UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
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SUBJECT: Policy Interpretation - In Between Terrain

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TO: Joseph A. Tikvart, Chief
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Over the last year or so we have had numerous discussions regarding the appropriate procedure that should be followed to implement our policy on modeling "in-between terrain" (IBT). We define IBT to be terrain located between stack top and plume height. As we have discussed previously, the policy as written in the "Guideline on Air Quality Models (Revised)" (GAQM), is quite vague and needs further elaboration if we are to establish a consistent approach. My purpose in writing is to provide my thoughts, and what I believe has been our understanding, on how the policy should be interpreted and to request your review with the hope of developing definitive guidance on this matter. My major impetus for writing at this time is a request I have received, from the State of Virginia, asking for clear guidance in this area. Also there is a PSD source, in Maryland, (RESCO) where this issue has arisen and will need resolution shortly. Finally, it is my understanding that this issue has and is causing problems in Region IV.

The GAQM states that "Receptors between stack height and plume height should be modeled with both complex terrain and simple terrain models and the highest concentration used." The confusion is related to the fact that there has developed two quite different approaches which have come up in order to satisfy the needs of applying the guidance to multiple source situations.

Initially, one would think that the guidance could be satisfied simply by performing two sperate analyses using both a simple terrain model, with terrain chopped off at stack top, and a complex terrain model and then choosing the higher of the two design concentrations. For single source applications, this procedure proceeds in a straight forward manner consistent with our guidance. However, as soon as one other source having different stack height/plume height characteristics is added to the analysis, this approach breaks down and inconsistencies in guidance develop requiring a different approach which is both more resource intensive and more conservative.

The problem that develops in a multi-source application relates to the fact that for a given hour a specific receptor may be an IBT receptor for one source while for a second source it's clearly either complex terrain or simple terrain. If one applies the above procedure to this situation, the second

source which should be modeled using say a complex terrain model will, for the simple terrain portion of the analysis, for the hour in question, be modeled in conflict with our guidance. Furthermore, even if the plumes for all sources are above terrain, it is quite possible that for the same receptor, for a particular averaging period, one source may be controlled by the complex terrain model while another source is controlled by the simple terrain model. The necessary sum of these contributions is not possible using the above procedure.

The only resolution to this dilemma, consistent with our guidance, appears to be to apply the guidance on an hour-by-hour basis. That is, for each hour of any given averaging period at a given receptor each source is modeled consistent with our guidance. Those sources for which the receptor is complex terrain are run using the complex terrain model only. For those sources where the same receptor is IBT, both models are run and the higher prediction is used as that source's contribution for that hour. Finally, sources for which the receptor is simple terrain are modeled only with the simple terrain model. These contributions are then added to produce the total concentration for that hour. The upshot of this procedure is that any given average concentration could be made up of prediction from different models, for even the same source, for the various hours. Since the guidance requires the choice of the highest concentration between the predictions we are guaranteed that this procedure will produce either the same or higher concentrations than the first technique.

Although it seems clear that the hour-by-hour technique must be used for the multi-source case, there has been no such understanding regarding the single source case. It is our opinion the we must establish a single technique that applies to both situations since there would appear to be a clear inequity to require a more conservative approach of a source simply because there are other sources to be modeled. As a result of this we have instructed our states to follow the hour-by-hour procedure in all applications. Although the State of Virginia has accepted this approach, they have requested further guidance and I quote, "... We would appreciate your providing us with the EPA guidance that should be used to do this so that we can advise PSD applicants accordingly. The absence of clear, concise guidance leaves too much uncertainty in how the evaluation will be made."

A corollary issue which confuses what I would consider the straight forward solution of requiring the hour-by-hour approach is the situation in which an applicant intends to use the Valley screen for the complex terrain model and sequential modeling for the simple terrain model. This is the issue that needs resolution in the upcoming Maryland RESCO PSD permit. In this situation, it is not possible to perform the hour-by-hour approach since the Valley model is incapable of making predictions for the various hourly meteorological conditions.

One possible option would be to require the applicant to collect on-site data so that the hour-by-hour procedure could be implemented. I believe that it is inappropriate and possibly irresponsible to require such a measure to evaluate what in most cases will be clearly a non-controlling situation. Another option would be to require for each hour, regardless of the actual meteorology, that the screening meteorology of "F - 2.5 m/s" be assumed for the Valley portion of the analysis. This option fails to produce an adequate

screening value for those receptors located a significant distance below plume height. That is, for such receptors, for say a neutral atmosphere, Complex I would most certainly produce a higher concentration.

We have been unable to come up with any good ideas for a specific procedure that could be applied generically in this situation. Therefore we would recommend that more general guidance be provided in this case. Our recommendation would be to allow for a case-by-case analysis designed to determine how likely it would be that the controlling concentrations would occur at the IBT receptors. If it could be demonstrated that this would be unlikely, then we would allow the applicant to ignore those receptors. On the other hand, if it was determined to be likely, then the applicant would be required to either collect on-site data, for use with either Complex I or RTDM, or develop a case specific screen.

We would appreciate your review and comment as soon as possible.

cc: L. Nagler, Region IV