



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711
June 8, 1989

MEMORANDUM

SUBJECT: Policy Interpretation - Modeling for Intermediate Terrain

FROM:

Dean A. Walker, for
Joseph A. Tikvart, Chief
Source Receptor Analysis Branch, TSD (MD-14)

TO:

Alan J. Cimorelli, Lead Meteorologist
Region III (3AM12)

In response to your request, the Model Clearinghouse has reviewed your position regarding modeling procedures that should be used for "in-between" terrain, which we choose to call "intermediate" terrain. Our understanding of your position is as follows. When on-site meteorological data are available, receptors that are located in intermediate terrain, i.e., between stack height and plume height, should be modeled with both a simple terrain model (with terrain "cut-off" at stack height) and a complex terrain model and the highest of the two estimates chosen on an hour-by-hour basis. Estimates for averaging times longer than 1 hour would be determined in a standard fashion and may contain a mixture of simple terrain and complex terrain model estimates. This procedure would be used for both single and multiple stack situations.

When on-site meteorological data are not available and only the Valley screen is available for the complex terrain estimates, your recommendation is to allow for a case-by-case analysis where judgments can be made on whether the controlling (design) concentration would be associated with the simple terrain model estimates or the Valley model estimates. In those cases where judgmental considerations do not lead to a probable conclusion in that regard, it may be necessary to require the source to collect 1 year of on-site meteorological data so that the procedure in the previous paragraph can be used.

If the above restatement of your position is correct, then we agree that it is appropriate. Initially it was believed that the language in the "Guideline on Air Quality Models," could be satisfied by processing 1 year of data with both a simple terrain model and a complex terrain model; the higher of the two design concentrations (assuming that the design concentration indeed occurs in intermediate terrain) was to be used in setting the emission limits.

During FY-88 a number of situations arose, involving multiple stacks of varying heights, where it became clear that the above procedure would not logically satisfy the guidance. As you point out, in a multiple source situation for a given hour a specific receptor may be an intermediate terrain

receptor for one source while for a second source it may be either a complex terrain or simple terrain receptor. If one applies the above procedure to this situation, the second source which should be modeled using, say, a complex terrain model for the simple terrain portion of the analysis will, for the hour in question, be modeled in conflict with our guidance. Because of these difficulties we determined that the only logical way to satisfy the guidance was to conduct the comparison on an hour-by-hour basis when multiple stacks are involved. A summary of that position is contained in the FY-88 Model Clearinghouse Report. Finally, in your recent memorandum you point out that modeling multiple source situations differently from single sources is not equitable and that the hour-by-hour modeling should be required for single stack situations as well. As indicated above, we agree with that position.

Of course, the eventual availability of CTDMPLUS will ameliorate this problem. CTDMPLUS should be applicable to all receptors above stack height; it will do away with the need for using two different models and comparing the estimates. While there will be some ambiguity in multi-stack situations, we are working jointly to develop straightforward guidance for such situations. However, for the present, we agree that your position is the only logical approach available.

A related concern is the resources required to perform modeling in complicated situations with more than one model. Possible approaches to deal with this problem might be:

1. acquire data and do analyses to substantiate/refute the need for estimates from both models,
2. on a case-by-case basis make a proposal to apply the original version of CTDM to all receptors above stack height, and
3. develop a general hybrid model or post-processing software to make the analysis less resource consumptive.

Alternatives 1 and 3, while perhaps desirable, require resources to complete; such resources are not currently identified. For Alternative 2, it is doubtful that very many sources will want to, or have the data bases to, apply CTDM at the present time. Thus, for the foreseeable future we will need to implement the guidance as we have in the past, using existing simple terrain models and complex terrain models in the fashion described in your memorandum. Modelers will need to develop software to process the data on a case-by-case basis.

If you have any questions, please contact me.

cc: D. Grano, AQMD (MD-15)
S. Reinders, TSD (MD-14)
D. Wilson, TSD (MD-14)

FY 89 MODEL CLEARINGHOUSE MEMORANDA

<u>Date</u>	<u>Region</u>	<u>Subject</u>
11/11/88	VI	Use of ISC UNAMAP 6, Change 7
11/07/88	VI	Compilation of Most Recent, Available 5-Year Meteorological Data By Texas
11/08/88	V	State of Indiana Meteorological Preprocessor Program
11/09/88	VI	Information Regarding Refinery Tank Farms and Their Rural/Urban Designation
11/09/88	VI	Request for Use of ISC 6.2
11/21/88	VI	Request for Use of ISCST and ISCLT Version 6.2 in Twin Oak Steam Electric Station PSD Application
11/28/88	VI	Request for Use of ISCST and ISCLT Version 6.2 in Formosa Plastics PSD Application
01/30/89	VIII	E. Helena Lead SIP
02/08/89	IV	Yates Power Plant GEP SIP
02/10/89	VIII	Denver PM ₁₀ SIP
02/27/89	IV	Paradise Power Plant
02/28/89	III	Martins Creek -- Regulations for Redesignation
03/20/89	VI	Proposed Region VI Responses to Louisiana About Modeling Issues
03/20/89	III & VI	Use of Allowable Emissions for National Ambient Air Quality Standards (NAAQS) Impact Analyses Under the Requirements for Prevention of Significant Deterioration (PSD)
03/23/89	X	Model Clearinghouse Review of Outline for PM ₁₀ SIP Modeling Protocol
04/06/89	I	"Connecticut Ambient Impact Analysis Guideline"

4/25/89	I	MassPower PSD -- Urban vs Rural for Background Source
5/11/89	I - X	Issues Associated with Modeling Background Sources
6/8/89	III	Policy Interpretation - Modeling for Intermediate Terrain