

WHEELABRATOR NORTH AND SOUTH BROWARD, INC.
POMPANO BEACH AND FT. LAUDERDALE, FL

CleanAir Project No: 11414

PROJECT OVERVIEW

1-1

INTRODUCTION

Wheelabrator North Broward, Inc. operates the North Broward County Resource Recovery facility, located in Pompano Beach, Florida. Wheelabrator South Broward, Inc. operates the South Broward Resource Recovery facility, located in Ft. Lauderdale, Florida.

Wheelabrator North and South Broward, Inc. have contracted Clean Air Engineering (CleanAir) to perform test programs at each facility to show compliance with their air permits, as well as 40 CFR Subpart Cb. This test protocol provides a summary of the test methods, procedures, process conditions and all other information necessary to ensure that testing is conducted in full compliance with all requirements under 40 CFR Subpart Cb, and applicable sections of each facility's Title V permits:

- 0112120-010-AV - North Broward
- 0112119-015-AV - South Broward

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

Most of the sampling will be conducted at the Spray Dryer Absorber (SDA) Inlets and the Fabric Filter (FF) Outlets. In addition, opacity determinations will be conducted for the Lime Silo, using EPA Method 9, and Ash Handling System fugitive emissions, using EPA Method 22.

PROJECT OVERVIEW

INTRODUCTION (CONTINUED)

Key Project Participants

Individuals responsible for coordinating and conducting the test program are listed below in Table 1-1.

**Table 1-1:
 Project Contact Information**

Client Contact – South Broward	CleanAir Contact
Chuck Faller Wheelabrator South Broward Inc. 4400 South State Road 7 Ft. Lauderdale, FL 33314 Phone: 954-581-6606 Email: cfaller@WM.com	Scott Brown Clean Air Engineering 500 West Wood Street Palatine, IL 60067 Phone: 847-654-4544 Email: sbrown@cleanair.com
Client Contact – North Broward	
Chuck Faller Wheelabrator North Broward Inc. 2600 Wiles Road Pompano Beach, FL 33073 Phone: 954-971-8701 Email: cfaller@WM.com	

Test Program Parameters

The testing will include the following emissions measurements:

- cadmium (Cd)
- lead (Pb)
- mercury (Hg)
- dioxins and furans (PCDD/PCDF), Unit 1 only
- filterable particulate matter (FPM)
- hydrogen chloride (HCl)
- total fluoride
- visual emissions

All the above pollutants will be measured at the FF Outlets. In addition, hydrogen chloride (HCl) will be measured at the SDA Inlets at both plants in order to obtain system removal efficiencies.

PROJECT OVERVIEW**INTRODUCTION (CONTINUED)**

The testing will also include the relative accuracy test audit (RATA) at the FF Outlet continuous emission monitors (CEMs) for the following compounds:

- sulfur dioxide (SO₂)
- nitrogen oxides (NO_x)
- carbon monoxide (CO)
- carbon dioxide (CO₂)

SCOPE OF WORK**Test Schedule**

The on-site schedule to be followed during the yearly test program at each facility is outlined in Table 1-2.

**Table 1-2:
Schedule of Activities – 2012 Compliance / RATA**

<u>Day</u>	<u>Activity</u>	<u>Location</u>	<u>Test Method(s)</u>	<u>Replicates</u>	<u>Time/Volume</u>
1	Particulate/Metals ²	FF Outlet 1	M5/29	3	125 min. / 60 ft ³
	HCl ¹	SDA Inlet/FF Outlet 2	Mod. 26A	3	1 hr / 30 ft ³
	Particulate/Metals ²	FF Outlet 3	M5/29	1	125 min. / 60 ft ³
	PCDD/PCDF	FF Outlet 1	M23	1	250 min. / ~120 ft ³
	O ₂ /CO ₂ /SO ₂ /NO _x /CO	FF Outlet 2	3A, 6C, 7E, 10	10-12	21-27 min. / NA
	Volumetric Flow	FF Outlet 2	1-2	10-12	NA
2	Particulate/Metals	FF Outlet 2	M5/29	3	125 min. / 60 ft ³
	HCl ¹	SDA Inlet/FF Outlet 3	Mod. 26A	3	1 hr / 30 ft ³
	Particulate/Metals ²	FF Outlet 1	M5/29	1	125 min. / 60 ft ³
	PCDD/PCDF	FF Outlet 1	M23	2	250 min. / ~120 ft ³
	O ₂ /CO ₂ /SO ₂ /NO _x /CO	FF Outlet 3	3A, 6C, 7E, 10	10-12	21-27 min. / NA
	Volumetric Flow	FF Outlet 3	1-2	10-12	NA
3	Particulate/Metals ²	FF Outlet 3	M5/29	3	125 min. / 60 ft ³
	HCl ¹	SDA Inlet/FF Outlet 1	Mod. 26A	3	1 hr / 30 ft ³
	Particulate/Metals ²	FF Outlet 2	M5/29	1	125 min. / 60 ft ³
	O ₂ /CO ₂ /SO ₂ /NO _x /CO	FF Outlet 1	3A, 6C, 7E, 10	10-12	21-27 min. / NA
	Volumetric Flow	FF Outlet 1	1-2	10-12	NA
	Opacity ⁴	Lime Silo	9	1 unload	NA
Fugitive Emissions ⁵	Ash System	22	1	3 hrs / NA	

¹ EPA Method 26A will be used in a modified format at the FF Outlets and SDA Inlets (single point, constant sampling rate).

² The fourth Method (5)/29 test runs will be analyzed for mercury only.

³ Moisture and flow rates will be performed along with each CO₂ lb./hr test run with 1 moisture being performed for every two RATA runs.

⁴ The opacity of the Lime Silo will be observed during one loading operation. This observation may be done on a different day or during another week to coordinate with the lime delivery schedule.

⁵ The time period for any fugitive emissions will be determined for the entire Ash Handling System for a three-hour period including times when ash is transferred to the ash storage area and loaded into trucks. To encompass the entire system, multiple observation locations will be utilized.

PROJECT OVERVIEW

1-4

SCOPE OF WORK (CONTINUED)

In addition, the following table presents the quarterly mercury testing schedule for North Broward. This is in accordance with F.A.C. 62-296.416. The semi-annual mercury testing shall be staggered so that at least one unit is tested during each calendar quarter and each unit is tested twice per year.

**Table 1-3:
 Schedule of Activities - 2012 North Broward Quarterly Hg**

Day	Activity	Location	Test Method	Replicates	Sample Time	Sample Volume
1	Set-up	1, 2 or 3 FF Outlet				
	Mercury (Hg)	1, 2 or 3 FF Outlet	29	1	125 min.	60 ft ³
2	Mercury (Hg)	1, 2 or 3 FF Outlet	29	3	125 min.	60 ft ³

Results Summary

Tables 1-4 through 1-6 (on pages 1-5 and 1-6) summarize the units to be reported. The emission limits are from Subpart Cb Emission Guidelines and Compliance Times for Large Municipal Waste Combustors That Are Constructed on or Before September 20, 1994 - final rules published December 19, 1995, as modified on August 25, 1997 (for NO_x) and April 28, 2009, along with each facility's Title V permit.

PROJECT OVERVIEW**SCOPE OF WORK (CONTINUED)**

**Table 1-4:
Summary of Stack Test Reporting Units**

<u>Source</u> Constituent	Sampling Method	Reporting Units	Limit ¹
<u>FF Outlets</u>			
Particulate Particulate (PSD Limit)	EPA 5	mg/dscm @ 7% O ₂	25
	EPA 5	mg/dscm @ 7% O ₂	27
Total PCDD/PCDFs	EPA 23	ng/dscm @7%O ₂	30
Hydrogen chloride ²	EPA 26A ³	ppmdv @ 7%O ₂ % Reduction	29 ² or >95
Cadmium Cadmium (PSD Limit)	EPA 29	mg /dscm @ 7%O ₂	0.035
	EPA 29	mg /dscm @ 7%O ₂	0.040
Lead Lead (PSD Limit)	EPA 29	mg /dscm @ 7%O ₂	0.40
	EPA 29	mg /dscm @ 7%O ₂	0.44
Mercury Mercury (PSD Limit)	EPA 29	µg/dscm @ 7%O ₂	50
	EPA 29	µg/dscm @ 7%O ₂	70
<u>Stacks</u>			
Visual Emissions	COMS	percent	10
<u>Ash Handling System</u>			
Fugitive Visual Emissions	EPA 22	percent	5 ⁴
<u>Lime Silo</u>			
Visual Emissions	EPA 9	percent	5

¹ Limits obtained from each facility's Title V Permit (0112120-010-AV North/0112119-015-AV South) and from the PSD limits (as notated). The HCl and PCDD/PCDF limits are both NSPS and PSD limits.

² Hydrogen chloride concentrations will be measured at the SDA Inlet and FF Outlet concurrently. A removal efficiency will be calculated using ppmdv @ 7%O₂ for hydrogen chloride. Limits are the less stringent of the outlet concentration or % reduction.

³ Hydrogen chloride concentrations will be measured with a modified Method 26A sampling train at the SDA inlet. These trains will utilize single point constant rate sampling.

⁴ Visible emissions (5% opacity) no more than 5% of the observation time, excluding periods of maintenance or repair.

⁵ The lb/10⁶ BTU calculation will use an Fd value of 9570 (dscf/10⁶BTU) per EPA Method 19.

PROJECT OVERVIEW

SCOPE OF WORK (CONTINUED)

**Table 1-5:
 Summary of Relative Accuracy Test Reporting Units**

<u>Location</u> Constituent Units	Sampling Method	Limit ¹
<u>FF Outlet</u>		
Nitrogen Oxides @ 7% O ₂ CEM Relative Accuracy	EPA 7E, PS2	20 percent of RM or 10 percent of Standard
Sulfur Dioxide @ 7% O ₂ CEM Relative Accuracy	EPA 6C, PS2	20 percent of RM or 20 percent of Standard ²
Carbon Monoxide @ 7% O ₂ CEM Relative Accuracy	EPA 10, PS2 and 4A	10 percent of RM or 5 ppm Mean Difference
Carbon Dioxide lb/hr CEM Relative Accuracy	EPA 3A, PS6	20 percent of RM

¹ Limits obtained from 40 Code of Federal Register part 60 Appendix B PS 2, Section 13.2 and 4A, Section 13.2.

² The 29 ppm SO₂ limit is equivalent to ~0.069 lb/MMBtu and, therefore, qualifies for the alternate SO₂ RATA criteria of 20% of the standard (limit).

**Table 1-6:
 Operating Data to be Reported**

Process Condition

Maximum Demonstrated Combustor Load (klbs/hr)¹

Maximum Particulate Control Device Inlet Temperature (°F)²

Carbon Feed Rate (lbs/hr)³

¹ From 40 CFR 60.58b (i) (8) the maximum demonstrated load during PCDDs/PCDFs testing, highest four-hour block average. This will be revised only on the one unit tested.

² From 40 CFR 60.58b (i) (9) the highest four-hour average during PCDDs/PCDFs testing. This will be revised only on the one unit tested.

³ From 40 CFR 60.58b (m)(1)(i) an average mass carbon rate during mercury (South Broward only) or dioxin testing. The minimum carbon feed rate is established as the lower of the average carbon feed rates measured during the mercury or dioxin testing.

PROJECT OVERVIEW

1-7

SCOPE OF WORK (CONTINUED)***Discussion of Test Program***

Operational constraints may cause Wheelabrator North and/or South Broward to modify the corresponding schedule or personnel during each testing week. The referenced field coordinators may change, depending on CleanAir and plant staffing. Currently, the testing is scheduled to take place at South Broward from March 20 through 22, 2012, and at North Broward from March 26 through 28, 2012.

During all compliance testing, the unit being tested will be operated within 10% of the plants' maximum steam flow of 192,000 lbs/hr for South Broward and 186,000 lbs/hr for North Broward. The steam flow for each test will be reported in the final compliance report.

Other parameters recorded during testing are further outlined in Section 2 on page 2-3. All testing will be done in accordance with 40 CFR 60.58b and F.A.C. 62-297. A final report will be issued within 40 days of the last compliance test date.

During each dioxin test run, the steam flow and FF Inlet temperature will be recorded and averaged by the Bailey Net 90 system to determine the maximum combustor load and particulate control device temperature required by 40 CFR 60.58b. The lower average carbon injection rate during the dioxin or mercury test runs will be used to establish the minimum carbon feed rate for each unit. These reporting requirements are outlined in Table 1-6 on the previous page.

At North and South Broward, only one (1) unit will be tested for PCDD/PCDF, per the alternative performance testing schedule in Section 60.38b of Subpart Cb. The maximum demonstrated load and FF Inlet temperature limit will be revised only on the one unit tested. Unit 1 will be tested at both facilities during the 2012 test program. Methylene chloride will be omitted in the Method 23 sample recovery, per approved Alternative Test Method 052 (ALT-052).

The carbon dioxide (CO₂) CERMS RATA will be performed along with the yearly sulfur dioxide (SO₂), nitrogen oxides (NO_x) and carbon monoxide (CO) concentration based (ppm 7% O₂) RATA and will utilize flow data obtained from a distinct pitot traverse performed during each RATA run. Moisture data will be obtained from simultaneous Modified Method 26A testing as well as Method 4 runs, as necessary, to obtain nine (9) to twelve (12) CERMS RATA runs.

To determine the O₂ concentration, CO₂ concentration and gas molecular weight for all isokinetic compliance testing, a time-integrated sample of the gas will be obtained for each sampling train and analyzed in accordance with EPA Method 3A.

PROJECT OVERVIEW

1-8

SCOPE OF WORK (CONTINUED)

The gas sample will be collected in a vinyl sample bag from each isokinetic test method. The contents of the bag will be analyzed for O₂ and CO₂ concentrations, using O₂/CO₂ continuous monitoring analyzers calibrated with EPA Protocol gases. A linearity and bias check will be performed on the analyzers prior to any analysis. All data will be stored using CleanAir's CEM data acquisition system (DAS). If deemed necessary due to analyzer malfunction or other problems, the bags will be analyzed using an Orsat analyzer, per EPA Method 3B.

Opacity Performance Tests

As allowed under Title V Conditions B.53(6), B.76 and B.81 for South Broward and B.54(6), B.77 and B.82 for North Broward, compliance with the opacity standard will be demonstrated, using the certified continuous opacity monitor system (COMS) installed on each unit, in lieu of conducting EPA Reference Method 9 test, as provided under 40 CFR 60.11 (e).

For the purpose of determining compliance with the opacity standard during a performance test using COMS data, the minimum total time of COMS data collection will consist of the average of all six-minute continuous periods within the duration of the Method 5/29 particulate tests. The COMS data printout will be included in the test reports.

Test Method Modifications

Method 5 will be combined with Method 29 for particulate and metals compliance. Metals and particulate matter sampling can be combined, as referenced in Method 29 Section 1.2 Principle, "This method may be used to determine particulate emissions in addition to the metals emissions if the prescribed procedures and precautions are followed". A more detailed description of Method 5/29 procedures is detailed in Appendix A of this protocol.

Four (4) Method 29 test runs for mercury will be performed at the FF Outlets on all three (3) units, at each plant, during the annual and quarterly (North only) mercury compliance testing. The average of all four (4) runs will be used to determine compliance with limits.

Sixty-minute Method 26A sample trains at the SDA Inlets and FF Outlets will be utilized to exhibit compliance with each unit's HCl limit(s). Method 26A will be modified to a single-point constant sampling rate at both test locations. This approach was accepted by Errin Prichard of the FDEP in an e-mail dated September 29, 2009. A copy of the e-mail is presented in Appendix C of this test protocol.

End of Section 1 – Project Overview