



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

APR 18 2008

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

MEMORANDUM

SUBJECT: Issues Regarding Class I Increment Analysis Inventories

FROM: Dennis Atkinson, Meteorologist *Dennis Atkinson*
Model Clearinghouse Director, C439-01

TO: Jeff Robinson, Chief
Air Permits Section (6PD-R)

THRU: Tyler Fox, Leader *Tyler Fox*
Air Quality Modeling Group, C439-01

INTRODUCTION

In response to your memo of April 18, 2008, the Model Clearinghouse has reviewed your proposed resolution of the issues presented, in order to properly and adequately account for cumulative impacts of emissions from all increment affecting sources in the Class I increment analysis associated with the proposed Prevention of Significant Deterioration (PSD) permit for AEP SWEPCO John W. Turk, Jr. power plant in Hempstead, AR. Recognizing the difficulty of the situation presented by the applicant's exclusion of a significant number of increment affecting sources from the original dispersion modeling analysis, we concur with your assessment of the key technical and guidance issues raised and with the general approach presented in your submittal in addressing this application.

BACKGROUND

The original Class I increment analysis submitted by AEP SWEPCO indicated numerous increment exceedances for 24-hour SO₂ at the Caney Creek Class I Wilderness Area, but the proposed source was less than the EPA proposed Class I significant impact level (SIL) for SO₂ on the high, second high (H2H) days at each violating receptor. EPA Region 6 commented in July 2007 and again in April 2008 that the applicant had inappropriately excluded increment-contributing sources. As a result of this exclusion, the modeled impacts from the original increment inventory did not provide sufficient information to conclude that the applicant did not cause or contribute to exceedances of the SO₂ increment in Caney Creek already identified in their previous modeling submittal, or potential exceedances that may occur on additional days due to cumulative impacts from excluded sources.

After reviewing the increment inventory data files provided by the applicant, it was apparent that the applicant had eliminated several hundred sources from Arkansas, Louisiana, Oklahoma, and Texas. Subsequent discussions with the applicant revealed that they had used an emissions over distance (Q/D) approach to eliminate increment consuming sources from their final modeled inventory (a Q/D value of less than 20 was used as a threshold to exclude sources, with Q in TPY and D in kilometers). cursory review of the emissions total of the sources eliminated from the original modeled inventory indicated that a majority of the emissions reside in the same general area upwind of the Class I area as the source currently under permit review. Since there were a number of additional modeled impacts that were within 5%-10% of the 24-hour SO₂ increment level, Region 6 expressed a concern regarding the potential that the applicant could contribute significantly to additional increment exceedance periods that would not have been identified due to the elimination of those sources from the increment inventory. Based on these concerns, Region 6 requested that the applicant resubmit the Class I increment modeling including all increment affecting sources, pursuant to Section 7.2.1(a) of 40 CFR Part 51, Appendix W, hereafter referred to as the *Guideline on Air Quality Models* (or *Guideline*). In response to the request from Region 6 to include all increment-contributing sources, the applicant proposed the use of an alternative approach to identify sources to be eliminated from the additional modeled increment inventory.

CLARIFICATION OF RELEVANT GUIDANCE

We concur with your assessment that the key issue of concern in this case is the requirement, clearly stated in Section 7.2.1.1(a) of the *Guideline*, to include impacts from all increment-contributing sources in an analysis of impacts on PSD increments. The full text of the relevant paragraph is quoted here for reference:

“7.2.1.1 Design Concentrations for SO₂, PM-10, CO, Pb, and NO₂

a. An air quality analysis for SO₂, PM-10, CO, Pb, and NO₂ is required to determine if the source will (1) cause a violation of the NAAQS, or (2) cause or contribute to air quality deterioration greater than the specified allowable PSD increment. For the former, background concentration (subsection 8.2) should be added to the estimated impact of the source to determine the design concentration.

For the latter, the design concentration includes impact from all increment consuming sources.” [emphasis added]

This paragraph makes a clear distinction between the requirements of air quality analyses for compliance with the NAAQS as opposed to PSD increments. For NAAQS compliance modeling, a further distinction is made between estimated impacts from the source under review and background concentrations which need to be added to the source’s impact for comparison to the NAAQS. Reference is made to Section 8.2 for further guidance regarding the estimation of background concentration. Table 8.2 in Section 8.1 addresses the emission input requirements for NAAQS compliance demonstrations, and distinguishes between the proposed source, “nearby source(s)”, and “other source(s)”. A footnote to Table 8.2 indicates that impacts from the latter category can often be represented by an appropriate determination of the “background concentration” from an analysis of monitored ambient air quality data. Section 8.2.3(b) provides

the following criterion for determination of which sources to include in a NAAQS modeling analysis:

“8.2.3 Recommendations (Multi-Source Areas)

b. Nearby Sources: All sources expected to cause a significant concentration gradient in the vicinity of the source or sources under consideration for emission limit(s) should be explicitly modeled.”

Our purpose in citing the sections of the *Guideline* related to requirements for NAAQS compliance demonstrations is to emphasize the clear distinction between the requirements for the emissions inventory needed for NAAQS compliance as opposed to PSD increment compliance. Procedures that may be applicable to determining which sources need to be explicitly modeled for NAAQS compliance cannot be applied for PSD increment compliance inventories. There is nothing comparable to the “monitored background” component typically included in a NAAQS demonstration for PSD analyses, and no technical or regulatory basis for “screening out” or otherwise excluding impacts from increment affecting sources from a cumulative (net) increment analysis.

As noted in your submittal, we also recognize the potential computational challenge of modeling a very large number of sources that may be identified as increment affecting sources, especially across a large domain that may be required for demonstrating compliance with the increments for a distance Class I area using the CALPUFF modeling system. In such situations, we believe it is appropriate and consistent with the *Guideline* to utilize a combination of screening and refined modeling techniques as a more efficient method to estimate the cumulative contribution to increment than to include all sources in the refined modeling analysis. Section 4.2.1.1(a) of the *Guideline* states that “*Where a preliminary or conservative estimate is desired, point source screening techniques are an acceptable approach to air quality analyses.*” Section 4.2.1.1(b) further stipulates that “*Agreement should be reached between the model user and the appropriate reviewing authority on the choice of the screening model for each analysis, and on the input data as well as the ultimate use of the results.*”

MODEL CLEARINGHOUSE RECOMMENDATION

As stated in the Introduction, we concur with your assessment of the key technical and guidance issues raised and with the general approach presented in your submittal to address this application. Although the exclusion of a significant number of sources from the original increment modeling analysis does not conform with the *Guideline* and presents a difficult situation to resolve, we agree that a reasonable and technically sound approach to provide additional assurance that the proposed source will not contribute significantly to potential PSD increment violations is feasible and can be justified for this specific case based on the information available. The most direct option to resolve the issue, which would not require any further justification by the applicant or review by the Clearinghouse, would be to perform additional refined modeling of the increment-consuming sources excluded from the original analysis to complete the impact assessment. Short of that more direct approach to resolve the issue, some mix of refined and screening-level estimates is the only alternative, provided that an

acceptable level of justification and assurance can be given that the final assessment will be protective of air quality levels.

The *Guideline* references several existing screening techniques, for both simple and complex terrain applications. However, the use of an emission/distance ratio (Q/D) as a screening technique is not addressed in the *Guideline*, and we will not address its use as a screening technique in a generic sense with this response. Our review and concurrence with your proposal merely acknowledges that use of a Q/D threshold as a tool to identify which sources to explicitly account for in the refined modeling vs. sources to be accounted for in an aggregate sense, based on the inclusion of pseudo-sources within the refined modeling, is technically reasonable given the specific circumstances of this case.

We concur with your conclusions, based on an analysis of backward trajectories to determine air mass histories on days that exceeded, that the focus for including impacts from additional sources beyond 50 km from the Class I area can be limited to the 90° sector focused on transport from the south, including the proposed facility. We see no benefit to further supplementing the inventory for sources beyond 50 km from the Class I area and outside the 90° sector. However, we also want to emphasize that such a determination could not have been made *a priori*, and can only be justified in this specific case based on the information available from the original incomplete modeling analysis.

This concurrence by the Model Clearinghouse is limited solely to this application. If you have any further questions or comments, please contact Dennis Atkinson at (919) 541-0518 or Tyler Fox at (919) 541-5562.

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