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

March 6, 1985

MEMORANDUM

SUBJECT: Modification of ISC

FROM: Joseph A. Tikvart, Chief
Source Receptor Analysis Branch

TO: Michael Koerber, Regional Meteorologist,
Environmental Protection Agency, Region V

This memorandum is in response to your request for comments on the acceptability of the Dames & Moore preprocessor program (PREWAKE) when used with the ISC model for regulatory applications.

We understand that (1) you are confident from hand calculations that the correct building dimensions are output by PREWAKE for hour-by-hour varying wind directions and (2) the State of Wisconsin has also satisfactorily performed such a test. However, it appears that for the particular regulatory application under review, ISC-PREWAKE calculates a less stringent emission limit than does ISC in its normal mode.

Although the ISC User's Guide recommends a procedure for more accurately determining concentration estimates for squat buildings after ISC is run in its normal mode, this has usually been interpreted in terms of the appropriate, single building width for the time period of concern, e.g. a 3 or 24-hours NAAQS. We are not aware of any demonstration showing that the performance of the ISC model is improved when the building width term is varied each hour. Thus, there is no compelling reason that this interpretation of the user's guide should be changed at this time. However, your further specification of 2L as the upwind "region of influence" distance is a reasonable one for typical buildings in lieu of results from a site-specific study.

We have also received criticism from the American Petroleum Institute (API) that the ISC model underestimates concentrations influenced by building wakes, eddies and downwash. API has a study underway to remedy this situation. They are attempting to upgrade the performance of ISC by modifying the dispersion coefficients and plume rise under downwash conditions and by allowing the user to input wind direction specific building dimensions on an hour-by-hour basis. A presentation on this project was given at the Third Conference on Air Quality Modeling and a formal submittal to the rulemaking Docket is expected. The final results of the project together with API's recommendations should be submitted to EPA in a few months.

In summary, without some sort of performance evaluation, we do not believe the use of PREWAKE is either timely or adequately justified, especially in light of the comments we have received from API concerning underestimates for building downwash conditions. Hopefully, this situation will be corrected by the results of the API study. The issue of wind direction dependent building dimensions, on an hourly basis, may also be resolved at that time.

cc: J. Dicke
R. Rhoads
D. Wilson