



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

19 JUL 1993

MEMORANDUM

SUBJECT: Proposal for Calculating Plume Rise for Stacks with Horizontal Releases or Rain Caps for Cookson Pigment, Newark, New Jersey

FROM: Joseph A. Tikvart, Chief *J. Tikvart*
Source Receptor Analysis Branch, TSD (MD-14)

TO: Ken Eng, Chief
Air Compliance Branch, Region II

In response to your request, the Model Clearinghouse has reviewed your proposal for treating horizontal and capped stacks at Cookson Pigment so that the model (SCREEN or ISC2) will properly treat plume rise from the Cookson Pigment stacks. We concur in principle with the approach, with some relatively minor changes.

First, the analysis provided by New Jersey Department of Environmental Protection is technically correct. We suggest, however, that the exit velocity for horizontal and capped stacks be set to a lower figure than 0.1 m/s. A 0.1 m/s exit velocity may still result in significant momentum plume rise being calculated, even though these kinds of sources should have zero momentum rise. We therefore suggest setting the stack exit velocity to a lower value, such as .001.

For horizontal stacks that are not capped, we suggest turning stack tip downwash off, whether there are buildings or not. Stack tip downwash calculations are inappropriate for horizontal stacks.

For vertical stacks that are capped, turn stack tip downwash off and reduce the stack height by three times the actual stack diameter. The cap will probably force stack tip downwash most of the time. The maximum amount of the stack tip downwash (as calculated in ISC2) is three times the stack diameter. Reducing the stack height by this amount, while turning off the stack tip downwash option, causes the maximum stack tip downwash effect. The resulting concentrations may err slightly on the high side.

For stacks with small diameters, such as those at Cookson Pigment, the error should be quite small. Note, however, that this approach may not be valid for large diameter stacks (say, several meters).

cc: A. Colecchia
D. Wilson

FY-93 MODEL CLEARINGHOUSE MEMORANDA (Cont'd)

<u>Date</u>	<u>Region</u>	<u>Subject</u>
3/2/93	VIII	E. Helena Lead SIP Attainment Demonstration
3/30/93	V	Nonmethane Organic Compound (NMOC) and Nitrogen Oxides (NO _x) Monitoring Required for the Empirical Kinetics Modeling Approach (EKMA) for Nonattainment Areas in Ohio
4/5/93	V	Nonmethane Organic Compounds (NMOC) and Nitrogen Oxides (NO _x) Monitoring Required for the Empirical Kinetics Modeling Approach (EKMA) for Nonattainment Areas in Ohio
5/18/93	VI	Technical Comparison Document--Phelps Dodge Smelter
6/7/93	VII	Wind Field Development for the Urban Airshed Model (UAM)
6/10/93	V	Draft Protocol for Modeling a Sewage Sludge Incinerator
6/22/93	II	Proposal for Calculating Plume Rise for Stacks with Horizontal Releases or Rain Caps for Cookson Pigment, Newark, New Jersey