

**Minutes of the BAAQMD 2004 SIP Modeling Advisory Committee (MAC)
Ninth Meeting**

**The ninth meeting of the MAC was held on
Tuesday, April 29, 2003, at 1:00 p.m.
at the District office, seventh floor Board Room.**

Attendees: see sign-up listing attached

Agenda: Posted with these minutes on project web site
(www.environ.org/project.html; click on "Bay Area Air Quality Management District"; enter user name and password)

Next meeting: Tuesday, June 10, 2003 (1:00 pm at BAAQMD)

Presentations and handouts (all are provided on project web site):

- Agenda
- Chris Emery's presentation on project status and schedule, and CAMx runs;
- Craig Tremback's presentation on meteorological results
- Jim Wilkinson's presentation on emissions processing status
- Bob Bornstein's presentation on shipping activity during July/August episode

Discussion items:

Agenda -- No changes were suggested

Approval of minutes from last meeting – No comments/corrections offered by attendees to last meeting minutes.

Project Status Summary

Chris Emery discussed the status of modeling database development for all three episodes, and air quality/meteorological measurement data from CCOS. For the July/August 2000 episode, meteorological modeling is complete for now, pending some additional runs that may be identified from analyzing photochemical model results, and independent review of meteorological modeling results by the District. Additional runs may include changes to FDDA, incorporation of CCOS wind data, and additional changes to surface characteristics. Emissions for July/August are awaiting resolution of several issues, including new biogenic/on-road mobile emissions reflecting revised temperatures, SAPRC99 speciation, refinery flaring stack data, shipping emission updates, and the development of 1-km gridding surrogates. Numerous CAMx simulations have been completed to date, reflecting several emission and meteorological updates, boundary condition sensitivity tests, and others.

The bulk of stationary emissions have been processed for the June 2000 and July 1999 episodes, and we are awaiting temperature fields to complete biogenic and on-road mobile sources for these episodes. Meteorological modeling has commenced for June 2000, but not for July 1999.

A CCOS air quality database at Level "1B" validation was received from ARB on April 29, and should include VOC lumped to CB-IV and SAPRC99 compounds. CCOS meteorological data for both 2000 episodes will be obtained by the District and quality assured by District staff.

The project schedule continues to be compressed since emissions processing and meteorological modeling continue to be delayed because of delays in CCOS data acquisition. Extension of the project end date may be necessary. A new project schedule will be developed to reflect current estimates on the time necessary to complete all tasks. The District has committed staff time to assisting in several areas to maintain timely completion of the project.

Meteorological Modeling

Chris Emery discussed ATMET's presentation on the status of modeling the June 2000 episode. Six RAMS simulations have been completed to date, focusing on soil moisture and FDDA. This episode is more difficult to model than the July/August episode for several reasons, mainly attributable to strong mesoscale dynamical forcing that was not especially present in the former episode. There is a strong interaction between downslope/subsiding air coming off of the Sierras and the boundary layer evolution in the central valley. Craig Tremback believes that nudging to large-scale analyses that do not resolve high-frequency microscale interactions is damping out dynamical features that RAMS is attempting to develop. This is causing difficulty in correctly simulate downward momentum mixing and subsidence warming. Therefore, model performance is indicating large biases in wind speed, and may be a dominant reason for under predicted afternoon temperatures. However, moisture performance is quite good, which is opposite of the July/August performance.

Bob Bornstein correctly pointed out several salient points, and made a number of good suggestions, based on his SCOS modeling experiences in Los Angeles and lessons learned regarding meteorological model peculiarities: namely, large scale nudging can be a mixed blessing; and the location/timing and strength of convergence between off-shore and on-shore flow regimes in this episode will be crucial to ozone simulation performance, which can be regulated by changes to FDDA, etc. This will need to be explored further. Bob will follow up in discussions with Craig Tremback and Chris Emery.

ATMET's presentation discussed the configuration of RAMS relative to the July/August episode: changes include weaker nudging and higher moisture at deep soil levels. Note that observation nudging toward CCOS wind measurements has not yet been undertaken in any episode given that data continue to be unavailable.

Additional sensitivity runs are planned, including a 4-grid run (inclusion of 1-km grid over the Bay Area), runs with no FDDA to investigate its role in suppressing proper small-scale physics/dynamics, and tests with surface modifications (roughness, deep soil temperature, etc.).

Saffet Tanrikulu stated that the District will begin an independent review of RAMS performance to assist in identifying key areas of needed improvement.

Emissions

Jim Wilkinson presented the current status of the July-August 2000, the June 2000, and the July 1999 emissions inventories for use in CAMx air quality modeling. Since the last MAC meeting, the ARB delivered a new round of on-road mobile source and biogenic emissions estimates for the July-August 2000 episode. These new emissions estimates were based on new temperature fields derived from observations using Calmet. Further, the ARB has delivered the new Calmet-derived temperature field for the July-August 2000 episode for use in the study team's efforts to estimate biogenic NO. These new data are currently being added to the model-ready inputs by Alpine.

Mr. Wilkinson indicated that the June 2000 and July 1999 stationary and area source emissions estimates had been processed and were available for use in the CAMx air quality modeling. Efforts to prepare emissions estimates for biogenics and on-road mobile sources were on hold until the relevant meteorology become available. Of note, Dr. Tanrikulu of the BAAQMD has offered to prepare temperature and solar radiation fields for the June 2000 and July 1999 episodes using the same methods that ARB used for the July-August 2000 episode. Dr. Tanrikulu indicated that the June 2000 fields will be ready by the end of May.

Mr. Wilkinson indicated that the project team was conducting quality assurance and "reasonableness" checks on the new emissions estimates, and will provide periodic updates of his findings to the MAC members via e-mail and web site references. He presented the current summary of the emissions estimates for each episode. These QA checks were summarized and presented in both graphical and tabular form to the MAC. Mr. Wilkinson indicated that he had concerns in regards to the episodic comparison of the emissions (e.g., EGU NOX emissions in July 2000 were about a factor of three higher than the EGU NOX emissions in June 2000). The project team will continue to work with the ARB to determine if these issues are relevant problems. Further, it was suggested that it would be good to have other categories listed explicitly in the summary tables (e.g., biogenics, flares, etc.).

Though it now appears that the refining industry, the BAAQMD, and the ARB are in agreement as to the magnitude of the emissions from refinery-related operations, stack parameters associated with the flares still were problematic. Mr. Hess of the BAAQMD provided, during the course of the MAC meeting, a summary that the District prepared in January to assist in reconciling CARB data and industry data; this

included a data set of flare-related stack parameters that the project team will attempt to use to reset said parameters in the emissions data base, although CARB has since stated that these emissions and stack data are included in the CARB provided information. Mr. Wilkinson indicated that due to data base identifier problems (associated with frequent changes in facility ownership) that some, or all, of the data Mr. Hess provided may not have been used by CARB. Alpine will re-examine all data to assure most recent is being used, and will report findings back to the MAC prior to the next MAC meeting.

Another issue that the project team will investigate prior to the next meeting concerns the temperature effects on evaporative emissions from storage tanks, marine loading, and the like. Alpine will check the procedure by which CARB is adjusting tank storage (petro refineries) for temperature.

Mr. Wilkinson stated that the project team had begun to prepare the future year baseline emissions estimates. EMS-95 has been setup for the future year baselines, but the project team is waiting on the outcome of a number of small issues that still impact the base case emissions before proceeding to run the future year baseline emissions.

Among these issues were the impact of additional controls that must be applied to the year 2000 base emissions estimates for the Sacramento region. Brigitte Tollstrup asked if the emissions and/or control measure comments made and submitted to the BAAQMD/CARB had been addressed in the emissions inventory. Districts were to check and coordinate with Jim Wilkinson. Vernon Hughes commented that CARB "was aware of the SMAQMD comments and was working on it". No deliverable or timeline was offered by Hughes. The MAC was concerned that the inventories for 2000 might not recognize new controls that were in effect in the SMAQMD area in 2000, and the project should also recognize the new controls that will go into effect before 2006, and thus affect future year emissions estimate. This is in CARB's "to do" list.

Vernon Hughes also expressed that CARB is looking at SMAQMD comments to see if they have broader application throughout the CCOS domain (i.e., is CARB properly representing the current and future state of emissions controls in their inventories?). This is also on the CARB "to do" list.

Evan Shipp wanted to be assured that all emissions inventory data and plots would be available to him and all MAC participants. He was told that these have been available for several months, and new information will continue to be available either via the ENVIRON or the AG web sites.

Bob Bornstein discussed on-going efforts to assess commercial marine shipping emissions. Marine shipping constitutes about 3% of Bay Area NOx emissions and 4% of basin-wide NOx emissions (the definition of basin vs. Bay Area was unclear). In any case, these are not insignificant NOx sources, and they do not include ferries. There was some discussion of significant day to day variability of ship movements, and

thus emissions. Two approaches were identified: obtain detailed ship data and calculate emissions specific to each vessel, or use the overall ship movement data to broadly assess the range of emissions change that is likely (overall ship emissions times ship movement range), and then use that for some insight on likely ozone impact and need to better define the emissions by day. For now, in order to gauge the impact of day-specific commercial marine travel on the emissions estimates, the project team will estimate new commercial marine shipping emissions based on Dr. Bornstein's work for the July-August 2000 episode. Results will be distributed to MAC members.

Preliminary CAMx Results

Chris Emery presented results from ozone modeling using the latest meteorology from ATMET and the latest (March 3 version) emissions from Alpine. Several specific simulations were discussed, which tested the effects of the 1-km grid, changes to boundary conditions (simple and observation-based), and a small change to nighttime vertical diffusion coefficients (mixing rates). Model performance is indicating wide spread under predictions by ~30-50%, once a problem with fire emissions were corrected. Boundary condition tests indicate that results are sensitive to higher ozone on the boundaries, but not in a linear way (e.g., 25 ppb increases in boundary ozone results in ~10 ppb higher ozone in the Bay Area). Changes to nighttime vertical diffusion make very little difference to daily maximum ozone.

Several additional tests are planned, including invoking the Plume-in-Grid module, adding vegetation drought stress (reduces deposition rates), further refinement of boundary conditions using aircraft measurements to the extent possible, examining the impact of the revised biogenic and on-road mobile inventories for higher temperatures, use of SAPRC99, and the development of 1-km emissions for use in 1-km photochemical modeling.

The District is planning to undertake additional tests to assist in the analysis of model performance. Saffet Tanrikulu suggested that the District pull together a table of available datasets developed in this project (measurement, emissions, and modeling).

--- END ---