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Memorandum

Date: October 30, 2006
 To: Ed Martin (NC DAQ)
 From: Jeffrey Connors (ENSR)
 Subject: Addendum to Class I Modeling:
 Cliffside Unit 6&7 Project – PSD Permit
 Application

Distribution:	<u>Kris Knudsen</u> <u>Harry Lancaster</u> <u>(Duke Power)</u>	<u>William</u> <u>Campbell</u> <u>(ENSR)</u>	<u>Don van der Vaart</u> <u>(NC DAQ)</u>	<u>Chuck Buckler</u> <u>(NC DAQ)</u>
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As requested by the North Carolina Department of Air Quality (DAQ), ENSR has performed additional Class I modeling in support of Duke Power’s “Unit 6&7 Project” located at the Cliffside Steam Station (Cliffside) in Rutherford County, NC. This modeling was performed to address DAQ’s concerns that the CALPUFF modeling submitted with the December 2005 PSD used a higher NO_x emission rate than the eventual BACT determination for the main boiler stacks. The proposed NO_x BACT limit in the December 2005 PSD Application was 0.08 lbs/MMBtu for each boiler. The final BACT determination by DAQ is 0.07 lbs/MMBtu for each boiler, agreed to by Duke Power. Modeling at the higher emission rate caused overly conservative modeled impacts to be reported in the Application at the nearby Class I areas.

To address this concern, on behalf of Duke Power, ENSR has prepared this modeling addendum that can be used along with the December 2005 PSD application to evaluate impacts at the Class I areas. This addendum provides adjustments to certain modeling results that are affected by the NO_x emission rate, while the rest of the results reported in the December 2005 PSD application are still valid. Both the previous modeling and this current update have demonstrated that the proposed project will not have a significant impact on air quality in nearby Class I areas.

There are five PSD Class I areas within 300-km of Cliffside (see Figure 1). As summarized in Section 10 of the December 2005 PSD Application, CALPUFF was run with two different grid resolutions for specific areas: (1) a 1-km resolution for more distant Class I areas – Cohutta, Great Smoky Mountains, and Joyce Kilmer-Slickrock; (2) a 500-m resolution for the nearest Class I areas – Linville Gorge and Shining Rock.

The change in NO_x emissions potentially has an effect on the annual NO_x PSD increment along with nitrogen deposition and visibility. In order to quantify the change in impacts due to the change of NO_x

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emissions from the main boiler stacks at the Class I areas, the CALPUFF post-processing utility POSTUTIL was used. POSTUTIL has the same chemistry modules as does CALPUFF, so it was used to scale results from the original CALPUFF runs in order to compute the change in modeled impacts due to the lower NO_x emissions without having to rerun CALPUFF. POSTUTIL is expected to provide results equivalent to CALPUFF in this case because SO₂ was not modeled because the project nets out of PSD review for SO₂.

Tables 1-3 present an updated set of modeling results for NO_x increment, nitrogen deposition, and regional haze based on the lower NO_x emission rate of 0.07 lbs/MMBtu. The NO_x increment and nitrogen deposition results are 7/8th lower than the results presented in the December 2005 PSD Application. The regional haze results are a bit less linear in the reduction of impacts due to the contribution of PM₁₀ to the modeled extinction remaining the same.

Table 1 Maximum Concentrations at the PSD Class I Areas

Pollutant	Class I Area	Averaging Period	CALPUFF Modeled Concentration (µg/m ³)							Class I Significant Impact Level (µg/m ³)
			2001		2002		2003		MAX	
			100%	50%	100%	50%	100%	50%	(µg/m ³)	
NO _x	Cohutta	Annual	0.002	0.001	0.006	0.003	0.004	0.002	0.006	0.1
	Great Smoky Mountain	Annual	0.005	0.002	0.008	0.004	0.007	0.003	0.008	0.1
	Joyce Kilmer Slickrock	Annual	0.004	0.001	0.004	0.002	0.006	0.003	0.006	0.1
	Linville Gorge	Annual	0.021	0.013	0.017	0.011	0.016	0.009	0.021	0.1
	Shinning Rock	Annual	0.008	0.003	0.014	0.007	0.008	0.004	0.014	0.1

Table 2 Acidic Deposition Impacts at the PSD Class I Areas

Pollutant	Class I Area	Averaging Period	CALPUFF Modeled Deposition			
			2001	2002	2003	Maximum
			(µg/m ² /s)	(µg/m ² /s)	(µg/m ² /s)	(kg/ha/yr)
Nitrogen	Cohutta	Annual	8.72E-06	1.55E-05	1.00E-05	0.0049
	Great Smoky Mountain	Annual	1.65E-05	2.32E-05	1.86E-05	0.0073
	Joyce Kilmer Slickrock	Annual	1.42E-05	1.45E-05	1.59E-05	0.0050
	Linville Gorge	Annual	5.00E-05	3.96E-05	4.57E-05	0.0158
	Shinning Rock	Annual	2.03E-05	2.64E-05	2.13E-05	0.0083

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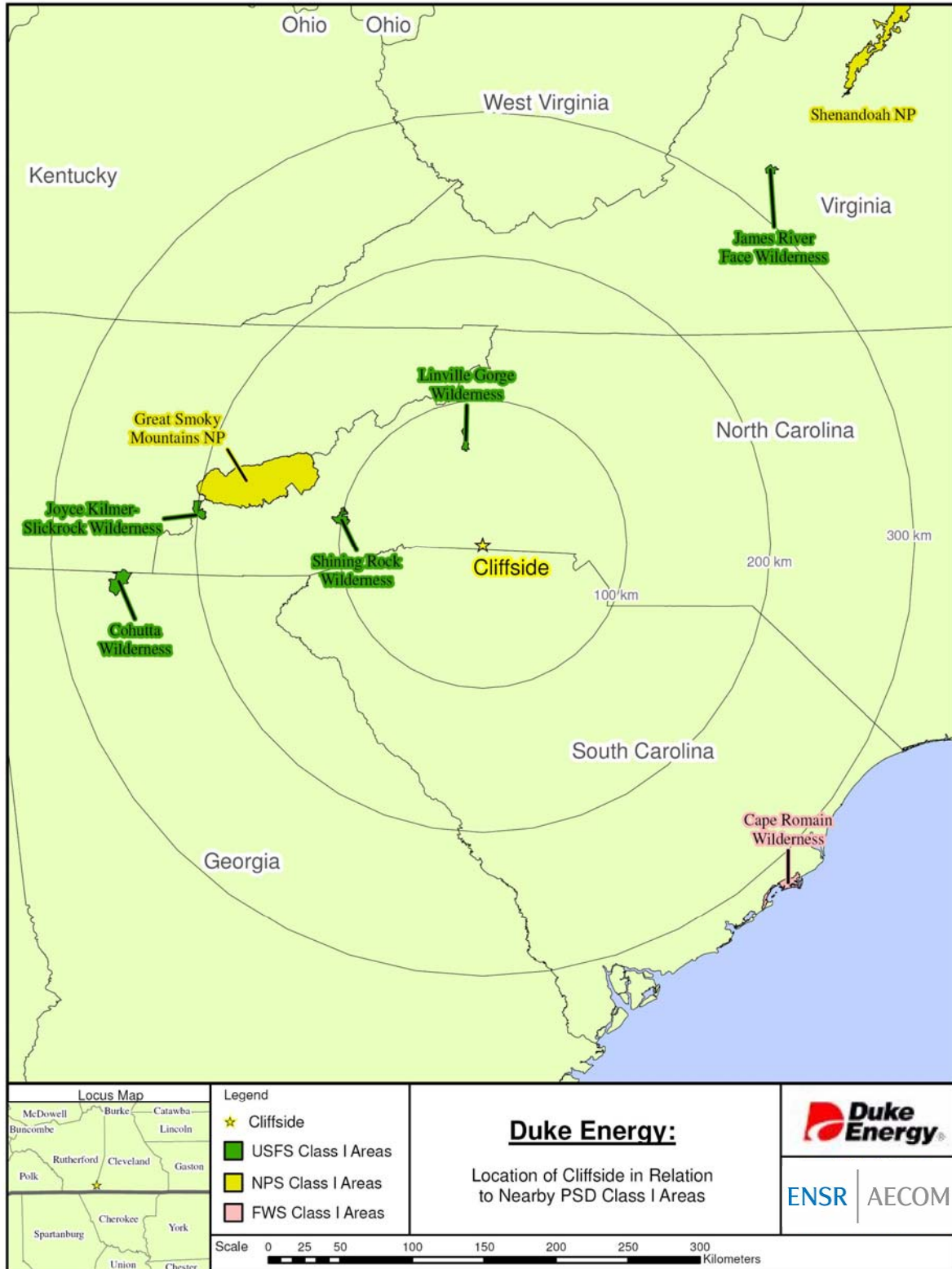
Table 3 Visibility Impacts at the PSD Class I Areas

Class I Area	2001			2002			2003		
	Days > than		MAX % Change in B _{ext}	Days > than		MAX % Change in B _{ext}	Days > than		MAX % Change in B _{ext}
	5% Δ B _{ext}	10% Δ B _{ext}		5% Δ B _{ext}	10% Δ B _{ext}		5% Δ B _{ext}	10% Δ B _{ext}	
Cohutta	0	0	0.89	0	0	1.70	0	0	0.87
Great Smoky Mountains	0	0	1.79	0	0	2.29	0	0	1.32
Joyce Kilmer- Slickrock	0	0	0.96	0	0	1.50	0	0	1.04
Linville Gorge	0	0	2.95	0	0	3.68	0	0	3.52
Shining Rock	0	0	4.35	0	0	2.86	0	0	2.03

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Figure 1 Location of Nearby Class I Areas in Relation to the Cliffside Steam Station



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