

**RESPONSE TO PEER REVIEW COMMENTS OF
THE INTERAGENCY WORKGROUP ON AIR
QUALITY MODELING PHASE 2 SUMMARY
REPORT AND RECOMMENDATIONS FOR
MODELING LONG RANGE TRANSPORT IMPACTS**

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Introduction

During September through December 1998 a peer review was conducted of the Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations For Modeling Long Range Transport Impacts (Irwin, 1999). The comments received from the peer review of the modeling system can be summarized into several general areas:

- 1) The order of presentation of the material in the draft version of the report was considered awkward, and the reviewers provided ideas on how the material could be edited and rearranged for better clarity;
- 2) the reviewers agreed with IWAQM that the sulfate and nitrate chemistry treatment within the CALPUFF modeling system was limited (especially as it does not address adequately aqueous phase in-cloud chemistry);
- 3) the new screening procedure that was developed and tested by IWAQM was seen as an improvement over that proposed in the Phase 1 interim recommendations; however, the reviewers recommended that it be made clear that this screening procedure is not guaranteed to provide conservative impact estimates, and that the technique is applicable for one or several closely spaced sources of emissions (not for multiple sources that are widely spaced around a Class I area);
- 4) the reviewers were concerned with the ramifications of allowing use of sophisticated mesoscale meteorological models for preparing the meteorological input to CALMET, in that even when operated by skilled personnel, the characterization of the meteorological conditions will differ, depending on which of several available models is selected for use, the options used and the manner in which the model is implemented, and,
- 5) the reviewers were concerned with IWAQM's suggestion that less than five years of analysis might be acceptable, if mesoscale meteorological modeling results were used in characterizing the meteorological conditions (in lieu of only relying on the available National Weather Service routine observations); and they felt that the results shown on year-to-year variability in concentration and flux impacts argued for at least several years of analysis.

The following discussion provides a brief summary of the main points of the peer review comments, and describes how the Environmental Protection Agency (EPA) intends to address the comments received.

Report Structure

Comment Summary. The peer reviewers provided specific edits to improve the clarity in certain places in the draft Phase 2 report. They also provided various ideas on how the sections might be rearranged in order to improve the order of presentation of the material. Except as noted before (with respect to the use of less than 5 year of meteorology, and perhaps providing some warnings on the screening technique) they did not believe any aspect of Phase 2 summary report needed to be changed prior to release. They believed the descriptions of previous work

were complete with adequate references, and that the science foundation of the recommendations was understandable and well documented.

Response. Most all of the specific edits suggested were incorporated. The one exception was the suggestion to focus more on changes of visual range versus the deciview. In this regard and as this is an area that is yet in a state of flux, we choose to add a caveat to the beginning of the section discussing air quality related values, directing readers to a web site where more up to date concepts could be obtained. The sections of the summary report were reordered and one section was moved to an appendix to accommodate the reviewers recommendations.

Aqueous In-Cloud Chemistry

Comment Summary. The reviewers agreed with IWAQM that the sulfate and nitrate chemistry treatment within the CALPUFF modeling system was limited (especially as it does not address adequately aqueous phase in-cloud chemistry).

Response. The EPA is aware that Earth Tech Inc is currently working with EPA Region X to develop a technique that might provide a more complete characterization of in-cloud chemistry. This new technique is untested and requires input data that may be difficult to routinely apply. Therefore, EPA believes the best approach is to offer the system as is, with cautions that the chemistry is treated simplistically. If and when a more complete in-cloud chemistry treatment is shown to work, then it can be recommended for use at that time.

Screening Procedure

Comment Summary. The new screening procedure that was developed and tested by IWAQM was seen as an improvement over that proposed in the Phase 1 interim recommendations; however, the reviewers recommended that it be made clear that this screening procedure is not guaranteed to provide conservative impact estimates, and that the technique is applicable for one or several closely spaced sources of emissions (not for multiple sources that are widely spaced around a Class I area)

Response. The EPA believes the cautions expressed are reasonable. In developing the draft language proposing the use of the CALPUFF modeling, the screening technique is mentioned as being available (but not required) for use on a case-by-case basis.

Use of Mesoscale Modeling Results

Comment Summary. The reviewers were concerned with the ramifications of allowing use of sophisticated mesoscale meteorological models for preparing the meteorological input to CALMET, in that even when operated by skilled personnel, the characterization of the meteorological conditions will differ, depending on which of several available models is selected for use, the options used and the manner in which the model is implemented.

Response. The EPA believes the future of air quality modeling resides in the general acceptance and use of these more sophisticated mesoscale meteorological models. It is also believed that the differences that might result by the use of different but yet valid mesoscale meteorological models, or by the implementation of different but yet valid options, is acceptable and represents the uncertainty in the science.

Year-to-Year Variability

Comment Summary. The reviewers were concerned with IWAQM's suggestion that less than five years of analysis might be acceptable, if mesoscale meteorological modeling results were used in characterizing the meteorological conditions (in lieu of only relying on the available National Weather Service routine observations); and they felt that the results shown on year-to-year variability in concentration and flux impacts argued for at least several years of analysis.

Response. In making the recommendation, the EPA recognized that several concerns were being balanced. There was the desire to promote the use of sophisticated mesoscale meteorological models, since testing results had indicated that the simulation results were improved through the use of such models. At the same time, it was recognized that the year-to-year variability in the modeled impacts could not be ignored. And finally, there was some concern that the computer resources for some states might be challenged, even in performing a 5-year analysis with routinely available National Weather Service observations. Hence, a compromise was offered that less than five years might be accepted on a case-by-case basis, if sophisticated mesoscale meteorological modeling results were to be employed in the assessment. The EPA intends to formally submit the CALMET/CALPUFF modeling system as a refined modeling technique for inclusion in Appendix W of 40 CFR Part 51 (Guideline On Air Quality Models). When this occurs the EPA will likely receive comments from the public regarding the efficacy of routinely using the modeling system as proposed. We understand the reviewers concerns will make a final decision on this issue once comments have been received from the public.

References

Irwin, J.S., 1999: Peer Review of the Interagency Workgroup On Air Quality Modeling Phase 2 Summary Report And Recommendations For Modeling Long Range Transport Impacts by M. Garrison, H.A. Gray, S.T. Rao, and M. Scruggs. January, 1999. Staff EPA Report. 64 pages.