EXHIBIT A

EMISSIONS CALCULATIONS

EXHIBIT A

TABLE OF CONTENTS

LIST OF TABLES

ADDITIONAL INFORMATION

1 Coal Fired Boiler - Stack S1

Basis	Value	Units	Reference
Gross Power Rating - Full Load	930	MW	Plant Washington Specification
Maximum Heat Input - Full Load	8300	MMBtu/hr	Plant Washington Specification
Fuel Oil Burner Rating	1300	MMBtu/hr	Plant Washington Specification
Maximum Expected Hours of Operation	8760	hr/yr	Plant Washington Specification
PM Emission Factor - Coal	0.018	lb/MMBtu	BACT
PM_{10} Emission Factor - Coal	0.018	lb/MMBtu	BACT
PM_{10} Emission Factor Filterable- Coal	0.012	lb/MMBtu	BACT
$PM_{2.5}$ Percentage-Filterable	53.00%		AP 42, Section 1.1 - Particulate Matter Size Distribution
Condensable $PM_{2.5}$ Emission Factor	0.006	lb/MMBtu	Engineering Estimate
SO_2 Emission Factor - Coal	959	lb/hr	BACT (3 hour averaging period) - Section 4.3.5
SO_2 Emission Factor - Coal	0.052	lb/MMBtu	BACT (annual averaging period)
NO_X Emission Factor - Coal	0.05	lb/MMBtu	BACT (30-Day Rolling averaging period)
CO Emission Factor - Coal	0.10	lb/MMBtu	BACT (30-Day Rolling averaging period)
CO Emission Factor - Coal	0.30	lb/MMBtu	BACT (1-hour averaging period)
VOC Coal Emission Factor - Coal	0.003	lb/MMBtu	BACT
H_2SO_4 Emission Factor - Coal	0.004	lb/MMBtu	BACT
Pb Emission Factor - Coal	1.60E-05	lb/MMBtu	BACT-PSD Avoidance Limit
Hg Emission Factor - Coal	1.68E-06	lb/MMBtu	BACT
HF Emission Factor - Coal	2.68E-04	lb/MMBtu	BACT
Exhaust Flow Rate	1,927,690	dscfm	Vendor Specification
Ammonia Slip Concentration	10	ppm	Vendor Guarantee

PM Emissions - Full Load

8300 MMBtu/hr * 0.018 lb/MMBtu / 2,000 lb/ton * 8,760 hr/yr = 654 ton/yr

PM_{10} Emissions - Full Load

8300 MMBtu/hr * 0.018 lb/MMBtu / 2,000 lb/ton * 8,760 hr/yr = 654 ton/yr

PM_{10} (Filterable) Emissions - Full Load

8300 MMBtu/hr * 0.012 lb/MMBtu / 2,000 lb/ton * 8,760 hr/yr = 436 ton/yr

$PM_{2.5}$ (Filterable) Emissions

436 ton/yr * 53.00% = 231 ton/yr

$PM_{2.5}$ (Condensable) Emissions

8300 MMBtu/hr * 0.006 lb/MMBtu / 2,000 lb/ton * 8,760 hr/yr = 218 ton/yr

$PM_{2.5}$ (Filterable + Condensable) Emissions

231 ton/yr + 218 ton/yr = 449 ton/yr

SO_2 Emissions - Full Load (3 hr and 24 hr averaging periods)

959 lb/hr * 8760 hr/yr / 2,000 lb/ton = 4,200 ton/yr

SO_2 Emissions - Full Load (annual averaging periods)

8300 MMBtu/hr * 0.052 lb/MMBtu / 2,000 lb/ton * 8,760 hr/yr = 1,890 ton/yr

NO_X Emissions - Full Load

8300 MMBtu/hr * 0.05 lb/MMBtu / 2,000 lb/ton * 8,760 hr/yr = 1,818 ton/yr

CO Emissions - Full Load (Annual)

8300 MMBtu/hr * 0.10 lb/MMBtu / 2,000 lb/ton * 8,760 hr/yr = 3635.40 ton/yr

CO Emissions - Full Load (1 hr averaging period)

8300 MMBtu/hr * 0.30 lb/MMBtu = 2,490 lb/hr

VOC Emissions - Full Load

8300 MMBtu/hr * 0.003 lb/MMBtu / 2,000 lb/ton * 8,760 hr/yr = 109.1 ton/yr

H_2SO_4 Emissions - Full Load

8300 MMBtu/hr * 0.004 lb/MMBtu / 2,000 lb/ton * 8,760 hr/yr = 145.4 ton/yr

HF Emissions - Full Load

8300 MMBtu/hr * 2.68E-04 lb/MMBtu / 2,000 lb/ton * 8,760 hr/yr = 9.74 ton/yr

Pb Emissions - Full Load

8300 MMBtu/hr * 1.60E-05 lb/MMBtu / 2,000 lb/ton * 8,760 hr/yr = 0.58 ton/yr

Hg Emissions - Full Load

8300 MMBtu/hr * 1.68E-06 lb/MMBtu / 2,000 lb/ton * 8,760 hr/yr = 0.06 ton/yr

Ammonia Emissions - Full Load

1,927,690 dscfm * 10 ppm / 385 dscf/lb-mole * 17 lb/lb-mole * 60 min/hr = 51.07 lb/hr

51.07 lb/hr / 2,000 lb/ton * 8,760 hr/yr = 223.7 ton/yr

2 Auxiliary Boiler - Stack S45

Basis	Value	Units	Reference
Boiler Rating	240	MMBtu/hr	Plant Washington Specification
Maximum Hours of Operation	876	hr/yr	Plant Washington Specification
PM Emission Factor - Fuel Oil	0.024	lb/MMBtu	BACT
PM_{10} Emission Factor - Fuel Oil	0.024	lb/MMBtu	BACT
PM_{10} Emission Factor Filterable - Fuel Oil	0.014	lb/MMBtu	BACT
$PM_{2.5}$ Percentage Filterable - Fuel Oil	12.0%	of PM_{10}	AP-42, Table 1.3-6
Condensable $PM_{2.5}$ Emission Factor	0.010	lb/MMBtu	Engineering Estimate
SO_2 Emission Factor - Fuel Oil	0.05	lb/MMBtu	BACT
NO_X Emission Factor - Fuel	0.10	lb/MMBtu	BACT
CO Emission Factor - Fuel Oil	0.04	lb/MMBtu	BACT
VOC Coal Emission Factor - Fuel Oil	0.003	lb/MMBtu	BACT
H_2SO_4 Emission Factor - Fuel Oil	6.00E-05	lb/MMBtu	BACT
HF Emission Factor - Fuel Oil	3.19E-08	lb/MMBtu	AP-42 Table 1.3-9
Pb Emission Factor - Fuel Oil	9.00E-06	lb/MMBtu	AP-42, Table 1.3-10
Hg Emission Factor - Fuel Oil	3.00E-06	lb/MMBtu	AP-42, Table 1.3-10

PM Emissions

Fuel Oil

240 MMBtu/hr * 0.024 lb/MMBtu / 2,000 lb/ton * 876 hr/yr = 2.52 ton/yr

PM_{10} Emissions

Fuel Oil

240 MMBtu/hr * 0.024 lb/MMBtu / 2,000 lb/ton * 876 hr/yr = 2.52 ton/yr

PM_{10} (Filterable) Emissions - Full Load

Fuel Oil

240 MMBtu/hr * 0.014 lb/MMBtu / 2,000 lb/ton * 876 hr/yr = 1.472 ton/yr

$PM_{2.5}$ (Filterable) Emissions

Fuel Oil

1.472 ton/yr * 12.00% = 0.177 ton/yr

$PM_{2.5}$ (Condensable) Emissions
Fuel Oil

240 MMBtu/hr	*	0.010 lb/MMBtu	/	2,000 lb/ton	*	876 hr/yr	=	1.051 ton/yr

$PM_{2.5}$ (Filterable + Condensable) Emissions
Fuel Oil

0.177 ton/yr	+	1.051 ton/yr	=	1.228 ton/yr

SO_2 Emissions
Fuel Oil

240 MMBtu/hr	*	0.050 lb/MMBtu	/	2,000 lb/ton	*	876 hr/yr	=	5.26 ton/yr

NO_X Emissions
Fuel Oil

240 MMBtu/hr	*	0.10 lb/MMBtu	/	2,000 lb/ton	*	876 hr/yr	=	10.51 ton/yr

CO Emissions
Fuel Oil

240 MMBtu/hr	*	0.04 lb/MMBtu	/	2,000 lb/ton	*	876 hr/yr	=	4.20 ton/yr

VOC Emissions
Fuel Oil

240 MMBtu/hr	*	0.0030 lb/MMBtu	/	2,000 lb/ton	*	876 hr/yr	=	0.32 ton/yr

H_2SO_4 Emissions
Fuel Oil

240 MMBtu/hr	*	6.00E-05 lb/MMBtu	/	2,000 lb/ton	*	876 hr/yr	=	6.31E-03 ton/yr

HF Emissions
Fuel Oil

240 MMBtu/hr	*	3.19E-08 lb/MMBtu	/	2,000 lb/ton	*	876 hr/yr	=	3.35E-06 ton/yr

Pb Emissions
Fuel Oil

240 MMBtu/hr	*	9.00E-06 lb/MMBtu	/	2,000 lb/ton	*	876 hr/yr	=	9.46E-04 ton.yr

Hg Emissions
Fuel Oil

240 MMBtu/hr	*	3.00E-06 Btu	/	2,000 lb/ton	*	876 hr/yr	=	3.15E-04 ton.yr

3 Diesel Fired Equipment

Basis	Value	Units	Reference
Diesel-Fuel Engine Rating	1500	HP	Plant Washington Specification
Diesel-Fuel Fire Water Pump Rating	350	HP	Plant Washington Specification
Maximum Diesel Engine Hours of Operation	500	hr/yr	Plant Washington Specification
Maximum Fire Water Pump Hours of Operation	500	hr/yr	Plant Washington Specification
Fire Water Pump PM/PM_{10} Emission Factor	2.20E-03	lb/hp-hr	AP-42, Table 3.3-1
Fire Water Pump SO_2 Emission Factor	2.05E-03	lb/hp-hr	AP-42, Table 3.3-1
Fire Water Pump NO_X Emission Factor	0.031	lb/hp-hr	AP-42, Table 3.3-1
Fire Water Pump CO Emission Factor	6.68E-03	lb/hp-hr	AP-42, Table 3.3-1
Fire Water Pump VOC Emission Factor	2.47E-03	lb/hp-hr	AP-42, Table 3.3-1
Diesel Engine PM/PM_{10} Emission Factor	7.00E-04	lb/hp-hr	AP-42, Table 3.4-1
Diesel Engine SO_2 Emission Factor	4.05E-04	lb/hp-hr	AP-42, Table 3.4-1, Assuming Diesel Fuel has 0.05% Sulfur Content
Diesel Engine NO_X Emission Factor	0.013	lb/hp-hr	AP-42, Table 3.4-1, Controlled
Diesel Engine CO Emission Factor	5.50E-03	lb/hp-hr	AP-42, Table 3.4-1
Diesel Engine VOC Emission Factor	7.05E-04	lb/hp-hr	AP-42, Table 3.4-1

PM/PM_{10} Emissions

Diesel Fuel Engine

1500 HP * 7.00E-04 lb/hp-hr / 2,000 lb/ton * 500 hr/yr = 0.26 ton/yr

Diesel Fuel Fire Water Pump

350 HP * 2.20E-03 lb/hp-hr / 2,000 lb/ton * 500 hr/yr = 0.193 ton/yr

Total Emissions

0.19 ton/yr + 0.26 ton/yr = 0.46 ton/yr

SO_2 Emissions

Diesel Fuel Engine

1500 HP * 4.05E-04 lb/hp-hr / 2,000 lb/ton * 500 hr/yr = 0.15 ton/yr

Diesel Fuel Fire Water Pump

350 HP * 2.05E-03 lb/hp-hr / 2,000 lb/ton * 500 hr/yr = 0.18 ton/yr

Total Emissions

0.15 ton/yr + 0.18 ton/yr = 0.33 ton/yr

NO_X Emissions

Diesel Fuel Engine

1500 HP * 1.30E-02 lb/hp-hr / 2,000 lb/ton * 500 hr/yr = 4.88 ton/yr

Diesel Fuel Fire Water Pump

350 HP * 3.10E-02 lb/hp-hr / 2,000 lb/ton * 500 hr/yr = 2.71 ton/yr

Total Emissions

4.88 ton/yr + 2.71 ton/yr = 7.59 ton/yr

CO Emissions

Diesel Fuel Engine

1500 HP * 5.50E-03 lb/hp-hr / 2,000 lb/ton * 500 hr/yr = 2.06 ton/yr

Diesel Fuel Fire Water Pump

350 HP * 6.68E-03 lb/hp-hr / 2,000 lb/ton * 500 hr/yr = 0.58 ton/yr

Total Emissions

2.06 ton/yr + 0.58 ton/yr = 2.65 ton/yr

VOC Emissions

Diesel Fuel Engine

1500 HP * 7.05E-04 lb/hp-hr / 2,000 lb/ton * 500 hr/yr = 0.26 ton/yr

Diesel Fuel Fire Water Pump

350 HP	*	2.47E-03 lb/hp-hr	/	2,000 lb/ton	*	500 hr/yr	=	0.22 ton/yr			

Total Emissions

0.26 ton/yr	+	0.22 ton/yr	=	**0.48 ton/yr**

4 Cooling Tower - Stack S2 - S35

Basis:	Value	Reference:
Water Flow Rate	450,000 gal/min	Plant Washington Specification
Operating hours	8,760 hr/yr	Plant Washington Specification
Total Drift %	0.0005%	Plant Washington Specification
Total Dissolved Solids	3300 ppm	Plant Washington Specification
Density of Water	1 g/mL	Constant
PM_{10} Percentage	46.10%	Riesman, Joel and Gordon Frisbie. "Calculating Realistic PM_{10} from Cooling Towers."
$PM_{2.5}$ Percentage	0.20%	Riesman, Joel and Gordon Frisbie. "Calculating Realistic PM_{10} from Cooling Towers."

Total Liquid Drift

450,000 gal/min	*	0.0005%	*	3.785 L / gal	=	8.52 L/min					

PM Emission

3300 g / 1000000 g	*	1 g/mL	*	1000 mL / 1 L	*	8.52 L/min	*	1 lb / 453.59 g	=	0.06 lb/min	
0.06 lb/min	*	60 min / hr	*	8,760 hr/yr	/	2,000 lb/ton	=	**16.28 ton/yr**			

PM_{10} Emissions

16.28 ton/yr	*	46.10%	=	**7.51 ton/yr**

$PM_{2.5}$ Emissions

16.28 ton/yr	*	0.20%	=	**3.29E-02 ton/yr**

Table A-1 : Cooling Tower $PM_{10}/PM_{2.5}$ Percentage Evaluation

Solid Particles Same Density as Sodium Chloride (2.2 g/cm^3) - Assumption

Drift Water Droplets Have a Density of Water (1.0 g/cm^3) - Assumption

TDS 3300 mg/L - Project Design Specification

Particle density 2.2 g/cm^3

EPRI Droplet Diameter (um)	Droplet Volume (um^3)	Droplet Mass (ug)	Particle Mass Solids (ug)	Solid Particle Volume (um^3)	Solid Particle Diameter (um)	EPRI % Mass Smaller
10	524	5.24E-04	1.73E-06	0.79	1.145	0
20	4189	4.19E-03	1.38E-05	6.28	2.289	0.196
30	14137	1.41E-02	4.67E-05	21.21	3.434	0.226
40	33510	3.35E-02	1.11E-04	50.27	4.579	0.514
50	65450	6.54E-02	2.16E-04	98.17	5.724	1.816
60	113097	1.13E-01	3.73E-04	169.65	6.868	5.702
70	179594	1.80E-01	5.93E-04	269.39	8.013	21.348
90	381704	3.82E-01	1.26E-03	572.56	10.302	49.812
110	696910	6.97E-01	2.30E-03	1045.36	12.592	70.509
130	1150347	1.15E+00	3.80E-03	1725.52	14.881	82.023
150	1767146	1.77E+00	5.83E-03	2650.72	17.171	88.012
180	3053628	3.05E+00	1.01E-02	4580.44	20.605	91.032
210	4849048	4.85E+00	1.60E-02	7273.57	24.039	92.468
240	7238229	7.24E+00	2.39E-02	10857.34	27.473	94.091
270	10305995	1.03E+01	3.40E-02	15458.99	30.907	94.689
300	14137167	1.41E+01	4.67E-02	21205.75	34.341	96.288
350	22449298	2.24E+01	7.41E-02	33673.95	40.065	97.011
400	33510322	3.35E+01	1.11E-01	50265.48	45.789	98.34
450	47712938	4.77E+01	1.57E-01	71569.41	51.512	99.071
500	65449847	6.54E+01	2.16E-01	98174.77	57.236	99.071
600	113097336	1.13E+02	3.73E-01	169646.00	68.683	100
$PM_{2.5}$	0.202 %					
PM_{10}	46.1 %					

Completed by: JFD 11/26/2008
Checked by: SAK 11/26/2008

5 Particulate Matter Baghouse Sources

Source	Stack ID	Model ID	Emission Factor gr/dscf	Air Flowrate (cfm)	PM/PM_{10} Emissions		$PM_{2.5}$ Emissions	
					(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
Crusher House Dust Collector	S40	CRUSH	0.005	24,000	1.03	4.51	0.16	0.72
Tripper Deck	S41	TRIP	0.005	18,000	0.77	3.38	0.12	0.54
Limestone Preparation Building Silo	S42	LIMEPR	0.005	5,000	0.21	0.94	5.79E-02	0.25
Fly Ash Filter Separator (Fly Ash Mechanical Exhausters)	S43	ASHEXH	0.005	2,407	0.10	0.45	0.05	0.24
Fly Ash Silo	S37	FLYASH	0.005	1,500	0.06	0.28	0.03	0.15
Mercury Sorbent Silo	S38*	HGSILO	0.005	1,500	1.61E-02	7.04E-02	1.61E-02	7.04E-02
SO_3 Sorbent Silo	S36*	SO3SILO	0.005	1,500	1.61E-02	7.04E-02	1.61E-02	7.04E-02
Pre-Treatment Soda Ash Silo	S44*	SODAASH	0.005	1,500	8.04E-03	3.52E-02	8.04E-03	3.52E-02
Pre-Treatment Hydrated Lime Silo	S39*	LSILO	0.005	1,500	8.04E-03	3.52E-02	2.17E-03	9.50E-03
PRB Stackout (Insertable Dust Collector)	S46	PRBSO	0.005	1,500	0.06	0.28	1.03E-02	4.51E-02
Illinois No. 6 Stackout (Insertable Dust Collector)	S47	IL6SO	0.005	1,500	0.06	0.28	1.03E-02	4.51E-02
Limestone Stackout (Insertable Dust Collector)	S48	LIMESO	0.005	1,500	0.06	0.28	1.74E-02	7.60E-02

* lb/hr emission rate reflects the average hourly emission rate over a 24-hr period (The sorbent silos are expected to vent only 6 hours per day and the soda ash and lime silos will operate only 3 hours per day)

Parameters

Basis	Value	Reference
PM Emission Factor	0.0050 gr/dscf	Vendor Design Basis
Crusher House Dust Collector Operating Hours	8,760 hr/yr	Project Specification
Tripper Deck Operating Hours	8,760 hr/yr	Project Specification
Limestone Preparation Building Operating Hours	8,760 hr/yr	Project Specification
Fly Ash Mechanical Exhausters Operating Hours	8,760 hr/yr	Project Specification
Fly Ash Silo Operating Hours	8,760 hr/yr	Project Specification
Mercury Sorbent Silo Operating Hours	2,190 hr/yr	Project Specification
SO_3 Sorbent Silo Operating Hours	2,190 hr/yr	Project Specification
Pre-Treatment Soda Ash Silo Operating Hours	1,095 hr/yr	Project Specification
Pre-Treatment Hydrated Lime Silo Operating Hours	1,095 hr/yr	Project Specification
Ash $PM_{2.5}$ Percentage	53.00%	AP 42, Section 1.1 - Particulate Matter Size Distribution
Lime $PM_{2.5}$ Percentage	27.00%	AP 42, Table 11.17-7 - PM Size Distribution for Rotary Kiln with Fabric Filter
Coal $PM_{2.5}$ Percentage	16.00%	AP-42, Appendix B.1 (Section 11.10 Coal Cleaning: Dry Process)

Sample Emissions Calculations (Crusher House Dust Collector):

Hourly:

$$0.005 \text{ gr/dscf} * \frac{24{,}000 \text{ dscf}}{\text{min}} * \frac{\text{lb}}{7{,}000 \text{ gr}} * \frac{60 \text{ min}}{\text{hr}} = \frac{1.029 \text{ lb}}{\text{hr}}$$

Yearly:

$$\frac{1.029 \text{ lb}}{\text{hr}} * 8{,}760 \text{ hr/yr} / 2{,}000 \text{ lb/ton} = \frac{4.51 \text{ ton}}{\text{yr}}$$

Completed by: BSA 11/26/2008
Checked by: SAK 11/26/2008

Table A-2 : Coal Design Data

Item (%) As Received (Wet Basis)	PRB		50/50 Blend		Illinois #6	
	Average	Abnormal	Average	Abnormal	Average	Abnormal
Moisture	29.61	32.05	19.81	21.19	10	10.32
Carbon	49.16	47.66	55.24	53.89	61.32	60.12
Hydrogen	3.43	3.29	4.45	4.10	5.46	4.9
Oxygen	11.31	12.25	9.75	9.77	8.19	7.28
Nitrogen	0.71	0.57	1.55	1.21	2.38	1.85
Sulfur	0.32	0.53	1.72	2.23	3.11	3.93
Ash	5.46	3.65	7.49	7.63	9.52	11.6
HHV (Btu/lb)	8500	8300	9950	9650	11,400	11,000
Trace Analysis (ppm) (Dry Basis)						
Chlorine	100	220	1400	2110	2700	4000
Fluorine	77	181	79	152	80	124
Mercury	0.1	0.25	0.1	0.2	0.09	0.15
Lead	4.63	10.8	7.7	18	10.8	25.3

Completed by : JDF 11/26/2008
Checked by: SAK 11/26/2008

6 PM Drop Point Emission Factors for Material Handling

Emission Description	Source ID	Pollutant			Units	Reference
		TSP	PM_{10}	$PM_{2.5}$		
Coal Rail Unloading (indoor)	A4	4.32E-05	2.04E-05	3.09E-06	lb/ton	AP-42, 13.2.4.3, Eqn (1)
Transfer Point for PRB Coal (outdoor)	A6, A8	7.59E-05	3.59E-05	5.44E-06	lb/ton	AP-42, 13.2.4.3, Eqn (1)
Transfer Point for Illinois Basin Coal (outdoor)	A7, A9	3.47E-04	1.64E-04	2.49E-05	lb/ton	AP-42, 13.2.4.3, Eqn (1)
Limestone Rail Unloading (indoor)	A5	4.32E-05	2.04E-05	3.09E-06	lb/ton	AP-42, 13.2.4.3, Eqn (1)
Limestone Transfer Point (outdoor)	A10	3.47E-04	1.64E-04	2.49E-05	lb/ton	AP-42, 13.2.4.3, Eqn (1)
Bottom Ash Transfer Point to Bottom Ash Bin (outdoor)	A3	1.97E-04	9.31E-05	1.41E-05	lb/ton	AP-42, 13.2.4.3, Eqn (1)
Bottom Ash Transfer Point from Bin to Truck (outdoor)	A3	1.97E-04	9.31E-05	1.41E-05	lb/ton	AP-42, 13.2.4.3, Eqn (1)

Parameter	Value		Reference
Coal Moisture Content PRB Coal	29.61	%	Typical for PRB from Project Specification
Coal Moisture Content Illinois Basin Coal	10		Typical for Illinois #6 from Project Specification
Limestone Moisture Content	10	%	Plant Washington Specification
Bottom Ash Moisture Content	15	%	Plant Washington Specification
Gypsum Moisture Content	20	%	Plant Washington Specification
Fly Ash Moisture Content	15	%	Plant Washington Specification
Mercury Sorbent Moisture	12	%	Plant Washington Specification
Hydrated Lime Moisture	1	%	Plant Washington Specification
Soda Ash Moisture	1	%	Plant Washington Specification
SO_3 Sorbent Moisture	10	%	Plant Washington Specification
Wind Speed, Outdoor	6.46 mph		Based on average wind speed of 2.89 m/s for Macon, GA (1987-1991)
Wind Speed, Indoor	1.3 mph		Lower bound for emission equation AP-42, 13.2.4(1)
Percent of the time wind is greater than 12 mph	6	%	Based on Macon/Centerville Weather Data 1987-1991

Notes:

Material Handling Emission Factor — AP-42 Section 13.2.4.3, Equation (1)

$E = k\ (0.0032)\ ((U/5)^{1.3} / (M/2)^{1.4})$

Where:
E = Emissions in lb/tons
k = Particle Size Multiplier
U = Mean Wind Speed (mph)
M = Material Moisture Content (%)

Aerodynamic Particle Species	k
Total Suspended Particle (TSP)	0.74
PM_{10}	0.35
$PM_{2.5}$	0.053

Sample Calculations (TSP for Rail Unloading):

$$0.74 * 0.0032 * \left(\frac{1.3\ \text{mph}}{5}\right)^{1.3} / \left(\frac{29.61\%}{2}\right)^{1.4} = 9.45\text{E-}06\ \text{lb/ton}$$

Particulate Matter Drop Point Emissions

Emission Description	Source ID	Pollutant			Units
		TSP	PM_{10}	$PM_{2.5}$	
Rail Unloading	A4	2.84E-01	1.34E-01	2.03E-02	ton/yr
Transfer Point for PRB Coal	A6, A8	0.07	3.28E-02	4.97E-03	ton/yr
Transfer Point for Illinois Basin Coal	A7, A9	0.32	1.50E-01	2.27E-02	ton/yr
Limestone Unloading	A5	1.89E-01	8.95E-02	1.35E-02	ton/yr
Limestone Transfer Point	A10	3.45E-02	1.63E-02	2.47E-03	ton/yr
Bottom Ash Transfer Point to Bottom Ash Bin	A3	2.69E-02	1.27E-02	1.93E-03	ton/yr
Bottom Ash Transfer Point from Bin to Truck	A3	2.69E-02	1.27E-02	1.93E-03	ton/yr

Material Throughput

Parameter	Value	Reference
Powder River Basin Coal Throughput	1,826,834 ton/yr	Typical 50/50 Blend - Plant Washington Specification
Illinois No. 6 Coal Throughput	1,826,834 ton/yr	Typical 50/50 Blend - Plant Washington Specification
Limestone Throughput	198,923 ton/yr	Plant Washington Specification
Ash Throughput	273,660 ton/yr	Typical 50/50 Blend - Plant Washington Specification
Rail unloading rate	1,500 ton/hr	Plant Washington Specification
Limestone unloading rate	1,000 ton/hr	Plant Washington Specification

Sample Emission Calculations (TSP for Rail Unloading):

13,140,000 ton/yr * 4.32E-05 lb/ton * $\frac{1 \text{ ton}}{2000 \text{ lb}}$ = 2.84E-01 ton/yr

Area Emission Rate

Bottom Ash Storage and Handling System

PM_{10} Emission Rate	2.55E-2 ton/yr
$PM_{2.5}$ Emission Rate	3.86E-3 ton/yr
Modeled Area	257 m^2

PM_{10} Emission Rate

2.55E-2 ton/yr * $\frac{2000 \text{ lb/ton}}{8760 \text{ hr/yr}}$ * $\frac{453.6 \text{ g/lb}}{3600 \text{ sec/hr}}$ / 257 m^2 = 2.85E-06 g/(s-m^2)

$PM_{2.5}$ Emission Rate

3.86E-3 ton/yr * $\frac{2000 \text{ lb/ton}}{8760 \text{ hr/yr}}$ * $\frac{453.6 \text{ g/lb}}{3600 \text{ sec/hr}}$ / 257 m^2 = 4.32E-07 g/(s-m^2)

Limestone Rail Unloading

PM_{10} Emission Rate	8.95E-2 ton/yr
$PM_{2.5}$ Emission Rate	1.35E-2 ton/yr
Modeled Area	168 m^2

PM_{10} Emission Rate

8.95E-2 ton/yr * $\frac{2000 \text{ lb/ton}}{8760 \text{ hr/yr}}$ * $\frac{453.6 \text{ g/lb}}{3600 \text{ sec/hr}}$ / 168 m^2 = 1.53E-05 g/(s-m^2)

$PM_{2.5}$ Emission Rate

1.35E-2 ton/yr	*	2000 lb/ton 8760 hr/yr	*	453.6 g/lb 3600 sec/hr	/	168 m^2	= 2.32E-06 g/(s-m^2)

Coal Rail Unlading

PM_{10} Emission Rate	1.34E-1 ton/yr
$PM_{2.5}$ Emission Rate	2.03E-2 ton/yr
Modeled Area	167 m^2

PM_{10} Emission Rate

1.34E-1 ton/yr	*	2000 lb/ton 8760 hr/yr	*	453.6 g/lb 3600 sec/hr	/	167 m^2	= 2.31E-05 g/(s-m^2)

$PM_{2.5}$ Emission Rate

2.03E-2 ton/yr	*	2000 lb/ton 8760 hr/yr	*	453.6 g/lb 3600 sec/hr	/	167 m^2	= 3.50E-06 g/(s-m^2)

7 Solid Material Handling Facility Fugitive Dust Emissions

Emissions form Earth Moving Operations-Ash Portion of SMHF - Source A1

Basis	Value	Units	Reference
PM_{10} Scaling Factor, k	0.75		AP-42, Table 11.9-1 Bulldozing (Overburden)
$PM_{2.5}$ Scaling Factor, k	0.105		AP-42, Table 11.9-1 Bulldozing (Overburden)
Silt Content	6.9	%	AP-42, Table 11.9-3 Bulldozers (Overburden)
Moisture Content	7.9	%	AP-42, Table 11.9-3 Bulldozers (Overburden)
Control Efficiency	90	%	Plant Washington Specification
Solid Material Handling Area	118	acres	Plant Washington Specification
Acre to m^2 Conversion	4046.86	m^2/Acre	Conversion Factor

PM Emissions

$$5.7 * \left(6.9 \wedge 1.2\right) / \left(7.9 \wedge 1.3\right) = 3.94 \text{ lb/hr}$$

$$3.94 \text{ lb/hr} * \frac{1 \text{ ton}}{2000 \text{ lb}} * 8{,}760 \text{ hr/yr} * \frac{(100\%-90\%)}{100\%} = \boxed{1.73 \text{ ton/yr}}$$

PM_{10} Emission Rate

$$0.75 * 1 * \left(6.9 \wedge 1.5\right) / \left(7.9 \wedge 1.4\right) = 0.75 \text{ lb/hr}$$

$$0.75 \text{ lb/hr} * \frac{1 \text{ ton}}{2000 \text{ lb}} * 8{,}760 \text{ hr/yr} * \frac{(100\%-90\%)}{100\%} = \boxed{0.33 \text{ ton/yr}}$$

Area Emission Rate

$$0.33 \text{ ton/yr} * \frac{2000 \text{ lb}}{1 \text{ ton}} / 8{,}760 \text{ hr/yr} * \frac{1 \text{ hr}}{3600 \text{ s}} * \frac{453.5 \text{ g}}{1 \text{ lb}} = 0.01 \text{ g/s}$$

$$\frac{0.01 \text{ g/s}}{118 \text{ acre}} / \frac{4.05E+03 \text{ m}^2}{\text{acre}} = \boxed{1.99E-08 \text{ g/(s-m}^2)}$$

$PM_{2.5}$ Emission Rate

$$0.105 * 5.7 * \left(6.9 \wedge 1.2\right) / \left(7.9 \wedge 1.3\right) = 0.41 \text{ lb/hr}$$

$$0.41 \text{ lb/hr} * \frac{1 \text{ ton}}{2000 \text{ lb}} * 8{,}760 \text{ hr/yr} * \frac{(100\%-90\%)}{100\%} = \boxed{0.18 \text{ ton/yr}}$$

Area Emission Rate

$$0.18 \text{ ton/yr} * \frac{2000 \text{ lb}}{1 \text{ ton}} / 8{,}760 \text{ hr/yr} * \frac{1 \text{ hr}}{3600 \text{ s}} * \frac{453.5 \text{ g}}{1 \text{ lb}} = 5.21E-03 \text{ g/s}$$

$$\frac{5.21E-03 \text{ g/s}}{118 \text{ acre}} / \frac{4.05E+03 \text{ m}^2}{\text{acre}} = \boxed{1.09E-08 \text{ g/(s-m}^2)}$$

Completed by: BSA11/26/2008
Checked by: SAK 11/26/2008

Emissions form Earth Moving Operations-Gypsum Portion of SMHF - Source A2

Basis	Value	Units	Reference
PM_{10} Scaling Factor, k	0.75		AP-42, Table 11.9-1 Bulldozing (Overburden)
$PM_{2.5}$ Scaling Factor, k	0.105		AP-42, Table 11.9-1 Bulldozing (Overburden)
Silt Content	6.9	%	AP-42, Table 11.9-3 Bulldozers (Overburden)
Moisture Content	7.9	%	AP-42, Table 11.9-3 Bulldozers (Overburden)
Control Efficiency	90	%	Plant Washington Specification
Solid Material Handling Area	267	acres	Plant Washington Specification
Acre to m^2 Conversion	4046.86	m^2/Acre	Conversion Factor

PM Emissions

$$5.7 * \left(6.9 \wedge 1.2\right) / \left(7.9 \wedge 1.3\right) = 3.94 \text{ lb/hr}$$

$$3.94 \text{ lb/hr} * \frac{1 \text{ ton}}{2000 \text{ lb}} * 8{,}760 \text{ hr/yr} * \frac{(100\%-90\%)}{100\%} = \boxed{1.73 \text{ ton/yr}}$$

PM_{10} Emission Rate

$$0.75 * 1 * \left(6.9 \wedge 1.5\right) / \left(7.9 \wedge 1.4\right) = 0.75 \text{ lb/hr}$$

$$0.75 \text{ lb/hr} * \frac{1 \text{ ton}}{2000 \text{ lb}} * 8{,}760 \text{ hr/yr} * \frac{(100\%-90\%)}{100\%} = \boxed{0.33 \text{ ton/yr}}$$

Area Emission Rate

$$0.33 \text{ ton/yr} * \frac{2000 \text{ lb}}{1 \text{ ton}} / 8{,}760 \text{ hr/yr} * \frac{1 \text{ hr}}{3600 \text{ s}} * \frac{453.5 \text{ g}}{1 \text{ lb}} = 0.01 \text{ g/s}$$

$$\frac{0.01 \text{ g/s}}{267 \text{ acre}} / \frac{4.05\text{E+}03 \text{ m}\wedge2}{\text{acre}} = \boxed{8.78\text{E-}09 \text{ g/(s-m}\wedge2)}$$

$PM_{2.5}$ Emission Rate

$$0.105 * 5.7 * \left(6.9 \wedge 1.2\right) / \left(7.9 \wedge 1.3\right) = 0.41 \text{ lb/hr}$$

$$0.41 \text{ lb/hr} * \frac{1 \text{ ton}}{2000 \text{ lb}} * 8{,}760 \text{ hr/yr} * \frac{(100\%-90\%)}{100\%} = \boxed{0.18 \text{ ton/yr}}$$

Area Emission Rate

$$0.18 \text{ ton/yr} * \frac{2000 \text{ lb}}{1 \text{ ton}} / 8{,}760 \text{ hr/yr} * \frac{1 \text{ hr}}{3600 \text{ s}} * \frac{453.5 \text{ g}}{1 \text{ lb}} = 5.21\text{E-}03 \text{ g/s}$$

$$\frac{5.21\text{E-}03 \text{ g/s}}{267 \text{ acre}} / \frac{4.05\text{E+}03 \text{ m}\wedge2}{\text{acre}} = \boxed{4.82\text{E-}09 \text{ g/(s-m}\wedge2)}$$

8 InActive PRB Coal Storage Pile Emission Calculations - Source A6

Basis	Value		Reference
Pile Volume	20,422,395	ft^3	Plant Washington Specification- Based on Trapezoidal-elevated Plane Shape
Base Width	900	ft	Plant Washington Specification
Base length	750	ft	Plant Washington Specification
Top Width	802	ft	Plant Washington Specification
Top length	652	ft	Plant Washington Specification
Pile Height	34.2	ft	Plant Washington Specification
Threshold Velocity	1.12	m/s	Table 13.2.5-2 AP-42 for wind erosion from piles
Surface Area	705,977 ft^2 =	65,581 m^2	

Modeled Area at top of pile: 802 ft * 652 ft = 523,058 ft^2 = 48,589 m^2

Pile B2 from Fig 13..2.5-2 is the selected Pile Configuration for wind contours because the prevailing wind is WNW. According to the figure, the maximum shear velocity is 1.1 times ten percent of the prevailing wind; therefore, wind erosion occurs whenever the fastest 2 minute wind exceeds the following value:

$$V = \frac{1.12}{0.11} = 10.2 \text{ m/s} = 22.78 \text{ mph}$$

Sample Calculation:
Erosion Potentials were calculated for the dates where the normalized wind surface wind speeds exceeded the threshold velocity for uncrusted coal piles (1.12 m/s)
Erosion Potential ((AP-42, 13.2.5-3, Equation 3)
$P=58(u^*-u^*_t)^2+25(u^*-u^*_t)$ g/m^2
where:
P = Erosion Potential
u^* = Friction velocity = 0.1 u
u^*_t = Threshold Friction Velocity
u_s = Surface Wind Speed
u_t = Approach Wind Speed
December 1, 2006 - 1.1 Wind Contour

$$P = 58 * (1.13 - 1.12)^2 + 25 * (1.13 - 1.12) = 0.28 \text{ g/m^2}$$

Emissions are computed by multiplying the Erosion Potential by the surface area of the pile, the Aerodynamic Particle Size Multiplier to speciate the PM size, and the fraction of the pile subarea that is subject to a specified wind contour. Emissions from the pile are controlled to 90% by dust suppressant

Emission rates multiplied by k = 0.5 to reduce emissions to just PM_{10} and k = 0.075 to $PM_{2.5}$ (AP-42, 13.2.5-3)
Fraction of Pile Subarea Subject to 0.9 Contour of Normalized Surface Wind Speed = 0
Fraction of Pile Subarea Subject to 1.1 Contour of Normalized Surface Wind Speed = 0
December 1, 2006 - PM10 Emissions for 1.1 Wind Contour

$$0.28 \text{ g/m^2} * 65{,}581 \text{ m^2} * 0.5 * 0 * \frac{(100\%-90\%)}{100\%} = 0.00 \text{ g/d}$$

InActive PRB Coal Storage Pile Emission Calculations - Source A6

Daily records of fastest mile from 12/1/06 through 11/30/07 and it exceeded the calculated threshold on the following dates:(10 m anemometer)

	Wind Speed	Wind Speed	Normalized Surface Wind Speeds				Erosion Potential $P=58(u^*-u^*_t)^2+25(u^*-u^*_t)$ g/m^2 (AP-42, 13.2.5-3, Equation 3)		Daily PM_{10} Erosion Potential		Daily PM_{10} Erosion Potential Summation	Daily $PM_{2.5}$ Erosion Potential		Daily $PM_{2.5}$ Erosion Potential Summation
Date	mph	m/s	$u_t/u_s = 0.2$	$u_t/u_s = 0.6$	$u_t/u_s = 0.9$	$u_t/u_s = 1.1$	P(0.9)	P(1.1)	P(0.9)	P(1.1)		P(0.9)	P(1.1)	
20061201	23	10.28	0.21	0.62	0.93	1.13					0.00		0.00	0.00
20061207	24	10.73	0.21	0.64	0.97	1.18					0		0.00	0.00
20061225	26	11.62	0.23	0.70	1.05	1.28					0		0.00	0.00
20061226	23	10.28	0.21	0.62	0.93	1.13					0.00		0.00	0.00
20061231	24	10.73	0.21	0.64	0.97	1.18					0		0.00	0.00
20070108	23	10.28	0.21	0.62	0.93	1.13					0		0.00	0.00
20070109	28	12.52	0.25	0.75	1.13	1.38					0	0.00	0.00	0
20070128	24	10.73	0.21	0.64	0.97	1.18					0		0.00	0.00
20070213	31	13.86	0.28	0.83	1.25	1.52					0	0	0.00	0
20070218	23	10.28	0.21	0.62	0.93	1.13					0.00		0.00	0.00
20070301	32	14.30	0.29	0.86	1.29	1.57					0	0	0.00	0
20070302	30	13.41	0.27	0.80	1.21	1.48					0	0	0.00	0
20070316	29	12.96	0.26	0.78	1.17	1.43					0	0	0.00	0
20070404	33	14.75	0.30	0.89	1.33	1.62					0	0	0.00	0
20070415	32	14.30	0.29	0.86	1.29	1.57					0	0	0.00	0
20070416	28	12.52	0.25	0.75	1.13	1.38					0	0	0.00	0.00
20070508	23	10.28	0.21	0.62	0.93	1.13					0.00		0.00	0.00
20070603	23	10.28	0.21	0.62	0.93	1.13					0.00		0.00	0.00
20070629	32	14.30	0.29	0.86	1.29	1.57					0	0	0.00	0
20070701	28	12.52	0.25	0.75	1.13	1.38					0	0	0.00	0
20070711	25	11.18	0.22	0.67	1.01	1.23					0		0.00	0.00
20070720	38	16.99	0.34	1.02	1.53	1.87					0	0	0.00	0
20070806	23	10.28	0.21	0.62	0.93	1.13					0		0.00	0.00
20070816	25	11.18	0.22	0.67	1.01	1.23					0		0.00	0.00
20070817	41	18.33	0.37	1.10	1.65	2.02					0	0	0.00	0
20070824	26	11.62	0.23	0.70	1.05	1.28					0		0.00	0.00
20071115	25	11.18	0.22	0.67	1.01	1.23					0		0.00	0.00
								Subtotal	0	0 g/yr	0 g/d	0 g/yr	0 g/yr	0 g/d
								Annual Emission Rate		0 g/yr 0.00E+00 ton/yr	Annual Emission Rate		0 g/yr 0.00E+00 ton/yr	
								24 Hour Emission Rate		0 g/d 0.00 ton/yr	24 Hour Emission Rate		0 g/d 0.00E+00 ton/yr	

The shape (Trapezoidal-elevated plane) of the inactive pile is such that no contours of 0.9 or greater will occur on the pile. None of the 0.2 or 0.6 contours exceed the 1.12 threshold velocity. Wind erosion emission from the inactive pile are therefore zero.

InActive PRB Coal Storage Pile Emission Calculations - Source A6

Area Emission Rate (Drop Point Emissions and Wind Erosion)

Basis	Value	Reference
PM_{10} Drop Point Emission Rate	3.28E-02 ton/yr	See calculation 6
$PM_{2.5}$ Drop Point Emission Rate	4.97E-03 ton/yr	See calculation 6
PM_{10} Annual Emission Rate-Wind Erosion	0.00E+00 ton/yr	See calculation above
$PM_{2.5}$ Annual Emission Rate-Wind Erosion	0.00E+00 ton/yr	See calculation above
PM_{10} 24-Hr Emission Rate-Wind Erosion	0.00E+00 ton/yr	See calculation above
$PM_{2.5}$ 24-Hr Emission Rate-Wind Erosion	0.00E+00 ton/yr	See calculation above
Area at Half Height- Modeled Area	48,589 m^2	See calculation above

PM_{10} Emission Rate- Annual

3.28E-02 ton/yr + 0.00E+00 ton/yr = 3.28E-02 ton/yr

3.28E-02 ton/yr * 2000 lb/ton / 8760 hr/yr * 453.6 g/lb / 3600 sec/hr / 48,589 m^2 = **1.94E-08 g/(s-m^2)**

$PM_{2.5}$ Emission Rate- Annual

4.97E-03 ton/yr + 0.00E+00 ton/yr = 4.97E-03 ton/yr

4.97E-03 ton/yr * 2000 lb/ton / 8760 hr/yr * 453.6 g/lb / 3600 sec/hr / 48,589 m^2 = **2.94E-09 g/(s-m^2)**

PM_{10} Emission Rate- 24-Hr

3.28E-02 ton/yr + 0.00E+00 ton/yr = 3.28E-02 ton/yr

3.28E-02 ton/yr * 2000 lb/ton / 8760 hr/yr * 453.6 g/lb / 3600 sec/hr / 48,589 m^2 = **1.94E-08 g/(s-m^2)**

$PM_{2.5}$ Emission Rate- 24-Hr

4.97E-03 ton/yr + 0.00E+00 ton/yr = 4.97E-03 ton/yr

4.97E-03 ton/yr * 2000 lb/ton / 8760 hr/yr * 453.6 g/lb / 3600 sec/hr / 48,589 m^2 = **2.94E-09 g/(s-m^2)**

9 InActive Illinois No. 6 Coal Storage Pile Emission Calculations - Source A7

Basis	Value		Reference
Pile Volume	9,465,546	ft^3	Plant Washington Specification- Based on Trapezoidal-elevated Plane Shape
Base Width	750	ft	Plant Washington Specification
Base length	550	ft	Plant Washington Specification
Top Width	676	ft	Plant Washington Specification
Top length	476	ft	Plant Washington Specification
Pile Height	25.9	ft	Plant Washington Specification
Threshold Velocity	1.12	m/s	Table 13.2.5-2 AP-42 for wind erosion from piles
Surface Area	431,063 ft^2 =	40,043 m^2	

Modeled Area at top of pile: 676 ft * 476 ft = 321,874 ft^2 = 29,900 m^2

Pile B2 from Fig 13..2.5-2 is the selected Pile Configuration for wind contours because the prevailing wind is WNW. According to the figure, the maximum shear velocity is 1.1 times ten percent of the prevailing wind; therefore, wind erosion occurs whenever the fastest 2 minute wind exceeds the following value:

$$V = \frac{1.12}{0.11} = 10.2 \text{ m/s} = 22.78 \text{ mph}$$

Sample Calculation:
Erosion Potentials were calculated for the dates where the normalized wind surface wind speeds exceeded the threshold velocity for uncrusted coal piles (1.12 m/s)
Erosion Potential ((AP-42, 13.2.5-3, Equation 3)
$P=58(u^*-u^*_t)^2+25(u^*-u^*_t)$ g/m^2
where:
P = Erosion Potential
u^* = Friction velocity = 0.1 u
u^*_t = Threshold Friction Velocity
u_s = Surface Wind Speed
u_t = Approach Wind Speed
December 1, 2006 - 1.1 Wind Contour

$$P = 58 * (1.13 - 1.12)^2 + 25 * (1.13 - 1.12) = 0.28 \text{ g/m}^2$$

Emissions are computed by multiplying the Erosion Potential by the surface area of the pile, the Aerodynamic Particle Size Multiplier to speciate the PM size, and the fraction of the pile subarea that is subject to a specified wind contour. Emissions from the pile are controlled to 90% by dust suppressant

Emission rates multiplied by k = 0.5 to reduce emissions to just PM_{10} and k = 0.075 to $PM_{2.5}$ (AP-42, 13.2.5-3)
Fraction of Pile Subarea Subject to 0.9 Contour of Normalized Surface Wind Speed = 0.0
Fraction of Pile Subarea Subject to 1.1 Contour of Normalized Surface Wind Speed = 0.0
December 1, 2006 - PM10 Emissions for 1.1 Wind Contour

$$0.28 \text{ g/m}^2 * 40{,}043 \text{ m}^2 * 0.5 * 0 * \frac{(100\%-90\%)}{100\%} = 0.00 \text{ g/d}$$

InActive Illinois No. 6 Coal Storage Pile Emission Calculations - Source A7

Daily records of fastest mile from 12/1/06 through 11/30/07 and it exceeded the calculated threshold on the following dates:(10 m anemometer)

	Wind Speed	Wind Speed	Normalized Surface Wind Speeds				Erosion Potential $P=58(u^*-u^*_t)^2+25(u^*-u^*_t)$ g/m^2 (AP-42, 13.2.5-3, Equation 3)		Daily PM_{10} Erosion Potential		Daily PM_{10} Erosion Potential Summation	Daily $PM_{2.5}$ Erosion Potential		Daily $PM_{2.5}$ Erosion Potential Summation
Date	mph	m/s	$u_t/u_t = 0.2$	$u_t/u_t = 0.6$	$u_t/u_t = 0.9$	$u_t/u_t = 1.1$	P(0.9)	P(1.1)	P(0.9)	P(1.1)		P(0.9)	P(1.1)	
20061201	23	10.28	0.21	0.62	0.93	1.13					0.00		0.00	0.00
20061207	24	10.73	0.21	0.64	0.97	1.18					0		0.00	0.00
20061225	26	11.62	0.23	0.70	1.05	1.28					0		0.00	0.00
20061226	23	10.28	0.21	0.62	0.93	1.13					0.00		0.00	0.00
20061231	24	10.73	0.21	0.64	0.97	1.18					0		0.00	0.00
20070108	23	10.28	0.21	0.62	0.93	1.13					0		0.00	0.00
20070109	28	12.52	0.25	0.75	1.13	1.38					0	0.00	0.00	0
20070128	24	10.73	0.21	0.64	0.97	1.18					0		0.00	0.00
20070213	31	13.86	0.28	0.83	1.25	1.52					0	0	0.00	0
20070218	23	10.28	0.21	0.62	0.93	1.13					0.00		0.00	0.00
20070301	32	14.30	0.29	0.86	1.29	1.57					0	0	0.00	0
20070302	30	13.41	0.27	0.80	1.21	1.48					0	0	0.00	0
20070316	29	12.96	0.26	0.78	1.17	1.43					0	0	0.00	0
20070404	33	14.75	0.30	0.89	1.33	1.62					0	0	0.00	0
20070415	32	14.30	0.29	0.86	1.29	1.57					0	0	0.00	0
20070416	28	12.52	0.25	0.75	1.13	1.38					0	0	0.00	0.00
20070508	23	10.28	0.21	0.62	0.93	1.13					0.00		0.00	0.00
20070603	23	10.28	0.21	0.62	0.93	1.13					0.00		0.00	0.00
20070629	32	14.30	0.29	0.86	1.29	1.57					0	0	0.00	0
20070701	28	12.52	0.25	0.75	1.13	1.38					0	0	0.00	0
20070711	25	11.18	0.22	0.67	1.01	1.23					0		0.00	0.00
20070720	38	16.99	0.34	1.02	1.53	1.87					0	0	0.00	0
20070806	23	10.28	0.21	0.62	0.93	1.13					0		0.00	0.00
20070816	25	11.18	0.22	0.67	1.01	1.23					0		0.00	0.00
20070817	41	18.33	0.37	1.10	1.65	2.02					0	0	0.00	0
20070824	26	11.62	0.23	0.70	1.05	1.28					0		0.00	0.00
20071115	25	11.18	0.22	0.67	1.01	1.23					0		0.00	0.00
								Subtotal	0 g/yr	0 g/yr	0 g/d	0 g/yr	0 g/yr	0 g/d
								Annual Emission Rate		0 g/yr 0.00E+00 ton/yr	**Annual Emission Rate**		0 g/yr 0.00E+00 ton/yr	
								24 Hour Emission Rate		0 g/d 0.00 ton/yr	**24 Hour Emission Rate**		0 g/d 0.00E+00 ton/yr	

The shape (Trapezoidal-elevated plane) of the inactive pile is such that no contours of 0.9 or greater will occur on the pile. None of the 0.2 or 0.6 contours exceed the 1.12 threshold velocity. Wind erosion emission from the inactive pile are therefore zero.

Completed by: BSA 11/26/2008
Checked by: SAK 11/26/2008

InActive Illinois No. 6 Coal Storage Pile Emission Calculations - Source A7

Area Emission Rate (Drop Point Emissions and Wind Erosion)

Basis	Value	Reference
PM_{10} Drop Point Emission Rate	1.50E-01 ton/yr	See calculation 6
$PM_{2.5}$ Drop Point Emission Rate	2.27E-02 ton/yr	See calculation 6
PM_{10} Annual Emission Rate-Wind Erosion	0.00E+00 ton/yr	See calculation above
$PM_{2.5}$ Annual Emission Rate-Wind Erosion	0.00E+00 ton/yr	See calculation above
PM_{10} 24-Hr Emission Rate-Wind Erosion	0.00E+00 ton/yr	See calculation above
$PM_{2.5}$ 24-Hr Emission Rate-Wind Erosion	0.00E+00 ton/yr	See calculation above
Area at Half Height- Modeled Area	29,900 m^2	See calculation above

PM_{10} Emission Rate- Annual

1.50E-01 ton/yr + 0.00E+00 ton/yr = 1.50E-01 ton/yr

1.50E-01 ton/yr * 2000 lb/ton / 8760 hr/yr * 453.6 g/lb / 3600 sec/hr / 29,900 m^2 = **1.44E-07 g/(s-m^2)**

$PM_{2.5}$ Emission Rate- Annual

2.27E-02 ton/yr + 0.00E+00 ton/yr = 2.27E-02 ton/yr

2.27E-02 ton/yr * 2000 lb/ton / 8760 hr/yr * 453.6 g/lb / 3600 sec/hr / 29,900 m^2 = **2.18E-08 g/(s-m^2)**

PM_{10} Emission Rate- 24-Hr

1.50E-01 ton/yr + 0.00E+00 ton/yr = 1.50E-01 ton/yr

1.50E-01 ton/yr * 2000 lb/ton / 8760 hr/yr * 453.6 g/lb / 3600 sec/hr / 29,900 m^2 = **1.44E-07 g/(s-m^2)**

$PM_{2.5}$ Emission Rate- 24-Hr

2.27E-02 ton/yr + 0.00E+00 ton/yr = 2.27E-02 ton/yr

2.27E-02 ton/yr * 2000 lb/ton / 8760 hr/yr * 453.6 g/lb / 3600 sec/hr / 29,900 m^2 = **2.18E-08 g/(s-m^2)**

10 Active PRB Coal Storage Pile Emission Calculations - Source A8

Basis	Value		Reference
Pile Volume	2,137,605	ft^3	Plant Washington Specification
Pile Diameter	286	feet	Plant Washington Specification
Threshold Velocity	1.12	m/s	Table 13.2.5-2 AP-42 for wind erosion from piles

Pile Dimension Calculations

Assumed cone shape V=1/3*h*Area of base

Surface Area = 1/2*(perimeter of base* slant height)

slant height = $SQRT(h^2+(L/2)^2)$

Area of Base: π * 286 ft ^ 2 / 4 = 64,242 ft^2

Height: 3 * 2,137,605 ft^3 / 64,242 ft^2 = 100 ft

Radius at Half Height: 71.30 ft

Area at Half Height: 15,963 ft^2 = 1,483 m^2

Slant Height: $SQRT\left(143\ ft^{2} + 100\ ft^{2} \right) = 174$ ft

Surface Area: $\left(\left(\pi * 286\ ft \right) * 174\ ft \right) * 0.5 = 78{,}346\ ft^2 = 7{,}278\ m^2$

Pile B2 from Fig 13..2.5-2 is the selected Pile Configuration for wind contours because the prevailing wind is WNW. According to the figure, the maximum shear velocity is 1.1 times ten percent of the prevailing wind; therefore, wind erosion occurs whenever the fastest 2 minute wind exceeds the following value:

$$V = \frac{1.12}{0.11} = 10.2\ m/s = 22.78\ mph$$

Sample Calculation:

Erosion Potentials were calculated for the dates where the normalized wind surface wind speeds exceeded the threshold velocity for uncrusted coal piles (1.12 m/s)

Erosion Potential ((AP-42, 13.2.5-3, Equation 3)

$P=58(u^*-u^*_t)^2+25(u^*-u^*_t)\ g/m^2$

where:

P = Erosion Potential

u^* = Friction velocity = 0.1 u

u^*_t = Threshold Friction Velocity

u_s = Surface Wind Speed

u_r = Approach Wind Speed

December 1, 2006 - 1.1 Wind Contour

$$P = 58 * (1.13 - 1.12)^2 + 25 * (1.13 - 1.12) = 0.28\ g/m^2$$

Emissions are computed by multiplying the Erosion Potential by the surface area of the pile, the Aerodynamic Particle Size Multiplier to speciate the PM size, and the fraction of the pile subarea that is subject to a specified wind contour. Emissions from the pile are controlled to 90% by dust suppressant

Emission rates multiplied by k = 0.5 to reduce emissions to just PM_{10} and k = 0.075 to $PM_{2.5}$ (AP-42, 13.2.5-3)

Fraction of Pile Subarea Subject to 0.9 Contour of Normalized Surface Wind Speed = 0.17

Fraction of Pile Subarea Subject to 1.1 Contour of Normalized Surface Wind Speed = 0.024

December 1, 2006 - PM10 Emissions for 1.1 Wind Contour

$$0.28\ g/m^2 * 7{,}278\ m^2 * 0.5 * 0.024 * \frac{(100\%-90\%)}{100\%} = 2.45\ g/d$$

Active PRB Coal Storage Pile Emission Calculations - Source A8

Daily records of fastest mile from 12/1/06 through 11/30/07 and it exceeded the calculated threshold on the following dates:(10 m anemometer)

	Wind Speed	Wind Speed	Normalized Surface Wind Speeds				Erosion Potential $P=58(u^*-u^*_t)^2+25(u^*-u^*_t)$ g/m^2 (AP-42, 13.2.5-3, Equation 3)		Daily PM_{10} Erosion Potential		Daily PM_{10} Erosion Potential Summation	Daily $PM_{2.5}$ Erosion Potential		Daily $PM_{2.5}$ Erosion Potential Summation
Date	mph	m/s	$u_s/u_t = 0.2$	$u_s/u_t = 0.6$	$u_s/u_t = 0.9$	$u_s/u_t = 1.1$	P(0.9)	P(1.1)	P(0.9)	P(1.1)		P(0.9)	P(1.1)	
20061201	23	10.28	0.21	0.62	0.93	1.13		0.28		2.45	2.45		0.37	0.37
20061207	24	10.73	0.21	0.64	0.97	1.18		1.71		15	15		2.24	2.24
20061225	26	11.62	0.23	0.70	1.05	1.28		5.42		47	47		7.10	7.10
20061226	23	10.28	0.21	0.62	0.93	1.13		0.28		2.45	2.45		0.37	0.37
20061231	24	10.73	0.21	0.64	0.97	1.18		1.71		15	15		2.24	2.24
20070108	23	10.28	0.21	0.62	0.93	1.13		0.28		2	2		0.37	0.37
20070109	28	12.52	0.25	0.75	1.13	1.38	0.16	10.25	10.18	89	100	1.53	13.42	15
20070128	24	10.73	0.21	0.64	0.97	1.18		1.71		15	15		2.24	2.24
20070213	31	13.86	0.28	0.83	1.25	1.52	4.12	19.59	255	171	426	38	25.7	64
20070218	23	10.28	0.21	0.62	0.93	1.13		0.28		2.45	2.45		0.37	0.37
20070301	32	14.30	0.29	0.86	1.29	1.57	5.81	23.27	359	203	563	54	30.5	84
20070302	30	13.41	0.27	0.80	1.21	1.48	2.61	16.20	162	141	303	24	21.2	45
20070316	29	12.96	0.26	0.78	1.17	1.43	1.29	13.08	80	114	194	12	17.1	29
20070404	33	14.75	0.30	0.89	1.33	1.62	7.69	27.22	476	238	714	71	35.7	107
20070415	32	14.30	0.29	0.86	1.29	1.57	5.81	23.27	359	203	563	54	30.5	84
20070416	28	12.52	0.25	0.75	1.13	1.38	0.16	10.25	10.18	89	100	1.53	13.42	14.95
20070508	23	10.28	0.21	0.62	0.93	1.13		0.28		2.45	2.45		0.37	0.37
20070603	23	10.28	0.21	0.62	0.93	1.13		0.28		2.45	2.45		0.37	0.37
20070629	32	14.30	0.29	0.86	1.29	1.57	5.81	23.27	359	203	563	54	30.5	84
20070701	28	12.52	0.25	0.75	1.13	1.38	0.16	10.25	10.18	89	100	1.53	13.42	15
20070711	25	11.18	0.22	0.67	1.01	1.23		3.43		30	30		4.49	4.49
20070720	38	16.99	0.34	1.02	1.53	1.87	19.91	51.21	1,232	447	1,679	185	67.1	252
20070806	23	10.28	0.21	0.62	0.93	1.13		0.28		2	2		0.37	0.37
20070816	25	11.18	0.22	0.67	1.01	1.23		3.43		30	30		4.49	4.49
20070817	41	18.33	0.37	1.10	1.65	2.02	29.50	68.97	1,825	602	2,427	274	90.4	364
20070824	26	11.62	0.23	0.70	1.05	1.28		5.42		47	47		7.10	7.10
20071115	25	11.18	0.22	0.67	1.01	1.23		3.43		30	30		4.49	4.49
							Subtotal		5,138	2,839 g/yr	2,427 g/d	771 g/yr	426 g/yr	364 g/d
							Annual Emission Rate			7,977 g/yr	**Annual Emission Rate**		**1,196 g/yr**	
										8.79E-03 ton/yr			1.32E-03 ton/yr	
							24 Hour Emission Rate			2,427 g/d	**24 Hour Emission Rate**		364 g/d	
										0.98 ton/yr			1.46E-01 ton/yr	

Active PRB Coal Storage Pile Emission Calculations - Source A8

Area Emission Rate (Drop Point Emissions and Wind Erosion)

Basis	Value	Reference
PM_{10} Drop Point Emission Rate	3.28E-02 ton/yr	See calculation 6
$PM_{2.5}$ Drop Point Emission Rate	4.97E-03 ton/yr	See calculation 6
PM_{10} Annual Emission Rate-Wind Erosion	8.79E-03 ton/yr	See calculation above
$PM_{2.5}$ Annual Emission Rate-Wind Erosion	1.32E-03 ton/yr	See calculation above
PM_{10} 24-Hr Emission Rate-Wind Erosion	9.77E-01 ton/yr	See calculation above
$PM_{2.5}$ 24-Hr Emission Rate-Wind Erosion	1.46E-01 ton/yr	See calculation above
Area at Half Height- Modeled Area	1,483 m^2	See calculation above

PM_{10} Emission Rate- Annual

3.28E-02 ton/yr + 8.79E-03 ton/yr = 4.16E-02 ton/yr

4.16E-02 ton/yr * 2000 lb/ton / 8760 hr/yr * 453.6 g/lb / 3600 sec/hr / 1,483 m^2 = **8.07E-07 g/(s-m^2)**

$PM_{2.5}$ Emission Rate- Annual

4.97E-03 ton/yr + 1.32E-03 ton/yr = 6.29E-03 ton/yr

6.29E-03 ton/yr * 2000 lb/ton / 8760 hr/yr * 453.6 g/lb / 3600 sec/hr / 1,483 m^2 = **1.22E-07 g/(s-m^2)**

PM_{10} Emission Rate- 24-Hr

3.28E-02 ton/yr + 9.77E-01 ton/yr = 1.01E+00 ton/yr

1.01E+00 ton/yr * 2000 lb/ton / 8760 hr/yr * 453.6 g/lb / 3600 sec/hr / 1,483 m^2 = **1.96E-05 g/(s-m^2)**

$PM_{2.5}$ Emission Rate- 24-Hr

4.97E-03 ton/yr + 1.46E-01 ton/yr = 1.51E-01 ton/yr

1.51E-01 ton/yr * 2000 lb/ton / 8760 hr/yr * 453.6 g/lb / 3600 sec/hr / 1,483 m^2 = **2.94E-06 g/(s-m^2)**

11 Active Illinois No. 6 Coal Storage Pile Emission Calculations - Source A9

Basis	Value		Reference
Pile Volume	2,137,605	ft^3	Plant Washington Specification
Pile Diameter	286	feet	Plant Washington Specification
Threshold Velocity	1.12	m/s	Table 13.2.5-2 AP-42 for wind erosion from piles
N	365	days	Daily fresh coal applied to the Main Inactive pile

Pile Dimension Calculations

Assumed cone shape V=1/3*h*Area of base

Surface Area = 1/2*(perimeter of base* slant height)

slant height = $SQRT(h^2+(L/2)^2)$

Area of Base π * 286 ft ^ 2 / 4 = 64,242 ft^2

Height 3 * 2,137,605 ft^3 / 64,242 ft^2 = 100 ft

Radius at Half Height 71.30 ft

Area at Half Height 15,963 ft^2 = 1,483 m^2

Slant Height SQRT (143 ft ^ 2 + 100 ft ^ 2) = 174 ft

Surface Area ((π * 286 ft) * 174 ft * 0.5 = 78,346 ft^2 = 7,278 m^2

Pile B2 from Fig 13..2.5-2 is the selected Pile Configuration for wind contours because the prevailing wind is WNW. According to the figure, the maximum shear velocity is 1.1 times ten percent of the prevailing wind; therefore, wind erosion occurs whenever the fastest 2 minute wind exceeds the following value:

$$V = \frac{1.12}{0.11} = 10.2 \text{ m/s} = 22.78 \text{ mph}$$

Sample Calculation:

Erosion Potentials were calculated for the dates where the normalized wind surface wind speeds exceeded the threshold velocity for uncrusted coal piles (1.12 m/s)

Erosion Potential ((AP-42, 13.2.5-3, Equation 3)

$P=58(u^*-u^*_t)^2+25(u^*-u^*_t)$ g/m^2

where:

P = Erosion Potential

u^* = Friction velocity = 0.1 u

u^*_t = Threshold Friction Velocity

u_s = Surface Wind Speed

u_t = Approach Wind Speed

December 1, 2006 - 1.1 Wind Contour

P = 58 * $(1.13 - 1.12)^2$ + 25 * (1.13 - 1.12) = 0.28 g/m^2

Emissions are computed by multiplying the Erosion Potential by the surface area of the pile, the Aerodynamic Particle Size Multiplier to speciate the PM size, and the fraction of the pile subarea that is subject to a specified wind contour. Emissions from the pile are controlled to 90% by dust suppressant

Emission rates multiplied by k = 0.5 to reduce emissions to just PM_{10} and k = 0.075 to $PM_{2.5}$ (AP-42, 13.2.5-3)

Fraction of Pile Subarea Subject to 0.9 Contour of Normalized Surface Wind Speed = 0.17

Fraction of Pile Subarea Subject to 1.1 Contour of Normalized Surface Wind Speed = 0.024

December 1, 2006 - PM10 Emissions for 1.1 Wind Contour

$$0.28 \text{ g/m}^2 * 7{,}278 \text{ m}^2 * 0.5 * 0.024 * \frac{(100\%-90\%)}{100\%} = 2.45 \text{ g/d}$$

Active Illinois No. 6 Coal Storage Pile Emission Calculations - Source A9

Daily records of fastest mile from 12/1/06 through 11/30/07 and it exceeded the calculated threshold on the following dates:(10 m anemometer)

	Wind Speed	Wind Speed	Normalized Surface Wind Speeds				Erosion Potential $P=58(u^*-u^*_t)^2+25(u^*-u^*_t)$ g/m^2 (AP-42, 13.2.5-3, Equation 3)		Daily PM_{10} Erosion Potential		Daily PM_{10} Erosion Potential Summation	Daily $PM_{2.5}$ Erosion Potential		Daily $PM_{2.5}$ Erosion Potential Summation
Date	mph	m/s	$u_s/u_t = 0.2$	$u_s/u_t = 0.6$	$u_s/u_t = 0.9$	$u_s/u_t = 1.1$	P(0.9)	P(1.1)	P(0.9)	P(1.1)		P(0.9)	P(1.1)	
20061201	23	10.28	0.21	0.62	0.93	1.13		0.28		2.45	2.45		0.37	0.37
20061207	24	10.73	0.21	0.64	0.97	1.18		1.71		15	15		2.24	2.24
20061225	26	11.62	0.23	0.70	1.05	1.28		5.42		47	47		7.10	7.10
20061226	23	10.28	0.21	0.62	0.93	1.13		0.28		2.45	2.45		0.37	0.37
20061231	24	10.73	0.21	0.64	0.97	1.18		1.71		15	15		2.24	2.24
20070108	23	10.28	0.21	0.62	0.93	1.13		0.28		2	2		0.37	0.37
20070109	28	12.52	0.25	0.75	1.13	1.38	0.16	10.25	10.18	89	100	1.53	13.42	15
20070128	24	10.73	0.21	0.64	0.97	1.18		1.71		15	15		2.24	2.24
20070213	31	13.86	0.28	0.83	1.25	1.52	4.12	19.59	255	171	426	38	25.7	64
20070218	23	10.28	0.21	0.62	0.93	1.13		0.28		2.45	2.45		0.37	0.37
20070301	32	14.30	0.29	0.86	1.29	1.57	5.81	23.27	359	203	563	54	30.5	84
20070302	30	13.41	0.27	0.80	1.21	1.48	2.61	16.20	162	141	303	24	21.2	45
20070316	29	12.96	0.26	0.78	1.17	1.43	1.29	13.08	80	114	194	12	17.1	29
20070404	33	14.75	0.30	0.89	1.33	1.62	7.69	27.22	476	238	714	71	35.7	107
20070415	32	14.30	0.29	0.86	1.29	1.57	5.81	23.27	359	203	563	54	30.5	84
20070416	28	12.52	0.25	0.75	1.13	1.38	0.16	10.25	10.18	89	100	1.53	13.42	14.95
20070508	23	10.28	0.21	0.62	0.93	1.13		0.28		2.45	2.45		0.37	0.37
20070603	23	10.28	0.21	0.62	0.93	1.13		0.28		2.45	2.45		0.37	0.37
20070629	32	14.30	0.29	0.86	1.29	1.57	5.81	23.27	359	203	563	54	30.5	84
20070701	28	12.52	0.25	0.75	1.13	1.38	0.16	10.25	10.18	89	100	1.53	13.42	15
20070711	25	11.18	0.22	0.67	1.01	1.23		3.43		30	30		4.49	4.49
20070720	38	16.99	0.34	1.02	1.53	1.87	19.91	51.21	1,232	447	1,679	185	67.1	252
20070806	23	10.28	0.21	0.62	0.93	1.13		0.28		2	2		0.37	0.37
20070816	25	11.18	0.22	0.67	1.01	1.23		3.43		30	30		4.49	4.49
20070817	41	18.33	0.37	1.10	1.65	2.02	29.50	68.97	1,825	602	2,427	274	90.4	364
20070824	26	11.62	0.23	0.70	1.05	1.28		5.42		47	47		7.10	7.10
20071115	25	11.18	0.22	0.67	1.01	1.23		3.43		30	30		4.49	4.49
							Subtotal		5,138 g/yr	2,839 g/yr	2,427 g/d	771 g/yr	426 g/yr	364 g/d
							Annual Emission Rate			7,977 g/yr	Annual Emission Rate		1,196 g/yr	
										8.79E-03 ton/yr			1.32E-03 ton/yr	
							24 Hour Emission Rate			2,427 g/d	24 Hour Emission Rate		364 g/d	
										0.98 ton/yr			1.46E-01 ton/yr	

Active Illinois No. 6 Coal Storage Pile Emission Calculations - Source A9

Area Emission Rate (Drop Point Emissions and Wind Erosion)

Basis	Value	Reference
PM_{10} Drop Point Emission Rate	1.50E-01 ton/yr	See calculation 6
$PM_{2.5}$ Drop Point Emission Rate	2.27E-02 ton/yr	See calculation 6
PM_{10} Annual Emission Rate-Wind Erosion	8.79E-03 ton/yr	See calculation above
$PM_{2.5}$ Annual Emission Rate-Wind Erosion	1.32E-03 ton/yr	See calculation above
PM_{10} 24-Hr Emission Rate-Wind Erosion	9.77E-01 ton/yr	See calculation above
$PM_{2.5}$ 24-Hr Emission Rate-Wind Erosion	1.46E-01 ton/yr	See calculation above
Area at Half Height- Modeled Area	1,483 m^2	See calculation above

PM_{10} Emission Rate- Annual

1.50E-01 ton/yr + 8.79E-03 ton/yr = 1.59E-01 ton/yr

1.59E-01 ton/yr * (2000 lb/ton / 8760 hr/yr) * (453.6 g/lb / 3600 sec/hr) / 1,483 m^2 = **3.08E-06 g/(s-m^2)**

$PM_{2.5}$ Emission Rate- Annual

2.27E-02 ton/yr + 1.32E-03 ton/yr = 2.40E-02 ton/yr

2.40E-02 ton/yr * (2000 lb/ton / 8760 hr/yr) * (453.6 g/lb / 3600 sec/hr) / 1,483 m^2 = **4.66E-07 g/(s-m^2)**

PM_{10} Emission Rate- 24-Hr

1.50E-01 ton/yr + 9.77E-01 ton/yr = 1.13E+00 ton/yr

1.13E+00 ton/yr * (2000 lb/ton / 8760 hr/yr) * (453.6 g/lb / 3600 sec/hr) / 1,483 m^2 = **2.19E-05 g/(s-m^2)**

$PM_{2.5}$ Emission Rate- 24-Hr

2.27E-02 ton/yr + 1.46E-01 ton/yr = 1.69E-01 ton/yr

1.69E-01 ton/yr * (2000 lb/ton / 8760 hr/yr) * (453.6 g/lb / 3600 sec/hr) / 1,483 m^2 = **3.28E-06 g/(s-m^2)**

12 Limestone Storage Pile Emission Calculations -Source A10

Basis	Value		Reference
Pile Volume	461,723	ft^3	Plant Washington Specification
Pile Base Diameter	172	feet	Plant Washington Specification
Threshold Velocity	1.33	m/s	Table 13.2.5-2 AP-42 for wind erosion from piles
N	365	days	Daily fresh coal applied to the Main Inactive pile

Pile Dimension Calculations

Assumed cone shape V=1/3*h*Area of base

Surface Area = 1/2*(perimeter of base* slant height)

slant height = $SQRT(h^2+(L/2)^2)$

Area of Base π * 172 ft ^ 2 / 4 = 23,235 ft^2

Height 3 * 461,723 ft^3 / 23,235 ft^2 = 60 ft

Radius at Half Height 42.58 ft

Area at Half Height 5,694 ft^2 = 529 m^2

Slant Height $SQRT\left(86\ ft^{2} + 60\ ft^{2} \right)$ = 105 ft

Surface Area $\left(\left(\pi * 172\ ft \right) * 105\ ft * 0.5 \right)$ = 28,272 ft^2 = 2,626 m^2

Pile B2 from Fig 13..2.5-2 is the selected Pile Configuration for wind contours because the prevailing wind is WNW. According to the figure, the maximum shear velocity is 1.1 times ten percent of the prevailing wind; therefore, wind erosion occurs whenever the fastest 2 minute wind exceeds the following value:

$$V = \frac{1.33}{0.11} = 12.1\ m/s = 27.05\ mph$$

Sample Calculation:

Erosion Potentials were calculated for the dates where the normalized wind surface wind speeds exceeded the threshold velocity for a limestone pile (1.33 m/s)

Erosion Potential ((AP-42, 13.2.5-3, Equation 3)

$P=58(u^*-u^*_t)^2+25(u^*-u^*_t)\ g/m^2$

where:

P = Erosion Potential

u^* = Friction velocity = 0.1 u

u^*_t = Threshold Friction Velocity

u_s = Surface Wind Speed

u_t = Approach Wind Speed

January 9, 2007 - 1.1 Wind Contour

$P = 58 * (1.38 - 1.33)^2 + 25 * (1.38 - 1.33) = 1.30\ g/m^2$

Emissions are computed by multiplying the Erosion Potential by the surface area of the pile, the Aerodynamic Particle Size Multiplier to speciate the PM size, and the fraction of the pile subarea that is subject to a specified wind contour. Emissions from the pile are controlled to 90% by dust suppressant

Emission rates multiplied by k = 0.5 to reduce emissions to just PM_{10} and k = 0.075 to $PM_{2.5}$ (AP-42, 13.2.5-3)

Fraction of Pile Subarea Subject to 0.9 Contour of Normalized Surface Wind Speed = 0.17

Fraction of Pile Subarea Subject to 1.1 Contour of Normalized Surface Wind Speed = 0.024

January 9, 2007 - PM10 Emissions for 1.1 Wind Contour

$$1.30\ g/m^2 * 2{,}626\ m^2 * 0.5 * 0.024 * \frac{(100\%-90\%)}{100\%} = 4\ g/d$$

Limestone Storage Pile Emission Calculations -Source A10

Daily records of fastest mile from 12/1/06 through 11/30/07 and it exceeded the calculated threshold on the following dates:(10 m anemometer)

	Wind Speed	Wind Speed	Normalized Surface Wind Speeds				Erosion Potential $P=58(u^*-u^*_t)^2+25(u^*-u^*_t)$ g/m^2 (AP-42, 13.2.5-3, Equation 3)		Daily PM_{10} Erosion Potential		Daily PM_{10} Erosion Potential Summation	Daily $PM_{2.5}$ Erosion Potential		Daily $PM_{2.5}$ Erosion Potential Summation
Date	mph	m/s	$u_z/u_r = 0.2$	$u_z/u_r = 0.6$	$u_z/u_r = 0.9$	$u_z/u_r = 1.1$	P(0.9)	P(1.1)	P(0.9)	P(1.1)		P(0.9)	P(1.1)	
20061201	23	10.28	0.21	0.62	0.93	1.13								
20061207	24	10.73	0.21	0.64	0.97	1.18								
20061225	26	11.62	0.23	0.70	1.05	1.28								
20061226	23	10.28	0.21	0.62	0.93	1.13								
20061231	24	10.73	0.21	0.64	0.97	1.18								
20070108	23	10.28	0.21	0.62	0.93	1.13								
20070109	28	12.52	0.25	0.75	1.13	1.38		1.30		4	4		0.61	0.61
20070128	24	10.73	0.21	0.64	0.97	1.18								
20070213	31	13.86	0.28	0.83	1.25	1.52		7.05		22	22		3.33	3.33
20070218	23	10.28	0.21	0.62	0.93	1.13								
20070301	32	14.30	0.29	0.86	1.29	1.57		9.53		30	30		4.50	4.50
20070302	30	13.41	0.27	0.80	1.21	1.48		4.85		15	15		2.29	2.29
20070316	29	12.96	0.26	0.78	1.17	1.43		2.93		9	9		1.39	1.39
20070404	33	14.75	0.30	0.89	1.328	1.62		12.29		39	39		5.81	5.81
20070415	32	14.30	0.29	0.86	1.29	1.57		9.53		30	30		4.50	4.50
20070416	28	12.52	0.25	0.75	1.13	1.38		1.30		4	4		0.61	0.61
20070508	23	10.28	0.21	0.62	0.93	1.13								
20070603	23	10.28	0.21	0.62	0.93	1.13								
20070629	32	14.30	0.29	0.86	1.29	1.57		9.53		30	30		4.50	4.50
20070701	28	12.52	0.25	0.75	1.13	1.38		1.30		4	4		0.61	0.61
20070711	25	11.18	0.22	0.67	1.01	1.23								
20070720	38	16.99	0.34	1.02	1.53	1.87	7.26	30.28	162	95	258	24	14	39
20070806	23	10.28	0.21	0.62	0.93	1.13								
20070816	25	11.18	0.22	0.67	1.01	1.23								
20070817	41	18.33	0.37	1.10	1.65	2.02	13.91	44.45	310	140	451	47	21	68
20070824	26	11.62	0.23	0.70	1.05	1.28								
20071115	25	11.18	0.22	0.67	1.01	1.23								
								Subtotal	473 g/yr	423 g/yr	451 g/d	71 g/yr	64 g/yr	68 g/d
								Annual Emission Rate		896 g/yr	**Annual Emission Rate**		134 g/yr	
										9.88E-04 ton/yr			1.48E-04 ton/yr	
								24 Hour Emission Rate		451 g/d	**24 Hour Emission Rate**		68 g/d	
										0.18 ton/yr			2.72E-02 ton/yr	

Limestone Storage Pile Emission Calculations -Source A10

Area Emission Rate (Drop Point Emissions and Wind Erosion)

Basis	Value	Reference
PM_{10} Drop Point Emission Rate	1.63E-02 ton/yr	See calculation 6
$PM_{2.5}$ Drop Point Emission Rate	2.47E-03 ton/yr	See calculation 6
PM_{10} Annual Emission Rate-Wind Erosion	9.88E-04 ton/yr	See calculation above
$PM_{2.5}$ Annual Emission Rate-Wind Erosion	1.48E-04 ton/yr	See calculation above
PM_{10} 24-Hr Emission Rate-Wind Erosion	1.81E-01 ton/yr	See calculation above
$PM_{2.5}$ 24-Hr Emission Rate-Wind Erosion	2.72E-02 ton/yr	See calculation above
Area at Half Height- Modeled Area	529 m^2	See calculation above

PM_{10} Emission Rate- Annual

1.63E-02 ton/yr + 9.88E-04 ton/yr = 1.73E-02 ton/yr

1.73E-02 ton/yr * 2000 lb/ton / 8760 hr/yr * 453.6 g/lb / 3600 sec/hr / 529 m^2 = **9.42E-07 g/(s-m^2)**

$PM_{2.5}$ Emission Rate- Annual

2.47E-03 ton/yr + 1.48E-04 ton/yr = 2.62E-03 ton/yr

2.62E-03 ton/yr * 2000 lb/ton / 8760 hr/yr * 453.6 g/lb / 3600 sec/hr / 529 m^2 = **1.43E-07 g/(s-m^2)**

PM_{10} Emission Rate- 24-Hr

1.63E-02 ton/yr + 1.81E-01 ton/yr = 1.98E-01 ton/yr

1.98E-01 ton/yr * 2000 lb/ton / 8760 hr/yr * 453.6 g/lb / 3600 sec/hr / 529 m^2 = **1.07E-05 g/(s-m^2)**

$PM_{2.5}$ Emission Rate- 24-Hr

2.47E-03 ton/yr + 2.72E-02 ton/yr = 2.97E-02 ton/yr

2.97E-02 ton/yr * 2000 lb/ton / 8760 hr/yr * 453.6 g/lb / 3600 sec/hr / 529 m^2 = **1.61E-06 g/(s-m^2)**

13 Total Vehicle Miles Traveled for Paved Road

Basis	Value	Units	Reference
Daily Number of Trucks	126	Trucks	Plant Washington Specification
Length of Paved Road	0.380	Miles	Plant Washington Specification
Number of Trips on Road	2		Accounts for Distance to and from Solid Materials Handling Facility

Total Vehicle Miles Traveled to and from Land Fill

126 Trucks/day * 0.380 Miles/Truck * 2 = 95.73 miles/day

95.73 miles/day * 365 days/year = 34,943 miles/year

14 Fugitive Emission Calculations for Paved Road - Source P1-P21

Basis	Value	Units	Reference
Road Surface Silt Loading (sL)	8.2	g/m^2	EPD specifications
Mean Vehicle Weight (W)	12.5	tons	Average Weight of vehicles
k (empircal constant) - PM_{10}	0.016	lb/VMT	AP-42 constant for paved road
k (empircal constant) - $PM_{2.5}$	0.0024	lb/VMT	AP-42 constant for paved road
Number of wet days in a year (P)	120	days/year	AP-42 table (number of days in a year with at least 0.01 inch of precipitation)
Total Miles traveled on a road segment	34,943 miles/year		Based on Segment Distance and Number of Trips
Control Efficiency	90	%	Projected Control Efficiency
Number of Days in Averaging Period	365	days	Number of Days in Averaging Period

PM_{10} Emission Factor (E)

$$k * \left(\frac{sL}{2}\right)^{0.65} * \left(\frac{W}{3}\right)^{1.5}$$

$$0.016 * \left(\frac{8.2}{2}\right)^{0.65} * \left(\frac{12.5}{3}\right)^{1.5} = 0.34 \text{ lb/VMT}$$

PM_{10} Emissions

$$0.34 \text{ lb/VMT} * 34{,}943 \text{ miles/year} * \frac{1 \text{ ton}}{2000 \text{ lb}} * (1-120/(4*365)) * \frac{(100\%-90\%)}{100\%} = 0.55 \text{ ton/yr}$$

$PM_{2.5}$ Emission Factor (E)

$$k * \left(\frac{sL}{2}\right)^{0.65} * \left(\frac{W}{3}\right)^{1.5}$$

$$0.0024 * \left(\frac{8.2}{2}\right)^{0.65} * \left(\frac{12.5}{3}\right)^{1.5} = 0.05 \text{ lb/VMT}$$

$PM_{2.5}$ Emissions

$$0.05 \text{ lb/VMT} * 34{,}943 \text{ miles/year} * \frac{1 \text{ ton}}{2000 \text{ lb}} * (1-120/(4*365)) * \frac{(100\%-90\%)}{100\%} = 8.19 \text{ E-02 ton/yr}$$

15 Fugitive Emission Calculations for Unpaved Road - Source U1-U15

Basis	Value	Units	Reference
Mean Vehicle Weight (W)	50	tons	Average Weight of vehicles, Project Specification
Surface Material Silt Content (s)	6	%	AP-42, Table 11.9-3 Bulldozers (Coal)
k (empirical constant) - TSP	4.9	lb/VMT	AP-42 constant for unpaved road
k (empirical constant) - PM_{10}	1.5	lb/VMT	AP-42 constant for unpaved road
k (empirical constant) - $PM_{2.5}$	0.15	lb/VMT	AP-42 constant for unpaved road
a (empirical constant) - TSP	0.7		AP-42 constant for unpaved road
a (empirical constant) - PM_{10}	0.9		AP-42 constant for unpaved road
a (empirical constant) - $PM_{2.5}$	0.9		AP-42 constant for unpaved road
b (empirical constant) - TSP	0.45		AP-42 constant for unpaved road
b (empirical constant) - PM_{10}	0.45		AP-42 constant for unpaved road
b (empirical constant) - $PM_{2.5}$	0.45		AP-42 constant for unpaved road
Number of wet days in a year (P)	120	days/year	AP-42 table (number of days in a year with at least 0.01 inch of precipitation)
Total Miles traveled on a road segment	730 miles/year		Project Specification
Control Efficiency	50	%	Projected Control Efficiency
Number of Days in Averaging Period	120	days	Number of Days in Averaging Period

TSP Emission Factor (E)

$$E = k * \left(\frac{s}{12}\right)^{a} * \left(\frac{W}{3}\right)^{b} * (1-f) * \left(\frac{365-P}{365}\right)$$

$$4.9 * \left(\frac{6}{12}\right)^{0.7} * \left(\frac{50}{3}\right)^{0.45} * 0.5 * \left(\frac{245}{365}\right) = 3.59 \text{ lb/VMT}$$

TSP Emissions

$$3.59 \text{ lb/VMT} * 730 \text{ miles/year} * \frac{1 \text{ ton}}{2000 \text{ lb}} = \boxed{1.31 \text{ ton/yr}}$$

PM_{10} Emission Factor (E)

$$E = k * \left(\frac{s}{12}\right)^{a} * \left(\frac{W}{3}\right)^{b} * (1-f) * \left(\frac{365-P}{365}\right)$$

$$1.5 * \left(\frac{6}{12}\right)^{0.9} * \left(\frac{50}{3}\right)^{0.45} * 0.5 * \left(\frac{245}{365}\right) = 0.96 \text{ lb/VMT}$$

PM_{10} Emissions

$$0.96 \text{ lb/VMT} * 730 \text{ miles/year} * \frac{1 \text{ ton}}{2000 \text{ lb}} = \boxed{0.35 \text{ ton/yr}}$$

$PM_{2.5}$ Emission Factor (E)

$$E = k * \left(\frac{s}{12}\right)^{a} * \left(\frac{W}{3}\right)^{b} * (1-f) * \left(\frac{365-P}{365}\right)$$

$$0.15 * \left(\frac{6}{12}\right)^{0.9} * \left(\frac{50}{3}\right)^{0.45} * 0.5 * \left(\frac{245}{365}\right) = 9.57\text{E-}02 \text{ lb/VMT}$$

$PM_{2.5}$ Emissions

$$9.57\text{E-}02 \text{ lb/VMT} * 730 \text{ miles/year} * \frac{1 \text{ ton}}{2000 \text{ lb}} = \boxed{3.49\text{E-}2 \text{ ton/yr}}$$

Completed by: BSA 11/26/2008
Checked by: SAK 11/26/2008

CASE-BY-CASE MACT CALCULATIONS

Table A-3: USGS COALQUAL Summary Data for PRB and Illinois No. 6

Elements	PRB Coal Average	Standard Deviation	90% Confidence Level PRB	Illinois #6 Coal Average	Standard Deviation	90% Confidence Level Illinois #6 Coal	PRB-Illinois # 6 Coal 50-50 Blend Average	90% Confidence Level 50-50 Blend
Antimony (Sb) Emission Factor	0.67 ppm	0.90 ppm	1.82 ppm	0.89 ppm	0.97 ppm	2.14 ppm	0.78 ppm	1.98 ppm
Arsenic (As) Emission Factor	7.10 ppm	25.82 ppm	40.15 ppm	7.50 ppm	10.47 ppm	20.90 ppm	7.30 ppm	30.52 ppm
Beryllium (Be) Emission Factor	0.95 ppm	1.01 ppm	2.24 ppm	2.59 ppm	2.26 ppm	5.49 ppm	1.77 ppm	3.87 ppm
Cadmium (Cd) Emission Factor	0.14 ppm	0.19 ppm	0.38 ppm	3.41 ppm	8.40 ppm	14.16 ppm	1.77 ppm	7.27 ppm
Chlorine (Cl) Emission Factor	97.52 ppm	97.62 ppm	222.48 ppm	2700 ppm	---	4000 ppm	1398.76 ppm	2111.24 ppm
Chromium (Cr) Emission Factor	7.19 ppm	7.16 ppm	16.35 ppm	16.63 ppm	7.47 ppm	26.19 ppm	11.91 ppm	21.27 ppm
Cobalt (Co) Emission Factor	2.17 ppm	2.36 ppm	5.18 ppm	3.45 ppm	1.39 ppm	5.23 ppm	2.81 ppm	5.21 ppm
Fluorine (F) Emission Factor	76.76 ppm	81.51 ppm	181.09 ppm	80.38 ppm	33.95 ppm	123.83 ppm	78.57 ppm	152.46 ppm
Manganese (Mn) Emission Fact	47.80 ppm	56.45 ppm	120.05 ppm	56.75 ppm	32.74 ppm	98.66 ppm	52.27 ppm	109.36 ppm
Mercury (Hg) Emission Factor	0.10 ppm	0.11 ppm	0.25 ppm	0.09 ppm	0.05 ppm	0.15 ppm	0.10 ppm	0.20 ppm
Nickel (Ni) Emission Factor	6.04 ppm	7.43 ppm	15.56 ppm	15.65 ppm	10.53 ppm	29.12 ppm	10.85 ppm	22.34 ppm
Lead (Pb) Emission Factor	4.63 ppm	4.79 ppm	10.77 ppm	10.76 ppm	11.37 ppm	25.31 ppm	7.70 ppm	18.04 ppm
Selenium (Se) Emission Factor	1.09 ppm	0.94 ppm	2.30 ppm	2.28 ppm	1.10 ppm	3.69 ppm	1.68 ppm	2.99 ppm

Note: Fluorine and Chlorine ppm values used to determine uncontrolled emissions of HF and HCl. Raw coal quality analysis data can be found in Exhibit A. Chlorine concentration values indicated for Illinois #6 coals based on coal design basis data and not USGS COALQUAL data.

Completed by: BSA 11/26/2008
Checked by: SAK 11/26/2008

Table A-4 : Moisture Data Correction

Coal	Total Moisture (%)	Average Ratio of Residual Moisture to Total Moisture[1]	Residual Moisture (%)[2]	Moisture Correction[3]
PRB	29.61	0.3957	11.72	0.7973
Illinois # 6	10	0.6546	6.55	0.9630
50-50 Blend	19.81		9.13	0.8825

1. Value derived from USGS COALQUAL Data as described in Section 10.
2. Residual moisture (%) of project coal is moisture (%) * average ratio of Residual moisture to Total moisture.
3. Moisture correction is (100 - Total Moisture)/ (100 - Residual moisture).

Completed by: JDF 11/26/2008
Checked by: SAK 11/26/2008

16 **PRB Coal Case-By-Case MACT 90% Confidence Level Emission Rate Calculations - Main Boiler (Stack S1)**

Basis	Value	Units	
Exhaust Flow Rate	1,927,690	dscf/min	Project Specification
Maximum Heat Input - Full Load	8300	MMBtu/hr	Project Specification
Antimony (Sb) Emission Factor	1.82	ppm	90% Confidence level from Coal Analysis Data
Arsenic (As) Emission Factor	40.15	ppm	90% Confidence level from Coal Analysis Data
Beryllium (Be) Emission Factor	2.24	ppm	90% Confidence level from Coal Analysis Data
Cadmium (Cd) Emission Factor	0.38	ppm	90% Confidence level from Coal Analysis Data
Chromium (Cr) Emission Factor	16.35	ppm	90% Confidence level from Coal Analysis Data
Cobalt (Co) Emission Factor	5.18	ppm	90% Confidence level from Coal Analysis Data
Manganese (Mn) Emission Factor	120.05	ppm	90% Confidence level from Coal Analysis Data
Nickel (Ni) Emission Factor	15.56	ppm	90% Confidence level from Coal Analysis Data
Lead (Pb) Emission Factor	10.77	ppm	90% Confidence level from Coal Analysis Data
Selenium (Se) Emission Factor	2.30	ppm	90% Confidence level from Coal Analysis Data
Fluorine Fuel Content	0.018109094	lb F per 100 lb coal	Project Specification
Chlorine Fuel Content	0.02224787	lb Cl per 100 lb coal	Project Specification
MACT Floor Metals Control Efficiency	99	%	
MACT Floor Acid Gas (HCl, HF) Control Efficiency	98.5	%	
Moisture Correction Factor	0.7973		From Table A-4
Coal Heating Value	8500	Btu/lb	
lb HCl per lb Cl	1.03	lb	
lb HF per lb F	1.05	lb	
kg per ton	907.18	kg/ton	
mg per lb	453592.37	mg/lb	
Coal Flow Rate For PRB	488	ton/hr	

Antimony (Sb) Emissions

Estimated Uncontrolled Emissions

$$\frac{1.82\ \text{mg}}{\text{kg}} * \frac{907.18\ \text{kg}}{\text{ton}} * \frac{1\ \text{lb}}{453592.37\ \text{mg}} * \frac{488\ \text{ton}}{\text{hr}} * 0.7973 * \frac{1\ \text{hr}}{8300\ \text{MMBtu}} = \boxed{\textbf{1.71E-04 lb/MMBtu}}$$

Estimated Controlled Emissions

1.71E-04 lb/MMBtu * 99 % Removal = **1.71E-06 lb/MMBtu**

Arsenic (As) Emissions

Estimated Uncontrolled Emissions

$$\frac{40.15\ \text{mg}}{\text{kg}} * \frac{907.18\ \text{kg}}{\text{ton}} * \frac{1\ \text{lb}}{453592.37\ \text{mg}} * \frac{488\ \text{ton}}{\text{hr}} * 0.7973 * \frac{1\ \text{hr}}{8300\ \text{MMBtu}} = \boxed{\textbf{3.77E-03 lb/MMBtu}}$$

Estimated Controlled Emissions

3.77E-03 lb/MMBtu * 99 % Removal = **3.77E-05 lb/MMBtu**

Completed by : BSA 11/26/2008
Checked by: SAK 11/26/2008

Beryllium (Be) Emissions

Estimated Uncontrolled Emissions

$$\frac{2.24\ mg}{kg} * \frac{907.18\ kg}{ton} * \frac{1\ lb}{453592.37\ mg} * \frac{488\ ton}{hr} * 0.7973 * \frac{1\ hr}{8300\ MMBtu} = \mathbf{2.11E\text{-}04\ lb/MMBtu}$$

Estimated Controlled Emissions

2.11E-04 lb/MMBtu * 99 % Removal = **2.11E-06 lb/MMBtu**

Cadmium (Cd) Emissions

Estimated Uncontrolled Emissions

$$\frac{0.38\ mg}{kg} * \frac{907.18\ kg}{ton} * \frac{1\ lb}{453592.37\ mg} * \frac{488\ ton}{hr} * 0.7973 * \frac{1\ hr}{8300\ MMBtu} = \mathbf{3.53E\text{-}05\ lb/MMBtu}$$

Estimated Controlled Emissions

3.53E-05 lb/MMBtu * 99 % Removal = **3.53E-07 lb/MMBtu**

Chromium (Cr) Emissions

Estimated Uncontrolled Emissions

$$\frac{16.35\ mg}{kg} * \frac{907.18\ kg}{ton} * \frac{1\ lb}{453592.37\ mg} * \frac{488\ ton}{hr} * 0.7973 * \frac{1\ hr}{8300\ MMBtu} = \mathbf{1.53E\text{-}03\ lb/MMBtu}$$

Estimated Controlled Emissions

1.53E-03 lb/MMBtu * 99 % Removal = **1.53E-05 lb/MMBtu**

Cobalt (Co) Emissions

Estimated Uncontrolled Emissions

$$\frac{5.18\ mg}{kg} * \frac{907.18\ kg}{ton} * \frac{1\ lb}{453592.37\ mg} * \frac{488\ ton}{hr} * 0.7973 * \frac{1\ hr}{8300\ MMBtu} = \mathbf{4.86E\text{-}04\ lb/MMBtu}$$

Estimated Controlled Emissions

4.86E-04 lb/MMBtu * 99 % Removal = **4.86E-06 lb/MMBtu**

Manganese (Mn) Emissions

Estimated Uncontrolled Emissions

$$\frac{120.05\ mg}{kg} * \frac{907.18\ kg}{ton} * \frac{1\ lb}{453592.37\ mg} * \frac{488\ ton}{hr} * 0.7973 * \frac{1\ hr}{8300\ MMBtu} = \mathbf{1.13E\text{-}02\ lb/MMBtu}$$

Completed by : BSA 11/26/2008
Checked by: SAK 11/26/2008

Estimated Controlled Emissions

1.13E-02 lb/MMBtu * 99 % Removal = **1.13E-04 lb/MMBtu**

Nickel (Ni) Emissions

Estimated Uncontrolled Emissions

$$\frac{15.56\ mg}{kg} * \frac{907.18\ kg}{ton} * \frac{1\ lb}{453592.37\ mg} * \frac{488\ ton}{hr} * 0.7973 * \frac{1\ hr}{8300\ MMBtu} = \mathbf{1.46E\text{-}03\ lb/MMBtu}$$

Estimated Controlled Emissions

1.46E-03 lb/MMBtu * 99 % Removal = **1.46E-05 lb/MMBtu**

Lead (Pb) Emissions

Estimated Uncontrolled Emissions

$$\frac{10.77\ mg}{kg} * \frac{907.18\ kg}{ton} * \frac{1\ lb}{453592.37\ mg} * \frac{488\ ton}{hr} * 0.7973 * \frac{1\ hr}{8300\ MMBtu} = \mathbf{1.01E\text{-}03\ lb/MMBtu}$$

Estimated Controlled Emissions

1.01E-03 lb/MMBtu * 99 % Removal = **1.01E-05 lb/MMBtu**

Selenium (Se) Emissions

Estimated Uncontrolled Emissions

$$\frac{2.30\ mg}{kg} * \frac{907.18\ kg}{ton} * \frac{1\ lb}{453592.37\ mg} * \frac{488\ ton}{hr} * 0.7973 * \frac{1\ hr}{8300\ MMBtu} = \mathbf{2.15E\text{-}04\ lb/MMBtu}$$

Estimated Controlled Emissions

2.15E-04 lb/MMBtu * 99 % Removal = **2.15E-06 lb/MMBtu**

Hydrogen Chloride (HCl) Emissions

Estimated Uncontrolled Emissions

$$\frac{0.02\ lb\ Cl}{100\ lb\ coal} * \frac{1\ lb}{8500\ Btu} * \frac{1 \times 10^{6}\ Btu}{MMBtu} * \frac{1.03\ lb\ HCl}{lb\ Cl} * 0.7973 = \mathbf{2.15E\text{-}02\ lb/MMBtu}$$

Estimated Controlled Emissions

2.15E-02 lb/MMBtu * 98.5 % Removal = **3.22E-04 lb/MMBtu**

Completed by : BSA 11/26/2008
Checked by: SAK 11/26/2008

Hydrogen Fluoride (HF) Emissions

Estimated Uncontrolled Emissions

$$\frac{0.0181 \text{ lb F}}{100 \text{ lb coal}} * \frac{1 \text{ lb}}{8500 \text{ Btu}} * \frac{1 \times 10^6 \text{ Btu}}{\text{MMBtu}} * \frac{1.05 \text{ lb HF}}{\text{lb F}} * 0.7973 = \boxed{\textbf{1.78E-02 lb/MMBtu}}$$

Estimated Controlled Emissions

1.78E-02 lb/MMBtu * 98.5 % Removal = **2.68E-04 lb/MMBtu**

Completed by : BSA 11/26/2008
Checked by: SAK 11/26/2008

17 PRB Coal 95% UCL Mercury Calculations - Main Boiler (Stack S1)

Basis	Value	Units	
Exhaust Flow Rate	1,927,690	dscf/min	Project Specification
Maximum Heat Input - Full Load	8300	MMBtu/hr	Project Specification
Mercury (Hg) Emission Factor (PRB Coal Avg.)	0.11	ppm	95% UCL from Coal Analysis Data
MACT Floor Mercury Control Efficiency	83.6	%	
Moisture Correction Factor	0.7973		From Table A-4
Coal Heating Value	8500	Btu/lb	From Coal Analysis Data
kg per ton	907.18	kg/ton	
mg per lb	453592.37	mg/lb	
Coal Flow Rate For PRB	488	ton/hr	
Plant Gross Output Capacity	930	MW	

Mercury (Hg) Emissions (PRB Coal Avg.)

Estimated Uncontrolled Emissions

$$\frac{0.11\ \text{mg}}{\text{kg}} * \frac{907.18\ \text{kg}}{\text{ton}} * \frac{1\ \text{lb}}{453592.37\ \text{mg}} * \frac{488\ \text{ton}}{\text{hr}} * 0.7973 * \frac{1\ \text{hr}}{8300\ \text{MMBtu}} = \boxed{\textbf{1.02E-05 lb/MMBtu}}$$

Estimated Controlled Emissions

1.02E-05 lb/MMBtu * 84 % Removal = **1.68E-06 lb/MMBtu**

1.68E-06 lb/MMBtu * 8300 MMBtu/hr ÷ 930 MW = **1.50E-05 lb/MW-hr**

Completed by : BSA11/26/2008
Checked by : SAK 11/26/2008

18 50-50 Blend of PRB Coals and Illinois No. 6 Coals 90% Confidence Level Emission Rate Calculations - Main Boiler (Stack S1)

Basis	Value	Units	
Exhaust Flow Rate	1,927,690	dscf/min	Project Specification
Maximum Heat Input - Full Load	8300	MMBtu/hr	Project Specification
Antimony (Sb) Emission Factor	1.98	ppm	90% Confidence level from Coal Analysis Data
Arsenic (As) Emission Factor	30.52	ppm	90% Confidence level from Coal Analysis Data
Beryllium (Be) Emission Factor	3.87	ppm	90% Confidence level from Coal Analysis Data
Cadmium (Cd) Emission Factor	7.27	ppm	90% Confidence level from Coal Analysis Data
Chromium (Cr) Emission Factor	21.27	ppm	90% Confidence level from Coal Analysis Data
Cobalt (Co) Emission Factor	5.21	ppm	90% Confidence level from Coal Analysis Data
Manganese (Mn) Emission Factor	109.36	ppm	90% Confidence level from Coal Analysis Data
Nickel (Ni) Emission Factor	22.34	ppm	90% Confidence level from Coal Analysis Data
Lead (Pb) Emission Factor	18.04	ppm	90% Confidence level from Coal Analysis Data
Selenium (Se) Emission Factor	2.99	ppm	90% Confidence level from Coal Analysis Data
Fluorine Fuel Content	0.015246016	lb F per 100 lb coal	Project Specification
Chlorine Fuel Content	0.211123935	lb Cl per 100 lb coal	Project Specification
MACT Floor Metals Control Efficiency	99	%	
MACT Floor Acid Gas (HCl, HF) Control Efficien	98.5	%	
Moisture Correction Factor	0.8825		From Table A-4
Coal Heating Value	9950	Btu/lb	
lb HCl per lb Cl	1.03	lb	
lb HF per lb F	1.05	lb	
kg per ton	907.18	kg/ton	
mg per lb	453592.37	mg/lb	
Coal Flow Rate For 50/50 Blend	417	ton/hr	

Antimony (Sb) Emissions

Estimated Uncontrolled Emissions

$$\frac{1.98\ \text{mg}}{\text{kg}} * \frac{907.18\ \text{kg}}{\text{ton}} * \frac{1\ \text{lb}}{453592.37\ \text{mg}} * \frac{417\ \text{ton}}{\text{hr}} * \frac{1\ \text{hr}}{8300\ \text{MMBtu}} * 0.8825 = \boxed{\textbf{1.75E-04 lb/MMBtu}}$$

Estimated Controlled Emissions

1.75E-04 lb/MMBtu * 99 % Removal = **1.75E-06 lb/MMBtu**

Arsenic (As) Emissions

Estimated Uncontrolled Emissions

$$\frac{30.52\ \text{mg}}{\text{kg}} * \frac{907.18\ \text{kg}}{\text{ton}} * \frac{1\ \text{lb}}{453592.37\ \text{mg}} * \frac{417\ \text{ton}}{\text{hr}} * \frac{1\ \text{hr}}{8300\ \text{MMBtu}} * 0.8825 = \boxed{\textbf{2.71E-03 lb/MMBtu}}$$

Estimated Controlled Emissions

2.71E-03 lb/MMBtu * 99 % Removal = **2.71E-05 lb/MMBtu**

Beryllium (Be) Emissions

Estimated Uncontrolled Emissions

$$\frac{3.87\ mg}{kg} * \frac{907.18\ kg}{ton} * \frac{1\ lb}{453592.37\ mg} * \frac{417\ ton}{hr} * \frac{1\ hr}{8300\ MMBtu} * 0.8825 = \boxed{\textbf{3.43E-04 lb/MMBtu}}$$

Estimated Controlled Emissions

3.43E-04 lb/MMBtu * 99 % Removal = **3.43E-06 lb/MMBtu**

Cadmium (Cd) Emissions

Estimated Uncontrolled Emissions

$$\frac{7.27\ mg}{kg} * \frac{907.18\ kg}{ton} * \frac{1\ lb}{453592.37\ mg} * \frac{417\ ton}{hr} * \frac{1\ hr}{8300\ MMBtu} * 0.8825 = \boxed{\textbf{6.45E-04 lb/MMBtu}}$$

Estimated Controlled Emissions

6.45E-04 lb/MMBtu * 99 % Removal = **6.45E-06 lb/MMBtu**

Chromium (Cr) Emissions

Estimated Uncontrolled Emissions

$$\frac{21.27\ mg}{kg} * \frac{907.18\ kg}{ton} * \frac{1\ lb}{453592.37\ mg} * \frac{417\ ton}{hr} * \frac{1\ hr}{8300\ MMBtu} * 0.8825 = \boxed{\textbf{1.89E-03 lb/MMBtu}}$$

Estimated Controlled Emissions

1.89E-03 lb/MMBtu * 99 % Removal = **1.89E-05 lb/MMBtu**

Cobalt (Co) Emissions

Estimated Uncontrolled Emissions

$$\frac{5.21\ mg}{kg} * \frac{907.18\ kg}{ton} * \frac{1\ lb}{453592.37\ mg} * \frac{417\ ton}{hr} * \frac{1\ hr}{8300\ MMBtu} * (100\% - 88.25\%) = \boxed{\textbf{4.62E-04 lb/MMBtu}}$$

Estimated Controlled Emissions

4.62E-04 lb/MMBtu * 99 % Removal = **4.62E-06 lb/MMBtu**

Manganese (Mn) Emissions

Estimated Uncontrolled Emissions

$$\frac{109.36\ mg}{kg} * \frac{907.18\ kg}{ton} * \frac{1\ lb}{453592.37\ mg} * \frac{417\ ton}{hr} * \frac{1\ hr}{8300\ MMBtu} * 0.8825 = \boxed{\textbf{9.70E-03 lb/MMBtu}}$$

Estimated Controlled Emissions

9.70E-03 lb/MMBtu * 99 % Removal = **9.70E-05 lb/MMBtu**

Nickel (Ni) Emissions

Estimated Uncontrolled Emissions

$\frac{22.34\ mg}{kg} * \frac{907.18\ kg}{ton} * \frac{1\ lb}{453592.37\ mg} * \frac{417\ ton}{hr} * \frac{1\ hr}{8300\ MMBtu} * 0.8825 =$ **1.98E-03 lb/MMBtu**

Estimated Controlled Emissions

1.98E-03 lb/MMBtu * 99 % Removal = **1.98E-05 lb/MMBtu**

Lead (Pb) Emissions

Estimated Uncontrolled Emissions

$\frac{18.04\ mg}{kg} * \frac{907.18\ kg}{ton} * \frac{1\ lb}{453592.37\ mg} * \frac{417\ ton}{hr} * \frac{1\ hr}{8300\ MMBtu} * 0.8825 =$ **1.60E-03 lb/MMBtu**

Estimated Controlled Emissions

1.60E-03 lb/MMBtu * 99 % Removal = **1.60E-05 lb/MMBtu**

Selenium (Se) Emissions

Estimated Uncontrolled Emissions

$\frac{2.99\ mg}{kg} * \frac{907.18\ kg}{ton} * \frac{1\ lb}{453592.37\ mg} * \frac{417\ ton}{hr} * \frac{1\ hr}{8300\ MMBtu} * 0.8825 =$ **2.65E-04 lb/MMBtu**

Estimated Controlled Emissions

2.65E-04 lb/MMBtu * 99 % Removal = **2.65E-06 lb/MMBtu**

Hydrogen Chloride (HCl) Emissions

Estimated Uncontrolled Emissions

$\frac{0.21\ lb\ Cl}{100\ lb\ coal} * \frac{1\ lb}{9950\ Btu} * \frac{1 \times 10^6\ Btu}{MMBtu} * \frac{1.03\ lb\ HCl}{lb\ Cl} * 0.8825 =$ **1.93E-01 lb/MMBtu**

Estimated Controlled Emissions

1.93E-01 lb/MMBtu * 98.5 % Removal = **2.89E-03 lb/MMBtu**

Hydrogen Fluoride (HF) Emissions

Estimated Uncontrolled Emissions

$$\frac{0.0152 \text{ lb F}}{100 \text{ lb coal}} * \frac{1 \text{ lb}}{9950 \text{ Btu}} * \frac{1 \times 10^6 \text{ Btu}}{\text{MMBtu}} * \frac{1.05 \text{ lb HF}}{\text{lb F}} * 0.8825 = \boxed{\textbf{1.42E-02 lb/MMBtu}}$$

Estimated Controlled Emissions

1.42E-02 lb/MMBtu * 98.5 % Removal = **2.13E-04 lb/MMBtu**

Table A-5: Organic HAP (and Others) Emission Calculations: Main Boiler - 100% PRB Coal

Basis:
Coal Consumption Rate 488 ton Coal/hr
Fuel Oil Consumption Rate 9286 gal/hr
Maximum heat Input 8.30E-03 Trillion Btu/hr

Compound	Pulverized Coal [1] - AP42			Fuel Oil [2] - AP42			Pulverized Coal [3] - Utility Report to Congress, NEI Database, TRI Database			Worst Case Emissions (lb/hr)	Worst Case Emissions (tpy)
	Emission Factor	Units	Hourly Emissions (lb/hr)	Emission Factor	Units	Hourly Emissions (lb/hr)	Emission Factor	Units	Hourly Emissions (lb/hr)		
Organics											
Acenaphthene	5.10E-07	lb/ton	2.49E-04	2.1E-05	lb/1,000 gal	2.0E-04	0.013	lb/trillion btu	1.08E-04	2.5E-04	1.1E-03
Acenaphthylene	2.50E-07	lb/ton	1.22E-04	2.5E-07	lb/1,000 gal	2.3E-06	0.004	lb/trillion btu	3.32E-05	1.2E-04	5.3E-04
Acetaldehyde	5.70E-04	lb/ton	2.78E-01				6.75	lb/trillion btu	5.60E-02	2.8E-01	1.2E+00
Acetophenone	1.50E-05	lb/ton	7.32E-03				0.68	lb/trillion btu	5.64E-03	7.3E-03	3.2E-02
Acrolein	2.90E-04	lb/ton	1.42E-01				3.25	lb/trillion btu	2.70E-02	1.4E-01	6.2E-01
Anthracene	2.10E-07	lb/ton	1.02E-04	1.2E-06	lb/1,000 gal	1.1E-05	0.004	lb/trillion btu	3.32E-05	1.0E-04	4.5E-04
Benzene	1.30E-03	lb/ton	6.34E-01	2.14E-04	lb/1,000 gal	2.0E-03	2.5	lb/trillion btu	2.08E-02	6.3E-01	2.8E+00
Benzo(a)anthracene	8.00E-08	lb/ton	3.90E-05	4.0E-06	lb/1,000 gal	3.7E-05	0.002	lb/trillion btu	1.66E-05	3.9E-05	1.7E-04
Benzo(a)pyrene	3.80E-08	lb/ton	1.85E-05				0.001	lb/trillion btu	8.30E-06	1.9E-05	8.1E-05
Benzo(b)fluoranthene			-				0.008	lb/trillion btu	6.64E-05	6.6E-05	2.9E-04
Benzo(e)pyrene			-				0.001	lb/trillion btu	8.30E-06	8.3E-06	3.6E-05
Benzo(g,h,i)perylene			-	2.26E-06	lb/1,000 gal	2.1E-05	0.002	lb/trillion btu	1.66E-05	2.1E-05	9.2E-05
Benzo(g,h,i)pyrene	2.70E-08	lb/ton	1.32E-05							1.3E-05	5.8E-05
Benzo(b,k)fluoranthene	1.10E-07	lb/ton	5.37E-05	1.48E-06	lb/1,000 gal	1.4E-05	0.004	lb/trillion btu	3.32E-05	5.4E-05	2.4E-04
Benzo(k)fluoranthene			-				0.004	lb/trillion btu	3.32E-05	3.3E-05	1.5E-04
Benzyl chloride	7.00E-04	lb/ton	3.42E-01				0.006	lb/trillion btu	4.98E-05	3.4E-01	1.5E+00
Biphenyl	1.70E-06	lb/ton	8.30E-04				0.18	lb/trillion btu	1.49E-03	1.5E-03	6.5E-03
bis(2-Ethylhexyl)phthalate	7.30E-05	lb/ton	3.56E-02				4.1	lb/trillion btu	3.40E-02	3.6E-02	1.6E-01
Bromoform	3.90E-05	lb/ton	1.90E-02				6.6	lb/trillion btu	5.48E-02	5.5E-02	2.4E-01
Carbon tetrachloride			-				3.25	lb/trillion btu	2.70E-02	2.7E-02	1.2E-01
Carbon disulfide	1.30E-04	lb/ton	6.34E-02				4.3	lb/trillion btu	3.57E-02	6.3E-02	2.8E-01
Chlorobenzene	2.20E-05	lb/ton	1.07E-02				3.18	lb/trillion btu	2.64E-02	2.6E-02	1.2E-01
Chloroform	5.90E-05	lb/ton	2.88E-02				3.2	lb/trillion btu	2.66E-02	2.9E-02	1.3E-01
Chloromethane	5.30E-04	lb/ton	2.59E-01				5.9	lb/trillion btu	4.90E-02	2.6E-01	1.1E+00
2-Chloronaphthalene			-				0.04	lb/trillion btu	3.32E-04	3.3E-04	1.5E-03
2-Chloroacetophenone	7.00E-06	lb/ton	3.42E-03				0.29	lb/trillion btu	2.41E-03	3.4E-03	1.5E-02
Chrysene	1.00E-07	lb/ton	4.88E-05	2.4E-06	lb/1,000 gal	2.2E-05	0.003	lb/trillion btu	2.49E-05	4.9E-05	2.1E-04
Cumene	5.30E-06	lb/ton	2.59E-03				0.29	lb/trillion btu	2.41E-03	2.6E-03	1.1E-02
Hydrogen Cyanide	2.50E-03	lb/ton	1.22E+00				28.00	lb/trillion btu	2.32E-01	1.2E+00	5.3E+00
Dibenzo(a,h)anthracene			-	1.7E-06	lb/1,000 gal	1.6E-05	0.001	lb/trillion btu	8.30E-06	1.6E-05	6.8E-05
Dibutyl phthalate							2.8	lb/trillion btu	2.32E-02	2.3E-02	1.0E-01
Dimethyl sulfate	4.80E-05	lb/ton	2.34E-02							2.3E-02	1.0E-01
2,4-Dinitrotoluene	2.80E-07	lb/ton	1.37E-04				0.015	lb/trillion btu	1.25E-04	1.4E-04	6.0E-04
Ethylbenzene	9.40E-05	lb/ton	4.59E-02	6.36E-05	lb/1,000 gal	5.9E-04	0.41	lb/trillion btu	3.40E-03	4.6E-02	2.0E-01
Ethyl Chloride	4.20E-05	lb/ton	2.05E-02				2.4	lb/trillion btu	1.99E-02	2.0E-02	9.0E-02
Ethylene dichloride	4.00E-05	lb/ton	1.95E-02				3.1	lb/trillion btu	2.57E-02	2.6E-02	1.1E-01
Ethylene dibromide	1.20E-06	lb/ton	5.86E-04							5.9E-04	2.6E-03
Fluoranthene	7.10E-07	lb/ton	3.46E-04	4.8E-06	lb/1,000 gal	4.5E-05	0.016	lb/trillion btu	1.33E-04	3.5E-04	1.5E-03
Fluorene	9.10E-07	lb/ton	4.44E-04	4.5E-06	lb/1,000 gal	4.2E-05	0.013	lb/trillion btu	1.08E-04	4.4E-04	1.9E-03
Formaldehyde	2.40E-04	lb/ton	1.17E-01	3.3E-02	lb/1,000 gal	3.1E-01	4.0	lb/trillion btu	3.32E-02	3.1E-01	1.3E+00
Hexane	6.70E-05	lb/ton	3.27E-02				0.83	lb/trillion btu	6.89E-03	3.3E-02	1.4E-01
Indeno(1,2,3,c,d)pyrene	6.10E-08	lb/ton	2.98E-05	2.1E-06	lb/1,000 gal	2.0E-05	0.003	lb/trillion btu	2.49E-05	3.0E-05	1.3E-04
Isophorone	5.80E-04	lb/ton	2.83E-01				24	lb/trillion btu	1.99E-01	2.8E-01	1.2E+00
Methyl Bromide	1.60E-04	lb/ton	7.81E-02				0.89	lb/trillion btu	7.39E-03	7.8E-02	3.4E-01
Methyl hydrazine	1.70E-04	lb/ton	8.30E-02							8.3E-02	3.6E-01
MMA	2.00E-03	lb/ton	9.76E-03				1.1	lb/trillion btu	9.13E-03	9.8E-03	4.3E-02
2-Methylnaphthalene			-				0.032	lb/trillion btu	2.66E-04	2.7E-04	1.2E-03
MTBE	3.50E-05	lb/ton	1.71E-02				1.4	lb/trillion btu	1.16E-02	1.7E-02	7.5E-02
Methylene chloride	2.90E-04	lb/ton	1.42E-01				13	lb/trillion btu	1.08E-01	1.4E-01	6.2E-01
Naphthalene	1.30E-05	lb/ton	6.34E-03	1.13E-03	lb/1,000 gal	1.0E-02	0.77	lb/trillion btu	6.39E-03	1.0E-02	4.6E-02
5-Methyl chrysene	2.20E-08	lb/ton	1.07E-05							1.1E-05	4.7E-05
OCDD				3.10E-09	lb/1,000 gal	2.9E-08				2.9E-08	1.3E-07
Phenanthrene	2.70E-06	lb/ton	1.32E-03	1.1E-05	lb/1,000 gal	9.8E-05	0.032	lb/trillion btu	2.66E-04	1.3E-03	5.8E-03
Phenol	1.60E-05	lb/ton	7.81E-03				6.1	lb/trillion btu	5.06E-02	5.1E-02	2.2E-01
Propionaldehyde	3.80E-04	lb/ton	1.85E-01				10.35	lb/trillion btu	8.59E-02	1.9E-01	8.1E-01
Pyrene	3.30E-07	lb/ton	1.61E-04	4.3E-06	lb/1,000 gal	3.9E-05	0.012	lb/trillion btu	9.96E-05	1.6E-04	7.1E-04
Styrene	2.50E-05	lb/ton	1.22E-02				3.1	lb/trillion btu	2.57E-02	2.6E-02	1.1E-01
Tetrachloroethylene	4.30E-05	lb/ton	2.10E-02				3.1	lb/trillion btu	2.57E-02	2.6E-02	1.1E-01
Toluene	2.40E-04	lb/ton	1.17E-01	6.20E-03	lb/1,000 gal	5.8E-02	3.6	lb/trillion btu	2.99E-02	1.2E-01	5.1E-01
1,1,1-Trichloroethane	2.00E-05	lb/ton	9.76E-03	2.36E-04	lb/1,000 gal	2.2E-03				9.8E-03	4.3E-02
1,1,2-Trichloroethane			-				4.7	lb/trillion btu	3.90E-02	3.9E-02	1.7E-01
Trichloroethylene			-				3.1	lb/trillion btu	2.57E-02	2.6E-02	1.1E-01
Vinyl acetate	7.60E-06	lb/ton	3.71E-03				0.42	lb/trillion btu	3.49E-03	3.7E-03	1.6E-02
Xylene	3.70E-05	lb/ton	1.81E-02	1.09E-04	lb/1,000 gal	1.0E-03	4.65	lb/trillion btu	3.86E-02	3.9E-02	1.7E-01
m-xylene			-				1.45	lb/trillion btu	1.20E-02	1.2E-02	5.3E-02
o-xylene							0.81	lb/trillion btu	6.72E-03	6.7E-03	2.9E-02
p-xylene							1.45	lb/trillion btu	1.20E-02	1.2E-02	5.3E-02
Dioxins (Total)							9.68E-06	lb/trillion btu	8.03E-08	8.0E-08	3.5E-07
P-Cresol							0.95	lb/trillion btu	7.89E-03	7.9E-03	3.5E-02
perylene							0.075	lb/trillion btu	6.23E-04	6.2E-04	2.7E-03
Pentachlorophenol							0.008	lb/trillion btu	6.64E-05	6.6E-05	2.9E-04
Hexachlorobenzene							0.08	lb/trillion btu	6.64E-04	6.6E-04	2.9E-03
Methyl chloroform							3.42	lb/trillion btu	2.84E-02	2.8E-02	1.2E-01
Methyl iodine							0.4	lb/trillion btu	3.32E-03	3.3E-03	1.5E-02
Methyl isobutyl ketone							4.9	lb/trillion btu	4.07E-02	4.1E-02	1.8E-01
1,2,4-Trichlorobenzene	-	-	-	-	-	-	1.51E-06	lb/MMBtu	1.25E-02	1.3E-02	5.5E-02
1,3-Butadiene	-	-	-	-	-	-	3.71E-07	lb/MMBtu	3.08E-03	3.1E-03	1.3E-02
1,3-Dichloropropene	-	-	-	-	-	-	6.61E-07	lb/MMBtu	5.48E-03	5.5E-03	2.4E-02
1,4-Dichlorobenzene	-	-	-	-	-	-	1.06E-06	lb/MMBtu	8.76E-03	8.8E-03	3.8E-02
2,4,6-Trichlorophenol	-	-	-	-	-	-	8.01E-10	lb/MMBtu	6.64E-06	6.6E-06	2.9E-05
2,4-Dinitrophenol	-	-	-	-	-	-	1.08E-08	lb/MMBtu	8.92E-05	8.9E-05	3.9E-04
3-Methylcholanthrene	-	-	-	-	-	-	6.62E-11	lb/MMBtu	5.49E-07	5.5E-07	2.4E-06
4-Nitrophenol	-	-	-	-	-	-	4.00E-09	lb/MMBtu	3.32E-05	3.3E-05	1.5E-04
7,12-Dimethylbenz(a)Anthracene	-	-	-	-	-	-	5.88E-10	lb/MMBtu	4.88E-06	4.9E-06	2.1E-05
Allyl Chloride	-	-	-	-	-	-	8.03E-06	lb/MMBtu	6.66E-02	6.7E-02	2.9E-01
Arsenic Trioxide	-	-	-	-	-	-	2.98E-05	lb/MMBtu	2.47E-01	2.5E-01	1.1E+00
Cadmium Oxide	-	-	-	-	-	-	3.20E-06	lb/MMBtu	2.66E-02	2.7E-02	1.2E-01
Calcium Cyanamide	-	-	-	-	-	-	3.39E-06	lb/MMBtu	2.81E-02	2.8E-02	1.2E-01
Chromic Acid (VI)	-	-	-	-	-	-	8.32E-06	lb/MMBtu	6.91E-02	6.9E-02	3.0E-01
Chromic Oxide	-	-	-	-	-	-	2.44E-05	lb/MMBtu	2.02E-01	2.0E-01	8.9E-01

Table A-5: Organic HAP (and Others) Emission Calculations: Main Boiler - 100% PRB Coal

Basis:

Coal Consumption Rate	488	ton Coal/hr
Fuel Oil Consumption Rate	9286	gal/hr
Maximum heat Input	8.30E-03	Trillion Btu/hr

Compound	Pulverized Coal [1] - AP42			Fuel Oil [2] - AP42			Pulverized Coal [3] - Utility Report to Congress, NEI Database, TRI Database			Worst Case Emissions (lb/hr)	Worst Case Emissions (tpy)
	Emission Factor	Units	Hourly Emissions (lb/hr)	Emission Factor	Units	Hourly Emissions (lb/hr)	Emission Factor	Units	Hourly Emissions (lb/hr)		
Dibenzo[a,j]Acridine	-	-	-	-	-	-	5.12E-07	lb/MMBtu	4.25E-03	4.2E-03	1.9E-02
Dibenzofuran	-	-	-	-	-	-	5.73E-07	lb/MMBtu	4.75E-03	4.8E-03	2.1E-02
Diethyl Sulfate	-	-	-	-	-	-	2.33E-06	lb/MMBtu	1.94E-02	1.9E-02	8.5E-02
Dimethyl Phthalate	-	-	-	-	-	-	9.64E-08	lb/MMBtu	8.00E-04	8.0E-04	3.5E-03
Manganese Dioxide	-	-	-	-	-	-	4.26E-05	lb/MMBtu	3.54E-01	3.5E-01	1.5E+00
Polychlorinated Biphenyls	-	-	-	-	-	-	1.37E-08	lb/MMBtu	1.14E-04	1.1E-04	5.0E-04
Polycyclic Organic Matter	-	-	-	-	-	-	6.21E-06	lb/MMBtu	5.16E-02	5.2E-02	2.3E-01
Propylene Dichloride	-	-	-	-	-	-	1.20E-06	lb/MMBtu	9.97E-03	1.0E-02	4.4E-02
Sodium Cyanide	-	-	-	-	-	-	8.09E-05	lb/MMBtu	6.71E-01	6.7E-01	2.9E+00
Toluene-2,4-Diamine	-	-	-	-	-	-	1.38E-08	lb/MMBtu	1.14E-04	1.1E-04	5.0E-04
Vinyl Chloride	-	-	-	-	-	-	7.14E-07	lb/MMBtu	5.92E-03	5.9E-03	2.6E-02
Phosphorus							31.50	lb/trillion btu	2.61E-01	2.6E-01	1.1E+00
										Total (ton/yr)	30.30

1)AP-42 Table 1.1-13, 1.1-14, & 1.1-18

2)AP-42 Tables 1.3-9 & 1.3-10

3) Test Report Data Table A-1 and A-4 from the study of Hazardous Air Pollutant emissions from Electric Utility Steam Generating Units- Final report to Congress (1998) and Data derived from EPA NEI HAP emissions inventory data - 2002 NEI V3 last updated September 2007 and TRI Database.

Table A-6 : EPA NEI HAP Database and TRI Database Emissions Information and EPA Clean Markets MMBtu/hr Values

STATE	FacilityName	Emission Unit ID	Boiler ID	Emission Release Point ID	Pollutant	Emissions (TPY)	HEAT INPUT (MMBtu)	Emission Rate (lb/MMBtu)	Avg. Emission Rate (lb/MMBtu)
MN	NSP DBA XCEL ENERGY - BLACK DOG	EU003	3	SV001	1,2,4-Trichlorobenzene	0.0044	6302333	1.40E-06	1.28E-06
MN	NSP DBA XCEL ENERGY - BLACK DOG	EU004	4	SV001	1,2,4-Trichlorobenzene	0.007045	12188405	1.16E-06	
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU001	6	SV002	1,2,4-Trichlorobenzene	0.00394	4388784	1.80E-06	1.75E-06
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU002	7	SV002	1,2,4-Trichlorobenzene	0.003965	4670969	1.70E-06	
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU003	8	SV003	1,2,4-Trichlorobenzene	0.011335	12939421	1.75E-06	
MN	XCEL ENERGY - HIGH BRIDGE GENERATING	EU003	5	SV001	1,2,4-Trichlorobenzene	0.00402	6154367	1.31E-06	1.39E-06
MN	XCEL ENERGY - HIGH BRIDGE GENERATING	EU004	6	SV001	1,2,4-Trichlorobenzene	0.006455	8744882	1.48E-06	
MN	NSP - SHERBURNE GENERATING PLANT	EU001	1	SV001	1,2,4-Trichlorobenzene	0.03807	53500053	1.42E-06	1.37E-06
MN	NSP - SHERBURNE GENERATING PLANT	EU002	2	SV001	1,2,4-Trichlorobenzene	0.035535	46259012	1.54E-06	
MN	NSP - SHERBURNE GENERATING PLANT	EU003	3	SV002	1,2,4-Trichlorobenzene	0.043815	75715065	1.16E-06	
MN	XCEL ENERGY - ALLEN S KING GENERATING	EU001	1	SV001	1,2,4-Trichlorobenzene	0.02459	18096637	2.72E-06	2.72E-06
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-1	3	S-3	1,2,4-Trichlorobenzene	0.032	29979755	2.13E-06	1.74E-06
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-2	4	S-4	1,2,4-Trichlorobenzene	0.033	32692109	2.02E-06	
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-4	1	S-1	1,2,4-Trichlorobenzene	0.0165	24152709	1.37E-06	
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-5	2	S-2	1,2,4-Trichlorobenzene	0.0175	24537935	1.43E-06	
NC	L V SUTTON STEAM ELECTRIC PLANT	G-187	1	S-1	1,2,4-Trichlorobenzene	0.0039	4629725	1.68E-06	1.41E-06
NC	L V SUTTON STEAM ELECTRIC PLANT	G-188	2	S-1	1,2,4-Trichlorobenzene	0.00305	5203884	1.17E-06	
NC	L V SUTTON STEAM ELECTRIC PLANT	G-189	3	S-2	1,2,4-Trichlorobenzene	0.0145	20975938	1.38E-06	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-29	1	S-1	1,2,4-Trichlorobenzene	0.013	25494527	1.02E-06	1.39E-06
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-30	2	S-2	1,2,4-Trichlorobenzene	0.031	47033163	1.32E-06	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-35	MULTI	S-3	1,2,4-Trichlorobenzene	0.031	35494009	1.75E-06	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-36	MULTI	S-4	1,2,4-Trichlorobenzene	0.03	40155873	1.49E-06	
NC	DUKE ENERGY CORP - DAN RIVER STEAM STATION	G-21	3	S-3	1,2,4-Trichlorobenzene	0.0015	6642892	4.52E-07	5.34E-07
NC	DUKE ENERGY CORP - DAN RIVER STEAM STATION	G-22	1	S-1	1,2,4-Trichlorobenzene	0.0005	2817682	3.55E-07	
NC	DUKE ENERGY CORP - DAN RIVER STEAM STATION	G-23	2	S-2	1,2,4-Trichlorobenzene	0.001	2513404	7.96E-07	
NC	DUKE ENERGY CORP - BELEWS CREEK STEAM STATION	G-17	1	S-1	1,2,4-Trichlorobenzene	0.062	67835959	1.83E-06	1.68E-06
NC	DUKE ENERGY CORP - BELEWS CREEK STEAM STATION	G-18	2	S-2	1,2,4-Trichlorobenzene	0.053	68954797	1.54E-06	
NC	PROGRESS ENERGY - F LEE PLANT	G-2	1	S-1	1,2,4-Trichlorobenzene	0.0031	4016709	1.54E-06	1.48E-06
NC	PROGRESS ENERGY - F LEE PLANT	G-3	2	S-1	1,2,4-Trichlorobenzene	0.003	3913221	1.53E-06	
NC	PROGRESS ENERGY - F LEE PLANT	G-4	3	S-2	1,2,4-Trichlorobenzene	0.0095	13970082	1.36E-06	
TN	ALLEN FOSSIL PLANT	Boilr1	1	Stack1	1,2,4-Trichlorobenzene	0.0109	20568457	1.06E-06	1.37E-06
TN	ALLEN FOSSIL PLANT	Boilr2	2	Stack2	1,2,4-Trichlorobenzene	0.0127	19131766	1.33E-06	
TN	ALLEN FOSSIL PLANT	Boilr3	3	Stack3	1,2,4-Trichlorobenzene	0.014	16183389	1.73E-06	
								Total Avg.	1.51E-06
NC	PROGRESS ENERGY CAROLINAS - CAPE FEAR PLANT	G-1	5	S-1	1,3-Butadiene	0.0003	8135544	7.38E-08	1.05E-07
NC	PROGRESS ENERGY CAROLINAS - CAPE FEAR PLANT	G-2	6	S-2	1,3-Butadiene	0.00075	11041675	1.36E-07	
NC	L V SUTTON STEAM ELECTRIC PLANT	G-187	1	S-1	1,3-Butadiene	0.0013	4629725	5.62E-07	4.87E-07
NC	L V SUTTON STEAM ELECTRIC PLANT	G-188	2	S-1	1,3-Butadiene	0.00135	5203884	5.19E-07	
NC	L V SUTTON STEAM ELECTRIC PLANT	G-189	3	S-2	1,3-Butadiene	0.004	20975938	3.81E-07	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-29	1	S-1	1,3-Butadiene	0.002	25494527	1.57E-07	1.49E-07
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-30	2	S-2	1,3-Butadiene	0.0035	47033163	1.49E-07	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-35	MULTI	S-3	1,3-Butadiene	0.0025	35494009	1.41E-07	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-36	MULTI	S-4	1,3-Butadiene	0.003	40155873	1.49E-07	
NC	CP&L - MAYO FACILITY	G-46	MULTI	S-1	1,3-Butadiene	0.006	46476354	2.58E-07	2.58E-07
NC	PROGRESS ENERGY CAROLINAS, INC., W.H. WEATHERSPOON	G-24	1	S-1	1,3-Butadiene	0.00035	2047727	3.42E-07	3.60E-07
NC	PROGRESS ENERGY CAROLINAS, INC., W.H. WEATHERSPOON	G-25	2	S-1	1,3-Butadiene	0.0004	2120634	3.77E-07	
NC	PROGRESS ENERGY - F LEE PLANT	G-2	1	S-1	1,3-Butadiene	0.0015	4016709	7.47E-07	8.68E-07
NC	PROGRESS ENERGY - F LEE PLANT	G-3	2	S-1	1,3-Butadiene	0.0026	3913221	1.33E-06	
NC	PROGRESS ENERGY - F LEE PLANT	G-4	3	S-2	1,3-Butadiene	0.0037	13970082	5.30E-07	
								Total Avg.	3.71E-07
TN	ALLEN FOSSIL PLANT	Boilr1	1	Stack1	1,3-Dichloropropene	0.00525	20568457	5.10E-07	6.61E-07
TN	ALLEN FOSSIL PLANT	Boilr2	2	Stack2	1,3-Dichloropropene	0.0061	19131766	6.38E-07	
TN	ALLEN FOSSIL PLANT	Boilr3	3	Stack3	1,3-Dichloropropene	0.00675	16183389	8.34E-07	
								Total Avg.	6.61E-07
MN	NSP DBA XCEL ENERGY - BLACK DOG	EU003	3	SV001	1,4-Dichlorobenzene	0.003225	6302333	1.02E-06	9.35E-07
MN	NSP DBA XCEL ENERGY - BLACK DOG	EU004	4	SV001	1,4-Dichlorobenzene	0.005165	12188405	8.48E-07	
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU001	6	SV002	1,4-Dichlorobenzene	0.00289	4388784	1.32E-06	1.28E-06
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU002	7	SV002	1,4-Dichlorobenzene	0.002905	4670969	1.24E-06	
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU003	8	SV003	1,4-Dichlorobenzene	0.00831	12939421	1.28E-06	
MN	OTTER TAIL POWER CO - HOOT LAKE PLANT	EU002	2	SV002	1,4-Dichlorobenzene	0.00241	4758198	1.01E-06	1.08E-06
MN	OTTER TAIL POWER CO - HOOT LAKE PLANT	EU003	3	SV002	1,4-Dichlorobenzene	0.003285	5695698	1.15E-06	
MN	XCEL ENERGY - HIGH BRIDGE GENERATING	EU003	5	SV001	1,4-Dichlorobenzene	0.00295	6154367	9.59E-07	1.02E-06
MN	XCEL ENERGY - HIGH BRIDGE GENERATING	EU004	6	SV001	1,4-Dichlorobenzene	0.004735	8744882	1.08E-06	
MN	NSP - SHERBURNE GENERATING PLANT	EU001	1	SV001	1,4-Dichlorobenzene	0.02792	53500053	1.04E-06	1.01E-06
MN	NSP - SHERBURNE GENERATING PLANT	EU002	2	SV001	1,4-Dichlorobenzene	0.02606	46259012	1.13E-06	
MN	NSP - SHERBURNE GENERATING PLANT	EU003	3	SV002	1,4-Dichlorobenzene	0.03213	75715065	8.49E-07	
MN	XCEL ENERGY - ALLEN S KING GENERATING	EU001	1	SV001	1,4-Dichlorobenzene	0.01803	18096637	1.99E-06	1.99E-06
NC	PROGRESS ENERGY CAROLINAS - CAPE FEAR PLANT	G-1	5	S-1	1,4-Dichlorobenzene	0.0049	8135544	1.20E-06	1.10E-06
NC	PROGRESS ENERGY CAROLINAS - CAPE FEAR PLANT	G-2	6	S-2	1,4-Dichlorobenzene	0.0055	11041675	9.96E-07	
NC	L V SUTTON STEAM ELECTRIC PLANT	G-187	1	S-1	1,4-Dichlorobenzene	0.00285	4629725	1.23E-06	1.03E-06
NC	L V SUTTON STEAM ELECTRIC PLANT	G-188	2	S-1	1,4-Dichlorobenzene	0.00225	5203884	8.65E-07	
NC	L V SUTTON STEAM ELECTRIC PLANT	G-189	3	S-2	1,4-Dichlorobenzene	0.0105	20975938	1.00E-06	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-29	1	S-1	1,4-Dichlorobenzene	0.0095	25494527	7.45E-07	1.02E-06
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-30	2	S-2	1,4-Dichlorobenzene	0.0225	47033163	9.57E-07	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-35	MULTI	S-3	1,4-Dichlorobenzene	0.0225	35494009	1.27E-06	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-36	MULTI	S-4	1,4-Dichlorobenzene	0.022	40155873	1.10E-06	
NC	CP&L - MAYO FACILITY	G-46	MULTI	S-1	1,4-Dichlorobenzene	0.0265	46476354	1.14E-06	1.14E-06
NC	DUKE ENERGY CORP - DAN RIVER STEAM STATION	G-21	3	S-3	1,4-Dichlorobenzene	0.001	6642892	3.01E-07	3.51E-07
NC	DUKE ENERGY CORP - DAN RIVER STEAM STATION	G-22	1	S-1	1,4-Dichlorobenzene	0.0005	2817682	3.55E-07	
NC	DUKE ENERGY CORP - DAN RIVER STEAM STATION	G-23	2	S-2	1,4-Dichlorobenzene	0.0005	2513404	3.98E-07	
NC	DUKE ENERGY CORPORATION - CLIFFSIDE STEAM STATION	G-83	2	S-2	1,4-Dichlorobenzene	0.0005	1575124	6.35E-07	6.36E-07
NC	DUKE ENERGY CORPORATION - CLIFFSIDE STEAM STATION	G-84	3	S-3	1,4-Dichlorobenzene	0.0005	2069663	4.83E-07	
NC	DUKE ENERGY CORPORATION - CLIFFSIDE STEAM STATION	G-86	5	S-5	1,4-Dichlorobenzene	0.013	32950329	7.89E-07	
NC	DUKE ENERGY CORP - BELEWS CREEK STEAM STATION	G-18	2	S-2	1,4-Dichlorobenzene	0.039	68954797	1.13E-06	1.13E-06
NC	PROGRESS ENERGY - F LEE PLANT	G-2	1	S-1	1,4-Dichlorobenzene	0.0023	4016709	1.15E-06	1.10E-06
NC	PROGRESS ENERGY - F LEE PLANT	G-3	2	S-1	1,4-Dichlorobenzene	0.0022	3913221	1.12E-06	
NC	PROGRESS ENERGY - F LEE PLANT	G-4	3	S-2	1,4-Dichlorobenzene	0.0071	13970082	1.02E-06	
TN	ALLEN FOSSIL PLANT	Boilr1	1	Stack1	1,4-Dichlorobenzene	0.008	20568457	7.78E-07	1.01E-06
TN	ALLEN FOSSIL PLANT	Boilr2	2	Stack2	1,4-Dichlorobenzene	0.0093	19131766	9.72E-07	
TN	ALLEN FOSSIL PLANT	Boilr3	3	Stack3	1,4-Dichlorobenzene	0.0103	16183389	1.27E-06	
								Total Avg.	1.06E-06
NY	AES GREENIDGE LLC	G00004	6	00004	2,4,6-Trichlorophenol	0.0000002024	5056599	8.01E-10	8.01E-10
								Total Avg.	8.01E-10
NY	AES GREENIDGE LLC	G00004	6	00004	2,4-Dinitrophenol	0.000001656	5056599	6.55E-09	6.55E-09
UT	HUNTINGTON POWER PLANT	4034	2	1285	2,4-Dinitrophenol	0.0002	26754943	1.50E-08	1.50E-08
								Total Avg.	1.08E-08
OH	DP&L O.H. HUTCHINGS GENERATING STATION	H-1	H-1	001	3-Methylcholanthrene	4.9E-09	238277	4.11E-11	6.62E-11
OH	DP&L O.H. HUTCHINGS GENERATING STATION	H-2	H-2	002	3-Methylcholanthrene	1.29E-08	206693	1.25E-10	
OH	DP&L O.H. HUTCHINGS GENERATING STATION	H-3	H-3	003	3-Methylcholanthrene	2.85E-08	773126	7.37E-11	
OH	DP&L O.H. HUTCHINGS GENERATING STATION	H-4	H-4	004	3-Methylcholanthrene	3.17E-08	1115965	5.68E-11	
OH	DP&L O.H. HUTCHINGS GENERATING STATION	H-5	H-5	005	3-Methylcholanthrene	2.91E-08	1162990	5.00E-11	
OH	DP&L O.H. HUTCHINGS GENERATING STATION	H-6	H-6	006	3-Methylcholanthrene	3.22E-08	1271630	5.06E-11	
								Total Avg.	6.62E-11

Completed by: JDL 11-26-2008
Checked by: SAK 11-26-2008

Table A-6 : EPA NEI HAP Database and TRI Database Emissions Information and EPA Clean Markets MMBtu/hr Values

STATE	FacilityName	Emission Unit ID	Boiler ID	Emission Release Point ID	Pollutant	Emissions (TPY)	HEAT INPUT (MMBtu)	Emission Rate (lb/MMBtu)	Avg. Emission Rate (lb/MMBtu)
NY	AES GREENIDGE LLC	G00004	6	00004	4-Nitrophenol	0.00001012	5056599	4.00E-09	4.00E-09
								Total Avg.	4.00E-09
OH	DP&L, O.H. HUTCHINGS GENERATING STATION	H-1	H-1	001	7,12-Dimethylbenz[a]Anthracene	4.34E-08	238277	3.64E-10	5.88E-10
OH	DP&L, O.H. HUTCHINGS GENERATING STATION	H-2	H-2	002	7,12-Dimethylbenz[a]Anthracene	1.146E-07	206693	1.11E-09	
OH	DP&L, O.H. HUTCHINGS GENERATING STATION	H-3	H-3	003	7,12-Dimethylbenz[a]Anthracene	2.534E-07	773126	6.56E-10	
OH	DP&L, O.H. HUTCHINGS GENERATING STATION	H-4	H-4	004	7,12-Dimethylbenz[a]Anthracene	2.819E-07	1115965	5.05E-10	
OH	DP&L, O.H. HUTCHINGS GENERATING STATION	H-5	H-5	005	7,12-Dimethylbenz[a]Anthracene	2.586E-07	1162990	4.45E-10	
OH	DP&L, O.H. HUTCHINGS GENERATING STATION	H-6	H-6	006	7,12-Dimethylbenz[a]Anthracene	2.863E-07	1271630	4.50E-10	
								Total Avg.	5.88E-10
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-1	3	S-3	Allyl Chloride	0.1925	29979755	1.28E-05	1.05E-05
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-2	4	S-4	Allyl Chloride	0.199	32692109	1.22E-05	
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-4	1	S-1	Allyl Chloride	0.1	24152709	8.28E-06	
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-5	2	S-2	Allyl Chloride	0.1055	24537935	8.60E-06	
NC	PROGRESS ENERGY CAROLINAS - CAPE FEAR PLANT	G-1	5	S-1	Allyl Chloride	0.0405	8135544	9.96E-06	9.01E-06
NC	PROGRESS ENERGY CAROLINAS - CAPE FEAR PLANT	G-2	6	S-2	Allyl Chloride	0.0445	11041675	8.06E-06	
NC	DUKE ENERGY CORPORATION - ALLEN STEAM STATION	G-14	1	S-1	Allyl Chloride	0.0285	8399352	6.79E-06	7.13E-06
NC	DUKE ENERGY CORPORATION - ALLEN STEAM STATION	G-15	2	S-2	Allyl Chloride	0.0265	9210552	5.75E-06	
NC	DUKE ENERGY CORPORATION - ALLEN STEAM STATION	G-16	3	S-3	Allyl Chloride	0.0445	15956865	5.58E-06	
NC	DUKE ENERGY CORPORATION - ALLEN STEAM STATION	G-17	4	S-4	Allyl Chloride	0.061	14172222	8.61E-06	
NC	DUKE ENERGY CORPORATION - ALLEN STEAM STATION	G-18	5	S-5	Allyl Chloride	0.064	14313317	8.94E-06	
NC	DUKE ENERGY CORPORATION - RIVERBEND STEAM STATION	G-17	7	S-5	Allyl Chloride	0.012	4128778	5.81E-06	7.82E-06
NC	DUKE ENERGY CORPORATION - RIVERBEND STEAM STATION	G-18	8	S-6	Allyl Chloride	0.016	4012669	7.97E-06	
NC	DUKE ENERGY CORPORATION - RIVERBEND STEAM STATION	G-19	9	S-7	Allyl Chloride	0.023	5731728	8.03E-06	
NC	DUKE ENERGY CORPORATION - RIVERBEND STEAM STATION	G-20	10	S-8	Allyl Chloride	0.0285	6028904	9.45E-06	
NC	L V SUTTON STEAM ELECTRIC PLANT	G-187	1	S-1	Allyl Chloride	0.0235	4629725	1.02E-05	8.52E-06
NC	L V SUTTON STEAM ELECTRIC PLANT	G-188	2	S-1	Allyl Chloride	0.0185	5203884	7.11E-06	
NC	L V SUTTON STEAM ELECTRIC PLANT	G-189	3	S-2	Allyl Chloride	0.087	20975938	8.30E-06	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-29	1	S-1	Allyl Chloride	0.08	25494527	6.28E-06	8.48E-06
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-30	2	S-2	Allyl Chloride	0.1865	47033163	7.93E-06	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-35	MULTI	S-3	Allyl Chloride	0.1875	35494009	1.06E-05	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-36	MULTI	S-4	Allyl Chloride	0.1835	40155873	9.14E-06	
NC	CP&L - MAYO FACILITY	G-46	MULTI	S-1	Allyl Chloride	0.2195	46476354	9.45E-06	9.45E-06
NC	PROGRESS ENERGY CAROLINAS, INC., W.H. WEATHERSPOON	G-24	1	S-1	Allyl Chloride	0.012	2047727	1.17E-05	1.10E-05
NC	PROGRESS ENERGY CAROLINAS, INC., W.H. WEATHERSPOON	G-25	2	S-1	Allyl Chloride	0.011	2120634	1.04E-05	
NC	DUKE ENERGY CORP - DAN RIVER STEAM STATION	G-21	3	S-3	Allyl Chloride	0.009	6642892	2.71E-06	2.92E-06
NC	DUKE ENERGY CORP - DAN RIVER STEAM STATION	G-22	1	S-1	Allyl Chloride	0.0035	2817682	2.48E-06	
NC	DUKE ENERGY CORP - DAN RIVER STEAM STATION	G-23	2	S-2	Allyl Chloride	0.0045	2513404	3.58E-06	
NC	DUKE ENERGY CORPORATION - BUCK STEAM STATION	G-1	5	S-2	Allyl Chloride	0.0025	1223835	4.09E-06	5.58E-06
NC	DUKE ENERGY CORPORATION - BUCK STEAM STATION	G-2	6	S-3	Allyl Chloride	0.0025	1362075	3.67E-06	
NC	DUKE ENERGY CORPORATION - BUCK STEAM STATION	G-3	7	S-6	Allyl Chloride	0.003	1603389	3.74E-06	
NC	DUKE ENERGY CORPORATION - BUCK STEAM STATION	G-4	8	S-6	Allyl Chloride	0.0245	6291656	7.79E-06	
NC	DUKE ENERGY CORPORATION - BUCK STEAM STATION	G-5	9	S-6	Allyl Chloride	0.0275	6379286	8.62E-06	
NC	DUKE ENERGY CORPORATION - CLIFFSIDE STEAM STATION	G-82	1	S-1	Allyl Chloride	0.001	1649132	1.21E-06	4.44E-06
NC	DUKE ENERGY CORPORATION - CLIFFSIDE STEAM STATION	G-83	2	S-2	Allyl Chloride	0.003	1575124	3.81E-06	
NC	DUKE ENERGY CORPORATION - CLIFFSIDE STEAM STATION	G-84	3	S-3	Allyl Chloride	0.0055	2069663	5.31E-06	
NC	DUKE ENERGY CORPORATION - CLIFFSIDE STEAM STATION	G-85	4	S-4	Allyl Chloride	0.0055	2103923	5.23E-06	
NC	DUKE ENERGY CORPORATION - CLIFFSIDE STEAM STATION	G-86	5	S-5	Allyl Chloride	0.109	32959329	6.61E-06	
NC	DUKE ENERGY CORP - BELEWS CREEK STEAM STATION	G-17	1	S-1	Allyl Chloride	0.3745	67835959	1.10E-05	1.02E-05
NC	DUKE ENERGY CORP - BELEWS CREEK STEAM STATION	G-18	2	S-2	Allyl Chloride	0.3225	68954797	9.35E-06	
NC	PROGRESS ENERGY - F LEE PLANT	G-2	1	S-1	Allyl Chloride	0.019	4016709	9.46E-06	9.01E-06
NC	PROGRESS ENERGY - F LEE PLANT	G-3	2	S-1	Allyl Chloride	0.018	3913221	9.20E-06	
NC	PROGRESS ENERGY - F LEE PLANT	G-4	3	S-2	Allyl Chloride	0.0585	13970082	8.38E-06	
TN	ALLEN FOSSIL PLANT	Boilr1	1	Stack1	Allyl Chloride	0.066	20568457	6.42E-06	8.32E-06
TN	ALLEN FOSSIL PLANT	Boilr2	2	Stack2	Allyl Chloride	0.077	19131766	8.05E-06	
TN	ALLEN FOSSIL PLANT	Boilr3	3	Stack3	Allyl Chloride	0.085	16183389	1.05E-05	
								Total Avg.	8.03E-06
TX	GIBBONS CREEK	000002	1	000002	Arsenic Trioxide	0.525	35281328	2.98E-05	2.98E-05
								Total Avg.	2.98E-05
TX	GIBBONS CREEK	000002	1	000002	Cadmium Oxide	0.0565	35281328	3.20E-06	3.20E-06
								Total Avg.	3.20E-06
IA	MIDAMERICAN ENERGY CO. - LOUISA STATION	147281	101	117487	Calcium Cyanamide	0.08	47240697	3.39E-06	3.39E-06
								Total Avg.	3.39E-06
CO	TRI STATE GENERATION CRAIG	001	C1	001	Chlorine	8.9685	34560386	5.19E-04	4.05E-04
CO	TRI STATE GENERATION CRAIG	002	C2	002	Chlorine	9.2345	41101830	4.49E-04	
CO	TRI STATE GENERATION CRAIG	003	C3	003	Chlorine	4.3095	34695350	2.48E-04	
NE	NPPD SHELDON STATION	001	MULTI	001	Chlorine	7.52	8720555	1.72E-03	1.72E-03
NY	AES GREENIDGE LLC	G00004	6	00004	Chlorine	0.07268	5056599	2.87E-05	2.87E-05
PA	EXELON GENERATION CO/CROMBY GENERATION STATION	031	1	S01	Chlorine	9	8697485	2.07E-03	2.07E-03
TX	TOLK STATION	000001	171B	000001	Chlorine	3.9	30985535	2.52E-04	2.25E-04
TX	TOLK STATION	000002	172B	000002	Chlorine	3.8	38451725	1.98E-04	
TX	HARRINGTON STATION	000004	061B	000007	Chlorine	3.9	29124807	2.68E-04	2.25E-04
TX	HARRINGTON STATION	000005	062B	000008	Chlorine	2.6	30559917	1.70E-04	
TX	HARRINGTON STATION	000007	063B	000009	Chlorine	2.7	22717892	2.38E-04	
VA	DOMINION - SOUTHAMPTON POWER STATION	1	1	1	Chlorine	8.758	1994216	8.78E-03	8.78E-03
								Total Avg.	1.92E-03
NC	DUKE ENERGY CORPORATION - CLIFFSIDE STEAM STATION	G-82	1	S-1	Chromic Acid (VI)	0.0015	1649132	1.82E-06	8.32E-06
NC	DUKE ENERGY CORPORATION - CLIFFSIDE STEAM STATION	G-83	2	S-2	Chromic Acid (VI)	0.005	1575124	6.35E-06	
NC	DUKE ENERGY CORPORATION - CLIFFSIDE STEAM STATION	G-84	3	S-3	Chromic Acid (VI)	0.0095	2069663	9.18E-06	
NC	DUKE ENERGY CORPORATION - CLIFFSIDE STEAM STATION	G-85	4	S-4	Chromic Acid (VI)	0.011	2103923	1.05E-05	
NC	DUKE ENERGY CORPORATION - CLIFFSIDE STEAM STATION	G-86	5	S-5	Chromic Acid (VI)	0.2275	32959329	1.38E-05	
								Total Avg.	8.32E-06
TX	GIBBONS CREEK	000002	1	000002	Chromic Oxide	0.4299	35281328	2.44E-05	2.44E-05
								Total Avg.	2.44E-05
MN	NSP DBA XCEL ENERGY - BLACK DOG	EU003	3	SV001	Dibenzo[a,j]Acridine	0.002934866	6302333	9.31E-07	8.51E-07
MN	NSP DBA XCEL ENERGY - BLACK DOG	EU004	4	SV001	Dibenzo[a,j]Acridine	0.00469816	12188495	7.71E-07	
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU001	6	SV002	Dibenzo[a,j]Acridine	0.002628811	4388784	1.20E-06	7.77E-07
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU002	7	SV002	Dibenzo[a,j]Acridine	0.002644414	4670969	1.13E-06	
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU003	8	SV003	Dibenzo[a,j]Acridine	0.0000805	12939421	7.73E-10	
MN	XCEL ENERGY - HIGH BRIDGE GENERATING	EU003	5	SV001	Dibenzo[a,j]Acridine	0.002628254	6154367	8.72E-07	9.28E-07
MN	XCEL ENERGY - HIGH BRIDGE GENERATING	EU004	6	SV001	Dibenzo[a,j]Acridine	0.004305114	8744882	9.85E-07	
MN	NSP - SHERBURNE GENERATING PLANT	EU001	1	SV001	Dibenzo[a,j]Acridine	0.000025	53580053	9.35E-10	8.20E-10
MN	NSP - SHERBURNE GENERATING PLANT	EU002	2	SV001	Dibenzo[a,j]Acridine	0.000002	46259012	8.65E-10	
MN	NSP - SHERBURNE GENERATING PLANT	EU003	3	SV002	Dibenzo[a,j]Acridine	0.000025	75715065	6.60E-10	
MN	XCEL ENERGY - ALLEN S KING GENERATING	EU001	1	SV001	Dibenzo[a,j]Acridine	0.0000015	18096637	1.66E-09	1.66E-09
								Total Avg.	5.12E-07

Completed by: JDF 11.26.2008
Checked by: SAK 11.26.2008

Table A-6 : EPA NEI HAP Database and TRI Database Emissions Information and EPA Clean Markets MMBtu/hr Values

STATE	FacilityName	Emission Unit ID	Boiler ID	Emission Release Point ID	Pollutant	Emissions (TPY)	HEAT INPUT (MMBtu)	Emission Rate (lb/MMBtu)	Avg. Emission Rate (lb/MMBtu)
MN	NSP DBA XCEL ENERGY - BLACK DOG	EU003	3	SV001	Dibenzofuran	0.0017	6302333	5.39E-07	4.93E-07
MN	NSP DBA XCEL ENERGY - BLACK DOG	EU004	4	SV001	Dibenzofuran	0.00272	12188405	4.46E-07	
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU001	6	SV002	Dibenzofuran	0.00152	4388784	6.93E-07	6.75E-07
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU002	7	SV002	Dibenzofuran	0.00153	4670969	6.55E-07	
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU003	8	SV003	Dibenzofuran	0.00438	12939421	6.77E-07	
MN	OTTER TAIL POWER CO - HOOT LAKE PLANT	EU002	2	SV002	Dibenzofuran	0.00127	4758198	5.34E-07	5.71E-07
MN	OTTER TAIL POWER CO - HOOT LAKE PLANT	EU003	3	SV002	Dibenzofuran	0.00173	5695698	6.07E-07	
MN	XCEL ENERGY - HIGH BRIDGE GENERATING	EU003	5	SV001	Dibenzofuran	0.001555	6154367	5.05E-07	5.38E-07
MN	XCEL ENERGY - HIGH BRIDGE GENERATING	EU004	6	SV001	Dibenzofuran	0.002495	8744882	5.71E-07	
MN	NSP - SHERBURNE GENERATING PLANT	EU001	1	SV001	Dibenzofuran	0.01472	53500053	5.50E-07	5.31E-07
MN	NSP - SHERBURNE GENERATING PLANT	EU002	2	SV001	Dibenzofuran	0.01374	46259012	5.94E-07	
MN	NSP - SHERBURNE GENERATING PLANT	EU003	3	SV002	Dibenzofuran	0.01694	75715065	4.47E-07	
MN	XCEL ENERGY - ALLEN S KING GENERATING	EU001	1	SV001	Dibenzofuran	0.009505	18096637	1.05E-06	1.05E-06
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-1	3	S-3	Dibenzofuran	0.0125	29979755	8.34E-07	6.67E-07
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-2	4	S-4	Dibenzofuran	0.0125	32692109	7.65E-07	
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-4	1	S-1	Dibenzofuran	0.0065	24152709	5.38E-07	
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-5	2	S-2	Dibenzofuran	0.0065	24537935	5.30E-07	
NC	PROGRESS ENERGY CAROLINAS - CAPE FEAR PLANT	G-1	5	S-1	Dibenzofuran	0.0026	8135544	6.39E-07	5.78E-07
NC	PROGRESS ENERGY CAROLINAS - CAPE FEAR PLANT	G-2	6	S-2	Dibenzofuran	0.00285	11041675	5.16E-07	
NC	DUKE ENERGY CORPORATION - RIVERBEND STEAM STATION	G-17	7	S-5	Dibenzofuran	0.001	4128778	4.84E-07	5.42E-07
NC	DUKE ENERGY CORPORATION - RIVERBEND STEAM STATION	G-18	8	S-6	Dibenzofuran	0.001	4012669	4.98E-07	
NC	DUKE ENERGY CORPORATION - RIVERBEND STEAM STATION	G-19	9	S-7	Dibenzofuran	0.0015	5731728	5.23E-07	
NC	DUKE ENERGY CORPORATION - RIVERBEND STEAM STATION	G-20	10	S-8	Dibenzofuran	0.002	6028904	6.63E-07	
NC	L V SUTTON STEAM ELECTRIC PLANT	G-187	1	S-1	Dibenzofuran	0.0015	4629725	6.48E-07	5.46E-07
NC	L V SUTTON STEAM ELECTRIC PLANT	G-188	2	S-1	Dibenzofuran	0.0012	5203884	4.61E-07	
NC	L V SUTTON STEAM ELECTRIC PLANT	G-189	3	S-2	Dibenzofuran	0.00555	20975938	5.29E-07	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-29	1	S-1	Dibenzofuran	0.005	25494527	3.92E-07	5.38E-07
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-30	2	S-2	Dibenzofuran	0.012	47033163	5.10E-07	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-35	MULTI	S-3	Dibenzofuran	0.012	35494009	6.76E-07	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-36	MULTI	S-4	Dibenzofuran	0.0115	40155873	5.73E-07	
NC	CP&L - MAYO FACILITY	G-46	MULTI	S-1	Dibenzofuran	0.014	46476354	6.02E-07	6.02E-07
NC	PROGRESS ENERGY CAROLINAS, INC., W.H. WEATHERSPOON	G-24	1	S-1	Dibenzofuran	0.00075	2047727	7.33E-07	6.37E-07
NC	PROGRESS ENERGY CAROLINAS, INC., W.H. WEATHERSPOON	G-25	2	S-1	Dibenzofuran	0.0007	2120634	6.60E-07	
NC	PROGRESS ENERGY CAROLINAS, INC., W.H. WEATHERSPOON	G-26	3	S-2	Dibenzofuran	0.0012	4620806	5.19E-07	
NC	DUKE ENERGY CORP - DAN RIVER STEAM STATION	G-21	3	S-3	Dibenzofuran	0.0005	6642892	1.51E-07	2.74E-07
NC	DUKE ENERGY CORP - DAN RIVER STEAM STATION	G-23	2	S-2	Dibenzofuran	0.0005	2513404	3.98E-07	
NC	DUKE ENERGY CORPORATION - CLIFFSIDE STEAM STATION	G-84	3	S-3	Dibenzofuran	0.0005	2069663	4.83E-07	4.61E-07
NC	DUKE ENERGY CORPORATION - CLIFFSIDE STEAM STATION	G-85	4	S-4	Dibenzofuran	0.0005	2103923	4.75E-07	
NC	DUKE ENERGY CORPORATION - CLIFFSIDE STEAM STATION	G-86	5	S-5	Dibenzofuran	0.007	32959329	4.25E-07	
NC	DUKE ENERGY CORP - BELEWS CREEK STEAM STATION	G-17	1	S-1	Dibenzofuran	0.024	67835959	7.08E-07	7.08E-07
NC	PROGRESS ENERGY - F LEE PLANT	G-2	1	S-1	Dibenzofuran	0.0012	4016709	5.98E-07	5.93E-07
NC	PROGRESS ENERGY - F LEE PLANT	G-3	2	S-1	Dibenzofuran	0.00115	3913221	5.88E-07	
PA	EXELON GENERATION CO CROMBY GENERATION STATION	031	1	S01	Dibenzofuran	0.0015	8697485	3.45E-07	3.45E-07
TN	ALLEN FOSSIL PLANT	Boilr1	1	Stack1	Dibenzofuran	0.00421	20568457	4.09E-07	5.32E-07
TN	ALLEN FOSSIL PLANT	Boilr2	2	Stack2	Dibenzofuran	0.00491	19131766	5.13E-07	
TN	ALLEN FOSSIL PLANT	Boilr3	3	Stack3	Dibenzofuran	0.00545	16183389	6.74E-07	
								Total Avg.	5.73E-07
MO	KANSAS CITY POWER & LIGHT CO-MONTROSE GENERATING S	7847	3	10060	Diethyl Sulfate	0.0099	12220708	1.62E-06	2.21E-06
MO	KANSAS CITY POWER & LIGHT CO-MONTROSE GENERATING S	7848	2	10063	Diethyl Sulfate	0.0156	11907048	2.62E-06	
MO	KANSAS CITY POWER & LIGHT CO-MONTROSE GENERATING S	7849	1	10065	Diethyl Sulfate	0.0155	12946678	2.39E-06	
MO	KANSAS CITY POWER & LIGHT CO-HAWTHORN STATION	24676	5A	47800	Diethyl Sulfate	0.05645	41839589	2.70E-06	2.70E-06
MO	KANSAS CITY POWER & LIGHT CO-IATAN GENERATING STAT	16912	1	21121	Diethyl Sulfate	0.055	52608092	2.09E-06	2.09E-06
								Total Avg.	2.33E-06
MN	NSP DBA XCEL ENERGY - BLACK DOG	EU003	3	SV001	Dimethyl Phthalate	0.00026	6302333	8.25E-08	7.57E-08
MN	NSP DBA XCEL ENERGY - BLACK DOG	EU004	4	SV001	Dimethyl Phthalate	0.00042	12188405	6.89E-08	
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU001	6	SV002	Dimethyl Phthalate	0.000235	4388784	1.07E-07	1.04E-07
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU002	7	SV002	Dimethyl Phthalate	0.000235	4670969	1.01E-07	
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU003	8	SV003	Dimethyl Phthalate	0.00068	12939421	1.05E-07	
MN	OTTER TAIL POWER CO - HOOT LAKE PLANT	EU002	2	SV002	Dimethyl Phthalate	0.000195	4758198	8.20E-08	8.75E-08
MN	OTTER TAIL POWER CO - HOOT LAKE PLANT	EU003	3	SV002	Dimethyl Phthalate	0.000265	5695698	9.31E-08	
MN	XCEL ENERGY - HIGH BRIDGE GENERATING	EU003	5	SV001	Dimethyl Phthalate	0.00024	6154367	7.80E-08	8.30E-08
MN	XCEL ENERGY - HIGH BRIDGE GENERATING	EU004	6	SV001	Dimethyl Phthalate	0.000385	8744882	8.81E-08	
MN	NSP - SHERBURNE GENERATING PLANT	EU001	1	SV001	Dimethyl Phthalate	0.00228	53500053	8.52E-08	8.22E-08
MN	NSP - SHERBURNE GENERATING PLANT	EU002	2	SV001	Dimethyl Phthalate	0.00213	46259012	9.21E-08	
MN	NSP - SHERBURNE GENERATING PLANT	EU003	3	SV002	Dimethyl Phthalate	0.002625	75715065	6.93E-08	
MN	XCEL ENERGY - ALLEN S KING GENERATING	EU001	1	SV001	Dimethyl Phthalate	0.001475	18096637	1.63E-07	1.63E-07
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-1	3	S-3	Dimethyl Phthalate	0.002	29979755	1.33E-07	1.05E-07
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-2	4	S-4	Dimethyl Phthalate	0.002	32692109	1.22E-07	
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-4	1	S-1	Dimethyl Phthalate	0.001	24152709	8.28E-08	
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-5	2	S-2	Dimethyl Phthalate	0.001	24537935	8.15E-08	
NC	L V SUTTON STEAM ELECTRIC PLANT	G-187	1	S-1	Dimethyl Phthalate	0.00025	4629725	1.08E-07	8.86E-08
NC	L V SUTTON STEAM ELECTRIC PLANT	G-188	2	S-1	Dimethyl Phthalate	0.0002	5203884	7.69E-08	
NC	L V SUTTON STEAM ELECTRIC PLANT	G-189	3	S-2	Dimethyl Phthalate	0.00085	20975938	8.10E-08	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-29	1	S-1	Dimethyl Phthalate	0.001	25494527	7.84E-08	9.40E-08
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-30	2	S-2	Dimethyl Phthalate	0.002	47033163	8.50E-08	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-35	MULTI	S-3	Dimethyl Phthalate	0.002	35494009	1.13E-07	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-36	MULTI	S-4	Dimethyl Phthalate	0.002	40155873	9.96E-08	
NC	DUKE ENERGY CORP - BELEWS CREEK STEAM STATION	G-17	1	S-1	Dimethyl Phthalate	0.0035	67835959	1.03E-07	9.51E-08
NC	DUKE ENERGY CORP - BELEWS CREEK STEAM STATION	G-18	2	S-2	Dimethyl Phthalate	0.003	68954797	8.70E-08	
NC	PROGRESS ENERGY - F LEE PLANT	G-2	1	S-1	Dimethyl Phthalate	0.0002	4016709	9.96E-08	9.59E-08
NC	PROGRESS ENERGY - F LEE PLANT	G-3	2	S-1	Dimethyl Phthalate	0.0002	3913221	1.02E-07	
NC	PROGRESS ENERGY - F LEE PLANT	G-4	3	S-2	Dimethyl Phthalate	0.0006	13970082	8.59E-08	
TN	ALLEN FOSSIL PLANT	Boilr1	1	Stack1	Dimethyl Phthalate	0.000655	20568457	6.37E-08	8.25E-08
TN	ALLEN FOSSIL PLANT	Boilr2	2	Stack2	Dimethyl Phthalate	0.00076	19131766	7.94E-08	
TN	ALLEN FOSSIL PLANT	Boilr3	3	Stack3	Dimethyl Phthalate	0.000845	16183389	1.04E-07	
								Total Avg.	9.64E-08
TX	GIBBONS CREEK	000002	1	000002	Manganese Dioxide	0.752	35281328	4.26E-05	4.26E-05
								Total Avg.	4.26E-05
TN	ALLEN FOSSIL PLANT	Boilr1	1	Stack1	Polychlorinated Biphenyls	0.000109	20568457	1.06E-08	1.37E-08
TN	ALLEN FOSSIL PLANT	Boilr2	2	Stack2	Polychlorinated Biphenyls	0.000127	19131766	1.33E-08	
TN	ALLEN FOSSIL PLANT	Boilr3	3	Stack3	Polychlorinated Biphenyls	0.00014	16183389	1.73E-08	
								Total Avg.	1.37E-08

Completed by: JDE 11-26-2008
Checked by: SAK 11-26-2008

Table A-6 : EPA NEI HAP Database and TRI Database Emissions Information and EPA Clean Markets MMBtu/hr Values

STATE	FacilityName	Emission Unit ID	Boiler ID	Emission Release Point ID	Pollutant	Emissions (TPY)	HEAT INPUT (MMBtu)	Emission Rate (lb/MMBtu)	Avg. Emission Rate (lb/MMBtu)
IA	IPL - LANSING GENERATING STATION	145136	4	114991	Polycyclic Organic Matter	0.0137	14456441	1.90E-06	1.90E-06
IA	IPL - M.L. KAPP GENERATING STATION	144559	2	114945	Polycyclic Organic Matter	0.0174	11586035	3.00E-06	3.00E-06
IA	IPL - BURLINGTON GENERATING STATION	145381	1	115078	Polycyclic Organic Matter	0.0138	14304675	1.93E-06	1.93E-06
IA	IPL - PRAIRIE CREEK GENERATING STATION	144096	4	114824	Polycyclic Organic Matter	0.00854	8096263	2.11E-06	2.11E-06
IA	MIDAMERICAN ENERGY CO. - LOUISA STATION	147281	101	117487	Polycyclic Organic Matter	0.05	47240697	2.12E-06	2.12E-06
IA	MUSCATINE POWER & WATER	163415	9	130857	Polycyclic Organic Matter	0.003849	12758228	6.03E-07	3.54E-07
IA	MUSCATINE POWER & WATER	163419	8	130911	Polycyclic Organic Matter	0.000354	6793436	1.04E-07	
IA	MIDAMERICAN ENERGY CO. - COUNCIL BLUFFS ENERGY CTR	143797	2	114672	Polycyclic Organic Matter	0.01	6281538	3.18E-06	2.69E-06
IA	MIDAMERICAN ENERGY CO. - COUNCIL BLUFFS ENERGY CTR	143798	3	114673	Polycyclic Organic Matter	0.05	45431195	2.20E-06	
IA	MIDAMERICAN ENERGY CO. - RIVERSIDE STATION	147465	9	131993	Polycyclic Organic Matter	0.01	6246921	3.20E-06	3.20E-06
IA	IPL - OTTUMWA GENERATING STATION	143977	1	114771	Polycyclic Organic Matter	0.0504	45946302	2.19E-06	2.19E-06
IA	MIDAMERICAN ENERGY CO. - GEORGE NEAL NORTH	148764	1	118711	Polycyclic Organic Matter	0.01	9662316	2.07E-06	1.97E-06
IA	MIDAMERICAN ENERGY CO. - GEORGE NEAL NORTH	148765	2	118712	Polycyclic Organic Matter	0.02	18870064	2.12E-06	
IA	MIDAMERICAN ENERGY CO. - GEORGE NEAL NORTH	148766	3	118713	Polycyclic Organic Matter	0.03	40185308	1.49E-06	
IA	MIDAMERICAN ENERGY CO. - GEORGE NEAL SOUTH	147140	4	117334	Polycyclic Organic Matter	0.05	45569716	2.19E-06	
MN	NSP DBA XCEL ENERGY - BLACK DOG	EU003	3	SV001	Polycyclic Organic Matter	0.00704	6302333	2.23E-06	2.04E-06
MN	NSP DBA XCEL ENERGY - BLACK DOG	EU004	4	SV001	Polycyclic Organic Matter	0.011275	12188405	1.85E-06	
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU001	6	SV002	Polycyclic Organic Matter	0.005465	4388784	2.49E-06	2.42E-06
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU002	7	SV002	Polycyclic Organic Matter	0.005495	4670969	2.35E-06	
MN	MINNESOTA POWER INC - BOSWELL ENERGY CTR	EU001	1	SV001	Polycyclic Organic Matter	0.004215	5984583	1.41E-06	2.05E-06
MN	MINNESOTA POWER INC - BOSWELL ENERGY CTR	EU002	2	SV001	Polycyclic Organic Matter	0.004825	5815310	1.66E-06	
MN	MINNESOTA POWER INC - BOSWELL ENERGY CTR	EU003	3	SV003	Polycyclic Organic Matter	0.032735	26268955	2.49E-06	
MN	MINNESOTA POWER INC - BOSWELL ENERGY CTR	EU004	4	SV004	Polycyclic Organic Matter	0.054025	40948377	2.64E-06	
MN	ROCHESTER PUBLIC UTILITIES - SILVER LAKE	EU004	4	SV003	Polycyclic Organic Matter	0.00111	1668283	1.33E-06	1.33E-06
MN	OTTER TAIL POWER CO - HOOT LAKE PLANT	EU002	2	SV002	Polycyclic Organic Matter	0.00526	4758198	2.21E-06	2.20E-06
MN	OTTER TAIL POWER CO - HOOT LAKE PLANT	EU003	3	SV002	Polycyclic Organic Matter	0.006215	5695698	2.18E-06	
MN	XCEL ENERGY - HIGH BRIDGE GENERATING	EU003	5	SV001	Polycyclic Organic Matter	0.005575	6154367	1.81E-06	1.93E-06
MN	XCEL ENERGY - HIGH BRIDGE GENERATING	EU004	6	SV001	Polycyclic Organic Matter	0.00895	8744882	2.05E-06	
MN	MINNESOTA POWER INC - LASKIN ENERGY CTR	EU001	1	SV001	Polycyclic Organic Matter	0.004605	5141510	1.79E-06	2.04E-06
MN	MINNESOTA POWER INC - LASKIN ENERGY CTR	EU002	2	SV001	Polycyclic Organic Matter	0.00461	4031832	2.29E-06	
NE	OMAHA PUBLIC POWER DISTRICT - NORTH OMAHA POWER ST	01	MULTI	01	Polycyclic Organic Matter	0.0415	5101641	1.63E-05	1.63E-05
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-1	3	S-3	Polycyclic Organic Matter	0.0008	29979755	5.34E-08	4.38E-08
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-2	4	S-4	Polycyclic Organic Matter	0.00085	32692109	5.20E-08	
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-4	1	S-1	Polycyclic Organic Matter	0.0004	24152709	3.31E-08	
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-5	2	S-2	Polycyclic Organic Matter	0.00045	24537935	3.67E-08	
NC	PROGRESS ENERGY CAROLINAS - CAPE FEAR PLANT	G-1	5	S-1	Polycyclic Organic Matter	0.147	8135544	3.61E-05	3.26E-05
NC	PROGRESS ENERGY CAROLINAS - CAPE FEAR PLANT	G-2	6	S-2	Polycyclic Organic Matter	0.1605	11041675	2.91E-05	
NC	L V SUTTON STEAM ELECTRIC PLANT	G-187	1	S-1	Polycyclic Organic Matter	0.0855	4629725	3.69E-05	3.09E-05
NC	L V SUTTON STEAM ELECTRIC PLANT	G-188	2	S-1	Polycyclic Organic Matter	0.067	5203884	2.57E-05	
NC	L V SUTTON STEAM ELECTRIC PLANT	G-189	3	S-2	Polycyclic Organic Matter	0.3145	20975938	3.00E-05	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-29	1	S-1	Polycyclic Organic Matter	0.2885	25494527	2.26E-05	3.06E-05
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-30	2	S-2	Polycyclic Organic Matter	0.675	47033163	2.87E-05	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-35	MULTI	S-3	Polycyclic Organic Matter	0.6775	35494009	3.82E-05	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-36	MULTI	S-4	Polycyclic Organic Matter	0.663	40155873	3.30E-05	
NC	CP&L - MAYO FACILITY	G-46	MULTI	S-1	Polycyclic Organic Matter	0.7925	46476354	3.41E-05	3.41E-05
NC	PROGRESS ENERGY CAROLINAS, INC., W.H. WEATHERSPOON	G-24	1	S-1	Polycyclic Organic Matter	0.0435	2047727	4.25E-05	3.64E-05
NC	PROGRESS ENERGY CAROLINAS, INC., W.H. WEATHERSPOON	G-25	2	S-1	Polycyclic Organic Matter	0.04	2120634	3.77E-05	
NC	PROGRESS ENERGY CAROLINAS, INC., W.H. WEATHERSPOON	G-26	3	S-2	Polycyclic Organic Matter	0.067	4620806	2.90E-05	
NC	DUKE ENERGY CORP - DAN RIVER STEAM STATION	G-21	3	S-3	Polycyclic Organic Matter	0.000025	6642892	7.53E-09	7.53E-09
NC	DUKE ENERGY CORP - DAN RIVER STEAM STATION	G-21	3	S-4	Polycyclic Organic Matter	0.000025	6642892	7.53E-09	
NC	DUKE ENERGY CORP - BELEWS CREEK STEAM STATION	G-17	1	S-1	Polycyclic Organic Matter	0.00155	67835959	4.57E-08	4.24E-08
NC	DUKE ENERGY CORP - BELEWS CREEK STEAM STATION	G-18	2	S-2	Polycyclic Organic Matter	0.00135	68954797	3.92E-08	
NC	PROGRESS ENERGY - F LEE PLANT	G-2	1	S-1	Polycyclic Organic Matter	0.0685	4016709	3.41E-05	3.28E-05
NC	PROGRESS ENERGY - F LEE PLANT	G-3	2	S-1	Polycyclic Organic Matter	0.066	3913221	3.37E-05	
NC	PROGRESS ENERGY - F LEE PLANT	G-4	3	S-2	Polycyclic Organic Matter	0.2125	13970082	3.04E-05	
OH	DP&L, J.M. STUART GENERATING STATION	B001	1	000002	Polycyclic Organic Matter	0.04462226	30646464	2.91E-06	2.91E-06
OH	DP&L, J.M. STUART GENERATING STATION	B002	2	000003	Polycyclic Organic Matter	0.0419861	34601223	2.43E-06	2.41E-06
OH	DP&L, J.M. STUART GENERATING STATION	B003	3	000004	Polycyclic Organic Matter	0.0401248	37740832	2.13E-06	
OH	DP&L, J.M. STUART GENERATING STATION	B004	4	000005	Polycyclic Organic Matter	0.040821	30645557	2.66E-06	
OH	DP&L, KILLEN GENERATING STATION	B001	2	000002	Polycyclic Organic Matter	0.0381063	41790006	1.82E-06	1.82E-06
OH	CLEVELAND ELECTRIC ILLUMINATING CO., ASHTABULA PLA	B008	7	000001	Polycyclic Organic Matter	0.0182953	18695534	1.96E-06	1.96E-06
OH	R. E. BURGER PLANT	B011	7	000003	Polycyclic Organic Matter	0.009946653	9584154	2.08E-06	1.91E-06
OH	R. E. BURGER PLANT	B012	8	000003	Polycyclic Organic Matter	0.00818502	9424262	1.74E-06	
OH	CITY OF HAMILTON DEPARTMENT OF PUBLIC UTILITIES	B009	9	000003	Polycyclic Organic Matter	0.00829383	3410328	1.72E-06	1.72E-06
OH	CINCINNATI GAS & ELECTRIC CO., WM. H. ZIMMER	B006	1	000021	Polycyclic Organic Matter	0.09772063	83026148	2.34E-06	2.34E-06
OH	CONESVILLE POWER PLANT	B003	3	000006	Polycyclic Organic Matter	0.008348R	5002365	3.33E-06	3.33E-06
OH	GAVIN POWER PLANT	B003	1	000003	Polycyclic Organic Matter	0.08613381	71980848	2.39E-06	2.06E-06
OH	GAVIN POWER PLANT	B004	2	000004	Polycyclic Organic Matter	0.08077236	93686331	1.72E-06	
OH	CARDINAL POWER PLANT (CARDINAL OPERATING COMPANY)	B001	1	000005	Polycyclic Organic Matter	0.0283875	31928035	1.83E-06	1.69E-06
OH	CARDINAL POWER PLANT (CARDINAL OPERATING COMPANY)	B002	2	000007	Polycyclic Organic Matter	0.0347251	36636142	1.90E-06	
OH	CARDINAL POWER PLANT (CARDINAL OPERATING COMPANY)	B009	3	000009	Polycyclic Organic Matter	0.0263268	39408868	1.34E-06	
OH	W. H. SAMMIS PLANT	B007	1	000007	Polycyclic Organic Matter	0.01513319	12507034	2.42E-06	2.26E-06
OH	W. H. SAMMIS PLANT	B008	2	000007	Polycyclic Organic Matter	0.01156955	11855430	1.95E-06	
OH	W. H. SAMMIS PLANT	B009	3	000008	Polycyclic Organic Matter	0.01503304	11170922	2.69E-06	
OH	W. H. SAMMIS PLANT	B010	4	000008	Polycyclic Organic Matter	0.01461331	10549109	2.77E-06	
OH	W. H. SAMMIS PLANT	B011	5	000010	Polycyclic Organic Matter	0.02173777	18902199	2.30E-06	
OH	W. H. SAMMIS PLANT	B012	6	000010	Polycyclic Organic Matter	0.04483171	43024605	2.08E-06	
OH	W. H. SAMMIS PLANT	B013	7	000009	Polycyclic Organic Matter	0.03708883	45614013	1.63E-06	
OH	CLEVELAND ELECTRIC ILLUMINATING CO., EASTLAKE PLA	B001	1	000001	Polycyclic Organic Matter	0.00856319	6610984	2.59E-06	2.02E-06
OH	CLEVELAND ELECTRIC ILLUMINATING CO., EASTLAKE PLA	B002	2	000002	Polycyclic Organic Matter	0.00902711	9582228	1.88E-06	
OH	CLEVELAND ELECTRIC ILLUMINATING CO., EASTLAKE PLA	B003	3	000003	Polycyclic Organic Matter	0.00853363	8606980	1.98E-06	
OH	CLEVELAND ELECTRIC ILLUMINATING CO., EASTLAKE PLA	B004	4	000004	Polycyclic Organic Matter	0.01164113	17644289	1.86E-06	
OH	CLEVELAND ELECTRIC ILLUMINATING CO., EASTLAKE PLA	B005	5	000005	Polycyclic Organic Matter	0.0327805	42648146	1.77E-06	
OH	AVON LAKE POWER PLANT	B010	10	000001	Polycyclic Organic Matter	0.00532514	3406103	3.13E-06	2.81E-06
OH	AVON LAKE POWER PLANT	B012	12	000002	Polycyclic Organic Matter	0.0394663	31705425	2.49E-06	
OH	TOLEDO EDISON CO., BAY SHORE POWER PLANT	B002	2	000002	Polycyclic Organic Matter	0.0111379	9642914	2.31E-06	1.99E-06
OH	TOLEDO EDISON CO., BAY SHORE POWER PLANT	B003	3	000002	Polycyclic Organic Matter	0.00953528	10364396	1.84E-06	
OH	TOLEDO EDISON CO., BAY SHORE POWER PLANT	B004	4	000002	Polycyclic Organic Matter	0.01060941	17544350	1.83E-06	
OH	MUSKINGUM RIVER POWER PLANT	B006	5	000004	Polycyclic Organic Matter	0.0412772	35301392	2.34E-06	2.34E-06
OH	R. H. GORSUCH STATION	B001	1	000007	Polycyclic Organic Matter	0.00530254	3621082	2.93E-06	2.86E-06
OH	R. H. GORSUCH STATION	B002	2	000007	Polycyclic Organic Matter	0.00508074	4002690	2.54E-06	
OH	R. H. GORSUCH STATION	B003	3	000007	Polycyclic Organic Matter	0.00467331	3229962	2.89E-06	
OH	R. H. GORSUCH STATION	B004	4	000007	Polycyclic Organic Matter	0.00517867	3373420	3.07E-06	
PA	ALLEGHENY ENERGY SUPPLY CO ARMSTRONG POWER STATION	031	1	S03	Polycyclic Organic Matter	0.011	8744228	2.52E-06	2.49E-06
PA	ALLEGHENY ENERGY SUPPLY CO ARMSTRONG POWER STATION	032	2	S04	Polycyclic Organic Matter	0.0115	9341468	2.46E-06	
SC	DUKE ENERGY:LEE	001	1	1	Polycyclic Organic Matter	0.003701	3146584	2.99E-06	2.45E-06
SC	DUKE ENERGY:LEE	002	2	2	Polycyclic Organic Matter	0.003605	3298670	2.79E-06	
SC	DUKE ENERGY:LEE	003	3	3	Polycyclic Organic Matter	0.005551	7049954	1.57E-06	
TN	ALLEN FOSSIL PLANT	Boilr1	1	Stack1	Polycyclic Organic Matter	0.0098	20568457	9.53E-07	1.24E-06
TN	ALLEN FOSSIL PLANT	Boilr2	2	Stack2	Polycyclic Organic Matter	0.0214	19131766	1.19E-06	
TN	ALLEN FOSSIL PLANT	Boilr3	3	Stack3	Polycyclic Organic Matter	0.0128	16183389	1.58E-06	
TX	GIBBONS CREEK	000002	1	000002	Polycyclic Organic Matter	0.0029	3528132R	1.64E-07	1.64E-07
								Total Avg.	6.21E-06
NY	AES GREENIDGE LLC	GR0004	6	00004	Propylene Dichloride	0.003036	5056599	1.20E-06	1.20E-06

Completed by: JDT 11.26.2008
Checked by: SAK 11.26.2008

Table A-6 : EPA NEI HAP Database and TRI Database Emissions Information and EPA Clean Markets MMBtu/hr Values

STATE	FacilityName	Emission Unit ID	Boiler ID	Emission Release Point ID	Pollutant	Emissions (TPY)	HEAT INPUT (MMBtu)	Emission Rate (lb/MMBtu)	Avg. Emission Rate (lb/MMBtu)
								Total Avg.	1.20E-06
UT	CARBON POWER PLANT	3974	1	1001	Sodium Cyanide	0.31635	6740398	9.39E-05	9.74E-05
UT	CARBON POWER PLANT	3976	2	1002	Sodium Cyanide	0.46915	9300537	1.01E-04	
UT	HUNTER POWER PLANT	4026	1	1281	Sodium Cyanide	1.0747	37638145	5.71E-05	8.98E-05
UT	HUNTER POWER PLANT	4028	2	1282	Sodium Cyanide	1.71355	32252702	1.06E-04	
UT	HUNTER POWER PLANT	4030	3	1283	Sodium Cyanide	1.828	34434000	1.06E-04	
UT	HUNTINGTON POWER PLANT	4032	1	1284	Sodium Cyanide	1.5591	32929773	9.47E-05	1.14E-04
UT	HUNTINGTON POWER PLANT	4034	2	1285	Sodium Cyanide	1.7858	26754943	1.33E-04	
UT	INTERMOUNTAIN GENERATION STATION	2381	1SGA	1709	Sodium Cyanide	0.88393	83006107	2.13E-05	2.21E-05
UT	INTERMOUNTAIN GENERATION STATION	2382	2SGA	1710	Sodium Cyanide	0.840831	73285622	2.29E-05	
								Total Avg.	8.09E-05
MO	KANSAS CITY POWER & LIGHT CO-MONTROSE GENERATING S	7848	2	10063	Toluene-2,4-Diamine	0.0001	11907048	1.68E-08	1.61E-08
MO	KANSAS CITY POWER & LIGHT CO-MONTROSE GENERATING S	7849	1	10065	Toluene-2,4-Diamine	0.0001	12946678	1.54E-08	
MO	KANSAS CITY POWER & LIGHT CO-IATAN GENERATING STAT	16912	1	21121	Toluene-2,4-Diamine	0.0003	52608092	1.14E-08	1.14E-08
								Total Avg.	1.38E-08
MN	NSP DBA XCEL ENERGY - BLACK DOG	EU003	3	SV001	Vinyl Chloride	0.00214	6302333	6.79E-07	6.21E-07
MN	NSP DBA XCEL ENERGY - BLACK DOG	EU004	4	SV001	Vinyl Chloride	0.003425	12188405	5.62E-07	
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU001	6	SV002	Vinyl Chloride	0.001915	4388784	8.73E-07	8.50E-07
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU002	7	SV002	Vinyl Chloride	0.00193	4670969	8.26E-07	
MN	XCEL ENERGY - RIVERSIDE GENERATING PLANT	EU003	8	SV003	Vinyl Chloride	0.005515	12939421	8.52E-07	
MN	OTTER TAIL POWER CO - HOOT LAKE PLANT	EU002	2	SV002	Vinyl Chloride	0.0016	4758198	6.73E-07	7.19E-07
MN	OTTER TAIL POWER CO - HOOT LAKE PLANT	EU003	3	SV002	Vinyl Chloride	0.00218	5695698	7.65E-07	
MN	XCEL ENERGY - HIGH BRIDGE GENERATING	EU003	5	SV001	Vinyl Chloride	0.001955	6154367	6.35E-07	6.77E-07
MN	XCEL ENERGY - HIGH BRIDGE GENERATING	EU004	6	SV001	Vinyl Chloride	0.00314	8744882	7.18E-07	
MN	NSP - SHERBURNE GENERATING PLANT	EU001	1	SV001	Vinyl Chloride	0.018525	53500053	6.93E-07	6.68E-07
MN	NSP - SHERBURNE GENERATING PLANT	EU002	2	SV001	Vinyl Chloride	0.01729	46259012	7.48E-07	
MN	NSP - SHERBURNE GENERATING PLANT	EU003	3	SV002	Vinyl Chloride	0.02132	75715065	5.63E-07	
MN	XCEL ENERGY - ALLEN S KING GENERATING	EU001	1	SV001	Vinyl Chloride	0.011965	18096637	1.32E-06	1.32E-06
NY	AES GREENIDGE LLC	G00004	6	00004	Vinyl Chloride	0.001656	5056599	6.55E-07	6.55E-07
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-1	3	S-3	Vinyl Chloride	0.0155	29979755	1.03E-06	8.42E-07
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-2	4	S-4	Vinyl Chloride	0.016	32692109	9.79E-07	
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-4	1	S-1	Vinyl Chloride	0.008	24152709	6.62E-07	
NC	DUKE ENERGY CORPORATION - MARSHALL STEAM STATION	G-5	2	S-2	Vinyl Chloride	0.0085	24537935	6.93E-07	
NC	PROGRESS ENERGY CAROLINAS - CAPE FEAR PLANT	G-1	5	S-1	Vinyl Chloride	0.00325	8135544	7.99E-07	7.16E-07
NC	PROGRESS ENERGY CAROLINAS - CAPE FEAR PLANT	G-2	6	S-2	Vinyl Chloride	0.0035	11041675	6.34E-07	
NC	DUKE ENERGY CORPORATION - ALLEN STEAM STATION	G-14	1	S-1	Vinyl Chloride	0.0025	8399352	5.95E-07	5.75E-07
NC	DUKE ENERGY CORPORATION - ALLEN STEAM STATION	G-15	2	S-2	Vinyl Chloride	0.002	9210552	4.34E-07	
NC	DUKE ENERGY CORPORATION - ALLEN STEAM STATION	G-16	3	S-3	Vinyl Chloride	0.0035	15956865	4.39E-07	
NC	DUKE ENERGY CORPORATION - ALLEN STEAM STATION	G-17	4	S-4	Vinyl Chloride	0.005	14172222	7.06E-07	
NC	DUKE ENERGY CORPORATION - ALLEN STEAM STATION	G-18	5	S-5	Vinyl Chloride	0.005	14313317	6.99E-07	
NC	DUKE ENERGY CORPORATION - RIVERBEND STEAM STATION	G-18	8	S-6	Vinyl Chloride	0.0015	4012669	7.48E-07	7.58E-07
NC	DUKE ENERGY CORPORATION - RIVERBEND STEAM STATION	G-19	9	S-7	Vinyl Chloride	0.002	5731728	6.98E-07	
NC	DUKE ENERGY CORPORATION - RIVERBEND STEAM STATION	G-20	10	S-8	Vinyl Chloride	0.0025	6028904	8.29E-07	
NC	L V SUTTON STEAM ELECTRIC PLANT	G-187	1	S-1	Vinyl Chloride	0.0019	4629725	8.21E-07	6.88E-07
NC	L V SUTTON STEAM ELECTRIC PLANT	G-188	2	S-1	Vinyl Chloride	0.0015	5203884	5.76E-07	
NC	L V SUTTON STEAM ELECTRIC PLANT	G-189	3	S-2	Vinyl Chloride	0.007	20975938	6.67E-07	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-29	1	S-1	Vinyl Chloride	0.0065	25494527	5.10E-07	6.79E-07
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-30	2	S-2	Vinyl Chloride	0.015	47033163	6.38E-07	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-35	MULTI	S-3	Vinyl Chloride	0.015	35494009	8.45E-07	
NC	CP&L - ROXBORO STEAM ELECTRIC PLANT	G-36	MULTI	S-4	Vinyl Chloride	0.0145	40155873	7.22E-07	
NC	CP&L - MAYO FACILITY	G-46	MULTI	S-1	Vinyl Chloride	0.0175	46476354	7.53E-07	7.53E-07
NC	PROGRESS ENERGY CAROLINAS, INC., W.H. WEATHERSPOON	G-24	1	S-1	Vinyl Chloride	0.00095	2047727	9.28E-07	8.09E-07
NC	PROGRESS ENERGY CAROLINAS, INC., W.H. WEATHERSPOON	G-25	2	S-1	Vinyl Chloride	0.0009	2120634	8.49E-07	
NC	PROGRESS ENERGY CAROLINAS, INC., W.H. WEATHERSPOON	G-26	3	S-2	Vinyl Chloride	0.0015	4620806	6.49E-07	
NC	DUKE ENERGY CORP - DAN RIVER STEAM STATION	G-21	3	S-3	Vinyl Chloride	0.00075	6642892	2.26E-07	3.26E-07
NC	DUKE ENERGY CORP - DAN RIVER STEAM STATION	G-22	1	S-1	Vinyl Chloride	0.0005	2817682	3.55E-07	
NC	DUKE ENERGY CORP - DAN RIVER STEAM STATION	G-23	2	S-2	Vinyl Chloride	0.0005	2513404	3.98E-07	
NC	DUKE ENERGY CORPORATION - BUCK STEAM STATION	G-3	7	S-6	Vinyl Chloride	0.0005	1603389	6.24E-07	6.29E-07
NC	DUKE ENERGY CORPORATION - BUCK STEAM STATION	G-4	8	S-6	Vinyl Chloride	0.002	6291656	6.36E-07	
NC	DUKE ENERGY CORPORATION - BUCK STEAM STATION	G-5	9	S-6	Vinyl Chloride	0.002	6379286	6.27E-07	
NC	DUKE ENERGY CORPORATION - CLIFFSIDE STEAM STATION	G-84	3	S-3	Vinyl Chloride	0.0005	2069663	4.83E-07	4.91E-07
NC	DUKE ENERGY CORPORATION - CLIFFSIDE STEAM STATION	G-85	4	S-4	Vinyl Chloride	0.0005	2103923	4.75E-07	
NC	DUKE ENERGY CORPORATION - CLIFFSIDE STEAM STATION	G-86	5	S-5	Vinyl Chloride	0.0085	32959329	5.16E-07	
NC	DUKE ENERGY CORP - BELEWS CREEK STEAM STATION	G-17	1	S-1	Vinyl Chloride	0.03	67835959	8.84E-07	8.19E-07
NC	DUKE ENERGY CORP - BELEWS CREEK STEAM STATION	G-18	2	S-2	Vinyl Chloride	0.026	68954797	7.54E-07	
NC	PROGRESS ENERGY - F LEE PLANT	G-2	1	S-1	Vinyl Chloride	0.0015	4016709	7.47E-07	7.20E-07
NC	PROGRESS ENERGY - F LEE PLANT	G-3	2	S-1	Vinyl Chloride	0.00145	3913221	7.41E-07	
NC	PROGRESS ENERGY - F LEE PLANT	G-4	3	S-2	Vinyl Chloride	0.0047	13970082	6.73E-07	
TN	ALLEN FOSSIL PLANT	Boilr1	1	Stack1	Vinyl Chloride	0.0053	20568457	5.15E-07	6.70E-07
TN	ALLEN FOSSIL PLANT	Boilr2	2	Stack2	Vinyl Chloride	0.0062	19131766	6.48E-07	
TN	ALLEN FOSSIL PLANT	Boilr3	3	Stack3	Vinyl Chloride	0.00685	16183389	8.47E-07	
								Total Avg.	7.14E-07

Completed by: JDF 11-26-2008
Checked by: SAK 11-26-2008

TOXIC EMISSION CALCULATIONS

Table A-7: Toxic Emission Calculations: Main Boiler

Basis:

PRB Coal Consumption Rate	488	ton Coal/hr
50-50 Blend Coal Consumption rate	417	ton Coal/hr
Fuel Oil Consumption Rate	9286	gal/hr
Maximum heat Input	8.30E-03	Trillion Btu/hr

Compound	Pulverized Coal [1] -AP-42				Fuel Oil [2]-AP-42			Pulverized Coal [3] -Utility report to Congress, NEI Database, TRI Database			Pulverized Coal[4] -MACT Analysis						Worst Case Emissions (lb/hr)	Worst Case Emissions (tpy)[5]
	Emission Factor	Units	Hourly Emissions (lb/hr) (PRB Coal)	Hourly Emissions (lb/hr) 50-50 Blend	Emission Factor	Units	Hourly Emissions (lb/hr)	Emission Factor	Units	Hourly Emissions (lb/hr)	Emission Factor (PRB Coal)	Units	Hourly Emissions (lb/hr) (PRB Coal)	Emission Factor (50-50 Blend Coal)	Units	Hourly Emissions (lb/hr) 50-50 Blend		
Organics																		
Acenaphthene	5.10E-07	lb/ton	2.49E-04	2.13E-04	2.1E-05	lb/1,000 gal	2.0E-04	0.013	lb/trillion btu	1.08E-04							2.49E-04	1.1E-03
Acenaphthylene	2.50E-07	lb/ton	1.22E-04	1.04E-04	2.5E-07	lb/1,000 gal	2.3E-06	0.004	lb/trillion btu	3.32E-05							1.22E-04	5.3E-04
Acetaldehyde	5.70E-04	lb/ton	2.78E-01	2.38E-01				6.75	lb/trillion btu	5.60E-02							2.78E-01	1.2E+00
Acetophenone	1.50E-05	lb/ton	7.32E-03	6.26E-03				0.68	lb/trillion btu	5.64E-03							7.32E-03	3.2E-02
Acrolein	2.90E-04	lb/ton	1.42E-01	1.21E-01				3.25	lb/trillion btu	2.70E-02							1.42E-01	6.2E-01
Anthracene	2.10E-07	lb/ton	1.02E-04	8.76E-05	1.2E-06	lb/1,000 gal	1.1E-05	0.004	lb/trillion btu	3.32E-05							1.02E-04	4.5E-04
Benzene	1.30E-03	lb/ton	6.34E-01	5.42E-01	2.14E-04	lb/1,000 gal	2.0E-03	2.5	lb/trillion btu	2.08E-02							6.34E-01	2.8E+00
Benzo(a)anthracene	8.00E-08	lb/ton	3.90E-05	3.34E-05	4.0E-06	lb/1,000 gal	3.7E-05	0.002	lb/trillion btu	1.66E-05							3.90E-05	1.7E-04
Benzo(a)pyrene	3.80E-08	lb/ton	1.85E-05	1.58E-05				0.001	lb/trillion btu	8.30E-06							1.85E-05	8.1E-05
Benzo(b)fluoranthene			-	-				0.008	lb/trillion btu	6.64E-05							6.64E-05	2.9E-04
Benzo(e)pyrene			-	-				0.001	lb/trillion btu	8.30E-06							8.30E-06	3.6E-05
Benzo(g,h,i)perylene			-	-	2.26E-06	lb/1,000 gal	2.1E-05	0.002	lb/trillion btu	1.66E-05							2.10E-05	9.2E-05
Benzo(g,h,i)pyrene	2.70E-08	lb/ton	1.32E-05	1.13E-05													1.32E-05	5.8E-05
Benzo(b,k)fluoranthene	1.10E-07	lb/ton	5.37E-05	4.59E-05	1.48E-06	lb/1,000 gal	1.4E-05	0.004	lb/trillion btu	3.32E-05							5.37E-05	2.4E-04
Benzo(k)fluoranthene			-	-				0.004	lb/trillion btu	3.32E-05							3.32E-05	1.5E-04
Benzyl chloride	7.00E-04	lb/ton	3.42E-01	2.92E-01				0.006	lb/trillion btu	4.98E-05							3.42E-01	1.5E+00
Biphenyl	1.70E-06	lb/ton	8.30E-04	7.09E-04				0.18	lb/trillion btu	1.49E-03							1.49E-03	6.5E-03
bis(2-Ethylhexyl)phthalate	7.30E-05	lb/ton	3.56E-02	3.04E-02				4.1	lb/trillion btu	3.40E-02							3.56E-02	1.6E-01
Bromoform	3.90E-05	lb/ton	1.90E-02	1.63E-02				6.6	lb/trillion btu	5.48E-02							5.48E-02	2.4E-01
2-Butanone (MEK)	3.90E-04	lb/ton	1.90E-01	1.63E-01													1.90E-01	
Carbon tetrachloride			-	-				3.25	lb/trillion btu	2.70E-02							2.70E-02	1.2E-01
Carbon disulfide	1.30E-04	lb/ton	6.34E-02	5.42E-02				4.3	lb/trillion btu	3.57E-02							6.34E-02	2.8E-01
Chlorobenzene	2.20E-05	lb/ton	1.07E-02	9.17E-03				3.18	lb/trillion btu	2.64E-02							2.64E-02	1.2E-01
Chloroform	5.90E-05	lb/ton	2.88E-02	2.46E-02				3.2	lb/trillion btu	2.66E-02							2.88E-02	1.3E-01
Chloromethane	5.30E-04	lb/ton	2.59E-01	2.21E-01				5.9	lb/trillion btu	4.90E-02							2.59E-01	1.1E+00
2-Chloronaphthalene			-					0.04	lb/trillion btu	3.32E-04							3.32E-04	1.5E-03
2-Chloroacetophenone	7.00E-06	lb/ton	3.42E-03	2.92E-03				0.29	lb/trillion btu	2.41E-03							3.42E-03	1.5E-02
Chrysene	1.00E-07	lb/ton	4.88E-05	4.17E-05	2.4E-06	lb/1,000 gal	2.2E-05	0.003	lb/trillion btu	2.49E-05							4.88E-05	2.1E-04
Cumene	5.30E-06	lb/ton	2.59E-03	2.21E-03				0.29	lb/trillion btu	2.41E-03			-				2.59E-03	1.1E-02
Cyanide	2.50E-03	lb/ton	1.22E+00	1.04E+00				28.00	lb/trillion btu	2.32E-01							1.22E+00	5.3E+00
Dibenzo(a,h)anthracene			-	-	1.7E-06	lb/1,000 gal	1.6E-05	0.001	lb/trillion btu	8.30E-06							1.55E-05	6.8E-05
Dibutyl phthalate				-				2.8	lb/trillion btu	2.32E-02							2.32E-02	1.0E-01
Dimethyl sulfate	4.80E-05	lb/ton	2.34E-02	2.00E-02													2.34E-02	1.0E-01
2,4-Dinitrotoluene	2.80E-07	lb/ton	1.37E-04	1.17E-04				0.015	lb/trillion btu	1.25E-04							1.37E-04	6.0E-04
Ethylbenzene	9.40E-05	lb/ton	4.59E-02	3.92E-02	6.36E-05	lb/1,000 gal	5.9E-04	0.41	lb/trillion btu	3.40E-03							4.59E-02	2.0E-01
Ethyl Chloride	4.20E-05	lb/ton	2.05E-02	1.75E-02				2.4	lb/trillion btu	1.99E-02							2.05E-02	9.0E-02
Ethylene dichloride	4.00E-05	lb/ton	1.95E-02	1.67E-02				3.1	lb/trillion btu	2.57E-02							2.57E-02	1.1E-01
Ethylene dibromide	1.20E-06	lb/ton	5.86E-04	5.00E-04													5.86E-04	2.6E-03
Fluoranthene	7.10E-07	lb/ton	3.46E-04	2.96E-04	4.8E-06	lb/1,000 gal	4.5E-05	0.016	lb/trillion btu	1.33E-04							3.46E-04	1.5E-03
Fluorene	9.10E-07	lb/ton	4.44E-04	3.79E-04	4.5E-06	lb/1,000 gal	4.2E-05	0.013	lb/trillion btu	1.08E-04							4.44E-04	1.9E-03
Formaldehyde	2.40E-04	lb/ton	1.17E-01	1.00E-01	3.3E-02	lb/1,000 gal	3.1E-01	4.0	lb/trillion btu	3.32E-02							3.06E-01	1.3E+00
Hexane	6.70E-05	lb/ton	3.27E-02	2.79E-02				0.83	lb/trillion btu	6.89E-03							3.27E-02	1.4E-01
Hydrogen chloride	1.20E+00	lb/ton	5.86E+02	5.00E+02				13634.6623	lb/trillion btu	1.13E+02	3.22E-04	lb/MMBtu	2.68E+00	2.89E-03	lb/MMBtu	2.40E+01	2.40E+01	1.1E+02
Hydrogen Fluoride	1.50E-01	lb/ton	7.32E+01	6.26E+01				2260.714975	lb/trillion btu	1.88E+01	2.68E-04	lb/MMBtu	2.22E+00	2.13E-04	lb/MMBtu	1.77E+00	2.22E+00	9.7E+00
Indeno(1,2,3,c,d)pyrene	6.10E-08	lb/ton	2.98E-05	2.54E-05	2.1E-06	lb/1,000 gal	2.0E-05	0.003	lb/trillion btu	2.49E-05							2.98E-05	1.3E-04
Isophorone	5.80E-04	lb/ton	2.83E-01	2.42E-01				24	lb/trillion btu	1.99E-01							2.83E-01	1.2E+00
Methyl Bromide	1.60E-04	lb/ton	7.81E-02	6.67E-02				0.89	lb/trillion btu	7.39E-03							7.81E-02	3.4E-01
Methyl hydrazine	1.70E-04	lb/ton	8.30E-02	7.09E-02													8.30E-02	3.6E-01
MMA	2.00E-05	lb/ton	9.76E-03	8.34E-03				1.1	lb/trillion btu	9.13E-03							9.76E-03	4.3E-02
2-Methylnaphthalene			-	-				0.032	lb/trillion btu	2.66E-04							2.66E-04	1.2E-03
MTBE	3.50E-05	lb/ton	1.71E-02	1.46E-02				1.4	lb/trillion btu	1.16E-02							1.71E-02	7.5E-02
Methylene chloride	2.90E-04	lb/ton	1.42E-01	1.21E-01				13	lb/trillion btu	1.08E-01							1.42E-01	6.2E-01
Naphthalene	1.30E-05	lb/ton	6.34E-03	5.42E-03	1.13E-03	lb/1,000 gal	1.0E-02	0.77	lb/trillion btu	6.39E-03							1.05E-02	4.6E-02
5-Methyl chrysene	2.20E-08	lb/ton	1.07E-05	9.17E-06													1.07E-05	4.7E-05
OCDD					3.10E-09	lb/1,000 gal	2.9E-08										2.88E-08	1.3E-07
Phenanthrene	2.70E-06	lb/ton	1.32E-03	1.13E-03	1.1E-05	lb/1,000 gal	9.8E-05	0.032	lb/trillion btu	2.66E-04							1.32E-03	5.8E-03
Phenol	1.60E-05	lb/ton	7.81E-03	6.67E-03				6.1	lb/trillion btu	5.06E-02							5.06E-02	2.2E-01
Propionaldehyde	3.80E-04	lb/ton	1.85E-01	1.58E-01				10.35	lb/trillion btu	8.59E-02							1.85E-01	8.1E-01
Pyrene	3.30E-07	lb/ton	1.61E-04	1.38E-04	4.3E-06	lb/1,000 gal	3.9E-05	0.012	lb/trillion btu	9.96E-05							1.61E-04	7.1E-04
Styrene	2.50E-05	lb/ton	1.22E-02	1.04E-02				3.1	lb/trillion btu	2.57E-02							2.57E-02	1.1E-01
Tetrachloroethylene	4.30E-05	lb/ton	2.10E-02	1.79E-02				3.1	lb/trillion btu	2.57E-02							2.57E-02	1.1E-01
Toluene	2.40E-04	lb/ton	1.17E-01	1.00E-01	6.20E-03	lb/1,000 gal	5.8E-02	3.6	lb/trillion btu	2.99E-02							1.17E-01	5.1E-01
1,1,1-Trichloroethane	2.00E-05	lb/ton	9.76E-03	8.34E-03	2.36E-04	lb/1,000 gal	2.2E-03										9.76E-03	4.3E-02
1,1,2-Trichloroethane			-	-				4.7	lb/trillion btu	3.90E-02							3.90E-02	1.7E-01
Trichloroethylene			-	-				3.1	lb/trillion btu	2.57E-02							2.57E-02	1.1E-01
Vinyl acetate	7.60E-06	lb/ton	3.71E-03	3.17E-03				0.42	lb/trillion btu	3.49E-03							3.71E-03	1.6E-02

Completed by: PBS 11/26/08
Checked by: SAK 11/26/08

Table A-7: Toxic Emission Calculations: Main Boiler

Basis:

PRB Coal Consumption Rate	488	ton Coal/hr
50-50 Blend Coal Consumption rate	417	ton Coal/hr
Fuel Oil Consumption Rate	9286	gal/hr
Maximum heat Input	8.30E-03	Trillion Btu/hr

Compound	Pulverized Coal [1] -AP-42				Fuel Oil [2]-AP-42			Pulverized Coal [3]-Utility report to Congress, NEI Database, TRI Database			Pulverized Coal[4] -MACT Analysis						Worst Case Emissions (lb/hr)	Worst Case Emissions (tpy)[5]
	Emission Factor	Units	Hourly Emissions (lb/hr) (PRB Coal)	Hourly Emissions (lb/hr) 50-50 Blend	Emission Factor	Units	Hourly Emissions (lb/hr)	Emission Factor	Units	Hourly Emissions (lb/hr)	Emission Factor (PRB Coal)	Units	Hourly Emissions (lb/hr) (PRB Coal)	Emission Factor (50-50 Blend Coal)	Units	Hourly Emissions (lb/hr) 50-50 Blend		
Xylene	3.70E-05	lb/ton	1.81E-02	1.54E-02	1.09E-04	lb/1,000 gal	1.0E-03	4.65	lb/trillion btu	3.86E-02							3.86E-02	1.7E-01
m-xylene	-	-	-	-	-	-	-	1.45	lb/trillion btu	1.20E-02							1.20E-02	5.3E-02
o-xylene	-	-	-	-	1.09E-04	lb/1,000 gal	1.0E-03	0.81	lb/trillion btu	6.72E-03							6.72E-03	2.9E-02
p-xylene	-	-	-	-	-	-	-	1.45	lb/trillion btu	1.20E-02							1.20E-02	5.3E-02
Dioxins (Total)	-	-	-	-	-	-	-	9.68E-06	lb/trillion btu	8.03E-08							8.03E-08	3.5E-07
P-Cresol	-	-	-	-	-	-	-	0.95	lb/trillion btu	7.89E-03							7.89E-03	3.5E-02
Pentachlorophenol	-	-	-	-	-	-	-	0.008	lb/trillion btu	6.64E-05							6.64E-05	2.9E-04
Hexachlorobenzene	-	-	-	-	-	-	-	0.08	lb/trillion btu	6.64E-04							6.64E-04	2.9E-03
Methyl chloroform	-	-	-	-	-	-	-	3.42	lb/trillion btu	2.84E-02							2.84E-02	1.2E-01
Methyl iodine	-	-	-	-	-	-	-	0.4	lb/trillion btu	3.32E-03							3.32E-03	1.5E-02
Methyl isobutyl ketone	-	-	-	-	-	-	-	4.9	lb/trillion btu	4.07E-02							4.07E-02	1.8E-01
1,2,4-Trichlorobenzene	-	-	-	-	-	-	-	1.51E-06	lb/MMBtu	1.25E-02							1.25E-02	5.5E-02
1,3-Butadiene	-	-	-	-	-	-	-	3.71E-07	lb/MMBtu	3.08E-03							3.08E-03	1.3E-02
1,3-Dichloropropene	-	-	-	-	-	-	-	6.61E-07	lb/MMBtu	5.48E-03							5.48E-03	2.4E-02
1,4-Dichlorobenzene	-	-	-	-	-	-	-	1.06E-06	lb/MMBtu	8.76E-03							8.76E-03	3.8E-02
2,4,6-Trichlorophenol	-	-	-	-	-	-	-	8.01E-10	lb/MMBtu	6.64E-06							6.64E-06	2.9E-05
2,4-Dinitrophenol	-	-	-	-	-	-	-	1.08E-08	lb/MMBtu	8.92E-05							8.92E-05	3.9E-04
3-Methylcholanthrene	-	-	-	-	-	-	-	6.62E-11	lb/MMBtu	5.49E-07							5.49E-07	2.4E-06
4-Nitrophenol	-	-	-	-	-	-	-	4.00E-09	lb/MMBtu	3.32E-05							3.32E-05	1.5E-04
7,12-Dimethylbenz[a]Anthracene	-	-	-	-	-	-	-	5.88E-10	lb/MMBtu	4.88E-06							4.88E-06	2.1E-05
Allyl Chloride	-	-	-	-	-	-	-	8.03E-06	lb/MMBtu	6.66E-02							6.66E-02	2.9E-01
Arsenic Trioxide	-	-	-	-	-	-	-	2.98E-05	lb/MMBtu	2.47E-01							2.47E-01	1.1E+00
Cadmium Oxide	-	-	-	-	-	-	-	3.20E-06	lb/MMBtu	2.66E-02							2.66E-02	1.2E-01
Calcium Cyanamide	-	-	-	-	-	-	-	3.39E-06	lb/MMBtu	2.81E-02							2.81E-02	1.2E-01
Chromic Acid (VI)	-	-	-	-	-	-	-	8.32E-06	lb/MMBtu	6.91E-02							6.91E-02	3.0E-01
Chromic Oxide	-	-	-	-	-	-	-	2.44E-05	lb/MMBtu	2.02E-01							2.02E-01	8.9E-01
Dibenzo[a,j]Acridine	-	-	-	-	-	-	-	5.12E-07	lb/MMBtu	4.25E-03							4.25E-03	1.9E-02
Dibenzofuran	-	-	-	-	-	-	-	5.73E-07	lb/MMBtu	4.75E-03							4.75E-03	2.1E-02
Diethyl Sulfate	-	-	-	-	-	-	-	2.33E-06	lb/MMBtu	1.94E-02							1.94E-02	8.5E-02
Dimethyl Phthalate	-	-	-	-	-	-	-	9.64E-08	lb/MMBtu	8.00E-04							8.00E-04	3.5E-03
Manganese Dioxide	-	-	-	-	-	-	-	4.26E-05	lb/MMBtu	3.54E-01							3.54E-01	1.5E+00
Polychlorinated Biphenyls	-	-	-	-	-	-	-	1.37E-08	lb/MMBtu	1.14E-04							1.14E-04	5.0E-04
Polycyclic Organic Matter	-	-	-	-	-	-	-	6.21E-06	lb/MMBtu	5.16E-02							5.16E-02	2.3E-01
Propylene Dichloride	-	-	-	-	-	-	-	1.20E-06	lb/MMBtu	9.97E-03							9.97E-03	4.4E-02
Sodium Cyanide	-	-	-	-	-	-	-	8.09E-05	lb/MMBtu	6.71E-01							6.71E-01	2.9E+00
Toluene-2,4-Diamine	-	-	-	-	-	-	-	1.38E-08	lb/MMBtu	1.14E-04							1.14E-04	5.0E-04
Vinyl Chloride	-	-	-	-	-	-	-	7.14E-07	lb/MMBtu	5.92E-03							5.92E-03	2.6E-02
Metals																		
Antimony	1.80E-05	lb/ton	8.78E-03	7.51E-03				0.87	lb/trillion btu	7.25E-03	1.71E-06	lb/MMBtu	1.42E-02	1.75E-06	lb/MMBtu	1.46E-02	1.46E-02	6.4E-02
Arsenic	4.10E-04	lb/ton	2.00E-01	1.71E-01	5.6E-04	lb/1,000 gal	5.2E-03	6.21	lb/trillion btu	5.16E-02	3.77E-05	lb/MMBtu	3.13E-01	2.71E-05	lb/MMBtu	2.25E-01	3.13E-01	1.4E+00
Beryllium	2.10E-05	lb/ton	1.02E-02	8.76E-03	4.2E-04	lb/1,000 gal	3.9E-03	0.72	lb/trillion btu	5.99E-03	2.11E-06	lb/MMBtu	1.75E-02	3.43E-06	lb/MMBtu	2.85E-02	2.85E-02	1.2E-01
Cadmium	5.10E-05	lb/ton	2.49E-02	2.13E-02	4.2E-04	lb/1,000 gal	3.9E-03	0.34	lb/trillion btu	2.79E-03	3.53E-07	lb/MMBtu	2.93E-03	6.45E-06	lb/MMBtu	5.35E-02	5.35E-02	2.3E-01
Chromium, total	2.60E-04	lb/ton	1.27E-01	1.08E-01	4.2E-04	lb/1,000 gal	3.9E-03	7.69	lb/trillion btu	6.38E-02	1.53E-05	lb/MMBtu	1.27E-01	1.89E-05	lb/MMBtu	1.57E-01	1.57E-01	6.9E-01
Chromium, hexavalent	7.90E-05	lb/ton	3.86E-02	3.29E-02													3.86E-02	1.7E-01
Cobalt	1.00E-04	lb/ton	4.88E-02	4.17E-02				2.38	lb/trillion btu	1.98E-02	4.86E-06	lb/MMBtu	4.04E-02	4.62E-06	lb/MMBtu	3.83E-02	4.88E-02	2.1E-01
Copper			-	-	8.4E-04	lb/1,000 gal	7.8E-03										7.80E-03	
Lead	4.20E-04	lb/ton	2.05E-01	1.75E-01	1.3E-03	lb/1,000 gal	1.2E-02	7.64	lb/trillion btu	6.34E-02	1.01E-05	lb/MMBtu	8.38E-02	1.60E-05	lb/MMBtu	1.33E-01	1.33E-01	5.8E-01
Mercury	8.30E-05	lb/ton	4.05E-02	3.46E-02	4.2E-04	lb/1,000 gal	3.9E-03	5.26	lb/trillion btu	4.36E-02	1.68E-06	lb/MMBtu	1.39E-02				1.39E-02	6.E-02
Magnesium	1.10E-02	lb/ton	5.37E+00	4.59E+00													5.37E+00	
Manganese	4.90E-04	lb/ton	2.39E-01	2.04E-01	8.4E-04	lb/1,000 gal	7.8E-03	19.27	lb/trillion btu	1.60E-01	1.13E-04	lb/MMBtu	9.35E-01	9.70E-05	lb/MMBtu	8.05E-01	9.35E-01	4.1E+00
Nickel	2.80E-04	lb/ton	1.37E-01	1.17E-01	4.2E-04	lb/1,000 gal		6.04	lb/trillion btu	5.01E-02	1.46E-05	lb/MMBtu	1.21E-01	1.98E-05	lb/MMBtu	1.64E-01	1.64E-01	7.2E-01
Phosphorus			-	-				31.50	lb/trillion btu	2.61E-01							2.61E-01	1.1E+00
Selenium	1.30E-03	lb/ton	6.34E-01	5.42E-01	2.1E-03	lb/1,000 gal	2.0E-02	18.76	lb/trillion btu	1.56E-01	2.15E-06	lb/MMBtu	1.79E-02	2.65E-06	lb/MMBtu	2.20E-02	6.34E-01	2.8E+00
Zinc			-		5.6E-04	lb/1,000 gal	5.2E-03										5.20E-03	

1)AP-42 Table 1.1-13, 1.1-14, & 1.1-18

2)AP-42 Tables 1.3-9 & 1.3-10

3) Test Report Data Table A-1 and A-4 from the study of Hazardous Air Pollutant emissions from Electric Utility Steam Generating Units- Final report to Congress (1998) and Data derived from EPA NEI HAP emissions inventory data - 2002 NEI V3 last updated September 2007 and 2006 TRI Database

4) MACT Analysis HAP Emissions rate data derived from USGS COALQUAL Data as indicated in Sections 17, 18, and 19 of calculations.

5) Worst case ton/yr emissions indicated for HAPs. Emissions indicated worst case value of emission estimate resources reviewed with four exceptions. Value indicated for HF, HCl, mercury, and lead representative of emission limits proposed for Plant Washington.

Completed by: PBS 11/26/08
Checked by: SAK 11/26/08

Table A-8: Toxic Emission Calculations: Auxiliary Boiler

Basis:

Fuel Oil Consumption	1,714	gal/hr
Auxiliary Boiler Capacity	240	MMBtu/hr
Annual Operating Hours	876	hrs/yr

Compound	Fuel Oil [1]			
	Emission Factor	Units	Hourly Emissions (lb/hr)	Total Emissions (tpy)2
Organics				
Acenaphthene	2.1E-05	lb/1,000 gal	3.62E-05	1.58E-05
Acenaphthylene	2.5E-07	lb/1,000 gal	4.34E-07	1.90E-07
Anthracene	1.2E-06	lb/1,000 gal	2.09E-06	9.16E-07
Benzene	2.14E-04	lb/1,000 gal	3.67E-04	1.61E-04
Benzo(a)anthracene	4.0E-06	lb/1,000 gal	6.87E-06	3.01E-06
Benzo(g,h,i)perylene	2.26E-06	lb/1,000 gal	3.87E-06	1.70E-06
Benzo(b,k)fluoranthene	1.48E-06	lb/1,000 gal	2.54E-06	1.11E-06
Chrysene	2.4E-06	lb/1,000 gal	4.08E-06	1.79E-06
Dibenzo(a,h)anthracene	1.7E-06	lb/1,000 gal	2.86E-06	1.25E-06
Ethylbenzene	6.36E-05	lb/1,000 gal	1.09E-04	4.78E-05
Fluoranthene	4.8E-06	lb/1,000 gal	8.30E-06	3.63E-06
Fluorene	4.5E-06	lb/1,000 gal	7.66E-06	3.36E-06
Formaldehyde	3.3E-02	lb/1,000 gal	5.66E-02	2.48E-02
Indeno(1,2,3,c,d)pyrene	2.1E-06	lb/1,000 gal	3.67E-06	1.61E-06
Naphthalene	1.13E-03	lb/1,000 gal	1.94E-03	8.48E-04
Phenanthrene	1.1E-05	lb/1,000 gal	1.80E-05	7.88E-06
Pyrene	4.3E-06	lb/1,000 gal	7.29E-06	3.19E-06
Toluene	6.20E-03	lb/1,000 gal	1.06E-02	4.66E-03
1,1,1-Trichloroethane	2.36E-04	lb/1,000 gal	4.05E-04	1.77E-04
Xylene	1.90E-04	lb/1,000 gal	3.26E-04	1.43E-04
Hydrogen fluoride	9.31E-06	lb/MMBtu	2.23E-03	9.79E-04
Phosphorous	1.12E+02	lb/TBtu	2.68E-02	1.18E-02
Acetaldehyde	8.20E+00	lb/TBtu	1.97E-03	8.62E-04
Methyl Chloroform	7.60E+00	lb/TBtu	1.82E-03	7.99E-04
Methylene chloride	3.23E+01	lb/TBtu	7.74E-03	3.39E-03
Phenol	2.43E+01	lb/TBtu	5.83E-03	2.55E-03
Tetrachloroethylene	5.50E-01	lb/TBtu	1.32E-04	5.78E-05
Vinyl acetate	5.15E+00	lb/TBtu	1.24E-03	5.41E-04
Dioxins (Total)	8.80E-06	lb/TBtu	2.11E-09	9.25E-10
2-Methylnaphthalene	1.70E-02	lb/TBtu	4.08E-06	1.79E-06
Metals				
Arsenic	5.6E-04	lb/1,000 gal	9.60E-04	4.20E-04
Beryllium	4.2E-04	lb/1,000 gal	7.20E-04	3.15E-04
Cadmium	4.2E-04	lb/1,000 gal	7.20E-04	3.15E-04
Chromium, total	4.2E-04	lb/1,000 gal	7.20E-04	3.15E-04
Copper	8.4E-04	lb/1,000 gal	1.44E-03	
Lead	1.3E-03	lb/1,000 gal	2.16E-03	9.46E-04
Mercury	4.2E-04	lb/1,000 gal	7.20E-04	3.15E-04
Manganese	8.4E-04	lb/1,000 gal	1.44E-03	6.31E-04
Nickel	4.2E-04	lb/1,000 gal	7.20E-04	3.15E-04
Selenium	2.1E-03	lb/1,000 gal	3.60E-03	1.58E-03
Zinc	5.6E-04	lb/1,000 gal	9.60E-04	4.20E-04

Notes:

1) AP-42 Table 1.3-9 and 1.3-10 and USEPA Utility Report To Congress

2) Total ton/yr emissions indicated for HAPs

Completed by: PBS 11/26/08
Checked by: SAK 11/26/08

TANKS 4.0.9

Emissions Report - Summary Format

Tank Indentification and Physical Characteristics

Identification

User Identification:	TNK1
City:	Sandersville
State:	Georgia
Company:	Plant Washington
Type of Tank:	Vertical Fixed Roof Tank
Description:	No.2 Fuel Oil Storage Tank-350,000 gal

Tank Dimensions

Shell Height (ft):	45.00
Diameter (ft):	40.00
Liquid Height (ft) :	37.23
Avg. Liquid Height (ft):	37.23
Volume (gallons):	349,974.25
Turnovers:	10.00
Net Throughput(gal/yr):	3,499,742.54
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft)	0.00
Slope (ft/ft) (Cone Roof)	0.06

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Macon, Georgia (Avg Atmospheric Pressure = 14.57 psia)

TANKS 4.0.9
Emissions Report - Summary Format
Liquid Contents of Storage Tank

TNK1 - Vertical Fixed Roof Tank
Sandersville, Georgia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	66.31	60.27	72.35	64.36	0.0081	0.0066	0.0097	130.0000			188.00	Option 1: VP60 = .0065 VP70 = .009

TANKS 4.0.9
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: Annual

TNK1 - Vertical Fixed Roof Tank
Sandersville, Georgia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	87.49	29.26	116.75

TANKS 4.0.9

Emissions Report - Summary Format

Tank Indentification and Physical Characteristics

Identification

User Identification:	TNK2
City:	Sandersville
State:	Georgia
Company:	Plant Washington
Type of Tank:	Vertical Fixed Roof Tank
Description:	Emergency General Fuel Storage Tank-750 gal

Tank Dimensions

Shell Height (ft):		7.00
Diameter (ft):		4.50
Liquid Height (ft) :		6.00
Avg. Liquid Height (ft):		5.00
Volume (gallons):		713.84
Turnovers:		1.00
Net Throughput(gal/yr):		713.84
Is Tank Heated (y/n):	N	

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Cone	
Height (ft)		0.00
Slope (ft/ft) (Cone Roof)		0.06

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Macon, Georgia (Avg Atmospheric Pressure = 14.57 psia)

TANKS 4.0.

Emissions Report - Summary Format
Liquid Contents of Storage Tank

TNK2 - Vertical Fixed Roof Tank
Sandersville, Georgia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	66.31	60.27	72.35	64.36	0.0081	0.0066	0.0097	130.0000			188.00	Option 1: VP60 = .0065 VP70 = .009

TANKS 4.0.9
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: Annual

TNK2 - Vertical Fixed Roof Tank
Sandersville, Georgia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	0.02	0.09	0.11

TANKS 4.0.9
Emissions Report - Summary Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	TNK3
City:	Sandersville
State:	Georgia
Company:	Plant Washington
Type of Tank:	Horizontal Tank
Description:	Fire Water Pump Fuel Storage Tank-250 gal

Tank Dimensions

Shell Length (ft):		5.00
Diameter (ft):		3.00
Volume (gallons):		250.00
Turnovers:		1.00
Net Throughput(gal/yr):		250.00
Is Tank Heated (y/n):	N	
Is Tank Underground (y/n):	N	

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Macon, Georgia (Avg Atmospheric Pressure = 14.57 psia)

TANKS 4.0.9
Emissions Report - Summary Format
Liquid Contents of Storage Tank

TNK3 - Horizontal Tank
Sandersville, Georgia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	66.31	60.27	72.35	64.36	0.0081	0.0066	0.0097	130.0000			188.00	Option 1: VP60 = .0065 VP70 = .009

TANKS 4.0.9
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: Annual

TNK3 - Horizontal Tank
Sandersville, Georgia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	0.01	0.06	0.07