

**ECONOMIC ANALYSIS**  
**Prevention of Significant Deterioration Biogenic CO<sub>2</sub> Deferral**

**I. Basic Information**

**Contact Information**

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6. Title of the Proposed Rule	Prevention of Significant Deterioration for Greenhouse Gases
7. Rule Citations	15A NCAC 02D .0544
8. Brief Description of the Proposed Rule Changes	Adopt Federal deferral for biogenic CO <sub>2</sub> under PSD
9. Rule Category	Division 1 – Regulatory Behavior
10. Authorizing Statute	G.S. 143-215.3(a)(1); 143-215.107(a)(3); 143-215.107(a)(5); 143-215.107(a)(7); 143-215.108(b); 150B-21.6;

**Screening Analysis**

Rule Actions	General Statute	Yes or No
<b>10. Federal Law Certification Required</b> - Does the proposed rule purport to implement a federal law requiring a certification statement by the rulemaking coordinator?	NCGS 150B-21(f)(1)	No
<b>11. Temporary Rules</b> - Does this rule meet the criteria listed relating to temporary rules?	NCGS 150B-21.1	No
<b>12. Emergency Rules</b> - Does this rule meet the criteria relating to emergency rules?	NCGS 150B-21.1(a)	No
<b>13. Establishes or Increases Fees</b> - Is the agency required to comply with the requirements of G.S. 12-3.1?	NCGS 150B-12-3.1 NCGS 150B-21.3(c1)	No
<b>14. State Funds</b> - Does the proposed rule require the expenditure or distribution of funds subject to the Executive Budget Act, Article 1 of Chapter 143?	NCGS 150B-21.4(a)	Yes
<b>15. NC DOT Analysis</b> - Does the proposed rule affect NC DOT environmental permitting that will result in an increased cost?	NCGS 150B-21.4(a1)	No
<b>16. Local Government Unit Funds</b> - Does the proposed rule affect the expenditures or revenues of a unit of local government?	NCGS 150B-21.4(b)	Yes
<b>17. Substantial Economic Impact Analysis - Federal Rule Exemption</b> - Does this rule meet the criterion of Federal Exemption?	NCGS 150B-21.4(b1)	Yes
<b>18. Technical Change</b> - Are only technical changes being incorporated such that public notice and rulemaking hearings are not required?	NCGS 150B-21.5	No
<b>19. Repeal of Regulatory Deadwood - Is the rule obsolete?</b>	NCGS 150B-2(1b) NCGS 150B-21.5(b)	No

## II. Executive Summary

This proposed rule change to 15A NCAC 02D .0544, Prevention of Significant Deterioration (PSD) for Greenhouse Gases (GHG), would implement a federally-issued deferral for biogenic CO<sub>2</sub> emission as part of the State's PSD program for three years. Under the proposal, biogenic CO<sub>2</sub> emissions would not be considered in determining whether a source meets PSD and Title V applicability thresholds. The proposed deferral applies only to CO<sub>2</sub> emissions and does not affect non-GHG pollutants or other GHGs emitted from combustion of biomass fuel. The rule amendment ensures that stationary sources would not have to complete a BACT analysis for biogenic CO<sub>2</sub> and possibly be required to install equipment to control emissions during the three year deferral period. It is not in the public interest to require stationary sources to incur costs implementing PSD permitting requirements before United States Environmental Protection Agency (EPA) completes their review when there may be a de-minimis impact on net CO<sub>2</sub> levels in the atmosphere.

Although the biogenic CO<sub>2</sub> emissions deferral is optional, a rule amendment is proposed to reflect the federal deferral while the uncertainty surrounding the impact of biogenic CO<sub>2</sub> emissions and how such emissions will be handled in the overall GHG framework is being resolved. Under § 150B-19.1 (a)(2), an agency shall seek to reduce the burden upon those persons or entities who must comply with the rule that is being adopted. Deferring biogenic CO<sub>2</sub> emissions will reduce the regulatory burden on affected facilities by eliminating biogenic CO<sub>2</sub> emissions when determining whether a stationary source meets the PSD and Title V applicability thresholds, including those for the application of BACT. This proposal conforms to the principles of Executive Order 70 and seeks to achieve the regulatory objective in the most cost-effective, timely, and least burdensome method.

The potential cost saving to the private sector may exceed \$5 million annually by the third year of the deferral and remain near that level beyond the deferral due to the operation and maintenance costs on the control equipment installed during the deferral period. NC Division of Air Quality funds may potentially be reduced by approximately \$20,000 per year due to the reduction in PSD permit application fees. Local governments that operate landfills could be affected if the emissions of biogenic CO<sub>2</sub> exceed the PSD permitting applicability requirements in the rule.

With data prepared by the EPA and the Division of Air Quality (DAQ), an estimate of the economic impacts on the affected sources can be made. Table 1, Costs and Benefits of Proposed Rule Change to Prevention of Significant Deterioration for Greenhouse Gases, summarizes the annual impact incurred by all the affected sources. These total incremental economic impact estimated as avoided costs (benefits) are adjusted to 2011 dollars. Annual potential avoided costs/savings, \$5 million by the third year of this analysis, are substantial as defined in the Administrative Procedures Act in NC §150B-21.4. *Fiscal notes on rules.*

Table 1: Costs and Benefits of Proposed Rule Change to Prevention of Significant Deterioration for Greenhouse Gases

<b>Fiscal Year</b>	<b>2011-12</b>	<b>2012-13</b>	<b>2013-14</b>	<b>2014-15</b>	<b>2015-16</b>	<b>2016-17</b>
<b>Year Number</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Costs</b>						
Loss of State Revenue		\$20,000	\$20,000	\$20,000	\$0	\$0
<b>Total Costs</b>	<b>\$0</b>	<b>\$20,000</b>	<b>\$20,000</b>	<b>\$20,000</b>	<b>\$0</b>	<b>\$0</b>
<b>Benefits</b>						
Private Sector Reduced Permit Fees		\$20,000	\$20,000	\$20,000	\$0	\$0
Private Sector Avoided BACT Costs		\$40,000	\$40,000	\$40,000	\$0	\$0
Private Sector Avoided Equipment and O&M Costs (Appendix D)		\$1,663,600	\$3,319,600	\$4,987,900	\$4,907,900	\$4,907,900
<b>Total Benefits</b>	<b>\$0</b>	<b>\$1,723,600</b>	<b>\$3,379,600</b>	<b>\$5,047,900</b>	<b>\$4,907,900</b>	<b>\$4,907,900</b>
<b>Net Impact (benefits-costs)</b>	<b>\$0</b>	<b>\$1,703,600</b>	<b>\$3,359,600</b>	<b>\$5,027,600</b>	<b>\$4,907,900</b>	<b>\$4,907,900</b>
<b>Total Impact (benefits+costs)</b>	<b>\$0</b>	<b>\$1,743,600</b>	<b>\$3,399,600</b>	<b>\$5,067,900</b>	<b>\$4,907,900</b>	<b>\$4,907,900</b>
<b>5 Year Net Present Value of Total Impact = \$15,979,300</b>						

### III. Background

On June 3, 2010, EPA published the final Prevention of Significant Deterioration (PSD) and Title V Greenhouse Gas Tailoring Rule (herein referred to as the Tailoring Rule; 75 FR 31514), setting thresholds for GHG emissions that define when permits under these programs are required for new and existing industrial facilities. Beginning January 2, 2011, sources currently subject to PSD or Title V permitting programs were required to determine the best available control technology (BACT) for their GHG emissions, but only for GHG increases of 75,000 short tons per year (tpy) or more of total GHGs, on a carbon dioxide equivalents (CO<sub>2</sub>e) basis and any increase on a mass basis. At that time, no sources would have been subject to CAA permitting requirements due solely to GHG emissions.

The North Carolina Division of Air Quality engaged in rulemaking to ensure that state laws would conform with this new federal requirement. On November 18, 2010, the Environmental Management Commission adopted 15A NCAC 02D .0544, Prevention of Significant Deterioration for Greenhouse Gases, which incorporated the requirements in the federal Tailoring Rule. The rule became effective on January 28, 2011 pursuant to Executive Order 81 signed by Governor Beverly E. Perdue. In the state rule, beginning July 1, 2011, the PSD permitting requirements will cover

new construction projects that will emit GHGs of at least 100,000 tpy on a CO<sub>2</sub>e basis even if they do not exceed the permitting thresholds for any other pollutant. Modifications at existing facilities that increase GHG emissions by at least 75,000 tpy, and any amount on a mass basis, will be subject to permitting requirements, even if they do not significantly increase emissions of any other pollutant. Operating permit requirements will, for the first time, apply to sources based on their GHG emissions even if they would not apply based on emissions of any other pollutant. Facilities that emit at least 100,000 tpy CO<sub>2</sub>e will be subject to Title V permitting requirements.

However, United States Environmental Protection Agency (EPA) recently proposed to defer application of the PSD and Title V permitting requirements to biogenic carbon dioxide (CO<sub>2</sub>) emissions from bioenergy and other biogenic stationary sources for three years. In the EPA deferral promulgation (76 FR 43490), biogenic CO<sub>2</sub> emissions are defined as emissions of CO<sub>2</sub> from a stationary source directly resulting from the combustion or decomposition of biologically-based materials other than fossil fuels and mineral sources of carbon. Examples of “biogenic CO<sub>2</sub> emissions” include, but are not limited to:

- CO<sub>2</sub> generated from the biological decomposition of waste in landfills, wastewater treatment or manure management processes;
- CO<sub>2</sub> from the combustion of biogas collected from biological decomposition of waste in landfills, wastewater treatment or manure management processes;
- CO<sub>2</sub> from fermentation during ethanol production or other industrial fermentation processes;
- CO<sub>2</sub> from combustion of the biological fraction of municipal solid waste or biosolids;
- CO<sub>2</sub> from combustion of the biological fraction of tire-derived fuel; and
- CO<sub>2</sub> derived from combustion of biological material, including all types of wood and wood waste, forest residue, and agricultural material.

Under the proposal, biogenic CO<sub>2</sub> emissions would not be considered in determining whether a source meets PSD and Title V applicability thresholds. As proposed the deferral applies only to CO<sub>2</sub> emissions and does not affect non-GHG pollutants or other GHGs emitted from combustion of biomass fuel. The EPA has provided an interim guidance document to assist permitting authorities in establishing a basis that best available control technology (BACT) for biogenic CO<sub>2</sub> emissions at stationary sources is the combustion of biomass fuels by itself. The EPA plans on conducting a detailed examination of the science associated with biogenic CO<sub>2</sub> emissions from stationary sources to consider technical issues EPA seeks to resolve to account for biogenic CO<sub>2</sub> emissions in scientifically sound ways that are manageable in practice. The information gathered will be used in a follow-up rulemaking by EPA on how such emissions should be treated in PSD and Title V permitting.

EPA’s future rulemaking is uncertain until EPA completes their review of the scientific and technical issues related to accounting for biogenic CO<sub>2</sub> emissions. An amendment to the state PSD rule for GHG emissions is proposed to reflect the federal deferral while the uncertainty surrounding the impact of biogenic CO<sub>2</sub> emissions and how such emissions will be handled in the overall GHG framework is being resolved. Until EPA’s review is completed, the proposed rule amendment ensures that stationary sources would not have to unnecessarily complete a BACT analysis for

biogenic CO<sub>2</sub> and possibly be required to install equipment to control emissions during the three year deferral period.

#### **IV. Description of Proposed Rule Adoption**

15A NCAC 02D .0544 is proposed for amendment to implement the three year deferral period for biogenic CO<sub>2</sub> emission into the State's PSD program.

#### **V. Costs by Affected Party**

##### **Units of Local Government Funds**

The adoption of the EPA three year deferral period for biogenic CO<sub>2</sub> emissions may affect local governmental funds under this rulemaking. One type of stationary source that may be owned by a local government that could be affected by the deferral are landfills that combust landfill methane. These facilities would most likely be Senate Bill 3 renewable sources. Currently, there are no landfills large enough to be affected by this rulemaking with the North Carolina Utilities Commission. For this reason, this analysis assumes that local governments are not affected by the proposed rule change.

##### **State Funds**

NC DAQ will lose permitting fees for the estimated three stationary sources that will avoid PSD permitting requirements. The reduction of PSD application fees are estimated to be \$20,000 annually during the three-year deferral period. The calculation for this value is located in the PSD Permit Savings section.

##### **Private Sector**

DAQ does not anticipate that the private sector will incur any additional costs as a result of this proposed rule amendment.

#### **VI. Benefits by Affected Party**

##### **Public Environmental Benefits**

EPA believes based on information currently before the Agency that at least some biomass feedstocks that may be utilized to produce energy or other products have a negligible impact on the net carbon cycle, or possibly even a positive net effect. Within the context of the PSD and Title V programs, the argument for treating CO<sub>2</sub> emissions from bioenergy and biogenic sources differently from fossil based CO<sub>2</sub> emissions at the facility relies on the premise that sequestration occurs offsite, outside the boundaries of the facility. Such a negligible or positive impact on the carbon cycle and net atmospheric CO<sub>2</sub> levels should not count towards the PSD and Title V applicability requirements. Until EPA completes its assessment, an environmental cost or benefit cannot be determined for this economic analysis.

## **State Funds**

NC DAQ will benefit from this rule by avoiding the administrative burden of processing these same PSD permits over the next three years. For the other stationary sources that can avoid a BACT analysis for their biogenic CO<sub>2</sub> emissions, NC DAQ will benefit by avoiding the administrative burden of doing a review of a biogenic CO<sub>2</sub> BACT analysis. Generally, the permit fee should represent the administrative costs of writing the permit. Therefore, reduction in fees should equate to the reduction in administrative burden to the agency of approximately \$20,000 annually. This figure is calculated in the PSD permit savings section.

## **Private Sector**

The private sector may have avoided costs as a result of the proposed rule amendment because some facilities may not have to perform a BACT analysis for biogenic CO<sub>2</sub> and these same sources will avoid paying PSD permitting fees. Some facilities will not have to install pollution abatement equipment and this will produce cost savings in the form of avoided capital and operations and maintenance costs.

## **Methodology and Model Assumptions**

For this analysis, the regulatory baseline is the current rule, 15A NCAC 02D .0544, Prevention of Significant Deterioration for Greenhouse Gases. Under the current rule, new stationary sources that emit GHGs of at least 100,000 tpy on a CO<sub>2</sub>e basis and modifications at existing facilities that increase GHG emissions by at least 75,000 tpy will be subject to the PSD permitting requirements even if they do not exceed the permitting thresholds for any other pollutant. EPA's three year deferral period will eliminate for consideration the CO<sub>2</sub> emissions from bioenergy and other biogenic sources when determining whether a stationary source meets the PSD and Title V applicability thresholds, including those for the application of BACT.

The number of stationary sources that are affected by the deferral will be the number of PSD permit applications that have been received since NC DAQ adopted the federal GHG Tailoring Rule provision on January 28, 2011. To date, NC DAQ has received three PSD applications in 2011. Based on this level of activity, it is assumed that a total of four applications will be received in each the first three model years. After the third year, there will be no impacts to additional stationary sources included in the analysis since the deferral will expire. It is uncertain if any owners of potential stationary sources would advance their plans and submit an earlier permit application to take advantage of the deferral period.

### PSD Permit Savings

NC DAQ collects a PSD permitting fee for each PSD application that is submitted by an affected source to the agency. The permit fee would be \$13,488 for a permit in an attainment area and \$26,235 in a non-attainment area. Stationary sources that avoid PSD permitting due to the biogenic CO<sub>2</sub> deferral will avoid these fees. Stationary sources that do not avoid PSD permitting due to

exceeding a threshold for other criteria pollutants will not avoid the PSD application fee. For this analysis, it is assumed that the distribution of affected stationary sources will be equally distributed between attainment and non-attainment areas. Therefore, the average PSD fee per stationary source that would not be collected if the source avoided PSD permitting is approximately \$20,000. NCDAQ thinks one facility in each of the first three years will avoid filing for a PSD as a result of the proposed rulemaking. Therefore, the annual savings would be \$20,000 per year during the three year deferral.

### BACT Savings

NCDAQ believes that all four new stationary sources will avoid the BACT analysis each year as a result of the proposed rulemaking. The DAQ PSD permitting supervisor estimates that annually for avoiding costs related to permit preparation, engineering review and analysis for including a BACT analysis for biogenic CO<sub>2</sub> emission in a PSD permit application is \$10,000 per facility. This would result in a total annual cost savings of \$40,000.

### **Capital and Operations and Maintenance Cost Savings**

New or existing stationary sources that would be required to get a PSD permit due to biogenic CO<sub>2</sub> emissions may or may not need to install additional control equipment for other pollutants such as particulate matter (PM) or nitrogen oxides (NO<sub>x</sub>) depending on if the other criteria pollutants exceed their significance levels. For this analysis, it is assumed that one stationary source per year would be required to submit a PSD permit due to exceeding CO<sub>2</sub>e thresholds. Since a BACT analysis under the PSD permit program is a case-by-case determination, a range of savings for not being required to submit a PSD application during the three year deferral period stationary source will be made. The minimal savings would be that the stationary source would not be required to install any additional pollution equipment for other criteria pollutants.

For this analysis, a 125 MMBTU/hr boiler burning wood is used as an example stationary source that would represent the size and fuel type that potentially could exceed the biogenic CO<sub>2</sub> emission threshold of 100,000 tons/year without exceeding other PSD emission limits. It is assumed that one facility of this type each year would have been constructed during the three year biomass CO<sub>2</sub> deferral period. Each stationary source will install both an ESP for particulate control and a SNCR for NO<sub>x</sub> control. The capital cost of the control equipment is annualized over a 20 year period.

According to EPA's AP-42, *Compilation of Air Pollutant Emission Factors*, the major emission of concern from wood boilers is particulate matter (PM). These emissions depend primarily on the composition of the residue fuel burned, and the particle control device. NO<sub>x</sub> may also be emitted in significant quantities when certain types of wood residue are combusted or when operating conditions are poor. To estimate the maximum savings, it is assumed that the stationary source would be required to install an electrostatic precipitator (ESP) for PM control, and Selective Non-Catalytic Reduction (SNCR) for NO<sub>x</sub>.

Cost estimates for ESPs were attained from *Applicability and Feasibility of NO<sub>x</sub>, SO<sub>2</sub>, and PM Emissions Control Technologies for Industrial, Commercial, and Institutional (ICI) Boilers* by

Northeast States for Coordinated Air Use Management (NESCAUM). On page 4-13, the capital cost for an ESP is \$7,560 to \$15,120 per MMBTU/hr. The operation and maintenance costs for an ESP are \$1,960 to \$15,120 per MMBTU/hr. These costs in 2002 dollars were attained from *Air Pollution Control Technology Fact Sheet: Wet Electrostatic Precipitator (ESP)- Wire-Plate Type*, EPA-452/F-03-030.

Cost estimates for SNCRs were attained from *Applicability and Feasibility of NO<sub>x</sub>, SO<sub>2</sub>, and PM Emissions Control Technologies for Industrial, Commercial, and Institutional (ICI) Boilers* by NESCAUM. On page 5-7, the capital cost for an SNCR is \$923,000 for an 88.5 MMBTU/hr boiler and \$1,025,000 for a 176.9 MMBTU/hr boiler. The annual operating cost is \$289,000 for the 88.5 MMBTU/hr boiler and \$324,000 for the 176.9 MMBTU/hr boiler. This analysis used the capital and operating costs from the CUECost model developed by EPA. The model has a ±30 percent accuracy (page xv of the NECAUM document). The costs are in 2006 dollars.

To calculate the costs for the ESP, the capital and annual operation and maintenance (O&M) were assumed to be at the midpoint of the cost estimates from the NESCAUM document listed in the above paragraph. The cost estimates were adjusted to 2011 dollars using an online CPI calculation at <http://www.usinflationcalculator.com/>. The detailed calculations for determining the ESP costs are found in Appendix B of this report.

To calculate the costs for the SNCR, the capital and annual O&M costs were estimated by doing a mathematical interpolation for a 125 MMBTU/hr boiler from the data for an 88.5 and 176.9 MMBTU/hr boiler found in the NESCAUM document. Those numbers are listed in the above paragraph. The cost estimates were adjusted to 2011 dollars. The detailed calculations for determining an SNCR costs are found in Appendix C of this report.

Table 2 is a summary of the annualized capital and annual O&M cost estimates when one wood-fired boiler is constructed each year during 2012, 2013, and 2014. These years represent the three year biomass CO<sub>2</sub> deferral.

**Table 2: Example Cost Analysis for a 125 MMBTU/hr Wood Boiler**

Cost year	2006	2012	2013	2014
CPI Adjustment	1.000	1.133	1.156	1.178
Capital Cost (for SNCR)	\$965,000	\$1,093,000	\$1,115,100	\$1,137,200
Annualized Capital: 20 yr life @ 7%	\$91,100	\$103,200	\$105,300	\$107,300
Annual O & M	\$303,000	\$343,200	\$350,100	\$357,100
Annualized Cost SNCR	\$394,100	\$446,400	\$455,400	\$464,400
Cost year	2002	2012	2013	2014
CPI Adjustment	1.000	1.269	1.295	1.321
Capital Cost (for ESP)	\$945,000	\$1,199,500	\$1,223,700	\$1,247,900
Annualized Capital: 20 yr life @ 7%	\$89,200	\$113,200	\$115,500	\$117,800
Annual O & M	\$822,500	\$1,044,000	\$1,065,100	\$1,086,100
Annualized Cost ESP	\$911,700	\$1,157,200	\$1,180,600	\$1,203,900
Total Annualized Cost SNCR+ESP	\$1,305,800	\$1,603,600	\$1,636,000	\$1,668,300

## **Small Entity Impacts**

USEPA is required to follow The Regulatory Flexibility Act (5 U.S.C. 601 et seq.), as amended by the Small Business Regulatory Enforcement Fairness Act (Public Law No. 104-121), which provides that whenever an agency is required to publish a general notice of proposed rulemaking, it must prepare and make available an initial regulatory flexibility analysis, unless it certifies that the proposed rule, if promulgated, will not have a significant economic impact on a substantial number of small entities (5 U.S.C. 605[b]). Small entities include small businesses, small organizations, and small governmental jurisdictions.

For the purposes of assessing the impacts of the deferral of emission from the GHG Rule on small entities, a small entity is defined as: (1) A small business according to the Small Business Administration size standards by the North American Industry Classification System (NAICS) category of the owning entity. The range of small business size standards for electric utilities is 4 billion kilowatt-hours of production or less; (2) a small government jurisdiction that is a government of a city, county, town, district, or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise that is independently owned and operated and is not dominant in its field.

DAQ Staff currently has no data to indicate that facilities meet the OSBM definition of "Small business" which means a business entity, including its affiliates, that (i) is independently owned and operated and (ii) employs fewer than 500 full-time employees or has gross annual sales of less than \$6 million.

## **IX. Summary**

### **Total Costs and Benefits**

The total costs and benefits to the private sector and state and local governments are summarized in Table 3 of this report. The benefits to the private sector over the 20 year expected life of the control equipment are summarized in Appendix D. The end of the deferral period will require NC DAQ to amend their rule to reflect the actions EPA takes in 2014. That amendment will require a new economic impact analysis that could potentially have a large impact starting in year 2015. Unless a facility that is exempted during these three years undergoes a major modification that increases their emission of biogenic CO<sub>2</sub> by more than 75,000 short tons, these facilities will not have to be required a get a PSD permit due to the CO<sub>2</sub> emissions. This means annual savings will occur for as long as these facilities operate.

Table 3: Costs and Benefits of Proposed Rule Change to Prevention of Significant Deterioration for Greenhouse Gases

<b>Fiscal Year</b>	<b>2011-12</b>	<b>2012-13</b>	<b>2013-14</b>	<b>2014-15</b>	<b>2015-16</b>	<b>2016-17</b>
<b>Year Number</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Costs</b>						
Loss of State Revenue		\$20,000	\$20,000	\$20,000	\$0	\$0
<b>Total Costs</b>	<b>\$0</b>	<b>\$20,000</b>	<b>\$20,000</b>	<b>\$20,000</b>	<b>\$0</b>	<b>\$0</b>
<b>Benefits</b>						
Private Sector Reduced Permit Fees		\$20,000	\$20,000	\$20,000	\$0	\$0
Private Sector Avoided BACT Costs		\$40,000	\$40,000	\$40,000	\$0	\$0
Private Sector Avoided Equipment and O&M Costs (Appendix D)		\$1,663,600	\$3,319,600	\$4,987,900	\$4,907,900	\$4,907,900
<b>Total Benefits</b>	<b>\$0</b>	<b>\$1,723,600</b>	<b>\$3,379,600</b>	<b>\$5,047,900</b>	<b>\$4,907,900</b>	<b>\$4,907,900</b>
<b>Net Impact (benefits-costs)</b>	<b>\$0</b>	<b>\$1,703,600</b>	<b>\$3,359,600</b>	<b>\$5,027,600</b>	<b>\$4,907,900</b>	<b>\$4,907,900</b>
<b>Total Impact (benefits+costs)</b>	<b>\$0</b>	<b>\$1,743,600</b>	<b>\$3,399,600</b>	<b>\$5,067,900</b>	<b>\$4,907,900</b>	<b>\$4,907,900</b>
<b>5 Year Net Present Value of Total Impact = \$15,979,300</b>						

## X. Risk Analysis

There are several sources of uncertainty that may affect the results of this analysis:

### Variability in Affected Sources

In the EPA deferral promulgation (76 FR 43490), biogenic CO<sub>2</sub> emissions are defined as emissions of CO<sub>2</sub> from a stationary source directly resulting from the combustion or decomposition of biologically-based materials other than fossil fuels and mineral sources of carbon. Some examples of “biogenic CO<sub>2</sub> emissions” are listed in the Background Section.

Stationary sources that may be affected by the deferral of biogenic CO<sub>2</sub> emissions are sources that use a wide variety of control strategies or control equipment. This high level of customization makes it challenging to develop a model stationary source to project future savings.

### Case-by-case aspect of BACT

Under the CAA and applicable regulations, a PSD permit must contain emissions limitations based on application of BACT for each regulated NSR pollutant. A determination of BACT for GHGs should be conducted in the same manner as it is done for any other PSD regulated pollutant. The

CAA and corresponding implementing regulations require that a permitting authority conduct a BACT analysis on a case-by-case basis, and the permitting authority must evaluate the amount of emissions reductions that each available emissions-reducing technology or technique would achieve, as well as the energy, environmental, economic and other costs associated with each technology or technique. Since the BACT analysis is on a case-by-case basis, it is difficult to apply a cost estimation to all potentially affected stationary sources due to the variability in the results of the BACT analysis.

### **Limited BACT reviews**

The NC EMC adopted the federal GHG Tailoring Rule provision on January 28, 2011. Before this adoption, NC DAQ did not regulate greenhouse gases, including biogenic CO<sub>2</sub> emissions that EPA is deferring from the PSD permit program requirements for three years. NC DAQ is in the process of reviewing their initial BACT analyses from affected stationary sources. Therefore, there is an uncertainty in what BACT is for biogenic CO<sub>2</sub> emissions until staff has gained experience in reviewing these PSD applications. Co-current with the proposed deferral of biogenic CO<sub>2</sub> emissions, EPA issued guidance on determining BACT for biogenic CO<sub>2</sub> emissions. The document is titled “*Guidance for Determining Best Available Control Technology for Reducing Carbon Dioxide Emissions from Bioenergy Production*” and was released in March 2011. A copy of this guidance is included in the Appendix. In the guidance document, EPA believes the analysis described in the document will be sufficient in most cases to support the conclusion that utilization of biomass fuel alone is BACT for a bioenergy facility.

This document does not provide a final determination of BACT for a particular source, since such determinations can only be made by individual permitting authorities on a case-by-case basis after consideration of the record in each case. Upon considering the record in an individual case, if a permitting authority has a reasoned basis to address particular issues discussed in this document in a different manner than EPA recommends here, permitting authorities (including EPA) have the discretion to do so in decisions on individual permit applications consistent with the relevant requirements in the CAA and regulations. As the permitting authority, NC DAQ will complete their own reviews for BACT for biogenic CO<sub>2</sub> emissions and may or may not come to the same conclusion as EPA’s BACT determination.

### **Interaction with Senate Bill 3, North Carolina's Renewable Energy and Energy Efficiency Portfolio Standard**

Paragraph (g) of §62-133.7, Renewable Energy and Energy Efficiency Portfolio Standard (REPS), requires a biomass combustion process at any new renewable energy facility that delivers electric power to an electric power supplier shall meet state BACT.

(g) Control of Emissions. – As used in this subsection, Best Available Control Technology (BACT) means an emissions limitation based on the maximum degree a reduction in the emission of air pollutants that is achievable for a facility, taking into account energy, environmental, and economic impacts and other costs. A biomass combustion process at any new renewable energy facility that delivers electric power to an electric power supplier shall meet BACT. The Environmental Management Commission shall determine on a case-by-case basis the BACT for a facility that would not otherwise be required to comply with BACT pursuant to the Prevention of Significant Deterioration (PSD) emissions program. The Environmental Management Commission may adopt rules to implement this subsection. In adopting rules, the Environmental Management Commission shall take into account cumulative and secondary impacts associated with the concentration of biomass facilities in close proximity to one another. In adopting rules the Environmental

Management Commission shall provide for the manner in which a facility that would not otherwise be required to comply with BACT pursuant to the PSD emissions programs shall meet the BACT requirement. The state BACT process is similar to the federal BACT process under the PSD permitting program except that a stationary source is not required to model for ambient impacts. Many of potential biomass facilities that may be required to apply for a PSD permit if biomass CO<sub>2</sub> emissions were not deferred would have had to complete a state BACT analysis under REPS.

The state BACT process is similar to the federal BACT process under the PSD permitting program except that a stationary source is not required to model for ambient impacts. Many of potential biomass facilities that may be required to apply for a PSD permit if biomass CO<sub>2</sub> emissions were not deferred would have had to complete a state BACT analysis under REPS.

### **Future EPA Rulemaking**

EPA's deferral of biogenic CO<sub>2</sub> emissions from PSD permitting requirements is intended to be a temporary measure to allow the agency to complete its work and determine what, if any, treatment of biogenic CO<sub>2</sub> emissions should be in the PSD and Title V programs. It is not the final determination in these programs. EPA plans to complete its scientific and technical review and any follow-on rulemakings within the three year period. It is possible that the subsequent rulemaking, depending on the nature of EPA's determinations, would supersede this deferral rulemaking and become effective in less than three years.

The cost/benefit analysis assumed that all stationary sources that were required to comply with the PSD permitting requirement due to exceeding only the biogenic CO<sub>2</sub> emission thresholds would be required to install control equipment to control PM and NO<sub>x</sub> emissions. The cost savings would be reduced significantly if one or more of the stationary sources were not required to install control equipment for one of those pollutants. The analysis also assumed only four stationary sources per year would be affected by the deferral where one of the stationary sources would be required to install control equipment. The cost savings would increase significantly if more than one stationary source would be required to install control equipment annually during the deferral period.

## **XI. Alternatives Considered**

DAQ's proposed amendment 15A NCAC 02D .0544 fixes the CFR reference date to July 20, 2011. However, the proposed amendment does not include any subsequent revisions to the CFR. The reference date that is currently found in the rule is August 2, 2010 when the Greenhouse Gas Tailoring Rule provisions were adopted. This proposal assures DAQ intention to implement a specific version of the federal regulation and avoids automatic update that may have unintended consequences on affected sources or permitting authorities in North Carolina. When EPA amends their regulations, it creates an appearance of two versions of the same regulation, when in fact the North Carolina rules date reference is simply out of date. Under such circumstances a fixed CFR date in our rules does not trump the federal revision. This requires DAQ to amend its rule to the later fixed CFR date.

Alternative 1 would be to not amend the rule to implement the federal three year deferral period. Under G.S. 150B-19.1(a)(2), an agency shall seek to reduce the burden upon those persons or entities who must comply with the rule that is being adopted. Deferring biogenic CO<sub>2</sub> emissions will reduce the regulatory burden on affected facilities by eliminating biogenic CO<sub>2</sub> emissions when

determining whether a stationary source meets the PSD and Title V applicability thresholds, including those for the application of BACT. Under G.S. 150B-19.3(a), an agency may not adopt a more restrictive requirement than those imposed by federal rule. If DAQ does not adopt the federal deferral period, its requirement would be more stringent than EPA's requirements.

Alternative 2 would amend the CFR reference date to July 20, 2011 and it includes any subsequent revisions. Alternative 2 may be warranted in this case because of that "fixed CFR reference date". The federal rule change defers biogenic CO<sub>2</sub> emissions from PSD permitting requirement until July 20, 2014. The time period of this deferral may be shortened if EPA finishes its science and technical review or possibly lengthened if EPA requires additional time to complete its study. The APA rulemaking process makes it difficult for an agency to quickly amend its rules. Generally, DAQ avoids automatic updates (adoption by reference) that may have unintended consequences on affected sources or permitting authorities in North Carolina until it has time to determine the effects of the federal rule change. For this reason, Alternative 2 was not the favored rule change.

## Appendix A

1 15A NCAC 02D .0544 is proposed for amendment as follows:  
2

3 **15A NCAC 02D .0544 PREVENTION OF SIGNIFICANT DETERIORATION REQUIREMENTS FOR**  
4 **GREENHOUSE GASES**

5 (a) The purpose of this Rule is to implement a program for the prevention of significant deterioration of air quality  
6 for greenhouse gases as required by 40 CFR 51.166. For purposes of greenhouse gases, the provisions of this Rule  
7 shall apply rather than the provisions of Rule .0530 of this Section. For all other regulated NSR pollutants, the  
8 provisions of Rule .0530 of this Section apply.

9 (b) For the purposes of this Rule, the definitions contained in 40 CFR 51.166(b) and 40 CFR 51.301 shall apply  
10 except the definition of "baseline actual emissions." "Baseline actual emissions" means the rate of emissions, in  
11 tons per year, of a regulated new source review (NSR) pollutant, as determined in accordance with Subparagraphs  
12 (1) through (3) of this Paragraph:

13 (1) For an existing emissions unit, baseline actual emissions means the average rate, in tons per year,  
14 at which the emissions unit actually emitted the pollutant during any consecutive 24-month period  
15 selected by the owner or operator within the 5-year period immediately preceding the date that a  
16 complete permit application is received by the Division for a permit required under this Rule. The  
17 Director shall allow a different time period, not to exceed 10 years immediately preceding the date  
18 that a complete permit application is received by the Division, if the owner or operator  
19 demonstrates that it is more representative of normal source operation. For the purpose of  
20 determining baseline actual emissions, the following shall apply:

21 (A) The average rate shall include fugitive emissions to the extent quantifiable, and emissions  
22 associated with startups, shutdowns, and malfunctions;

23 (B) The average rate shall be adjusted downward to exclude any non-compliant emissions  
24 that occurred while the source was operating above any emission limitation that was  
25 legally enforceable during the consecutive 24-month period;

26 (C) For an existing emission unit (other than an electric utility steam generating unit), the  
27 average rate shall be adjusted downward to exclude any emissions that would have  
28 exceeded an emission limitation with which the major stationary source must currently  
29 comply. However, if the State has taken credit in an attainment demonstration or  
30 maintenance plan consistent with the requirements of 40 CFR 51.165(a)(3)(ii)(G) for an  
31 emission limitation that is part of a maximum achievable control technology standard that  
32 the Administrator proposed or promulgated under part 63 of the Code of Federal  
33 Regulations, the baseline actual emissions shall be adjusted to account for such emission  
34 reductions;

35 (D) For an electric utility steam generating unit, the average rate shall be adjusted downward  
36 to reflect any emissions reductions under G.S. 143-215.107D and for which cost recovery  
37 is sought pursuant to G.S. 62-133.6;

38 (E) For a regulated NSR pollutant, when a project involves multiple emissions units, only  
39 one consecutive 24-month period shall be used to determine the baseline actual emissions  
40 for all the emissions units being changed. A different consecutive 24-month period for  
41 each regulated NSR pollutant can be used for each regulated NSR pollutant; and

42 (F) The average rate shall not be based on any consecutive 24-month period for which there  
43 is inadequate information for determining annual emissions, in tons per year, and for  
44 adjusting this amount if required by Parts (B) and (C) of this Subparagraph;

45 (2) For a new emissions unit, the baseline actual emissions for purposes of determining the emissions  
46 increase that will result from the initial construction and operation of such unit shall equal zero;  
47 and thereafter, for all other purposes, shall equal the unit's potential to emit; and

48 (3) For a plantwide applicability limit (PAL) for a stationary source, the baseline actual emissions  
49 shall be calculated for existing emissions units in accordance with the procedures contained in  
50 Subparagraph (1) of this Paragraph and for a new emissions unit in accordance with the  
51 procedures contained in Subparagraph (2) of this Paragraph.

52 (c) In the definition of "net emissions increase," the reasonable period specified in 40 CFR 51.166(b)(3)(ii) shall be  
53 seven years.

54 (d) The limitation specified in 40 CFR 51.166(b)(15)(ii) shall not apply.

55 (e) Major stationary sources and major modifications shall comply with the requirements contained in 40 CFR  
56 51.166(i) and (a)(7) and by extension in 40 CFR 51.166(j) through (o) and (w). The transition provisions allowed by

## Appendix A

1 40 CFR 52.21 (i)(11)(i) and (ii) and (m)(1)(vii) and (viii) are hereby adopted under this Rule. The minimum  
2 requirements described in the portions of 40 CFR 51.166 referenced in this Paragraph are hereby adopted as the  
3 requirements to be used under this Rule, except as otherwise provided in this Rule. Wherever the language of the  
4 portions of 40 CFR 51.166 referenced in this Paragraph speaks of the "plan," the requirements described therein  
5 shall apply to the source to which they pertain, except as otherwise provided in this Rule. Whenever the portions of  
6 40 CFR 51.166 referenced in this Paragraph provide that the State plan may exempt or not apply certain  
7 requirements in certain circumstances, those exemptions and provisions of nonapplicability are also hereby adopted  
8 under this Rule. However, this provision shall not be interpreted so as to limit information that may be requested  
9 from the owner or operator by the Director as specified in 40 CFR 51.166(n)(2).

10 (f) 40 CFR 51.166(w)(10)(iv)(a) is changed to read: "If the emissions level calculated in accordance with Paragraph  
11 (w)(6) of this Section is equal to or greater than 80 percent of the PAL [plant wide applicability limit] level, the  
12 Director shall renew the PAL at the same level." 40 CFR 51.166(w)(10)(iv)(b) is not incorporated by reference.

13 (g) 15A NCAC 02Q .0102 and .0302 are not applicable to any source to which this Rule applies. The owner or  
14 operator of the sources to which this Rule applies shall apply for and receive a permit as required in 15A NCAC  
15 02Q .0300 or .0500.

16 (h) When a particular source or modification becomes a major stationary source or major modification solely by  
17 virtue of a relaxation in any enforceable limitation which was established after August 7, 1980, on the capacity of  
18 the source or modification to emit a pollutant, such as a restriction on hours of operation, then the provisions of this  
19 Rule shall apply to the source or modification as though construction had not yet begun on the source or  
20 modification.

21 (i) The provisions of 40 CFR 52.21(r)(2) regarding the period of validity of approval to construct are incorporated  
22 by reference except that the term "Administrator" is replaced with "Director".

23 (j) Permits may be issued based on innovative control technology as set forth in 40 CFR 51.166(s)(1) if the  
24 requirements of 40 CFR 51.166(s)(2) have been met, subject to the condition of 40 CFR 51.166(s)(3), and with the  
25 allowance set forth in 40 CFR 51.166(s)(4).

26 (k) A permit application subject to this Rule shall be processed in accordance with the procedures and requirements  
27 of 40 CFR 51.166(q). Within 30 days of receipt of the application, applicants shall be notified if the application is  
28 complete as to initial information submitted. Commencement of construction before full prevention of significant  
29 deterioration approval is obtained constitutes a violation of this Rule.

30 (l) Approval of an application with regard to the requirements of this Rule shall not relieve the owner or operator of  
31 the responsibility to comply fully with applicable provisions of other rules of this Subchapter or Subchapter 02Q of  
32 this Title and any other requirements under local, state, or federal law.

33 (m) If the owner or operator of a source is using projected actual emissions to avoid applicability of prevention of  
34 significant deterioration requirements, the owner or operator shall notify the Director of the modification before  
35 beginning actual construction. The notification shall include:

- 36 (1) a description of the project;
- 37 (2) identification of sources whose emissions could be affected by the project;
- 38 (3) the calculated projected actual emissions and an explanation of how the projected actual emissions  
39 were calculated, including identification of emissions excluded by 40 CFR 51.166(b)(40)(ii)(c);
- 40 (4) the calculated baseline actual emissions and an explanation of how the baseline actual emissions  
41 were calculated; and
- 42 (5) any netting calculations if applicable.

43 If upon reviewing the notification, the Director finds that the project will cause a prevention of significant  
44 deterioration evaluation, then the Director shall notify the owner or operator of his findings. The owner or operator  
45 shall not make the modification until it has received a permit issued pursuant to this Rule. If a permit revision is not  
46 required pursuant to this Rule, the owner or operator shall maintain records of annual emissions in tons per year, on  
47 a calendar year basis related to the modifications for 10 years following resumption of regular operations after the  
48 change if the project involves increasing the emissions unit's design capacity or its potential to emit the regulated  
49 NSR pollutant; otherwise these records shall be maintained for five years following resumption of regular operations  
50 after the change. The owner or operator shall submit a report to the Director within 60 days after the end of each  
51 year during which these records must be generated. The report shall contain the items listed in 40 CFR  
52 51.166(r)(6)(v)(a) through (c). The owner or operator shall make the information documented and maintained under  
53 this Paragraph available to the Director or the general public pursuant to the requirements in 40 CFR  
54 70.4(b)(3)(viii).

55 (n) The references to the Code of Federal Regulations (CFR) in this Rule are incorporated by reference unless a  
56 specific reference states otherwise. The version of the CFR incorporated in this Rule is that published in the Federal

## Appendix A

1 ~~Register June 3, 2010 and effective August 2, 2010~~ as of July 20, 2011 and does not include any subsequent  
2 amendments or editions to the referenced material. This Rule is applicable as of its effective date in accordance with  
3 40 CFR 51.166(b)(48) and (b)(49)(iv) and (v).  
4

5 *History Note:* Authority G.S. 143-215.3(a)(1); 143-215.107(a)(3); 143-215.107(a)(5); 143-215.107(a)(7); 143-  
6 215.108(b); 150B-21.6;  
7 *Eff. January 28, 2011 pursuant to E.O. 81, Beverly E. Perdue;*  
8 *Pursuant to G.S. 150B-21.3(c), a bill was not ratified by the General Assembly to disapprove this*  
9 *rule.*  
10 *Amended Eff.*

## Appendix B

### ESP Cost Estimate

#### Assumptions:

125 MMBTU/hr boiler

Capital cost: \$7560 to \$15,120 per MMBTU/hr (2002)

Annual O&M cost: \$1960 to \$15,120 per MMBTU/hr (2002)

Source: *Applicability and Feasibility of NO<sub>x</sub>, SO<sub>2</sub>, and PM Emissions Control Technologies for Industrial, Commercial, and Institutional (ICI) Boilers*, Northeast States for Coordinated Air Use Management (NESCAUM), 2008, page 4-13

#### Calculations:

For the purposes of this calculation, assume the costs fall at the mid-point of the range of costs.

Mid-range capital cost: \$7560 MMBTU/hr

Mid-range annual O&M cost: \$6580 MMBTU/hr

The online calculator at <http://www.usinflationcalculator.com/> is used to adjust to 2011 dollars.

Adjusting capital cost to 2011: \$9520 per MMBTU/hr

Adjusting annual O&M cost to 2011: \$8286 per MMBTU/hr

Capital cost = (\$9520/MMBTU/hr) x (125 MMBTU/hr) = \$1,190,000

Annual O&M cost = (\$8286/MMBTU/hr) x (125 MMBTU/hr) = \$1,035,750

## Appendix C

### SNCR Cost Estimate

#### Assumptions:

125 MMBTU/hr boiler

Capital cost: \$923,000 for 88.5 MMBTU/hr boiler (CUECost, 2006)

\$1,025,000 for 176.9 MMBTU/hr boiler (CUECost, 2006)

Annual cost: \$289,000 for 88.5 MMBTU/hr boiler (CUECost, 2006)

\$324,000 for for 176.9 MMBTU/hr boiler (CUECost, 2006)

Source: *Applicability and Feasibility of NO<sub>x</sub>, SO<sub>2</sub>, and PM Emissions Control Technologies for Industrial, Commercial, and Institutional (ICI) Boilers*, Northeast States for Coordinated Air Use Management (NESCAUM), 2008, page 5-7

#### Calculations:

##### Linear interpolation:

88.5 MMBTU/hr	\$923,000	\$289,000
125 MMBTU/hr	x	y
176.9 MMBTU/hr	\$1,025,000	\$324,000

Capital cost: \$965,000

Annual cost: \$303,000

The online calculator at <http://www.usinflationcalculator.com/> is used to adjust to 2011 dollars.

Adjusting capital cost to 2011: \$1,084,000

Adjusting annual cost to 2011: \$341,000

## Appendix D

Below are the control equipment savings for control equipment installed during the three year deferral period. The capital costs are annualized over a 20 year period. The nominal cost/saving column include the annual operation and maintenance costs. One stationary source with an ESP and SNCR is constructed during years 2012, 2013 and 2014.

Year	Nominal Cost/Savings	NPV Factor	Discounted
2012	\$1,643,600	0.93458	\$1,536,100
2013	\$3,319,600	0.87344	\$2,899,500
2014	\$4,987,900	0.81630	\$4,071,600
2015	\$4,907,900	0.76290	\$3,744,200
2016	\$4,907,900	0.71299	\$3,499,300
2017	\$4,907,900	0.66634	\$3,270,300
2018	\$4,907,900	0.62275	\$3,056,400
2019	\$4,907,900	0.58201	\$2,856,400
2020	\$4,907,900	0.54393	\$2,669,600
2021	\$4,907,900	0.50835	\$2,494,900
2022	\$4,907,900	0.47509	\$2,331,700
2023	\$4,907,900	0.44401	\$2,179,200
2024	\$4,907,900	0.41496	\$2,036,600
2025	\$4,907,900	0.38782	\$1,903,400
2026	\$4,907,900	0.36245	\$1,778,800
2027	\$4,907,900	0.33873	\$1,662,500
2028	\$4,907,900	0.31657	\$1,553,700
2029	\$4,907,900	0.29586	\$1,452,100
2030	\$4,907,900	0.27651	\$1,357,100
2031	\$4,907,900	0.25842	\$1,268,300
2032	\$3,304,300	0.24151	\$798,000
2033	\$1,668,300	0.22571	\$376,600
<b>Total Cost</b>	<b>\$98,358,000</b>	<b>NPV</b>	<b>\$48,796,300</b>

## Appendix E

### Sources of Information

1. 76 FR 43490, *Deferral for CO<sub>2</sub> Emissions From Bioenergy and Other Biogenic Sources Under the Prevention of Significant Deterioration (PSD) and Title V Programs*, July 20, 2011.
2. Session Law 2011-398, Senate Bill 781
3. Session Law 2007-397, Senate Bill 3
4. AP-42, Compilation of Air Pollutant Emission Factors, Section 1.6, Wood Residue Combustion In Boilers, <http://www.epa.gov/ttnchie1/ap42/ch01/final/c01s06.pdf>
5. *Applicability and Feasibility of NO<sub>x</sub>, SO<sub>2</sub>, and PM Emissions Control Technologies for Industrial, Commercial, and Institutional (ICI) Boilers*, Northeast States for Coordinated Air Use Management (NESCAUM)
6. CPI calculator, <http://www.usinflationcalculator.com/>
7. Air Pollution Control Technology Fact Sheet: Wet Electrostatic Precipitator (ESP)- Wire-Plate Type, EPA-452/F-03-030
8. PSD and Title V Permitting Guidance For Greenhouse Gases, EPA, March 2011, <http://www.epa.gov/nsr/ghgdocs/ghgpermittingguidance.pdf>
9. Guidance For Determining Best Available Control Technology For Reducing Carbon Dioxide Emissions From Bioenergy Production, EPA, March 2011, <http://www.epa.gov/nsr/ghgdocs/bioenergyguidance.pdf>
10. North Carolina Utilities Commission, Renewable Energy and Energy Efficiency Portfolio Standard (REPS), <http://www.ncuc.commerce.state.nc.us/reps/reps.htm>