UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

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MEMORANDUM

SUBJECT: Valley Stagnation Models for PM_{10}

FROM: William G. Laxton, Director
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TO: Irwin L. Dickstein, Director
Air & Toxics Division, Region VIII (8AT)

Over the past months we have had several conversations about the status of PM_{10} modeling. In particular, we have focussed on the valley stagnation situation which is common in the western U. S. The purpose of this memorandum is to provide you with a brief status report.

When the guidance on PM_{10} implementation was originally prepared and when the PM_{10} workshops were held, it was clear that the necessary modeling tools were not all readily available. This was especially true of valley stagnation and secondary particulate formation in urban areas for which there are no models recommended in the modeling guideline. In both cases we suggested Regional consideration on a case-by-case basis. At the urging of several Regional Offices, a Valley Stagnation Work Group was formed to deal with that pressing problem; membership was composed of OAQPS, ORD, Regions III, IV, VIII, IX, X (Lead), and a State representative. Several major principles evolved from those work group discussions and from consideration of preliminary modeling protocols for SIP preparation. They are: (1) only the WYNDvalley model is technically credible/adequate among the several models considered; (2) it is generally necessary to consider both stagnation and conventional dispersion conditions (ISC/RAM) to estimate the highest concentrations; (3) in any application to valley stagnation, some model evaluation based on available air quality data is desirable, due of a lack of experience with the accuracy and overall performance of models like WYNDvalley; and (4) a comprehensive model evaluation program is desirable for valley stagnation to resolve uncertainties about model accuracy.

As a result of negotiation on the SIP modeling protocols, particularly for Regions VIII and X, our technical staffs have become fully cognizant of the relevancy and importance of the first three of the four principles described above. They fully understand and concur in techniques and data analyses necessary

to implement the principles. Region X has developed and recently submitted to OAQPS a written outline of how these three principles should be implemented in developing specific modeling protocols for PM_{10} SIP's. We expect a quick approval of the outline and will promptly circulate it as a tool to promote consistency in developing PM_{10} SIP protocols.

More difficult is the model evaluation program that is needed. This matter was discussed at the January 1989, Burlington long-range planning workshop. However, no commitment was made as a result of this meeting since suggested data bases (e.g., Crested Butte and Mammoth Lakes) contain significant deficiencies and a major source of funding required to support this program has not been identified. Funding of several hundreds, to as much as a million, dollars may be required due to the lack of adequate data bases. It appears that the collection of one or more new data sets will be necessary to fill the gap; the testing and evaluation of models is expected to be a relatively small part of the cost, perhaps $50K to $100K. Region X has again taken the lead in preparing a development plan for such a data collection and model evaluation program. Our staffs have reviewed and commented on a preliminary draft of the program and will continue to work with Region X. I am sure that you and I will eventually have to review this plan and deal with the tough resource issues. Also, please make sure that Region VIII staff concerned with air programs are aware of the status of this evaluation program; there seems to have been some confusion.

Finally, a comment on modeling the secondary formation of PM_{10} components in urban areas is in order. A conventional modeling approach (PEM-2) was developed by ORD at our request during the early 1980's. We subsequently found that this model did not perform significantly better for PM_{10} components than do Gaussian models like RAM. As a result, it is clear that a numerical model with the proper chemical mechanisms will be necessary; this implies sophistication on the order of the Urban Airshed Model that is applicable to photochemical oxidants. As a result of the Burlington workshop we have identified the development of such a model as an important research need and are working to include it in ORD's plans; however, a several year effort may be required and early availability should not be expected. Also, we are following work being conducted on this matter by the South Coast Air Quality Management District. At this time, though, we are not aware that secondary urban formation is a driving force for PM_{10} SIP's in any areas other than California.

I hope that you find the above information helpful. Please feel free to contact me (FTS 629-5536) or Joe Tikvart (FTS 629-5561) if you have any further questions concerning the status of modeling for PM_{10}.

cc: Air Director, Regions I-VII, IX-X
J. Emison
J. Tikvart