APPENDIX O

Air Permit

Appendix O1 – Emission Rates and Calculations*

*Appendix O2 – Testimony from Air Modeler on Air Permit R14-0028***

*Appendix O3 – Air Quality Board's Ruling on Air Permit R14-0028***

*This appendix contains tables extracted from Appendix B of Western Greenbrier Co-Generation, LLC Addendum to PSD Permit Application, dated October 21, 2005. The addendum was submitted to West Virginia Department of Environmental Protection in November 2005 as part of WGC's PSD permit application. On April 2006, WVDEP DAQ issued a PSD Permit (R14-0028) to WGC for the proposed construction of the waste coal-fired steam electric co-generation facility. The PSD Permit, which is a publicly accessible document, provides detailed information on the emission sources associated with the facility and the conditions under which the facility must be operated.

*****New appendix added for Final EIS.***

INTENTIONALLY LEFT BLANK

ATTACHMENT 1

Emission Calculations

Line of Performance

Western Greenbrier

Load	MCR
Fuel	Performance Fuel (as of 4-19-05)
Limestone	Performance Limestone (as of 6-05)
Turbine Balance	ISO Ambient - 100% Output Case 159 Rev E

Date	17-Aug-05
Engineer	L.Gatton

Steam Flow	lb/hr	759,136
SH Outlet Temperature	F	1,055
SH Outlet Pressure	psig	1,870
Feed Water Temperature	F	430
Combustor Temperature	F	1,646
Gas Temperature Leaving Air Heater	F	306
Ambient Air Temperature	F	59
Gas Flow Leaving Unit	lb/hr	1,142,800
Air Flow Entering Unit	lb/hr	1,035,600
Excess Air	%	20
Fuel Efficiency	%	82.38
Q Fired	MBtu/hr	1,016.9
Fuel Flow	lb/hr	243,860
Limestone Flow	lb/hr	55,960
Total Ash Flow	lb/hr	192,650
Total Condensate Duty in FBACs	MBtu/hr	5.3

Efficiency

Dry Gas Loss	6.33
Moisture in Fuel	1.63
Combustion of Hydrogen	4.06
Moisture in Air	0.09
Moisture in Sorbent	0.06
Calcination Heat Loss	3.57
Sulfation Heat Loss (Gain)	-2.14
Carbon Loss	3.00
Heat Loss in Ash	1.48
Radiaion Loss	0.24
Manufacturer's Margin	0.00
Unaccounted Loss	0.10
Total Losses	18.42
Fan Credits	0.80
Total Efficiency	82.38

Fuel Analysis (%)

Performance Fuel	
Heating Value (HHV) Btu/lb	4,170
Carbon	26.85
Hydrogen	1.62
Nitrogen	0.68
Oxygen	3.06
Sulfur	1.47
Ash	60.51
Moisture	5.81
Total	100.00

Limestone Analysis (%)

Performance	
$CaCO_3$	80.00
$MgCO_3$	3.70
Inert	15.30
Moisture	1.00
Total	100.00

Reactivity Medium

45% Calcium Utilization 60X100M@160min

Line of Performance

Western Greenbrier

Load	MCR
Fuel	Design High Sulfur/Ash Coal High Moisture (as of 4-19-05)
Limestone	Design Limestone (as of 6-13-05)
Turbine Balance	100% Output - Design Fuel Case 259 Rev A

Date	17-Aug-05
Engineer	L.Gatton

Steam Flow	lb/hr	759,136
SH Outlet Temperature	F	1,055
SH Outlet Pressure	psig	1,870
Feed Water Temperature	F	430
Combustor Temperature	F	1,600
Gas Temperature Leaving Air Heater	F	317
Ambient Air Temperature	F	59
Gas Flow Leaving Unit	lb/hr	1,290,900
Air Flow Entering Unit	lb/hr	1,159,700
Excess Air	%	20
Fuel Efficiency	%	78.40
Q Fired	MBtu/hr	1,068.5
Fuel Flow	lb/hr	313,450
Limestone Flow	lb/hr	84,950
Total Ash Flow	lb/hr	267,200
Total Condensate Duty in FBACs	MBtu/hr	10.2

Efficiency

Dry Gas Loss	7.07
Moisture in Fuel	2.40
Combustion of Hydrogen	4.35
Moisture in Air	0.10
Moisture in Sorbent	0.09
Calcination Heat Loss	4.60
Sulfation Heat Loss (Gain)	-2.40
Carbon Loss	3.00
Heat Loss in Ash	2.87
Radiaion Loss	0.24
Manufacturer's Margin	0.00
Unaccounted Loss	0.10
Total Losses	22.42
Fan Credits	0.82
Total Efficiency	78.40

Fuel Analysis (%)

Performance Fuel

Heating Value (HHV) Btu/lb	3,409
Carbon	23.31
Hydrogen	1.41
Nitrogen	0.59
Oxygen	2.66
Sulfur	1.35
Ash	63.71
Moisture	6.97
Total	100.00

Limestone Analysis (%)

Performance

$CaCO_3$	70.00
$MgCO_3$	5.60
Inert	23.40
Moisture	1.00
Total	100.00

Reactivity Low

25% Calcium Utilization 60X100M@160min

TABLE B-1
WESTERN GREENBRIER, LLC
Facility-Wide Maximum Potential Emissions

	All Values in tons/year								
POLLUTANT	**CFB**	**Kiln**	**Cooling Tower**	**Material Handling**	**Storage Pile**	**Roads**	**Oil Storage Tank**	**Fire Pump**	**TOTALS**
CRITERIA									
PM	134	4.86	3.45	1.09	0.072	12.33		0.13	156
PM10	134	4.86	3.45	0.49	0.034	1.90		0.13	145
SO2	624	23						0.003	646
NOx	445	159						1.86	607
CO	891	96						0.40	988
VOC	26.7	4.56					0.027	0.15	31
Pb	0.22	0.003							0.227
H2SO4	26.73	0.97							28
METAL HAPS									
Antimony compounds	9.61E-03	1.22E-04							0.0097
Arsenic compounds	2.19E-01	2.77E-03							0.2218
Beryllium compounds	1.12E-02	1.42E-04							0.0114
Cadmium compounds	2.72E-02	3.44E-04							0.0276
Chromium compounds	1.39E-01	1.76E-03							0.1406
Cobalt compounds	5.34E-02	6.75E-04							0.0541
Manganese compounds	2.62E-01	3.31E-03							0.2650
Mercury compounds	1.34E-02	4.86E-04							0.0138
Nickel compounds	1.50E-01	1.89E-03							0.1514
Selenium compounds	6.94E-01	8.78E-03							0.7031
ORGANIC HAPS									
PAH	1.11E-02	1.40E-04							0.0112
Acetaldehyde	3.04E-01	3.85E-03							0.3083
Acetophenone	8.01E-03	1.01E-04							0.0081
Acrolein	1.55E-01	1.96E-03							0.1568
Benzene	6.94E-01	8.78E-03							0.7031
Benzyl chloride	3.74E-01	4.73E-03							0.3786
Bis(2-ethylhexyl)phthalate	3.90E-02	4.93E-04							0.0395
Bromoform	2.08E-02	2.63E-04							0.0211
Carbon disulfide	6.94E-02	8.78E-04							0.0703
2-Chloroacetophenone	3.74E-03	4.73E-05							0.0038
Chlorobenzene	1.18E-02	1.49E-04							0.0119
Chloroform	2.08E-02	2.63E-04							0.0211
Cumene	2.83E-03	3.58E-05							0.0029
Cyanide	1.34E+00	1.69E-02							1.3522
2,4-Dinitrotoluene	1.50E-04	1.89E-06							0.0002
Dimethyl sulfate	2.56E-02	3.24E-04							0.0260
Ethyl benzene	5.02E-02	6.35E-04							0.0508
Ethyl chloride	2.24E-02	2.84E-04							0.0227
Ethylene dichloride	2.14E-02	2.70E-04							0.0216
Ethylene dibromide	6.41E-04	8.10E-06							0.0006
Formaldehyde	1.28E-01	1.62E-03							0.1298
Hexane	3.58E-02	4.52E-04							0.0362
Isophorone	3.10E-01	3.92E-03							0.3137
Methyl bromide	8.55E-02	1.08E-03							0.0865
Methyl chloride	2.83E-01	3.58E-03							0.2867
Methyl ethyl keytone	2.08E-01	2.63E-03							0.2109
Methyl hydrazine	9.08E-02	1.15E-03							0.0919
Methyl methacrylate	1.07E-02	1.35E-04							0.0108
Methyl tert butyl ether	1.87E-02	2.36E-04							0.0189
Methelyene chloride	1.55E-01	1.96E-03							0.1568
Phenol	8.55E-03	1.08E-04							0.0087
Propionaldehyde	2.03E-01	2.57E-03							0.2055
Tetrachloroethylene	2.30E-02	2.90E-04							0.0233
Toluene	1.28E-01	1.62E-03							0.1298
1,1,1-Trichloroethane	1.07E-02	1.35E-04							0.0108
Styrene	1.34E-02	1.69E-04							0.0135
Xylenes	1.98E-02	2.50E-04							0.0200
Vinyl acetate	4.06E-03	5.13E-05							0.0041
Total PCDD/PCDF	1.30E-04	1.65E-06							0.0001
OTHER HAPs									
HCl	5.34	0.07							5.409
HF	8.55	0.11							8.654
TOTAL HAPs									**20.63**

October 21, 2005
Rev 2

TABLE B-2
WESTERN GREENBRIER, LLC
Estimated Criteria Emissions from CFB and Kiln

OPERATING DATA	CFB		Kiln
	Short Term	Long Term	
	Design Fuel	Preferred Fuel	
Hours per year		8,760	8,760
Input (MMBtu/hr)	1,070	1,017	37
Coal HHV (Btu/lb)	3,409	4,170	12,000
Input (tons coal/hr)	157	122	2
Capacity (ton/day)			208

POLLUTANT	CFB				KILN				STACK [4]	
	EMISSION FACTOR		EMISSION RATE		EMISSION FACTOR		EMISSION RATE		EMISSION RATE	
	factor	units	LB/HR	TON/YR	factor	units	LB/HR	TON/YR	LB/HR	TON/YR
CRITERIA POLLUTANTS										
PM - Annual [3]	0.03	lb/MMBtu	30.5	133.6	0.03	lb/MMBtu	1.11	4.9	31.6	138.5
PM - 24 Hr [3]	0.03	lb/MMBtu	32.1		0.03	lb/MMBtu	1.11		33.2	
SO2 - Annual	0.14	lb/MMBtu	142	623.6	0.14	lb/MMBtu	5.18	22.7	147.6	646
SO2 - 3 hr Short Term	0.14	lb/MMBtu	150		0.14	lb/MMBtu	5.18		155.0	
SO2 - 24 hr Short Term	0.14	lb/MMBtu	150		0.14	lb/MMBtu	5.18		155.0	
NOx - Annual	0.10	lb/MMBtu	102	445.4	36.40	lb/hr	36.40	159.4	138.1	605
NOx - Short Term	0.10	lb/MMBtu	107		36.40	lb/hr	36.40		143.4	
CO - Annual	0.20	lb/MMBtu	203	890.9	2.54	lb/ton clinker	22.01	96.4	225.4	987
CO - Short Term [5]	0.20	lb/MMBtu	214		2.54	lb/ton clinker	22.01		236.0	
VOC- Annual	0.006	lb/MMBtu	6.10	26.7	0.120	lb/ton clinker	1.04	4.56	7.1	31
VOC - Short Term	0.006	lb/MMBtu	6.42		0.120	lb/ton clinker	1.04		7.5	
H2SO4	0.006	lb/MMBtu	6.42	26.7	0.006	lb/MMBtu	0.22	0.97	6.6	28
Pb	0.00042	lb/ton coal	0.07	0.224	0.00042	lb/ton coal	0.00065	0.0028	0.067	0.227

1 "Annual Emissions" are based on the expected annual average fuel, designated "Performance Fuel"
2 "Short Term Emissions" are based on the worst case fuel, designated "Design Fuel"
3 PM includes particulate and condensable
4 Kiln and CFB exhaust combined at entrance of stack
5 CO lb/MMBtu only valid at full load, lb/hr are worst case.

October 21, 2005
Rev 2

TABLE B-2A
WESTERN GREENBRIER, LLC

	Long Term Preferred Coal						Short Term Design Coal					
LOAD												
CFB, %	100%	75%	50%	100%	75%	50%	100%	75%	50%	100%	75%	50%
CFB Firing Rate, MMBtu/hr	1017	763	508	1017	763	508	1070	803	535	1070	803	535
Kiln, %	100%	100%	100%	0%	0%	0%	100%	100%	100%	0%	0%	0%
Kiln Firing Rate, MMBtu/hr	37.3	37.3	37.3				37.3	37.3	37.3			
Stack Data												
Stack Diameter	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Stack Exhaust Flow, acfm	379,136	288,143	197,151	355,398	270,102	184,807	423,222	321,649	220,075	399,483	303,607	207,731
Stack Exhaust Velocity, ft/s	55.90	42.5	29.1	52.4	39.8	27.2	62.40	47.4	32.4	58.9	44.8	30.6
Stack Exhaust Temperature, F	150	150	150	150	150	150	150	150	150	150	150	150
Emission Rates, lb/hr												
NOx [1]	138.1	112.7	87.3	101.7	76.3	50.9	143.4	116.7	89.9	107.0	80.3	53.5
PM10, Annual [2]	31.6	24.0	16.4	30.5	22.9	15.3						
PM10, 24-hr	31.6	24.0	16.4	30.5	22.9	15.3	33.2	25.2	17.2	32.1	24.1	16.1
CO	225.4	220.3	210.2	203.4	198.3	188.1	236.0	230.7	220.0	214.0	208.7	198.0
SO2, Annual [2]	147.6	112.0	76.4	142.4	106.8	71.2						
SO2, 24-hr	147.6	112.0	76.4	142.4	106.8	71.2	155.0	117.5	80.1	149.8	112.4	74.9
SO2, Short Term, 3-hr	147.6	112.0	76.4	142.4	106.8	71.2	155.0	117.5	80.1	149.8	112.4	74.9

1 Class II modeling based on Annual Preferred Case, for Class I analysis the Design Case (Short Term) cases were utilized
2 Annual Emission based only on Preferred Case
3 Short Term could be either Preferred or Design Cases

Western Greenbrier CO Performance versus % Load

	Performance Fuel			Design Fuel		
Load	Q Fired, mmb	CO, lb/mmbtu	CO, lb/hr	Q Fired, m	CO, lb/mmbt	CO, lb/hr
100%	1,017	0.20	203	1,070	0.20	214
75%	763	0.26	198	803	0.26	209
50%	509	0.37	188	535	0.37	198

TABLE B-3
WESTERN GREENBRIER, LLC
Estimate of HAP Emissions from CFB and Kiln

COAL OPERATING DATA			
	CFB		Kiln
	Long Term	Short Term	
Hours of operation per year	8,760		8,760
Input (MMBtu/hr)	1,017	1,070	37
Coal HHV (Btu/lb)	4,170	3,409	12,000
Input (tons coal/hr)	122	157	2

POLLUTANT	EMISSION FACTOR		REFERENCE	EMISSION RATE						
	factor	units		CFB		Kiln		Stack		
				LB/HR	TON/YR	LB/HR	TON/YR	LB/HR	TON/YR	lb/MMBtu
HAZARDOUS AIR POLLUTANTS										
METAL HAPS										
Antimony compounds	1.80E-05	lb/ton	AP-42, Table 1.1-18	2.82E-03	9.61E-03	2.78E-05	1.22E-04	0.0029	0.0097	2.80E-06
Arsenic compounds	4.10E-04	lb/ton	AP-42, Table 1.1-18	6.43E-02	2.19E-01	6.32E-04	2.77E-03	0.0650	0.2218	6.39E-05
Beryllium compounds	2.10E-05	lb/ton	AP-42, Table 1.1-18	3.30E-03	1.12E-02	3.24E-05	1.42E-04	0.0033	0.0114	3.27E-06
Cadmium compounds	5.10E-05	lb/ton	AP-42, Table 1.1-18	8.00E-03	2.72E-02	7.86E-05	3.44E-04	0.0081	0.0276	7.67E-06
Chromium compounds	2.60E-04	lb/ton	AP-42, Table 1.1-18	4.08E-02	1.39E-01	4.01E-04	1.76E-03	0.0412	0.1406	3.91E-05
Cobalt compounds	1.00E-04	lb/ton	AP-42, Table 1.1-18	1.57E-02	5.34E-02	1.54E-04	6.75E-04	0.0158	0.0541	1.50E-05
Manganese compounds	4.90E-04	lb/ton	AP-42, Table 1.1-18	7.69E-02	2.62E-01	7.55E-04	3.31E-03	0.0777	0.2650	7.37E-05
Mercury compounds	3.00E-06	lb/MMBtu	Vendor Estimate	3.21E-03	1.34E-02	1.11E-04	4.86E-04	0.0033	0.0138	3.15E-06
Nickel compounds	2.80E-04	lb/ton	AP-42, Table 1.1-18	4.39E-02	1.50E-01	4.32E-04	1.89E-03	0.0444	0.1514	4.21E-05
Selenium compounds	1.30E-03	lb/ton	AP-42, Table 1.1-18	2.04E-01	6.94E-01	2.00E-03	8.78E-03	0.2060	0.7031	1.95E-04
ORGANIC HAPS										
PAH	2.07E-05	lb/ton	AP-42, Table 1.1-13	3.25E-03	1.11E-02	3.19E-05	1.40E-04	0.0033	0.0112	3.11E-06
Acetaldehyde	5.70E-04	lb/ton	AP-42, Table 1.1-14	8.95E-02	3.04E-01	8.79E-04	3.85E-03	0.0903	0.3083	8.57E-05
Acetophenone	1.50E-05	lb/ton	AP-42, Table 1.1-14	2.35E-03	8.01E-03	2.31E-05	1.01E-04	0.0024	0.0081	2.26E-06
Acrolein	2.90E-04	lb/ton	AP-42, Table 1.1-14	4.55E-02	1.55E-01	4.47E-04	1.96E-03	0.0460	0.1568	4.36E-05
Benzene	1.30E-03	lb/ton	AP-42, Table 1.1-14	2.04E-01	6.94E-01	2.00E-03	8.78E-03	0.2060	0.7031	1.95E-04
Benzyl chloride	7.00E-04	lb/ton	AP-42, Table 1.1-14	1.10E-01	3.74E-01	1.08E-03	4.73E-03	0.1109	0.3786	1.05E-04
Bis(2-ethylhexyl)phthalate	7.30E-05	lb/ton	AP-42, Table 1.1-14	1.15E-02	3.90E-02	1.13E-04	4.93E-04	0.0116	0.0395	1.10E-05
Bromoform	3.90E-05	lb/ton	AP-42, Table 1.1-14	6.12E-03	2.08E-02	6.01E-05	2.63E-04	0.0062	0.0211	5.86E-06
Carbon disulfide	1.30E-04	lb/ton	AP-42, Table 1.1-14	2.04E-02	6.94E-02	2.00E-04	8.78E-04	0.0206	0.0703	1.95E-05
2-Chloroacetophenone	7.00E-06	lb/ton	AP-42, Table 1.1-14	1.10E-03	3.74E-03	1.08E-05	4.73E-05	0.0011	0.0038	1.05E-06
Chlorobenzene	2.20E-05	lb/ton	AP-42, Table 1.1-14	3.45E-03	1.18E-02	3.39E-05	1.49E-04	0.0035	0.0119	3.31E-06
Chloroform	3.90E-05	lb/ton	AP-42, Table 1.1-14	6.12E-03	2.08E-02	6.01E-05	2.63E-04	0.0062	0.0211	5.86E-06
Cumene	5.30E-06	lb/ton	AP-42, Table 1.1-14	8.32E-04	2.83E-03	8.17E-06	3.58E-05	0.0008	0.0029	7.97E-07
Cyanide	2.50E-03	lb/ton	AP-42, Table 1.1-14	3.92E-01	1.34E+00	3.85E-03	1.69E-02	0.3962	1.3522	3.76E-04
2,4-Dinitrotoluene	2.80E-07	lb/ton	AP-42, Table 1.1-14	4.39E-05	1.50E-04	4.32E-07	1.89E-06	0.0000	0.0002	4.21E-08
Dimethyl sulfate	4.80E-05	lb/ton	AP-42, Table 1.1-14	7.53E-03	2.56E-02	7.40E-05	3.24E-04	0.0076	0.0260	7.22E-06
Ethyl benzene	9.40E-05	lb/ton	AP-42, Table 1.1-14	1.48E-02	5.02E-02	1.45E-04	6.35E-04	0.0149	0.0508	1.41E-05
Ethyl chloride	4.20E-05	lb/ton	AP-42, Table 1.1-14	6.59E-03	2.24E-02	6.48E-05	2.84E-04	0.0067	0.0227	6.32E-06
Ethylene dichloride	4.00E-05	lb/ton	AP-42, Table 1.1-14	6.28E-03	2.14E-02	6.17E-05	2.70E-04	0.0063	0.0216	6.01E-06
Ethylene dibromide	1.20E-06	lb/ton	AP-42, Table 1.1-14	1.88E-04	6.41E-04	1.85E-06	8.10E-06	0.0002	0.0006	1.80E-07
Formaldehyde	2.40E-04	lb/ton	AP-42, Table 1.1-14	3.77E-02	1.28E-01	3.70E-04	1.62E-03	0.0380	0.1298	3.61E-05
Hexane	6.70E-05	lb/ton	AP-42, Table 1.1-14	1.05E-02	3.58E-02	1.03E-04	4.52E-04	0.0106	0.0362	1.01E-05
Isophorone	5.80E-04	lb/ton	AP-42, Table 1.1-14	9.10E-02	3.10E-01	8.94E-04	3.92E-03	0.0919	0.3137	8.72E-05
Methyl bromide	1.60E-04	lb/ton	AP-42, Table 1.1-14	2.51E-02	8.55E-02	2.47E-04	1.08E-03	0.0254	0.0865	2.41E-05
Methyl chloride	5.30E-04	lb/ton	AP-42, Table 1.1-14	8.32E-02	2.83E-01	8.17E-04	3.58E-03	0.0840	0.2867	7.97E-05
Methyl ethyl keytone	3.90E-04	lb/ton	AP-42, Table 1.1-14	6.12E-02	2.08E-01	6.01E-04	2.63E-03	0.0618	0.2109	5.86E-05
Methyl hydrazine	1.70E-04	lb/ton	AP-42, Table 1.1-14	2.67E-02	9.08E-02	2.62E-04	1.15E-03	0.0269	0.0919	2.56E-05
Methyl methacrylate	2.00E-05	lb/ton	AP-42, Table 1.1-14	3.14E-03	1.07E-02	3.08E-05	1.35E-04	0.0032	0.0108	3.01E-06
Methyl tert butyl ether	3.50E-05	lb/ton	AP-42, Table 1.1-14	5.49E-03	1.87E-02	5.40E-05	2.36E-04	0.0055	0.0189	5.26E-06
Methelyene chloride	2.90E-04	lb/ton	AP-42, Table 1.1-14	4.55E-02	1.55E-01	4.47E-04	1.96E-03	0.0460	0.1568	4.36E-05
Phenol	1.60E-05	lb/ton	AP-42, Table 1.1-14	2.51E-03	8.55E-03	2.47E-05	1.08E-04	0.0025	0.0087	2.41E-06
Propionaldehyde	3.80E-04	lb/ton	AP-42, Table 1.1-14	5.96E-02	2.03E-01	5.86E-04	2.57E-03	0.0602	0.2055	5.71E-05
Tetrachloroethylene	4.30E-05	lb/ton	AP-42, Table 1.1-14	6.75E-03	2.30E-02	6.63E-05	2.90E-04	0.0068	0.0233	6.47E-06
Toluene	2.40E-04	lb/ton	AP-42, Table 1.1-14	3.77E-02	1.28E-01	3.70E-04	1.62E-03	0.0380	0.1298	3.61E-05
1,1,1-Trichloroethane	2.00E-05	lb/ton	AP-42, Table 1.1-14	3.14E-03	1.07E-02	3.08E-05	1.35E-04	0.0032	0.0108	3.01E-06
Styrene	2.50E-05	lb/ton	AP-42, Table 1.1-14	3.92E-03	1.34E-02	3.85E-05	1.69E-04	0.0040	0.0135	3.76E-06
Xylenes	3.70E-05	lb/ton	AP-42, Table 1.1-14	5.81E-03	1.98E-02	5.70E-05	2.50E-04	0.0059	0.0200	5.56E-06
Vinyl acetate	7.60E-06	lb/ton	AP-42, Table 1.1-14	1.19E-03	4.06E-03	1.17E-05	5.13E-05	0.0012	0.0041	1.14E-06
Total PCDD/PCDF	2.44E-07	lb/ton	AP-42, Table 1.1-12	3.83E-05	1.30E-04	3.76E-07	1.65E-06	0.0000	0.0001	3.67E-08
OTHER HAPS										
HCl	0.01	lb/ton		1.57	5.34	0.02	0.07	1.58	5.41	1.50E-03
HF	0.016	lb/ton		2.51	8.55	0.02	0.11	2.54	8.65	2.41E-03
							TOTAL HAPS		20.63	

October 21, 2005
Rev 2

TABLE B-4
WESTERN GREENBRIER, LLC
Estimate of Emissions During Startup of CFB and Kiln

CFB OPERATING DATA		
	Coal	Oil
Input (MMBtu/hr)	1,017	400
HHV (Btu/lb)or (Btu/gal)	4,170	140,000
Fuel, ton/hr or gal/hr	122	2,857

POLLUTANT	CFB - Normal Operation				CFB - Oil Fired for Startup			
	EMISSION FACTOR		REFERENCE	EMISSION RATE	EMISSION FACTOR		REFERENCE	EMISSION RATE
	factor	units		LB/HR	factor	units		LB/HR
CRITERIA POLLUTANTS								
PM/PM10	0.03	lb/MMBtu	Vendor - baghouse	30.5	3.3	lb/1000 gal	AP-42, Fuel Oil Comb	9.43
SO2	0.14	lb/MMBtu	Vendor - FDA	142.4	0.05	lb/MMBtu	Oil Sulfur content= 0.05%	20.29
NOx	0.10	lb/MMBtu	Vendor - SNCR	101.7	0.25	lb/MMBtu	Vendor	100.00
CO	0.20	lb/MMBtu	Vendor	203.4	0.07	lb/MMBtu	Vendor	28.00
VOC	0.006	lb/MMBtu	Similar Unit - AVG	6.1	0.013	lb/MMBtu	Vendor	5.20
Pb	0.00042	lb/ton	AP-42, Table 1.1-18	0.0512	0.000009	lb/MMBtu	AP-42, Table 1.3-10	0.0036
H2SO4	0.006	lb/MMBtu	Vendor	6.1	0.006	lb/MMBtu		2.40

KILN OPERATING DATA		
	Coal	Oil
Input (MMBtu/hr)	37	37
HHV (Btu/lb)or (Btu/gal)	12,000	140,000
Fuel, ton or gal/hr	2	264

POLLUTANT	Kiln - Normal Operation				Kiln - Oil Fired for Startup			
	EMISSION FACTOR		REFERENCE	EMISSION RATE	EMISSION FACTOR		REFERENCE	EMISSION RATE
	factor	units		LB/HR	factor	units		LB/HR
CRITERIA POLLUTANTS								
PM/PM10	0.03	lb/MMBtu	Vendor	1.11	3.3	lb/1000 gal	AP-42, Fuel Oil Comb	0.87
SO2	0.14	lb/MMBtu	Vendor - FDA	5.18	0.05	lb/MMBtu	Oil Sulfur content= 0.05%	1.88
NOx	36.4	lb/hr	Vendor	36	0.25	lb/MMBtu	Vendor	9.25
CO	22	lb/hr	Vendor	22	0.07	lb/MMBtu		2.59
VOC	0.12	lb/MMBtu	Assume Same as FBC	4.44	0.013	lb/MMBtu		0.48
Pb	0.00042	lb/ton	AP-42, Table 1.1-18	0.0155	0.000009	lb/MMBtu	AP-42, Table 1.3-10	0.00033
H2SO4	0.006	lb/MMBtu	Vendor	0.2220	0.006	lb/MMBtu	Vendor	0.22

POLLUTANT	CFB/Kiln Normal	CFB/Kiln Startup
	LB/HR	
CRITERIA POLLUTANTS		
PM/PM10	31.62	10.3
SO2	147.56	22.2
NOx	138.10	109.3
CO	225.41	30.6
VOC	10.54	5.7
Pb	0.07	0.004
H2SO4	6.32	2.62

1 Application based on CFB and Kiln operating at full load 8,760 hours
2 CFB and Kiln not expected to startup in same hour.

October 21, 2005
Rev 2

TABLE B-5
WESTERN GREENBRIER, LLC
Estimate of Emissions from Cooling Tower

Cooling Tower Data

Water Circulation Rate	50,000	gpm
Drift	0.0005	%
Drift Loss	0.25	gpm
Total Dissolved Solids(TDS)	6,300	ppm
Operating hours	8,760	hours per year

PM Emission Rate Calculation

Particulate matter (PM) emissions from the induced draft mechanical cooling tower were estimated using procedures from USEPA AP42, Section 13.4, Wet Cooling Tower.

PM = Drift loss x TDS

PM= (Gal/min) x (ppm) x (1/E06) x (60 min/hr) x (8.345 lb/gal)

Emission Estimates

lb/hr	ton/yr
0.79	3.45

October 21, 2005
Rev 2

TABLE B-6
WESTERN GREENBRIER, LLC
Material Handling Emission Estimates

Reference	Source ID	Source Description	Vent Point/Control	Vent ID	Control ID	Operating Capacity hr/day	Operating Capacity day/week	Operating Capacity tph	Operating Capacity tpy	Flow Rate (ACFM)	Stack Height (Feet)	Emission Factor Uncontrolled lb/ton PM	Emission Factor Uncontrolled lb/ton PM10	Control %	Building Credit %	Emissions - Uncontrolled lb/hr PM	Emissions - Uncontrolled lb/hr PM10	Emissions - Uncontrolled ton/yr PM	Emissions - Uncontrolled ton/yr PM10	Emissions - Controlled lb/hr PM	Emissions - Controlled lb/hr PM10	Emissions - Controlled ton/yr PM	Emissions - Controlled ton/yr PM10	TOTALS ton/yr PM	TOTALS ton/yr PM10
COAL HANDLING OPERATIONS																									
46	C-01	Coal from Dump Trucks To Coal Pile	Outdoor Unloading	EP-37	WS-01	16	5	630	2,620,800			2.98E-04	1.41E-04	50%		0.188	0.089	0.391	0.185	0.0940	0.0445	0.1956	0.0925		
44	C-02	Coal from Wheel Loader to Coal Loading Feeder Hopper	Outdoor Coal Loading Area/Sprays	EP-02	WS-02	24	7	300	2,620,800			2.98E-04	1.41E-04	70%		0.090	0.042	0.391	0.185	0.0269	0.0127	0.1173	0.0555		
44	C-03	Coal Loading Feeder to Silo Feed Conveyor	Outdoor Coal Loading Area/Sprays	EP-02	WS-02	24	7	300	2,620,800			2.98E-04	1.41E-04	70%		0.090	0.042	0.391	0.185	0.0269	0.0127	0.1173	0.0555		
65	C-19	Silo Feed Conveyor to Coal Day Silo Distribution Conveyor	Head Chute Transfer/Dust Collector	EP-07	FF-04	11	7	300	1,201,200	2,500	100	2.98E-04	1.41E-04	90%		0.090	0.042	0.179	0.085	0.0090	0.0042	0.0179	0.0085		
69	C-20	CFB Coal Day Silo A	Coal Day Silo A Dust Collector	EP-08	FF-05	5.5	7	300	600,600	3,500	110	2.98E-04	1.41E-04	90%		0.090	0.042	0.090	0.042	0.0090	0.0042	0.0090	0.0042		
70	C-21	CFB Coal Day Silo B	Coal Day Silo B Dust Collector	EP-09	FF-06	5.5	7	300	600,600	3,500	110	2.98E-04	1.41E-04	90%		0.090	0.042	0.090	0.042	0.0090	0.0042	0.0090	0.0042		
L	C-22	Kiln Coal Day Silo	Kiln Silo Dust Collector	EP-10	FF-07	1	7	30	10,920	2,000	62	2.98E-04	1.41E-04	90%		0.009	0.004	0.002	0.001	0.0009	0.0004	0.0002	0.0001		
																								0.4663	0.2205
LIMESTONE HANDLING OPERATIONS																									
42	L-01	Limestone From Dump Trucks to Pile	Outdoor Unloading	EP-11	WS-05	16	5	52.5	218,400			5.27E-04	2.49E-04	50%		0.028	0.013	0.058	0.027	0.0138	0.0065	0.0288	0.0136		
74	L-02	Limestone Reclaim Feeder to Limestone Reclaim Conveyor	Head Chute Transfer/Sprays	EP-12	WS-05	6	7	100	218,400			5.27E-04	2.49E-04	90%		0.053	0.025	0.058	0.027	0.0053	0.0025	0.0058	0.0027		
Bldg # 81	L-03	Limestone Reclaim Conveyor to Limestone Distribution Conveyor	Limestone Preparation System Dust Collector	EP-13	FF-08	6	7	100	218,400	10,000	100	5.27E-04	2.49E-04	90%	50%	0.053	0.025	0.058	0.027	0.0026	0.0012	0.0029	0.0014		
Bldg # 81	L-04	Limestone Distribution Conveyor to Limestone Bin A	Limestone Preparation System Dust Collector	EP-13	FF-08	3	7	100	109,200			5.27E-04	2.49E-04	90%	50%	0.053	0.025	0.029	0.014	0.0026	0.0012	0.0014	0.0007		
Bldg # 81	L-05	Limestone Distribution Conveyor to Limestone Bin B	Limestone Preparation System Dust Collector	EP-13	FF-08	3	7	100	109,200			5.27E-04	2.49E-04	90%	50%	0.053	0.025	0.029	0.014	0.0026	0.0012	0.0014	0.0007		
Bldg # 81	L-06	Limestone Bin A to Limestone Crusher A Inlet Feeder	Limestone Preparation System Dust Collector	EP-13	FF-08	12	7	35	152,880			5.40E-03	2.40E-03	90%	50%	0.189	0.084	0.413	0.183	0.0095	0.0042	0.0206	0.0092		
Bldg # 81	L-07	Limestone Bin B to Limestone Crusher B Inlet Feeder	Limestone Preparation System Dust Collector	EP-13	FF-08	12	7	35	152,880			5.40E-03	2.40E-03	90%	50%	0.189	0.084	0.413	0.183	0.0095	0.0042	0.0206	0.0092		
Bldg # 81	L-08	Limestone Crusher A Inlet Feeder to Limestone Crusher A	Limestone Preparation System Dust Collector	EP-13	FF-08	12	7	35	152,880			5.40E-03	2.40E-03	90%	50%	0.189	0.084	0.413	0.183	0.0095	0.0042	0.0206	0.0092		
Bldg # 81	L-09	Limestone Crusher B Inlet Feeder to Limestone Crusher B	Limestone Preparation System Dust Collector	EP-13	FF-08	12	7	35	152,880			5.40E-03	2.40E-03	90%	50%	0.189	0.084	0.413	0.183	0.0095	0.0042	0.0206	0.0092		
Bldg # 81	L-10	Limestone Crusher A to Limestone Crusher A Outlet Feeder	Limestone Preparation System Dust Collector	EP-13	FF-08	12	7	35	152,880			5.27E-04	2.49E-04	90%	50%	0.018	0.009	0.040	0.019	0.0009	0.0004	0.0020	0.0010		
Bldg # 81	L-11	Limestone Crusher B to Limestone Crusher B Outlet Feeder	Limestone Preparation System Dust Collector	EP-13	FF-08	12	7	35	152,880			5.27E-04	2.49E-04	90%	50%	0.018	0.009	0.040	0.019	0.0009	0.0004	0.0020	0.0010		
Bldg # 81	L-12	Limestone Crusher A Outlet Feeder to Limestone Screen A	Limestone Preparation System Dust Collector	EP-13	FF-08	12	7	35	152,880			2.50E-02	8.70E-03	90%	50%	0.875	0.305	1.911	0.665	0.0438	0.0152	0.0956	0.0333		
Bldg # 81	L-13	Limestone Crusher B Outlet Feeder to Limestone Screen B	Limestone Preparation System Dust Collector	EP-13	FF-08	12	7	35	152,880			2.50E-02	8.70E-03	90%	50%	0.875	0.305	1.911	0.665	0.0438	0.0152	0.0956	0.0333		
Bldg # 81	L-14	Limestone Screen A Overs to Limestone Oversize Conveyor	Limestone Preparation System Dust Collector	EP-13	FF-08	12	7	10	43,680			5.49E-03	2.59E-03	90%	50%	0.055	0.026	0.120	0.057	0.0027	0.0013	0.0060	0.0028		
Bldg # 81	L-15	Limestone Screen B Overs to Limestone Oversize Conveyor	Limestone Preparation System Dust Collector	EP-13	FF-08	12	7	10	43,680			5.49E-03	2.59E-03	90%	50%	0.055	0.026	0.120	0.057	0.0027	0.0013	0.0060	0.0028		
Bldg # 81	L-16	Limestone Oversize Conveyor to Bucket Elevator	Limestone Preparation System Dust Collector	EP-13	FF-08	12	7	20	87,360			5.49E-03	2.59E-03	90%	50%	0.110	0.052	0.240	0.113	0.0055	0.0026	0.0120	0.0057		
Bldg # 81	L-17	Bucket Elevator to Limestone Distribution Conveyor	Limestone Preparation System Dust Collector	EP-13	FF-08	12	7	20	87,360			5.49E-03	2.59E-03	90%	50%	0.110	0.052	0.240	0.113	0.0055	0.0026	0.0120	0.0057		
Bldg # 81	L-18	Limestone Screen A Unders to Limestone Product Surge Bin A	Limestone Preparation System Dust Collector	EP-13	FF-08	12	7	25	109,200			5.49E-03	2.59E-03	90%	50%	0.137	0.065	0.300	0.142	0.0069	0.0032	0.0150	0.0071		
Bldg # 81	L-19	Limestone Screen B Unders to Limestone Product Surge Bin B	Limestone Preparation System Dust Collector	EP-13	FF-08	12	7	25	109,200			5.49E-03	2.59E-03	90%	50%	0.137	0.065	0.300	0.142	0.0069	0.0032	0.0150	0.0071		
10	L-20	Limestone Product Surge Bin A to CFB Limestone Day Silo	CFB Limestone Day Silo Vent Filter	EP-14	FF-09	12	7	25	109,200	7,500	62	5.49E-03	2.59E-03	90%		0.137	0.065	0.300	0.142	0.0137	0.0065	0.0300	0.0142		
10	L-21	Limestone Product Surge Bin B to CFB Limestone Day Silo	CFB Limestone Day Silo Vent Filter	EP-14	FF-09	12	7	25	109,200			5.49E-03	2.59E-03	90%		0.137	0.065	0.300	0.142	0.0137	0.0065	0.0300	0.0142		
F and G	L-22	Kiln Limestone Day Bin	Dust Filter	EP-15	FF-10	3	7	50	54,600	2,500	62	5.49E-03	2.59E-03	90%		0.274	0.130	0.150	0.071	0.0274	0.0130	0.0150	0.0071		
																								0.4587	0.1907
ASH HANDLING OPERATIONS																									
21	A-01	CFB Flyash Silo	Dust Filter	EP-17	FF-11	12	7	45	196,560	6,720	107	3.67E-03	1.73E-03	90%		0.165	0.078	0.360	0.170	0.0165	0.0078	0.0360	0.0170		
22	A-02	CFB Bottom Ash Silo	Dust Filter	EP-18	FF-12	12	7	45	196,560	14,500	107	1.46E-04	6.91E-05	90%		0.007	0.003	0.014	0.007	0.0007	0.0003	0.0014	0.0007		
E	A-03	Kiln Bottom Ash Silo	Dust Filter	EP-19	FF-13	2	7	54	39,312	5,000	62	1.46E-04	6.91E-05	90%		0.008	0.004	0.003	0.001	0.0008	0.0004	0.0003	0.0001		
	A-04	Ash Loadout		EP-16		24	6	105	786,240			1.46E-04	6.91E-05			0.015	0.007	0.057	0.027	0.0153	0.0073	0.0574	0.0271		
																								0.0952	0.0450
KILN/CLINKER PRODUCTION																									
A	K-01	Alumina Silo	Bin Filter 200-170	EP-20	FF-14	1	5	25	6,500	2,500	62	1.02E-03	4.81E-04	90%		0.025	0.012	0.003	0.002	0.0025	0.0012	0.0003	0.0002		
A	K-02	Wood Waste Silo	Bin Filter 500-520	EP-21	FF-15	18	7	1	6,552	2,500	62	3.85E-04	1.82E-04	90%		0.00039	0.00018	0.00126	0.00060	0.00004	0.00002	0.00013	0.00006		
C	K-03	Fly Ash Silo		EP-22	FF-16	18	7	3	19,656	2,500	62	3.67E-03	1.73E-03	90%		0.011	0.005	0.036	0.017	0.0011	0.0005	0.0036	0.0017		
X	K-04	Gypsum Bin	Bin Filter 600-310	EP-23	FF-17	18	7	1	6,552	2,500	50	1.46E-04	6.91E-05	90%		0.00015	0.00007	0.00048	0.00023	0.00001	0.00001	0.00005	0.00002		
F	K-05	Limestone/Cal Mount - A	Bin Filter 200-010	EP-24	FF-18	18	7	5	32,760	2,500	62	5.27E-04	2.49E-04	90%		0.003	0.001	0.009	0.004	0.0003	0.0001	0.0009	0.0004		
G	K-06	Limestone/Cal Mount - B	Bin Filter 200-010	EP-24	FF-18	18	7	5	32,760			5.27E-04	2.49E-04	90%		0.003	0.001	0.009	0.004	0.0003	0.0001	0.0009	0.0004		
J	K-07	Raw Mix Conveyor - Limestone	Dust Filter 200-290	EP-25	FF-19	18	7	10	65,520	2,500	25	5.27E-04	2.49E-04	90%		0.005	0.002	0.017	0.008	0.0005	0.0002	0.0017	0.0008		
J	K-08	Raw Mix Conveyor - Bottom Ash	Dust Filter 200-290	EP-25	FF-19	18	7	4	26,208			1.46E-04	6.91E-05	90%		0.001	0.0003	0.002	0.001	0.0001	0.0000	0.0002	0.0001		
J	K-09	Raw Mix Conveyor - Fly Ash	Dust Filter 200-260	EP-26	FF-20	18	7	3	19,656	2,500	25	1.46E-04	6.91E-05	90%		0.000	0.0002	0.001	0.001	0.000044	0.000021	0.0001	0.0001		
J	K-10	Raw Mix Conveyor - Alumina	Dust Filter 200-260	EP-26	FF-20	18	7	2	13,104			1.02E-03	4.81E-04	90%		0.002	0.001	0.007	0.003	0.0002	0.0001	0.0007	0.0003		
J	K-11	Raw Mix Conveyor	Dust Filter 300-040	EP-27	FF-21	18	7	19	124,488	2,500	25	3.85E-04	1.82E-04	90%		0.007	0.003	0.024	0.011	0.0007	0.0003	0.0024	0.0011		
K	K-12	Raw Mill Grinding and Drying	COMBINED WITH KILN																						
D	K-13	Raw Mill Homogenizing Silo	Bin Filter 300-240	EP-28	FF-22	18	7	17	111,384	2,500	84	3.85E-04	1.82E-04	90%		0.007	0.003	0.021	0.010	0.0007	0.0003	0.0021	0.0010		
M	K-14	Kiln Coal Mill	Dust Filter 500-140	EP-29	FF-23	24	7	0.5	4,368	2,500	60	0.0200	0.0094	90%		0.010	0.005	0.044	0.021	0.0010	0.0005	0.0044	0.0021		
M	K-15	Coal Feeders	Dust Filter 500-323	EP-30	FF-24	24	7	0.5	4,368	2,500	60	2.98E-04	1.41E-04	90%		0.0001	0.0001	0.001	0.000	0.000015	0.000007	0.0001	0.0000		
	K-16	Clinker Crusher	Fabric Filter 400-300	EP-31	FF-25	24	7	9	78,624	12,000	60	0.0054	0.0024	90%		0.049	0.022	0.212	0.094	0.0049	0.0022	0.0212	0.0094		
V	K-17	Clinker Storage (including off spec. clinker bin - point K-17A)	Fabric Filter 600-030	EP-32	FF-26	24	7	9	78,624	2,500	55	3.85E-04	1.82E-04	90%		0.003	0.002	0.015	0.007	0.0003	0.0002	0.0015	0.0007		
Y	K-18	Clinker Conveyor	Fabric Filter 600-100	EP-33	FF-27	18	7	12	78,624	2,500	25	3.85E-04	1.82E-04	90%		0.005	0.002	0.015	0.007	0.0005	0.0002	0.0015	0.0007		
Y	K-19	Clinker Vibrator	Fabric Filter 600-100	EP-33	FF-27	18	7	12	78,624			3.85E-04	1.82E-04	90%		0.005	0.002	0.015	0.007	0.0005	0.0002	0.0015	0.0007		
Y	K-20	Clinker Weightbelt Feeder	Fabric Filter 600-100	EP-33	FF-27	18	7	12	78,624			3.85E-04	1.82E-04	90%		0.005	0.002	0.015	0.007	0.0005	0.0002	0.0015	0.0007		
	K-21	Clinker Belt to Ball Mill	Fabric Filter 600-100	EP-33	FF-27	18	7	12	78,624			3.85E-04	1.82E-04	90%		0.005	0.002	0.015	0.007	0.0005	0.0002	0.0015	0.0007		
Z	K-22	Clinker Finish (Ball) Mill	Fabric Filter 600-150	EP-34	FF-28	18	7	12	78,624	12,000	50	0.0054	0.0024	90%		0.065	0.029	0.212	0.094	0.0065	0.0029	0.0212	0.0094		
																								0.068	0.031
WOODBRICK OPERATIONS																									
VII	W-01	Clinker Storage Silos - Three units	Bin Filter	EP-35	FF-29	18	7	12	78,624	2,000	25	3.85E-04	1.82E-04	90%		0.005	0.002	0.015	0.007	0.0005	0.0002	0.0015	0.0007		
V	W-02	Woodchip Silo	Bin Filter	EP-36	FF-30	3	5	20	15,600	2,000	25	3.85E-04	1.82E-04	90%		0.008	0.004	0.003	0.001	0.0008	0.0004	0.0003	0.0001		
VII	W-03	Cementitious Material Silo	Bin Filter	EP-38	FF-31	18	7	12	78,624	2,000	25	3.85E-04	1.82E-04	90%		0.005	0.002	0.015	0.007	0.0005	0.0002	0.0015	0.0007	0.003	0.002
																								1.0911	0.4886

Appendix O1

TABLE B-7
WESTERN GREENBRIER, LLC
EMISSION FACTORS FOR MATERIAL HANDLING

Emission Unit	Pollutant		Units	Reference
	TSP	PM_{10}		
Coal Transfer	0.000298	0.000141	lb/ton	AP-42 Fifth Edition, Table 13.2.4-1 and Equation (1)
Limestone Transfer	0.000527	0.000249	lb/ton	AP-42 Fifth Edition, Table 13.2.4-1 and Equation (1)
Ground Limestone Transfer	0.0055	0.0026	lb/ton	AP-42 Fifth Edition, Table 13.2.4-1 and Equation (1)
Bottom Ash Transfer	0.000146	0.000069	lb/ton	AP-42 Fifth Edition, Table 13.2.4-1 and Equation (1)
Fly Ash Transfer	0.003667	0.001735	lb/ton	AP-42 Fifth Edition, Table 13.2.4-1 and Equation (1)
Alumina Transfer	0.001017	0.000481	lb/ton	AP-42 Fifth Edition, Table 13.2.4-1 and Equation (1)
Wood Waste Transfer	0.000385	0.000182	lb/ton	AP-42 Fifth Edition, Table 13.2.4-1 and Equation (1)
Fly Ash/ Gypsum Mixture	0.000146	0.000069	lb/ton	AP-42 Fifth Edition, Table 13.2.4-1 and Equation (1)
Raw Meal Transfer	0.000385	0.000182	lb/ton	AP-42 Fifth Edition, Table 13.2.4-1 and Equation (1)
Clinker Transfer	0.000385	0.000182	lb/ton	AP-42 Fifth Edition, Table 13.2.4-1 and Equation (1)
Screening Operation	0.0250	0.0087	lb/ton	AP-42 Fifth Edition, Table 11.19.2-2
Screening Operation - Coal	0.1	0.047	lb/ton	WVDEP General Permit 10
Crushing - Limestone/Clinker	0.0054	0.0024	lb/ton	AP-42 Fifth Edition, Table 11.19.2-2
Crushing - Coal	0.02	0.0094	lb/ton	WVDEP General Permit 10

Wind speed	7	mph	Per WVDEP guidance Documents
Waste coal moisture content	12	%	Engineering Estimate
Limestone moisture content	8	%	Engineering Estimate
Ground Limestone	1.5	%	Engineering Estimate
Ash / Gypsum moisture content	20	%	Engineering Estimate
Fly ash moisture content	2	%	Engineering Estimate
Aluminia moisture	5	%	Engineering Estimate
Raw Meal moisture	10	%	Engineering Estimate
Clinker moisture	10	%	Engineering Estimate
Wood Waste moisture	10	%	Engineering Estimate
Days with >=0.01 in rain per year	170	days	Per WVDEP guidance Documents

TABLE B-8
WESTERN GREENBRIER, LLC
Road Emissions

Road	Source	Annual	Load	Truck	Trips		W	k		sL	f	C	P	E (lbs/vmt)		L	VDT/yr	Emission (TPY)	
Segment		Throughput (TPY)	(Ton)	(Ton)	in	out	(Ton)	PM10	TSP			lb/vmt		PM10	TSP	(mi)	(mi)	PM10	TSP
P-1	Waste Coal Delivery	2,620,800	40	15	65,520		52	0.016	0.082	8.2	0.9	0.00047	170	0.24	1.24	0.170	11,168	1.35	6.94
In to plant	Limestone Delivery	218,400	20	15	10,920												1,861	0.23	1.16
	Ash Loadout	786,240	40	15													0	0.00	0.00
	Quality Coal Delivery	10,400	40	15	260												44	0.0054	0.0275
	Alumina	5,200	20	15	260												44	0.0054	0.0275
P-1 Total																		**1.35**	**8.15**
P-2	Waste Coal Delivery	2,620,800	40	15		45,864	26	0.016	0.082	8.2	0.95	0.00047	170	0.04	0.22	0.170	7,818	0.31	1.58
Out	Limestone Delivery	218,400	20	15		10,920											1,861	0.07	0.38
	Ash Loadout	786,240	40	15		19,656											3,350	0.13	0.68
	Quality Coal Delivery	10,400	40	15		260											44	0.0017	0.0089
	Alumina	5,200	20	15		260											44	0.0017	0.0089
P-2 Total																		**0.31**	**2.65**
P-3	Waste Coal Delivery	2,620,800	40	15	65,520	45,864	39	0.016	0.082	8.2	0.95	0.00047	170	0.08	0.40	0.034	3,797	0.15	0.77
	Limestone Delivery	218,400	20	15	10,920	10,920											745	0.03	0.15
	Ash Loadout	786,240	40	15		19,656											670	0.03	0.14
	Quality Coal Delivery	10,400	40	15	260	260											18	0.0007	0.0036
	Alumina	5,200	20	15	260	260											18	0.0007	0.0036
P-3 Total																		**0.15**	**1.06**
P-4	Wood Chips	15,600	20	15	780	780	26	0.016	0.082	8.2	0.9	0.00047	170	0.08	0.43	0.10	156	0.02	0.10
	Woodbrick	10,400	20	15	520	520											104	0.01	0.06
	Ash Product	52,000	20	15	2,600	2,600											520	0.06	0.32
P-4 Total																		**0.09**	**0.48**
																		1.90	**12.33**

E=[(k)(sL/2)^0.65*(W/3)^1.5-C](1-P/4N)(1-f)
Emission equations taken from AP-42 13.2.1
k = Particle size multiplier
sL-silt loading - g/m^2 (From Table 13.2.1-4 for quarry)
C= Emission Factor for brake, exhaust and tire wear from Table13.2.1-2

VDT/yr-annual vehicle distance traveled
W-Mean Vehicle Weight (tons)
L = Length of paved roadway
t-trips/yr
P = Number of wet days, from Figure13.2.1-2

f=Control efficiency
watering/sweeping
N = Number of days in averaging period
Assume = 260
based on 5 day/week

Operation Schedule	truck/day	day/week
Waste Coal Deliveries	160	5
Quality Coal	1	5
Limestone	27	5
Ash Loadout	64	5
Ash Product	10	5
Alumina	1	5
Wood Chips	3	5
Woodbrick	2	5

TABLE B-9
WESTERN GREENBRIER, LLC
Estimate of Emissions from Storage Piles

Source ID No.	Emission Point ID	Stockpile Description	Silt Content of Material %	Stockpile base area Max. sqft	Control Device ID Number	Control Efficiency %	E lb/acre/day	Emissions - Controlled lb/hr PM	Emissions - Controlled lb/hr PM10	Emissions - Controlled ton/yr PM	Emissions - Controlled ton/yr PM10
C-01	EP-02	Waste Coal Pile	2.2	8,160	WS-01	50%	2.759	0.011	0.005	0.047	0.022
L-01	EP-11	Limestone Pile	1.6	5,915	WS-05	50%	2.006	0.006	0.0027	0.025	0.012
TOTAL								0.016	0.008	0.072	0.034

Source:
Air Pollution Engineering Manual

Storage Pile Wind Erosion (Active Storage)

E = 1.7*[s/1.5]*[(365-p)/235]*[f/15] = (lb/day/acre)

Where:

		Value	Basis
s =	silt content of material		AP-42 Fifth Edition, Table 13.2.4-1
p =	number of days with >0.01 inch of precipitation per year	170	Table B - General Permit GC-10
f =	percentage of time that the unobstructed wind speed exceeds 12 mph at the mean pile height	20	WVDEP recommended default

October 21, 2005
Rev 2

TABLE B-10
WESTERN GREENBRIER, LLC
Emissions from Emergency Fire Pump

	Emission Factor		Emissions per Unit			Total
	lb/hp-hr		lb/hr	ton/yr		ton/yr
NOx	0.031		9.30	1.86		1.86
CO	0.007		2.00	0.40		0.40
PM	0.0022		0.66	0.13		0.13
VOC	0.0025		0.74	0.15		0.15
SO2			0.015	0.00		0.003

1 Number of Diesel Fire Pumps	1	Units
2 Rated at	300	hp
3 Annual operating hours	400	hr/yr
4 Emissions Factors for NOx, CO, PM and VOC from US EPA, AP-42, Section 3.3 "Gasoline and Industrial Engines"		
5 Emission Rate for SO2 based on	0.05%	Sulfur in Fuel
6 All HAPs have "E" rating - not utilized.		
7 Fuel heating value	140,000	Btu/gal
8 Assumed fuel consumption	7,000	Btu/hp-hr
	2.1	MMBtu/hr
	15	gal/hr
	6,000	gal/yr

October 21, 2005
Rev 2

JACKSON KELLY
ATTORNEYS AT LAW PLLC
1600 LAIDLEY TOWER • P.O. BOX 553 • CHARLESTON, WEST VIRGINIA 25322 • TELEPHONE: 304-340-1000 • TELECOPIER: 304-340-1130
www.jacksonkelly.com

FACSIMILE COVER SHEET

DATE: March 2, 2007

FACSIMILE NUMBER: 304-340-1272

CONFIRMATION/PROBLEMS: ____________

Transmit to Fax #: (304) 438-7757   14074 /301

For immediate delivery to: Brian Neeley

From: Edward L. "Skipp" Kropp

Special Information: Testimony of Chris Arrington in the Sierra Club, et al. v. Division of Air Quality hearing dated August 30, 2006. If you have any questions, please contact Skipp at 304-340-1199 or on his cell at 304-539-1650. Thank you.

Original to follow: ☐ Yes, by: ☐ Regular Mail ☐ UPS
☑ No (Original available upon request)

Total Number of Pages, including this cover sheet: 32

MR. ARRINGTON: Yes.

(WHEREUPON,

CHRIS ARRINGTON

WAS CALLED AS A WITNESS, PREVIOUSLY SWORN, AND TESTIFIED AS FOLLOWS BEGINNING AT 9:43 A.M.:)

DIRECT EXAMINATION

BY MR. HUSON:

Q Would you state your name for the record, please?

A Chris Arrington.

Q And would you tell the Board about your educational background?

A I have a Bachelor's degree in Electrical Engineering from West Virginia University in 1991. I went to graduate school for Environmental Engineering at Marshall Graduate College that next fall. I graduated from that in 1994. During that period I acted as graduate assistant for Dr. Kresser. Some of you may know him. I acted in that capacity doing air dispersion modeling work for him. I wrote my Master's thesis, final project, for that degree in air dispersion modeling in West Virginia and the

Appendix O2

appropriate choice of models and application of those models in the state.

I have been in this capacity -- Excuse me. I have been in this capacity with the State since November 1994, approximately 12 years now. Eight of those years I've been the senior of the two modelers we typically keep in this office. I have worked on PSD permits. Basically every one since I have been here since the Apple Grove pulp and paper mill way back when till today I have been involved in some capacity. So I have done quite a few of these.

I participate nationally in modeling work. I'm the state's representative to the Regional Planning Organization. Excuse me, I'm sorry, I'm a little hoarse today. So I'm the state's representative to these large technical organizations that do modeling on a regional basis. I have participated in EPA work groups. I recently was a co-author on the Air Model Implementation Guide. That's a new model that's being introduced for use. And I'm one of the people that EPA asked me my expertise to help write this guidance to tell -- excuse me -- to tell other states, you know, what's the best way to

apply these models.

I have also been working on a work group called -- it was initially called the IWAQM group, the Interagency Work Group on Air Quality Models. That is a group that helps write the guidance for the Class I area modeling, the federal parks, the Forest Service, that sort of modeling.

MR. HUSON: At this point I would offer Mr. Arrington as an expert in air dispersion modeling.

BY MR. HUSON:

Q One additional question. Have you ever testified before this Board as an expert?

A Yes, several times before this Board and the Environmental Quality Board.

MR. HUSON: I would offer him as an expert in air emission -- air dispersion modeling.

MR. LOVETT: No objection.

MR. KROPP: No objection.

MR. KOON: All right. We'll recognize him as an expert in air dispersion modeling, then. Go ahead and proceed, Mr. Huson.

BY MR. HUSON:

Q Would you explain briefly for the Board

Appendix O2

what is meant by modeling and what the general procedures are for modeling with regard to a permit application?

A Well, a model is a simulation. I think it's been discussed by the doctor and several other people you take input data, you take emissions calculations, in this case we used the numbers from the permit, you input them into the model. There's two different types of models that you do for a permit like this type, a Class II, the local area, and a Class I, which is those special protected areas. You need meteorology, which has been discussed. Meteorology is what drives the pollutants and moves that pollutants out into the environment. And, of course, there's algorithm that compute that dispersion. That will give you a final estimation or a computer simulated concentration of what -- that you then compare against national standards, such as National Ambient Air Quality Standards and the PSD increments, which were also discussed earlier.

Q Are there different kinds of models? For instance, what is ISC, which Dr. --

A Sure.

Q -- Sahu indicated he has worked with?

A As with any kind models, or even levels of experience in engineering, you have different levels of expertise. With modeling, you're basic model for the last 15, 20 years has been the ISC model, Industrial Source Complex model. That model is being replaced currently by the AERMOD model that I just mentioned. But that's your basic level of model.

Then you go up through some more complicated models, for instance, one called Complex Terrain. It's called CT screen. It's a Complex Terrain screening model. Then you would step up to the next level of expertise would be the model called CALPUFF, which deals with long range transport modeling. That special Class I area we discussed earlier, that's a type of modeling.

And then the most comprehensive difficult and the resource intensive modeling is atmospheric chemistry models. They're on a regional scale. You know, we're talking the entire southeast, everything east of the Mississippi. And those models are used for ozone modeling and fine particulate modeling.

Q What is the difference between -- the technical difference between ISC and CALPUFF, for example?

A ISC is what's called a straight line model. Basically think of it as a lighthouse. Think of the lighthouse as being the stack, the pollutant, and the pollutant, itself, being the beam of light as it goes out. That beam of light moves one time every hour. That's the meteorology. So you have one set of wind speed, one wind direction, one temperature, and the other variables that go into that. So you have one set of meteorology.

CALPUFF is what's called a puff model. It's a long range transport model that basically simulates the meteorology over a very large area. It's a grid model. It breaks it up into little tiny grid pieces, both X and Y and Z. So in CALPUFF where -- well, ISC, where you may have one set of meteorology that drives the pollutants, in CALPUFF you could literally have tens of thousands, depending on how small of blocks you break it down into. So CALPUFF is much more resource intensive and requires much more expertise and experience in applying it to

determine that the meteorology that you're building in the simulation is appropriate for what you're doing.

Q There was testimony yesterday that for the meteorology you need it is required that there be a year's worth of data. Is that correct?

A Not specifically, no. What the guidelines says, the guideline on air quality models -- It's Section 8.3, Meteorology. Basically it says you must have one year of onsite data or five years of representative data. Now, in this case -- Would you like me to elaborate about that?

Q Please. Please. Please.

A Okay. In this case when the initial pre meetings with URS and Western Greenbrier came in they did propose using ISC with the airport data for this facility as its basic model for the Class II. As an agency we agreed with the doctor and said, "That is inappropriate." And maybe I could draw a diagram to help with his?

Q Please.

A Maybe this will allow me to explain somewhat better. The issue here is that in modeling certain models are appropriate for certain situations.

That's really the key in modeling. I mean, anybody with computer programming and whatnot can throw numbers in and get a number out, but knowing how to apply it is the key, knowing how that applies to the guidance. That's the difference between a professional modeler and someone who just blends a model here and there. Okay. My drawings tend to look like kindergarten crayon drawings, so please forgive me. Okay. So we have the base of the valley here (indicating), and here's our stack (indicating). This was brought up yesterday. You have your stack height and then you have the plume that comes out (indicating), and the plume will come up and basically disperse in this manner. Now, the final plume height, how high this plume gets is important. Basically the plume, you don't just consider the stack height. You have to consider the thermal buoyancy, you know, the heat pushes it up and it rises. You can see that when you drive past a power plant. It comes up, gets to a certain point, then levels off. That's called the thermal heat.

Now, when you're looking at a terrain where everything is pretty flat, which is the case in

quite a bit of the U.S., this would be called simple terrain. It's very simple in relation to the stack and the plume height. Unfortunately in West Virginia we don't have that luxury. We have hills, river valleys, and of course frequently the stacks are shorter than what the hills around you are. Now, let's assume that as a backdrop here I'm going to draw a range of hills. I realize this is not just like behind the stack, it's in all directions around it, so it's a crude two dimensional representation of a three dimensional effect (indicating). You know, you'll have some mountains that will be below stack height and somewhere there might be one below it. It may be like that, and it applies in all directions.

Now, in modeling terms, anything below the stack height is simple terrain. Anything between the final plume height to stack top is called intermediate terrain. And anything above it, well, is called complex terrain. Now, in this case there were several hills around the facility that fell into this intermediate or complex terrain, principally one ridge line to the south of the facility and there was one ridge line to the north of the facility. Now, when

Appendix O2

you have simple terrain you can use meteorology that's more area wide. The doctor brought up synoptic. That's appropriate in the guidance and pretty commonly used. And airport data, if it's in the same region and sees the same kind of meteorology, is commonly accepted as appropriate.

Now, in the same diagram let's assume that the distance -- We discussed the Beckley Airport data. This here is quite representative of the drawing. So that Beckley Airport data, which monitors this region here where the plume goes up to, is what steers meteorology, the synoptic meteorology. So the data from the Beckley Airport is appropriate for the area wide modeling simulations. That's called the simple terrain. Now what is not appropriate, and this is a determination we made, is those areas where you have intermediate terrain and complex terrain. That's where it's critical to have representative meteorology. That's what the guidance says.

Now obviously the applicant in this case and their consultant did not have that specific onsite meteorology. But remember the guidance doesn't say you have to have onsite meteorology, what it says

is representative data. Now, EPA has anticipated this. They have anticipated you will not always have a met tower right where a source is going to be. So they have developed some models that's called screening models. And what those models do is they look at a wide range of meteorology and have developed a matrix to develop worse case meteorology conditions that you can apply in this situation where you don't have that onsite. Now, there's a tradeoff. In all modeling there's an attempt to be conservative. You always want to make sure that the model develops a number that's a worse case estimate. But in this situation where you have a screening model the level of that conservatism is greatly increased. In other words, you will get much, much higher numbers out of the screening model than you would out of this normal model like ISC that -- if you use onsite meteorology.

Now, in this case what we did was this, EPA developed a method back in 1990 -- 1995, and actually it was pioneered in this state. And when I started here with the agency I worked on it somewhat. But it's become a recognized technique. It's documented in the Model Clearinghouse Guidance. What it says is, "Here's a technique to combine the results from ISC for the simple terrain, the area wide," and then you use a model called CT Screen which computes the concentrations for those intermediate and complex terrain areas, principally those two ridge lines, one to the south, one to the north, for those areas. And what you do is you take those two results, you take the worse case results from each model so not only are you modeling with one model, you're modeling with two models, and then you're taking the worse case numbers and using that to judge against the standards. Now, in this case we did that and I will guarantee you, or I can go back and show you, that every single number that you compare against the National Ambient Air Quality Standards and the numbers against the PSD increments was computed with CT Screen. Now, if we would have went back and found appropriate meteorology for here I can guarantee you that those numbers would be lower, in my professional judgement, than the numbers we got from that CT Screen model.

Q When did you do your modeling? And there was some testimony earlier today, a question about whether modeling was done before or after the

BACT analysis and whether or not that's appropriate.

A Sure.

Q When did you do your modeling?

A A PSD permit is a very fluid process, as has been testified to the last two days. A lot of the design work is ongoing as the permitting work is done -- excuse me -- so therefore numbers change as you go along. You know, maybe a determination is made that a limit should be lowered or tightened and so basically the modeling changes over time. So when we get a modeling application in we'll look at it and see if it's generally the approach that we agreed on with the applicant.

Now, the actual modeling is not actually done or reviewed for us until the very last stage, that way we get the final numbers in the permit, we get the final input data, and we get the final emissions levels so that our modeling reflects what the permit is trying to do. So it's actually the very last stage of the permitting process in our office.

Q There's -- The very first stage in the modeling is the development of a modeling protocol?

A Correct.

Q And that protocol is the guide by which the company does its modeling?

A Correct. Typically before a company does a permit application we'll have a pre-meeting. They'll come in and they will talk to us. They'll say, "Here's the approaches," or they'll ask what our guidance is. They will propose what approaches they are thinking of doing. We'll give our guidance and like, yes, in general we agree with this method or not. And then we have them submit a modeling protocol. The modeling protocol is like any other protocol. It sets out, "Here's how we're going to do it, here's the model we're going to use, here's the options we're going to use, here's the meteorology we're going to use." Typically the State will then review that. If it's a case of a Class I modeling protocol the Federal Land Managers will review that, as well. And EPA also typically is given a courtesy copy of that and they'll tell us what they think about it and then we'll do a formal approval or disapproval. And then the company, once they receive an approval, will do their modeling and submit it as part of the

application.

Q And is part of your job to check to see that they follow the protocol?

A Correct.

Q You mentioned the Class I areas. There was some discussion yesterday about a 50 kilometer --

A Correct.

Q -- versus 20 kilometer situation.

A Sure.

Q Would you discuss that for the Board, please?

A The discussion centered on the fact that in this case Western Greenbrier used a meteorological domain. That's that area, that computer simulation of meteorology in the X, Y, and Z that had been used previously. That is not uncommon. Developing a meteorological domain is an extremely time and resource intensive project. It takes -- There's a very small subset of modelers that do it, that have that kind of expertise and skill. It typically takes months of collecting data from different agencies like NOAA. We also get what's called prognostic data. In other words, data from other weather models that the Weather Service uses, and use that as input into our model. And then it can take weeks or months to run these -- this data through.

And commonly these areas will overlap. So if we do a project here in West Virginia, a project is done in Pennsylvania or Virginia, we're all concerned about the same Class I areas. There's four of them in West Virginia and they're all located along the West Virginia/Virginia border. So these regions will overlap. So it's not uncommon if there's already a domain there that the work is already done, you don't need to re-event the wheel to do it.

The concern in this case, though, was is that typically when you do a project you set up a buffer zone on the edges of this domain, because basically in a simulation anything that goes over the edge disappears. For the simulation this domain is the world, there is nothing else. So if a puff of pollutant moves along and gets to the edge it ceases to exist. Now, the concern here is that in this three dimensional meteorology is that puffs don't move in straight lines anymore. Pollutants don't go like a

lighthouse beam out to infinity. They will meander and move and rise and fall and follow terrain. So the idea is you don't want a puff to disappear and to cease to exist in a case where it's important. So you build this buffer zone in. Now, that is a general guideline to do that. That guidance comes from, I believe, that interagency work group on air quality modeling that I discussed earlier that -- So basically that's the guidance, and that's what you're trying to do.

But the thing of it is, you have to take a professional look at this to understand dominant wind directions, what the model does, how the pollutants move. In our case the applicant's facility was towards the western side of the domain. Now, with the predominant wind directions blowing towards the east and given the size and location of the facility it was our professional judgement that in this case you would not see many pollutant puffs make this transition of moving in a clockwise direction and coming back onto the area of interest that we have.

Now, we discussed this with the Federal Land Managers. They were well aware of it. There's e-mails in the record, I know. And they initially expressed concern, and we discussed it further with them. After these discussions they were comfortable with the idea. It's documented in the e-mails that they felt our assertion that the conditions that would lead to maximum impacts would not occur, in other words, it wouldn't be a problem what we were doing. They concurred with that.

EPA Region III, their meteorologist, reviews all this modeling as part of the permit process. They get a copy of all of it. They did not have concerns in that situation. And one thing I was kind of confused about in the doctor's testimony was even he said that the FLM's reviewed this and were not concerned. So I wasn't quite sure why that was brought up as a point before the Board, because we reviewed it, the Federal Land Managers reviewed it, the EPA had reviewed it, and everyone with the expertise to look at this had said that they did not believe it was an issue for this permit.

Q In your experience, are the Federal Land Managers shy or bashful?

A We have a long working history with

them. I'm sure all you guys remember Longview and they participated in some of that work. The Federal Land Managers take their jobs very seriously. They are not shy in any way, shape or form about commenting on anything that they feel uncomfortable about. Neither is Region III. Region III is known to be very strict in the nation for modeling work. And if they feel you're stepping outside the bounds they will definitely comment upon it.

Q The last point I would like to cover with you is Dr. Sahu testified, I believe, that he felt that the Department had -- in its modeling had either forgotten or ignored the PM issue.

A No, of course not. We did model for PM10. I think his statement was that we neglected in some way to do a model of analysis for PM2.5. Now, I think it's been brought up in here previously, I think some of this testimony was yesterday after I had to leave, but the Scites memo that has been referenced several times -- and I do have a date for that memo.

Q What was the date for that?

A The date for that memo was October 1997. This is a common piece of guidance that's well known for people doing PSD work, you know, over the last five years. And, in short, I mean, this memo states that there are extreme difficulties with implementing modeling and guidance right now for PM2.5. They're working on it. They have not released any guidance whatsoever. But what they have told us to do in this memo is to use PM10 as a surrogate. And so when you do the PM10 work and it passes the PM10 standards, therefore you are meeting the requirements to model PM2.5 as of this time.

MR. HUSON: I tender the witness.

MR. KOON: I tell you what, let's take a break and then we can continue with Mr. Kropp after that. Okay? Let's take ten minutes.

(WHEREUPON, a recess was taken from 10:09 a.m. to 10:25 a.m., after which the following proceedings were had.)

MR. KOON: Okay, let's go ahead and start back. Mr. Kropp, do you have some questions for this witness?

MR. KROPP: I have no questions, Mr. Chairman.

MR. KOON: Mr. Lovett?

MR. LOVETT: Very few.

CROSS-EXAMINATION

BY MR. LOVETT:

Q Do you know what the final plume height is in this case?

A The final plume height would be within the models. I don't know off the top of my head. It's part of the calculations in the modeling.

Q You considered that in the modeling?

A Yes.

Q So you know what -- the agency knows what's in the modeling?

A Yes.

Q You don't know it now?

A No.

Q Now, is it CT Screen? Is that what the model is called?

A Correct.

Q Did you testify that was used for the complex terrain?

A Correct.

Q What was used for the intermediate

Appendix O2

terrain?

A You run both models. You run the CT Screen, as well as the ISC, and you look at the maximum result for each and you take the maximum concentration. Almost always it's CT Screen. In this case I believe it was CT Screen gave us the maximum concentrations for the analysis.

Q I guess, really, if you're using these conservative models there's really no reason to have -- to require a company ever to get site specific data, you would always just rely on these models. Is that correct?

A No, actually we don't.

Q Okay. What experience have you had with getting site specific data?

A Well, we had a large project in Marshall Company where we installed four 100 meter met towers with what's called a sonar unit, it's a ranging unit. We had a project for Cabot Corporation where we installed onsite met data. And there may be a few others.

Q Why did they use that instead of the CT Screen? Why did they go to all that trouble?

A They go to that trouble because the screening model does give very high results, so, therefore, that's usually detrimental to the permit or the application of the applicant. So it's usually beneficial. In this case it's a very small source relatively and so they have the benefit of -- Even though it's estimating very high concentrations relatively to the other model it still falls within that National Ambient Air Quality Standards and the PSD increments.

Q Do you know which five years the meteorological data were used in this?

A I can look in my memo and see.

Q I mean, I can tell you, I think.

A (Witness examines document.) 1996 to 2000.

Q '96 to 2000. That's not what --

A That's what's in the memo. I had to go back and check.

Q Is that memo in the record?

A Yes, it is. That's my modeling memo on the Class II area modeling review.

Q Okay. Now, is there any site specific

data showing that the predominant wind blows east, or is that just general knowledge?

A Are you talking about the synoptic flow area wide?

Q You testified, I think -- You testified -- We're talking about the grid.

A Okay.

Q I think you testified that you didn't feel the need to go to the west any further because, you know, EPA raises an issue and your judgement was that because the wind blows to the east you were okay over there on the western edge of it?

A EPA did not raise an issue, neither did the Federal Land Managers. We raised the issue --

Q You raised it. Okay.

A -- and after looking at it made the determination. Part of it is there are available data that show historically in the eastern United States, in West Virginia, you can look at wind roses, which are statistical data that shows the wind directions and wind speeds, and it shows that generally from the southeast -- I mean, southwest to the northeast and the from the west to the east are the general wind

patterns.

Q Okay. So that's what you relied on, were wind roses? Just your general experience with wind roses in the state made you believe that?

A Not just the state. This is data published by the Weather Service from NOAA, from looking at other modeling results which takes onsite data -- or site specific data and develops these domains.

Q How does that apply -- How do those wind roses and that data apply to Rainelle, specifically, or to this area, for that matter?

A It applies specifically to that -- There's wind roses for the Raleigh County Airport. Basically what that is is representative of the synoptic flow. Those measurement sites are up on plateaus so they read the higher winds. If you look at the diagram, they read the higher winds that are representative of the area wide meteorology. And so if you look at that for several areas, for all the meteorological stations you have, and from the published data, it gives you the result that I have described.

Q Well, is the Raleigh County Airport representative of the wind pattern a mile west of this grid down in the Greenbrier Valley?

A In general, yes, because regional winds are consistent over large areas. They're not specific to one small valley down in the valley or to a specific site. So, yes, it is representative of the general area wide meteorology.

Q Okay. And the two ridges that you were worried about in the topographic irregularities, you know, the area down in the valley, do you think that the general wind data from the Beckley Airport, the Raleigh County Airport, is representative of what would happen down there?

A Okay. The plume does not move directly from the stack down into the valley.

Q Right.

A The plume goes up into the atmosphere, into this regional wind pattern, and the regional wind pattern moves that plume out before it starts to disperse and comes down. So, yes, it is representative of the movement of that plume and how that plume will disperse.

Q As I understood it -- Okay. So you think that all that matters is the general wind pattern. The global wind patterns don't matter for the plume or any of the pollutants falling on the Rainelle area?

A Once the plume moves up into the regional meteorology, of which --

Q That wasn't my question. Because I don't understand this well enough to ask you that question. Forget once it moves up into the higher atmosphere. I just want to know if the wind patterns in -- the localized wind patterns will impact the fallout from the pollutants onto Rainelle?

A That's my point. The localized wind patterns do not affect that plume. That plume moves up in the stack height in thermal lift, the buoyancy of the plume, where it is moved by the meteorology. Well, the meteorology that moves it is the regional synoptic flow, not the flow in the valley where Rainelle is. So, therefore, that data is representative of what we need to do for this modeling.

Q And now are you aware of any PM2.5

Appendix O2

modeling done from EPA?

A The modeling guide is for PM2.5, as stated, using PM10 is the surrogate.

Q You're not aware of anything that tells you how to actually model the PM2.5 without using PM10 as a surrogate?

A The only -- For NSR that is the guidance. The modeling for PM2.5 is a regional model which usually takes, I want to say, four to five years to complete solely, includes large regions of the United States, thousands of sources. It's just not done and it is not the guidance of EPA to apply those models at this time for NSR.

Q In this region or nationally?

A Nationally.

MR. LOVETT: That's all I have.

MR. KOON: Mr. Huson, any re-direct?

RE-DIRECT EXAMINATION

BY MR. HUSON:

Q The guidance that you were just discussing, the PM2.5 guidance, and the -- it's based on regional sampling and -- What's its purpose? What's the purpose of the --

A The PM2.5 modeling?

Q Yeah, the 2.5 modeling.

A The purpose of the PM2.5 modeling that's conducted is to address non attainment areas. PM2.5 is a pollutant. It's not like sulfur dioxide, nitrogen oxides. It doesn't -- PM2.5 is what's called a secondary pollutant. It interacts with other pollutants within the atmosphere and transforms as it's there. So it's not like -- It's not similar to the kind of modeling we use for PSD work. So what that is for is to usually examine large urban areas or urban corridors, like the northeast, and determine how to get back into attainment for PM2.5. It's not used to model single sources. And that's the reason why there's not guidance, is because EPA does not know how to do it.

MR. HUSON: No further questions.

MR. KROPP: No further questions.

MR. KOON: Any questions of the Board members?

EXAMINATION

BY MR. CURTIS:

Q Just one, just a curiosity question

which probably has no applicability to the Greenbrier site. But I'm assuming it's possible that you could have major sources in close proximity so that you would have another major source in the same, I believe domain is the term you used. What happens, then? Is there a way that these models are integrated for over land, or how are those taken into account?

A If you're talking about the Class I modeling where you're looking at those large areas, you know, the protected valley sides and Otto Creek and Shenandoah National Park, you do include other large major sources in those. That's called a PNC, a Cumulative Increment Analysis. And so in this case, I believe for this plant they have a limit to say where you're significant. Significant means you have a significant impact on those areas. And if you have a significant impact, then you have to model all the other large sources and look at their combined impact. In this case Western Greenbrier was insignificant. Their impact on these Class I areas was so small that EPA deems you need to go no further to include those other sources because the individual impact is very tiny.

MR. KOON: Any other questions?

MR. FOSTER: Yeah.

EXAMINATION

BY MR. FOSTER:

Q Do you consider -- Your statement says consider all sources, minor, as well as major, or do you just consider major sources?

A That is a very complicated description. Typically what is done is you look at all major sources, which in West Virginia is Reg 14's. Of course you look at other states, as well, and the guidance from Federal Land Managers. Then you look at what they deem large, minor sources within 50 kilometers of the Class I area. Those are very rare in this state because our Class I areas are very rural and away from industry, so.

MR. FOSTER: Okay. Thank you.

MR. KOON: Thank you.

(WITNESS STANDS ASIDE AT 10:35 A.M.)

MR. HUSON: I have just one other witness. I call Roger Green.

MR. KOON: Mr. Green has been sworn in, right?

BEFORE THE AIR QUALITY BOARD
CHARLESTON, WEST VIRGINIA

SIERRA CLUB, WEST VIRGINIA HIGHLANDS CONSERVANCY, GREENBRIER RIVER WATERSHED ASSOCIATION,

Appellant,

v. **Appeal No. 06-03-AQB**

JOHN BENEDICT, DIRECTOR, DIVISION OF AIR QUALITY, WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Appellee,

and

WESTERN GREENBRIER CO-GENERATION, LLC,

Intervenor.

FINAL ORDER

I. PROCEDURAL HISTORY

Appeal No. 06-03-AQB was filed by the Sierra Club, West Virginia Highlands Conservancy, and Greenbrier River Watershed Association ("Appellants") with the West Virginia Air Quality Board ("Board") on May 25, 2006. The basis of this appeal is the issuance of PSD Permit Number R14-0028 to Western Greenbrier Co-Generation, LLC ("Intervenor") by the West Virginia Department of Environmental Protection's Division of Air Quality ("Appellee") on April 26, 2006, which allows for the proposed construction of a waste coal-

fired steam electric co-generation facility located in Rainelle, Greenbrier County, West Virginia.

An evidentiary hearing before a quorum of the members of the Board was held on August 29-30, 2006. Joseph M. Lovett, Esquire represented the Appellants. Roland T. Huson, III, Esquire, of the Department of Environmental Protection Office of Legal Services, represented the Appellee, and Edward L. Kropp, Esquire, of Jackson Kelly PLLC, represented the Intervenor. The Board was comprised of J. Michael Koon, Chairperson; Dick Calvert; Randy E. Curtis; Robert Foster; R. Thomas Hansen; and Douglas E. Hudson.

Prior to the hearing, Intervenor filed a "Motion for Protective Order" on August 28, 2006. Intervenor requests the Board grant this Motion to protect Proposal No. 7240604 to Intervenor from Alstom dated November 11, 2005 from public disclosure and further requests the Board rule that it is exempt from public disclosure under FOIA's "trade secret" exception. Finding it proper to do so, the Board **GRANTS** Intervenor's "Motion for Protective Order."

Subsequent to the hearing, Appellee and Intervenor both filed motions to strike revisions to Appellants' Proposed Findings of Fact and Proposed Conclusion of Law on November 15, 2006 and November 17, 2006, respectively. Appellee and Intervenor request that the Board strike Appellants' revisions as being unwarranted and unauthorized. Finding it proper to do so, the Board hereby **DENIES** Appellee's and Intervenor's motions to strike revisions to Appellants' Proposed Findings of Fact and Proposed Conclusions of Law, which were filed with the Board on November 9, 2006.

Also subsequent to the hearing, Intervenor filed a "Motion to Supplement Response to Appellants' Proposed Findings of Fact and Conclusions of Law" to incorporate the

Pennsylvania Environmental Hearing Board's decision in EHB Docket No. 2005-246-R into Intervenor's Response to Appellants' Proposed Findings of Fact and Conclusions of Law. Finding it proper to do so, the Board **GRANTS** Intervenor's motion to supplement its response to Appellants' Proposed Findings of Fact and Conclusions of Law.

In deciding this appeal, the Board reviewed and considered the certified file, the relevant law and regulations, the Notice of Appeal, all written filings and memoranda, the testimony of the witnesses, exhibits, and arguments by counsel. In accordance with *West Virginia Code* §22B-1-7(g)(1), the Board **AFFIRMS** Appellee's issuance of Permit Number R14-0028 to Western Greenbrier Co-Generation, LLC on April 26, 2006.

All proposed findings submitted by the parties have been considered and reviewed in relation to the adjudicatory record developed in this matter. All argument of counsel, proposed findings of fact and conclusions of law have been considered and reviewed in relation to the aforementioned record, as well as to applicable law. To the extent that the proposed findings of fact, conclusions of law and arguments advanced by the parties are in accordance with these findings of fact, conclusions and legal analysis of the Board and are supported by evidence, they have been adopted in their entirety. To the extent that the proposed findings, conclusions, and arguments are inconsistent therewith, they have been rejected. Certain proposed findings and conclusions have been omitted as not relevant or necessary to a proper decision. To the extent that the testimony of the various witnesses is not in accord with the findings stated herein, it is not credited.

II. STANDARD OF REVIEW

The Board hears appeals of enforcement actions in accordance with *West Virginia Code* §22B-1-7. The applicable standard of review of the Appellee's action is *de novo* review. *West Virginia Code* §22B-1-7(e). Pursuant to *de novo* review, the Board does not afford deference to the decision of the Department of Environmental Protection, but rather, the Board acts independently on the evidence before it. *West Virginia Division of Environmental Protection v. Kingwood Coal Company*, 200 W.Va. 734, 745, 490 S.E. 2d 823, 834 (1997).

To prevail in the appeal, the Appellant must raise an issue with sufficient evidence to support a finding that the Appellee's decision was incorrect. If sufficient evidence supported such a finding, then the Appellee would have to produce the evidence demonstrating why its decision was sound, regardless of the Appellant's evidence. The Appellant has an opportunity to show that the evidence produced by the Appellee is pre-textual or otherwise deficient. This shifting burden of proof standard was set out in *Wetzel County Solid Waste Authority v. Chief, Office of Waste Management, Division of Environmental Protection*, Civil Action Number: 95-AA-3 (Circuit Court of Kanawha County, 1999). While *Wetzel County* is merely persuasive authority, the Board agrees with the analysis and has used that test here.

III. DISCUSSION

This Appeal involves PSD Permit No. R14-0028, issued by Appellee to Intervenor on April 26, 2006, for the proposed construction of a waste coal-fired steam electric co-generation facility.

Appellants allege that the issuance of the permit is arbitrary, capricious, and contrary to law and fact, and threatens to cause injury to Appellants and to its members in the form of

Appendix O3

increased exposure to air pollution and to water pollution caused by atmospheric deposition, increased risk of illness, restriction of recreational enjoyment, and deprivation of the right of meaningful participation in the permitting process.

The thrust of Appellants' argument is that the Best Available Control Technology ("BACT") analysis performed was contrary to law and fact for all emission units because it (1) failed to identify all available control technologies, (2) improperly eliminated technologies based on cost; (3) failed to evaluate lowest achievable emission rate technologies at the top control option, (4) limited the control options to only those used on the same type of boiler burning waste coal, (5) improperly eliminated control options as not cost effective based on incremental costs, (6) rejected BACT decision by other permitting authorities because they were not yet operating, and (7) failed to consider all available sources of information.

Appellants persuaded the Board that BACT is technology forcing. However, the Board disagrees with Appellants in its assertion that this was a "bottom up" analysis and finds that the West Virginia Department of Environmental Protection made an informed determination about the best available control technology.

The New Source Review Manual (Appellants' Ex.11) states that in determining the technical feasibility of "available" control technologies:

> "[a] source would not be required to experience extended time delays or resource penalties to allow research to be conducted on a new technique. Neither is it expected that an applicant would be required to experience extended trials to learn how to apply a technology on a totally new or dissimilar source type."
> (Page B. 18)

The Board finds that it is appropriate to make each individual BACT determination on a "case-by-case" basis using available and applicable technologies. The Board finds that a BACT

permittee is not required to innovate or to push technology beyond what is available and applicable.

IV. FINDINGS OF FACT

1. Intervenor is a non-profit, limited liability company, owned by three small West Virginia municipalities: Rupert, Rainelle, and Quinwood, Greenbrier County, West Virginia.
2. The Department of Energy ("DOE"), through its Clean Coal Power Initiative Project, has committed to provide Intervenor with $107,500,000.00 in public funding in order that Intervenor "demonstrate" Alstom Power Company's "inverted cyclone circulating fluidized bed boiler ("CFB Boiler").
3. An inverted cyclone CFB Boiler of this size and scale uses coal ash and/or limestone to make a "bed" of particulate matter. Combustion air is passed through the bed causing the particulate matter to become partially supported and circulated. This results in a circulating fluidized mass which in turn allows the combustion process to be adjusted to limit emissions. Specifically, the CFB Boiler's temperature can be controlled to reduce the amount of nitrous oxide ("Nox") created by the combustion process.
4. The proposal submitted by Intervenor involved the construction of a seventy-five megawatt (now a ninety megawatt) electric co-generation facility and cement production facility to be located in Rainelle, West Virginia. The electric co-generation facility would initially be fueled by waste coal taken from the nearby Anjean waste coal mountain.

5. The facility is designed so that emissions generated from the electric co-generation facility and the cement production facility are exhausted through the same stack fitted with emission control technologies. Specifically, the facility as proposed includes the use of a CFB Boiler and selective non-catalytic reduction ("SNCR") to remove the NOx, the injection of limestone into the fluidized bed coupled with a flash dryer absorber ("FDA") to remove sulfur dioxide ("SO2"), and a baghouse or fabric filter to remove particulate matter.

6. On March 1, 2005, Intervenor submitted its first iteration of the application and the twelve-thousand dollar ($12,000.00) application fee.

7. On March 2, 2005, Appellee sent a copy of Intervenor's permit application to the Rainelle Public Library so that the permit would be available to the public.

8. On March 28, 2005, Joe Kessler, Division of Air Quality Permit Engineer on this project, sent Intervenor a letter notifying them of several deficiencies within the application, such as (1) a class one area air quality impact analysis was not included for Dolly Sods/Otter Creek Wilderness Areas, Shenandoah National Park, and James River Face Wilderness Area, (2) a class two area air quality impact analysis was not included, (3) an additional impacts analysis was not included, (4) a process flow diagram was not included, and (5) an original affidavit of publication verifying that a class one legal advertisement was placed in a paper of general circulation in the area where the source is to be constructed was not included.

9. On May 18, 2005, Intervenor submitted a revised permit application to Appellee completely replacing the prior application and stating that all prior deficiencies had been corrected.

10. On May 18, 2005, Appellee sent a copy of Intervenors's revised permit application to the Rainelle Public Library so that the permit would be available to the public.

11. On June 13, 2005, Mr. Kessler sent Intervenor a letter of deficiency notifying them of the application's lack of computer modeling files and failure to include updated tables.

12. On June 15, 2005, Intervenor sent Appellee a hard drive containing the files utilized in both the Class I and Class II ambient impact analysis and the updated tables, as requested.

13. On October 25, 2005, Intervenor revised its permit application in the form of an addendum including the following information: (1) additional waste fuel cases, (2) revision to exhaust configuration for kiln and boiler, (3) deletion of certain waste coal processing operations, and (4) additional documentation and cost analysis to support the BACT analysis.

14. On October 26, 2005, Appellee sent a copy of Intervenor's revised permit application to the Rainelle Public Library.

15. On November 14, 2005, Intervenor submitted updated Section 6 and 7 Air Quality Analyses and one hard drive containing the Class I and II modeling files.

16. On January 13, 2006, in response to a meeting between Intervenor and Appellee, Intervenors again revised the permit application by: (1) proposing a smaller kiln size, (2) analyzing coal benefication, and (3) correcting the NAAQS analysis for SO2.

Appendix O3

17. On January 17, 2006, Appellee sent a copy of Intervenor's revised permit application to the Rainelle Public Library so that the permit would be available to the public.

18. On March 8, 2006, Appellee issued its preliminary determination, proposed permit, public notice for a thirty (30) day comment period, and direct notice by mail to all those who had commented during the process.

19. On April 26, 2006, Appellee issued Permit No. R14-0038 to Intervenor.

20. On May 25, 2006, Appellants filed a Petition for Appeal with the Board alleging that Appellee's actions in granting the permit were arbitrary, capricious, and contrary to law and fact.

21. A hearing on the merits was held on August 29-30, 2006.

22. Appellants' only witness in the August 29-30, 2006 hearing before the Board was Dr. Ron Sahu.

23. Appellee and Intervenor presented three witnesses in the August 29-30, 2006 hearing before the Board: Jerry Joseph, a registered professional engineer: Joe Kessler, a registered professional engineer; and Chris Arrington, an air quality dispersion modeling expert.

24. During the hearing, Appellants did not introduce evidence to support Dr. Sahu's contention that (1) SCR was economically feasible, (2) that SCR could have been placed in a high dust pre-baghouse position, and (3) SNCR was not BACT.

25. At the hearing, Appellants did not move to admit evidence supporting Dr. Sahu's assertion that: (1) limestone injection coupled with an FDA was not BACT for SO2, (2)

a wet scrubber was economically feasible, and (3) the 5,000/ton-pollutant removed EPA guideline was a bright-line rule.

26. During the hearing, Appellants failed to introduce evidence support Dr. Sahu's claim that use of PM10 as a surrogate for PM2.5 somehow flawed the BACT analysis.

27. At the hearing, Appellants did not offer evidence supporting Dr. Sahu's claim that Hydrogen Fluoride was treated as a Fluoride under the CAA, and therefore, Appellee/Intervenor's BACT analysis was flawed for failure to consider Hydrogen Fluoride. Furthermore, Dr. Sahu himself conceded on cross examination that Hydrogen Fluoride was not treated as a Fluoride for purposes of the CAA, and therefore, Appellee/Intervenor's BACT analysis had not been flawed due to the proper omission of a hydrogen fluoride analysis.

28. Appellants did not introduce evidence supporting Dr. Sahu's unqualified opinion that the modeling done in this case was defective.

29. As set forth in its original and revised applications, Intervenor, with the assistance of URS Corporation ("URS"), a design and engineering firm, conducted a BACT analysis for the control of major sources of pollutants, including Nox, SO2, PM, CO, and H2SO4.

30. Appellee independently reviewed Intervenor's BACT analysis and properly conducted a top down BACT analysis, as required by EPA guidelines. Based on this review, Appellee approved the use of a CFB Boiler and SNCR to remove Nox, the injection of limestone into the fluidized bed coupled with an FDA to remove SO2, and a baghouse or fabric filter to remove PM. Appellee concluded that serious technical, economic,

Appendix O3

environmental and energy considerations prevented selection of: (1) SCR for Nox removal and (2) Wet Flue Gas Desulphurization Scrubber ("wet scrubber") for removal of SO2.

31. The BACT analysis resulted in the use of an SCR being properly excluded as being "economically infeasible." The cost analysis revealed that the average cost effective of SCR was $30,224/tons-SO2 removed and resulted in an additional for combustion of 9.5 millions gallons/year of fuel oil for reheat, 23 tons per year of CO emissions and 37 tons per year of SO2 emissions, and added NH3 emissions from ammonia slip.

32. According to Joe Kessler and Jerry Joseph, Alstom Power Company, a vendor of SCR systems, and a separate BACT review conducted by Pennsylvania, SCR cannot feasibly be placed in a high dust, pre-baghouse position without significant catalyst fouling.

33. The BACT analysis resulted in the installation of a wet scrubber being properly ruled out as being "economically infeasible" where a cost analysis revealed that the average cost effectiveness of limestone injection with a wet scrubber was $4,604/tons-SO2 removed in addition to the environmental impacts of additional water usage, waste water disposal and solid waste disposal.

34. The air dispersion modeling was properly conducted based on the fact that Chris Arrington testified that: (1) both models were simulated according to the guidelines and were even more conservative than necessary, (2) the guidelines require "representative data," not just on-site (local) meteorology, and (3) he took predominate wind directions and the size and location of the facility into consideration when determining that

pollutant "puffs" would not rotate in a clockwise direction and move against the predominate wind direction into the area of concern raised by Dr. Sahu.

35. The Appellee analyzed PM10 as a surrogate for PM2.5 in its air quality dispersion modeling analysis of Intervenor's facility.

V. CONCLUSIONS OF LAW

1. Intervenor conducted a BACT analysis for pollutants the proposed facility has the potential to emit in significant amounts. This analysis was conducted in accordance with applicable laws and regulations.

2. Appellee issued Permit No. R14-0028 in compliance with *West Virginia Code* §45-14-8.2; *West Virginia Code* § 45-14-2.12; West Virginia Code §45-14-4; and West Virginia Code §45-14-9.

3. In issuing Permit No. R14-0028, Appellee complied with procedural requirements as required by applicable laws and regulations.

4. BACT is defined as an emission limitation (based on the maximum degree of reduction for each regulated NSR pollutant, which would be emitted from any proposed major stationary source) which the reviewing authority, on a case-by-case basis, taking into account energy, environment, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combination techniques for control of such pollutant. . . . If the reviewing authority determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the

imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard or combination thereof, may be prescribed instead to satisfy the requirement for the application of BACT.

5. The Board hears appeals of permitting actions under a *de novo* standard, pursuant to West Virginia Code §22B-1-7(e) and, therefore, the Board does not afford deference to the Director's action, but rather, the Board acts independently on the evidence before it. *West Virginia Div. Of Env't Prot. V. Kingwood Coal Co.*, 200 W.Va. 734, 745, 490 S.E. 2d 823, 834 (1997).

6. When pursuing an appeal before the Board, the Appellant has the burden to provide sufficient evidence to support a finding that the Appellee's action was incorrect. If the Appellant provides sufficient evidence, the burden shifts over to the Appellee who must then produce sufficient evidence to support its decision. At that point, the burden shifts back to the Appellant who has the final opportunity to show that the evidence produced by the Appellee is pre-textual or otherwise deficient. *Wetzel County Solid Waste Authority v. Chief, Office of Waste Management, Division of Environmental Protection*, Civil Action Number 95-AA-3 (Circuit Court of Kanawha County, 1999)

VI. CONCLUSION

For all the reasons set forth in these Findings of Fact and Conclusions of Law, the Board hereby **AFFIRMS** the Division of Air Quality's April 26, 2006 final determination to issue Permit No. R14-0028.

It is so ordered on this 28th day of February, 2007.

R. Thomas Hansen, Vice-Chairperson
Air Quality Board

Appendix O3

BEFORE THE WEST VIRGINIA AIR QUALITY BOARD
CHARLESTON, WEST VIRGINIA

SIERRA CLUB, WEST VIRGINIA HIGHLANDS CONSERVANCY,
GREENBRIER RIVER WATERSHED ASSOCIATION,

Appellant,

v. Appeal No. 06-03-AQB

DIRECTOR, DIVISION OF AIR QUALITY,
DEPARTMENT OF ENVIRONMENTAL PROTECTION,

Appellee,

and

WESTERN GREENBRIER CO-GENERATION, LLC,

INTERVENOR.

CERTIFICATE OF SERVICE

This is to certify that I, Jackie D. Shultz, Clerk for the Environmental Quality Board, have this day, the 28th day of February, 2007, served a true copy of the foregoing "FINAL ORDER" to all parties in Appeal No. 06-03-AQB, by mailing the same via United States Mail, with sufficient postage, to the following address:

via certified mail:

Joe Lovett, Esquire
Appalachian Center for the Economy
And the Environment
PO Box 507
Lewisburg, WV 24901

Certified Mail # 7160 6690 2530 0000 4656

Edward I. Kropp, Esquire
Jackson Kelly PLLC
PO Box 553
Charleston, WV 25322

Certified Mail # 7160 6690 2530 0000 4663

via personal service:

John Benedict, Director
Division of Air Quality
WV Department of Environmental Protection
601 57th Street
Charleston, West Virginia 25304

Roland Huson, Esquire
Office of Legal Services
WV Department of Environmental Protection
601 57th Street
Charleston, West Virginia 25304

Jackie D. Shultz
Jackie D. Shultz, Clerk