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

DATE: 2/20/81

SUBJECT: Long Distance Terrain Impacts from Power Plants on Long Island--Model Clearinghouse Comments

FROM: Joseph A. Tikvart, Chief J. Tikvart 2/27/81
Source Receptor Analysis Branch (MD-14)

TO: Raymond Werner, Chief
Impact Assessment Section, Region II

cc. Flynn Linda

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AIR BRANCH

The Model Clearinghouse has completed its review of your January 27, 1981, analysis of the SO_2 impacts of LILCO power plants in Connecticut. Of the several hypotheses you have proposed, we support Hypothesis 3A, i.e., the use of CRSTER with terrain correction factors. The Valley model (Hypothesis 1) is inappropriate to use in this case since the concept of an intact plume impinging on marginally complex terrain at a distance of 30-50 km from the source cannot be technically supported. Similarly, the use of the Complex models (Hypothesis 3B) is not appropriate because the meteorological data does not provide any support for the concept of a stable plume impinging on rolling terrain at that distance. However, to completely ignore terrain as in Hypothesis 2 is inappropriate, and is not technically sound nor in the interest of national consistency.

As pointed out by several of the participants at the Section 126 public hearing, there are many issues regarding atmospheric transport and diffusion that are involved in estimating ground-level concentrations in Connecticut from the LILCO plants. These include the following:

1. The plumes must traverse a variety of topographic classes between the sources and the receptors. These range from open water to urban areas to terrain with significant roughness elements. Given the expected affects of topography on atmospheric stability in the boundary layer, it is highly unlikely that a stable plume could be maintained over the travel distance in question.

2. The assumption of straight line transport is conservative because of the distance and travel time involved and the varying land use pattern. Meander (and possible breakup) of the plumes in response to land/water interfaces, urban areas and terrain would likely increase the travel time between source and receptor, thus allowing for additional dilution.

3. Some plume depletion of SO_2 is probable. If a half-life of four to eight hours is assumed for SO_2, it is apparent that a 10 percent to 20 percent depletion of the SO_2 in the plume could occur over a travel distance of 30 km to 50 km.

In summary, we support your position to use CRSTER with terrain corrections. While estimates with this technique may be conservative, they are more defensible than ignoring terrain completely, given the state of the science and present modeling policy. Based on the issues raised above and the ones you have cited in your position paper, we believe it is not appropriate to estimate concentrations with either the Valley model or the Complex models.

If you have any questions, please contact Dean Wilson at 629-5391.

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