



IN REPLY REFER TO:

United States Department of the Interior
NATIONAL PARK SERVICE
Air Resources Division
P.O. Box 25287
Denver, CO 80225



N3615 (2350)

September 2, 2011

Bill Baumann, Acting Chief
Bureau of Air
Wisconsin Department of Natural Resources
101 South Webster Street
Madison, Wisconsin 53707-7921

Dear Mr. Bauman:

On July 1, 2011, we received Wisconsin's revised draft Regional Haze State Implementation Plan. The National Park Service, in consultation with the U.S. Fish and Wildlife Service, has reviewed the revised draft. The Department of Natural Resources (DNR) has addressed some of our comments on the previous draft SIP. However, we are concerned that DNR has weakened the BART determination for Georgia Pacific in the revised SIP. Our technical comments are enclosed.

We appreciate the opportunity to work closely with the State of Wisconsin to improve visibility in our Class I areas. For further information regarding our comments, you can contact Don Shepherd of my staff at (303) 969-2075.

Sincerely,

Carol McCoy
Chief, Air Resources Division

Enclosures

cc:

John Summerhays
U.S. EPA Region 5
77 W. Jackson Blvd.
Chicago, IL 60604

Jonathan Loftus
Bureau of Air Management
Wisconsin Department of Natural Resources
101 South Webster Street, Seventh Floor
Madison, WI 53703

Todd Hawes
U.S. EPA OAQPS
Mail Code C539-04
Research Triangle Park, NC 27711

National Park Service Comments
Wisconsin Revised Draft Regional Haze State Implementation Plan
September 2, 2011

The National Park Service, in consultation with the U. S. Fish and Wildlife Service, has reviewed Wisconsin Department of Natural Resources (WDNR)'s revised draft regional haze state implementation plan (SIP) dated July 1, 2011. Our comments below focus on WDNR's analyses of Best Available Retrofit Technology for Georgia Pacific and of reasonable progress in visibility improvement at Northern Class I areas. We also support comments provided to WDNR by the U.S. Forest Service.

Cross State Air Pollution Rule

WDNR is relying on federal rules (initially the Clean Air Interstate Rule (CAIR), now replaced by the Cross State Air Pollution Rule, CSAPR) for reductions of sulfur dioxide (SO₂) and nitrogen oxide (NO_x) emissions from Electric Generating Units (EGU) in the state. The visibility modeling provided by the Midwest Regional Planning Organization (MRPO) used 2018 "on-the-books" projections for EGU controls under CAIR. We commend WDNR for also providing a range of 2018 EGU control assumptions for comparison with the original MRPO modeling results.

BART for EGU Sources

All Wisconsin EGU subject to BART are now subject to CSAPR. WDNR expects that the Environmental Protection Agency (EPA) will determine that SO₂ and NO_x reductions under CSAPR are better than would be accomplished by source-specific BART requirements. We are concerned that while CSAPR may result in greater regional emissions reductions than cumulative source-specific BART requirements, specific Class I areas, such as the Northern Class I areas, may not be as well protected as would be the case under source by source BART. We, like WDNR, are awaiting EPA's analysis.

WDNR is proposing that the existing PM control equipment (electrostatic precipitator or baghouse) and permit limitations are satisfactory for BART. However, as noted in our March 6, 2011 comments to WDNR, the analysis used by WDNR modeled current actual emissions instead of the proposed permit limits, which, in some cases, are more than an order of magnitude greater than the emissions modeled.

The WDNR modeling exercise demonstrates that elimination of the modeled emissions would have no significant visibility benefit. However, WDNR must show that the proposed BART limits for PM₁₀ have no significant impact on visibility to successfully demonstrate that a full five-factor BART analysis is unnecessary. Or, WDNR could propose BART limits that reflect the true capabilities of the existing control technologies.

BART Determination for Georgia Pacific

WDNR determined that Georgia Pacific (GP) in Green Bay is the only industrial source subject to BART in Wisconsin. The National Park Service is disappointed in the revisions made to the GP BART determination. We do not agree with WDNR's reported emissions reductions at GP (7,098 tons/year SO₂ and 2,509 tons/year NO_x) because the changes made to the baseline emissions and control efficiencies appear to lead to paper reductions greater than actual emissions reductions.

We recommend that WDNR return to the fundamental, underlying concepts inherent in the Regional Haze Program--the goal is to reduce visibility impairment in Class I areas by applying reasonable emission reduction methods in an expeditious manner.

WDNR has revised the baseline emissions for GP. The BART-subject boilers at GP are B-26 and B-27. It appears that WDNR has assumed that boilers which have been shut down would be brought back on line, and that coal sulfur content would increase substantially. Because WDNR has provided no real-world evidence to support these assumptions, and because the aim of the BART process is to reduce emissions—not to maximize future potential emission limits—we disagree with this approach. Boilers that have been shut down should not be included in the baseline, nor should higher sulfur coal be postulated for the future case. Both of these approaches are contrary to the strategy of reducing emissions. Finally, all analyses of the amount of emissions reduced and the associated costs should be based upon valid baseline emissions.¹

WDNR has made several incorrect assumptions regarding baseline emissions:

- WDNR has included boilers B24, B25, and B28 in its BART analysis. These boilers are not BART-eligible and cannot be used to mitigate more-stringent BART requirements on boilers B26 and B27 which are BART-eligible.
- Boiler B24 ceased operation in 2004 and could be subject to New Source Review requirements if it were to resume operation. Emissions from boiler B24 cannot be included in this BART analysis.
- Boiler B25 ceased operation in 2008 and could be subject to New Source Review requirements if it were to resume operation. Emissions from boiler B25 cannot be included in this BART analysis.
- WDNR cannot assume that GP would switch to higher-sulfur fuels in the absence of supporting evidence. On the contrary, in its March 2009 BART analysis, GP evaluated switching to **lower-sulfur** fuels as a technically-feasible option. The BART program encourages switching to cleaner fuels, not maximizing future potential emissions.²

Instead, WDNR should assume for baseline estimation purposes that GP will continue to burn its current fuels at its current rate in the boilers it currently uses, unless GP provides strong evidence and commitment to modifying its current method of operation.

¹ If WDNR is to base an emission limit upon an assumption that each boiler will always operate at its historic maximum rate, then it must conduct its five-step BART analysis upon that basis.

² We note that WDNR expressed concern that certain pollution control technologies might increase CO₂ emissions. However, by allowing continued use of petroleum coke, WDNR appears to have ignored GP's statement that "An additional difference between the fuels is the estimated CO₂ emissions. CO₂ Emissions from petroleum coke combustion is approximately 10 to 15% above coal combustion (on a lb/mmBtu basis)."

As we discuss below, WDNR should have instead included GP boilers B24, B25, and B28 in its Reasonable Progress analysis.

Control Effectiveness

We commend WDNR for the breadth of its review of potential control technologies for SO₂ and NO_x, but we remain concerned about how the effectiveness of some of those technologies was estimated.

WDNR improperly lumped all dry-scrubbing technologies together in its proposal of 93% efficiency for SO₂ controls. Instead, WDNR should have focused upon the specific control technology, Turbosorp, it evaluated for GP. Had it done so, the data cited by WDNR for the two facilities and SO₂ concentrations most similar to GP, Greenridge and Deerhaven, clearly show that the Turbosorp scrubber can achieve 0.11 – 0.13 lb SO₂/mmBtu,³ which, in these cases, is equivalent to 95% - 97% control. This should be the basis for a SO₂ control effectiveness estimate at GP. Instead, WDNR is proposing an SO₂ limit that is equivalent to 0.23 – 0.27 lb/mmBtu.⁴ WDNR cites “operating variability” as its reason for downgrading the effectiveness of the scrubber, but its own data show that such “operating variability” was already taken into account in its evaluation of the Greenridge Turbosorp scrubber. Not only has WDNR double-counted this “operating variability” at GP, it has also exaggerated it compared to Greenridge.

WDNR raises a concern that SO₂ BART for GP at a default flue gas concentration of 1.0 lbs/mmBtu will generate a visible plume and that would create concern for overall technical feasibility of applying the Regenerative Selective Catalytic Reduction (RSCR) under these conditions. According to WDNR notes from its conversation with Babcock Power, “the typical conversion of SO₂ to SO₃ over the Selective Catalytic Reduction (SCR) catalyst in the RSCR is well less than 1%,” which is typical of most SCR catalysts. The potential for an SO₃ plume can be essentially eliminated by a return by WDNR to its original more-stringent SO₂ BART determination. This issue can be further mitigated by WDNR addressing SO₂ emissions from the non-BART boilers under its Reasonable Progress requirements.

WDNR also raises concern about the formation of ammonium bisulfates in the RSCR and downstream flue duct system that would increase maintenance and operating costs throughout the system. The potential for deposition of ammonium bisulfates can be essentially eliminated by a return by WDNR to its original more-stringent SO₂ BART determination. This issue can be further mitigated by WDNR addressing SO₂ emissions from the non-BART boilers under its Reasonable Progress requirements.

Evaluate Impacts and Document the Results

WDNR determined that all five NO_x control strategies for Boiler B26 and B27 are cost-effective.

³ Because SO₂ control efficiency is heavily influenced by inlet SO₂ concentration, in controlling SO₂, the control efficiency is less important than the ultimate outlet SO₂ concentration, as this is primarily a function of chemical equilibrium conditions and the mass transfer capability of the scrubber.

⁴ Table 2.1 of the WDNR GP BART analysis document.

Evaluate Visibility Impacts

WDNR performed CALPUFF modeling to assess visibility improvement achieved under the amended BART requirements. The modeled emission cases are based on the maximum actual emissions during the baseline years for the combined stack S10. We are concerned that WDNR may not have modeled its “adjusted baseline emissions.” (Although we disagree with the adjustment process as discussed above, for internal consistency, once WDNR decided to use that approach, it should have based all of its analyses upon those adjusted emissions.) Had it done so, it is likely that baseline impacts, emission reductions, and visibility improvements would have been greater than presented by WDNR.

WDNR presented the total maximum visibility impact that represents the sum of the maximum modeled impacts for each of the four northern Class I areas. We commend WDNR for considering cumulative visibility impacts and benefits.

Sulfur Dioxide (SO₂) BART Determination

WDNR compared wet flue gas desulfurization (FGD) and dry circulating fluidized bed (CFB) FGD in preparing the draft BART determination. The Department maintains, under this amended BART determination, that dry CFB FGD at 93% control efficiency represents SO₂ BART for boilers B26 and B27. As discussed above, we believe that WDNR has improperly applied multiple layers of safety margins in deterring that the Turbosorp scrubber could achieve only 0.23 – 0.27 lb/mmBtu (93% control) as compared to the demonstrated capability of this technology to achieve 0.11 – 0.13 lb/mmBtu at similar facilities burning similar fuels.

Nitrogen Oxide (NO_x) BART Determination

WDNR proposed 84% and 94% control efficiency of NO_x emitted from boilers B26 and B27, respectively, in the draft BART determination. These proposed control levels were the result of assumed combustion modifications to each individual boiler followed by a RSCR unit operating on the common flue stack at 75% to 80% efficiency. In the amended NO_x BART, WDNR maintains RSCR for boiler B27 at 70% control efficiency. With the combustion modifications and RSCR, WDNR proposes that the NO_x BART compliance control efficiency for boiler B27 is 84% reduction.

For boiler B26, WDNR has determined that RSCR control is not applicable under BART and amended the NO_x BART to 68% control based on combustion modifications and selective non-catalytic reduction (SNCR).

We remind WDNR that BART is not necessarily the most cost-effective solution. WDNR has stated that all of the NO_x control technologies presented in its Table 4.4 are cost-effective, and yet it has chosen the third-ranked technology, OFA/FGR/SNCR at 68% control efficiency, as BART. In rejecting RSCR, WDNR cites an “energy penalty” and increased CO₂ emissions. However, the “energy penalty” is already accounted for in the cost analysis and is a legitimate concern only if there is a scarcity of available energy to operate the system—which no one has suggested. And, if WDNR is sincerely concerned about CO₂ emissions, it would prohibit the combustion of petroleum coke.

Instead, based solely upon WDNR estimates in its Table 4.4, and in consideration of incremental costs, we recommend that OFA/FGR/RSCR be determined to represent BART for boiler B26 because it achieves the greatest emission reduction (81%) with cost-effectiveness of \$3,675/ton and \$15.6 million/dv at the most-impacted Class I area (Seney). Based upon our review of BART determination across the nation, these cost-effectiveness values are very reasonable.

Particulate Matter (PM) BART Determination

WDNR determined that the existing PM controls and permit limitations constitute BART PM requirements for boilers B26 and B27. However, the WDNR modeling exercise only demonstrates that elimination of the modeled emissions⁵ would have no significant visibility benefit. Instead, WDNR must show that the proposed 0.30 lb/mmBtu BART limit for PM₁₀ has no significant impact on visibility in order to successfully demonstrate that a full five-factor BART analysis is unnecessary. Or, WDNR could propose BART limits that reflect the true capabilities of the existing control technologies.

BART emission limitations

WDNR proposed two forms of emissions limits for each boiler and each pollutant SO₂ and NO_x: 1) emission rate limitations (lbs/mmBtu) and, 2) allowable mass emissions (tons). The permit allows BART requirements to be satisfied by demonstrating compliance with either emission limitation format. We disagree with this proposal. Emission limits must reflect the best level of control all of the time, and should not allow the source to mix-and-match to find the least-stringent combination for each situation. Also, a mass cap limit would allow a very high lb/mmBtu emission rate during periods of low utilization.

Reasonable Progress Goals (RPG)

In setting reasonable progress goals, the Regional Haze Rule requires states to consider four factors for any potentially affected sources and include a demonstration how these factors were considered in setting the goal.⁶ This analysis is required independent of the projected visibility improvement by 2018.

WDNR determined that RPG is met for the Boundary Waters and Voyageurs northern class I areas based on MRPO visibility modeling of the "on-the-books" 2018 emissions inventory. However, the WDNR statement is contrary to the finding by Minnesota in its Regional Haze SIP⁷ that, for Boundary Waters and Voyageurs, "The RPG provides for less annual progress towards the ultimate visibility goals than the uniform rate of progress (URP)." MN goes on to estimate that natural condition will not be achieved in Boundary Water until 2093 and in Voyageurs until 2177.

MRPO visibility modeling projects that Isle Royale and Seney will not meet the uniform rate of progress by 2018.

In our March 10, 2011 comments we suggested to WDNR that:

⁵ PM controls are operated at a very high level achieving 0.025 lbs/mmBtu emission rates.

⁶ 40 CFR Part 51.308 (d)(1)(i)

⁷ Table 10.7: Reasonable Progress Goals for Class I areas

“WDNR has not included the required reasonable progress four factor analysis to evaluate what additional emission reductions are feasible and reasonable. WDNR needs to evaluate its emission sources and demonstrate that the State is making reasonable progress in reducing anthropogenic emissions. WDNR cites the four factor analysis prepared for MRPO by the contractor EC/R⁸ for possible further controls on EGU, but does not cite the controls analyzed for industrial sectors by EC/R. This analysis should be completed for the major industrial source sectors represented in Wisconsin.”

WDNR has added an analysis of emissions (Q) divided by distance (d) for the top 30 sources affecting visibility in each of the Northern Class I areas. Since the "on-the-books" 2018 inventory was used in this Q/d analysis, WDNR indicated additional control levels for some of these sources and concluded that these emissions reductions will reduce the visibility impact for both Seney and Isle Royale.

It is not clear how WDNR used the Q/d analysis. While we commend WDNR for the emissions reductions shown in its Tables 8A and 8B, we see no criterion by which WDNR determined which sources to evaluate under the Reasonable Progress four-factor approach. For example, we note that in Table 1 of its June 24, 2010 “Best Available Retrofit Technology at Non-EGU Facilities” report, WDNR showed that several facilities⁹ that were exempted from BART had impacts on visibility that warrant further attention. And, Georgia Pacific, the only non-EGU subject to BART, also has large emission units that, while not BART-eligible, still have considerable visibility impacts. WDNR should justify its decision to exempt these sources from a Reasonable Progress analysis, especially considering the projections that the URP glide path will not be achieved at any of the northern Class I areas, and that, based upon WDNR’s Table 1, Wisconsin is the second-largest contributing state to visibility impairment in the northern Class I areas.

We do not agree with WDNR that non-EGU controls cannot be implemented before 2018. There is significant uncertainty in the timing of future federal rules that could impact the non-EGU sectors. WDNR should evaluate all four factors for all the BART-eligible sources, the non-BART sources at Georgia Pacific, and the sources listed in Tables 8A and 8B.

In the Emissions Inventory Section (p18), WDNR reports that non-EGU SO₂ and NO_x emissions are 18,358 and 3,283 tons greater, respectively, than modeled in the “on-the-books” MRPO visibility modeling. This is due to earlier projected BART controls for non-EGU that were not implemented and is further evidence that additional reductions for non-EGU sources should be considered as part of the reasonable progress analysis.

Interstate Contributions

⁸http://www.ladco.org/reports/rpo/consultation/products/reasonable_progress_for_class_i_areas_in_the_northern_midwest-factor_analysis_draft_final_technical_memo_july_18_2007.pdf

⁹ WIS DOA/UW Madison-Charter Dt., Proctor & Gamble Paper Production Company, Thilmany paper, Packing Corporation of America-Tomahawk, Wausau Paper Corp-Mosinee, New Page – WI Rapids Pulp Mill, and Domtar A. W. Corp – Nakoosa.

WDNR asserts that “the rate of emission reduction projected for Wisconsin sources compared to Michigan and Minnesota shows that Wisconsin is meeting its share of visibility improvement.” However, inspection of Figures 6 and 7 finds that, while Wisconsin is predicting greater reductions in NO_x than MI and MN, it falls short of the SO₂ reductions estimated in MN.

On September 19, 2007, the State of Minnesota sent Wisconsin a letter asking for specific emission reductions:

“In particular, Minnesota asks Iowa, Missouri, North Dakota, and Wisconsin to evaluate further reductions of SO₂ from electric generating units (EGU) in order to reduce SO₂ emissions by 2018 to a rate that is more comparable to the rate projected in 2018 for Minnesota, approximately 0.25 lbs/MMBtu. Minnesota believes that Illinois is already in the process of meeting this goal. Emission reductions in Wisconsin are particularly important, as Wisconsin is the highest contributor outside Minnesota to visibility impairment in Minnesota’s Class I areas.”

From page 36-37 of the SIP:

“In 2009, EGU SO₂ emission rates in Wisconsin were 0.47 lbs/mmBtu. A simple projection for 2018 SO₂ emission rate from EGUs can be calculated using the 2014 Clean Air Transport Rule (CATR) allocations (71,514 tons SO₂) and 2009 heat input (441 billion Btu’s) grown by 1%, to results in an SO₂ emission rate of 0.29 lbs/mmBtu. This estimate is conservative as old facilities are being committed to retirement and it does not account for replacing capacity with the new Elm Road facility (1200 MW). On this basis the Wisconsin average electric utility emission rate will significantly decrease by 2014. In addition, due to EPA's committed second phase of CATR the EGU emission rate will decrease further. Therefore, the overall goal of reducing the EGU emission rate in response to the Minnesota ask is met.”

We recognize that the recent promulgation of the CSAPR makes it difficult to determine if these estimates are still valid, and suggest that WDNR update its estimates accordingly. Nevertheless, it is not sufficient for WDNR to assume that, because it believes it has underestimated emission reductions, it can assume that it is making reasonable progress in spite of its analyses that show otherwise.