

DRAFT COMMENT SUMMARY - 02/10/2006

Search Criteria:

Outline: XX. PM2.5 Modeling for Minnesota

**DRAFT COMMENT SUMMARY - 02/10/2006**  
**Clean Air Interstate Rule**

---

**XX. PM2.5 Modeling for Minnesota**

---

**Document No.:** OAR-2003-0053-2284.2

**Commenter:** Minnesota Power

**Phase:** Reconsideration

**Notes:**

Docket Number 2284 is the general comment cover letter (FDMS version). Docket Number 2284.1 is the cover letter. Docket Number 2284.2 is the comment letter. Also submitted were the following attachments: Docket Numbers 2284.3, 2284.5, 2284.6, 2284.7, and 2284.8.

**Comment:**

MP is an investor owned utility providing energy services to customers in central and northeastern Minnesota and Wisconsin. The majority of MP's electrical generation is from combustion of low sulfur, low mercury subbituminous coal. MP's northern location and high percentage of industrial customers who operate around-the-clock make MP a winter-peaking utility. Thirteen large power customers (requiring at least 10 megawatts of generating capacity) purchase about half the electricity IMP sells. Because of MP's high percentage of industrial customers who are high energy users and struggling to compete in a competitive global market economy, we are concerned that any further emission reductions applicable to electric generating units (EGU) be implemented with reasonable timeframes and cost to minimize the impact to residential and industrial customers alike. [[ (2284.2, p.2) ]]In the August 5, 2005 CAIR Petition for Reconsideration, MP noted concern about several issues related to CAIR, including whether the significance of Minnesota emissions was correctly characterized when EPA made its determination for states that will be subject to the CAIR and whether EPA's decision to carry over Acid Rain Program sulfur dioxide allowance allocations into the CAIR while applying a greater surrender ratio (required allowances per ton SO<sub>2</sub> emissions) gives equitable treatment for National Ambient Air Quality Standard attainment states like Minnesota, where Acid Rain Program allocations were applied to a baseline in which the majority of coal fired electric generating units were already scrubbed and burning low sulfur coal. These concerns were reinforced when EPA established that Minnesota was the only state that EPA's air quality modeling had determined to be exhibiting emissions significance on a nonattainment area right at the 0.20 ug/m<sup>3</sup> PM<sub>2.5</sub> significant contribution value established by EPA in the final CAIR. [[ (2284.2, p.2) ]]In its November 22, 2005 CAIR reconsideration announcement, EPA noted that it is accepting comments on four issues related to the final rule, including two that relate directly to issues identified in the Minnesota Power August 5, 2005, Petition for Reconsideration (inequities in sulfur dioxide allocation methodology and certain inputs to the fine particle (PM<sub>2.5</sub>) modeling used to determine Minnesota's inclusion in the CAIR region for PM<sub>2.5</sub>). EPA also requested comments about EPA's use of fuel adjustment factors when establishing state nitrogen oxides (Nox) budgets and EPA's determination that Florida should be included in the CAIR region. MP is directing our comments to the issues addressed in the MP Petition for Reconsideration. [[

**DRAFT COMMENT SUMMARY - 02/10/2006**  
**Clean Air Interstate Rule**

(2284.2, p.2) ]]Modeling used to determine Minnesota's inclusion in the CAIR region for PM2.5 When EPA had begun to make CAIR related modeling available to the public, it became apparent that EPA had not given proper consideration to emissions and emission rates from Minnesota electric generation units. Specifically, 2010 emissions performance from electric generating units (EGUs) affected by Xcel Energy's Metropolitan Emission Reduction Program (MEW) and emission rates for other Minnesota EGUs (ref. May 20, 2005 letter) had been incorrectly characterized. EPA responded to some of these concerns in its March 9, 2005 (posted incorrectly as 3/9/2004) Memorandum to the CAIR Docket in which it assessed the impact on Minnesota's significance calculation from a corrected characterization of MERP emission reductions by applying a Minnesota SO2 and Nox emissions prorating technique to the result of EPA's CMAQ Version 4.3 modeling results released just before the May 12, 2005 posting of the final CAIR in the Federal Register. In this 'Emissions in Minnesota: Additional Analysis' memorandum, EPA's proration methodology estimated that an adjustment of about 16,500 tons of Nox emissions and 5800 tons of SO2 emissions result in a 4.3% to 4.6% reduction in overall Minnesota emissions, which in turn, results in an estimated 0.01 ug/m3 PM2.5 shift in the significance calculation in the Chicago area, to 0.20 ug/m3. [[ (2284.2, pp.2-3) ]]

Minnesota Power's contractor (Environ/AG) modeled Minnesota's emissions impacts on nonattainment areas by obtaining files from EPA used to run CMAQ version 4.3 for the CAIR Final Rule. Environ/AG CMAQ version 4.3 model run results replicated EPA's Minnesota model run results as characterized in the CAIR Technical Support Document, validating the Environ/AG modeling as a means for characterizing the impact of Minnesota emissions. However, applying the EPA truncation technique resulted in an Environ/AG modeled, Minnesota PM2.5 contribution to the Chicago area that is 0.01 ug/m3 lower than EPA. Environ/AG also brought to Minnesota Power's attention that EPA had discovered problems with the CMAQ version 4.3 model used to characterize PM2.5 significance, where CMAQ version 4.3 is not stable for mass analysis. Environ/AG reported that the use of the more stable CMAQ version 4.5 model determined a result for Minnesota's modeled PM2.5 contribution to Chicago that was 0.01 ug/m3 lower than was determined by Environ/AG using CMAQ version 4.3 when applying EPA's truncating methodology, which is about a 5% shift. [[ (See pp.3-7 of Docket Number 2284.2 for a detailed discussion of this issue.) ]]

**Response:**

The commenter (Minnesota Power, or MP) asked EPA to reconsider whether emissions from Minnesota significantly contribute to downwind nonattainment of the PM2.5 NAAQS. MP asserts that EPA's modeling failed to account for certain emissions reductions required by State programs (especially those required under the Minnesota Emissions Reduction Program or MERP). In granting reconsideration, EPA explained that it was aware of the emission reductions in question when it made the significant contribution determinations in the final CAIR. EPA had accounted for these reductions during the rulemaking by conducting a sensitivity analysis

**DRAFT COMMENT SUMMARY - 02/10/2006**  
**Clean Air Interstate Rule**

(available in the CAIR docket), but had not conducted revised air quality modeling (70 FR at 72279-280). In response to the reconsideration petition, EPA conducted revised air quality modeling which used the inputs reflecting emission reductions required by the MERP. This modeling showed (consistent with the sensitivity analysis) that Minnesota contributes a maximum of 0.20 ug/m<sup>3</sup> to the downwind PM 2.5 nonattainment area of Chicago-Gary-Lake County, IL-IN. This modeling thus supported EPA's conclusion that Minnesota's contribution met the criteria in CAIR for determining "significant contribution." *Id.* This revised air quality modeling used the same modeling platform used for all of the air quality modeling in CAIR. In the Notice of Reconsideration, EPA solicited comment on the inputs used to model Minnesota emissions, but declined to reconsider or reopen for public comment issues relating to the air quality modeling platform itself. *Id.* at 72280.

Most of the comments received on this issue in response to the Notice of Reconsideration supported EPA's conclusion. These include comments from the Minnesota Pollution Control Agency (MPCA), the entity with the most direct knowledge of emission reductions required by state programs. EPA also received no adverse comments from Xcel Energy, the entity that entered into the MERP with the MPCA and whose projected emission levels were the centerpiece of the reconsideration petition. In fact, no other power generation source in Minnesota besides Minnesota Power offered adverse comments. EPA views these comments as confirmation of the reasonableness of the modeling approach used by EPA to assess significance of contribution of the State. EPA also views these comments as confirmation that its revised modeling accurately accounts for the MERP reductions.

Minnesota Power (MP) did not comment on the revised emissions modeling done for power sector units in Minnesota and instead directed its comments to the original emissions modeling done for the final CAIR that did not fully account for the MERP reductions. MP does not directly challenge EPA's conclusion that the revised modeling accurately accounts for the emission reductions required by the MERP. MP claims, nonetheless, that the model inputs for the final CAIR modeling (not the modeling done for the Notice of Reconsideration, as just noted) contain errors. To the extent these alleged errors relate to the MERP, EPA has corrected the errors as explained above. The additional "errors" of which MP complains relate to inputs regarding the projected 2010 emissions for certain units in Minnesota. Although MP states that EPA has mischaracterized emissions from some units, EPA believes that the emissions projections done to provide inputs for the revised air quality modeling described in the Notice of Reconsideration are appropriate.

EPA believes its method of projecting power sector emissions for units in Minnesota reflects a more accurate and robust method for projecting emissions than the method used by MP. However, MP claims that if its own lower emissions were used as inputs to the PM<sub>2.5</sub> modeling, that modeling would show that Minnesota's contribution is below the PM<sub>2.5</sub> significance threshold of 0.2 µg/m<sup>3</sup>. MP was selective in its application of its methodology for projecting emissions and EPA does not believe that it is an appropriate method for projecting emissions.

**DRAFT COMMENT SUMMARY - 02/10/2006**  
**Clean Air Interstate Rule**

MP also comments that “EPA had erroneously assigned 2010 sulfur dioxide emission rates on scrubbed Minnesota units at values as much as double that of the performance levels posted in 2001.” MP Comment p. 4. After reviewing the modeling results, EPA is unable to find any instances in Minnesota where EPA projected SO<sub>2</sub> emission rates of scrubbed units from the revised power sector modeling that are double that of the 2001 performance level.

MP also claims that “NO<sub>x</sub> emission rates deviated between 2001 and 2010 without supportive operating rationale.” The difference in NO<sub>x</sub> rates that MP alludes to is again based upon the modeling for the Final CAIR, not for the Notice of Reconsideration. In addition, MP’s characterization is inaccurate. EPA’s 2010 projections of NO<sub>x</sub> emission rates are generally lower than 2001 NO<sub>x</sub> emission rate data for Minnesota units. Also, the petitioner has also failed to demonstrate that EPA’s projected NO<sub>x</sub> emission rates are inaccurate.

Another comment from MP stated that “the EPA IPM modeling had shifted heat input from large, lower emission units to higher emission units.” *Id.* A comparison of the historical data from 2001 and 2004 with the revised emissions modeling does not support this broad conclusion. Heat input usage does not change significantly, and although there are some shifts in heat input usage between 2010 EPA projections and the 2001 data, these shifts occur where the IPM projects it will be cost-effective to make relatively small changes to where electricity is produced. In addition, EPA does not accept the suggestion that because a certain rate applied in 2001 it should be applied in 2010. This argument is not adequate and ignores the many other factors that may change in the future which could cause a change in the way a unit produces electricity.

The power sector is a complicated, interrelated, and interdependent system of operation, and must be looked at holistically to ascertain the sector’s response to a certain set of conditions or constraints. The petitioner’s approach selectively chooses the methodology for determining emissions at certain units and ignores the changes that may occur at other units as a result. In addition, it is easy to question the choices or assumptions that one makes for selective forecasts of this nature, since methodologies can be developed to support foregone conclusions, like lower emission levels in a future year. For this reason, EPA uses the Integrated Planning Model to develop its power sector emissions projections.

IPM is a detailed, sophisticated, and comprehensive electric power sector model that is used to derive all manner of projections for the power sector and is used to develop the power sector emissions projections that are used in air quality modeling. The model accurately reflects the power sector and contains millions of variables to best ascertain how specific facilities will produce electricity to meet demand in the most cost-effective manner possible. The variables are based upon the best available data, both current and anticipated, and include permitted emission rates for units, unit efficiency, cost data, and operational constraints. This model has been used to support the development of Title IV of the Clean Air Act (the Acid Rain Program), the NO<sub>x</sub> SIP Call, the Clean Air Interstate Rule, the Clean Air Mercury Rule, and the Clean Air Visibility Rule. In addition, it is used by the Federal Energy Regulatory Commission, private sector, non-profits, research groups, States, and regional planning organizations for power sector projections.

**DRAFT COMMENT SUMMARY - 02/10/2006**  
**Clean Air Interstate Rule**

The model has undergone extensive peer-review and scrutiny, and EPA believes it is an appropriate tool for use in developing power sector emission projections and better accounts for the many dynamics that exist in the power sector (<http://www.epa.gov/airmarkets/epa-ipm/index.html>).

MP does not challenge the use of IPM for developing power sector emission projections for certain units, but comments that at other units, a revised methodology should be used. EPA believes that a holistic approach is necessary and using a modeling tool that reflects the integrated nature of the power sector as accurately as possible is the most rational approach to forecasting emissions for all units comprehensively.

To its credit, MP also points out that emissions from the Taconite Harbor Facility (a facility that was recently converted from an industrial source to an electricity generating source) were not included by EPA in either the power sector emissions data or in other emissions inventory used for CAIR modeling. EPA will include the facility in the next version of the IPM. If the facility had been included in the inventory, emissions in Minnesota would have been higher by almost 2,000 tons of SO<sub>2</sub> and about 1,150 tons NO<sub>x</sub> than what EPA projected (according to the commenter). Since EPA did not include this facility, EPA believes that its own projections of emissions in Minnesota underestimate likely future emissions.

MP also stated that it is “noteworthy that there are other reductions that Minnesota Power has not modeled that should warrant consideration by EPA, including those resulting from emission controls provided on Minnesota BART eligible units for the regional haze program.” MP Comment p. 6. The Regional Haze program requires Best Available Retrofit Technology or BART to be installed and operational on sources that the State finds subject to BART within five years after EPA approves a State’s regional haze SIP. These SIPs are due in December, 2007. EPA does not believe that States will require the installation of operation of BART before 2010. Thus it is highly unlikely that 2010 emissions would be affected by the BART requirements. In addition, MP does not quantify any reductions it believes will occur due to the application of BART in Minnesota. Thus, MP has not established that there will be additional reductions due to BART that must be taken into account when projecting 2010 emissions for units in MN. It is also important to note that EPA has determined that CAIR achieves greater progress than BART, and may be used by States in the CAIR region as an alternative to BART.

In sum, EPA continues to believe its emission projections have reasonably accounted for emission trends within Minnesota and fully account for emission reductions attributable to the MERP. EPA believes the inputs used for the modeling discussed in the Notice of Reconsideration are reasonable and rational projections of 2010 emissions in Minnesota. For these reasons, EPA is not making any additional changes to the inputs to the PM<sub>2.5</sub> modeling for Minnesota, beyond those changes described in the Notice of Reconsideration. For more detail regarding Minnesota EGUs and EPA modeling, please see Xcel spreadsheet titled “Minnesota EGU Unit Summary\_CAIR Reconsideration.xls” in the CAIR docket.

MP also notes that Environ/AG’s CMAQ version 4.3 modeling shows a PM<sub>2.5</sub> contribution to the Chicago area that is 0.01 ug/m<sup>3</sup> lower than EPA’s modeling shows. This

**DRAFT COMMENT SUMMARY - 02/10/2006**  
**Clean Air Interstate Rule**

difference was caused by an error of the petitioners. The petitioner was not properly following EPA's truncation methodology for calculating PM<sub>2.5</sub> contributions, as described in the CAIR Air Quality Modeling Technical Support Document (EPA-HQ-OAR-2003-0053-2151) (See pp 21, 41-43). The petitioner corrected this error and submitted revised PM<sub>2.5</sub> contributions to Chicago (EPA-HQ-OAR-2003-0053-2312) based on petitioner's CMAQ version 4.3 modeling. These results replicate EPA's contribution to Chicago.

MP also raises a new issue in their comments. They argue EPA should use a more recent version of its modeling platform to conduct air quality modeling. However, EPA stated when granting reconsideration that it was not reopening any issues dealing with the modeling platforms used for the CAIR modeling. We reiterate that position here. EPA used CMAQ 4.3 for all of the air quality analyses conducted for the final CAIR, and provided full notice and opportunity to comment on the appropriateness of the model. See 69 FR 47828 (August 6, 2004)(announcing plan to use CMAQ 4.3 for the final rule); see also 70 FR 25234-36 (summarizing the use of CMAQ 4.3). There was ample opportunity to comment on any issues regarding the adequacy of the model during the rulemaking. Nor is the existence of a new iteration of the model "grounds for ... objection ar[ising] after the period for public comment" (CAA section 307 (d) (7) (B)). Predictive models are of course open to the possibility of updating and so are often adjusted. Such adjustments do not normally occasion new opportunities for comment, particularly after the close of a rulemaking. Indeed, doing so would create a perverse incentive to leave models unadjusted. The ultimate issue is whether the model used in the rulemaking bears a "rational relationship to the characteristics of the data to which it is applied". *Appalachian Power v. EPA*, 249 F. 3d 1032, 1052 (D.C. Cir. 2001). There has already been full opportunity to comment on this issue.

For more discussion on all issues related to MP's comments, see the CAIR Notice of Final Action on Reconsideration.

**Document No.:** OAR-2003-0053-2274  
**Commenter:** Minnesota Pollution Control Agency  
**Phase:** Reconsideration

**Comment:**

The Minnesota Pollution Control Agency has reviewed the reconsideration notice (EPA-HQ-OAR-2003-0053-2215) and in particular, the information in this notice relating to item C. 'PM<sub>2.5</sub> Modeling for Minnesota'. We have also reviewed and evaluated information related to item C. Contained in the docket. Based on our review, we believe that Xcel Energy's Metropolitan Emission Reduction Project emission reductions have been accounted for in a reasonable manner in the emission projections EPA used for contribution modeling. [[ (p.1) ]]

**Response:**

EPA has performed revised modeling of emission in Minnesota and believes that Minnesota still

**DRAFT COMMENT SUMMARY - 02/10/2006**  
**Clean Air Interstate Rule**

meets EPA's threshold for inclusion in the Clean Air Interstate Rule. See the CAIR Notice of Final Action on Reconsideration for further discussion.



**DRAFT COMMENT SUMMARY - 02/10/2006**  
**Clean Air Interstate Rule**

**Document No.:** OAR-2003-0053-2268.1  
**Commenter:** Northeast States for Coordinated Air Use Management  
(NESCAUM)

**Phase:** Reconsideration

**Notes:**

Docket Number 2268 is the cover letter. Docket Number 2268.1 is the comment letter.

**Comment:**

Fine particulate matter (PM2.5) modeling for Minnesota and including Florida in the CAIR region for ozone. EPA has asked for comment on the inclusion of Florida in the CAIR region for ozone and on revised modeling inputs for Minnesota. NESCAUM is not commenting on those specific issues. However, EPA must include States in the CAIR program for which analyses demonstrate that they contribute to non-attainment under section 110(a)(2)(d) of the Clean Air Act. Should EPA choose to remove any jurisdiction from the CAIR program, EPA must reduce the total Nox and SO2 CAIR budgets by amounts equal to that jurisdiction's Nox and SO2 budgets, respectively. The NESCAUM States cannot attain the eight-hour ozone and PM2.5 National Ambient Air Quality Standards without substantial reductions in direct and transported emissions of Nox and SO2 across the Eastern U.S. We urge EPA to ensure that the CAIR program maximizes reductions of transported Nox and SO2 to the extent feasible. [[ (2268.1, p.2) ]]

**Response:**

EPA is including in CAIR all States that it has determined significantly contribute to downwind nonattainment of or interfere with maintenance of the PM2.5 and/or 8-hour ozone NAAQS. EPA has determined that Minnesota is properly included in the CAIR region for PM2.5 and that Florida is properly included in the CAIR regions for PM2.5 and 8-hour ozone.. See the CAIR Notice of Final Action on Reconsideration for further discussion.

**Document No.:** OAR-2003-0053-2279.1

**Commenter:** Midwest Generation

**Phase:** Reconsideration

**Notes:**

Docket Number 2279 is the cover letter. Docket Number 2279.1 is the comment letter. Docket Number 2278 is a duplicate of 2279 (cover letter).

**Comment:**

MIDWEST GENERATION SUPPORTS EPAS DETERMINATION THAT PM2.5 EMISSIONS FROM MINNESOTA CONTRIBUTE SIGNIFICANTLY TO NONATTAINMENT IN ILLINOIS. Midwest Generation supports EPA's conclusion that Minnesota is subject to the final CAIR based on the Agency's most recent analyses confirming that Minnesota contributes significantly to nonattainment of PM2.5 NAAQS in Cook County, Illinois. Generally, Midwest Generation submits that air quality challenges should be addressed just as they develop irrespective of political boundaries. Indeed, Congress recognized as much when it enacted the 'good neighbor' provision of the Clean Air Act, CAA § 110(a)(2)(D). Section 110(a)(2)(D) provides that state SIPs must contain adequate provisions prohibiting in-state sources from emitting any pollutant in amounts that contribute significantly to nonattainment of NAAQS in a downwind

**DRAFT COMMENT SUMMARY - 02/10/2006**  
**Clean Air Interstate Rule**

state. Notably, in the preamble to the final CAIR, EPA noted the regional nature of PM<sub>2.5</sub> nonattainment, in particular. EPA explained its relatively low air quality impact threshold of 0.20 µg/m<sup>3</sup> for PM<sub>2.5</sub>, noting that ‘PM<sub>2.5</sub> nonattainment, like ozone, is caused by many sources in a broad region, and therefore may be solved only by controlling sources throughout the region.’ [[ (2279.1, p.7) ]]In response to Petitioners’ questions regarding whether EPA’s modeling supporting the final CAIR sufficiently accounted for certain emissions reductions required by Minnesota regulation (and, thus, whether Minnesota was properly a CAIR-affected state), EPA reviewed its prior analysis and concluded that, indeed, the analysis did not fully account for such effects on future PM<sub>2.5</sub> emissions. As a result, EPA projected future emissions a second time using inputs revised downward. As revised, EPA’s estimate of statewide Nox emissions was approximately 16,500 tons lower and the estimate for SO<sub>2</sub> emissions about 5,800 tons lower relative to EPA’s prior analysis. Even based on these more conservative emissions projections, the same IPM modeling consistently demonstrated that PM<sub>2.5</sub> emissions from Minnesota result in an air quality impact in Cook County, Illinois of 0.2 µg/m<sup>3</sup>. [[ (2279.1, pp.7-8) ]]EPA defines ‘significant contribution’ for purposes of the ‘good neighbor’ provision in terms of air quality impact. In the final CAIR, EPA makes clear that any air quality impact on PM<sub>2.5</sub> equal to 0.2 µg/m<sup>3</sup> or higher amounts to ‘significant contribution,’ interfering with attainment or maintenance such that imposition of CAIR is triggered. Because EPA’s IPM modeling showed that emissions within Minnesota’s borders impact air quality in Cook County at the threshold - even after fully accounting for emissions reductions that are expected as a result of state regulation - EPA properly concluded that fine particulate emissions in Minnesota contribute significantly to the nonattainment of the PM<sub>2.5</sub> NAAQS in Cook County, Illinois. Sources in Minnesota aggravate air quality problems in the region and, thus, should be required to achieve their fair share of emissions reductions. A decision by EPA to exclude Minnesota from the CAIR region would unfairly burden affected sources in Cook County. Sources in Minnesota would be permitted to benefit from activity that results in the deterioration of air quality in Cook County without being required to ameliorate the damage. Sources in Cook County, on the other hand, would be saddled unfairly with the costs of reducing emissions sufficient to offset out-of-state emissions in order to bring the area into attainment. [[ (2279.1, p.8) ]]EPA’s determination represents sound policy as it fairly requires sources to whom the exceedance of the relevant NAAQS can fairly be traced to bear a proportionate share of the costs for emissions control. Indeed, it would be unfair for EPA to not include Minnesota within the CAIR region given EPA’s analyses showing that upwind sources cause air quality impacts downwind to a degree that constitutes significant contribution based on EPA’s empirical threshold for regulation. [[ (2279.1, p.8) ]]

**Response:**

EPA is including in CAIR all States that it has determined significantly contribute to downwind nonattainment of or interfere with maintenance of the PM<sub>2.5</sub> and/or 8-hour ozone NAAQS. EPA has determined that Minnesota is properly included in the CAIR region for PM<sub>2.5</sub> and that Florida is properly included in the CAIR regions for PM<sub>2.5</sub> and 8-hour ozone.. See the CAIR Notice of Final Action on Reconsideration for further discussion.

**DRAFT COMMENT SUMMARY - 02/10/2006**  
**Clean Air Interstate Rule**