

Table 12.6a – Sulfur Dioxide Uncontrolled Emission Factors, Electricity Generators

Fuel	Emissions Units ¹	Boiler Type/Firing Configuration					All Other
		Cyclone	Fluidized Bed	Opposed Firing	Spreader Stoker	Tangential	
Agricultural Byproducts	Lbs per ton	0.08	0.01	0.08	0.08	0.08	0.08
Blast Furnace Gas	Lbs per MMCF	3.5	0.35	3.5	3.5	3.5	3.5
Bituminous Coal*	Lbs per ton	38	3.1	38	38	38	38
Black Liquor	Lbs per ton ***	7	0.7	7	7	7	7
Distillate Fuel Oil*	Lbs per MG	142	14.2	142	142	142	142
Jet Fuel*	Lbs per MG	142	14.2	142	142	142	142
Kerosene*	Lbs per MG	142	14.2	142	142	142	142
Landfill Gas	Lbs per MMCF	3.5	0.35	3.5	3.5	3.5	3.5
Lignite Coal*	Lbs per ton	30	1	30	30	30	30
Municipal Solid Waste	Lbs per ton	1.7	0.17	1.7	1.7	1.7	1.7
Natural Gas	Lbs per MMCF	0.6	0.06	0.6	0.6	0.6	0.6
Other Biomass Gas	Lbs per MMCF	3.5	0.35	3.5	3.5	3.5	3.5
Other Biomass Liquids	Lbs per MG	1.42	1.42	1.42	1.42	1.42	1.42
Other Biomass Solids	Lbs per ton	0.08	0.01	0.08	0.08	0.08	0.08
Other Gases	Lbs per MMCF	3.5	0.35	3.5	3.5	3.5	3.5
Other	Lbs per MMCF	0.6	0.06	0.6	0.6	0.6	0.6
Petroleum Coke*	Lbs per ton	39	3.9	39	39	39	39
Propane Gas	Lbs per MMCF	0.6	0.06	0.6	0.6	0.6	0.6
Residual Fuel Oil*	Lbs per MG	157	15.7	157	157	157	157
Synthetic Coal*	Lbs per ton	38	3.1	38	38	38	38
Sludge Waste	Lbs per ton	2.8	0.28	2.8	2.8	2.8	2.8
Subbituminous Coal*	Lbs per ton ***	35	3.1	35	38	35	35
Tire Derived Fuel*	Lbs per ton	38	3.8	38	38	38	38
Waste Coal*	Lbs per ton	38	3.1	38	38	38	38
Wood Waste Liquids	Lbs per MG	1.42	1.42	1.42	1.42	1.42	1.42
Wood Waste Solids	Lbs per ton	0.08	0.01	0.08	0.08	0.08	0.08
Waste Oil*	Lbs per MG	147	14.7	147	147	147	147

Source: EIA, *Electric Power Annual 2004*, DOE/EIA-0348(2004) November 2005, Table A1.

Notes:

¹ Lbs = pounds, MMCF = million cubic feet, MG = thousand gallons.

* For these fuels, emissions are estimated by multiplying the emissions factor by the physical volume of fuel and the sulfur percentage of the fuel (other fuels do not require the sulfur percentage in the calculation). Note that EIA data do not provide a sulfur content for TDF. The value used (1.56 percent) is from <http://www.epa.gov/appcdwww/ptb/EPA-600-R-01-109A.pdf>, Table A-11.

** Source is EPA emission factors reported in <http://www.epa.gov/ttn/chief/ap42/> and <http://www.epa.gov/ttn/chief/software/fire/index.html>.

*** Although SLW and BLQ consist substantially of liquids, these fuels are measured and reported to EIA in tons.

Table 12.6b – Nitrogen Oxide Uncontrolled Emissions Factors, Electricity Generators

Fuel	Emissions Units ²	Boiler Type/Firing Configuration ¹					
		Cyclone	Fluidized Bed	Opposed Firing	Spreader Stoker	Tangential	All Other
Agricultural Byproducts	Lbs per ton	1.20	1.20	1.20	1.20	1.20	1.20
Blast Furnace Gas	Lbs per MMCF	15.40	15.40	15.40	15.40	15.40	15.40
Bituminous Coal	Lbs per ton	33.00	5.00	22.00	11.00	15.0 [14.0]	22.0 [31.0]
Black Liquor	Lbs per ton ***	1.50	1.50	1.50	1.50	1.50	1.50
Distillate Fuel Oil	Lbs per MG	24.00	24.00	24.00	24.00	24.00	24.00
Jet Fuel	Lbs per MG	24.00	24.00	24.00	24.00	24.00	24.00
Kerosene	Lbs per MG	24.00	24.00	24.00	24.00	24.00	24.00
Landfill Gas	Lbs per MMCF	72.40	72.40	72.40	72.40	72.40	72.40
Lignite Coal	Lbs per ton	15.00	3.60	13.00	5.80	7.10	7.1 [13.0]
Municipal Solid Waste	Lbs per ton	5.90	5.90	5.90	5.90	5.90	5.90
Natural Gas	Lbs per MMCF	280.00	280.00	280.00	280.00	170.00	280.00
Other Biomass Gas	Lbs per MMCF	72.40	72.40	72.40	72.40	72.40	72.40
Other Biomass Liquids	Lbs per MG	1.66	1.66	1.66	1.66	1.66	1.66
Other Biomass Solids	Lbs per ton	1.20	1.20	1.20	1.20	1.20	1.20
Other Gases	Lbs per MMCF	14.90	14.90	14.90	14.90	14.90	14.90
Other	Lbs per MMCF	1.50	1.50	1.50	1.50	1.50	1.50
Petroleum Coke	Lbs per ton	21.00	21.00	21.00	21.00	21.00	21.00
Propane Gas	Lbs per MMCF	19.00	19.00	19.00	19.00	19.00	19.00
Residual Fuel Oil	Lbs per MG	47.00	47.00	47.00	47.00	32.00	47.00
Synthetic Coal	Lbs per ton	33.00	5.00	22.00	11.00	15.00	22.00
Sludge Waste	Lbs per ton	5.00	5.00	5.00	5.00	5.00	5.00
Subbituminous Coal	Lbs per ton ***	17.00	5.00	12.00	8.80	8.40	12.0 [24.0]

Tire Derived Fuel	Lbs per ton	33.00	5.00	22.00	11.00	15.00	22.00
Waste Coal	Lbs per ton	21.70	21.70	21.70	21.70	21.70	21.70
Wood Waste Liquids	Lbs per MG	1.66	1.66	1.66	1.66	1.66	1.66
Wood Waste Solids	Lbs per ton	1.50	1.50	1.50	1.50	1.50	1.50
Waste Oil	Lbs per MG	19.00	19.00	19.00	19.00	19.00	19.00

Source: EIA, *Electric Power Annual 2004*, DOE/EIA-0348(2004) November 2005, Table A1.

Notes:

¹ All Dry-Bottom Boilers, Except Wet-Bottom as indicated by values in brackets

² Lbs = pounds, MMCF = million cubic feet, MG = thousand gallons.

** Source is EPA emission factors reported in <http://www.epa.gov/ttn/chief/ap42/> and <http://www.epa.gov/ttn/chief/software/fire/index.html>.

*** Although Sludge Waste and Black Liquor consist substantially of liquids, these fuels are measured and reported to EIA in tons.

Table 12.6c – Uncontrolled Carbon Dioxide Emissions Factors, Electricity Generators

Fuel	Factor (lbs of CO₂ per MMBtu)*
Blast Furnace Gas	116.97
Bituminous Coal	205.45
Distillate Fuel Oil	161.27
Geothermal	0.34
Jet Fuel	159.41
Kerosene	159.41
Landfill Gas	115.12
Lignite Coal	215.53
Municipal Solid Waste	14.63
Natural Gas	116.97
Other Biomass Gas	115.11
Other Gases	141.54
Petroleum Coke	225.13
Propane Gas	139.04
Residual Fuel Oil	173.72
Synthetic Coal	205.45
Subbituminous Coal	212.58
Waste Coal	205.16
Waste Oil	163.61

Source: EIA, *Electric Power Annual 2004*, DOE/EIA-0348(2004), November 2005, Table A1.

* CO₂ factors do not vary by boiler type or firing configuration.