

2003 PM10 Plan Appendix G, Exhibit D

Supplemental BACM Analysis for Rule 4352 - Solid Fuel Fired Boilers, Steam Generators, and Process Heaters

Added December 18, 2003

Introduction

The Best Available Control Measures (BACM) Analysis was prepared to determine if units subject to District Rule 4352 (Solid Fuel Fired Boilers, Steam Generators, and Process Heaters) meet EPA BACM requirements for this class and category of sources. The EPA Technology Transfer Network Clean Air Technology Center RACT/BACT/LAER Clearinghouse (EPA TTN RLBC) was used to identify BACM controls and limits for this category. Units listed in the Clearinghouse that were closest in heat input rating to the units subject to Rule 4352 are assumed to be the BACM criteria for that class and category.

Background

This rule applies to any boiler, steam generator or process heater fired on solid fuel, and part of a major NO_x source. Additional energy may also be supplied by supplemental liquid or gaseous fuels for start-ups, shutdowns, and during other flame stabilization periods, as deemed necessary by the owner/operator and as allowed by permit condition.

The BACM analysis was prepared to determine if emission reductions could be obtained by amending Rule 4352 to include BACM emission levels. Rule 4352 affects 15 permitted units. Nine units of those units operate on biomass fuels and six units operate on coal. Current emission controls on these units include Selective Catalytic Reduction (SCR), Selective Non-Catalytic Reduction (SNCR), Electrostatic Precipitator (ESP), Baghouses, Limestone and Sand Injection, Low-NO_x Burners, and Flue Gas Recirculation (FGR).

The analysis compared the emission rates from the permitted units with similar units listed in the EPA Clearinghouse, which represent federal BACT for their respective class and category and is presumed to therefore represent an appropriate BACM. As shown below, the analysis demonstrates that units subject to the District rule meet or exceed the federal BACM level of emission controls. Since all permitted units are equipped with BACM controls, no additional emission reductions would be expected by amending the rule.

Inventory of Permitted units in the District

There are 15 permitted solid-fuel fired sources in the District. Nine units operate on biomass fuels and six on coal. The units were divided into four groups based on size and fuel type:

- Small Biomass (SB) One unit <100 MMBtu and firing on biomass,
- Medium Biomass: (MB) Two units rated between 100 to 250 MMBtu and firing on biomass,

- Large Biomass: (LB) Six units rated >250 MMBtu and firing on biomass, and
- Large Coal-fired (LC) Six units rated >250 MMBtu and fired on coal.

Summary of Findings

BACM requirements were gathered from the EPA TTN RLBC referencing the units in the clearinghouse that were closest in heat input rating to the units in the District inventory.

- Table 1 contains the summary of Federal RACT/BACT/LAER limits. Details of the information used to create this table are shown in Table 3 through 6.
- Table 2 contains the summary of District units and shows if the units meet the BACM level.

Based on this analysis, the 15 existing solid-fuel fired boilers are operating with emissions which are at or below the presumed EPA BACM limits. Therefore, no additional reductions would be realized by amending District Rule 4352 to include those limits and the Clean Air ACT BACM requirement is satisfied.

**Table 1 Summary of EPA BACM Limits
(in LB/MMBtu)**

<i>Group</i>	<i>NOx</i>	<i>SOx</i>	<i>VOC</i>	<i>PM</i>
Large Biomass (LB)	0.25	0.12	0.16	0.07
Medium Biomass (MB)	0.22	0.11	0.12	0.11
Small Biomass (SB)	0.45	0.01	0.06	0.14
Large Coal-fired (LC)	0.26	0.36	0.02	0.02

**Table 2 Summary of Emission Limits for District Units
 (in LB/MMBtu)**

Unit #	Group	NOx	SOx	VOC	PM	Meets BACT
BACT	Large Biomass	.25	.12	.16	.07	
1		.1	.02	.05	.02	Yes
2		.1	.03	.02	.05	Yes
3		.08	.03	.03	.02	Yes
4		.08	.03	.03	.02	Yes
5		.1	.03	.02	.04	Yes
6		.1	.06	.05	.02	Yes
BACT	Medium Biomass	.22	.11	.12	.11	
7		.1	.061	.066	.005	Yes
8		.09	.05	.07	.03	Yes
BACT	Small Biomass	.45	.01	.06	.14	
9		.33	.017	.008	.03	Yes
BACT	Large Coal	.26	.36	.02	.02	
10		.2	.09	.02	.01	Yes
11		.2	.09	.003	.02	Yes
12		.04	.29	.02	.02	Yes
13		.04	.29	.02	.02	Yes
14		.1	.04	.015	.01	Yes
15		.1	.04	.015	.01	Yes

Detailed Information Tables:

The following tables detail the EPA Clearinghouse information used to calculate the BACM limits summarized in Table 1.

- Emission limits were converted to lb/MMBtu where limits were given in the Clearinghouse as lb/hr.
- If limits were given in terms of lb/MMBtu, the lb/hr were not included in the tables.
- If the Clearinghouse did not list an emission factor for a specific pollutant, the term "N/A" was included in the table.

**Table 3: Federal RACT/BACT/LAER
Large Biomass (>250 MMBtu)**

MMBtu	NOx LIMITS		VOC		SOx		PM10	
	Emissions (LB/H)	Emissions (LB/MMBTU)	Emissions (LB/H)	Emissions (LB/MMBTU)	Emissions (LB/H)	Emissions (LB/MMBTU)	Emissions (LB/H)	Emissions (LB/MMBTU)
275	63.25	0.23	27.5	0.1	8.25	0.03		0.1
280		0.2	21.2	0.073		0.002	10.45	0.038
291	87.2	0.3	9.45	0.03		0.06		0.24
315		0.25	47	0.1	38.9	0.12	11.4	0.036
362		0.54		0.5	49.5	0.1	23.5	0.05
470	141	0.3	42.9	0.06		0.05		0.15
633		0.2	34.5	0.5	62	0.1	21.5	0.03
715	107.3	0.15	157	0.212		0.1	17.4	0.024
718	180	0.25	23.3	0.03		0.01	22	0.03
738	185	0.25	9.1	0.007	185	0.25	39	0.03
760		0.14	27.5	0.1		0.05	20.75	0.07
775	232.5	0.3	21.2	0.073	355.7	0.46		0.1
1300	260	0.2	9.45	0.03	351	0.27	10.45	0.038
AVG	157	0.25	41.33	0.16	150.05	0.12	20.75	0.07

**Table 4: Federal RACT/BACT/LAER
 Medium Biomass (100<X<250 MMBtu)**

MMBtu	NOx LIMITS		VOC		SOx		PM10	
	Emissions (LB/H)	Emissions (LB/MMBTU)	Emissions (LB/H)	Emissions (LB/MMBTU)	Emissions (LB/H)	Emissions (LB/MMBTU)	Emissions (LB/H)	Emissions (LB/MMBTU)
120		0.4	94.6	0.18		0.47		0.15
159	39.9	0.25	N/A	N/A	N/A	N/A	15.9	0.1
175	24.5	0.14	2.7	.12	6.6	0.04	8.14	0.05
200		0.2	N/A	N/A		0.002		0.24
244		0.3		.02	6.21	0.017	24.4	0.1
245	5.63	0.023	N/A	N/A		.025	N/A	N/A
245.3	56.4	0.23	56.4	0.23	N/A	N/A	8.6	0.035
AVG	48.15	0.22	51.23	0.14	6.405	0.11	14.26	0.11

**Table 5: Federal RACT/BACT/LAER
 Small Biomass (<=100 MMBtu)**

MMBtu	NOx LIMITS		VOC		SOx*		PM10	
	Emissions (LB/H)	Emissions (LB/MMBTU)	Emissions (LB/H)	Emissions (LB/MMBTU)	Emissions (LB/H)	Emissions (LB/MMBTU)	Emissions (LB/H)	Emissions (LB/MMBTU)
28.7		0.604		0.01		0.01		0.2
29.5	13.57	0.23	N/A	N/A	0.09	0.002	7.2	0.24
29.63	8.9	0.3	3	0.1	0.8	0.01	11.6	0.29
40	57.2	1.43	0.48	0.01		0.008		0.1
84	35	0.4		0.05	N/A	N/A	10.1	0.12
88.6		0.35	10	0.1	N/A	N/A		0.036
90		0.23		0.07	N/A	N/A	4.5	0.1
91	13.7	0.23	4.6	0.05	N/A	N/A	13.7	0.15
98	29.4	0.3	9.8	0.1	N/A	N/A	1.48	0.0156
	N/A	N/A	N/A	N/A	N/A	N/A	9.8	0.1
AVG	29.8675	0.45	5.58	0.06	.445	.01	8.34	.14

* SOx emissions in this category is a function of sulfur content inherent to the type of fuel burned. The units listed in the EPA Clearinghouse did not have any SOx controls. Therefore, BACM for this class and category is considered to be uncontrolled burning of the biomass and the District unit, which burns walnut hulls is presumed to meet this BACM control level.

**Table 6: Federal RACT/BACT/LAER
 Large Coal (>250 MMBtu)**

MMBtu	NOx LIMITS		VOC		SOx		PM10	
	Emissions (LB/H)	Emissions (LB/MMBTU)	Emissions (LB/H)	Emissions (LB/MMBTU)	Emissions (LB/H)	Emissions (LB/MMBTU)	Emissions (LB/H)	Emissions (LB/MMBTU)
423		0.3	N/A	N/A	N/A	N/A	N/A	N/A
454		0.1	11.6	0.03	54.1	0.022	36.9	0.015
520		0.3	N/A	N/A	N/A	N/A	N/A	N/A
700		0.42	22.4	0.032	490	0.7	17.5	0.025
799		0.2		0.006	N/A	N/A	N/A	N/A
AVG		0.26	17	.02	272.035	.36	27.2	.02