

**U.S. Environmental Protection Agency
Advisory Council on Clean Air Compliance Analysis
Air Quality Modeling Subcommittee**

February 19, 2010

SAB Conference Center
1025 F Street, NW, Washington, D.C. 20004

Minutes of the Meeting

Attendees:

AQMS Members: Armistead Russell (Chair), David Allen, David Chock, Paulette Middleton, Ralph Morris, James Price, Chris Walcek

Council Members: James Hammitt (Council Chair), Richard Poirot.

SAB Staff Office: Stephanie Sanzone, Vanessa Vu, Marc Rigas

Other EPA Staff: James DeMocker, OAR

Other: Leland Deck, Stratus Consulting; Sharon Douglas, ICF; Cathe Kalisz, API; Jim Neumann, Industrial Economics; Stuart Parker, IWP News; James Wilson, Pechan & Assoc.

Purpose:

The AQMS, supplemented with additional members from the Council (see Roster¹), met to review air quality modeling results prepared for the Second Section 812 Prospective Analysis of the Costs and Benefits of the Clean Air Act Amendments of 1990.

Meeting Materials:

All materials discussed at the meeting are available on the Council Web site, <http://www.epa.gov/advisorycouncilcaa>, at the [February 19, 2010 AQMS Meeting](#) page.

Summary of Discussions:

The meeting was announced in the Federal Register² and proceeded according to the meeting agenda³, as revised. Stephanie Sanzone, Designate Federal Officer for the Air Quality Modeling Subcommittee (AQMS), convened the meeting and noted that the AQMS operates in accordance with the Federal Advisory Committee Act. This means that meetings are announced and open to the public, meeting minutes are prepared, and all materials prepared for or by the AQMS are available to the public. She also noted that subcommittee members are in compliance with ethics and conflict of interest rules that apply to them as Special Government Employees. Dr. Vu, Director for the SAB Staff Office, welcomed panel members and thanked Dr. Russell for agreeing to serve as Chair of the AQMS. Dr. Russell reviewed the agenda and the Charge to the Subcommittee⁴. He noted that previous AQMS meetings had provided input on data and methods, so the primary focus of this meeting would be on Charge Question 3 on validity and utility of the air quality scenarios.

The following is a summary of the issues discussed and conclusions reached during the meeting.

A. Briefing on Second Prospective Study

Mr. Jim DeMocker, Senior Policy Analyst with EPA's Office of Policy Analysis and Review and head of the 812 Project Team, provided an overview of the Second Prospective Study, including a comparison to the previous study of benefits and costs (see Presentation Slides⁵). He noted that the monetized health benefits for the Second Prospective Study are greater than those estimated in the First Prospective Study, in part because of differences in data, models, and methods used. For example, the current analysis captures organic aerosols and other fine particle species that were not included in the first prospective; a different interpolation procedure is used; and more PM_{2.5} monitoring data is available this time. The largest component of the benefits is associated with reduced premature mortality from exposure to particulate matter (PM). Revisions to the premature mortality estimates, based on suggestions from the Council's Health Effects Subcommittee, will increase the health benefits somewhat. DeMocker noted that the 76% reduction from non-EGU seems like an artifact and he asked for AQMS advice on how to adjust that part of the emissions inventory. He also showed some visualization techniques using Google Earth that the Agency may use to help present the final 812 study results.

Subcommittee members made the following points:

- The modeling report uses projections developed by the Regional Planning Organizations (RPOs) to project growth in nonpoint emissions for SIP. This is important for SO₂, but the RPO estimates are unrealistic because many states have BACT requirements for new sources.
- The greatest reductions are in the category of direct PM from area sources. What are the elements contributing to that category? For example, how much of the difference in PM mortality is from primary PM versus sulfate?
- Composition obtained from the National Emissions Inventory (NEI) doesn't match the fugitive dust inventory, so the analysis may be totaling up benefits that aren't real.
- The reductions in PM emissions from area sources appear too large to be credible, and results should be compared to monitoring observations in cities where local controls have been put in place.
- Without seeing the results from the Modeled Attained Test Software (MATS), it is not possible to determine if there are significant errors in the emissions inventories that would bias the outcome.

Jim DeMocker clarified that for each PM_{2.5} species, the emission estimates were developed by applying the modeled before/after ratio to the measured dust component, rather than re-running the CMAQ model. He suggested a follow-up teleconference call of the AQMS to look further at the PM emissions corrections.

B. Briefing on Air Quality Modeling

Dr. Sharon Douglas, ICF International, presented an overview of the analytical work done to prepare air emission inventories and model projected air quality for scenarios with and without the Clean Air Act Amendments (CAAA) of 1990 (Presentation Slides⁶). She also described the Particle Precursor Tagging Methodology (PPTM) that was used to evaluate the relative

contribution of various sources to the modeled changes. The tagging analyses were conducted separately from the CMAQ simulation, and did not affect the model results. Douglas also noted that, although the model scenarios are used for comparative (rather than absolute) analyses, a simple model performance evaluation was performed using the Atmospheric Model Evaluation Tool (AMET) to compare CMAQ outputs to observations. The analysis showed that CMAQ performance was similar across most of the U.S., although it performed less well in California.

During the discussion, Subcommittee members raised the following points:

- Since PM will dominate the estimated benefits, it is important to determine if the model is underestimating the organic carbon (OC) component. If OC is not as prevalent in a simulated future, precursors will not form ozone as readily; i.e., the reactivity of the atmosphere would be changed, and organic aerosol formation would be altered.
- In presenting results for PM_{2.5}, use stacked bars to show the relative contribution of various constituents.
- For ammonium sulfate, when using PPTM, the ammonia is tracked separately from sulfate (area versus EGU sources) in the model.
- The application of PPTM should not be used to apportion reductions, and the PPTM results might be better left out of the 812 report.
- Some comparison should be included of the results from the 12-km and 36-km grid cell resolutions, and it might be preferable just to report results for one resolution.
- The regional domains omit portions of the U.S.; it might be useful to use results from the national domain for those areas.
- Data graphs in the report should include variability around the point values.
- What possible benefits are lost by not considering ozone exposures outside of the summer months?
- Additional comparisons of simulated air quality and observed data would be useful to determine if the model is under-estimating ozone reductions in populated areas (and therefore causing an undercounting of benefits).

C. Subcommittee Discussion of Charge Questions

Dr. Middleton led the Subcommittee discussion of Charge Question 1 on data choices, and the following summary points were made:

- Choice of 2002 meteorological data: the decision to use 2002 seems sound, but discussion should be included to justify the choice (e.g., representative weather year, the database has been used and vetted thoroughly). Be aware of fires in 2002 when interpreting regions with outlier values.
- There are some problems with the NEI and some of the other data sources, but the team seems to have used the best information that is available
- The contributions to biogenic emissions should be discussed in order to determine the appropriateness of the data choices.
- Overall, the report needs more discussion of the data choices.

Dr. Walcek led the Subcommittee discussion of Charge Question 2 on methodological choices, and the following points were made:

- Grid Cell Resolution. Some members suggested using 36-km resolution only, and moving the 12-km work to an appendix. However, other members noted that the ozone

photochemical modeling at 36-km would miss many areas with high ozone. All members agreed it would be helpful to see how the results from the two resolutions compare.

- **MATS:** The AQMS agreed that the discussion of PM should include results after the MATS adjustments. This part of the analysis is not being peer-reviewed, and should be looked at. This step is the link between the CMAQ outputs and the differences in air quality that are the basis for the health benefits analysis. DeMocker agreed that a technical memorandum on the application of MATS, and the results, could be submitted to AQMS for review.
- **PPTM:** several members agreed that the tagging analysis might not represent a true source apportionment and that discussion of PPTM should be downplayed in the report. The speciation of PM may not reflect what is happening in the atmosphere, so the focus should stay on total mass of PM.
- **Unidentified Local Controls:** the assumption that all CAAA standards will be met is not realistic. The document should make clear that ULC are assumed in order to produce modeled scenarios that meet attainment.
- **Uncertainty:** AQMS members requested information on how uncertainty would be conveyed (i.e., were quantitative or semi-quantitative estimates planned?), and what were the major sources of uncertainty? DeMocker noted that the Agency had designed a workshop to develop an assessment of key uncertainties and how they would influence downstream analyses, but the workshop was not held because of funding issues. Members were concerned that some description of uncertainties be evaluated prior to being provided to the Council.

Dr. Chock led the Subcommittee discussion of Charge Question 3 on the validity and utility of the modeling work. He noted that data and methodological issues influence the validity of the overall effort, but agreed that the CMAQ is a state-of-the-art model. However, he raised concerns with the realism of the scenarios, in light of the “Great Recession”, assumptions about transboundary emissions, and the assumption of no climate change over the 30-year timeframe modeled. Other members noted that the study was useful for developing ballpark estimates of benefits and costs. Members agreed, however, that the term “validity” was not appropriate in this context, and recommended that the question be refocused on “utility” of the results; i.e., are the modeling scenarios a reasonable basis for the benefits assessments?

Subcommittee members had recommendations for improving future air quality modeling efforts, including using the newest version of CMAQ, update to include new regulations, consider winter ozone, incorporate methane (contributes to background ozone), and doing quasi-best-case and quasi-worst-case scenarios to bound the outputs, then consider economic growth and climate change as the major factors effecting the cases. In addition, several members suggested that an effort be made to evaluate past emissions projections using observations (e.g., for 2010).

Dr. Russell asked whether significant changes could be requested in the CMAQ document, for example to discuss MATS and uncertainty. DeMocker replied that responses to AQMS recommendations likely would be addressed via technical memoranda rather than by making changes to the draft contractor report. (The MATS work was done by a different contractor than the original CMAQ report.) The AQMS agreed to schedule a public teleconference in mid-March

to consider additional materials on (1) MATS adjustments to the emissions inventories, and (2) uncertainties in the air quality modeling.

D. Writing Session and Next Steps

Members held a writing session from 3:00 to 3:45 p.m., at which time draft text was circulated for review, and edits and additions were provided to each subject lead. Dr. Russell agreed to develop a first draft of the AQMS report over the weekend, and provide it to the DFO for editorial and format review. The resulting draft report will be circulated to the AQMS for review and comment. The DFO also was directed to check on the timing for additional technical information from EPA and to schedule a follow-up teleconference call.

The DFO adjourned the meeting at 4:30 p.m.

Respectfully Submitted:

/s/

Stephanie Sanzone
Designated Federal Officer

Certified as Accurate:

/s/

Dr. Armistead Russell, Chair
Air Quality Modeling Subcommittee
Advisory Council on Clean Air
Compliance Analysis

Materials Cited

The following cited materials are available on the Council Web site, <http://www.epa.gov/advisorycouncilcaa>, at the [February 19, 2010 AQMS Meeting](#) page:

¹ Air Quality Modeling Subcommittee Roster, February 19, 2010

² Federal Register Notice Announcing the Meeting, Vol 75 Number 16 Pages 4070-4071

³ Final Agenda, Air Quality Modeling Subcommittee of the Advisory Council on Clean Air Compliance Analysis, February 19, 2010

⁴ Charge to the Air Quality Modeling Subcommittee

⁵ Presentation by Jim DeMocker on Section 812 Second Prospective Air Quality Modeling, February 19, 2010

⁶ Presentation by Sharon Douglas on Second Prospective Analysis of Air Quality in the U.S. – Air Quality Modeling, February 19, 2010