UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
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JAN 3 1 2007

Ms. Sheila Holman
Division of Air Quality
North Carolina Department of Environment
and Natural Resources
1641 Mail Service Center
Raleigh, NC 27699-1641

Dear Ms. Holman:

Thank you for the opportunity to review the proposed Best Available Retrofit Technology (BART) technology evaluation for the Blue Ridge Paper – Canton Mill (Blue Ridge) dated November 16, 2006. With the significant visibility impacts modeled for this facility, we believe that it is important that thorough consideration be given to all the various options for installing available retrofit control technologies at this facility.

Enclosed are our comments on the Blue Ridge document. Enclosure 1 describes our comments on the control and cost analyses. Enclosure 2 details our comments on the modeling analysis. Enclosure 3 provides some clarifications to certain statements addressed in the Blue Ridge document.

We appreciate your transmittal of this package for our consideration. If you have any further questions regarding this letter, please contact Michele Notarianni of the Region 4 staff at (404) 562-9031.

Sincerely,

Brenda C Johnson for

Kay T. Prince
Chief
Air Planning Branch

Enclosures

Enclosure 1: Control and Cost Analyses

1. Pollution Prevention (P2) Options:
   - When identifying all available retrofit control technologies, the "Guidelines for BART Determinations Under the Regional Haze Rule" (BART Guidelines) clarify that consideration should be given not only to add-on controls but also improvement in the performance of existing controls and P2. The analysis does not discuss the facility's evaluation of any P2 options for the five BART-eligible units, with the exception of installation of quaternary air on each recovery furnace (RF).

2. Process Changes to Reduce Formation of Emissions from RFs:
   - Although Table 4-1 indicates that several kraft pulp and paper mills utilize good combustion control practices to minimize sulfur dioxide (SO2) emissions from their RFs, there is no discussion of what options may exist for making process changes, such as improved furnace design and operation, to limit the formation of SO2 in each RF. An effective approach to minimizing the formation of SO2 in the RFs would be to practice high dry solids firing combined with a modern air system to promote efficient mixing. Examples of process changes which have been demonstrated are identified in section 5.3.1 of "Assessment of Control Options for BART Eligible Sources," prepared by NESCAUM, for the Mid-Atlantic/Northeast Visibility Union Regional Planning Organization: http://www.nescaum.org/documents/bart-resource-guide/. These examples include optimizing liquor and combustion air properties and firing patterns to maintain uniform temperatures in the lower part of the RF in order to reduce SO2 emissions, and reducing liquor sulfidity to reduce SO2 emissions from the RFs.

3. Control Option Alternatives:
   - The document states that installation of add-on SO2 controls on the RFs results in lower stack heights and a higher modeled delta deciview (dv) than current conditions due to decreased dispersion associated with scrubber exhaust characteristics. (Executive Summary) We believe this may be due to the effects of cooling the exhaust stream. The analysis does not discuss whether good engineering practice (GEP) was considered in the development of the new stack height for this SO2 control.

4. Lost Production Costs:
   - There is no indication of whether the facility considered ways to mitigate costs attributed to "Lost Production" listed in Table 4-2 (pulp purchase of $5,390,000 plus $975,843 for lost power generation per RF) and Table 4-4 ($11,550,000 for pulp purchase for 30 days downtime per RF). For example, the effects on costs in Tables 4-2 and 4-4 if potential controls were installed during an already planned plant shutdown for maintenance, or when one of the RFs is off-line, should be addressed. Also, it is unclear why one month is

needed for each RF retrofit to install a quaternary air system, which results in significant lost production costs of purchased pulp in Table 4-4.

- When major work is done at a pulp and paper mill, the mill can often increase production significantly prior to and following the shut down to offset any lost production. It is not clear whether the facility considered this possibility and its effects on the lost production costs.

- To minimize lost power generation costs listed in Table 4-2, it is not clear whether the facility considered achieving some additional power generation from its power boilers during the retrofit period to offset the losses. The mill has five power boilers and generally a pulp and paper mill with multiple power boilers does not operate all the boilers at maximum capacity at the same time.

5. Contingency Costs in Table 4-2:
   - In Table 4-2, the contingency factor of 15 percent should be justified. It is our understanding that a factor no higher than 10 percent would be considered acceptable for wet scrubber installation on a RF at a pulp and paper mill, and would be consistent with standard industry practice. Also, since this is a "turnkey" installation, it is unclear why such a high contingency factor is projected. Since no distinct retrofit factor is identified, it is possible that the facility may have merged the retrofit factor with the contingency factor, resulting in the 15 percent contingency factor used in Table 4-2. The *EPA Air Pollution Control Cost Manual* (Cost Manual), EPA/452/B-02-001, January 2002, distinguishes between the contingency and retrofit factors and recommends keeping them separate as follows. A retrofit factor should be reserved for those items directly related to the demolition, fabrication, and installation of the control system, and should not be double-counted again as part of a contingency factor. In this case, the additional ductwork, new stack, fan, and switch gear should be assigned to the retrofit factor since they are a necessary part of installing this control on an existing unit. A contingency factor should be applied to only those items that could incur a reasonable but unanticipated cost increase (i.e., outside of the contractor's control), and are not directly related to the retrofit factor elements just described. (See pages 2-28 to 2-30 in subsection 2.5.4.2 of Chapter 2, "Cost Estimation: Concepts and Methodology," (dated January 2002) in Section 1 of the Cost Manual.)

   - The contingency factor calculations in Table 4-2 are not based on the correct line item costs and need to be redone. The factor was applied to the scrubber "installation cost," additional ductwork, new stack, fan, and switch gear, and lost power generation. This is incorrect for two reasons. First, the "installation cost" listed for the wet scrubber appears to also include the cost of the equipment. The contingency factor should be applied to the purchased equipment costs. However, installation costs are not to be included in contingency factor calculations. This should be corrected. The second reason the calculations are incorrectly applied is that the "14 days lost power generation" cost of $975,843 should not be included in the "contingency" cost calculations. The Cost Manual describes contingencies as a category that covers unforeseen costs that may arise, such as delays encountered in start-up and increases in field labor costs. (See page 2-5, of Chapter 2, "Cost Estimation: Concepts and Methodology," (dated January 2002) in Section 1 of the Cost Manual.) The lost power generation cost in Table 4-2 refers to power that cannot be produced during the 14-day retrofit period for each RF, which is a planned event, not an unforeseen cost. We note that lost production in terms of pulp purchase correctly does not appear to be included in the contingency cost calculations.

6. RF Wet Scrubber Cost Considerations:
   - Table 4-2 describes costs with wet scrubber installation on one of the RFs. Given the relatively high nature of costs for the modifications to existing ductwork and installation of a new stack, fan, and switch gear (totaling to $11,945,605), consideration should be given to other, more cost effective options. For example, the feasibility and cost effectiveness of moving the road or other buildings to allow closer location of the wet scrubbers and avoid extensive ductwork could be considered.

   - It would be helpful to have more information on the design of the wet scrubber analyzed. We are aware of at least one kraft pulp mill (i.e., the James River Camas Mill in Washington State) that has installed a cross-flow, packed bed scrubber following the RF electrostatic precipitator (ESP) as part of an energy recovery system. At that mill, caustic (sodium hydroxide or NaOH) is added to the scrubber liquid and the mill has claimed SO2 reductions as a result. It is not clear whether the facility has considered installing a similar system.

   - There is no discussion indicating whether the facility considered use of caustic as the scrubbing reagent instead of limestone. Kraft pulp mills have a relatively inexpensive supply of caustic available since it is used in the cooking liquor, which can make caustic more economical than limestone. Also, the use of caustic eliminates the material handling and space requirements associated with lime or limestone systems. Lime and limestone processes produce a sludge which requires dewatering and landfilling. Wet caustic processes produce a neutral pH solution which can be pumped to the existing mill wastewater treatment system for disposal. Thus, the estimated annual costs would be greatly reduced by using a caustic scrubber instead.

   - We suggest that the State closely evaluate the electricity costs for the RF scrubber. For example, the basis for the 746 kilowatt-hours used in Table 4-2 should be discussed. Other considerations should include the assumed pressure drop of the scrubber, and what portion of the electricity costs are associated with the use of limestone rather than caustic (e.g., limestone preparation and slurry mix system, gypsum filter system, etc.).

7. RF Quaternary Air System Cost Considerations:
   - The capital cost estimate of $9 million (includes quaternary air and new liquor guns for both RFs) cited on page 4-7 and detailed per RF in Table 4-4 seems extremely high. In 2001, the American Forest and Paper Association (AF&PA) commissioned BE&K Engineering to develop emissions control cost estimates for a variety of scenarios at pulp and paper mills, including the addition of a quaternary air system for reducing NO_X emissions from a RF. The model RF was larger than the RFs at Blue Ridge. Based on the AF&PA analysis, the capital cost for the quaternary air system was $624,000 per furnace. Disregarding differences in size and base years, the total cost would be approximately $1.2 million for two RFs, which is considerably less than the $9 million quoted on page 4-7. It would be helpful if Blue Ridge could provide an estimate just for the addition of the quaternary air system, omitting the costs of the new liquor guns, to provide for a better comparison of costs.

8. Supporting Documentation for Cost Analyses:
   - To aid review of the document, we suggest that the vendor quotes, data estimates, and relevant portions of the presentation identified in the cost references [1], [6], [7] in Tables 4-2 be included in this document. Also, it is unclear where the e-mail described in Reference 1 of Table 4-2 is located in the documentation so we were unable to review this reference.

   - Reference 7 of Table 4-2 indicates that costs for wet scrubber installation are based on a vendor quote for an "original recovery furnace," which does not appear to be either of the RFs subject to this BART analysis. Although the facility adapted the cost estimate to the size of the No. 10 RF, we question why the facility did not seek a vendor quote for wet scrubber installation specific to the RFs subject to this BART analysis (i.e., No. 10 and No. 11). We recommend that a copy of the quote be included in the documentation to provide information such as what year the quote for the original RF was received.

   - Reference 7 of Table 4-2 also states that, "Cost was escalated using EPA's 0.6 rule…" The "0.6 rule" referenced is to be used for a rough estimate calculation of costs only and should not be relied upon for this BART analysis to estimate installation costs of the wet scrubber. Also, we are not aware that the "0.6 rule" is part of an EPA document. However, the book, *Plant Design and Economics for Chemical Engineers* by Peter and Timmerhaus (Fifth Edition) does discuss this "rule of thumb" and calls it the "six-tenths-factor" rule. (Peters, Max S., Timmerhaus, Klaus and West, Ronald. *Plant Design and Economics for Chemical Engineers*, Fifth Edition, McGraw-Hill, 2002, p. 169.)

9. Capital Recovery Factor (CRF) Calculations:
   - The facility should justify its capital recovery cost assumptions of an equipment life of 10 years with an interest rate of 15 percent listed under "Indirect Annual Costs" in Tables 4-2, 4-4, and 4-6. For capital recovery costs on wet scrubbers for acid gas, the EPA Cost Manual and EPA's *Technical Support Document: Chemical Recovery Combustion Sources at Kraft and Soda Pulp Mills* (EPA-453/R-96-012, October 1996) presume a CRF based on a 15-year control equipment life and an interest rate of seven percent. Note that changing the assumptions about equipment life and interest rates to this presumptive value significantly decreases the annualized cost estimates.

Enclosure 2: Modeling Analysis

1. Table 5-1 indicates a 31.25-meter decrease in the stack heights for the No. 10 and 11 RFs' stack for Scenarios 2 and 5. It is unclear why a decrease in stack height is required or if this is a typographical error. Also, the analysis does not discuss whether GEP was considered in the development of the new stack height for this SO2 control. According to Table 5-1, the modeled location of the stacks has not changed from the current location. Table 5-4 indicates that the maximum visibility impact has shifted slightly to another geographical location in the Shining Rock and Great Smoky Mountain Class I areas. With decreased SO2 emissions from installation of the scrubber, the expected result is that the visibility impact should also decrease. The analysis should provide more discussion on how and where the visibility increases occurred in the Class I areas in addition to providing the maximum delta visibility impact and explain why a decrease in stack heights is necessary.

2. The NOx emissions used in the baseline (i.e., Scenario 1) modeling was based on a February 1999 stack test. There is no discussion of why data from this year was used to the exclusion of data from other years. Such discussion should include such items as stack test data availability from other years and how this ensures that the maximum 24-hr emission rate for the 2001-2003 period was developed. We encourage the State to review these data to ensure the assumptions supporting the emission rates are correct and the supporting documentation is submitted.

3. A vendor guarantee was used to set the emission rate for the black liquor oxidation system (BLOX) regenerative thermal oxidizer (RTO) provided in Table 5-2 (reference 3). We suggest that the referenced guarantee be included in the document and recommend that the State carefully evaluate this rate in conjunction with the specified operating parameters to ensure appropriate values are being used in the BART modeling.

4. It may appear that the visibility improvements from the various control scenarios assessed do not indicate a desired level of benefit at two of the five Class I areas, but the other three Class I areas being affected by the facility could also be considered in the determination.

5. Addition of a wet scrubber should also reduce fine particulate matter (PM2.5), including condensable PM, which is not controlled by the ESP. The impact of additional PM control achieved by the scrubber (for scenario 2) should be considered. The modeling results presented indicate fine PM has a limited impact on the modeled extinction (i.e., 9.51 percent and 18.6 percent of the modeled extinction for the baseline and Scenario 2 conditions, respectively, for Shining Rock). Also, the PM emissions are based on the most recent compliance test. These data likely represent the best ESP operating conditions, which may not be representative of ongoing emissions.

6. The State might consider giving a second look at the model inputs for PM emissions and the resulting visibility impacts for baseline conditions and scenarios No 2 and No 5 for two reasons. One reason to reconsider the PM inputs into the modeling is that the PM emissions are based on the most recent compliance test (as noted above in item number 5). These data likely represent the best ESP operating conditions, which may not be representative of ongoing emissions.

   Another reason to possibly reconsider the PM data and modeled impacts is that there are ongoing discussions taking place between EPA and the pulp and paper industry (AF&PA/NCASI) related to measurement of PM2.5 emissions. The current use of EPA Method 202 by the industry appears to be underreporting PM2.5 emissions, specifically condensable PM2.5. In some cases, the condensable PM is analyzed to determine the elemental composition and it is assumed that all of the sulfates found in the condensable PM are "artifacts" resulting from conversion of SO2 to sulfates (i.e., to SO3 and then to H2SO4). The reported condensable PM is "corrected" by subtracting the sulfate fraction from the total condensable PM emissions. This "correction" results in biasing the measured emissions low. It is not clear whether this type correction was done for the reported emissions used in this modeling analysis. The State may want to clarify how EPA Method 202 was used in the measurement of PM2.5 emissions. For more information on this method, go to: http://www.epa.gov/ttn/emc/methods/method202.html .)

7. **Modeling performed at 1-km grid resolution -** Page 2-4 of the November 16, 2006 submission to NC DAQ notes that comments received from NC DAQ on March 7, 2006, related to the modeling protocol specific to the Blue Ridge Canton Mill states that "the 12-km screening approach should not be used. At a minimum, the 4-km CALMET data should be used and a refinement to 1-km may be necessary." This comment matches page 48 of the VISTAS Protocol document*, which says that source-receptor distances less than about 50 km may require grid resolution less than 1-km if complex terrain effects are likely to be important. More refined digital elevation model (DEM) data are also required. Complex terrain effects should be important in western North Carolina both within the Class 1 areas of concern and between the source and each of these areas. Although the BART control technology report omits the 12-km screening, it appears to report on only a 4-km grid resolution instead of the finer resolution recommended. It is not clear whether consideration was given to revising the modeling using a 1-km CALMET grid.

8. **Results tables specified in the VISTAS Protocol -** The VISTAS Protocol provides standard table formats for presenting modeling results. There should be a table showing number of days and number of receptors with impact greater than

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* Visibility Improvement State and Tribal Association of the Southeast (VISTAS), Protocol for the Application of the CALPUFF Model for Analyses of Best Available Retrofit Technology (BART), December 22, 2005 (Revision 3.2 – 8/31/06).

0.5 dv for each Class 1 area, and for each year, number of days and number of receptors with impact greater than 1.0 dv for each Class 1 area for the entire 3-yr period, and the maximum 24-hr impact during the 3-yr period. These tables were provided in the October 2006 BART Exemption Modeling Report, but have not been included in the November 16, 2006, document. It is suggested that similar tables be included in the determination report. Also, documentation that addresses the development of the baseline modeling should be included in the determination report. This may be in the BART exemption modeling report. It is suggested that the complete October 2006 BART Exemption Modeling Report be included as an appendix to the determination report.

9. **Deciview Thresholds** - The document states in several places that "...the change in modeled visibility impact...is less than the 1 deciview threshold of human perception for changes in visibility." This statement implies that the controls are not considered to make enough of an improvement in visibility at the Class I areas identified in the report. We note, however, that there is no bright line for evaluating in the BART determination analysis the degree of visibility improvement that is considered significant enough to warrant BART controls. Rather, a State has flexibility in setting absolute thresholds and determining the weight and significance to be assigned to each BART factor. (See 70 FR 39170, 1st col., July 6, 2005.) Also, this statement does not recognize that a source may be *contributing* to visibility impairment at a Class I area.

Enclosure 3: Text Clarifications

Below are clarifications we wish to note on certain statements in the text. (The location of the text in the document is identified in parentheses.)

1. BACT Cost Effectiveness Comparisons (Section 1.2, P.1-1; cover letter, P.1)
   The document makes the following statement: "As a comparison, costs from $3,000 to $5,000 per ton of emissions reduction are generally considered cost prohibitive for BACT evaluations." The Agency has not established cost effectiveness values considered cost prohibitive in regulation or policy. Also, these BACT cost effectiveness numbers may not be directly applicable for use in the BART cost analysis as BACT costs can apply to a new source adding on controls, whereas BART costs for retrofit technology may need to be weighed differently. The State will identify what costs are reasonable or not. Where data are available, we recommend use of a comparative approach for costs, i.e., compare cost effectiveness numbers to a similar facility which operates with controls under similar conditions. Another way of stating this is as follows.

   > *If comparable emissions units are operating with controls, the owner of the BART-affected unit should show why control costs are prohibitive for the BART-affected unit, even though they are acceptable for similar controlled units in operation.*

2. BART-Eligibility Descriptions (Section 2.2, P.2-2; Section 3.1, P. 3.1)
   Potential to Emit (PTE) Thresholds: The PTE threshold provided for BART – eligible sources should be corrected to read, "...the potential to emit ~~more than~~ 250 tons per year or more..." (See 40 CFR 51.301, "Definitions," *Existing stationary facility.*)

3. Due date for Regional Haze SIPs (Section 2.2, P. 2-3)
   The document identifies a due date for Regional Haze SIPs of January 2008. To clarify, the due date for Regional Haze SIPs specified in the Regional Haze regulations at 40 CFR 51.308 (b) is: "...no later than December 17, 2007."

4. Line-of-Sight (LOS)
   (a) The document refers to a proposed LOS approach in several places and presents data for comparison on page 2-5. We recommend excluding LOS documentation since, as the report indicates, this specific approach is not appropriate for BART modeling purposes.

   (b) The document provides selected definitions from 40 CFR 51. We wish to clarify that the definitions provided in Section 2.1 for *Line-of-Sight (LOS)* and *Just Noticeable Change* are not from the Definitions section of the Regional Haze regulations (40 CFR 51.301, "Definitions").

5. Permit Changes (Section 4.2, P.4-4)

The document asserts that the electrostatic precipitators (ESPs) on each RF exceed the Maximum Achievable Control Technology (MACT) standard for particulate matter (PM), and that this level of control is already required in the facility's Title V operating permit. The BART Guidelines say if the most stringent control available is adopted, it must be made federally enforceable for purposes of BART. Thus, the SIP and potentially the facility's permit must be modified to include a statement that these controls and operating conditions on the two recovery furnaces also serve to satisfy BART for PM.

6. References (Tables 4-2, 4-4, 4-6)
The EPA Cost Manual references for Tables 4-2, 4-4, and 4-6 are confusing as written, which made it difficult to find the appropriate citations. Chapter 1, December 1995, is cited in the EPA Cost Manual in these cost references. Since there are presently nine chapters labeled "Chapter 1" in the Cost Manual dated January 2002, we suggest that these references be clarified to include the relevant section and chapter title. This will enable reviewers to find the referenced portions of the document. In this case, the relevant items we suggest to include in these Cost Manual references are italicized as follows: "*EPA Air Pollution* Control Cost Control Manual, sixth edition *(January 2002)*, EPA 452-02-001, *Section 5.2*, Chapter 1, *"Wet Scrubbers for Acid Gas,"* December 1995." (The current EPA Cost Manual is available at: http://www.epa.gov/ttncatc1/products.html#cccinfo.)

7. Table 4-1 – "Summary of RBLC Database for SO2 Control Technologies"
It appears that the following four "RACT/BACT/LAER (RBLC)" Clearinghouse entries of facilities with SO2 controls on their RFs were either inadvertently omitted from Table 4-1 or slightly different search criteria may have been used. We used the following search criteria: default time span of 10 years back, Process Type: 30.211 "Kraft Recovery Furnaces/Boilers," Pollutant: "SOx". For completeness, we suggest including these entries if they were omitted in error. The following control descriptions are included here for your convenience:

   - LA-0201, Weyerhaeuser Company, Red River Mill facility (Proper Boiler Design and Operation);
   - LA-0207, International Paper Co, Mansfield Mill (Proper Design, Good Combustion Practices, Firing Low Sulfur Fuel, and a 10% Annual Capacity Factor for Fossil Fuels);
   - MS-0078, Georgia Pacific Corporation, Monticello Mill (Combustion Control and Furnace Design); and
   - NC-0108, International Paper, Roanoke Rapids Mill (Furnace Design and Combustion optimization).

   Based on the RBLC search we performed, it also appears that certain RBLC entries with a "No Controls Feasible" label are not included in Table 4-1. We are unclear as to the reason for this. For completeness, we suggest that the table could either include all or exclude all facilities with a "No Controls Feasible" label.

8. Visibility Impact Thresholds (Section 4.1.5, P. 4-3)
Section 4.1.5 provides a summary of Step 5 of the BART Guidelines. The second paragraph of this section states: "If the net visibility improvement is less than the humanly perceptible change, then there is no need for the facility to implement the control technologies because the resulting visibility impacts would be negligible." The BART Guidelines do not make such an assertion. Rather, the Guidelines provide flexibility to the States with setting thresholds and weighing each of the BART factors. (See 70 FR 39170, 1st col., July 6, 2005.) All of the statutory factors should be used in the determination of whether or not BART controls are needed. Visibility improvement based on modeling results is only one of the factors that should be assessed in this decision.

9. 22nd highest values for the two worst-case years (Section 5.8, P. 5-7)
Page 5-7 of the document states that a spreadsheet was used to determine the 22nd highest values for the two worst-case years. The 98th percentile value for an individual year is the 8th highest value, so it is unclear why the report references the 22nd highest value. This appears to be a typographical error.