

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: DEC 26 1984

SUBJECT: Niagara Frontier Modeling Protocol

FROM: William S. Baker, Chief WSB
Air Programs Branch

TO: Joseph Tikvart, Chief
Source Receptor Analysis Branch (MD-14)

The New York State Department of Environmental Conservation (NYSDEC) has agreed to perform short term modeling to demonstrate attainment of the total suspended particulate (TSP) standard in the Niagara Frontier. We have reached agreement with NYSDEC on a modeling protocol which we feel will provide an adequate demonstration for SIP purposes. We are presenting this protocol to you for your comment and to invite you to participate in future discussion with NYSDEC. In particular, we intend to meet with NYSDEC after they complete Item 2d) of the short term analysis. We will schedule the meeting at a time that is convenient for you if you desire to attend. Please let Ray Werner know of your intentions.

Background

NYSDEC proposes using long and short term dispersion modeling to support a revision to the State Implementation Plan (SIP) for the Niagara Frontier nonattainment TSP area. The area has seen an extensive decrease in steel production since 1980 and also the loss of major steel and coke producing facilities. Monitors have shown the area to be attainment since 1982.

The Region II office has sponsored the development of an extensive annual emissions inventory in the past, which included particle distributions for area and fugitive sources. This latest air quality demonstration is necessitated by the changes in the emission inventory (permanent shutdowns) and the fact that statistical techniques are not accepted as valid techniques in similar situations.

Short Term Analysis

1) Because it is our belief that building downwash and particle deposition are the controlling modeling parameters, ISCST will be used.

2) Previous modeling has shown the Bethlehem Steel complex to be the controlling source and it will be the focus of all further modeling. Since the number of sources within this complex is extensive, the following approach will be used to arrive at the maximum impacts.

- a) EPA has supplemented NYSDEC's existing three years of Buffalo National Weather Service (NWS) data with two additional years.
- b) The modeling analysis will be run for a one kilometer grid as per the long term analysis. In addition, the receptor grid will be limited to the proximity where air quality monitoring and annual modeling indicates highest values. This will be confirmed as the analysis proceeds to insure the correctness of this assumption. X
- c) Bethlehem Steel's 160 point and area sources will be modeled for the year 1977 to estimate source impacts. Area sources will be combined and 1977 rerun to demonstrate that source combinations will produce levels as high or higher than the previous source inventory produced (attachment). If so, the combined source inventory for Bethlehem will be used in future analysis to save resources.
- d) The modeling analysis will be expanded by using the remaining four years of meteorological data.
- e) The results of the full five year analysis will be reviewed to determine the worst days, and to decide how many days need to be remodeled with all Niagara Frontier sources (>1000 sources). The number of days will be agreed upon by both EPA and NYSDEC staff after meeting to review the modeling results to date.
- f) At the same time the results will be reviewed to confirm that an adequate receptor grid was used. If not additional modeling will be undertaken.

- g) If violations occur, ISCST will be run for worst case days with an emission inventory which is adjusted to account for fugitive emission changes due to soil moisture content, wind speed and atmospheric stability factors. The analysis so far assumed annual emission rates which we believe produce conservative results. We will use the factors mentioned above only if it becomes apparent that the conservative emission assumption may be a factor in predicting any air quality violations.

Long Term Analysis

1) Five separate years of Buffalo NWS meteorological data will be modeled using ISCLT. The source inventory previously developed for the 1979 and 1982 SIP demonstrations will be input to the model with changes reflecting permanent plant shutdowns. No model calibration will be performed.

2) The receptor grid used for the short term analysis will be used for the long term analysis. NYSDEC will demonstrate, as in the short term analysis, that maximum impacts have been modeled.

To date, NYSDEC has performed one year of short term modeling to determine if fugitive and area sources can be combined to reduce the number of Bethlehem Steel's sources from 160 to 40 (Section 2.b of the short term analysis section). Preliminary results confirm that modeled impacts are as high or higher than those previously modeled (see attachment).

cc: G.T. Helms, CPDD (MD-15)
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