Minutes of the BAAQMD 2004 SIP Modeling Advisory Committee (MAC)
Thirteenth Meeting - Continuation

Continuation of the thirteenth meeting of the MAC was held on
Monday, October 27, 2003, at 1:30 p.m.
By conference call

Attendees: see sign-up listing attached

Agenda: See agenda for October 21, 2003
Posted with these minutes on project web site (www.environ.org/basip2004), enter user name (basip2004) and password (goldengate)

Next meeting: Thursday, December 4, 2003 (1:00 PM)

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

- Agenda for October 21, 2003

Discussion items:

The purpose of this continuation by conference call was to complete the discussion of agenda items from the October 21 meeting. Rob Harley was invited to participate on this call to discuss his report on fuel-based emission inventory estimates.

CAMx applications undertaken by the District, CARB, and UCR for central California are all under predicting ozone throughout the domain using similar meteorological fields, emissions, and boundary conditions. The District is looking into ways to improve model performance. It is the goal of this MAC meeting to identify known and suspected problems, identify potential ways to resolved them, and to line up resources to assist in this effort. A schedule for implementing the analyses identified in these meetings will need to be developed.

Mobile Emissions

Saffet Tanrikulu opened the discussion by referring to the fuel-based inventory report developed by Rob Harley. This study was a field research program that initially involved remote sensing. As part of the analysis of the field data, a fuel-based inventory was constructed for the Bay Area, Sacramento, and SJV.

The diesel element of the inventory included a literature review, which suggests that diesel emission factors have remained constant since the late 1980's (they were expected to decrease). These are combined with diesel fuel usage to obtain NOx emissions estimates. It is clear that diesel usage has increased more than gasoline

(modeling assumes a fixed percentage of gasoline usage), and so diesel is responsible for a larger fuel share lately, and thus responsible for more NOx than currently assumed. SJV diesel use has increased ~60%, while statewide it has increased ~45%. Results for the Bay Area and Sacramento are in reasonable agreement with EMFAC. Diesel use is much lower on weekends due to commercial activity differences.

For the gasoline element of the study, there is nearly exact agreement with EMFAC in all counties except SJV. While agreement against EMFAC is better than it used to be, significant uncertainties continue to exist. Dr. Harley's HC:CO ratios are higher than in EMFAC. In the SJV, his estimates suggest 35% higher HC and 40-60% higher NOx (if we are to accept that CO in EMFAC is correct).

CARB asked if his comparisons are against the latest version of EMFAC. Dr. Harley replied that he used v2.2. Steve Ziman referred to a Blanchard report that looked at ambient concentration trends over 1990 – 2000, in which there is no real trend in NOx reductions in the central valley; could this help explain what we are seeing? Dr. Harley suggested that light duty NOx is decreasing, but between 1990 – 2000 diesel NOx has increased 35% (based on his calculations) while EMFAC is showing NOx reductions. He suggests that more attention be directed to diesel NOx, as he is concerned about the modeling approach (diesel effects are often treated as an afterthought). His report offers brackets for the range of uncertainty.

Steve Ziman asked about the influence of out-of-state refueling. Dr. Harley responded that this is not considered in his analyses, but would only serve to increase his estimates; this suggests that Harley's numbers are likely to be biased low. David Schonbrun asked if non-road diesel use was factored out of his analyses. Dr. Harley stated that yes, only taxable diesel sales were considered, but this is a source of uncertainty given potential cross-over of untaxed diesel usage for on-road vehicles. It is also impossible to know the breakdown by vehicle types or ages. Dave Souten asked if any of this could be extrapolated to non-road sources. Dr. Harley responded that it could not (although a national evaluation has been performed); the main problem is that two very different models are used for on/off road estimates (EMFAC vs. OFFROAD) and this introduces a significant discontinuity.

Mark Carlock brought up the issue of which surrogate is more important in determining county-level emissions: (1) whether all fuel is assumed to be used in the county in which it is bought (Harley approach) or (2) whether all VMT is accrued in the county in which vehicles are registered (EMFAC approach). There is no accounting for thru-traffic in either approach. Need to evaluate effects of simply pumping up VMT vs. simply the scaling emissions.

Action Item: The District will continue to discuss this issue offline with CARB, other districts, and Dr. Harley to develop a procedure to deal with this issue in

the SIP inventories. CARB will be responsible for distributing Harley's report when their review is complete.

The next topic concerned the role of temperatures data in the development of on-road emission estimates. Should we use higher temperatures than observed to account for warmer roadways and parking lots? According to Mark Carlock, such a temperature adjustment exists within EMFAC already, and it weights input temperature data by what vehicles are likely to see. Bob Bornstein discussed role of traffic-induced turbulence and appropriate heights of temperature data to use, and suggested that there may be a better correction based on his urban meteorological work. He suggested that CARB send documentation on the current approach. Mark Carlock responded that it depends on the process: engine temperature is most important for emissions from moving vehicles, while ambient temperatures are more important for emission from stationary vehicles (depends on surface, covered or not, etc.).

Action Item: The District asked Mark to provide what information Mark can provide and suggested that this be further discussed offline.

The District asked Jim Wilkinson if he had any new information on the weekend differences he sees between CARB's and Alpines' on-road mobile source processing. Jim responded that he was still working on it.

Other mobile issues were brought to the table. Vernon Hughes stated that the methodology employed for on-road mobile source estimation was heavily intertwined with conformity assessments, and for consistency reasons we cannot simply scale EMFAC results without considering that complication. Steve Ziman stated that this discussion is attempting to get at model performance issues. While the regulatory requirements are appreciated, the obvious technical problems need to be addressed; how do we resolved these problems rather than setting them aside as a regulatory limitation as was done in SARMAP? Peter Hess, Evan Shipp, and Steve Ziman agreed that sensitivity tests need to progress, and that guidance is needed on what to do. Saffet Tanrikulu suggested two directions: (1) scale the mobile inventory based on Harley's results; (2) then discuss conformity issue to revamp the approach for parallelism. Dave Souten agreed and stated that we do not want to undermine the science to accommodate the regulatory requirements. There are always two sets of books: SIP and conformity. We should move forward with better science and let conformity catch up. Toch Mangat brought up the problem that if we adjust the mobile inventory, how do we adjust for the effects of controls? Bridgette Tollstrup added that the conformity inventory would need to be modified in parallel with whatever changes are made to the EMFAC approach sooner than later so that areas do not fall out of conformity.

Action Item: The District will develop a small working group to plan an approach for adjusting the CARB/EMFAC on-road emission inventory.

Non-road Emissions

Are the non-road emissions similarly under estimated? Jim Wilkinson stated that we need a handle on the uncertainty of this source, especially in the central valley. Was a micro-inventory analysis preformed to replace any of the large number of defaults used in NONROAD and OFFROAD models? Mark Carlock responded that OFFROAD was used for the estimates, but no micro-scale analysis was performed. Saffet Tanrikulu asked if there are any analyses available against which to verify emission estimates? We know much less about non-road sources than on-road mobile.

Jim Wilkinson asked about temperature sensitivity. Mark Carlock responded that given the majority of diesel-powered equipment (no evaporative) there is less temperature sensitivity. Temperature adjustments to gasoline-powered equipment is new in OFFROAD. Saffet Tanrikulu mentioned that there were many missing sources in the 1990 nonroad inventory, but most are now included. Are there any other missing sources, e.g., non-registered equipment or use in remote areas? Mark Carlock responded that the inventory estimates do not rely on registration data, but total production of equipment and California market share. This results in more engines in the inventory than are registered with the Districts. Vernon Hughes mentioned that the CARB undertook a strong attempt to push the Districts to review the final source-category numbers. Mark Carlock continued that documentation exists, and that CARB was sure not to "over use" the limited data that were available to them.

Point Sources

Saffet Tanrikulu started the topic off by stating that of 18,000 point sources in SARMAP, ~4,000 had known stack parameters. What is the current status of the database? Jim Wilkinson stated that he is most confident in the Bay Area sources. Cheryl Taylor looked at the remainder of California, and the major emitters are well in hand. Cheryl confirmed that a major update was undertaken for CCOS, that Districts submitted their best data for the 1999 inventory. Jim noted that an early screening of point sources did not reveal any strange stack parameters or overly high plume rise estimates. He stated that he should perform this simple check again given the rash of small updates lately. He believes that we have reached a point of diminishing returns in terms of the effects of further updates. But in comparison to SARMAP, the current point inventory is much improved.

Saffet Tanrikulu suggested that it seems no action items are necessary. Phil Martien suggested that some simple plots of source position and stack parameters be developed to provide a simple review. Jim Wilkinson will run his simple screening program again on the latest inventory, but warned that it will only find mis-located stacks if they are placed outside their county boundaries. He knows the location of major sources, but cannot know exact location of all sources.

Fires

Vernon Hughes stated that the CARB emission coordination group is thinking of removing fires from the future year inventories. John DaMassa stated that Smoke Management Plans (SMP) will limit these events in coming years. Evan Shipp has several issues with SMPs that need to be discussed. In SJV, ~50% of the episodes show effects from fires. Do we stay with baseline fire emissions in the future, or do we really eliminate all fires and say that SMP's will eliminate fire effects? Bob Bornstein agreed that it seems extreme to remove all fires; how would EPA react? Carol Bohnenkamp says that EPA is still discussing the issues internally.

Steve Ziman suggested sensitivity runs to see what the effects of fires are; SMP or not, there will be fires and taking them out completely may result in attainment alone. Ajith Kaduwela stated that CARB's sensitivity runs show that the SJV is affected (~10 ppb peak, 15-20 ppb off-peak), but other areas are not. Chris Emery summarized the WRAP approach wherein they are using long-term (multi-year) average fire activity in each state to define future year smoke emissions. But the WRAP focus is on a different problem (annual worst-case visibility and PM), and different scale (regional and Class I impacts). Locations/durations/intenstity of fires are much more important in episodic ozone modeling.

Bob Bornstein suggested listing a series of potential simulations to investigate their effects. For each, the objective and approach would be listed to evaluate their usefulness. Even Shipp suggested at least 2 scenarios: with and without fires in the future years. Vernon Hughes reminded the group that the schedule is short and the we need to establish action items according to priority.

Meteorology

The District is evaluating winds at the surface and aloft in CCOS data and MM5 results in order to obtain the best meteorological results. He anticipates this activity to take another 3-4 weeks.

Saffet Tanrikulu wishes to assemble a mobile source working group and a meteorological working group by next week. He hopes to have updated meteorology and temperature-sensitive emissions in about 1 month.

Steve Ziman asked about how this work will be coordinated with the July 1999 efforts. His concern is that with less data, it will be easier to get good performance. With higher concentrations, the potential for transport is also higher. All of this needs to be addressed. Will the SIP contain results for only 1 episode? Or will it contain 2 episodes with some technical "holes"? Chris Emery stated that the July 1999 does not have all of the data available from CCOS IOP, especially in regards to aloft measurements (profilers and aircraft), but that surface data are nearly as populated as in CCOS. The perceived lack of data should not be too much of a problem. Chris Emery stated that our plan is to improve the Bay Area episodes as much as we can in

about one month, but of course success depends upon what we find in our analyses and the availability/turn-around of needed data.

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Conference Call
Bay Area Modeling Advisory Committee 10/27/03

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