



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

6 NOV 1992

MEMORANDUM

SUBJECT: Proposal to Use ISCRDT to Model Intermediate Terrain
(Boise Cascade, Rumford, Maine)

FROM: *Dean A. Wilson*
Dean A. Wilson, Meteorologist/Model Clearinghouse
Coordinator
Techniques Evaluation Section, SRAB (MD-14)

TO: Brian Hennessey, Regional Modeling Contact
Techniques Assistance Section, Region I

In response to your request, the Model Clearinghouse has reviewed your position with respect to the equivalency between applying the proposed ISCRDT model and applying the Industrial Source Complex Short Term (ISCST) model and the Rough Terrain Dispersion Model (RTDM) in accordance with the Intermediate Terrain Policy (ITP). It is our understanding that you believe equivalency between ISCRDT and the ITP has been demonstrated for application to Boise Cascade, but only for assessing the impacts of increment consuming sources and the impacts of sources that are in the existing baseline. For sources which are shutting down or reducing emissions, you believe that the ISCRDT model needs to be modified such that the lesser of the simple terrain and complex terrain concentration "credits" are chosen (on an hour-by-hour, source-by-source and receptor-by-receptor basis).

The Model Clearinghouse agrees with your position, but suggests that there may be some room for flexibility with respect to concentration credits for sources reducing emissions. We have also reviewed the replicability aspects of the equivalency and agree that the ISCRDT model is indeed reproducing the concentration estimates of ISCST and RTDM and that it is making the appropriate choice of concentration estimates, notwithstanding the issue of what choice should be made in the case of concentration credits. We also agree that the appropriate cases have been chosen to make the replicability demonstration.

Regarding the issue of concentration credits, we agree that the source should not be given credit for increment expansion or for reductions in the total concentration by choosing the higher of the simple terrain or complex terrain modeled concentration credits. As you have pointed out, doing so would result in a nonconservative credit, i.e., a larger credit than is really

available if a refined model yielding unbiased estimates were applied. For this reason you conclude that for ambient credits due to emission reductions, the lower of the two estimates (in absolute value) should be chosen, the result being that concentration credits would be conservative.

As indicated above, we agree that the lower of the two credits would indeed be conservative but we believe that we can offer an alternative scheme, one that is still conservative but does not penalize the source quite so much. Our reasoning is as follows. RTDM is a screening model, designed to produce conservative estimates within its applicability domain. ISCST is a refined model, designed to yield unbiased estimates, but again within its applicability domain. The problem in intermediate terrain is that both models are being applied outside of their stated limitations. However, when applying ISCST in intermediate terrain, following the ITP, the terrain is "cut off" at stack height and the estimate is made at that elevation and applied at a higher elevation. Since it is postulated by the guidance that: (1) ISCST is unbiased at stack top, and (2) as one goes up in elevation above stack top, the true concentration would be expected to increase, it follows that the true concentration should be at least as high as the ISCST estimate. Following this rationale we believe that crediting the ISCST estimate as increment expansion or as a concentration offset would still be protective of air quality in intermediate terrain. If the source wants to go back and modify their program to reflect this concept and again demonstrate equivalency to the ITP, we believe that the Environmental Protection Agency should accept such an approach.

It should be made clear however, that the above suggestion of allowing ambient credit for emissions reductions according to ISCST can only apply in intermediate terrain. For receptors above plume height, i.e., in true complex terrain, crediting the ISCST estimate could easily be nonconservative. Also, crediting RTDM or Complex I estimates at such receptors would also be nonconservative since such screening estimates would normally be higher in absolute magnitude than the true concentration. If the true concentration could be estimated from an unbiased refined model, it could be credited. Also, an estimate from a model that was designed to yield a minimum concentration (hour-by-hour) could also be credited as being conservative. Since neither a refined model nor a minimum estimate model are currently available for application to the Boise Cascade problem, there is really no other choice than to allow no credit for emission reductions from sources impacting on complex terrain. Again, if the source wants to develop a technique for making minimum estimates in complex terrain, and demonstrate that such estimates would be lower than a refined model estimate, we would be willing to entertain such a proposal. However, such an undertaking is not a small task. We have thought about the problem some within the Clearinghouse; it is not a trivial problem.

If the source chooses to modify their program to allow for ISCST concentration credits for receptors in intermediate terrain and no credit for receptors in complex terrain, they should also be cognizant of the following. The "classification" of some receptors with respect to a given source can switch between intermediate terrain and complex terrain because the plume height will vary with stability and wind speed. For hours when the receptor is in intermediate terrain, the ISCST credit would be acceptable, whereas when the receptor is in complex terrain, a zero concentration credit would be appropriate.

There are a couple of other points worth mentioning with respect to the Boise Cascade permit. First, as we discussed on the telephone, for purposes of increment expansion the source reducing emissions only gets credit for actual emissions decreases. Second, given the results of the petition for reconsideration in the Hadson case, it is advisable to provide notice and opportunity for public hearing for the application of a nonguideline model.

If you have any questions, please contact me at 919-541-5683.

cc: R. Lee
D. deRoeck

bcc: Regional Modeling Contact, Regions II-X (with copy of incoming memorandum and list of FY-93 Clearinghouse memoranda)

FY-93 MODEL CLEARINGHOUSE MEMORANDA

<u>Date</u>	<u>Region</u>	<u>Subject</u>
10/7/92	IV	Response to Proposal to Allow Credit for a Stack Height Increase at the Dade County Resource Recovery Facility, Dade County, Florida
10/28/92	V	Demonstrating Attainment of the Ozone National Ambient Air Quality Standards (NAAQS) with the Urban Airshed Model (UAM) for Detroit
10/28/92	VII	Demonstrating Attainment of the Ozone National Ambient Air Quality Standards (NAAQS) with the Urban Airshed Model (UAM) for St. Louis
10/28/92	IV	Attainment Demonstrations using the Empirical Kinetics Modeling Approach (EKMA)
11/5/92	I	Proposal to Use ISCRDT to Model Intermediate Terrain (Boise Cascade, Rumford, Maine)