UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203-2211

DATE: 2 November 1992

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

FROM: Brian Hennessey, Regional Modeling Contact
Technical Assistance Section

TO: Dean Wilson, Model Clearinghouse Coordinator
Source Receptor Analysis Branch

This memo seeks your concurrence with Region I's decision to conditionally approve the use of the nonguideline ISCRDT model for PSD permitting of modifications to the Boise Cascade Corporation's Rumford Mill. Boise's consultant, Engineering-Science, has combined ISCST Version 3.4 (dated 90346) and RTDM Version 3.2 (dated 889226) into ISCRDT in order to meet EPA's intermediate terrain policy (ITP). Although EPA now recommends ISCST2's direction dependent treatment for all downwash cases, which ISCRDT does not implement, ISCRDT's direction independent use of the Huber-Snyder algorithm, almost always predicts higher impacts and yields a more conservative result.

Region I's review of Engineering-Science's equivalency demonstration concluded that for the Rumford Mill ISCRDT reproduces ISCST results on simple terrain and RTDM results on complex terrain. The equivalency demonstration also showed that ISCRDT meets the ITP with respect to modeling impacts on NAAQS and increment consumption. However, we believe that the model fails to properly implement the ITP in modeling air quality improvements (e.g., increment expansion) or modeling PSD baseline concentrations for credit against modeled future pollutant levels.

As programmed by Engineering-Science, when ISCRDT models the impact of negative emissions on intermediate terrain, it will use results from whichever module, the simple or complex terrain, gives the lowest or most negative result. It discards the numerically greater impact. Engineering-Science reportedly took this approach for the following two reasons:

a) It treats the physical process consistently. That is, as programmed, ISCRTD chooses predictions from the same model, all else held constant, whether positive or negative emissions were input.

b) It yields the same results on intermediate terrain as modeling proposed maximum allowable emission, modeling for base line, and then assessing increment consumption by subtracting impacts hourly impacts point by point.

EPA adopted the ITP because of an uncertainty as to how to most realistically model point source impacts on intermediate terrain. Simple terrain and complex terrain models represent plume-terrain interactions differently and both can't be right. Lacking a better knowledge of the physics, the ITP deals with this uncertainty by requiring modelers to use the more conservative result. For impacts on NAAQS or increment consumption by emission increases, this means using whichever model gives the higher impact. When modeling for baseline concentrations or increment expansion, however, a conservative result requires using the lower of competing impact predictions. Since EPA did not formulate the ITP for physical realism or consistency, Engineering-Science's assertions, though both correct, do not justify its interpretation of the ITP when modeling baseline concentrations or increment expansion.

We believe that Boise Cascade can use ISCRDT for PSD permitting of emission increases at the Rumford Mill. However, Engineering-Science would need to modify the model along the lines in the last paragraph to model baseline concentrations or increment expansion on intermediate terrain. We ask your concurrence in these conclusions.