

RPO National Technical Workgroup Meeting November 4-6, 2003 Meeting Summary

Plenary Sessions

Plenary Session 1 – November 4, 2003

Goals of the Meeting

Several participants spoke about the progress the RPOs have made in laying a solid technical base which will serve the upcoming policy decisions. The leads for the three technical sessions (modeling, monitoring, and inventories) each provided a brief status report.

- Marc Pitchford and Rich Poirot spoke for the monitoring group which has worked hard on inter-RPO communication. The next opportunities for integration are across the RPOs. They announced a Visibility Specialty conference for late October 2004 in Asheville, NC. The new focus is on the spatial extent of the emissionsources and tie-ins with global scale modeling.
- Laura Boothe and Tom Moore spoke for the emissions inventory group and their efforts to coordinate the timing and approach for inventory development. They are focusing on ammonia and fire emissions and are supporting development of a new emissions model, OPEM, which will begin in January.
- Chad Daniel said the modeling group is maintaining good communication and are doing sensitivity analyses and model/air quality analyses. The RPOs are still in different places on their modeling timeline.

IEWS Training Announcement

Shawn McClure (CIRA) reminded the participants that IEWS training was available throughout the meeting. IEWS is the first inter-RPO project. They are currently finishing the development of the database and are working on the development of back-end tools to integrate, analyze and present the data. They are adding new visualization tools, including geographic information systems (GIS), and are anxious to get user feedback on future directions and query menus.

CATT and FASTNET Training Announcement

Rudy Husar (CAPITA, Washington University, St. Louis) introduced two tools under development. The Combined Aerosol Trajectory Tool (CATT) is being developed by MANE-VU and MWRPO to indicate the origin of air masses for specific aerosol conditions and the Fast

Aerosol Sensing Tools for Natural Event Tracking (FASTNET), which is a demonstration of tools and procedures for natural event characterization, is being developed by NESCAUM. The first phase of CATT supports 16 sites and is a “value adding chain” that includes emissions and transport data (weather, etc.). The filter figures out where the air mass originates and the chemical conditions. They have just begun work on FASTNET, which will have 3 zones of activity. One is the community website (tracking what is happening - e.g., Chinese dust storms or Canadian smoke); there will also be an analysts console and a managers console.

Plenary Session 2 – November 4, 2003

Jim Szykman (EPA/NOAA) made a presentation on Infusing satellite Data into Environmental (air quality) Applications (IDEA). IDEA is a partnership between the EPA, NASA, and NOAA to improve air quality assessment, management, and prediction by infusing NASA satellite measurements into air quality analyses completed by EPA and NOAA to be used for the public benefit. A MODerate-resolution Imaging Spectroradiometer (MODIS) satellite in polar orbit records aerosol optical thickness. Integrating the satellite with meteorological data and ground aerosol measurements puts the aerosol optical depth (AOD) measurements into the appropriate context to be used for regional haze forecasting. MODIS aids in forecasting by helping to predict regional transport influences, natural event influences, and re-circulation influences. Using a case study on fires that occurred in British Columbia in September 2003, Mr. Szykman showed how IDEA can be used for forecasting.

Plenary Session - November 5, 2003

- Neil Frank (EPA/OAQPS) announced the release and availability of “Guidance for Tracking Progress Under the Regional Haze Program” and “Guidance for Estimating Natural Visibility Conditions.” Statistics for the regulatory applications will be posted when the Federal Register notice for the guidance is published.
- Dan Jacob (Harvard University) presented information on natural sources and transboundary pollution. He recommended that the interannual variability of fires be analyzed along with IMPROVE data. He believes ammonia emissions are overestimated in the fall and summer nitrate predictions are overestimated because the sulfur scavenging in the summer is underestimated.
- Fred Dimmick presented results of source apportionment analyses that EPA has conducted in support of the development of the Transport Rule.

Monitoring/Data Analysis Summary

The Monitoring/Data Analysis Work Group met as part of the National RPO Meeting. Representatives of each RPO provided an update on the progress made over the past year. Work Group members also made presentations on the following topics:

- Reserve, KS satellite super-site monitoring study;
- The IMPROVE ion study;
- The assessment of the causes of haze;
- Special studies by SEARCH and VISTAS;
- Monitoring studies in the Northeast;
- The Ohio University Database and Analytical Tool;
- Update on VIEWS;
- An assessment of aerosol extinction methodology;
- A comparison from co-located IMPROVE/STN sites;
- Update on the RPO and EPA fire emissions systems; and
- An update on the CATT system.

Also, the Work Group discussed (1) the RPO Grant Guidance for Monitoring and Data Analysis; (2) RPO coordination, and (3) RPO integration. The RPO updates as well as the guidance, coordination, and integration are discussed below.

RPO Monitoring and Data Analysis Updates

Representatives of all of the RPOs provided updates on the status of their organizations' monitoring and data analysis activities. The following provides a brief update on what each of the RPOs has accomplished.

- **WRAP.** *Presenter: Marc Pitchford* (presentation not shown but is available). WRAP, in conjunction with the Desert Research Institute, has been researching the causes of regional haze. The program is not a contract; it is an interactive program that will continue over several years. Data and other information generated by this program will be reviewed by committees, and the information as well as results generated by this committee will be posted on the Web for RPO and public use. Some questions being examined by WRAP and Desert Research Institute include: (1) What components of aerosols are responsible for regional haze? (2) What role does meteorology play in regional haze? and (3) What are emissions sources for regional haze?
- **MANE-VU.** *Presenter: Rich Poirot.* MANE-VU has completed the Phase II modeling analysis, sponsored CATTs, and successfully implemented CATTs to evaluate the results of the study. MANE-VU has also worked with the Desert Research Institute and the Midwest RPO to do a refined modeling analysis.
- **VISTAS.** *Presenter: Scott Reynolds* (Presentation available). VISTAS has been comparing the different monitoring networks within its jurisdiction in an attempt to understand why differences within the monitoring networks exist. Mr. Reynolds noted the need for VISTAS to monitor near its boundaries to determine the impact of outside sources on regional haze. Furthermore, VISTAS has made supporting modeling one of its primary objectives and has begun altering its monitoring network to accommodate their needs.

- **CENRAP.** *Presenter: Ray Bishop.* CENRAP has been involved with inter-RPO projects with WRAP and the Midwest RPO. CENRAP and the Midwest RPO are working with each other to monitor ammonia emissions. They hope to be able to collect data soon. CENRAP has also completed a monitoring study at Reserve, KS.
- **Midwest RPO.** *Presenter: Donna Kenski (Presentation available).* The Midwest RPO has taken a three-pronged approach to analyze data. The first prong consists of a work group made up of state data analysts and interested stakeholders. This work group focuses on a narrowly defined set of issues. The second prong is to use contractors for the more complicated data analysis since this type of analysis requires more specialized expertise. The third prong is working in-house to direct work groups, develop new projects, and focus on projects that require more complex tools or analysis. By using this approach, the Midwest RPO hopes to cover all bases needed for regional haze research.

RPO Grant Guidance

The bulk of the comments regarding the RPO grant guidance relate to the SIPs and the potential impacts that discussing regional haze at the policymaking level might have. Concerns regarding the SIPs are:

- Better defining the location of sources of regional haze; and
- Releasing as much information as possible to avoid “finger pointing” by states as to who has sources of regional haze.

Concerns related to future policymaking are:

- Characterizing the impacts of regional haze on Class I areas (e.g., the amount of dollars lost due to less tourism, etc.). These numbers need to be in terms that politicians would understand.
- Convincing regulators and legislators that balancing SIPs makes economic sense. RPOs should be ready to answer questions that might occur during policymaking discussions.
- The value that Americans place on preserving visibility in Class I areas. If important enough, an inter-RPO discussion should occur. The RPOs would also need to decide what benefits could be monitored.

RPO Coordination

The points made during this discussion are as follows:

- The RPOs need to work to fill in the monitoring gaps to develop a national monitoring network that would also be a multi-pollutant network.

- Rural monitoring is also difficult due to a lack of resources among the states. The EPA will examine its national budget to determine how to reallocate some funding to assist in putting out a rural network.
- If the EPA would be willing to fund co-located sites, then the RPOs could make sure that the infrastructure at the sites would be large enough to accommodate extra monitoring equipment.

RPO Integration

The points made during the discussion of RPO integration are as follows:

- Regarding integration, the process is far enough along that it needs to begin moving toward the policymaking stage.
- The RPOs need to show policymakers that regional haze impacts do occur across state lines.
- The RPOs need to address ways to organize information such that it is readily available for review during the policymaking process. The information also needs to be analyzed and organized by the RPOs so that the states have easy access to it. One possibility would be to use VIEWS as a central repository.

Emissions Inventory

The Emissions Inventory Work Group met as part of the National RPO Meeting held on November 4-6, 2003 in St. Louis, MO. Work Group members gave presentations on the following topics:

- Development of windblown dust emissions inventories (*Ralph Morris, WRAP; Tom Pace, EPA*);
- CEM/EGU data analysis (*Mark Janssen, LADCO/MWRPO; Marc Houyoux, EPA*);
- Development of nonroad and area source emissions inventories (*Mark Janssen; Pat Brewer, VISTAS; Megan Schuster, MANE-VU*);
- Development of the 2002 NEI (*David Misenheimer, EPA*);
- Tracking/registries (RPO Virtual Inventory and inventory schedules) (*Mark Janssen; Tom Moore, WRAP*);
- Inventory projections (*Greg Stella, Alpine Geophysics LLC; Marc Houyoux; Tom Pace*);
- Networked Environmental Information System for Global Emissions Inventories (NEISGEI) (*Stefan Falke, Washington University, St. Louis*);
- Development of wildland fire emissions inventories (*Mark Janssen; Tom Pace; Pat Brewer; Stefan Falke; Pete Lahm, USFS*); and
- Development of ammonia inventories (*Tom Pace, Ralph Morris, Marc Houyoux, Mark Janssen*).

Work Group members also had the opportunity to participate in a question and answer session with Phil Lorang of EPA regarding SIP EI reporting, EPA guidance, motor vehicles and point sources inventory development. A complete list of questions is available in the presentation file.

Some questions focused specifically on the presentation given by David Misenheimer entitled "2002 National Emission Inventory (NEI) Briefing." In the presentation, he explained that a new data collection system will be up and running by January 2004, and States will be able to submit data through June 2004.

Issues and questions were addressed as follows:

- SIP Emission Inventories

- < What are the stipulations for updating SIP EI's?

SIP EI's can be updated up to the minute States submit them. EPA will make an effort to communicate that to the Regions.

- < How do States and Regions deal with elements in modeling inventories that are not required or included in the Consolidated Emission Reporting Rule (CERR)? Is there a process for submitting more extensive modeling inventories to EPA?

More detailed inventories could be submitted as part of the SIP. EPA wants the best information, but EPA is developing a national, coarser scale inventory. RPO's may develop finer scale inventories. EPA will incorporate data from RPOs if possible.

- < States need clarity from Regional EPA offices regarding SIP inventories, especially in how to document PM inventories. Is draft guidance available? Guidance is needed for area source calculations. States need assurance that Regions agree with the guidance and keep communication channels open for special cases.

EPA is not asking for documentation on the NEI development process, but they are asking for documentation on SIP preparation. The process is decentralized to EPA Regions. EPA cannot make a blanket statement to cover all regions.

- EPA Guidance

- < Does EPA have guidance for use of dust transport fractions?

County-level transport fractions will be used until something better becomes available. However, EPA will not force States to use these defaults if they have better fractions.

< When will updates become available for SMOKE and/or CMAQ?

That question will be referred to ORD.

< Biogenics shown in 2002 NEI vs. “attenuated” biogenics used for modeling (including Dust, NH₃)

EPA will only present biogenic emissions in broad and general terms, so they are not requiring States to go into much detail regarding biogenic inventories. Different RPOs may have different degrees of complexity; for example, eastern States do not necessarily place a high importance on biogenic emissions while the WRAP has detailed inventories. There will be divergences between RPO inventories and CERR for things like biogenics. EPA has said that they will develop biogenic emissions for States for the NEI. In retrospect, EPA would not have required biogenics as part of CERR, but there are ways around it.

< Other issues regarding CERR and the NEI

There are several differences between the NEI and CERR. States are required to submit data to the NEI that may not be used in CERR, and vice versa. CERR data is also used in other applications beside the NEI. There is currently no system for public information on CERR, but this needs to be a priority.

< Display and uses of EPA transport rule EI and modeling results

The transport rule emission inventory has been changed to 2001. The published proposal will explain the adjustments. In the long run, a database will be available to some users such as modelers. Projection inventories will also be available on the server. Control and growth factors are available for Clear Skies. These are SIC-based growth factors for 2002 and 2020, but they use 1996 as the base year.

- Mobile Sources

< When is the NMIM release date?

NMIM is not high on the priority list, but EPA is making progress. If it is not out by the first of the year, RPOs will probably not be able to use it for CERR inventory development.

- Area Sources

The WRAP has done an inventory on oil and natural gas well sites in the Rockies. Denver was found to be in non-attainment because of well emissions. This large new

area source is a result of over 13,000 small wells that would not have been regulated individually. For every well not controlled, it becomes a type 5 source. EPA should find a way to categorize this source and include it in the emissions inventory.

- Point Sources

- < Continuous Emissions Monitoring (CEM) data vs. State Electric Generating Unit (EGU) inventories

EPA will need to examine which specific sources to include in the federal inventory. There will be an opportunity to comment on which emission factors to use to ensure consistent projections. It has been too difficult to reconcile State and EPA data, so EPA data will be used. Emissions will be at the facility level and allocated to the point level. All details or changes provided by States may not be included in the national inventory.

- < How will point sources be pulled out of CERR submissions using CEM data?

EPA has a set of data for cross-referencing. If plant ids are the same, there will be some matching, but it is a big effort to match ids. EPA would like to have as much harmony as possible in reporting so double-counting will be minimized.

- < What if States cannot or do not submit data?

If States find it easier to not submit data, let EPA know. However, there is a lot of value in having State information. If State resources are limited, they will not be required to submit new data. EPA will do everything possible to honor State submittals and needs.

Photochemical and Meteorological Modeling

RPO Updates

Representatives from each RPO provided updates of modeling activities within their respective RPOs. The following is a brief summary of each update.

- Calvin Ku presented an update of CENRAP's modeling activities including a timeline of their modeling efforts. CENRAP has contracted with Atmospheric Environmental Research to develop model evaluation/selection software.
- MANE-VU gave an oral update of their activities. They are working with Calpuff on emission source strengths. They are updating their meteorological data to support Calpuff modeling. They have 3 Linux machines running REMSAD7.1, and they recently

hired a modeler who is proficient in CMAQ. They are working with Earthtech on a screening tool, "Calgrid."

- Kirk Baker presented an update of the Midwest RPO modeling activities. They have been doing a lot of sensitivity analyses with both geographic and global cuts to see how the models perform.
- Sheila Holman presented information on VISTAS modeling activities. The Southeast has the worst visibility problems and they need to get the sulfur correct in their modeling. Two of their member states have long legislative time lines so VISTAS is working to have their modeling complete by December 2005. They are in Phase I and are conducting sensitivity analyses of three episodes (7/99, 7/01 and 1/02). Their regulatory modeling will begin in January 2004.
- John Vimont provided an update on the WRAP modeling efforts. The WRAP had to do up-front analyses for the §309 SIPs which are due in December 2003. They are currently addressing some of the problems they encountered and instituting other improvements including the update from CB4 to CB4_2002. He presented data on a comparison of the different chemical mechanisms with IMPROVE data. Nitrate is dominating their haziest days in both the summer and winter. Improvements in their nitrate performance are due in part to changes in their ammonia inventory.
- Chad Daniel reviewed the past efforts and meeting goals for the Modeling group. Some of the unresolved issues for the group include: (1) vertical layer collapsing, (2) deposition velocity calculations, (3) horizontal diffusion, (4) relative reduction factors, and (5) emission inventory uncertainties. Upcoming issues include: (1) finalizing the meteorology, (2) inventory improvements and timing issues, (3) model performance, and (4) post-processing analysis techniques.

Updates on Guidance

Brian Timin gave an oral update on the draft "Guidance for Demonstrating Attainment of Air Quality Goals for PM_{2.5} and Regional Haze (1/2001)". He emphasized that modeling should coordinate the ozone and PM modeling needs and those data could dictate which years to model. He discussed potential updates. One is the selection of the future year for regional haze modeling analyses (should it be based on 2016 which is midway in the 5-year period). Selection of design value data is very important. A common representative data set is needed for projections. Finally the use of spatial fields of ambient concentrations as part of the "modeled" attainment test.

- He is proposing to set up a model evaluation workshop at the end of January 2004 to discuss statistical metrics. Contractors and stakeholders would be welcome. There is a need to go beyond gross error and bias. Following the workshop he would update that chapter in the guidance.

- He announced that the improvements on visibility that would result from the Clear Skies legislation is available in the technical support document which has been posted on EPA's website.

Rosalina Rodriguez provided an update on the grant guidance. The current guidance was released with the 2002 appropriations. The 2004 appropriations will be finalized once Congress establishes the budget. EPA wants to update this guidance to go through 2007 when the SIPs are due. Ms. Rodriguez made the following requests:

- She would like comments and suggestions by the end of November 2003 to modify this guidance.
- She is specifically seeking guidance on what should be done in the 2005-2007 timeframe.

General Presentations

The Work Group made several presentations which are listed below.

- Kirk Baker presented additional information on their CAMx4 model performance evaluations at supersites and the results of their sensitivity runs on grid resolution.
- Betty Pun (Atmospheric and Environmental Research, Inc.) presented information on a database and software tool under development (sponsored by CENRAP) to support model performance evaluation.
- John Vimont presented information on the BRAVO study but asked that questions about BRAVO be directed to Bret Schichtel of Colorado State University.
- Jim Boylan presented data on CMAQ sensitivity runs that have been run by VISTAS.
- John Vimont provided a verbal update on recent WRAP modeling activities. They are using the new carbon-bond IV chemistry - 2002 version. This has an updated nitrate chemistry. It has not really fixed the nitrate overestimation problem.
- Mike Abraczinskas presented information on the meteorological modeling conducted by VISTAS to analyze the different physics options and inputs for the MM5 meteorological modeling.

Remaining Issues

- Jim Boylan agreed to be the new co-chair for the modeling group.
- The meteorological modeling issues discussion addressed the EPA/ORD's desire for a different wet deposition scheme that better accounts for the phase of water in clouds.

The group discussed the need to analyze the issue and the status of the models (CMAQ and CAMx) with regard to the use of mixed phased water in clouds. The group also discussed whether the 2002 meteorological runs should be rerun to pick up the cold restart. There was discussion about using the GEOS-Chem data from Daniel Jacobs to support boundary conditions. EPRI is funding additional GEOS-Chem research for 2000, 2001, and 2002. VISTAS may also support that effort after analyzing the impact of boundary conditions on their modeling efforts. For the Virgin Islands, the 20% worst days are dominated by Saharan dust, but in the VISTAS domain, they are dominated by sulfur.

- The group discussed analysis of control scenarios and whether coordination was needed across the RPOs. It was suggested that the individual groups model “high” and “low” control scenarios for the neighboring RPOs.
- Goals for next year include identifying critical items to support the modeling. There was discussion of using the BENMAP model to provide consistency in the analysis of ancillary benefits (e.g., asthma and other health benefit costs). The group may want to get the model and look at some of the underlying assumptions. Some areas (e.g., Wisconsin) may have a hard time selling the reductions to the State legislatures when they have no Class I areas.
- Brian Timin is organizing a model performance workshop, tentatively scheduled for late January 2004.
- There was support for another national RPO meeting in June.
- The ice in clouds issue will be discussed at the next monthly modeling call; someone from ORD will be invited to provide more information on the issue and their recommendations.

Joint Emission Inventory and Modeling Session - Afternoon of November 5, 2003

The Emissions Inventory and Modeling Work Groups held a joint session on the afternoon of November 5, 2003. The following presentations were made:

- Mark Janssen of the Lake Michigan Air Directors Consortium presented a presentation on the Open Emissions Model (OPEM).
- Ralph Morris of ENVIRON made a presentation on Emissions updates for wind blown fugitive dust within WRAP.
- Kirk Baker of the Midwest RPO and Ralph Morris made a presentation on PM_{2.5} soil and crustal sensitivity runs.

- Marc Houyoux presented improvements in the SMOKE 2.0 model.
- Tom Moore led the discussion regarding inventory schedules for the emissions and modeling groups.