Appendix G

Beyond the Floor for New Sources Tables

PCDD/PCDF
PM
Hg
SVM
LVM
Total Chlorine

D/F BTF Evaluation for New Sources

Combustor Category	Model Plant Size	Model Plant Sizes Flowrate acfm	Model Plant Sizes Flowrate dscfm	Floor Stnd ug/dscm	Floor Control	BTF Stnd ug/dscm	BTF Control	TAC ($/yr) Floor	TAC ($/yr) BTF	Emiss (g/yr) Floor	Emiss (g/yr) BTF	BTF Cost Eff ($/ton)	Non-Air Impacts Elect kW-h/yr	Non-Air Impacts Nat Gas trill Btu/yr	Non-Air Impacts Water 1000 gal/yr	Non-Air Impacts Solid Waste tons/yr	Non-Air Impacts Waste Water 1000 gal/yr
Incinerators																	
Dry APCD or WHB	Avg	26,810	15,327	0.11	GOP	0.06	CB/RH		221,637	0.026	0.013	16,936,181	326,040	17.3		23.4	
	Min	1,098	979	0.11	GOP	0.06	CB/RH		82,393	0.002	0.001	98,532,275					
Others	Avg	26,810	15,327	0.20	GOP	0.10	CB/RH		221,637	0.048	0.024	9,314,899	326,040	17.3		23.4	
	Min	1,098	979	0.20	GOP	0.10	CB/RH		82,393	0.003	0.002	54,192,751					
CK	Avg	251,599	105,673	0.21	GOP	0.11	CI/FF		1,000,354	0.345	0.172	5,807,380	1,921,080			407.2	
	Min	92,931	44,047	0.21	GOP	0.11	CI/FF		437,123	0.144	0.072	6,088,008					
LWAK	Avg	40,464	26,446	1.30	GOP	0.40	CI/FF		261,048	0.534	0.164	706,480	392,461			101.9	
	Min	32,672	20,473	1.30	GOP	0.40	CI/FF		224,573	0.413	0.127	785,066					
Liquid Fuel Boiler																	
Dry APCD	Avg	74,974	40,832	0.02	GOP	0.01	CI		151,614	0.010	0.005	31,890,597	99,502			122.3	
	Min	3,159	1,602	0.02	GOP	0.01	CI		36,545	0.000	0.000	195,883,431					
Others	Avg	74,974	40,832	0.30	GOP	0.20	CI		151,614	0.190	0.127	2,391,795	99,502			123.3	
	Min	3,159	1,602	0.30	GOP	0.20	CI		36,545	0.007	0.005	14,691,257					
Solid Fuel Boiler	Avg	158,604	90,551	0.30	GOP	0.15	CI		284,169	0.422	0.211	1,347,643	99,502			271.3	
	Min	45,444	22,583	0.30	GOP	0.15	CI		101,677	0.105	0.053	1,933,435					
HCl Prod Furn	Avg	13,865	9,184	5.00	GOP	0.40	CB/RH		152,377	0.713	0.057	232,332	136,546	9.2		9.0	
	Min	1,334	1,112	5.00	GOP	0.40	CB/RH		84,206	0.086	0.007	1,060,699					

GOP: Good operating practices (efficient combustion, temperature control of flue gas)
CI: Carbon injection
CB/RH: Carbon bed, gas reheat

Controls and costs to meet floor are required for BTF (required in addition to BTF)
BTF CI costs are incremental (additional) to those required for the floor
BTF CE is determined based on the additional BTF costs and additional emissions reductions

Floor for Solid Fuel Boilers and HCl PFs based on highest expected level associated with good combustion practices

PM BTF Evaluation for New Sources

Combustor Category	Model Plant Size	Model Plant Sizes Flowrate acfm	Model Plant Sizes Flowrate dscfm	Floor Stnd ug/dscm	Floor Control	BTF Stnd ug/dscm	BTF Control	TAC ($/yr) Floor	TAC ($/yr) BTF	Emiss (ton/yr) Floor	Emiss (ton/yr) BTF	BTF Cost Eff ($/ton)	Non-Air Impacts Elect kW-h/yr	Non-Air Impacts Nat Gas trill Btu/yr	Non-Air Impacts Water 1000 gal/yr	Non-Air Impacts Solid Waste tons/yr	Non-Air Impacts Waste Water 1000 gal/yr
Incinerator	Avg	26,810	15,327	0.001	FF	0.0005	Adv FF	178,111	258,211	0.30	0.15	533,508	189,599			0.2	
	Min	1,098	979	0.001	FF	0.0005	Adv FF	56,439	97,106	0.02	0.01	4,239,028					
CK	Avg	251,599	105,673	0.006	FF	0.0030	Adv FF	1,243,110	1,624,643	12.42	6.21	61,429	1,821,578			6.2	
	Min	92,931	44,047	0.006	FF	0.0030	Adv FF	487,750	659,164	5.18	2.59	66,211					
LWAK	Avg	40,464	26,446	0.010	FF	0.0050	Adv FF	245,692	351,052	5.18	2.59	40,670	292,959			2.6	
	Min	32,672	20,473	0.010	FF	0.0050	Adv FF	207,388	298,792	4.01	2.01	45,576					
Liquid Fuel Boiler	Avg	74,974	40,832	0.008	FF	0.0040	Adv FF	406,757	559,030	6.40	3.20	47,587	542,813			3.2	
	Min	3,159	1,602	0.008	FF	0.0040	Adv FF	65,763	108,941	0.25	0.13	343,850					
Solid Fuel Boiler	Avg	158,604	90,551	0.040	ESP	0.0150	FF	529,677	813,511	70.96	26.61	6,400	1,148,290			44.4	
	Min	45,444	22,583	0.040	ESP	0.0150	FF	260,664	264,276	17.70	6.64	327					
HCl Prod Furn	Avg	13,865	9,184	NA													
	Min	1,334	1,112	NA													

Adv FF : Advanced fabric filter using high efficiency membrane bag material and low A/C ratio
NA: There is no PM floor standard for HCl Prod Furn; Cl is used as a surrogate.
BTF CE calculated as the ratio of the difference in cost to meet floor and BTF, and emissions reductions achieved by BTF

Hg BTF Evaluation for New Sources

Combustor Category	Model Plant Size	Model Plant Sizes Flowrate acfm	dscfm	Floor Stnd ug/dscm	Floor Control	BTF Stnd ug/dscm	BTF Control	TAC ($/yr) Floor	BTF	Emiss (ton/yr) Floor	BTF	BTF Cost Eff ($/ton)	Non-Air Impacts Elect kW-h/yr	Nat Gas trill Btu/yr	Water 1000 gal/yr	Solid Waste tons/yr	Waste Water 1000 gal/yr
Incinerators	Avg	26,810	15,327	8.0	WS, FC	4.0	CB/RH	221,637	0.0021	0.0010	2.11E+08	326,040	17.3			23.4	
	Min	1,098	979	8.0	WS, FC	4.0	CB/RH	82,393	0.0001	0.0001	1.23E+09						
CK	Avg	251,599	105,673	35.0	FC	10.5	CI/FF	1,000,354	0.0632	0.0190	2.26E+07	1,921,080				407.2	
	Min	92,931	44,047	35.0	FC	10.5	CI/FF	437,123	0.0264	0.0079	2.37E+07						
LWAK	Avg	40,464	26,446	67.0	FC	20.1	CI/FF	261,048	0.0303	0.0091	1.23E+07	392,461				101.9	
	Min	32,672	20,473	67.0	FC	20.1	CI/FF	224,573	0.0235	0.0070	1.37E+07						
Liquid Fuel Boiler	Avg	74,974	40,832	0.4	WS, FC	0.2	CI	151,614	0.0003	0.0001	1.07E+09	99,502				122.3	
	Min	3,159	1,602	0.4	WS, FC	0.2	CI	36,545	0.0000	0.0000	6.56E+09						
Solid Fuel Boiler	Avg	158,604	90,551	10.0	FF/ESP, FC	5.0	CI	284,169	0.0155	0.0077	3.67E+07	99,502				271.3	
	Min	45,444	22,583	10.0	FF/ESP, FC	5.0	CI	101,677	0.0039	0.0019	5.27E+07						
HCl Prod Furn	Avg	13,865	9,184	NA													
	Min	1,334	1,112	NA													

CI: Carbon injection, provides 70% additional control beyond floor for CK and LWAKs, 50% for incinerators, LFB, and SFBs
CB/RH: Carbon bed, reheat
Controls and costs to meet floor are independent of BTF CI
BTF CI costs are incremental (additional) to those required for the floor
BTF CE is determined as the additional CI costs and additional emissions reductions
NA: There is no SVM floor standard for HCl Prod Furn; CI is used as a surrogate.
For Liq Blrs, thermal emissions converted to ug/dscm

SVM BTF Evaluation for New Sources

Combustor Category	Model Plant Size	Model Plant Sizes Flowrate acfm	Model Plant Sizes Flowrate dscfm	Floor Stnd ug/dscm	Floor Control	BTF Stnd ug/dscm	BTF Control	TAC ($/yr) Floor	TAC ($/yr) BTF	Emiss (ton/yr) Floor	Emiss (ton/yr) BTF	BTF Cost Eff ($/ton)	Non-Air Impacts Elect kW-h/yr	Non-Air Impacts Nat Gas trill Btu/yr	Non-Air Impacts Water 1000 gal/yr	Non-Air Impacts Solid Waste tons/yr	Non-Air Impacts Waste Water 1000 gal/yr
Incinerator	Avg	26,810	15,327	6.5	FF, FC	3.3	Adv FF	178,111	258,211	0.002	0.001	94,052,187	189,599			0.2	
	Min	1,098	979	6.5	FF, FC	3.3	Adv FF	56,439	97,106	0.000	0.000	747,298,775					
CK	Avg	251,599	105,673	66.3	FF, FC	26.5	Adv FF	1,243,110	1,624,643	0.120	0.048	5,307,781	1,821,578			6.2	
	Min	92,931	44,047	66.3	FF, FC	26.5	Adv FF	487,750	659,164	0.050	0.020	5,720,993					
LWAK	Avg	40,464	26,446	25.7	FF, FC	12.8	Adv FF	245,692	351,052	0.012	0.006	18,156,145	292,959			3.1	
	Min	32,672	20,473	25.7	FF, FC	12.8	Adv FF	207,388	298,792	0.009	0.004	20,346,269					
Liquid Boiler	Avg	74,974	40,832	4.6	FF, FC	2.1	Adv FF	406,757	559,030	0.003	0.001	88,669,298	542,813			2.4	
	Min	3,159	1,602	4.6	FF, FC	2.1	Adv FF	65,763	108,941	0.000	0.000	640,694,979					
Coal Boiler	Avg	158,604	90,551	170.0	ESP, FC	70.8	FF	529,677	813,511	0.263	0.110	1,848,836	1,148,290			44.4	
	Min	45,444	22,583	170.0	ESP, FC	70.8	FF	260,664	264,276	0.066	0.027	94,336					
HCl Prod Furn	Avg	13,865	9,184	NA													
	Min	1,334	1,112	NA													

Adv FF : Advanced fabric filter using high efficiency membrane bag material and low A/C ratio
FC: Feedrate control of SVM
NA: There is no SVM floor standard for HCl Prod Furn; Cl is used as a surrogate.
BTF CE calculated as the ratio of the difference in cost to meet floor and BTF, and emissions reductions achieved by BTF
For liquid blrs, CK, LWAK, thermal emissions converted to ug/dscm

LVM BTF Evaluation for New Sources

Combustor Category	Model Plant Size	Model Plant Sizes Flowrate acfm	Model Plant Sizes Flowrate dscfm	Floor Stnd ug/dscm	Floor Control	BTF Stnd ug/dscm	BTF Control	TAC ($/yr) Floor	TAC ($/yr) BTF	Emiss (ton/yr) Floor	Emiss (ton/yr) BTF	BTF Cost Eff ($/ton)	Non-Air Impacts Elect kW-h/yr	Non-Air Impacts Nat Gas trill Btu/yr	Non-Air Impacts Water 1000 gal/yr	Non-Air Impacts Solid Waste tons/yr	Non-Air Impacts Waste Water 1000 gal/yr
Incinerator	Avg	26,810	15,327	8.9	FC, FF	4.5	Adv FF	178,111	258,211	0.002	0.001	68,689,799	189,598.9			0.2	
	Min	1,098	979	8.9	FC, FF	4.5	Adv FF	56,439	97,106	0.000	0.000	545,780,004					
CK	Avg	251,599	105,673	15.0	FC, FF	6.0	Adv FF	1,243,110	1,624,643	0.027	0.011	23,505,888	1,821,577.5			6.2	
	Min	92,931	44,047	15.0	FC, FF	6.0	Adv FF	487,750	659,164	0.011	0.005	25,335,825					
LWAK	Avg	40,464	26,446	34.2	FC, FF	17.1	Adv FF	245,692	351,052	0.015	0.008	13,617,109	292,958.8			3.1	
	Min	32,672	20,473	34.2	FC, FF	17.1	Adv FF	207,388	298,792	0.012	0.006	15,259,702					
Liquid Boiler	Avg	74,974	40,832	38.5	FC, FF	17.9	Adv FF	406,757	559,030	0.027	0.013	10,591,055	542,812.6			2.4	
	Min	3,159	1,602	38.5	FC, FF	17.9	Adv FF	65,763	108,941	0.001	0.000	76,527,456					
Coal Boiler	Avg	158,604	90,551	190.0	FC, ESP	79.2	FF	529,677	813,511	0.294	0.123	1,654,222	1,148,290.4			44.4	
	Min	45,444	22,583	190.0	FC, ESP	79.2	FF	260,664	264,276	0.073	0.031	84,406					
HCl Prod Furn	Avg	13,865	9,184	NA													
	Min	1,334	1,112	NA													

Adv FF : Advanced fabric filter using high efficiency membrane bag material and low A/C ratio
FC: Feedcontrol of LVM
NA: There is no LVM floor standard for HCl Prod Furn; Cl is used as a surrogate.
BTF CE calculated as the ratio of the difference in cost to meet floor and BTF, and emissions reductions achieved by BTF
For liquid blrs, CK, LWAK, thermal emissions are converted (estimated) to ug/dscm

CI BTF Evaluation for New Sources

Combustor Category	Model Plant Size	Model Plant Sizes Flowrate acfm	dscfm	Floor Stnd ug/dscm	Floor Control	BTF Stnd ug/dscm	BTF Control	TAC ($/yr) Floor	BTF	Emiss (ton/yr) Floor	BTF	BTF Cost Eff ($/ton)	Non-Air Impacts Elect kW-h/yr	Nat Gas trill Btu/yr	Water 1000 gal/yr	Solid Waste tons/yr	Waste Water 1000 gal/yr
Incinerator	Avg	26,810	15,327	0.2	WS, FC	0.1	Imp WS	212,950	0.04	0.02	12,039,145	466,933.3		50,280.4			50,280.4
	Min	1,098	979	0.2	WS, FC	0.1	Imp WS	66,117	0.00	0.00	58,498,335						
CK	Avg	251,599	105,673	78.0	FC	39.0	WS	1,206,811	105.69	52.85	22,836	4,486,075.4		483,070.3			483,070.3
	Min	92,931	44,047	78.0	FC	39.0	WS	529,072	44.06	22.03	24,018						
LWAK	Avg	40,464	26,446	600.0	FC	150.0	DS/FF	418,996	203.47	50.87	2,746	304,203.4		2,698.7	23.3		
	Min	32,672	20,473	600.0	FC	150.0	DS/FF	342,609	157.52	39.38	2,900						
Liquid Fuel Boiler	Avg	74,974	40,832	0.5	WS, FC	0.3	WS	440,269	0.27	0.13	3,275,953	1,336,807.4		143,950.3			143,950.3
	Min	3,159	1,602	0.5	WS, FC	0.3	WS	82,441	0.01	0.01	15,631,641						
Solid Fuel Boiler	Avg	158,604	90,551	73.0	FC	36.5	DS	606,328	84.76	42.38	14,306	38,501.4		9,240.3	2.3		
	Min	45,444	22,583	73.0	FC	36.5	DS	166,896	21.14	10.57	15,790						
HCl Prod Furn	Avg	13,865	9,184	1.2	WS	0.6	Imp WS	146,421	0.14	0.07	2,072,172	247,223.0		26,621.5			26,621.5
	Min	1,334	1,112	1.2	WS	0.6	Imp WS	68,220	0.02	0.01	7,976,120						

Imp WS: Improved wet scrubber
DS: Dry scrubber
WS: Wet scrubber
BTF costs are additional (incremental) to those required to meet floor
For liquid blrs, thermal emissions converted to ppmv