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Summary of Stakeholder Comments on the Contribution Assessment

June 28, 2006

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The MANE-VU Contribution Assessment was posted for external review on the MANE-VU website and stakeholders were invited to comment from May 16th to June 16th. Twelve stakeholders commented on the template and their comments are summarized here.

Conceptual Model of RH (Chapter 2)

It was noted that the text on page 2-6 stated that "coal combustion is often a source of significant amounts of organic carbon." This statement was attributed to a draft EPA report prepared in 2003. Earlier this year John Bachmann of the EPA stated publicly that the EPA erred and this statement is incorrect.

It was noted that the report has a section discussing the revised IMPROVE equation but contains no conclusions regarding whether MANE-VU will adopt any of the revisions. The commenter urges the MANE-VU states to incorporate the revisions to the IMPROVE equation that have been recommended by the EPA convened IMPROVE Committee because the method by which the natural background goal is calculated will have a dramatic effect on those sources and any controls implemented by the MANE-VU states should be supported by the most recent science available.

It was once again noted that the report is inconclusive about whether or not the revised IMPROVE equation will be adopted. The commenter noted that an EPA endorsed IMPROVE Committee was convened and revised the IMPROVE equation. Thus, the commenter urges MANE-VU to incorporate these revisions into its calculations and assessments. The method by which the natural background level and reasonable progress goals are calculated significantly impact the level of reductions that will be needed to demonstrate reasonable progress and these calculation methods should be supported by the best scientific data and information available.

It was noted by a commenter that the natural and baseline visibility values associated with the Forest Service sites, Great Gulf and Lye Brook, appear to be reasonable. However, the commenter is asking a Forest Service visibility analyst to look at the numbers also since he works with all the IMPROVE sites across the country. The commenter will make the information known as soon as the information is received from the analyst.

Overview of Modeling Results (Chapter 3)

It was noted that in Section 3.1.1, Figure 3-1 and Figure 3-2, 20% Worst Extinction plots (right side plots) all look the same for all Class I areas, the Acadia plot appears to be ok, but the other Class I area plots need to be corrected

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It was noted that the values for particle extinction in Table 3-2 and those reported as old algorithm data in Table 3-7 should match but some of the values are inconsistent.

It was stated that some of Table 3-4 is not quite correct, because the way that the f(RH) values were developed and applied requires the assumption that concentrations of all components of the aerosol will be rolled back by the same percentage. Therefore, the values in the last two columns should be considered approximations. The same applies to the last four columns of Table 3-5. As for Table 3-6 (described in footnote 13, where Table 3-4, should be Table 3-9), the method used is arbitrary, but not unreasonable and the values in Table 3-6 should be viewed as rough approximations.

Why did the extinctions due to EC, soil, and course matter change in Tables 3-7 and 3-8? The formulas for calculating extinction due to those components did not change from the old to the new algorithm.

Data Analysis (Chapter 5)

It was noted that the analysis focuses exclusively on sulfates, except the emissions inventory discussion in Section 4.1 and Appendix B. This information on non-sulfate components is not considered in any of the analyses except for the CMAQ and REMSAD modeling and results for non-sulfate components are not presented in this report. The reason for the sulfate focus is made clear early in the report, however, this focus is not universal.

A commenter inquired in regards to the trajectory analyses in Section 5.1, if had MANE-VU done any analysis for trajectories at other than 500m in elevation (as noted on page 5-2) since trajectories for 200m and 1000m were created? In the BRAVO study, trajectory at one level went in totally the opposite direction from one at a different level, so that trajectory analysis had to consider several levels to achieve any confidence in their results or to indicate their levels of uncertainty. That such altitude-related biases can occur is seen in the statement at the top of page 5-8, where HYSPLIT and ATAD trajectories disagree.

It was noted that in section 5.1 Trajectory Analysis, the first paragraph is confusing: It states that back trajectories were calculated for the five year period 1998-2002 yet the last sentence states that this analysis used back trajectories calculated from the baseline period 2000-2004. ME DEP suggests adding a paragraph about the 1998-2002 analysis (if that was done) and rewriting the first paragraph in this section. The paragraph changes are quite specific, please see the first page of this specific comment for the changes.

At the bottom of page 5-5 what is the "large sulfate" source, since emissions of primary sulfate are small?

Is the text on page 5-6 trying to say that Figure 5-5 applies only to large sources and not to all sources combined?

Chemical Transport Models (Chapter 6)

It was stated that the report focuses mostly on today's situation and does not give much insight into how its conclusions would change after current regulations, including CAIR are fully implemented. The future projections are clearly part of the analysis since they were included in CMAQ modeling for 2009 and 2018. The report also gives little insight into what assumptions were made to arrive at the 2009 and 2018 emissions.

The commenter noted that in future decisions regarding strategies to demonstrate uniform rates of progress the implementation of regulations such as CAIR or state specific requirements that will attain reductions in addition to CAIR (such as Massachusetts' 310 CMR 7.26 rules for SO_2 and NO_x) will yield significant improvements in visibility over the next decade. It is clear that Brigantine in New Jersey will meet their uniform progress goals by 2018. However, it is not clear from the description of emission inventories used in the modeling analyses what specific on-the-books (OTB) or on-the-way (OTW) reductions were assumed in the 2009 and 2018 inventories. It was suggested that MANE-VU provide this information and make every effort to account for all emissions reductions expected to be achieved during the initial rate of progress determination period (through 2018) in refined modeling efforts to assess reasonable progress goals.

It was also noted that the use of 2002 emissions (2002 emissions for EGUs and 1999 emissions for all other source sector) is appropriate for assessment of contribution to the baseline (2002-2004) period under the haze rule. But this approach does not account for emissions reductions under CAIR (Clean Air Interstate Rule) and other state and federal regulatory requirements. To identify further emissions reductions needed to achieve reasonable progress in 2018, it is essential to consider the progress made due to emissions reductions between 2002-2018. The relative source contributions will be different in 2018 than in 2002 as emissions reductions will be spatially uniform. It is recommend that MANE-VU also consider techniques to evaluate source contribution in 2018 as part of the reasonable progress analyses.

It was noted that the authors of the report declared in several places that their results are accurate, without proving this claim. For example on page 6-2, the use of GEOS-CHEM inputs to boundary conditions is supposed to be to "ensure accurate representation of the general trends and sulfate patterns." As anyone who has worked with the current generation of chemical models knows, this is hyperbole, according to the commenter.

Lagrangian Dispersion Models (Chapter 7)

In Section 7, Lagrangian Dispersion Models and Appendix D both need reference subsections

It was noted by a commenter that CALPUFF model applications are problematic for sources at transport distances greater than 200-300 km from the receptor. According to the EPA and IWAQM (Interagency Workgroup on Air Quality Models), CALPUFF should only be used to evaluate sources within 200-300 km of the receptor because at

greater distances CALPUFF underestimates the horizontal extent of dispersion and overestimates sulfate concentrations at the receptors. Thus contributions from VISTAS states to Class I areas in New England are most likely overestimated. This concern is discussed in more detail in the VISTAS comment.

The use of CALPUFF to model transport distances over 1,000 km is stretching the capacity of the model. The rationale behind using CALPUFF for such long distances is weak and enhancements to CALPUFF have reduced its overestimation tendencies, but only if these enhancements are turned on and used with expert judgment. The MANE-VU discussion does not indicate whether features such as puff-splitting were applied and what criteria were used to determine when to use them. The fact that the BART rule required modeling protocols for distances over 200 km does not imply an endorsement of the use of the model at such distances and in reality the application of CALPUFF at distances exceeding 300 km is very questionable.

Another commenter also noted that a significant portion of the contribution assessment was completed using air quality models such as CALPUFF, which are not suited for SIP quality regional air modeling. The commeter urges MANE-VU states to complete a more rigorous modeling exercise using either CMAQ or CAM_x to support its final contribution assessment.

A commenter noted that in Table 7-1 the faults of CALPUFF are demonstrated. The modeling with observation-based meteorology alone tended to underestimate ambient sulfate concentrations by nearly a factor of 2 at Class I areas in the southern part of the MANE-VU domain. The application with MM5 meteorology did better. However, as the final comparison of attribution rankings (Figure 8-1 in the report) shows, the ranking was not particularly sensitive to modeling biases.

It was noted, once again, that with the emissions and meteorological inputs in question the CALPUFF (MD) analysis should not be used at this time for Maine's Class I areas

Synthesis of Results Using Different Source Assessment Techniques (Chapter 8)

Note that the first line of Section 8.1 points out that the Q/D and emissions times residence time approaches (numbers 1 and 2 in the list at the beginning of VISTAS Comments on the MANE-VU Contribution Analysis Report) are "crude methods."

It appears that Acadia and Moosehorn have the highest percentage of "out of domain" area contribution while they are also closest to the grid boundary. The commenter requested MANE-VU's best-informed explanation on where this significantly large percentage is coming from.

The commenter mentioned that perhaps there is more information related to the REMSAD modeling results if this information is broken down by tagged boundary conditions in group 3 of the REMSAD model run that could be provided.

It was noted that the modeling analyses indicated that Canadian emissions contribute significantly to observed sulfate and visibility impairment in Class I areas. There is some level of uncertainty with respect to the current inventory of Canadian emissions, trans-boundary influences appear to be very pronounced and the states should account for this non-domestic component when calculating reasonable progress goals so that domestic sources are not disproportionately burdened with reductions to meet goals that are affected by non-domestic sources. It is suggested that sources in the MANE-VU region should not be required to further reduce emissions to account for or to offset trans-boundary contributions.

Conclusion (Chapter 9)

It was noted that initially the document stated that much of the modeling analyses and results were preliminary and provide a "first step" toward identifying sources of visibility impairment in the MANE-VU region, however, Chapter 9 states that "…MANE-VU findings are sufficiently robust to serve as a basis for inter-RPO consultations in the regional haze planning process." The commenter agrees that RPOs should continue discussions but they caution MANE-VU's conclusion regarding impacts of modeling refinements and these preliminary assessments in no way should preclude MANE-VU from completing a more rigorous modeling exercise using more refined modeling techniques such as CMAQ or CAM_x in addition to updated inventories to support its final contribution assessment.

Appendices

It was noted that the last sentence of the first paragraph on page C-2 contains a dated inaccurate assessment of current Ozone and $PM_{2.5}$ NAAQS violation trends in the Northeast US region. The suggested rewrite is very specific, please see the second page of comments from MD DEP for the suggested changes.

The commenter agrees with the decision on page C-30 of Appendix C to switch to CMAQ V4.5 modeling for the final Regional Haze modeling analysis primarily because a sea salt calculation scheme was added and sea salt is a significant factor in regional haze at coastal Class I areas in the MANE-VU region

The final changes suggested are minor (format, spelling, grammar and reference, footnote and figure numbering) edits and comments, which are very specific, please see the third page of comments from the MD DEP for the suggested changes.