WESTERN STATES AIR RESOURCES COUNCIL

WESTAR

August 21, 2000

Docket No. A-99-05
Air Docket (6102), Room M-1500
Waterside Mall, US EPA
401 M-Street, S.W.
Washington, DC 20460

On behalf of the WESTAR Modeling Committee, I am providing comments on the proposed changes of EPA's "Guideline on Air Quality Models." These comments are as follows:

1. Overall, we feel that the new point source models (CALPUFF, ISC-PRIME, and AERMOD) being proposed by EPA are a significant improvement over current tools. In the west, we are particularly concerned about the ability of models to predict impacts on complex terrain. AERMOD appears to be the first practical model for predicting impacts in complex terrain. Although it requires representative meteorology, it can be used with traditionally monitored meteorological data. This is not the case for CTDMPLUS. Further, AERMOD does not require the subjective contour plots that are required in CTDMPLUS.

2. We strongly encourage EPA to add the PRIME downwash algorithms to AERMOD as soon as possible. This would increase AERMOD's applicability to a wider range of applications, not just for those without downwash. It should not be necessary to apply and merge results from two different models (i.e., ISC-PRIME and AERMOD).

3. CALPUFF is being proposed for both far-field modeling (> 50 Km) and near field modeling (< 50 km) under certain conditions. We strongly support this recommendation to eliminate the 50-kilometer "bright line". This can prevent the difficult task of having to model some Class-I PSD receptors with two different models and then having to merge the model results. However, we request that the proposed language be changed regarding "case-by-case decisions." Rather than EPA, we feel that the delegated PSD authorities should make the determination of applicability for "complex winds" on a case-by-case basis rather than EPA.

The delegated PSD authorities already have the authority to decide what meteorology is applicable for a particular application. This is a more difficult decision as compared to deciding when there are "complex winds." Complex terrain in the western USA often causes complex winds and this should not be difficult to demonstrate.

4. Again, for CALPUFF to be more useful in near-field modeling, it also needs to include the PRIME downwash algorithms.

5. Screening meteorology is needed for AERMOD to attain wider usage. Without screening meteorology, AERMOD would only be run where representative meteorology is available.

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To fill this gap, individual agencies will probably be developing screening data sets on their own. EPA can prevent this inconsistency by developing their own set of screening meteorology now. We are encouraged by the formation of a workgroup headed by Jim Haywood of Michigan. Resources should be directed to this group to facilitate their mission.

6. CALMET is part of the modeling system being proposed for adoption in this package. This model can be used with prognostic meteorological models such as MM5. It can also use surface and upper air observations. Since CALMET incorporates a number of algorithms to calculate the effects of topography, it is tempting to think that CALMET might be used to produce hourly meteorology for AERMOD or ISC-PRIME. We encourage EPA to study the use of model-produced meteorology as a substitute for the usual surface and upper air observations, with the objective of better characterizing the situations where the model-generated data are acceptable.

7. We request that recompiled versions of AERMOD and ISC-PRIME be produced using F90 dynamic arrays. These would allow us to better use the capabilities of the newer PCs that are now available. We are no longer limited to 640 Kb of memory and 10 Mb of disk space. Computers with 128 Mb of memory and 40 Gb of disk space are now relatively inexpensive. These programs should have compiled versions that allow for far more receptors and sources. It is difficult to model a domain with a program that limits numbers of sources and receptors. Also, most users do not have access to the Fortran compiler needed to compile these programs.

8. The version of CALPUFF that is being proposed does not account for aqueous phase chemistry. We understand that a version of CALPUFF with this feature may soon be available. This mechanism can allow for far faster conversion of gaseous pollutants to particulate. This version should be evaluated and proposed for adoption when evaluation studies show that it is successful.

9. As AERMOD is being recommended for adoption without PRIME, we request that EPA expand the defined niche for AERMOD's use before the proposed rules are finalized. Currently EPA is limiting that niche to include situations where downwash is not important. This should be expanded to include situations where AERMOD with the current downwash algorithms can be shown as being conservative with respect to ISC-PRIME predictions. Here, EPA may be able to use existing ISCST3/ISC-PRIME evaluation studies that have already identified some cases where ISCST3 is conservative with respect to ISCST-PRIME. The domain could be expanded further to include cases where AERMOD is found to be conservative relative to ISC-PRIME.

Here are some examples that should be explored to show that AERMOD's predictions are more conservative than those from ISC-PRIME:

- When certain building obstacle designs produce more conservative predictions. Examples could be for tall narrow buildings under all meteorological conditions.
- When tall stacks (even next to tall buildings) modeled with AERMOD may show higher impacts than ISC-PRIME.

- This may occur as tall stacks modeled with AERMOD's convective boundary layer (CBL) algorithms produce significantly higher predicted impacts compared to ISC. This is a situation where AERMOD's different treatment of tall stacks with CBL conditions alone may be more important than a better treatment of downwash.
- When certain meteorological conditions may cause one downwash algorithm to be more important than the other.

These types of comparisons may show that be AERMOD is conservative over a wide range of conditions and AERMOD's further application to these areas could greatly increase the range of AERMOD modeling.

10. As up to four different models (ISCST3, ISC-PRIME, AERMOD, and possibly CALPUFF) are being proposed for the same types of applications, there may be an opportunity for "model shopping." This needs to be minimized by establishing niches for each of the applications. A methodology to identify a single model (or limited option of models) needs to be identified by the permitting authority. Applicants should not just select the model that gives the lowest predicted concentrations. We recommend the following protocol unless the applicant can demonstrate that another Guideline model has a better scientific basis for their particular application.

- We recommend that AERMOD be the first choice model for most applications with receptors less than 50 kilometers away. This would be based on the study requested in #9 above showing that AERMOD is conservative in estimating downwash impacts for those situations.

- Where AERMOD is not shown as being conservative relative to the study requested in #9 above, ISC-PRIME should be the recommended model for applications with receptors less than 50 kilometers away.

- For predicted impacts on Class-I areas at any distance downwind, CALPUFF should be the recommended model. No case-by-case permission should be needed for predicting impacts on Class-I areas.

- Where non-steady-state dispersion is demonstrated to be important, and delegated PSD authorities have approved the use of CALPUFF in the near-field area, CALPUFF should then be the model of choice.

12. The proposed IWAQM Phase II recommendations are silent on the issue of using terrain for the proposed Screen on Class I areas. Terrain effects can be important even at large distances downwind. We recommend rings include representative elevations of boundaries as well as the maximum PSD Class-I area elevation. This would allow a range of elevations to be used for each ring to represent elevation changes between the source and receptor.

13. We recommend that EPA's On-Site Monitoring Guidance be updated to deal with the additional meteorological monitoring needs of AERMOD.

14. Early versions of the RAMMET model had software problems that prevented their use at latitudes around the Arctic Circle (e.g., in parts of Alaska). We ask that AERMET be tested with these latitudes to assure that this problem does not reoccur.

If you have any questions, please contact Mr. Pat Hanrahan at (503) 229-6048 or myself at (503) 387-1660 ext. 8.

Sincerely,

Dan Johnson
Executive Director