %)	9.2000	9.2000	10.0000	**9.4667**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	81.0000	81.2000	80.6000	**80.9333**
V_{lc}	Total Liquid collected (ml)	445.30	459.70	494.80	
V_m	Volume metered, meter conditions (ft^3)	64.5700	72.6350	73.6900	
T_m	Dry gas meter temperature (°F)	87.8600	89.3000	89.6200	
T_s	Sample temperature (°F)	298.6800	299.6800	300.1600	**299.5067**
ΔH	Meter box orifice pressure drop (in. H_2O)	0.8364	1.0776	1.0876	
θ	Total sampling time (min)	125.0	125.0	125.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	20.9603	21.6381	23.2902	**21.9629**
V_{mstd}	Volume metered, standard (dscf)	61.8795	69.4666	70.4363	**67.2608**
P_s	Sample gas pressure, absolute (in. Hg)	29.3712	29.3712	29.3712	**29.3712**
P_v	Vapor pressure, actual (in. Hg)	29.3712	29.3712	29.3712	**29.3712**
B_{wo}	Moisture measured in sample (% by volume)	25.3022	23.7508	24.8491	**24.6340**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	25.3022	23.7508	24.8491	**24.6340**
$\sqrt{\Delta P}$	Velocity head ($\sqrt{in.}$ H_2O)	0.6495	0.6518	0.6617	**0.6543**
M_d	MW of sample gas, dry (lb/lb-mole)	29.8640	29.8560	29.9760	**29.8987**
M_s	MW of sample gas, wet (lb/lb-mole)	26.8621	27.0401	27.0001	**26.9674**
V_s	Velocity of sample (ft/sec)	45.7406	45.7760	46.5242	**46.0136**
%I	Isokinetic sampling (%)	106.2857	102.3761	103.6939	**104.1186**
Q_a	Volumetric flow rate, actual (acfm)	175,644	175,780	178,653	**176,692**
Q_s	Volumetric flow rate, standard (scfm)	119,996	119,931	121,815	**120,581**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	89,635	91,447	91,545	**90,875**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	71,579	74,342	75,738	**73,886**
Q_a	Volumetric flow rate, actual (acf/hr)	10,538,626	10,546,799	10,719,187	**10,601,537**
Q_s	Volumetric flow rate, standard (scf/hr)	7,199,777	7,195,875	7,308,874	**7,234,842**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,378,075	5,486,799	5,492,682	**5,452,519**
Q_a	Volumetric flow rate, actual (m^3/hr)	298,460	298,692	303,574	**300,242**
Q_s	Volumetric flow rate, standard (m^3/hr)	203,902	203,791	206,992	**204,895**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	152,310	155,389	155,556	**154,419**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	121,629	126,324	128,697	**125,550**
Q_a	Volumetric flow rate, normal (Nm^3/hr)	190,000	189,897	192,879	**190,925**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	141,925	144,795	144,950	**143,890**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	113,336	117,711	119,923	**116,990**

Comments:
Average includes 3 runs.

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

USEPA Method 29
Mercury (Hg) Emission Parameters

Run No.		4	5	6	Average
Date (2008)		Jun 25	Jun 25	Jun 25	
Start Time (approx.)		07:28	10:09	12:40	
Stop Time (approx.)		09:41	12:22	14:53	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	183	183	184	**183**
P_1	SDA Outlet Temperature (°F)	315	315	315	**315**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.8000	9.6000	9.4000	**9.6000**
CO_2	Carbon dioxide (dry volume %)	9.2000	9.2000	10.0000	**9.4667**
T_s	Sample temperature (°F)	298.6800	299.6800	300.1600	**299.5067**
B_w	Actual water vapor in gas (% by volume)	25.3022	23.7508	24.8491	**24.6340**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	175,644	175,780	178,653	**176,692**
Q_s	Volumetric flow rate, standard (scfm)	119,996	119,931	121,815	**120,581**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	89,635	91,447	91,545	**90,875**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	71,579	74,342	75,738	**73,886**
Q_a	Volumetric flow rate, actual (acf/hr)	10,538,626	10,546,799	10,719,187	**10,601,537**
Q_s	Volumetric flow rate, standard (scf/hr)	7,199,777	7,195,875	7,308,874	**7,234,842**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,378,075	5,486,799	5,492,682	**5,452,519**
Q_a	Volumetric flow rate, actual (m^3/hr)	298,460	298,692	303,574	**300,242**
Q_s	Volumetric flow rate, standard (m^3/hr)	203,902	203,791	206,992	**204,895**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	152,310	155,389	155,556	**154,419**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	121,629	126,324	128,697	**125,550**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	190,000	189,897	192,879	**190,925**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	141,925	144,795	144,950	**143,890**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	113,336	117,711	119,923	**116,990**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	61.8795	69.4666	70.4363	**67.2608**
%I	Isokinetic sampling (%)	106.2857	102.3761	103.6939	**104.1186**
Laboratory Data					
m_{n-1b}	Fraction 1B Prorated (µg)	<0.1000	<0.1000	<0.1000	
m_{n-2b}	Fraction 2B Prorated (µg)	18.4678	16.5236	19.3441	
m_{n-3a}	Fraction 3A Prorated (µg)	<0.2000	<0.2000	<0.2000	
m_{n-3b}	Fraction 3B Prorated (µg)	<0.5000	<0.5000	<0.5000	
m_{n-3c}	Fraction 3C Prorated (µg)	<0.4000	<0.4000	<0.4000	
m_n	Total matter corrected for allowable blanks (µg)	18.4678	16.5236	19.3441	
Mercury Results - Total					
C_{sd}	Concentration (lb/dscf)	6.5808E-10	5.2449E-10	6.0557E-10	**5.9604E-10**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	8.2408E-10	6.4517E-10	7.3194E-10	**7.3373E-10**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	8.5836E-10	6.8412E-10	7.2668E-10	**7.5638E-10**
C_a	Concentration (lb/acf)	3.3583E-10	2.7286E-10	3.1030E-10	**3.0633E-10**
C_{sd}	Concentration (µg/dscm)	1.0538E+01	8.3990E+00	9.6973E+00	**9.5448E+00**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	1.3196E+01	1.0331E+01	1.1721E+01	**1.1750E+01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	1.3745E+01	1.0955E+01	1.1637E+01	**1.2112E+01**
C_{sd}	Concentration (mg/dscm)	1.0538E-02	8.3990E-03	9.6973E-03	**9.5448E-03**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	1.3196E-02	1.0331E-02	1.1721E-02	**1.1750E-02**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	1.3745E-02	1.0955E-02	1.1637E-02	**1.2112E-02**
C_a	Concentration (µg/m^3 (actual,wet))	5.3778E+00	4.3694E+00	4.9690E+00	**4.9054E+00**
C_{sd}	Concentration (µg/Nm^3 dry)	1.1309E+01	9.0135E+00	1.0407E+01	**1.0243E+01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	1.4162E+01	1.1087E+01	1.2579E+01	**1.2609E+01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	1.4751E+01	1.1757E+01	1.2488E+01	**1.2999E+01**
$E_{lb/hr}$	Rate (lb/hr)	3.5392E-03	2.8778E-03	3.3262E-03	**3.2477E-03**
$E_{g/s}$	Rate (g/s)	4.4585E-04	3.6253E-04	4.1902E-04	**4.0913E-04**
$E_{T/yr}$	Rate (Ton/yr)	1.5502E-02	1.2605E-02	1.4569E-02	**1.4225E-02**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.1858E-05	9.2836E-06	1.0532E-05	**1.0558E-05**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	1.3018E-05	1.0376E-05	1.1021E-05	**1.1472E-05**

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

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

Run No.		4	5	6	Average
Date (2008)		Jun 25	Jun 25	Jun 25	
Start Time (approx.)		07:28	10:09	12:40	
Stop Time (approx.)		09:41	12:22	14:53	
Mercury Results - Front Half					
C_{sd}	Concentration (lb/dscf)	<3.5634E-12	<3.1742E-12	<3.1305E-12	**<3.2894E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<4.4623E-12	<3.9045E-12	<3.7838E-12	**<4.0502E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<4.6479E-12	<4.1402E-12	<3.7566E-12	**<4.1816E-12**
C_a	Concentration (lb/acf)	<1.8185E-12	<1.6513E-12	<1.6041E-12	**<1.6913E-12**
C_{sd}	Concentration (µg/dscm)	<5.7063E-02	<5.0830E-02	<5.0130E-02	**<5.2674E-02**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<7.1457E-02	<6.2526E-02	<6.0592E-02	**<6.4858E-02**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<7.4429E-02	<6.6300E-02	<6.0156E-02	**<6.6962E-02**
C_{sd}	Concentration (mg/dscm)	<5.7063E-05	<5.0830E-05	<5.0130E-05	**<5.2674E-05**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<7.1457E-05	<6.2526E-05	<6.0592E-05	**<6.4858E-05**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<7.4429E-05	<6.6300E-05	<6.0156E-05	**<6.6962E-05**
C_a	Concentration (µg/m^3 (actual,wet))	<2.9120E-02	<2.6444E-02	<2.5688E-02	**<2.7084E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<6.1238E-02	<5.4549E-02	<5.3798E-02	**<5.6529E-02**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<7.6685E-02	<6.7101E-02	<6.5026E-02	**<6.9604E-02**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<7.9875E-02	<7.1151E-02	<6.4558E-02	**<7.1862E-02**
$E_{lb/hr}$	Rate (lb/hr)	<1.9164E-05	<1.7416E-05	<1.7195E-05	**<1.7925E-05**
$E_{g/s}$	Rate (g/s)	<2.4142E-06	<2.1940E-06	<2.1661E-06	**<2.2581E-06**
$E_{T/yr}$	Rate (Ton/yr)	<8.3939E-05	<7.6283E-05	<7.5313E-05	**<7.8512E-05**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<6.4209E-08	<5.6184E-08	<5.4447E-08	**<5.8280E-08**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<7.0493E-08	<6.2794E-08	<5.6975E-08	**<6.3421E-08**

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

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

Run No.		4	5	6	Average
Date (2008)		Jun 25	Jun 25	Jun 25	
Start Time (approx.)		07:28	10:09	12:40	
Stop Time (approx.)		09:41	12:22	14:53	
Mercury Results - Impingers 1-3 Solution					
C_{sd}	Concentration (lb/dscf)	6.5808E-10	5.2449E-10	6.0557E-10	**5.9604E-10**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	8.2408E-10	6.4517E-10	7.3194E-10	**7.3373E-10**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	8.5836E-10	6.8412E-10	7.2668E-10	**7.5638E-10**
C_a	Concentration (lb/acf)	3.3583E-10	2.7286E-10	3.1030E-10	**3.0633E-10**
C_{sd}	Concentration (µg/dscm)	1.0538E+01	8.3990E+00	9.6973E+00	**9.5448E+00**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	1.3196E+01	1.0331E+01	1.1721E+01	**1.1750E+01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	1.3745E+01	1.0955E+01	1.1637E+01	**1.2112E+01**
C_{sd}	Concentration (mg/dscm)	1.0538E-02	8.3990E-03	9.6973E-03	**9.5448E-03**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	1.3196E-02	1.0331E-02	1.1721E-02	**1.1750E-02**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	1.3745E-02	1.0955E-02	1.1637E-02	**1.2112E-02**
C_a	Concentration (µg/m^3 (actual,wet))	5.3778E+00	4.3694E+00	4.9690E+00	**4.9054E+00**
C_{sd}	Concentration (µg/Nm^3 dry)	1.1309E+01	9.0135E+00	1.0407E+01	**1.0243E+01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	1.4162E+01	1.1087E+01	1.2579E+01	**1.2609E+01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	1.4751E+01	1.1757E+01	1.2488E+01	**1.2999E+01**
$E_{lb/hr}$	Rate (lb/hr)	3.5392E-03	2.8778E-03	3.3262E-03	**3.2477E-03**
$E_{g/s}$	Rate (g/s)	4.4585E-04	3.6253E-04	4.1902E-04	**4.0913E-04**
$E_{T/yr}$	Rate (Ton/yr)	1.5502E-02	1.2605E-02	1.4569E-02	**1.4225E-02**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.1858E-05	9.2836E-06	1.0532E-05	**1.0558E-05**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	1.3018E-05	1.0376E-05	1.1021E-05	**1.1472E-05**

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

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

Run No.		4	5	6	Average
Date (2008)		Jun 25	Jun 25	Jun 25	
Start Time (approx.)		07:28	10:09	12:40	
Stop Time (approx.)		09:41	12:22	14:53	
Mercury Results - Impinger 4 Solution					
C_{sd}	Concentration (lb/dscf)	<7.1268E-12	<6.3484E-12	<6.2610E-12	**<6.5787E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<8.9245E-12	<7.8091E-12	<7.5676E-12	**<8.1004E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<9.2958E-12	<8.2805E-12	<7.5132E-12	**<8.3631E-12**
C_a	Concentration (lb/acf)	<3.6369E-12	<3.3026E-12	<3.2082E-12	**<3.3826E-12**
C_{sd}	Concentration (µg/dscm)	<1.1413E-01	<1.0166E-01	<1.0026E-01	**<1.0535E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<1.4291E-01	<1.2505E-01	<1.2118E-01	**<1.2972E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<1.4886E-01	<1.3260E-01	<1.2031E-01	**<1.3392E-01**
C_{sd}	Concentration (mg/dscm)	<1.1413E-04	<1.0166E-04	<1.0026E-04	**<1.0535E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<1.4291E-04	<1.2505E-04	<1.2118E-04	**<1.2972E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<1.4886E-04	<1.3260E-04	<1.2031E-04	**<1.3392E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<5.8240E-02	<5.2887E-02	<5.1375E-02	**<5.4168E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<1.2248E-01	<1.0910E-01	<1.0760E-01	**<1.1306E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<1.5337E-01	<1.3420E-01	<1.3005E-01	**<1.3921E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<1.5975E-01	<1.4230E-01	<1.2912E-01	**<1.4372E-01**
$E_{lb/hr}$	Rate (lb/hr)	<3.8328E-05	<3.4832E-05	<3.4390E-05	**<3.5850E-05**
$E_{g/s}$	Rate (g/s)	<4.8285E-06	<4.3880E-06	<4.3323E-06	**<4.5163E-06**
$E_{T/yr}$	Rate (Ton/yr)	<1.6788E-04	<1.5257E-04	<1.5063E-04	**<1.5702E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<1.2842E-07	<1.1237E-07	<1.0889E-07	**<1.1656E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<1.4099E-07	<1.2559E-07	<1.1395E-07	**<1.2684E-07**

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Date _____

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

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

Run No.		4	5	6	Average
Date (2008)		Jun 25	Jun 25	Jun 25	
Start Time (approx.)		07:28	10:09	12:40	
Stop Time (approx.)		09:41	12:22	14:53	
Mercury Results - Filtered Permanganate Solution					
C_{sd}	Concentration (lb/dscf)	<1.7817E-11	<1.5871E-11	<1.5652E-11	**<1.6447E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<2.2311E-11	<1.9523E-11	<1.8919E-11	**<2.0251E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<2.3239E-11	<2.0701E-11	<1.8783E-11	**<2.0908E-11**
C_a	Concentration (lb/acf)	<9.0923E-12	<8.2566E-12	<8.0206E-12	**<8.4565E-12**
C_{sd}	Concentration (µg/dscm)	<2.8531E-01	<2.5415E-01	<2.5065E-01	**<2.6337E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<3.5728E-01	<3.1263E-01	<3.0296E-01	**<3.2429E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<3.7215E-01	<3.3150E-01	<3.0078E-01	**<3.3481E-01**
C_{sd}	Concentration (mg/dscm)	<2.8531E-04	<2.5415E-04	<2.5065E-04	**<2.6337E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<3.5728E-04	<3.1263E-04	<3.0296E-04	**<3.2429E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<3.7215E-04	<3.3150E-04	<3.0078E-04	**<3.3481E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<1.4560E-01	<1.3222E-01	<1.2844E-01	**<1.3542E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	<3.0619E-01	<2.7275E-01	<2.6899E-01	**<2.8264E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<3.8343E-01	<3.3550E-01	<3.2513E-01	**<3.4802E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<3.9938E-01	<3.5576E-01	<3.2279E-01	**<3.5931E-01**
$E_{lb/hr}$	Rate (lb/hr)	<9.5821E-05	<8.7081E-05	<8.5974E-05	**<8.9625E-05**
$E_{g/s}$	Rate (g/s)	<1.2071E-05	<1.0970E-05	<1.0831E-05	**<1.1291E-05**
$E_{T/yr}$	Rate (Ton/yr)	<4.1969E-04	<3.8141E-04	<3.7657E-04	**<3.9256E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<3.2105E-07	<2.8092E-07	<2.7223E-07	**<2.9140E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<3.5246E-07	<3.1397E-07	<2.8487E-07	**<3.1710E-07**
Mercury Results - HCl Rinse + HCl/MnO2 Precipitate					
C_{sd}	Concentration (lb/dscf)	<1.4254E-11	<1.2697E-11	<1.2522E-11	**<1.3157E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<1.7849E-11	<1.5618E-11	<1.5135E-11	**<1.6201E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<1.8592E-11	<1.6561E-11	<1.5026E-11	**<1.6726E-11**
C_a	Concentration (lb/acf)	<7.2739E-12	<6.6053E-12	<6.4164E-12	**<6.7652E-12**
C_{sd}	Concentration (µg/dscm)	<2.2825E-01	<2.0332E-01	<2.0052E-01	**<2.1070E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<2.8583E-01	<2.5010E-01	<2.4237E-01	**<2.5943E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<2.9772E-01	<2.6520E-01	<2.4063E-01	**<2.6785E-01**
C_{sd}	Concentration (mg/dscm)	<2.2825E-04	<2.0332E-04	<2.0052E-04	**<2.1070E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<2.8583E-04	<2.5010E-04	<2.4237E-04	**<2.5943E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<2.9772E-04	<2.6520E-04	<2.4063E-04	**<2.6785E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<1.1648E-01	<1.0577E-01	<1.0275E-01	**<1.0834E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	<2.4495E-01	<2.1820E-01	<2.1519E-01	**<2.2611E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<3.0674E-01	<2.6840E-01	<2.6010E-01	**<2.7842E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<3.1950E-01	<2.8461E-01	<2.5823E-01	**<2.8745E-01**
$E_{lb/hr}$	Rate (lb/hr)	<7.6656E-05	<6.9664E-05	<6.8779E-05	**<7.1700E-05**
$E_{g/s}$	Rate (g/s)	<9.6569E-06	<8.7761E-06	<8.6645E-06	**<9.0325E-06**
$E_{T/yr}$	Rate (Ton/yr)	<3.3576E-04	<3.0513E-04	<3.0125E-04	**<3.1405E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<2.5684E-07	<2.2474E-07	<2.1779E-07	**<2.3312E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<2.8197E-07	<2.5117E-07	<2.2790E-07	**<2.5368E-07**

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QA/QC DATA

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

USEPA Method 29 (Trace Metals)
QA/QC Results

Run No.		4	5	6	
Date (2008)		Jun 25	Jun 25	Jun 25	
Start Time (approx.)		07:28	10:09	12:40	
Stop Time (approx.)		09:41	12:22	14:53	
Total Duration of Test Run (min.)		133	133	133	
Net Sampling Time (min.)		125	125	125	
Sampling System Calibration Summary					
	Nozzle ID No:	66-247-1	66-264-1	66-264-1	
D_n	Nozzle Diameter (in):	0.247	0.264	0.264	
	Probe ID No:	67-8-15	67-8-15	67-8-15	
C_p	Pitot Coefficient:	0.840	0.840	0.840	
	Meter Box ID. No:	66-21	66-21	66-21	
Y_d	Meter Box Yd - Field Sheet	0.9842	0.9842	0.9842	
	Meter Box Yd - Database	0.9842	0.9842	0.9842	
	Meter Box ΔH@ - Field Sheet	1.8163	1.8163	1.8163	
	Meter Box ΔH@ - Database	1.8163	1.8163	1.8163	
QA/QC					
	Final Leak Check				
	(a) 4% of Sampling Rate (cfm)	0.0207	0.0232	0.0236	
	(b) Allowable Rate from Method (cfm)	0.0200	0.0200	0.0200	
	Allowable Limit - minimum of a and b (cfm)	0.0200	0.0200	0.0200	
	Actual Final Leak Rate (cfm)	0.0030	0.0020	0.0030	
	Sample Volume				
	Minimum Volume Required (dscf)	30.00	30.00	30.00	
V_{mstd}	Actual Sample Volume (dscf)	61.879	69.467	70.436	
	Alternative Method 5 Post-Test Calibration (EPA ALT-009)				
$\sqrt{\Delta H_{avg}}$	Average of Square Root of ΔH (in. W.C.)	0.9113	1.0338	1.0398	
Y_{qa}	Alternative Meter Calibration Factor	0.9799	0.9894	0.9792	**Average**
	Variation from full-test Y_d (average ≤ ±5%)	-0.4%	0.5%	-0.5%	**-0.1%**
	Mean Isokinetic Sampling Rate Variation				
	Minimum Allowable (%)	90	90	90	
	Maximum Allowable (%)	110	110	110	
%I	Actual Variation (%)	106.29	102.38	103.69	
	Point-by-Point Isokinetic Variation				
	Number of points <90%	0	0	0	
	Number of points >110%	1	1	1	
	Number of points <80%	0	0	0	
	Number of points >120%	0	0	0	

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Date _____

Meter Box Full Test Calibration

Meter Box No: 28-080307-1 (66-21)

Date of Calibration: 8/3/2007

Meter Box Y_d: 0.9842

Calibration conducted by: M. Vaquero

Meter Box ΔH@: 1.8163

Barometric Pressure: 29.40

				Standard Meter Gas Volume (ft^3)			Meter Box Gas Volume (ft^3)			Std. Meter Temperature (°F)			Meter Box Temperature (°F)			Time (min.)	Calibration Results	
Q	ΔH	ΔP	Y_{ds}	Initial	Final	V_{ds} Net	Initial	Final	V_d Net	In	Out	T_{ds} Avg.	In	T_o Out	T_d Avg.	Θ	Y_d	ΔH@
0.954	3.00	-1.90	1.0000	0.000	10.000	10.000	103.446	113.729	10.283	77.0	77.0	77.00	93.0	83.0	88.00	10.12	0.9803	1.7704
0.953	3.00	-1.90	1.0000	0.000	10.000	10.000	113.729	124.011	10.282	77.0	77.0	77.00	93.0	83.0	88.00	10.13	0.9804	1.7739
0.383	0.50	-1.30	1.0000	0.000	5.000	5.000	146.502	151.585	5.083	77.0	77.0	77.00	83.0	82.0	82.50	12.62	0.9893	1.8388
0.382	0.50	-1.30	1.0000	0.000	5.000	5.000	151.585	156.680	5.095	77.0	77.0	77.00	85.0	82.0	83.50	12.63	0.9888	1.8417
0.662	1.50	-1.40	1.0000	0.000	11.000	11.000	163.298	174.599	11.301	77.0	77.0	77.00	89.0	83.0	86.00	16.04	0.9825	1.8378
0.663	1.50	-1.40	1.0000	0.000	10.000	10.000	174.599	184.865	10.266	77.0	77.0	77.00	90.0	83.0	86.50	14.57	0.9842	1.8349
																Averages	0.98425	1.81627

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
9.9	10.0
14.7	15.0
19.5	20.0
24.4	25.0

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Meter Box - Pyrometer Calibration Sheet

Meter Box No: 28-080307-1 (66-21)

Office: Palatine

Calibrated by: M. Vaquero

Client: Dept 66

Date: 8/3/07

Job No: N/A

Temperature Scale Used: Fahrenheit

Type of Calibration: Full-Test

Calibration Reference Settings (°F)	Pyrometer Reading for each Channel (°F)						
	1 Stack	2 Probe	3 Filter	4 Imp Out	5 Aux	6 DGM In	7 DGM Out
50	48	49	51				
100	98	99	100				
150	148	150	150				
200	198	200	200				
250	248	250	250				
300	298	300	300				
350	348	350	350				
400	398	399	400				
450	448	450	450				
500	498	499	500				
550	548	549	549				
600	598	600	600				

Tolerance = ±2°F difference from reference setting.

Calibration Reference Information

Reference Used: Omega CL23A

Serial No: T-225950

Calibrated By: JH Metrology

Date Calibrated: 10/7/2007

Calibration Report No: R044701

Meter Box Critical Orifice Post-Test Calibration Data

Project No.	10455	Meter No.	66-21	Orifice	A-4
Location	FF Outlet	Meter Yd	0.9842	Orifice K'	0.4923
Test Date	6/28/2008	Meter ΔH@	1.8163	Orifice Cal. Date	10/2/2007
Operator	C. Slimp	Full Test Cal. Date	8/3/2007		

Leak Checks

Negative Pressure — *No movement of manometer in one-minute* ☑ Pass

Positive Pressure — *No movement of manometer in one-minute* ☑ Pass

Important: All leak checks must pass in order for calibration to be valid.

Barom. Press. (P_b) 30.05 in. Hg

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Ambient Temp. - T_{amb} (°F)	Orifice ΔH (in. W.C.)	Vacuum (in. Hg)	Net Run Time Θ (minutes)	Net Meter Volume for Run - V_m (dcf)	Avg Meter Temp. for Run T_m (°F)	DGM Calibration Factor - Y_i	Percent Variation - ΔY_i
	0.0	813.200	86	83								
1	5.0	816.44	87	83	90	1.40	17.0	5.0	3.24	84.8	0.9970	0.0%
2	10.0	819.68	88	84	90	1.40	17.0	5.0	3.24	85.5	0.9984	0.1%
3	15.0	822.930	88	84	90	1.40	17.0	5.0	3.25	86.0	0.9962	-0.1%
										Average Y_i	0.9972	
										Cal. Error	1.3%	

Calculations and Specifications

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

$$\Delta Y_i = \frac{Y_i - \overline{Y}_i}{\overline{Y}_i} \times 100 \qquad \text{Spec.: } \Delta Y_i \le \pm 2\%$$

$$Cal.Error = \frac{\overline{Y}_i - Y_d}{Y_d} \times 100 \qquad \text{Spec.: } Cal.Error \le \pm 5\%$$

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SAMPLE PROBE CALIBRATION DATA

Probe Type: S- Type M-5 I.D. number: 67-8-15

Thermocouple Calibration

Reference Type: _____ Reference I.D. No: _____ Pyrometer I.D. No: _____ Degrees: F / C

Point No.	Target Temp.	Reference Temp	Indicated Temp	Temp Difference	% Difference	Specification
1	ice-32°F					
2	ambient-70°F					%Difference ≤ 1.5
3	hot oil-150°F					
4	boiling H_2O-212°F					
5	hot oil-320°F					

Does assembly meet specifications? [ ] → If "NO" thermocouple must be replaced.

Geometric Pitot Calibration — diagrams on reverse

Is pitot assembly in good repair? (YES) / NO If "NO" explain: _____

If repairs are required, pitot does not meet specification.

[X] **"S" Pitot**

Measurement				Specification
a1 =	1	a2 =	2	<10 °
b1 =	2	b2 =	0	<5°
γ =	90	θ =	1	
Pa =	0.358	Pb =	0.358	Pa + Pb = A
A =	0.715	Dt =	0.250	

Calculations

z = A sin γ =	0.0125	<0.125"
w = A sin θ =	0.01745	<0.03125"

Does assembly meet specifications? (YES) / NO

[ ] **Standard Pitot**

Measurement		Specification
Tube O.D.		(D)
Static Hole I.D.		0.1 x D =
Length,		
Tip to Static		> 6xD =
Static to Bend		>8xD =

Does assembly meet specifications? YES / NO

If "YES" "S" pitot Cp=0.84; Std pitot Cp=0.99
If "NO" wind tunnel calibration is required.

Wind Tunnel Pitot Calibration

All specifications are from EPA-600/8-76-005, section 3.1

PROBE Cp = 0.84 Calibrated by: Jeff Thurs Date: 12/26/07

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FIELD DATA

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TEST LOCATION: FF Outlet Metals **TESTING** **METHOD:** 29 **PAGE** 1 **OF** 2

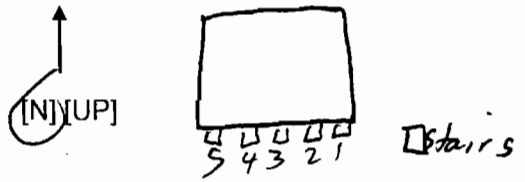
UNIT: 1 **RUN:** 1

FIELD DATA SHEET

Client: Wheelabrator	Project No.: 10455
Plant: S. Broward	Date: 6-24-08
Meter Operator: C. Slinger	
Probe Operator: C. Slinger	

Meter Box: 66-21	Sample Box No.: M6
Meter Y_d: 0.9842	Meter $\Delta H_@$: 1.8163
K Factor: 2	Pitot C_p: 0.84
Leak Rate Before: 0.006 [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]
-11.5	10		

Amb. Temp. (°F): 95	Bar. Press.: 30.17 [in Hg] [mbar]
Probe I.D. No.: C7-8-15	
Liner Material: Glass	

Filter No.: Run 1	—	—
Thimble No.: —	—	—
Nozzle Diameter: 0.247	Nozzle I.D.:	66-247-1

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

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. (ft³) [L]	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points	Filter T_f (°F) Set Points	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	~~XAD Trap Temp. T_t (°F)~~ O_2 %	Notes
				693.990		250	250						
1-1	5	0.44	0.88	695.70	301	246	250	58	91	91	5	10.6	
2	10	0.42	0.84	698.32	300	247	256	57	91	91	5	10.4	
3	15	0.35	0.70	~~695~~ 700.66	298	254	260	56	93	90	4.5	10.7	
4	20	0.42	0.84	703.26	299	251	245	55	95	91	5	7.7	706.560
5	25	0.57	1.1	706.255	298	250	251	53	97	91	5	10.5	New Volume
2-1	30	0.49	0.98	709.41	303	248	246	57	97	93	5.5	10.6	ΔV=0.305
2	35	0.42	0.84	712.04	302	251	250	52	100	93	5	10.4	
3	40	0.35	0.76	714.40	301	251	254	52	97	93	4.5	9.8	
4	45	0.48	0.96	717.13	301	250	250	53	96	93	5.5	10.2	
5	50	0.56	1.1	720.125	301	251	250	50	98	93	5.5	10.0	V= 720.525
3-1	55	0.46	0.92	723.28	302	247	247	57	94	93	5.5	10.5	ΔV=0.400
2	60	0.38	0.76	725.77	302	250	251	54	94	93	5.0	9.6	
		7.94157	10.68	#	3608	21			1143	1105			
	Total(s)	~~16.2187~~	23.18	68,490	7525				2355	2275			
	Average	~~0.6519~~	0.9272		~~301.0000~~				~~94.2000~~				

Sum of square roots. 17,0058 → 0.6802

Circle correct bracketed units on data sheet.

QA/QC ED

Date 6/24/08

CleanAir ENGINEERING

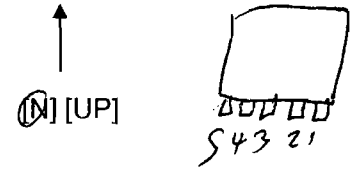
TEST LOCATION: FF Outlet / Metals **TESTING** **METHOD:** 29 **PAGE** 2 **OF** 2

UNIT: 1 **RUN:** 1

FIELD DATA SHEET

Client: Wheelabrator	Project No.: 10455
Plant: S. Brownsville	Date: 6-24-08
Meter Operator: C. Slump	
Probe Operator: C. Slump	

Cross-Section of Test Location



Amb. Temp. (°F): 95	Bar. Press.: 30.17 (in. Hg) [mbar]
Probe I.D. No.: 67-8-15	
Liner Material: Glass	

Meter Box: 66-2	Sample Box No.: MC
Meter Y_d: 0.9842	Meter $\Delta H_@$: 1.8163
K Factor	Pitot C_p
Leak Rate Before [cfm] [Lpm] @ (in. Hg)	
Leak Rate After [cfm] [Lpm] @ (in. Hg)	
Pitot Leak Check Before: ☐	After: Good ☐ Bad ☐

Filter No.	1	—	
Thimble No.	—	—	
Nozzle Diameter: 0.247	Nozzle I.D.	66-247-1	

Duct Dimensions (in.): 96 x 96			
Static Pres (in. H_2O): -11.5	Port Len. (in.): 10	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. [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_t (°F)~~ $\%O_2$	Notes
3-3	65	0.44	0.88	728.46	302	251	251	54	95	92	5	10.9	
4	70	0.57	1.1	731.51	302	249	248	54	94	92	6	11.1	
5	75	0.55	1.1	734.535	298	249	253	54	94	91	6	10.5	New V = 734.970
4-1	80	0.40	0.80	737.52	302	248	251	50	91	90	5	10.0	ΔV = 0.435
2	85	0.40	0.80	740.05	302	251	250	53	92	90	5	0.90	
3	90	0.51	1.0	742.93	302	250	249	53	92	89	5.5	6.95	
4	95	0.51	1.0	745.815	302	250	249	52	92	90	5.5	8.8	
5	100	0.57	1.1	748.785	301	249	250	54	93	89	6	9.1	New V = 749.150
5-1	105	0.40	0.80	751.65	299	250	252	60	96	88	5	9.4	ΔV = 0.365
2	110	0.43	0.86	754.29	301	253	252	55	94	89	5	9.5	
3	115	0.48	0.96	757.15	303	248	249	56	96	90	5.5	10.2	
4	120	0.53	1.1	760.04	302	249	250	57	94	90	6	11.6	
5	125	0.50	1.0	762.985	301	250	249	62	95	90		11.2	
	Total	* 9.0292							1				
	Average												

* Sum of square roots. $-1.505\,\Delta V$

Circle correct bracketed units on data sheet.

QA/QC: ED

Date: 6/24/08

CleanAir ENGINEERING

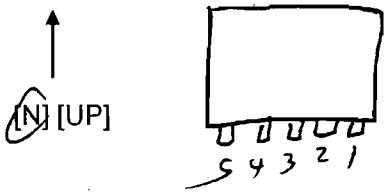
TEST LOCATION: FF Outlet Metals TESTING METHOD: 29 PAGE 1 OF 2

UNIT: 1 RUN: 2

FIELD DATA SHEET

Client: Wheelabrator	Project No.: 10455
Plant: S. Bronx	Date: 6-24-08
Meter Operator: C. Slump	
Probe Operator: C. Slump	

Cross-Section of Test Location



Amb. Temp. (°F): 95	Bar. Press.: 30.17 [in. Hg] [mbar]
Probe I.D. No.: 67-8-15	
Liner Material: Glass	

Meter Box: 66-21	Sample Box No.: M3	
Meter Y_d: 0.9842	Meter $\Delta H_@$: 1.8963	
K Factor: 2.0	Pitot C_p: 0.84	
Leak Rate Before: 0.003 [cfm] [Lpm] @ 15 (in. Hg)		
Leak Rate After: 0.002 [cfm] [Lpm] @ 11 (in. Hg)		
Pitot Leak Check Before: ☑	After: Good ☑ Bad ☐	

Duct Dimensions (in.): 96x96			
Static Pres (in. H_2O): -11.5	Port Len. (in.): 10	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Filter No.: RZ	—	—
Thimble No.: —	—	—
Nozzle Diameter: 0.247	Nozzle I.D.:	66-247-1

Start Time: 12:55	Stop Time: 15:15

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] 764.980	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. T_t (°F)	Notes
1-1	5	0.38	0.76	767.45	299	257	256	65	90	89	5	10.6	
2	10	0.35	0.70	769.82	299	250	252	65	92	90	5	9.7	
3	15	0.38	0.76	772.28	299	254	253	62	93	96	5	10.6	
4	20	0.41	0.82	774.75	299	250	250	61	93	90	5	10.7	
5	25	0.55	1.1	777.565	299	252	249	62	95	91	5	10.1	New V=777.885
2-1	30	0.46	0.92	780.50	299	251	249	62	94	91	5	10.5	ΔV=0.320
2	35	0.38	0.76	783.11	301	250	249	63	95	91	5.5	10.4	Change K=1.9
3	40	0.41	0.78	785.60	302	251	250	57	97	92	5	10.5	
4	45	0.56	1.1	788.09	302	249	250	58	96	92	5	10.0	
5	50	0.60	1.1	791.010	302	249	250	59	94	91	6	8.9	New V=791.308
3-1	55	0.35	0.67	793.65	301	250	249	62	93	91	5	10.5	
2	60	0.38	0.72	795.99	303	250	250	57	95	91	5	11.0	
		7.87239	10.19		3609	~~1505~~			1127	1089	5	0.96	
	Total	16.9292	22.22	65.550	7551				2365	2283			
	Average	0.6772	0.8888		302.0400				92.9600				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC ED

Date 6/24/08

CleanAir ENGINEERING

E-5

TEST LOCATION: FF Outlet Metals TESTING METHOD: 29 PAGE 1 OF 2

UNIT: 1 RUN: 2

FIELD DATA SHEET

Client Wheelabrator	Project No. 10455
Plant S. Broward's	Date 6-24-08
Meter Operator C. Slimp	
Probe Operator C. Slimp	

Cross-Section of Test Location

[N] [UP]

5432 1

Amb. Temp. (°F) 95	Bar. Press. 30.17 [in Hg] [mbar]
Probe I.D. No. 67-8-15	
Liner Material Glass	

Meter Box 66-21	Sample Box No. M3	
Meter Y_d 0.9842	Meter $\Delta H_@$ 1.8163	
K Factor 1.9	Pitot C_p 0.84	
Leak Rate Before [cfm] [Lpm] @ (in. Hg)		
Leak Rate After [cfm] [Lpm] @ (in. Hg)		
Pitot Leak Check Before: ☐	After: Good ☐ Bad ☐	

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]
-11.5	10	[In]	

Filter No. R2	—	—
Thimble No.	—	—
Nozzle Diameter 0.247	Nozzle I.D.	

Start Time:	Stop Time:

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L]	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	XAD Trap Temp. T_t (°F)	Notes
3-3	65	0.42	0.80	798.52	302	249	250	57	96	92	5	10.6	
4	70	0.51	0.97	801.31	302	249	251	56	95	92	5	11.2	
5	75	0.58	1.1	804.320	303	251	251	56	96	91	6	11.4	804.620
4-1	80	0.45	0.86	807.26	304	250	248	61	94	91	5.5	11.6	ΔV=0.300
2	85	0.41	0.78	809.77	301	249	251	57	94	91	5.5	11.7	
3	90	0.47	0.89	812.47	303	250	251	57	95	92	5.5	11.8	
4	95	0.53	1.0	815.14	304	250	251	58	96	91	6	12.1	
5	100	0.53	1.6	817.810	305	249	250	61	95	92	6	11.6	818.505
5-1	105	0.35	0.67	820.84	301	250	250	62	94	92	5	10.7	ΔV=0.695
2	110	0.45	0.86	823.44	306	250	250	61	96	92	5	10.6	
3	115	0.53	1.0	826.31	305	249	250	61	96	93	5.5	9.9	
4	120	0.57	1.1	829.26	307	250	250	63	95	92	6.5	10.6	
5	125	0.54	1.0	832.135	303	549	250	63	96	93	6	10.6	
	Total	*	22.22										
	Average												

* Sum of square roots. -1.605 ΔV

Circle correct bracketed units on data sheet.

QA/QC ED

Date 6/24/08

FDS005-General.xls, Feb 2002

CleanAir ENGINEERING

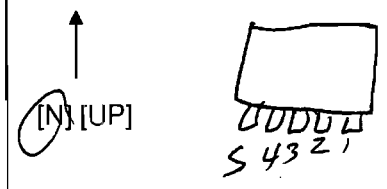
TEST LOCATION: FF Outlet Metals TESTING METHOD: 29 PAGE 1 OF 2

UNIT: 1 RUN: 3

FIELD DATA SHEET

Client	Wheelabrator	Project No.	10455
Plant	S. Broward	Date	6-24-08
Meter Operator	C. Slimp		
Probe Operator	C. Slimp		

Cross-Section of Test Location



Amb. Temp. (°F)	95	Bar. Press.	30.17 [in Hg] [mbar]
Probe I.D. No.	67-9-15		
Liner Material	Glass		

Meter Box	66-21	Sample Box No.	M6
Meter Y_d	0.9842	Meter $\Delta H_@$	1.863
K Factor	1.9	Pitot C_p	0.84
Leak Rate Before	0.005 [cfm] [Lpm]	@	15 (in. Hg)
Leak Rate After	[cfm] [Lpm]	@	(in. Hg)
Pitot Leak Check Before: ☑	After: Good ☑	Bad ☐	

Filter No.	3	—	—
Thimble No.	—	—	—
Nozzle Diameter	0.247	Nozzle I.D.	66-247-1

Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-11.5	10		

Start Time:	~~14:165~~ 16:17	Stop Time:	18:31

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] 832.795	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 28	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	~~XAD Trap Temp.~~ T_t (°F)	Notes
1-1	5	0.35	0.67	835.18	300	250	250	64	92	92	4.5	10.6	
2	10	0.35	0.67	837.49	301	251	250	63	92	92	4.5	9.8	
3	15	0.34	0.65	839.78	299	250	250	62	93	92	4	10.7	
4	20	0.37	0.70	842.16	299	250	449	63	94	92	4.5	11.4	
5	25	0.52	0.99	844.995	299	250	252	62	95	92	5	10.5	$\Sigma V = 845.185$
2-6	30	0.49	0.93	847.89	301	250	250	62	94	93	5	10.6	$\Delta V = 0.190$
2	35	0.36	0.68	850.24	300	249	250	61	97	93	4.5	10.4	
3	40	0.35	0.67	852.53	299	250	249	60	95	93	4.5	10.2	
4	45	0.45	0.86	854.81	298	251	250	60	96	93	5.0	11.1	
5	50	0.55	1.0	857.700	298	251	250	60	96	93	5.0	10.8	857.900
3-1	55	0.47	0.89	860.63	299	249	250	63	94	92	5	10.2	$\Delta V = 0.20$
2	60	0.40	0.76	863.15	299	249	250	60	96	92	5	10.3	
		7.71777	9.47	6	3592				1134	1109			
	Total	16.7814	21.5	65.230	2488				2376	2292			
	Average	0.6712	0.8958	5	299.5200				95.3600				

Sum of square roots: 0.86

Circle correct bracketed units on data sheet.

QA/QC CS

Date 6-24-08

CleanAir ENGINEERING

TEST LOCATION: FF Outlet Metals TESTING METHOD: 29 PAGE 2 OF 2

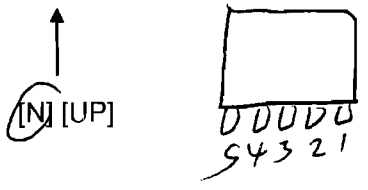
UNIT: 1 RUN: 3

FIELD DATA SHEET

Client Wheelabrator	Project No. 10455
Plant S. Brandy	Date 6/24/08
Meter Operator C. Slimp	
Probe Operator C. Slimp	

Meter Box 66-21	Sample Box No.
Meter Y_d 0.9842	Meter $\Delta H_@$ 1.8163
K Factor 1.9	Pitot C_p 0.84
Leak Rate Before [cfm] [Lpm] @ (in. Hg)	
Leak Rate After [cfm] [Lpm] @ (in. Hg)	
Pitot Leak Check Before: ☑	After: Good ☑ Bad ☐

Cross-Section of Test Location



Duct Dimensions (in.) 96 x 96

Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-16.3	10		

Amb. Temp. (°F) 95	Bar. Press. 30.17 [in. Hg] [mbar]	
Probe I.D. No. 67-A-15		
Liner Material Glass		

Filter No.	R3	—	—
Thimble No.	—	—	—
Nozzle Diameter	0.247	Nozzle I.D.	66-247-1

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)	ProbeT$_p$ (°F) Set Points 250	Filter T$_f$ (°F) Set Points 280	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	XAD Trap Temp. T_t (°F)	Notes
3-3	65	0.41	0.78	865.66	300	250	250	57	96	91	5	8.6	
4	70	0.53	1.0	868.55	301	250	249	58	96	91	5	10.4	
5	75	0.61	1.2	871.625	301	250	250	57	96	91	6	10.4	IV=871.820
4-61	80	0.40	0.76	874.34	300	249	249	61	93	90	5	10.4	ΔV=0.195
72	85	0.38	0.72	876.81	301	250	251	57	95	90	5	11.0	
83	90	0.45	0.86	879.30	300	250	250	58	95	90	5	11.5	
44	95	0.57	1.1	882.33	301	251	250	59	95	90	5	11.7	
105	100	0.59	1.1	885.355	298	250	250	59	97	91	6	12 11.2	IV=885.530
54	105	0.43	0.82	888.09	298	249	250	61	94	93	5	11.2	ΔV=0.175
2	110	0.40	0.76	890.58	299	250	250	62	96	91	5	10.0	
3	115	0.49	0.93	893.06	299	250	250	63	96	92	5	10.5	
4	120	0.55	1.0	895.91	299	250	250	63	96	91	5	10.7	
5	125	0.55	1.0	898.785	299	249	249	63	97	92	5.5	10.5	
	Total	*											
	Average												

* Sum of square roots. 0.76 = ΔV

Circle correct bracketed units on data sheet.

QA/QC CS

Date 6-24-08

CleanAir ENGINEERING

Impinger Weight Sheet

Client	WHEELABRATOR			Unit Name / Location	U1 / FF OUTLET
Plant	SOUTH BROWARD	Job No.	10455	Method	29

Run No.	FIELD BLANK	Filter Type	QUARTZ		Sample Box No.	66 - M3
Date	6/24/08	Lot No.	NA		pH	NA
Analyst	E. DOAK	Filter No.	NA		Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	EMPTY	521.9	521.9	0.0	
Impinger 2	100 ml 5% HNO_3/10% H_2O_2	614.0	ED ~~613~~ 613.9	0.1	QA/QC
Impinger 3	100 ml 5% HNO_3/10% H_2O_2	612.0	612.1	-0.1	Date
Impinger 4	EMPTY	491.3	491.3	0.0	
Impinger 5	100 ml 4% $KMnO_4$/10% H_2SO_4	592.9	593.2	-0.3	Total Weight (gm)
Impinger 6	100 ml 4% $KMnO_4$/10% H_2SO_4	607.6	607.7	-0.1	-0.5
Impinger 7	SILICA GEL	782.2	ED ~~786.8~~ 781.7	0.5	0.0

Run No.	1	Filter Type	QUARTZ		Sample Box No.	66 - M6
Date	6/24/08	Lot No.	NA		pH	NA
Analyst	E. DOAK	Filter No.	NA		Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	EMPTY 100 ml	819.0	520.9	298.1	
Impinger 2	100 ml 5% HNO_3/10% H_2O_2	677.9	603.0	74.9	QA/QC
Impinger 3	~~EMPTY~~ 100 ml 5% HNO_3/10% H_2O_2	601.1	592.1	9.0	Date
Impinger 4	~~100 ml~~ EMPTY	507.7	506.4	1.3	
Impinger 5	100 ml 4% $KMnO_4$/10% H_2SO_4	577.6	577.8	-0.2	Total Weight (gm)
Impinger 6	100 ml 4% $KMnO_4$/10% H_2SO_4	599.0	599.7	-0.7	382.4
Impinger 7	SILICA GEL	751.0	733.3	17.7	400.1

Run No.	2	Filter Type	QUARTZ		Sample Box No.	66 M3
Date	6/24/08	Lot No.	NA		pH	NA
Analyst	E. DOAK	Filter No.	NA		Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	EMPTY	825.3	523.0	302.3	
Impinger 2	100 ml 5% HNO_3/10% H_2O_2	674.4	616.9	57.5	QA/QC
Impinger 3	100 ml 5% HNO_3/10% H_2O_2	618.3	613.1	5.2	Date
Impinger 4	EMPTY	492.7	492.6	0.1	
Impinger 5	100 ml 4 $KMnO_4$/10% H_2SO_4	598.6	598.1	0.5	Total Weight (gm)
Impinger 6	100 ml 4 $KMnO_4$/10% H_2SO_4	606.4	606.8	-0.4	365.2
Impinger 7	SILICA GEL	797.0	782.2	14.8	380.0

QA/QC ED
Date 6/24/08

CleanAir ENGINEERING

ORSAT READINGS

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

Client	Wheelbrator	Project Number	10455	$Fo = \frac{20.9 - \%O_2}{\%CO_2}$
Plant	South Browards	Unit	1	
Orsat ID	ORSAT #7	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	9.4	19.3	~~10.1~~ 9.9		E. DOAK	6/24	1557
		2	9.4	19.3	~~10.1~~ 9.9	1.170			
		3	9.4	19.3	9.9				
		Avg.	9.4	19.3	9.9				
2	29	1	9.8	19.6	9.8	1.133	E. DOAK	6/24	1606
		2	9.8	19.6	9.8				
		3	9.8	19.6	9.8				
		Avg.	9.8	19.6	9.8				
3	29	1	9.7	19.4	9.7	1.159	C. SLIMP	6/24	1935
		2	9.7	19.4	9.7				
		3	9.7	19.4	9.7				
		Avg.							
		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 EA
Date 6/29/08

CleanAir. ENGINEERING

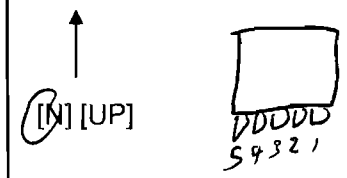
TEST LOCATION: FF Outlet Metals **TESTING** **METHOD:** 29 **PAGE** 1 **OF** 2

UNIT: 1 **RUN:** 4

FIELD DATA SHEET

Client Wheelabrator	Project No. 10455
Plant S. Broward	Date 6-25-08
Meter Operator C. Stamp	
Probe Operator C. Stamp	

Cross-Section of Test Location



Amb. Temp. (°F) 80	Bar. Press. 30.18 [in. Hg] [mbar]
Probe I.D. No. 67-B-15	
Liner Material Glass	

Meter Box 66-21	Sample Box No.	
Meter Y_d 0.9842	Meter $\Delta H_@$ 1.8163	
K Factor 1.9	Pitot C_p 0.84	
Leak Rate Before 0.004 [cfm] [Lpm]	@ 15 (in. Hg)	
Leak Rate After 0.003 [cfm] [Lpm]	@ 10 (in. Hg)	
Pitot Leak Check Before: ☑	After: Good ☑ Bad ☐	

Filter No. R4	—	—	
Thimble No. —	—	—	
Nozzle Diameter 0.247	Nozzle I.D.	66-247-1	

Duct Dimensions (in.) 96 x 96			
Static Pres (in. H_2O) -11.6	Port Len. (in.) 10	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Start Time: 07:28	Stop Time: 09:41

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L] 899.275	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. ~~Tr~~ (°F)	Notes
						250	250					021	
1-1	5	0.32	0.61	901.50	296	254	245	64	81	81	4.5	8.8	
2	10	0.35	0.67	903.77	297	252	253	63	83	81	4.5	9.3	
3	15	0.31	0.59	905.93	297	254	253	62	83	82	4.5	8.7	
4	20	0.37	0.70	908.34	297	252	253	62	85	82	4.5	7.6	
5	25	0.45	0.86	910.935	295	250	249	62	86	82	5	8.6	M.V.=911.115
2-1	30	0.44	0.84	913.65	294	248	249	63	86	83	5	10.5	ΔV=0.180
2	35	0.35	0.67	915.98	299	251	251	61	88	83	5	8.4	
3	40	0.31	0.59	918.16	298	250	250	58	89	84	4.5	8.2	
4	45	0.42	0.80	920.71	298	249	250	57	89	84	5	8.4	
5	50	0.53	1.1	923.630	298	251	250	56	91	85	6	8.4	K=2.0 M.V.=923.780
3-1	55	0.43	0.86	926.42	297	250	249	59	89	85	5	9.0	ΔV=0.150
2	60	0.40	0.80	929.04	299	250	250	61	91	85	5	9.0	
3-3	65	0.37	0.74	931.51	298	250	250	63	91	86	5.5	8.3	
	Total	16.2386	20.917	64.570	7467				2245	2148			
	Average	0.6495	0.8364		298.68				87.86	85.92	87.86		

Sum of square roots. 8.07744 9.83

Circle correct bracketed units on data sheet. 3883

QA/QC SB Date 7/31

1132 1083 87.86

CleanAir ENGINEERING

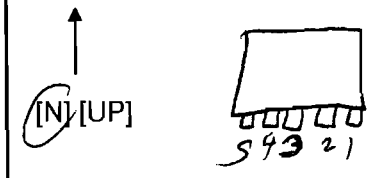
TEST LOCATION: EF Outlet Metals **TESTING** **METHOD:** 29 **PAGE** 2 **OF** 2

UNIT: 1 **RUN:** 4

FIELD DATA SHEET

Client Wheelabrator	Project No. 10455
Plant South Brownsville	Date 6-25-08
Meter Operator C. Slimp	
Probe Operator C. Slimp	

Cross-Section of Test Location



Amb. Temp. (°F)	Bar. Press. [in. Hg] [mbar]
Probe I.D. No. 62-B-15	
Liner Material Glass	

Meter Box 66-21	Sample Box No.	
Meter Y_d 0.9842	Meter $\Delta H_@$ 1.8163	
K Factor ~~1.9652.6~~	Pitot C_p 0.84	
Leak Rate Before [cfm] [Lpm] @ (in. Hg)		
Leak Rate After [cfm] [Lpm] @ (in. Hg)		
Pitot Leak Check Before: ☐	After: Good ☐ Bad ☐	

Duct Dimensions (in.) 96x96			
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-11.0	10		

Filter No.	—	—
Thimble No.	—	—
Nozzle Diameter 0.247	Nozzle I.D.	

Start Time:	Stop Time:

m-1	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. T_t (°F)~~ CS O2	Notes
3-4	~~3~~	~~65~~ 70	0.47	0.94	934.04	300	250	249	62	92	87	5.5	~~8.7~~	
5	~~4~~	~~70~~ 75	0.47	0.94	936.820	300	250	249	58	93	87	5.5	8.2	N.V. = 936.950
4-1	~~5~~	~~75~~ 80	0.47	0.94	939.71	300	250	251	60	92	88	6.0	9.1	ΔV=0.130
2	~~4-1~~	~~80~~ 85	0.40	0.80	942.27	301	249	248	58	93	89	5.5	8.2	
3	2	~~85~~ 90	0.45	0.96	944.96	300	250	249	56	91	88	5.5	8.2	
4	3	~~90~~ 95	0.50	1.0	947.82	306	251	250	56	92	88	6	7.9	
5	~~4~~	~~95~~ 100	0.50	1.0	950.700	300	250	250	57	93	89	6	7.5	950.805 = N.V.
5-1	5	~~100~~ 105	0.40	0.80	953.35	299	250	249	60	93	90	5.5	~~9.4~~ 8.5	ΔV=0.105
2	~~5-1~~	~~105~~ 110	0.42	0.84	955.97	301	250	251	56	94	90	5.5	8.1	
3	2	~~110~~ 115	0.46	0.92	958.67	301	248	248	57	94	90	6	7.5	
4	3	~~115~~ 120	0.52	1.0	961.52	301	250	249	58	93	89	6	7.3	
5	~~4~~	~~120~~ 125	0.50	1.0	964.410	301	250	250	59	93	90	6	7.4	
5	~~5~~	~~125~~												
		Total	*											
		Average												

* Sum of square roots. ΔV=0.565

Circle correct bracketed units on data sheet.

QA/QC JB

Date 6/9/08

CleanAir ENGINEERING

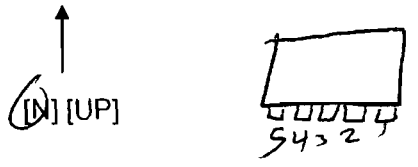
TEST LOCATION: FF Outlet Metals **TESTING** **METHOD:** 29 **PAGE** 1 **OF** 1

UNIT: 1 **RUN:** 5

FIELD DATA SHEET

Client	Wheelabrator	Project No.	10455
Plant	South Brevard, FL	Date	6-25-08
Meter Operator	C. Slimp		
Probe Operator	C. Slimp		

Cross-Section of Test Location



Amb. Temp. (°F)	90	Bar. Press.	30.16 [in. Hg] [mbar]
Probe I.D. No.	67-8-15		
Liner Material	Glass		

Meter Box	66-2.1	Sample Box No.	M6
Meter Y_d	0.9842	Meter $\Delta H_@$	1.8163
K Factor	~~1.9CS 2.5~~	Pitot C_p	0.84
Leak Rate Before	0.000 [cfm] [Lpm]	@	15 (in. Hg)
Leak Rate After	0.002 [cfm] [Lpm]	@	8 (in. Hg)
Pitot Leak Check Before: ☑	After: Good ☑	Bad ☐	

Filter No.	R4	—	—
Thimble No.	—	—	—
Nozzle Diameter	~~0.247~~ 0.264 CS	Nozzle I.D.	66-264-1

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]
-11.0	10		

Start Time:	10:08	Stop Time:	12:22

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. 164.955 [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: ~~T_t~~ ~~(°F)~~ O_2	Notes
1-1	5	0.35	0.88	967.68	298	254	253	64	89	87	5	11.0	
2	10	0.35	0.88	970.36	298	255	254	63	89	88	4.5	9.5	
3	15	0.32	0.80	972.90	296	252	248	60	90	89	4.5	9.4	
4	20	0.35	0.88	975.54	298	250	249	59	90	88	4.5	8.9	
5	25	0.50	1.3	978.650	298	250	250	60	90	88	~~4~~ 5.5	9.5	NV=978.795
~~2~~ 6-1	30	0.40	1.0	981.67	298	250	250	63	90	88	5.0	10.0	ΔV=0.145
~~7~~ 2	35	0.33	0.82	984.52	299	251	251	57	91	88	5.0	9.8	
~~8~~ 3	40	0.38	0.95	987.35	299	251	251	58	91	88	5.0	10.1	
~~9~~ 4	45	0.45	1.1	990.31	300	250	252	59	91	88	5.0	9.6	
5	50	0.50	1.3	993.280	299	250	252	57	91	89	5.5	8.2	993.430
3-1	55	0.45	1.1	996.39	301	250	249	60	91	88	5.0	9.0	ΔV=0.150
2	60	0.36	0.90	999.07	301	250	250	59	91	89	5.0	8.5	
		7.51972	11.91		3585				1084	1058			
	Total	*~~16.2942~~	~~26.94~~	72.635	~~4497~~				~~2262~~	~~2201~~			
	Average	~~0.6518~~	~~1.0776~~		~~299.68~~				~~90.4800~~ 89.30	88			

*Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC SG

Date 7/31

CleanAir ENGINEERING

TEST LOCATION: FF Outlet Metals **TESTING** **METHOD:** 29 **PAGE** 2 **OF** 2

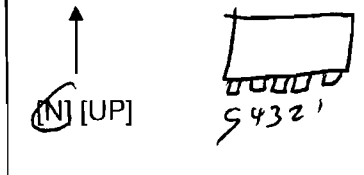
UNIT: 1 **RUN:** 5

FIELD DATA SHEET

Client: Wheelabrator	Project No.: 10455
Plant: S. Boswardy	Date: 6-25-08
Meter Operator: C. Slinge	
Probe Operator: C. Slinge	

Meter Box: 66-21	Sample Box No.:
Meter Y_d: 0.9842	Meter $\Delta H_@$: 1.8163
K Factor: ~~7.905~~ 2.5	Pitot C_p: 0.84
Leak Rate Before: [cfm] [Lpm] @ (in. Hg)	
Leak Rate After: [cfm] [Lpm] @ (in. Hg)	
Pitot Leak Check Before: ☐	After: Good ☑ Bad ☐

Cross-Section of Test Location



Duct Dimensions (in.): 96 x 96			
Static Pres (in. H_2O): -11	Port Len. (in.): 10	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Amb. Temp. (°F): 90	Bar. Press.: 30.18 [(in. Hg)] [mbar]
Probe I.D. No.: 67-8-15	
Liner Material: Glass	

Filter No.: R6	—	—
Thimble No.: —	—	—
Nozzle Diameter: 0.264	Nozzle I.D.: 66-264-1	

Start Time:	Stop Time:

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L]	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points	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
						250	250						
3-3	65	0.44	1.1	1001.78	301	250	250	60	91	89	5	9.2	
4	70	0.51	1.3	1005.00	301	250	248	59	91	88	6	8.7	
5	75	0.50	1.3	1008.190	300	250	250	60	91	88	6	8.9	N.V.=1008.375
4-1	80	0.45	1.1	1011.34	300	249	249	~~60~~ 59	90	86	5.5	10.0	ΔV=0.185
2	85	0.35	0.86	1014.00	301	250	249	58	91	88	5.5	8.0	
3	90	0.44	1.1	1016.90	301	251	251	57	91	88	5.5	8.4	
4	95	0.55	1.4	1019.87	303	250	250	57	91	86	5.5	7.5	
5	100	0.52	1.3	1023.125	300	249	250	58	91	88	6	8.7	N.V.=1023.275
5-1	105	0.30	0.75	1025.80	298	250	250	58	90	86	4.5	8.8	ΔV=0.150
2	110	0.40	1.0	1028.69	301	250	250	58	90	88	5	7.6	
3	115	0.49	1.2	1031.78	300	250	250	56	90	88	6	8.5	
4	120	0.51	1.3	1035.01	301	251	251	58	90	88	6	8.2	
5	125	0.50	1.3	1038.220	300	250	249	58	91	88	6	7.9	
	Total	*											
	Average												

* Sum of square roots. $\Delta V_1 = 0.63$

Circle correct bracketed units on data sheet.

QA/QC: SB

Date: 7/8/

CleanAir ENGINEERING

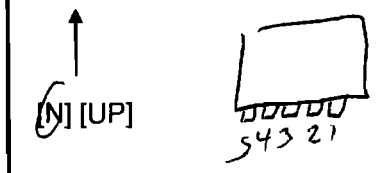
TEST LOCATION: FF Outlet **Metals TESTING** **METHOD:** 29 **PAGE** 1 **OF** 2

UNIT: 1 **RUN:** 6

FIELD DATA SHEET

Client: Wheelabrator	Project No.: 10455
Plant: S. Broward, FL	Date: 6-25-08
Meter Operator: C. Slimp	
Probe Operator: C. Slimp	

Cross-Section of Test Location



Amb. Temp (°F): 95	Bar. Press.: 30.18 (in. Hg) [mbar]
Probe I.D. No.: 67-8-15	
Liner Material: Glass	

Meter Box: 66-21	Sample Box No.: M3	
Meter Y_d: 0.9842	Meter $\Delta H_@$: 1.8163	
K Factor: 2.5	Pitot C_p: 0.84	
Leak Rate Before: 0.003 [cfm] [Lpm] @ 15 (in. Hg)		
Leak Rate After: 0.003 [cfm] [Lpm] @ 10 (in. Hg)		
Pitot Leak Check Before: ☑	After: Good ☑ Bad ☐	

Filter No.: R6	—	—	
Thimble No.: —	—	—	
Nozzle Diameter: 0.264	Nozzle I.D.:	66-264-1	

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]
-11.0	10	[In]	[In]

Start Time: 12:40	Stop Time: 14:53

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. 38.905 [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_t (°F)	Notes
1-1	5	0.44	1.1	42.00	301	253	248	62	87	87	6	10.1	
2	10	0.42	~~1.1~~ 1.1	44.99	300	250	255	62	89	87	6	8.3	
3	15	0.36	0.9	47.97	296	255	254	62	90	87	6	8.5	
4	20	0.47	1.2	51.02	299	251	249	61	90	88	6	8.3	K=2.45
5	25	0.60	1.5	54.370	300	251	248	61	91	88	8	7.8	N.V.=54.525
2-1	30	0.43	1.1	57.54	300	250	249	61	90	88	6	8.2	ΔV=0.155
2	35	0.42	1.0	60.52	302	250	253	60	91	88	6	7.8	
3	40	0.35	0.86	63.04	299	250	250	60	91	88	5	7.9	
4	45	0.45	1.1	65.97	306	250	249	59	91	88	6	8.5	
5	50	0.58	1.4	69.285	301	250	251	56	91	88	6.5	8.5	N.V.=69.415
3-1	55	0.38	0.93	72.12	299	250	246	57	91	88	5	8.5	ΔV=0.130
2	60	0.32	0.78	74.65	301	250	248	58	91	88	5	7.6	
		7.88151	12.99		3598				1083	1053			
	Total	(6.5430)	(27.21)	73.690	(7504)				(2278)	(2209)			
	Average	(0.6617)	(1.0884)		(300.1600)					(89.6200)			

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: ED

Date: 6/26/08

CleanAir ENGINEERING

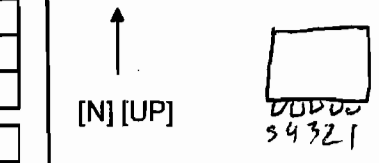
TEST LOCATION: EF Outlet **Metals TESTING** **METHOD:** 29 **PAGE** 2 **OF** 2

UNIT: 1 **RUN:** 6

FIELD DATA SHEET

Client: Wheelabrator	Project No.: 10455
Plant: S. Broward's	Date: 6-25-08
Meter Operator: C. Slimp	
Probe Operator: C. Slimp	

Cross-Section of Test Location



Amb. Temp. (°F): 95	Bar. Press: 30.18	[in. Hg] [mbar]
Probe I.D. No.: 67-8-15		
Liner Material: Glass		

Meter Box: 66-21	Sample Box No.: M3	
Meter Y_d: 0.9842	Meter $\Delta H_@$: 1.8163	
K Factor: 2.45	Pitot C_p: 0.84	
Leak Rate Before: [cfm] [Lpm] @ (in. Hg)		
Leak Rate After: [cfm] [Lpm] @ (in. Hg)		
Pitot Leak Check Before: ☐	After: Good ☐ Bad ☐	

Filter No.: R6	—	—	
Thimble No.: —	—	—	
Nozzle Diameter: 0.264	Nozzle I.D.:		

Duct Dimensions (in.): 96 x 96			
Static Pres ($in. H_2O$): -11	Port Len (in.): 10	Gas Flow: [In] [Out] of page	First point all the way: [In] [Out]

Start Time:	Stop Time:

Traverse Point Number	Min/pt Elapsed Time (5)	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_t (°F)	Notes
3-3	65	0.43	1.1	77.64	300	250	251	59	91	88	6.0	8.8	
4	70	0.50	1.2	80.79	301	249	250	60	92	88	6.5	7.6	
5	75	0.48	1.2	83.910	300	249	249	60	92	89	6.5	8.1	N.V.=84.055
4-1	80	0.36	0.88	86.74	299	249	247	59	90	89	5	8.1	ΔV=0.145
2	85	0.38	0.93	89.51	301	251	252	57	91	89	5.5	7.5	
3	90	0.46	1.1	92.57	301	250	252	56	92	89	6	7.4	
4	95	0.44	1.1	95.56	301	250	251	58	92	89	6.5	6.5	
5	100	0.48	1.2	98.615	301	250	248	59	92	90	6.5	8.5	N.V=98.720
5-1	105	0.37	0.91	101.57	299	250	247	56	90	89	5.5	8.6	ΔV=0.105
2	110	0.41	1.0	104.23	301	249	253	57	91	89	6.0	9.0	
3	115	0.46	1.1	107.18	300	251	253	57	92	89	6.0	8.6	
4	120	0.52	1.3	110.10	301	248	251	58	92	89	6.0	8.9	
5	125	0.56	1.2	113.130	301	248	249	60	92	89	6.0	8.0	
	Total	*											
	Average												

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC SG

Date 7/8/08

CleanAir ENGINEERING

TEST LOCATION: FF Outlet Metals TESTING METHOD: 29 PAGE 1 OF 2

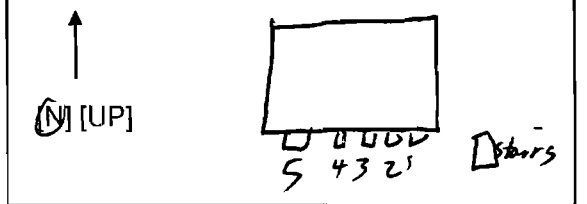
UNIT: 1 RUN: 7

FIELD DATA SHEET

Client Wheelabrator	Project No. 10455
Plant S. Crowards	Date 6-26-08
Meter Operator C. Slimp	
Probe Operator C. Slimp	

Meter Box 66-21	Sample Box No. M6
Meter Y_d 0.9842	Meter $\Delta H_@$ 1.8163
K Factor ~~2.5~~ 2.45	Pitot C_p 0.84
Leak Rate Before 0.001 [cfm] [Lpm] @ 15 (in. Hg)	
Leak Rate After 0.003 [cfm] [Lpm] @ 11 (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]
-11.8	10	[In]	[In]

Amb. Temp. (°F) 85	Bar. Press. 30.09 [in. Hg] [mbar]
Probe I.D. No. 67-9-15	
Liner Material Glass	

Filter No. R7	—	—
Thimble No. —	—	—
Nozzle Diameter 0.264	Nozzle I.D.	66-264-1

Start Time: 06:45	Stop Time: 08:59

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] 115,970	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)~~ O_2	Notes
1-1	5	0.49	1.2	119.15	298	255	255	64	82	81	6	9.8	
2	10	0.42	1.0	122.04	299	255	254	63	83	81	5	10.0	
3	15	0.38	0.93	124.95	292	253	252	64	84	81	5	9.5	
4	20	0.42	1.0	127.82	295	252	250	62	85	82	5	9.9	
5	25	0.59	1.4	131.185	296	250	251	62	86	82	6.5	10.4	M.V.=131,355
2-61	30	0.51	1.2	134.37	297	250	250	63	85	83	5.5	9.0	ΔV=0.170
~~72~~	35	0.41	1.0	137.38	300	251	249	63	87	83	5.0	7.4	
~~83~~	~~1040~~	0.42	1.0	140.24	299	251	250	63	87	83	5.5	7.4	
4	45	0.53	1.3	143.13	299	251	251	61	88	83	5.5	7.6	
5	50	0.66	1.6	146.705	300	249	251	59	89	84	7	7.6	M.V.=146,905
3-1	55	0.49	1.2	150.00	299	249	250	61	87	84	6	8.6	ΔV=0.200
2	60	0.41	1.0	152.84	301	250	250	60	89	84	5.5	8.2	
		8.26396	13.83		3575				1032	991			
	Total	16.9810	31.04	78.750	2475				2195	2103			
	Average	0.6792	1.2416		299.0000				85.96				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC ED

Date 6/26/08

CleanAir ENGINEERING

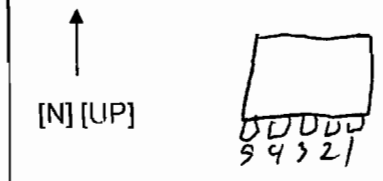
TEST LOCATION: FF Outlet **TESTING** Metals **METHOD:** 29 **PAGE** 2 **OF** 2

UNIT: 1 **RUN:** 7

FIELD DATA SHEET

Client Wheelabrator	Project No. 10455
Plant S. Bowards	Date 6-26-08
Meter Operator C. Slimp	
Probe Operator C. Slimp	

Cross-Section of Test Location



Amb. Temp. (°F) 85	Bar. Press. 30.09 [in. Hg] [mbar]
Probe I.D. No. 67-8-15	
Liner Material Glass	

Meter Box 66-21	Sample Box No. M3
Meter Y_d 0.9842	Meter $\Delta H_@$ 1.6163
K Factor 2.45	Pitot C_p 0.84
Leak Rate Before [cfm] [Lpm] @ (in. Hg)	
Leak Rate After [cfm] [Lpm] @ (in. Hg)	
Pitot Leak Check Before: ☐	After: Good ☐ Bad ☐

Filter No. RF	—	—
Thimble No. —	—	—
Nozzle Diameter 0.260	Nozzle I.D.	

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]
-11.8	10	(In)	(Out)

Start Time:	Stop Time:

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [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
						250	250						
3-3	65	0.49	1.2	155.87	300	250	250	58	90	85	6	8.2	
4	70	0.63	1.5	159.38	301	250	250	56	90	85	7	8.3	
5	75	0.67	1.6	162.985	299	250	250	56	90	85	7	8.5	N.V. = 163.120
4-1	80	0.53	1.3	166.28	301	250	249	57	87	85	6	8.4	ΔV = 0.135
2	85	0.46	1.1	169.28	301	250	249	57	88	85	6	8.2	
3	90	0.53	1.3	172.56	300	250	250	59	89	85	6	8.5	
4	95	0.63	1.5	176.03	300	249	250	59	89	85	7	8.4	
5	100	0.62	1.5	179.490	300	250	250	60	90	85	7	8.2	N.V. = 179.645
5-1	105	0.37	0.91	182.36	299	250	251	62	89	86	5	8.2	ΔV = 0.155
2	110	0.43	1.1	185.37	299	250	250	60	89	86	6	8.0	
3	115	0.52	1.3	188.62	300	249	251	61	90	86	6.5	8.4	
4	120	0.56	1.4	191.92	300	251	250	62	91	87	7	8.3	
5	125	0.60	1.5	195.380	300	250	249	63	91	87	7	8.4	
	Total	*											
	Average												

* Sum of square roots. $\Delta V_T = 0.66$

Circle correct bracketed units on data sheet.

QA/QC SB

Date 7/31

FDS005-General.xls, Feb 2002

CleanAir ENGINEERING

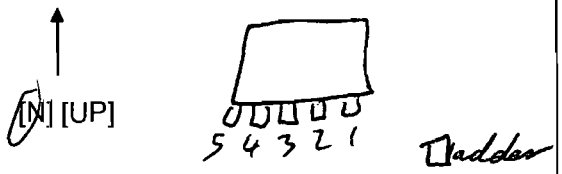
TEST LOCATION: FF Outlet Metals **TESTING** **METHOD:** 29 **PAGE** 1 **OF** 2

UNIT: 1 **RUN:** 8

FIELD DATA SHEET

Client Wheelbrator	Project No. 10455
Plant S. Broward's	Date 6-26-08
Meter Operator C. Slimp	
Probe Operator C. Slimp	

Cross-Section of Test Location



Amb. Temp. (°F) 85	Bar. Press. 30.08 [in. Hg] [mbar]
Probe I.D. No. 67-8-15	
Liner Material Glass	

Meter Box 66-21	Sample Box No. M3	
Meter Y_d 0.9842	Meter $\Delta H_@$ 1.8163	
K Factor 2.45	Pitot C_p 0.84	
Leak Rate Before 0.006 [cfm] [Lpm]	@ 13 (in. Hg)	
Leak Rate After 0.004 [cfm] [Lpm]	@ 16 (in. Hg)	
Pitot Leak Check Before: ☑	After: Good ☑ Bad ☐	

Filter No.	R8	—	—
Thimble No.	—	—	—
Nozzle Diameter	0.264	Nozzle I.D.	66-264-1

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]
+11.8	10		

Start Time: ~~09:14~~ 09:19 Stop Time: 11:35

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] 195.910	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
						250	250						
1-1	5	0.51	1.2	199.09	300	255	254	64	87	86	6.5	10.0	
2	10	0.44	1.1	202.13	300	257	254	64	89	87	6	8.3	
3	15	0.36	0.88	204.87	296	254	254	63	91	87	5.5	8.5	
4	20	0.46	1.1	207.75	298	251	251	63	91	87	6	9.1	
5	25	0.70	1.7	211.415	301	249	250	58	91	88	8	7.9	$N_w V_m$ = 211.530
2-1	30	0.52	1.2	214.60	301	250	250	59	90	88	6	8.1	K=2.35 ΔV_m=0.115
2	35	0.39	0.92	217.36	301	250	249	56	90	88	5.5	8.2	
3	40	0.43	1.0	220.15	300	250	251	59	91	88	6	9.1	
4	45	0.51	1.2	223.24	300	248	249	57	92	88	6	8.7	
5	50	0.64	1.5	226.615	299	250	250	59	91	88	7	8.5	$N_w V_m$ = 226.775
3-1	55	0.32	0.75	229.25	300	251	251	60	90	88	5	8.5	ΔV_m = 0.160
2	60	0.41	0.96	231.73	302	251	248	60	91	88	5	7.6	
		8.21386	13.51		3598				1084	1051			
	Total	*13.629	29.71	76.13	2520				2274	2196			
	Average	0.7051	1.1884		300.8000				89.4000				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC CS

Date 6-26-08

CleanAir ENGINEERING

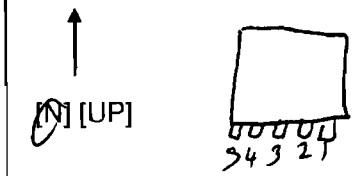
TEST LOCATION: FF Outlet Metals TESTING METHOD: 29 PAGE 2 OF 2

UNIT: 1 RUN: 8

FIELD DATA SHEET

Client Wheelbrator	Project No. 10455
Plant S. Broward's	Date 10455
Meter Operator C. Slimp	
Probe Operator C. Slimp	

Cross-Section of Test Location



Amb. Temp. (°F) 87	Bar. Press. 30.08 [in. Hg] [mbar]
Probe I.D. No. 67-8-15	
Liner Material Glass	

Meter Box 66-21	Sample Box No. M3	
Meter Y_d 0.9842	Meter $\Delta H_@$ 1.8163	
K Factor 0.235	Pitot C_p 0.84	
Leak Rate Before [cfm] [Lpm] @ (in. Hg)		
Leak Rate After [cfm] [Lpm] @ (in. Hg)		
Pitot Leak Check Before: ☑	After: Good ☑ Bad ☐	

Duct Dimensions (in.) 96x96			
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-11.8	10		

Filter No. R8	—	—
Thimble No. —	—	—
Nozzle Diameter 0.	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. 0 [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. T_t (°F)	Notes
3-3	65	0.46	1.1	234.57	302	250	250	61	91	88	6	7.3	
4	70	0.53	1.2	237.47	303	250	249	56	90	88	6	7.3	
5	75	0.58	1.4	240.765	299	250	251	54	90	87	6	7.5	V_m f = 246.925
4-1	80	0.46	1.1	244.02	301	250	250	60	90	87	6.5	8.4	ΔV = 0.160
2	85	0.55	1.3	247.28	303	251	251	58	90	87	7	8.5	
3	90	0.50	1.2	250.41	302	251	251	60	92	88	7	7.6	
4	95	0.58	1.4	253.56	302	250	250	61	92	88	7.5	7.1	
5	100	0.63	1.5	257.015	302	250	249	56	93	88	7.5	7.3	N.V. = 257.160
5-1	105	0.43	1.0	260.08	301	250	251	60	91	88	6.5	8.4	ΔV = 0.145
2	110	0.46	1.1	263.05	302	250	250	57	93	89	6.5	7.4	
3	115	0.53	1.2	266.05	302	250	251	57	93	89	6.5	7.2	
4	120	0.58	1.4	269.37	302	250	250	58	92	89	7.5	7.3	
5	125	0.55	1.3	272.620	301	249	250	59	93	89	7.5	7.2	
	Total	*											
	Average												

* Sum of square roots.

ΔV = 0.580

Circle correct bracketed units on data sheet.

QA/QC EA

Date 6/08

CleanAir ENGINEERING

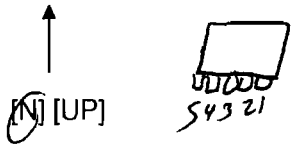
TEST LOCATION: FF Outlet **TESTING** Metals **METHOD:** 29 **PAGE** 1 **OF** 2

UNIT: 1 **RUN:** 9

FIELD DATA SHEET

Client: Wheelbrator	Project No.: 10455
Plant: S. Broward's	Date: 6-26-08
Meter Operator: C. Slump	
Probe Operator: C. Slump	

Cross-Section of Test Location



Amb. Temp. (°F): 90	Bar. Press.: 30.08 [in. Hg] [mbar]
Probe I.D. No.: 67-8-15	
Liner Material: Glass	

Meter Box: 66-21	Sample Box No.: M6	
Meter Y_d: 0.9842	Meter $\Delta H_@$: 1.8163	
K Factor: 235	Pitot C_p: 0.84	
Leak Rate Before: 0.005 [cfm] [Lpm]	@ 5 (in. Hg)	
Leak Rate After: 0.003 [cfm] [Lpm]	@ 10 (in. Hg)	
Pitot Leak Check Before: ☑	After: Good ☑ Bad ☐	

Duct Dimensions (in.): 96 x 96			
Static Pres (in. H_2O): -11.8	Port Len. (in.): 10	Gas Flow [In] [Out] of page	First point 6" the way [In] [Out]

Filter No.: R9	—	—
Thimble No.: —	—	—
Nozzle Diameter: 0.264	Nozzle I.D.:	66-264-1

Start Time: 11:57	Stop Time: 14:10

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. [ft³] [L] 275.180	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	0.49	1.2	278.40	301	255	246	64	89	88	6	9.7	
2	10	0.40	0.94	281.17	300	256	246	64	90	88	5	10.4	
3	15	0.32	0.75	283.63	295	252	249	62	91	89	5	10.0	
4	20	0.40	~~0.96~~ 0.96	286.39	296	249	247	60	90	88	5	10.3	*K=2.4
5	25	0.55	1.3	289.580	299	250	247	59	91	88	6	9.4	V_m=289.735
2-1	30	0.45	1.1	292.81	300	260	255	60	92	89	6	9.8	ΔV=0.155
2	35	0.39	0.94	295.61	302	250	253	59	93	89	6	10.3	
3	40	0.40	0.96	298.45	301	250	242	60	92	89	5.5	10.3	
4	45	0.49	1.2	301.51	301	250	249	61	93	89	6	9.5	
5	50	0.59	1.4	304.905	300	249	244	59	93	90	6.5	10.0	V_m=305.055
3-1	55	0.42	1.0	308.01	304	250	245	60	92	89	5.5	9.8	ΔV=+0.150
2	60	0.37	0.89	310.87	305	250	247	61	92	89			
		7.92446	12.64		3606				1096	1065			
	Total	(7.06639)	(28.03)	(74.64)	(7537)				(2309)	(2231)			
	Average	(0.6825)	(1.1212)		(301.46)				(90.8660)				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC CG

Date 6-26-08

CleanAir ENGINEERING

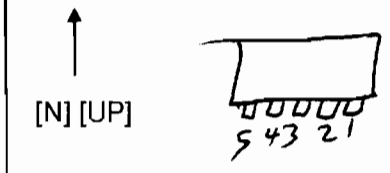
TEST LOCATION: FF Outlet Metals TESTING METHOD: 29 PAGE 2 OF 2

UNIT: 1 RUN: 9

FIELD DATA SHEET

Client Wheelabrator	Project No. 10455
Plant S. Broward's	Date 6-26-08
Meter Operator C. Sliva	
Probe Operator C. Sliva	

Cross-Section of Test Location



Amb. Temp. (°F) 90	Bar. Press. 30.06 [in. Hg] [mbar]
Probe I.D. No. 67-8-15	
Liner Material Glass	

Meter Box 66-21	Sample Box No.		
Meter Y_d 0.9842	Meter $\Delta H_@$ 1.8163		
K Factor	Pitot C_p 0.84		
Leak Rate Before [cfm] [Lpm] @ (in. Hg)			
Leak Rate After [cfm] [Lpm] @ (in. Hg)			
Pitot Leak Check Before: ☐	After: Good ☐ Bad ☐		

Filter No. R9	—	—	
Thimble No. —	—	—	
Nozzle Diameter 0.264	Nozzle I.D.	66-264-1	

Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow (IN) [Out] of page	First point all the way (IN) [Out]
-11.8	10		

Duct Dimensions (in.) 96 x 96

Start Time:	Stop Time:

Traverse Point Number	Min/pt Elapsed Time 5	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.~~ T_t ~~(°F)~~ O2	Notes
3-3	65	0.43	1.0	313.65	301	250	252	62	93	89	5.5	9.7	
4	70	0.47	1.1	316.49	301	251	250	58	94	90	5.5	9.0	
5	75	0.84	1.3	319.685	300	250	249	58	96	90	6.5	10.2	New V = 319.875
4-1	80	0.43	1.0	322.75	303	250	250	61	92	90	5.5	10.1	ΔV = 0.19
2	85	0.45	1.1	325.76	307	251	251	59	93	90	6	7.3	
3	90	0.53	1.3	328.92	301	250	250	60	94	91	6	8.2	
4	95	0.62	1.5	332.33	305	249	250	61	94	90	7	9.1	
5	100	0.62	1.5	335.765	304	250	249	62	93	91	7	7.3	New V = 335.895
5-1	105	0.37	0.89	338.58	306	250	250	60	91	89	.5	8.1	ΔV = 0.13
2	110	0.43	1.0	341.28	302	251	251	59	91	89	5	6.3	
3	115	0.52	1.2	344.01	303	251	250	58	93	89	5	6.7	
4	120	0.55	1.3	347.32	302	250	250	59	93	89	7	6.6	
5	125	0.50	1.2	350.445	302	249	249	60	94	89	6.5	6.5	
	Total	*											
	Average												

* Sum of square roots. $\Delta V_t = 0.625$

Circle correct bracketed units on data sheet.

QA/QC SB

Date 7/2/08

CleanAir ENGINEERING

Impinger Weight Sheet

Client	WHEELABRATOR			Unit Name / Location	U1 / FF OUTLET
Plant	SOUTH BROWARD	Job No.	10455	Method	29

Run No.	3	Filter Type	QUARTZ		Sample Box No.	66 - M6
Date	6/24/03	Lot No.	NA		pH	NA
Analyst	E. DOAK	Filter No.	NA		Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	EMPTY	835.5	522.3	313.2	
Impinger 2	100ml 5% HNO_3/10% H_2O_2	647.1	603.3	43.8	QA/QC
Impinger 3	100ml 5% HNO_3/10% H_2O_2	599.1	595.1	4.0	Date
Impinger 4	EMPTY	508.1	507.4	0.7	
Impinger 5	100ml 4% $KMnO_4$/10% H_2SO_4	588.3	587.2	1.1	Total Weight (gm)
Impinger 6	100ml 4% $KMnO_4$/10% H_2SO_4	599.3	599.1	0.2	363.0
Impinger 7	SILICA GEL	763.5	750.9	12.6	375.6

Run No.	4	Filter Type	QUARTZ		Sample Box No.	66 M3
Date	6/25/08	Lot No.	NA		pH	NA
Analyst	E. DOAK	Filter No.	NA		Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	EMPTY	829.2	523.0	306.2	
Impinger 2	100ml 5% HNO_3/10% H_2O_2	704.4	618.3	86.1	QA/QC
Impinger 3	100ml 5% HNO_3/10% H_2O_2	625.7	612.8	12.9	Date
Impinger 4	EMPTY	493.7	492.7	1.0	
Impinger 5	100ml 4% $KMnO_4$/10% H_2SO_4	609.6	607.7	1.9	Total Weight (gm)
Impinger 6	100ml 4% $KMnO_4$/10% H_2SO_4	599.3	599.3	0.0	408.1
Impinger 7	SILICA GEL	807.1	769.9	37.2	445.3

Run No.	5	Filter Type	QUARTZ		Sample Box No.	66 - M6
Date	6/26/08	Lot No.	NA		pH	NA
Analyst	E. DOAK	Filter No.	NA		Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	EMPTY	904.6	522.2	382.4	
Impinger 2	100ml 5% HNO_3/10% H_2O_2	658.4	602.2	56.2	QA/QC
Impinger 3	100ml 5% HNO_3/10% H_2O_2	597.7	593.4	4.3	Date
Impinger 4	EMPTY	507.7	507.5	0.2	
Impinger 5	100ml 4% $KMnO_4$/10% H_2SO_4	582.1	580.5	1.6	Total Weight (gm)
Impinger 6	100ml 4% $KMnO_4$/10% H_2SO_4	601.8	601.5	0.3	445.0
Impinger 7	SILICA GEL	753.2	738.5	14.7	459.7

QA/QC EO
Date 6/25/08

CleanAir ENGINEERING

Impinger Weight Sheet

Client	WHEELABRATOR		Unit Name / Location	U1 / FF OUTLET
Plant	SOUTH BROWARD	Job No. 10455	Method	29

Run No.	6	Filter Type	QUARTZ		Sample Box No.	66 - MB
Date	6/25/08	Lot No.	NA		pH	NA
Analyst	E. DOAK	Filter No.	NA		Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	EMPTY	879.6	523.1	356.5	
Impinger 2	100ml 5% HNO_3/10% H_2O_2	727.2	616.2	111.0	QA/QC
Impinger 3	100ml 5% HNO_3/10% H_2O_2	624.3	615.0	9.3	Date
Impinger 4	EMPTY	493.4	492.6	0.8	
Impinger 5	100ml 4% $KMnO_4$/10% H_2SO_4	601.8	600.3	1.5	Total Weight (gm)
Impinger 6	100ml 4% $KMnO_4$/10% H_2SO_4	589.9	589.6	0.3	479.4
Impinger 7	SILICA GEL	815.7	800.3	15.4	494.8

Run No.	7	Filter Type	QUARTZ		Sample Box No.	66 - MB
Date	6/26/08	Lot No.	NA		pH	NA
Analyst	E. DOAK	Filter No.	NA		Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	EMPTY	891.6	522.6	369.0	
Impinger 2	100ml 5% NH_4NO_3/10% H_2O_2	691.5	602.3	89.2	QA/QC
Impinger 3	100ml 5% NH_4NO_3/10% H_2O_2	606.6	595.4	11.2	Date
Impinger 4	EMPTY	508.7	507.5	1.2	
Impinger 5	100ml 4% $KMnO_4$/10% H_2SO_4	580.9	579.5	1.4	Total Weight (gm)
Impinger 6	100ml 4% $KMnO_4$/10% H_2SO_4	601.8	602.3	-0.5	471.5
Impinger 7	SILICA GEL	767.3	752.7	14.6	486.1

Run No.	8	Filter Type	QUARTZ		Sample Box No.	66 - MB
Date	6/26/08	Lot No.	NA		pH	NA
Analyst	E. DOAK	Filter No.	NA		Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	EMPTY	897.6	522.6	375.0	
Impinger 2	100ml 5% HNO_3/10% H_2O_2	696.5	616.8	79.7	QA/QC
Impinger 3	100ml 5% HNO_3/10% H_2O_2	624.0	618.0	6.0	Date
Impinger 4	EMPTY	492.8	492.4	0.4	
Impinger 5	100ml 4% $KMnO_4$/10% H_2SO_4	608.4	607.6	1.4	Total Weight (gm)
Impinger 6	100ml 4% $KMnO_4$/10% H_2SO_4	598.2	598.5	-0.3	462.2
Impinger 7	SILICA GEL	828.1	814.1	14.0	476.2

QA/QC EA
Date 6/26/08

CleanAir ENGINEERING

Impinger Weight Sheet

Client: WHEELABRATOR		Unit Name / Location: U1 / FF OUTLET	
Plant: SOUTH BROWARD	Job No.: 10455	Method: 29	

Run No.: 9	Filter Type: QUARTZ		Sample Box No.: 66 M6		
Date: 6/26/08	Lot No.: NA		pH: NA		
Analyst: E. DOAIC	Filter No.: NA		Rinse: NA		

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	EMPTY	926.2	522.3	403.9	
Impinger 2	100ml 5% HNO_3/10% H_2O_2	669.6	602.2	67.4	QA/QC
Impinger 3	100ml 5% HNO_3/10% H_2O_2	601.2	596.9	4.3	Date
Impinger 4	EMPTY	508.2	507.4	0.8	
Impinger 5	100ml 4% $KMnO_4$/10% H_2SO_4	581.9	579.8	2.1	Total Weight (gm)
Impinger 6	100ml 4% $KMnO_4$/10% H_2SO_4	604.5	605.1	-0.5	478.0
Impinger 7	SILICA GEL	742.2	724.6	17.6	495.6

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

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1					
Impinger 2					QA/QC
Impinger 3					Date
Impinger 4					
Impinger 5					Total Weight (gm)
Impinger 6					
Impinger 7					

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

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1					
Impinger 2					QA/QC
Impinger 3					Date
Impinger 4					
Impinger 5					Total Weight (gm)
Impinger 6					
Impinger 7					

QA/QC ES
Date 6/26/08

CleanAir ENGINEERING

ORSAT READINGS

TEST LOCATION: FF OUTLET **PAGE** 1 **OF** 1

Client	WHEELABRATOR	Project Number	10455	$Fo = \frac{20.9 - \%O_2}{\%CO_2}$
Plant	SOUTH BROWARD	Unit	U1	
Orsat ID	ORSAT # 7	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
4	29	1	9.2	19.0	9.8	1.206	E. DOAK	6/25/08	11 59
		2	9.2	19.0	9.8				
		3	9.2	19.0	9.8				
		Avg	(9.2)		(9.8)				
5	29	1	9.2	18.8	9.6	1.228	C. Slimp	6/25/08	15:29
		2	9.2	18.8	9.6				
		3	9.2	18.8	9.6				
		Avg	(9.2)		(9.6)				
6	29	1	~~9.7~~ 10.0	19.4	9.4	1.150	C. Slimp	6/25/08	15:46
		2	10.0	19.4	9.4				
		3	10.0	19.4	9.4				
		Avg	(10.0)		(9.4)				
7	29	1	9.2	19.0	9.8	1.206	E. DOAK	6/26/08	11 20
		2	9.2	19.0	9.8				
		3	9.2	19.0	9.8				
		Avg	(9.2)		(9.8)				
8	29	1	ED ~~9.2~~ 8.8	19.0	ED ~~10.6~~ 10.2	1.216	E. DOAK	6/26/08	13 39
		2	ED ~~9.2~~ 8.8	19.0	ED ~~10.0~~ 10.2				
		3	ED ~~9.2~~ 8.8	19.0	ED ~~10.0~~ 10.2				
		Avg	(8.8)		(10.2)				
9	29	1	9.6	19.2	9.6	1.178	E. DOAK	6/26/08	14 14
		2	9.6	19.2	9.6				
		3	9.6	19.2	9.6				
		Avg	9.6		9.6				

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 ED
Date 6/26/08

CleanAir ENGINEERING

FIELD DATA PRINTOUTS

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Field Data Printout

Test Method: **USEPA Method 29**
Analyte: **Trace Metals**

Location: Unit 1 FF Outlet
Test Run: 4
Client: Wheelabrator South Broward, Inc.
Project No: 10455
Source Area (ft^2): 64.00000
Meter Operator: C. Slimp 558
Probe Operator: C. Slimp 558
Test Date: 6/25/08
Start Time: 07:28
Stop Time: 09:41
Leak Rate Before: 0.004 cfm @ 15 "Hg
Leak Rate After: 0.003 cfm @ 10 "Hg

Bar. Press. (in. Hg): 30.18
Static P: -11.0
O_2 (dry volume %): 9.80
CO_2 (dry volume %): 9.20
N_2+CO (dry volume %): 81.00
H_2O (condensate, ml or gm): 408.1
H_2O (silica, g): 37.2
Actual Moisture (%): 25.30

Nozzle ID No: 66-247-1
Nozzle Diameter (D_n): 0.247
Probe ID No: 67-8-15
Pitot C_p: 0.84
Pitot Leak Check: ☑Pass ☐Fail
Meter Box ID. No: 66-21
Meter $\Delta H@$: 1.81630
Meter Y_d: 0.98420

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			899.275						
1-01	5.0	0.32	0.61	901.500	296	81	81	0.57	2.23	106.2
1-02	10.0	0.35	0.67	903.770	297	83	81	0.59	2.27	103.5
1-03	15.0	0.31	0.59	905.930	297	83	82	0.56	2.16	104.5
1-04	20.0	0.37	0.70	908.340	297	85	82	0.61	2.41	106.6
1-05	25.0	0.45	0.86	910.935	295	86	82	0.67	2.59	103.9
LEAK CHECK	25.0			911.115						
2-01	30.0	0.44	0.84	913.650	294	86	83	0.66	2.53	102.5
2-02	35.0	0.35	0.67	915.980	299	88	83	0.59	2.33	105.7
2-03	40.0	0.31	0.59	918.160	298	89	84	0.56	2.18	104.8
2-04	45.0	0.42	0.80	920.710	298	89	84	0.65	2.55	105.4
2-05	50.0	0.53	1.10	923.630	298	91	85	0.73	2.92	107.2
LEAK CHECK	50.0			923.780						
3-01	55.0	0.43	0.86	926.420	297	89	85	0.66	2.64	107.7
3-02	60.0	0.40	0.80	929.040	299	91	85	0.63	2.62	110.7*
3-03	65.0	0.37	0.74	931.510	298	91	86	0.61	2.47	108.3
3-04	70.0	0.47	0.94	934.040	300	92	87	0.69	2.53	98.5
3-05	75.0	0.47	0.94	936.820	300	93	87	0.69	2.78	108.1
LEAK CHECK	75.0			936.950						
4-01	80.0	0.47	0.94	939.710	300	92	88	0.69	2.76	107.3
4-02	85.0	0.40	0.80	942.270	301	93	89	0.63	2.56	107.7
4-03	90.0	0.45	0.90	944.960	300	91	88	0.67	2.69	107.0
4-04	95.0	0.50	1.00	947.820	300	92	88	0.71	2.86	107.8
4-05	100.0	0.50	1.00	950.700	300	93	89	0.71	2.88	108.4
LEAK CHECK	100.0			950.805						
5-01	105.0	0.40	0.80	953.350	299	93	90	0.63	2.55	106.9
5-02	110.0	0.42	0.84	955.970	301	94	90	0.65	2.62	107.4
5-03	115.0	0.46	0.92	958.670	301	94	90	0.68	2.70	105.8
5-04	120.0	0.52	1.00	961.520	301	93	89	0.72	2.85	105.2
5-05	125.0	0.50	1.00	964.410	301	93	90	0.71	2.89	108.7
Final	125.0		0.83640	64.57000	298.68000	87.86000		0.64954	64.57000	
25 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages		0.6495	0.8364	64.5700	298.6800	87.8600				
		☑Avg. OK	☑Avg. OK	☑Avg. OK	☑Avg. OK	☑Avg. OK				

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SS ISOKINETIC Version 2006-13a

QA/QC _____
Date _____

Field Data Printout

Test Method: USEPA Method 29
Analyte: Trace Metals

Location: Unit 1 FF Outlet
Test Run: 5
Client: Wheelabrator South Broward, Inc.
Project No: 10455
Source Area (ft^2): 64.00000
Meter Operator: C. Slimp 558
Probe Operator: C. Slimp 558
Test Date: 6/25/08
Start Time: 10:09
Stop Time: 12:22
Leak Rate Before: 0.003 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 8 "Hg

Bar. Press. (in. Hg): 30.18
Static P: -11.0
O_2 (dry volume %): 9.60
CO_2 (dry volume %): 9.20
N_2+CO (dry volume %): 81.20
H_2O (condensate, ml or gm): 445.0
H_2O (silica, g): 14.7
Actual Moisture (%): 23.75

Nozzle ID No: 66-264-1
Nozzle Diameter (D_n): 0.264
Probe ID No: 67-8-15
Pitot C_p: 0.84
Pitot Leak Check: ☑Pass ☐Fail
Meter Box ID. No: 66-21
Meter $\Delta H@$: 1.81630
Meter Y_d: 0.98420

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			964.955						
1-01	5.0	0.35	0.88	967.680	298	89	87	0.59	2.72	105.9
1-02	10.0	0.35	0.88	970.360	298	89	88	0.59	2.68	104.0
1-03	15.0	0.32	0.80	972.900	296	90	89	0.57	2.54	102.8
1-04	20.0	0.35	0.88	975.540	298	90	88	0.59	2.64	102.4
1-05	25.0	0.50	1.30	978.650	298	90	88	0.71	3.11	101.0
LEAK CHECK	25.0			978.795						
2-01	30.0	0.40	1.00	981.670	298	90	88	0.63	2.88	104.3
2-02	35.0	0.33	0.82	984.520	299	91	88	0.57	2.85	113.8*
2-03	40.0	0.38	0.95	987.350	299	91	88	0.62	2.83	105.3
2-04	45.0	0.45	1.10	990.310	300	91	88	0.67	2.96	101.3
2-05	50.0	0.50	1.30	993.280	299	91	89	0.71	2.97	96.3
LEAK CHECK	50.0			993.430						
3-01	55.0	0.45	1.10	996.390	301	91	88	0.67	2.96	101.4
3-02	60.0	0.36	0.90	999.070	301	91	89	0.60	2.68	102.5
3-03	65.0	0.44	1.10	1001.780	301	91	89	0.66	2.71	93.8
3-04	70.0	0.51	1.30	1005.000	301	91	88	0.71	3.22	103.7
3-05	75.0	0.50	1.30	1008.190	300	91	88	0.71	3.19	103.6
LEAK CHECK	75.0			1008.375						
4-01	80.0	0.45	1.10	1011.340	300	90	88	0.67	2.97	101.6
4-02	85.0	0.35	0.88	1014.000	301	91	88	0.59	2.66	103.3
4-03	90.0	0.44	1.10	1016.900	301	91	88	0.66	2.90	100.5
4-04	95.0	0.55	1.40	1019.870	303	91	88	0.74	2.97	92.2
4-05	100.0	0.52	1.30	1023.125	300	91	88	0.72	3.26	103.7
LEAK CHECK	100.0			1023.275						
5-01	105.0	0.30	0.75	1025.800	298	90	88	0.55	2.52	105.7
5-02	110.0	0.40	1.00	1028.690	301	90	88	0.63	2.89	105.1
5-03	115.0	0.49	1.20	1031.780	300	90	88	0.70	3.09	101.5
5-04	120.0	0.51	1.30	1035.010	301	90	88	0.71	3.23	104.1
5-05	125.0	0.50	1.30	1038.220	300	91	88	0.71	3.21	104.3
Final	125.0		1.07760	72.63500	299.68000	89.30000		0.65177	72.63500	
25 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages		0.6518	1.0776	72.6350	299.6800	89.3000				
		☑Avg. OK	☑Avg. OK	☑Avg. OK	☑Avg. OK	☑Avg. OK				

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Date _____

Field Data Printout

Test Method: **USEPA Method 29**
Analyte: **Trace Metals**

Location: Unit 1 FF Outlet
Test Run: 6
Client: Wheelabrator South Broward, Inc.
Project No: 10455
Source Area (ft^2): 64.00000
Meter Operator: C. Slimp 558
Probe Operator: C. Slimp 558
Test Date: 6/25/08
Start Time: 12:40
Stop Time: 14:53
Leak Rate Before: 0.003 cfm @ 15 "Hg
Leak Rate After: 0.003 cfm @ 10 "Hg

Bar. Press. (in. Hg): 30.18
Static P: -11.0
O_2 (dry volume %): 9.40
CO_2 (dry volume %): 10.00
N_2+CO (dry volume %): 80.60
H_2O (condensate, ml or gm): 479.4
H_2O (silica, g): 15.4
Actual Moisture (%): 24.85

Nozzle ID No: 66-264-1
Nozzle Diameter (D_n): 0.264
Probe ID No: 67-8-15
Pitot C_p: 0.84
Pitot Leak Check: ☑Pass ☐Fail

Meter Box ID. No: 66-21
Meter ΔH@: 1.81630
Meter Y_d: 0.98420

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			38.905						
1-01	5.0	0.44	1.10	42.000	301	87	87	0.66	3.10	109.2
1-02	10.0	0.42	1.10	44.990	300	89	87	0.65	2.99	107.7
1-03	15.0	0.36	0.90	47.970	296	90	87	0.60	2.98	115.5*
1-04	20.0	0.47	1.20	51.020	299	90	88	0.69	3.05	103.6
1-05	25.0	0.60	1.50	54.370	300	91	88	0.77	3.35	100.8
LEAK CHECK	25.0			54.525						
2-01	30.0	0.43	1.10	57.540	300	90	88	0.66	3.02	107.1
2-02	35.0	0.42	1.00	60.520	302	91	88	0.65	2.98	107.2
2-03	40.0	0.35	0.86	63.040	299	91	88	0.59	2.52	99.0
2-04	45.0	0.45	1.10	65.970	300	91	88	0.67	2.93	101.7
2-05	50.0	0.58	1.40	69.285	301	91	88	0.76	3.32	101.5
LEAK CHECK	50.0			69.415						
3-01	55.0	0.38	0.93	72.120	299	91	88	0.62	2.71	102.1
3-02	60.0	0.32	0.78	74.650	301	91	88	0.57	2.53	104.1
3-03	65.0	0.43	1.10	77.640	300	91	88	0.66	2.99	106.2
3-04	70.0	0.50	1.20	80.790	301	92	88	0.71	3.15	103.7
3-05	75.0	0.48	1.20	83.910	300	92	89	0.69	3.12	104.7
LEAK CHECK	75.0			84.055						
4-01	80.0	0.36	0.88	86.740	299	90	89	0.60	2.68	104.1
4-02	85.0	0.38	0.93	89.510	301	91	89	0.62	2.77	104.5
4-03	90.0	0.46	1.10	92.570	301	92	89	0.68	3.06	104.9
4-04	95.0	0.44	1.10	95.560	301	92	89	0.66	2.99	104.8
4-05	100.0	0.48	1.20	98.615	301	92	90	0.69	3.05	102.5
LEAK CHECK	100.0			98.720						
5-01	105.0	0.37	0.91	101.570	299	90	89	0.61	2.85	109.0
5-02	110.0	0.41	1.00	104.230	301	91	89	0.64	2.66	96.7
5-03	115.0	0.46	1.10	107.180	300	92	89	0.68	2.95	101.1
5-04	120.0	0.52	1.30	110.100	301	92	89	0.72	2.92	94.2
5-05	125.0	0.50	1.20	113.130	301	92	89	0.71	3.03	99.7
Final	125.0		1.08760	73.69000	300.16000	89.62000		0.66172	73.69000	
25 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages		0.6617	1.0884	73.6900	300.1600	89.6200				
		☑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: **Trace Metals**

Location: Unit 1 FF Outlet
Client: Wheelabrator South Broward, Inc.
Project No: 10455
Method: EPA Method 3
Fuel Type: Municipal Waste
F_o for Fuel: 1.03 to 1.3

Analyst: E. Doak
Analyst Emp No: 349

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
4	1	9.2	19.0	9.8	81.0	29.86		
	2	9.2	19.0	9.8	81.0	29.86		
	3	9.2	19.0	9.8	81.0	29.86		
	Avg.	9.20000		9.80000	81.00000	29.86	1.20652	*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
5	1	9.2	18.8	9.6	81.2	29.86		
	2	9.2	18.8	9.6	81.2	29.86		
	3	9.2	18.8	9.6	81.2	29.86		
	Avg.	9.20000		9.60000	81.20000	29.86	1.22826	*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
6	1	10.0	19.4	9.4	80.6	29.98		
	2	10.0	19.4	9.4	80.6	29.98		
	3	10.0	19.4	9.4	80.6	29.98		
	Avg.	10.00000		9.40000	80.60000	29.98	1.15000	*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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QA/QC _____
Date _____

USEPA Method 4 Laboratory Data

Location: Unit 1 FF Outlet
Client: Wheelabrator South Broward, Inc.
Project No: 10455

Test Method: USEPA Method 29
Analyte: Trace Metals
Analyst: E. Doak
Analyst Emp No: 349

Test Run: 4

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	829.2	523.0	306.2
Impinger 2	5%HNO3/10%H2O2	704.4	618.3	86.1
Impinger 3	5%HNO3/10%H2O2	625.7	612.8	12.9
Impinger 4	Empty	493.7	492.7	1.0
Impinger 5	4%KMnO4/10%H2SO4	609.6	607.7	1.9
Impinger 6	4%KMnO4/10%H2SO4	599.3	599.3	0.0
Impinger 7	Silica Gel	807.1	769.9	37.2
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
408.1	Liquid (gm)		
0.0	less rinse (gm)		
408.1	Net Liquid (gm)	408.1	☑ QA/QC OK
+ 37.2	Silica Gel (gm)	37.2	☑ QA/QC OK
445.3	Total Vlc (gm)	445.3	☑ QA/QC OK

Test Run: 5

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	904.6	522.2	382.4
Impinger 2	5%HNO3/10%H2O2	658.4	602.2	56.2
Impinger 3	5%HNO3/10%H2O2	597.7	593.4	4.3
Impinger 4	Empty	507.7	507.5	0.2
Impinger 5	4%KMnO4/10%H2SO4	582.1	580.5	1.6
Impinger 6	4%KMnO4/10%H2SO4	601.8	601.5	0.3
Impinger 7	Silica Gel	753.2	738.5	14.7
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
445.0	Liquid (gm)		
0.0	less rinse (gm)		
445.0	Net Liquid (gm)	445.0	☑ QA/QC OK
+ 14.7	Silica Gel (gm)	14.7	☑ QA/QC OK
459.7	Total Vlc (gm)	459.7	☑ QA/QC OK

Test Run: 6

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	879.6	523.1	356.5
Impinger 2	5%HNO3/10%H2O2	727.2	616.2	111.0
Impinger 3	5%HNO3/10%H2O2	624.3	615.0	9.3
Impinger 4	Empty	493.4	492.6	0.8
Impinger 5	4%KMnO4/10%H2SO4	601.8	600.3	1.5
Impinger 6	4%KMnO4/10%H2SO4	589.9	589.6	0.3
Impinger 7	Silica Gel	815.7	800.3	15.4
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
479.4	Liquid (gm)		
0.0	less rinse (gm)		
479.4	Net Liquid (gm)	479.4	☑ QA/QC OK
+ 15.4	Silica Gel (gm)	15.4	☑ QA/QC OK
494.8	Total Vlc (gm)	494.8	☑ 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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Wheelabrator South Broward, Inc.
Clean Air Project No: 10455
Unit 1 FF Outlet

USEPA Method 29
Mercury (Hg) Laboratory Parameters

Blank Analysis				
m_{1b-B}	Fraction 1B Blank (µg)	<0.1000		
m_{2b-B}	Fraction 2B Blank (µg)	<0.2000		
m_{3a-B}	Fraction 3A Blank (µg)	<0.2000		
m_{3b-B}	Fraction 3B Blank (µg)	<0.5000		
m_{3c-B}	Fraction 3C Blank (µg)	<0.4000		
$m_{total-B}$	Total Blank Amount (µg)	<1.4000		
Run No.		**4**	**5**	**6**
Date (2008)		Jun 25	Jun 25	Jun 25
Start Time (approx.)		07:28	10:09	12:40
Stop Time (approx.)		09:41	12:22	14:53
Sample Analysis				
m_{1b-S}	Fraction 1B Sample (µg)	<0.1000	<0.1000	<0.1000
m_{2b-S}	Fraction 2B Sample (µg)	18.4678	16.5236	19.3441
m_{3a-S}	Fraction 3A Sample (µg)	<0.2000	<0.2000	<0.2000
m_{3b-S}	Fraction 3B Sample (µg)	<0.5000	<0.5000	<0.5000
m_{3c-S}	Fraction 3C Sample (µg)	<0.4000	<0.4000	<0.4000
$m_{total-S}$	Total Sample Amount (µg)	18.4678	16.5236	19.3441
Allowable Blank				
$m_{T-B-allow}$	Total Allowable Blank (µg)	0.0000	0.0000	0.0000
Sample Corrected for Blank				
m_n	Total Sample Amount (µg)	18.4678	16.5236	19.3441
Sample Corrected for Blank				
m_{n-1b}	Fraction 1B (µg)	<0.1000	<0.1000	<0.1000
m_{n-2b}	Fraction 2B (µg)	18.4678	16.5236	19.3441
m_{n-3a}	Fraction 3A (µg)	<0.2000	<0.2000	<0.2000
m_{n-3b}	Fraction 3B (µg)	<0.5000	<0.5000	<0.5000
m_{n-3c}	Fraction 3C (µg)	<0.4000	<0.4000	<0.4000

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QA/QC _____
Date _____

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Clean Air Engineering, Inc.

500 West Wood Street
Palatine, IL 60067

Project Number: 10455

Mercury

EPA Method 29 Analysis

Analytical Report
11024

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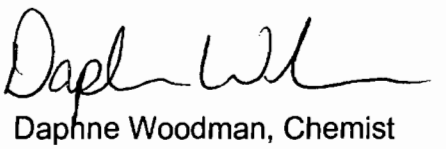
Element One, Inc.
5022-C Wrightsville Av., Wilmington, NC 28403
910-793-0128 FAX: 910-792-6853 e1lab@e1lab.com

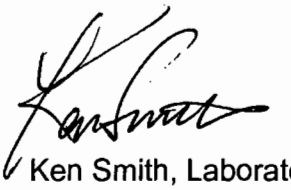
The following data for Analytical Report 11024
has been reviewed for completeness, accuracy,
adherence to method protocol,
and compliance with quality assurance guidelines.

Review by:



Daphne Woodman, Chemist
July 15, 2008

Report Reviewed and Finalized By:



Ken Smith, Laboratory Director
July 15, 2008

SUMMARY OF RESULTS

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Summary of Analysis

Unit 1 North - Summary of Method 29 Mercury Analysis

Run Number		Average Total Catch, µg	Front half µg	H_2O_2 /HNO_3 µg	Empty Impinger µg	$KMnO_4$ µg	HCl µg
U1 FF Outlet N R1	#1	18.9	< 0.1	18.9	< 0.2	< 0.5	< 0.4
	#2		< 0.1	18.9	< 0.2	< 0.5	< 0.4
U1 FF Outlet N R2	#1	21.3	< 0.1	21.3	< 0.2	< 0.5	< 0.4
	#2		< 0.1	21.3	< 0.2	< 0.5	< 0.4
U1 FF Outlet N R3	#1	25.0	< 0.1	25.3	< 0.2	< 0.5	< 0.4
	#2		< 0.1	24.7	< 0.2	< 0.5	< 0.4
N Field Blank	#1	< 0.5	< 0.1	< 0.3	< 0.2	< 0.5	< 0.4
	#2		< 0.1	< 0.3	< 0.2	< 0.5	< 0.4
N Reagent Blank	#1	< 0.5	< 0.1	< 0.2	< 0.2	< 0.5	< 0.4
	#2		< 0.1	< 0.2	< 0.2	< 0.5	< 0.4

Unit 1 South - Summary of Method 29 Mercury Analysis

Run Number		Average Total Catch, µg	Front half µg	H_2O_2 /HNO_3 µg	Empty Impinger µg	$KMnO_4$ µg	HCl µg
U1 FF Outlet S R4	#1	18.5	< 0.1	18.5	< 0.2	< 0.5	< 0.4
	#2		< 0.1	18.5	< 0.2	< 0.5	< 0.4
U1 FF Outlet S R5	#1	16.5	< 0.1	16.5	< 0.2	< 0.5	< 0.4
	#2		< 0.1	16.5	< 0.2	< 0.5	< 0.4
U1 FF Outlet S R6	#1	19.3	< 0.1	19.3	< 0.2	< 0.5	< 0.4
	#2		< 0.1	19.3	< 0.2	< 0.5	< 0.4
S Field Blank	#1	< 0.5	< 0.1	< 0.3	< 0.2	< 0.5	< 0.4
	#2		< 0.1	< 0.3	< 0.2	< 0.5	< 0.4
S 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

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ANALYTICAL NARRATIVE

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Element One Analytical Narrative

Client:	Clean Air Engineering	Element One #:	11024
Client ID:	North & South Broward	Analyst:	ESS
Method:	M29	Dates Received:	06/30/08
Analytes:	Hg	Dates Analyzed:	07/10-14/08

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.

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QUALITY CONTROL SUMMARY

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Summary of Quality Control Data

Mercury Duplicate Analysis RPD

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

Run Number	Front half	H_2O_2/HNO_3	Empty Imp	$KMnO_4$	HCl
U1 FF Outlet N R1	NA	0.0%	NA	NA	NA
U1 FF Outlet N R2	NA	0.1%	NA	NA	NA
U1 FF Outlet N R3	NA	2.6%	NA	NA	NA
N Field Blank	NA	NA	NA	NA	NA
N Reagent Blank	NA	NA	NA	NA	NA
U1 FF Outlet S R4	NA	0.0%	NA	NA	NA
U1 FF Outlet S R5	NA	0.2%	NA	NA	NA
U1 FF Outlet S R6	NA	0.0%	NA	NA	NA
S Field Blank	NA	NA	NA	NA	NA
S Reagent Blank	NA	NA	NA	NA	NA

Mercury Spike Recoveries

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

Run Number		Front half	H2O2/HNO4	Empty Imp	KMnO4	HCl
U1 FF Outlet N R3	#1	108%	94%	97%	86%	91%
	#2	106%	94%	98%	86%	90%
U1 FF Outlet S R6	#1	108%	103%	96%	93%	94%
	#2	107%	104%	97%	94%	94%

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SAMPLE CUSTODY

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11 of 1

CHAIN OF CUSTODY FORM

CLIENT Wheelabrator
PLANT North Broward
PROJECT MANAGER Scott Brown

PROJECT NO. 10455
DEPT. 66

CLEANAIR LAB NO.	RUN NO.	TEST LOCATION	DATE	SAMPLE MATRIX	NO. OF CONTAINERS	ORIGINAL VOLUME	ANALYSIS REQUESTED: Hg	ADDITIONAL INFORMATION
	1	Unit 1 FF Outlet	6/23/08	Filter	1	-	x	
	1	"	"	Front-Half 0.1N HNO3 Rinse	1	102	x	
	1	"	"	Imp. 1,2,3 + 0.1N HNO3 Rinse	1	744	x	
	1	"	"	Imp. 4 + 0.1N HNO3 Rinse	1	103	x	
	1	"	"	Imp. 5,6 KMnO4+H2O Rinse	1	425	x	
	1	"	"	Imp. 5,6 HCl Rinse	1	225	x	
	2	"	6/24/08	Filter	1	-	x	
	2	"	"	Front-Half 0.1N HNO3 Rinse	1	100	x	
	2	"	"	Imp. 1,2,3 + 0.1N HNO3 Rinse	1	748	x	
	2	"	"	Imp. 4 + 0.1N HNO3 Rinse	1	101	x	
	2	"	"	Imp. 5,6 KMnO4+H2O Rinse	1	431	x	
	2	V	V	Imp. 5,6 HCl Rinse	1	226	x	

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Relinquished by: (Signature)	Date / Time
Eric Doak	6/28/08 1700	Lisa Bruton	6/30/08 0849		
Courier: FED EX	Date / Time	Relinquished by: (Signature)	Date / Time	Received for Analysis by:	Date / Time

Special Handling Instructions

Forwarding Lab: Element One
Wilmington, NC

PO Number:

This form was completed by:
Eric Doak
Signature: Eric Doak
Date: 6/27/08

CleanAir ENGINEERING
LDS001A_1-COC Palatine_M29, August 2004

500 West Wood Street
Palatine, IL 60067

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CHAIN OF CUSTODY FORM

CLIENT Wheelabrator
PLANT North Broward
PROJECT MANAGER Scott Brown
PROJECT NO. 10455
DEPT. 66

CLEANAIR

LAB NO.	RUN NO.	TEST LOCATION	DATE	SAMPLE MATRIX	NO. OF CONTAINERS	ORIGINAL VOLUME	ANALYSIS REQUESTED: HF	ADDITIONAL INFORMATION
	3	Unit 1 FF Outlet	6/26/08	Filter	1	—	x	
	3			Front-Half 0.1N HNO3 Rinse	1	100	x	
	3			Imp. 1,2,3 + 0.1N HNO3 Rinse	1	740	x	
	3			Imp. 4 + 0.1N HNO3 Rinse	1	101	x	
	3			Imp. 5,6 KMnO4+H2O Rinse	1	432	x	
	3			Imp. 5,6 HCl Rinse	1	225	x	
	FB		6/26/08	Filter	1	—	x	
	FB			Front-Half 0.1N HNO3 Rinse	1	100	x	
	FB			Imp. 1,2,3 + 0.1N HNO3 Rinse	1	300	x	
	FB			Imp. 4 + 0.1N HNO3 Rinse	1	100	x	
	FB			Imp. 5,6 KMnO4+H2O Rinse	1	447	x	
	FB	V		Imp. 5,6 HCl Rinse	1	225	x	

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Eric Doak	6/26/08 1700	Lisa Bratton	06/30/08 0849		
Courier: FED EX	Date / Time	Relinquished by: (Signature)	Date / Time	Received for Analysis by:	Date / Time

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Eric Doak

Signature: Eric Doak Date: 6/27/08

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CHAIN OF CUSTODY FORM

CLIENT Wheelabrator | PROJECT NO. 10455
PLANT North Broward | DEPT. 66
PROJECT MANAGER Scott Brown

CLEANAIR LAB I.D.	RUN NO.	TEST LOCATION	DATE	S.M.L.E. MATRIX	NO. OF CONTAINERS	ORIGINAL VOLUME	ANALYSIS REQUESTED: Archive (Hg)	ADDITIONAL INFORMATION
	3	Unit 1 FF Outlet	6/28/08	Filter	1	-	x	
	4			Front-Half 0.1N HNO3 Rinse	1	100	x	
	4			Imp. 1,2,3 + 0.1N HNO3 Rinse	1	768	x	
	4			Imp. 4 + 0.1N HNO3 Rinse	1	103	x	
	4			Imp. 5,6 KMnO4+H2O Rinse	1	441	x	
	4			Imp. 5,6 HCl Rinse	1	224	x	
	5		6/28/08	Filter	1	-	x	
	5			Front-Half 0.1N HNO3 Rinse	1	105	x	
	5			Imp. 1,2,3 + 0.1N HNO3 Rinse	1	772	x	
	5			Imp. 4 + 0.1N HNO3 Rinse	1	102	x	
	5			Imp. 5,6 KMnO4+H2O Rinse	1	434	x	
	5	V		Imp. 5,6 HCl Rinse	1	225	x	

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Eric Doak	6/28/08 17:00	Lisa Bratton	6/30/08 0849		
Courier: Fed Ex	Date / Time	Relinquished by: (Signature)	Date / Time	Received for Analysis by:	Date / Time

Special Handling Instructions

Forwarding Lab: Element One
Wilmington, NC

PO Number:

This form was completed by:
Eric Doak
Signature: Eric Doak Date: 6/28/08

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Palatine, IL 60067

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CHAIN OF CUSTODY FORM

CLIENT Wheelabrator
PLANT North Broward
PROJECT MANAGER Scott Brown

PROJECT NO. 10455
DEPT. 66

CLEANAIR LAB NO.	RUN NO.	LOCATION	DATE	SAMPLE MATRIX	NO. OF CONTAINERS	ORIGINAL VOLUME	ANALYSIS REQUESTED (Dioxin/Furan)	ADDITIONAL INFORMATION
	6	Unit 1 FF Outlet	6/25/08	Filter	1	—	x	
	6			Front-Half 0.1N HNO3 Rinse	1	100	x	
	6			Imp. 1,2,3 + 0.1N HNO3 Rinse	1	772	x	
	6			Imp. 4 + 0.1N HNO3 Rinse	1	100	x	
	6			Imp. 5,6 KMnO4+H2O Rinse	1	443	x	
	6	V	V	Imp. 5,6 HCl Rinse	1	225	x	
				Filter				
				Front-Half 0.1N HNO3 Rinse				
				Imp. 1,2,3 + 0.1N HNO3 Rinse				
				Imp. 4 + 0.1N HNO3 Rinse				
				Imp. 5,6 KMnO4+H2O Rinse				
				Imp. 5,6 HCl Rinse				

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Eric Doak	6/26/08 1700	Lisa Braxton	6/30/08 0849		
Courier: FED EX	Date / Time	Relinquished by: (Signature)	Date / Time	Received for Analysis by:	Date / Time

Special Handling Instructions

Forwarding Lab: Element One
Wilmington, NC

PO Number:

This form was completed by:

Eric Doak

Signature Eric M. Doak Date 6/30/08

CleanAir ENGINEERING
LDS001A_1-COC Palatine_M29, August 2004

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CHAIN OF CUSTODY FORM

CLIENT Wheelabrator
PLANT North Broward
PROJECT MANAGER Scott Brown
PROJECT NO. 10455
DEPT. 66

CLEANAIR LAB NO.	RUN NO.	TEST LOCATION	DATE	SAMPLE MATRIX	NO. OF CONTAINERS	ORIGINAL VOLUME	ANALYSIS REQUESTED: Hg	ADDITIONAL INFORMATION
	NA	Reagent Blank	6/2/09	3 Quartz Filters	1	NA	x	
	NA	Reagent Blank		0.1N HNO3	1	300	x	
	NA	Reagent Blank		DI H_2O	1	100	x	
	NA	Reagent Blank		5% HNO_3 / 10% H_2O_2	1	~~200~~	x	200mL
	NA	Reagent Blank		4% $KMnO_4$ / 10% H_2SO_4	1	~~400~~	x	300mL
	NA	Reagent Blank	✓	8 N HCl / DI H_2O	1	~~225~~	x	215mL

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Relinquished by: (Signature)	Date / Time
Courier: FEDEX	Date / Time	Relinquished by: (Signature)	Date / Time	Received for Analysis by:	Date / Time

Special Handling Instructions:

Forwarding Lab: Element One
Wilmington, NC

PO Number:

This form was completed by:

Eric Doak

Signature: Eric Doak Date: 6/3/09

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11024

CHAIN OF CUSTODY FORM

CLIENT Wheelabrator — PROJECT NO. 10455

PLANT South Broward — DEPT. 66

PROJECT MANAGER Scott Brown

ANALYSIS REQUESTED

CLEANAIR LAB NO.	RUN NO.	TEST LOCATION	DATE	SAMPLE MATRIX	NO. OF CONTAINERS	ORIGINAL VOLUME	Hg				Volume / ADDITIONAL INFORMATION
	~~1~~ 4	Unit 1 FF Outlet	6/~~24~~ 25/08	Filter	1	—	x				
	~~1~~ 4	|	|	Front-Half 0.1N HNO3 Rinse	1	~~104~~	x				138 ml
	~~1~~ 4	|	|	Imp. 1,2,3 + 0.1N HNO3 Rinse	1	~~668~~	x				706 ml
	~~1~~ 4	|	|	Imp. 4 + 0.1N HNO3 Rinse	1	~~100~~	x				102 ml
	~~1~~ 4	|	|	Imp. 5,6 KMnO4+H2O Rinse	1	~~430~~	x				432 ml
	~~1~~ 4	|	↓	Imp. 5,6 HCl Rinse	1	~~215~~	x				215 ml
		|									
		|									
	~~2~~ 5	|	6/~~24~~ 25/08	Filter	1	—	x				~~[illegible]~~
	~~2~~ 5	|	|	Front-Half 0.1N HNO3 Rinse	1	~~104~~	x				~~108~~ 104 ml
	~~2~~ 5	|	|	Imp. 1,2,3 + 0.1N HNO3 Rinse	1	~~663~~	x				~~756 ml~~ 742 ml
	~~2~~ 5	|	|	Imp. 4 + 0.1N HNO3 Rinse	1	100	x				103 ml
	~~2~~ 5	|	|	Imp. 5,6 KMnO4+H2O Rinse	1	418	x				~~[illegible]~~ ml 425 ml
	~~2~~ 5	V	↓	Imp. 5,6 HCl Rinse	1	~~215~~	x				215 ml

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Relinquished by: (Signature)	Date / Time
Eric Doak	6/28/08 1700	Lisa Braton	6/30/08 0849		
Courier: Fed Ex	**Date / Time**	**Relinquished by: (Signature)**	**Date / Time**	**Received for Analysis by:**	**Date / Time**

Special Handling Instructions

Forwarding Lab: Element One, Inc.
Wilmington, NC

PO Number:

This form was completed by:

Eric Doak

Signature: Eric Doak — Date: 6/24/08

CleanAir ENGINEERING
500 West Wood Street
Palatine, IL 60067
(800) 627-0033 ph
(847) 991-3385 fax
www.cleanair.com

Runs 1-3 ARE VOID

CHAIN OF CUSTODY FORM

CLIENT Wheelabrator
PLANT South Broward
PROJECT MANAGER Scott Brown
PROJECT NO. 10455
DEPT. 66

CLEANAIR LAB NO.	RUN NO.	TEST LOCATION	DATE	SAMPLE MATRIX	NO. OF CONTAINERS	ORIGINAL VOLUME	ANALYSIS REQUESTED Hg	ADDITIONAL INFORMATION
	2a b	Unit 1 FF Outlet	6/24/08	Filter	1	X	x	
	2 b	"	"	Front-Half 0.1N HNO3 Rinse	1	105	x	
	2 b	"	"	Imp. 1,2,3 + 0.1N HNO3 Rinse	1	756	x	
	2 b	"	"	Imp. 4 + 0.1N HNO3 Rinse	1	100	x	
	2 b	"	"	Imp. 5,6 KMnO4+H2O Rinse	1	405	x	
	2 b	"	"	Imp. 5,6 HCl Rinse	1	215	x	
		"	"					
		"	"					
	FB	"	6/24/08	Filter	1	—	x	
	FB	"	"	Front-Half 0.1N HNO3 Rinse	1	100	x	TOBS
	FB	"	"	Imp. 1,2,3 + 0.1N HNO3 Rinse	1	300	x	
	FB	"	"	Imp. 4 + 0.1N HNO3 Rinse	1	100	x	
	FB	"	"	Imp. 5,6 KMnO4+H2O Rinse	1	420	x	
	FB	"	"	Imp. 5,6 HCl Rinse	1	220	x	

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Relinquished by: (Signature)	Date / Time
Eric Doak	6/29/08 1700	Lisa Bratton	6/30/08 0849		
Courier: FED EX	Date / Time	Relinquished by: (Signature)	Date / Time	Received for Analysis by:	Date / Time

Special Handling Instructions

Forwarding Lab: Element One, Inc.
Wilmington, NC

PO Number:

This form was completed by:
Eric Doak 6/27/08
Signature Date
Eric Doak

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CHAIN OF CUSTODY FORM

CLIENT Wheelabrator | PROJECT NO. 10455
PLANT South Broward | DEPT. 66
PROJECT MANAGER Scott Brown

CLEANAIR LAB NO.	RUN NO	TEST LOCATION	DATE	SAMPLE MATRIX	NO. OF CONTAINERS	ORIGINAL VOLUME	[illegible] (Hg)				ADDITIONAL INFORMATION
	(ed) ~~4~~ 7	Unit 1 FF Outlet	6/26/08	Filter	1	~	x				
	~~4~~ 7	|	|	Front-Half 0.1N HNO3 Rinse	1	100	x				
	~~4~~ 7	|	|	Imp. 1,2,3 + 0.1N HNO3 Rinse	1	779	x				
	~~4~~ 7	|	|	Imp. 4 + 0.1N HNO3 Rinse	1	101	x				
	~~4~~ 7	|	|	Imp. 5,6 KMnO4+H2O Rinse	1	424	x				
	~~4~~ 7	|	↓	Imp. 5,6 HCl Rinse	1	225	x				
		|									
		|									
	(ed) ~~5~~ 8	|	6/26/08	Filter	1	–	x				
	~~5~~ 8	|	|	Front-Half 0.1N HNO3 Rinse	1	105	x				
	~~5~~ 8	|	|	Imp. 1,2,3 + 0.1N HNO3 Rinse	1	770	x				
	~~5~~ 8	|	|	Imp. 4 + 0.1N HNO3 Rinse	1	102	x				
	~~5~~ 8	|	|	Imp. 5,6 KMnO4+H2O Rinse	1	422	x				
	~~5~~ 8	V	↓	Imp. 5,6 HCl Rinse	1	225	x				

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Relinquished by: (Signature)	Date / Time
Eric Doak	6/28/08 1700	Lisa Braton	6/30/08 0849		
Courier:	**Date / Time**	**Relinquished by: (Signature)**	**Date / Time**	**Received for Analysis by:**	**Date / Time**
FED EX					

Special Handling Instructions

Forwarding Lab: Element One, Inc.
Wilmington, NC

PO Number:

This form was completed by:
Eric Doak

Signature: Eric Doak | Date: 6/26/07

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CHAIN OF CUSTODY FORM

CLIENT Wheelabrator | PROJECT NO. 10455
PLANT South Broward | DEPT. 66
PROJECT MANAGER Scott Brown

CLEANAIR LAB NO.	RUN NO.	TEST LOCATION	DATE	SAMPLE MATRIX	NO. OF CONTAINERS	ORIGINAL VOLUME	ANALYSIS REQUESTED: Particulate (Hg)	ADDITIONAL INFORMATION
	(EA) ~~8~~ 09	Unit 1 FF Outlet	6/26/08	Filter	1	—	x	
	~~8~~ 9	"	"	Front-Half 0.1N HNO3 Rinse	1	108	x	
	~~8~~ 9	"	"	Imp. 1,2,3 + 0.1N HNO3 Rinse	1	776	x	
	~~8~~ 9	"	"	Imp. 4 + 0.1N HNO3 Rinse	1	100	x	
	~~8~~ 9	"	"	Imp. 5,6 KMnO4+H2O Rinse	1	427	x	
	~~8~~ 9	V	↓	Imp. 5,6 HCl Rinse	1	225	x	
				Filter				
				~~Front-Half 0.1N HNO3 Rinse~~				
				~~Imp. 1,2,3 + 0.1N HNO3 Rinse~~				
				~~Imp. 4 + 0.1N HNO3 Rinse~~				
				~~Imp. 5,6 KMnO4+H2O Rinse~~				
				~~Imp. 5,6 HCl Rinse~~				

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Relinquished by: (Signature)	Date / Time
Eric Doak	6/26/08 1750	Lisa Bratton	6/30/08 0849		
Courier:	Date / Time	Relinquished by: (Signature)	Date / Time	Received for Analysis by:	Date / Time

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Forwarding Lab: Element One, Inc.
Wilmington, NC

PO Number:

This form was completed by: Eric Doak

Signature: Eric Doak Date: 6/26/08

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CHAIN OF CUSTODY FORM

CLIENT Wheelabrator
PLANT South Broward
PROJECT MANAGER Scott Brown

PROJECT NO. 10455
DEPT. 66

CLEANAIR LAB NO.	PLAN NO.	TEST LOCATION	DATE	SAMPLE MATRIX	NO. OF CONTAINERS	ORIGINAL VOLUME	ANALYSIS REQUESTED	ADDITIONAL INFORMATION
	NA	Reagent Blank	6/26/08	3 Quartz Filters	1	NA	x	
	NA	Reagent Blank		0.1N HNO3	1	300	x	
	NA	Reagent Blank		DI H_2O	1	100	x	
	NA	Reagent Blank		5% HNO_3 / 10% H_2O_2	1	200	x	
	NA	Reagent Blank		4% $KMnO_4$ / 10% H_2SO_4	1	100	x	
	NA	Reagent Blank		8 N HCl / DI H_2O	1	225	x	

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Relinquished by: (Signature)	Date / Time
Eric M. Doak	6/26/08 1700	Lea Bruton	6/30/08 0849		
Courier: FED EX	Date / Time	Relinquished by: (Signature)	Date / Time	Received for Analysis by:	Date / Time

Special Handling Instructions

Forwarding Lab: Element One, Inc.
Wilmington, NC

PO Number:

This form was completed by:

Eric Doak 6/26/08
Signature Date

Eric M. Doak

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Palatine, IL 60067
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ANALYTICAL DATA

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Analytical Calculations

Metals-

Element Results (µg) =ICP Results (µg/L)*Dilution*Final Volume (L)

Where-

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

Dilution= Diluted Volume--*ICP-MS Run Sheet*
Aliquot

Final Volume=FH=Final Volume (FV)--*Sample Submission*
BH=Received Volume (BV).*Final Volume (FV)--*Sample Submission*
Aliquot (Used)
Combined Results=FH+BH

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*

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One AIR TESTING SAMPLE SUBMISSION FORM Lab ID 11024

Analysis	Due Date	07.10.08
QA/QC/Report	Due Date	07.11.08

Client	Clean Air [illegible]
Project No	10455—North & South Broward

Date Rec	06.30.08
Time Rec	0849

HNO_3 Lot: 07-3[illegible]2	HF Lot: 5[illegible]	HCl Lot: 9[illegible]8010	**Ref. Method:**
Volume Marked (Y) / N	Volume Loss Y / (N) ?		**29**

Sample Identification

1	U1 FF Outlet-North R1	4	North Field Blank	6	U1 FF Outlet North R4
2	U1 FF Outlet North R2	5	North Reagent Blank	7	U1 FF Outlet North R5
	U1 FF Outlet North R2 Duplicate				U1 FF Outlet North R5 Duplicate
3	U1 FF Outlet North R3			8	U1 FF Outlet North R6
	U1 FF Outlet North R3 Spike				U1 FF Outlet North R6 Spike

Analyses Requested	Samples 1-5	Hg
	Samples 6-8	ARCHIVE

Runs / FB	Acetone (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	BV ml	FV ml	BV ml	FV ml	BV ml	Used	FV ml	BV ml	FV ml	BV ml	FV ml	BV ml	FV ml
1			110	100	195			106	200	390	500	220	400
2.D			115	↓	190			104	↓	390	↓	230	↓
3.S			105	↓	180			104	↓	400	↓	230	↓
4			110	↓	200			104	↓	400	↓	230	↓
6													
7.D													
8.S													

Reagent Blank

Lab ID	Fraction			SV, ml	BV, ml	Used	FV, ml	pH	Prep By / Date
5	C-7	FH	Acetone Blank						
	C-8	FH	0.1N HNO_3			100			
	C-8	FH/A	0.1N HNO_3		306		306		RLC 7/09/08
	C-8	B	DI H_2O	110		33			
	C-9	BH	5% HNO_3/10% H_2O_2	300	190	100			
	C-10	B	4% $KMnO_4$/10% H_2SO_4	↓		↓			
	C-11	C	8N HCl & DI	220			400		
	C-12	FH	Filter						

Lab Communications

SS Page1 of 2
SS by Paul Smith
7/1/2008 5:34:31 PM

FH Prep By/Date ESS 7-10-08
BH Prep By/Date RLC 7/09/08
BH/FH Prep By/Date N/A
Logged By/Date PDS 7/1/08

A Prep By/Date RLC 7/09/08
B Prep By/Date ESS 7/9/08
C Prep By/Date ESS 7/10/08
ID Verification By/Date RLC 7/09/08

022

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One AIR TESTING SAMPLE SUBMISSION FORM Lab ID 11024

Analysis Due Date 07.11.08
QA/QC/Report Due Date 07.14.08

Client	Clean Air IL
Project No	10455—North & South Broward

Date Rec	06.30.08
Time Rec	0849

HNO_3 Lot: 07[illegible]	HF Lot: 5107113	HCl Lot: 4108010	Ref. Method: 29
Volume Marked Y/N	volume Loss Y/N?		

Sample Identification

9	U1 FF Outlet-South R4	12	South Field Blank	14	U1 FF Outlet South R7
10	U1 FF Outlet South R5	13	South Reagent Blank	15	U1 FF Outlet South R8
	U1 FF Outlet South R5 Duplicate				U1 FF Outlet South R8 Duplicate
11	U1 FF Outlet South R6			16	U1 FF Outlet South R9
	U1 FF Outlet South R6 Spike				U1 FF Outlet South R9 Spike

Analyses Requested Samples 9-13 Hg
Samples 14-16 ARCHIVE

Runs / FB	Acetone (FH) pH <2.0 Y / N		HNO_3 (FH) pH <2.0 Y / N		5% HNO_3/10% H_2O_2 (BH) pH <2.0 Y / N			HNO_3 (A) pH <2.0 Y / N		$KMnO_4$ (B) pH <2.0 Y / N		HCl (C) pH <2.0 Y / N	
Lab ID	BV ml	FV ml	BV ml	FV ml	BV ml	Used	FV ml	BV ml	FV ml	BV ml	FV ml	BV ml	FV ml
9			[illegible]	100	200			104	400	400	500	220	400
10.D			[illegible]	/	235			102	/	400	/	220	/
11.S			[illegible]	/	200			103	/	400	/	230	/
12			[illegible]	N	230			103	Y	385	N	230	/
14													
15 D													
16.S													

Reagent Blank

Lab ID		Fraction		SV ml	BV, ml	Used	FV, ml	pH	Prep By / Date
13	C-7	FH	Acetone Blank						
	C-8	FH	0.1N HNO_3			100			
	C-8	FH/A	0.1N HNO_3		303		303		RLC 7/8/08
	C-8	B	DI H_2O		110		33		
	C-9	BH	5% HNO_3/10% H_2O_2		200				
	C-10	B	4% $KMnO_4$/10%H_2SO_4		130		100		
	C-11	C	8N HCl & DI		230		400		
	C-12	FH	Filter						

Lab Communications

SS Page2 of 2
SS by Paul Smith
7/1/2008 5:34:31 PM

FH Prep By/Date ESS 7-10-08 A Prep By/Date RLC 7/10/08
BH Prep By/Date RLC 7/10/08 B Prep By/Date ESS 7/10/08
BH/FH Prep By/Date N/A C Prep By/Date ESS 7/10/08
Labeled By/Date 7.L08 PS ID Verification By/Date RLC 7/10/08

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11024

One **Method 29 Microwave Worksheet** **Lab ID # e**

Client: Clean Air

Date Digested: 7/10/08 Initials: ESS Worksheet Prepared by: ESS

Auto Sample Loc.	Sample Lab ID	Sample Weight (g)	# of filters digested	Spike	Prep Volume (ml)	Weight In Micro / Weight Out Micro	Units
2	11024-1		1		100		
3	-2						
4	-3						
5	-4						
6	-5						
7	-9						
8	-10						
9	-11						
10	-12						
11	-13						
1	11022 - LRB				40		
12	-11022-1		.2190g				
13	-2		.2050g				
14	-2dup		.2062g				
15	-3		.2474g				
16	LRB spk			[illegible]			

Element One, Inc. Form 104 - Revision 1.0

6mls HNO3 D73602

2mls HF 5107113

.24

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	7/10/2008	13:56:45	0.00091223			µg	4	200	0.00091223					
STD1=.004ug	7/10/2008	13:57:59	0.00153939			µg	4	200	0.00153939					
STD2=.04ug	7/10/2008	13:59:14	0.01579159			µg	4	200	0.01579159					
STD3=.08ug	7/10/2008	14:00:30	0.02982808			µg	4	200	0.02982808					
STD4=.16ug	7/10/2008	14:01:47	0.05817943			µg	4	200	0.05817943					
STD5=.2ug	7/10/2008	14:03:04	0.0739162			µg	4	200	0.0739162					
Reagent Blank	7/10/2008	14:04:50	-0.0000064	-0.0000174	-0.0000174	µg	4	200	0.00001338	0.00003634	0.00003634	-0.0000262	-0.0000711	-0.0000711
0.004ug = DL	7/10/2008	14:06:03	0.00145562	0.00395105	0.00395105	µg	4	200	0.00145562	0.00395105	0.00395105			
0.080ug = STD.2	7/10/2008	14:07:19	0.02777849	0.07540028	0.07540028	µg	4	200	0.02777849	0.07540028	0.07540028			
REAGENT BLANK	7/10/2008	14:08:34	-0.00017	-0.0004614	-0.0004614	µg	4	200	-0.00017	-0.0004614	-0.0004614			
0.080ug = STD.2	7/10/2008	14:09:50	0.02763982	0.07502388	0.07502388	µg	4	200	0.02763982	0.07502388	0.07502388			
REAGENT BLANK	7/10/2008	14:11:06	-0.0001709	-0.000464	-0.000464	µg	4	200	-0.0001709	-0.000464	-0.000464			
11024-1a	7/10/2008	14:12:50	0.00025211	0.00068432	0.03421643	µg	4	200	0.00025533	0.00069305	0.03465276	0.0002489	0.0006756	0.0337801
11024-2a	7/10/2008	14:14:34	0.0001241	0.00033685	0.01684261	µg	4	200	0.00014251	0.00038682	0.01934114	0.00010569	0.00028688	0.01434409
11024-2a dup	7/10/2008	14:16:19	0.00022316	0.00060574	0.03028718	µg	4	200	0.00023803	0.00064611	0.03230558	0.00020829	0.00056537	0.02826878
11024-3a	7/10/2008	14:18:06	0.0000334	0.00009067	0.00453371	µg	4	200	0.00002388	0.00006482	0.00324122	0.00004292	0.00011652	0.00582621
11024-3a spk	7/10/2008	14:19:53	0.0287038	0.07791189	3.8955947	µg	4	200	0.02862833	0.07770705	3.88535268	0.02877926	0.07811673	3.90583672
11024-4a	7/10/2008	14:21:41	0.00008573	0.00023271	0.01163563	µg	4	200	0.00008459	0.00022961	0.01148088	0.00008687	0.0002358	0.01179038
11024-5a	7/10/2008	14:23:30	-0.0000942	-0.0002559	-0.0127951	µg	4	200	-0.0001063	-0.0002886	-0.0144326	-0.0000822	-0.0002231	-0.0111577
11024-9a	7/10/2008	14:25:20	0.00002875	0.00007805	0.00390283	µg	4	200	0.00003671	0.00009965	0.00498272	0.0000208	0.00005645	0.00282293
11024-10a	7/10/2008	14:27:06	0.00007068	0.00019187	0.00959374	µg	4	200	0.00005496	0.00014918	0.00745927	0.00008641	0.00023456	0.01172822
11024-10a dup	7/10/2008	14:28:50	0.00008831	0.00023971	0.01198576	µg	4	200	0.00010626	0.00028844	0.0144223	0.00007036	0.00019098	0.00954922
0.004ug = DL	7/10/2008	14:30:03	0.00147527	0.00400439	0.00400439	µg	4	200	0.00147527	0.00400439	0.00400439			
0.080ug = STD.2	7/10/2008	14:31:19	0.02767978	0.07513236	0.07513236	µg	4	200	0.02767978	0.07513236	0.07513236			
REAGENT BLANK	7/10/2008	14:32:35	-0.000059	-0.0001602	-0.0001602	µg	4	200	-0.000059	-0.0001602	-0.0001602			
11024-11a	7/10/2008	14:34:19	0.00003316	0.00009003	0.00450154	µg	4	200	0.00003966	0.00010766	0.00538347	0.00002667	0.00007239	0.00361961
11024-11a spk	7/10/2008	14:36:03	0.02851502	0.07739949	3.86997493	µg	4	200	0.02842014	0.07714196	3.85709805	0.02860991	0.07765703	3.8828518
11024-12a	7/10/2008	14:37:48	-0.0000176	-0.0000478	-0.0023927	µg	4	200	-0.0000227	-0.0000617	-0.003088	-0.0000125	-0.0000339	-0.0016974
11024-13a	7/10/2008	14:39:33	-0.000014	-0.000038	-0.0019029	µg	4	200	-0.0000146	-0.0000396	-0.0019819	-0.0000134	-0.0000364	-0.0018239
11024-1b	7/10/2008	14:41:19	0.00003181	0.00008635	0.01079492	µg	4	500	0.00003172	0.00008612	0.01076562	0.0000319	0.00008659	0.01082422
11024-2b	7/10/2008	14:43:05	0.0001557	0.00042264	0.0528305	µg	4	500	0.00014628	0.00039706	0.04963348	0.00016513	0.00044822	0.05602752
11024-2b dup	7/10/2008	14:44:51	0.00014032	0.00038088	0.04761049	µg	4	500	0.00012483	0.00033884	0.04235531	0.00015581	0.00042292	0.05286567
11024-3b	7/10/2008	14:46:38	0.00014563	0.00039528	0.04941118	µg	4	500	0.00015156	0.00041139	0.05142393	0.00013969	0.00037918	0.04739844
11024-3b spk	7/10/2008	14:48:26	0.02542844	0.06902146	8.62768277	µg	4	500	0.02538008	0.06889019	8.61127463	0.0254768	0.06915272	8.64409091
11024-4b	7/10/2008	14:50:14	-0.0000777	-0.0002109	-0.0263632	µg	4	500	-0.0000586	-0.0001592	-0.0199059	-0.0000967	-0.0002625	-0.0328204
0.004ug = DL	7/10/2008	14:51:29	0.00145153	0.00393995	0.00393995	µg	4	500	0.00145153	0.00393995	0.00393995			
0.080ug = STD.2	7/10/2008	14:52:45	0.0273339	0.07419351	0.07419351	µg	4	500	0.0273339	0.07419351	0.07419351			
REAGENT BLANK	7/10/2008	14:54:01	-0.0001507	-0.0004091	-0.0004091	µg	4	500	-0.0001507	-0.0004091	-0.0004091			
11024-5b	7/10/2008	14:55:47	-0.000176	-0.0004777	-0.0597222	µg	4	500	-0.0001675	-0.0004548	-0.0568587	-0.0001844	-0.0005006	-0.0625856
11024-9b	7/10/2008	14:57:36	0.00013068	0.00035473	0.04434129	µg	4	500	0.00011103	0.00030137	0.03767216	0.00015034	0.00040808	0.05101041
11024-10b	7/10/2008	14:59:26	0.00012664	0.00034376	0.04297115	µg	4	500	0.00010086	0.00027376	0.03422111	0.00015243	0.00041376	0.05172119
11024-10b dup	7/10/2008	15:01:12	0.00013407	0.00036392	0.04549025	µg	4	500	0.00015817	0.00042933	0.05366742	0.00010997	0.0002985	0.03731308
11024-11b	7/10/2008	15:02:54	0.00032537	0.00088318	0.11039808	µg	4	500	0.00033326	0.0009046	0.11307543	0.00031748	0.00086176	0.10772073
11024-11b spk	7/10/2008	15:04:37	0.02747658	0.0745808	9.32260061	µg	4	500	0.02734243	0.07421667	9.27708498	0.02761073	0.07494492	9.36811624
11024-12b	7/10/2008	15:06:21	0.0000316	0.00008578	0.01072301	µg	4	500	0.00003595	0.00009758	0.01219791	0.00002725	0.00007398	0.0092481
11024-13b	7/10/2008	15:08:05	0.00006638	0.00018018	0.02252277	µg	4	500	0.00007045	0.00019124	0.02390561	0.0000623	0.00016911	0.02113994
11024-1bh	7/10/2008	15:09:49	0.03793484	0.10296807	18.9203833	µg	4	735	0.03793226	0.10296108	18.9190994	0.03793741	0.10297505	18.9216672
11024-2bh	7/10/2008	15:11:33	0.04246664	0.11526892	21.3247516	µg	4	740	0.04248076	0.11530724	21.3318404	0.04245252	0.1152306	21.3176627
0.004ug = DL	7/10/2008	15:12:47	0.00139345	0.00378232	0.00378232	µg	4	740	0.00139345	0.00378232	0.00378232			
0.080ug = STD.2	7/10/2008	15:14:03	0.02670106	0.07247579	0.07247579	µg	4	740	0.02670106	0.07247579	0.07247579			
REAGENT BLANK	7/10/2008	15:15:19	-0.0000645	-0.000175	-0.000175	µg	4	740	-0.0000645	-0.000175	-0.000175			
Calib Blank	7/10/2008	15:45:24	0.00027903			µg	4	290	0.00027903					
STD1=.004ug	7/10/2008	15:46:38	0.00186388			µg	4	290	0.00186388					
STD2=.04ug	7/10/2008	15:47:52	0.01503598			µg	4	290	0.01503598					
STD3=.08ug	7/10/2008	15:49:08	0.02821126			µg	4	290	0.02821126					
STD4=.16ug	7/10/2008	15:50:24	0.05452294			µg	4	290	0.05452294					
STD5=.2ug	7/10/2008	15:51:42	0.06954944			µg	4	290	0.06954944					
Reagent Blank	7/10/2008	15:53:28	0.00000936	0.00002703	0.00002703	µg	4	290	0.00002555	0.00007374	0.00007374	-0.0000068	-0.0000196	-0.0000196
0.004ug = DL	7/10/2008	15:55:54	0.00130096	0.00375467	0.00375467	µg	4	290	0.00130096	0.00375467	0.00375467			
0.080ug = STD.2	7/10/2008	15:57:09	0.02751189	0.07940138	0.07940138	µg	4	290	0.02751189	0.07940138	0.07940138			
0.080ug = QC STD 3	7/10/2008	15:58:28	0.02820714	0.08140791	0.08140791	µg	4	290	0.02820714	0.08140791	0.08140791			
REAGENT BLANK	7/10/2008	15:59:44	0.00004887	0.00014105	0.00014105	µg	4	290	0.00004887	0.00014105	0.00014105			
11024-2bh dup	7/10/2008	16:01:29	0.04139957	0.11948226	22.1042187	µg	4	740	0.04147992	0.11971414	22.1471169	0.04131923	0.11925038	22.0613205
11024-3bh	7/10/2008	16:03:15	0.04745479	0.13695807	24.9948481	µg	4	730	0.04808353	0.13877267	25.3260136	0.04682604	0.13514346	24.6636826
11024-3bh spk	7/10/2008	16:05:01	0.07340124	0.21184147	38.6610694	µg	4	730	0.07341636	0.2118851	38.6690317	0.07338613	0.21179784	38.653107
11024-4bh	7/10/2008	16:06:47	0.00105056	0.00303199	0.21981987	µg	4	290	0.00104717	0.00302223	0.21911175	0.00105394	0.00304176	0.22052799
11024-5bh	7/10/2008	16:08:35	0.0005088	0.00146844	0.06975118	µg	4	190	0.00052788	0.0015235	0.07236671	0.00048972	0.00141338	0.06713565
11024-9bh	7/10/2008	16:10:23	0.03656525	0.10553005	18.4677595	µg	4	700	0.03656684	0.10553463	18.4685619	0.03656366	0.10552546	18.466957
11024-10bh	7/10/2008	16:12:11	0.03115793	0.08992411	16.5235559	µg	4	735	0.03112441	0.08982738	16.5057816	0.03119144	0.09002084	16.5413302
11024-10bh dup	7/10/2008	16:14:00	0.03145651	0.09078584	16.6818988	µg	4	735	0.03142128	0.09068417	16.6632177	0.03149173	0.0908875	16.7005799
11024-11bh	7/10/2008	16:15:50	0.03574706	0.10316869	19.3441311	µg	4	750	0.03574139	0.10315231	19.3410599	0.03575274	0.10318507	19.3472023
11024-11bh spk	7/10/2008	16:17:36	0.06456392	0.18633631	34.9380584	µg	4	750	0.06442241	0.1859279	34.8614825	0.06470543	0.18674471	35.0146344
0.004ug = DL	7/10/2008	16:18:48	0.00130143	0.00375602	0.00375602	µg	4	750	0.00130143	0.00375602	0.00375602			
0.080ug = STD.2	7/10/2008	16:20:04	0.02788532	0.08047912	0.08047912	µg	4	750	0.02788532	0.08047912	0.08047912			
REAGENT BLANK	7/10/2008	16:21:20	0.00000288	0.00000832	0.00000832	µg	4	750	0.00000288	0.00000832	0.00000832			
11024-12bh	7/10/2008	16:23:03	0.00067993	0.00196233	0.14226942	µg	4	290	0.00067017	0.00193418	0.14022832	0.00068968	0.00199048	0.14431051

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
11024-13bh	7/10/2008	16:24:46	0.00068585	0.00197943	0.09897181	µg	4	200	0.00069106	0.00199447	0.09972388	0.00068064	0.00196439	0.09821974
0.004ug = DL	7/10/2008	16:31:10	0.00130459	0.00376514	0.00376514	µg	4	500	0.00130459	0.00376514	0.00376514			
0.080ug = QC STD 3	7/10/2008	16:32:27	0.02833349	0.08177257	0.08177257	µg	4	500	0.02833349	0.08177257	0.08177257			
REAGENT BLANK	7/10/2008	16:33:43	-0.0000132	-0.0000382	-0.0000382	µg	4	500	-0.0000132	-0.0000382	-0.0000382			
Calib Blank	7/14/2008	10:26:34	0.00069568			µg			0.00069568					
STD1=.004ug	7/14/2008	10:27:48	0.00167807			µg			0.00167807					
STD2=.04ug	7/14/2008	10:29:03	0.01578939			µg			0.01578939					
STD3=.08ug	7/14/2008	10:30:19	0.02853933			µg			0.02853933					
STD4=.16ug	7/14/2008	10:31:36	0.06086505			µg			0.06086505					
STD5=.2ug	7/14/2008	10:32:54	0.07645277			µg			0.07645277					
0.004ug = DL	7/14/2008	10:35:53	0.00161029	0.00423959	0.00423959	µg			0.00161029	0.00423959	0.00423959			
0.080ug = STD.2	7/14/2008	10:37:09	0.03276902	0.08627453	0.08627453	µg			0.03276902	0.08627453	0.08627453			
0.080ug = QC STD 3	7/14/2008	10:38:28	0.03278573	0.08631852	0.08631852	µg			0.03278573	0.08631852	0.08631852			
11024-1c	7/14/2008	10:50:18	0.00033619	0.00088514	0.08851428	µg	4	400	0.00035925	0.00094584	0.09458476	0.00031314	0.00082443	0.08244381
11024-2c	7/14/2008	10:52:07	0.00055621	0.0014644	0.14644001	µg	4	400	0.00057717	0.00151959	0.15195952	0.00053524	0.0014092	0.14092049
11024-2c dup	7/14/2008	10:53:57	0.00056976	0.00150006	0.15000697	µg	4	400	0.0005904	0.00155441	0.15544159	0.00054911	0.00144572	0.14457234
11024-3c	7/14/2008	10:55:44	0.00020173	0.00053112	0.05311234	µg	4	400	0.00018239	0.00048021	0.04802137	0.00022106	0.00058203	0.05820331
11024-3c spk	7/14/2008	10:57:27	0.02755968	0.07255933	7.25593325	µg	4	400	0.02768354	0.07288544	7.28854402	0.02743582	0.07223322	7.22332248
0.004ug = DL	7/14/2008	10:58:40	0.00139977	0.00368534	0.00368534	µg	4	400	0.00139977	0.00368534	0.00368534			
0.080ug = STD.2	7/14/2008	10:59:56	0.03195811	0.08413954	0.08413954	µg	4	400	0.03195811	0.08413954	0.08413954			
REAGENT BLANK	7/14/2008	11:01:12	0.0000817	0.0002151	0.0002151	µg	4	400	0.0000817	0.0002151	0.0002151			
11024-4c	7/14/2008	11:02:56	-0.0001119	-0.0002947	-0.029472	µg	4	400	-0.0000898	-0.0002364	-0.0236458	-0.000134	-0.0003529	-0.0352983
11024-5c	7/14/2008	11:04:40	-0.0001284	-0.0003381	-0.0338198	µg	4	400	-0.0001426	-0.0003755	-0.0375505	-0.0001142	-0.0003008	-0.0300891
11024-9c	7/14/2008	11:06:24	0.00048718	0.00128267	0.12826744	µg	4	400	0.00052535	0.00138314	0.13831482	0.00044902	0.0011822	0.11822007
11024-10c	7/14/2008	11:08:09	0.00059415	0.0015643	0.15643071	µg	4	400	0.00061111	0.00160894	0.16089495	0.0005772	0.00151966	0.15196648
11024-10c dup	7/14/2008	11:09:55	0.00056728	0.00149354	0.14935438	µg	4	400	0.00054364	0.00143131	0.14313155	0.00059091	0.00155577	0.15557722
11024-11c	7/14/2008	11:11:41	0.00008187	0.00021557	0.02155732	µg	4	400	0.00011266	0.00029661	0.02966126	0.00005109	0.00013453	0.01345337
11024-11c spk	7/14/2008	11:13:27	0.02852404	0.0750983	7.50983048	µg	4	400	0.02853333	0.07512276	7.51227659	0.02851475	0.07507384	7.50738437
11024-12c	7/14/2008	11:15:13	-0.0000211	-0.0000556	-0.0055601	µg	4	400	-0.0000241	-0.0000634	-0.0063482	-0.0000181	-0.0000477	-0.004772
11024-13c	7/14/2008	11:17:01	-0.000259	-0.0006819	-0.0681965	µg	4	400	-0.0002495	-0.0006569	-0.0656975	-0.0002685	-0.0007069	-0.0706955
11024-1fh	7/14/2008	11:18:49	0.00061863	0.00162874	0.04071862	µg	4	100	0.00063801	0.00167976	0.0419941	0.00059925	0.00157772	0.03944314
0.004ug = DL	7/14/2008	11:20:04	0.00138844	0.00365551	0.00365551	µg	4	100	0.00138844	0.00365551	0.00365551			
0.080ug = STD.2	7/14/2008	11:21:20	0.03137194	0.08259629	0.08259629	µg	4	100	0.03137194	0.08259629	0.08259629			
REAGENT BLANK	7/14/2008	11:22:36	0.00002714	0.00007146	0.00007146	µg	4	100	0.00002714	0.00007146	0.00007146			
11024-2fh	7/14/2008	11:24:22	0.00108122	0.00284666	0.07116673	µg	4	100	0.00107806	0.00283834	0.07095865	0.00108439	0.00285499	0.07137481
11024-2fh dup	7/14/2008	11:26:11	0.00106023	0.0027914	0.06978505	µg	4	100	0.00108142	0.00284718	0.0711795	0.00103905	0.00273562	0.06839061
11024-3fh	7/14/2008	11:28:01	0.00151038	0.00397654	0.09941362	µg	4	100	0.00151288	0.00398313	0.09957837	0.00150787	0.00396995	0.09924887
11024-4fh	7/14/2008	11:31:29	0.00036311	0.000956	0.02390009	µg	4	100	0.00038708	0.0010191	0.02547767	0.00033914	0.0008929	0.02232252
11024-5fh	7/14/2008	11:33:12	0.00030903	0.00081362	0.02034061	µg	4	100	0.00030039	0.00079086	0.01977173	0.00031767	0.00083637	0.02090949
11024-9fh	7/14/2008	11:34:56	0.00045054	0.0011862	0.02965508	µg	4	100	0.00043703	0.00115063	0.02876584	0.00046405	0.00122177	0.03054432
11024-10fh	7/14/2008	11:36:40	0.0007409	0.00195065	0.04876642	µg	4	100	0.00074952	0.00197334	0.04933355	0.00073228	0.00192797	0.0481993
11024-10fh dup	7/14/2008	11:38:24	0.00069464	0.00182886	0.04572166	µg	4	100	0.00068065	0.00179204	0.04480114	0.00070883	0.00186568	0.04664218
11024-11fh	7/14/2008	11:40:08	0.0005471	0.00144042	0.03601055	µg	4	100	0.00054034	0.00142261	0.0355654	0.00055386	0.00145822	0.03645571
0.004ug = DL	7/14/2008	11:43:49	0.00157025	0.00413418	0.00413418	µg	4	100	0.00157025	0.00413418	0.00413418			
0.080ug = STD.2	7/14/2008	11:45:05	0.03074771	0.08095279	0.08095279	µg	4	100	0.03074771	0.08095279	0.08095279			
REAGENT BLANK	7/14/2008	11:46:21	0.00001935	0.00005094	0.00005094	µg	4	100	0.00001935	0.00005094	0.00005094			
11024-11fh spk	7/14/2008	11:48:06	0.03260917	0.08585367	2.14634179	µg	4	100	0.0326987	0.08608939	2.15223491	0.03251964	0.08561794	2.14044867
11024-12fh	7/14/2008	11:49:52	0.00057106	0.0015035	0.03758771	µg	4	100	0.00057845	0.00152296	0.03807411	0.00056367	0.00148405	0.03710132
11024-13fh	7/14/2008	11:51:38	0.0006179	0.00162683	0.04067092	µg	4	100	0.00063902	0.00168241	0.04206047	0.00059679	0.00157125	0.03928136
0.004ug = DL	7/14/2008	12:05:43	0.00141229	0.0037183	0.0037183	µg	0	1	0.00141229	0.0037183	0.0037183			
0.080ug = STD.2	7/14/2008	12:06:59	0.03074117	0.08093557	0.08093557	µg	0	1	0.03074117	0.08093557	0.08093557			
REAGENT BLANK	7/14/2008	12:08:15	-0.0000202	-0.0000532	-0.0000532	µg	0	1	-0.0000202	-0.0000532	-0.0000532			
0.004ug = DL	7/14/2008	12:28:53	0.00136804	0.00360179	0.00360179	µg	4	400	0.00136804	0.00360179	0.00360179			
0.080ug = STD.2	7/14/2008	12:30:09	0.03069498	0.08081396	0.08081396	µg	4	400	0.03069498	0.08081396	0.08081396			
0.080ug = QC STD 3	7/14/2008	12:31:28	0.03017958	0.07945702	0.07945702	µg	4	400	0.03017958	0.07945702	0.07945702			
REAGENT BLANK	7/14/2008	12:32:44	0.00001293	0.00003404	0.00003404	µg	4	400	0.00001293	0.00003404	0.00003404			
11024-3fh spk	7/14/2008	12:34:27	0.03244495	0.08542131	2.13553284	µg	4	100	0.0326722	0.0860196	2.15049024	0.0322177	0.08482301	2.12057544
0.004ug = DL	7/14/2008	12:35:40	0.00136803	0.00360177	0.00360177	µg	4	100	0.00136803	0.00360177	0.00360177			
0.080ug = QC STD 3	7/14/2008	12:36:56	0.03017823	0.07945346	0.07945346	µg	4	100	0.03017823	0.07945346	0.07945346			
REAGENT BLANK	7/14/2008	12:38:12	-0.0000035	-0.0000093	-0.0000093	µg	4	100	-0.0000035	-0.0000093	-0.0000093			

PLANT DATA

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WHEELABRATOR SOUTH 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)
6/25/2008	Mercury	29	4	183.4	2.22	71.4
6/25/2008	Mercury	29	5	182.8	2.22	71.2
6/25/2008	Mercury	29	6	183.7	2.22	71.6

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 6/25/2008
Start Time: 7:33:00
End Time: 9:46:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	29 run 4	491.11	315.05	33.26	26.87	18.27	300.19	5.88	-10.61	183.37
Unit 2		502.84	315.19	36.18	27.70	16.89	301.62	6.59	-10.13	182.84
Unit 3		496.48	315.10	36.17	28.42	18.82	300.80	6.72	-10.30	183.36

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	186.29	900.91	824.80	79.88	-0.10	430.86	1144.03	8.88	5.25	8.01
Unit 2	187.58	898.92	824.69	81.83	-0.10	419.76	1063.78	4.17	6.72	9.39
Unit 3	186.79	900.17	823.84	87.72	-0.14	400.64	1065.94	6.33	6.91	9.47

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 6/25/2008
Start Time: 10:14:00
End Time: 12:27:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	29 run 5	501.38	315.06	36.00	28.93	15.75	301.63	5.88	-10.74	182.82
Unit 2		511.65	315.05	39.44	33.57	14.33	301.65	6.63	-10.13	183.81
Unit 3		487.83	314.93	31.56	25.17	19.58	301.04	6.49	-9.69	184.30

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	185.37	901.78	823.98	81.30	-0.09	433.22	1161.39	11.88	5.61	8.73
Unit 2	187.96	899.40	821.67	82.92	-0.11	423.73	1072.02	4.24	6.66	9.48
Unit 3	187.49	901.08	823.88	78.13	-0.14	390.81	1095.88	3.35	5.42	8.19

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 6/25/2008
Start Time: 12:45:00
End Time: 14:58:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	29 run 6	504.47	314.96	36.65	29.79	15.17	302.15	5.93	-10.78	183.71
Unit 2		511.55	315.00	39.24	33.62	14.19	300.99	6.57	-9.91	184.85
Unit 3		496.79	315.07	34.38	27.99	17.37	300.76	6.59	-9.99	183.88

		FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
		KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1		186.97	902.36	824.22	80.11	-0.10	433.36	1155.34	15.74	5.25	7.94
Unit 2		189.86	900.10	827.21	82.09	-0.10	421.92	1072.00	5.64	6.20	8.99
Unit 3		187.23	901.29	823.99	82.46	-0.14	394.03	1094.16	5.27	6.18	8.85

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 6/26/2008
Start Time: 6:50:00
End Time: 9:04:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	29 run 7	506.94	314.98	41.82	34.88	12.38	300.56	6.00	-11.47	184.14
Unit 2		504.38	315.03	38.59	32.86	13.39	302.03	6.65	-10.29	183.91
Unit 3		498.77	315.10	36.90	30.00	14.47	302.54	6.65	-10.16	183.63

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	187.33	901.62	825.07	84.62	-0.09	443.50	1119.68	8.61	6.28	9.17
Unit 2	188.52	899.33	825.45	83.96	-0.11	425.29	1040.78	6.60	6.48	9.05
Unit 3	186.63	900.69	823.29	87.14	-0.10	398.91	1090.34	9.13	6.71	9.33

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Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 6/26/2008
Start Time: 9:24:00
End Time: 11:39:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	29 run 8	513.35	314.90	42.77	33.79	12.32	302.54	5.98	-11.45	183.05
Unit 2		503.38	315.08	37.49	31.40	14.06	302.41	6.57	-9.98	181.57
Unit 3		501.58	314.97	37.48	28.30	14.77	301.56	6.62	-10.23	180.73

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	185.84	900.70	823.55	89.78	-0.10	443.81	1111.98	5.93	6.23	9.19
Unit 2	185.60	897.68	822.89	81.96	-0.10	422.81	1047.53	6.79	6.62	9.20
Unit 3	184.02	899.21	824.39	87.90	-0.10	400.86	1083.67	6.18	7.48	9.89

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 6/26/2008
Start Time: 12:02:00
End Time: 14:17:00

		SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME CONC	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW
		DEG F	DEG F	GPM	GPM	%	DEG F	" H2O	" H2O	KLBs/hr
Unit 1	29 run 9	510.39	315.60	40.47	31.48	13.17	303.08	5.98	-11.17	184.05
Unit 2		508.91	322.22	38.06	27.62	14.23	307.93	6.63	-9.90	183.16
Unit 3		484.02	308.87	31.75	18.11	18.42	296.83	6.00	-8.95	184.47

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	186.90	902.54	824.44	87.26	-0.11	438.95	1112.32	7.35	5.51	8.48
Unit 2	187.40	899.42	824.61	84.75	-0.10	424.22	1054.45	5.38	6.81	9.44
Unit 3	187.41	901.23	823.34	76.28	-0.11	381.75	1090.21	8.46	6.42	8.94

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PERTINENT CORRESPONDENCE

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Scott Brown

From: Faller, Chuck [cfaller@WM.com]
Sent: Monday, June 30, 2008 7:46 AM
To: 'Sbrown (E-mail)
Cc: Porter, Timothy
Subject: FW: Wheelabrator North & South Broward quarterly mercury testing

Please include this email in the North and South Broward quarterly reports.

-----Original Message-----
From: Faller, Chuck
Sent: Wednesday, June 25, 2008 1:24 PM
To: 'william.forrest@dep.state.fl.us'
Subject: Wheelabrator North & South Broward quarterly mercury testing

Second quarter mercury stack testing began yesterday (June 24th) at South Broward. Unfortunately, after the first three runs were completed, Clean Air Engineering notified me that they collected the samples with a broken Peto tube and the three runs had to be discarded. Therefore, we will be sampling the first three runs today (June 25). The second set of three runs will be collected tomorrow (June 26). North Broward testing will now be completed on Friday and Saturday (June 27 and 28).

If you have any questions please give me a call at (954) 581-6606, ext 255.

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