



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ATMOSPHERIC SCIENCES RESEARCH LABORATORY
RESEARCH TRIANGLE PARK
NORTH CAROLINA 27711

MEMORANDUM

DATE: September 21, 1987

SUBJECT: Technical Review of WYNDvalley Model

FROM: Robert E. Eskridge, Meteorologist *REE*
Terrain Effects Branch, MD/ASRL (MD-80)

TO: Joseph A. Tikvart, Chief
Source Receptor Analysis Branch, OAQPS (MD-14)

THROUGH: Francis A. Schiermeier, Director
Meteorology and Assessment Division, ASRL (MD-80) *F. Schiermeier*

I have read the reports you have sent me describing the WYNDvalley model developed by Halstead Harrison. The model developed by Harrison for stagnant valley flow can be considered a type of box model in that it does not attempt to resolve concentrations except on a rather large scale, which I believe is appropriate for this problem. The numerical scheme appears to have all the desirable characteristics a modern numerical scheme should have and the physics included in the model are appropriate to the problem of valley stagnation.

For any model, the solution will depend on an accurate emissions inventory and on the boundary conditions assuming a knowledge of the meteorological conditions. To the best of my knowledge, there are no data with which one can estimate the inflow and outflow boundary conditions and the top boundary condition. The ASCOT data is for summer valley flow and may not be applicable. Hence, the model cannot be depended on to give accurate estimates of pollutant concentrations in valleys directly.

I do think that one might be able to come up with reasonable estimates of what these boundary conditions should be and then run a series of computer simulations in a given valley to find a range of estimated concentrations.

To summarize and specifically address the points asked in the memo dated 14 July 1987 -

- 1) The model is technically sound in that it contains no errors, but proper boundary conditions are not known;
- 2) It was applied in an appropriate manner to the Methow Valley; and
- 3) This model cannot be applied, in a cookbook sense, to valley stagnation situations.