

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

SUBJECT: Mon Valley SO₂ Study
Allegheny County, Pennsylvania

DATE: FEB. 16 1990

FROM: Marcia L. Spink, Chief
Air Programs Branch (3AM10) *MS*

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

The purpose of this memorandum is to advise you of the status of the Allegheny County SO₂ Study and to request your concurrence and/or comments regarding our recommendation for completing the study and establishing approved emission limits for the large SO₂ sources in the Mon Valley of Allegheny County.

The three memoranda, comprising attachment 1, present a summary of the SO₂ problem in the County and the development of a model evaluation protocol. On February 17, 1987, contractor (TRC) submitted the final report of the model evaluation study (attachment 2). The winning model was a site specific model incorporating the concepts of RTDM (RTDAC). The winning model was furnished to the Allegheny County Bureau of Air Pollution Control (BAPC) and the process of SIP development control strategy testing was begun. As had been agreed to, the first step for the BAPC was to demonstrate that the network used for the model evaluation was adequate to represent the maximum SO₂ concentrations.

The first of several complications occurred when the meteorologist for the BAPC left to work for private industry. The staff engineer who had managed the monitoring and emission inventory aspects of the study, Jayme Graham, then began to work on the modeling of the sources for the demonstration of adequacy using the actual emissions estimates for the period of the study. The first major model run was almost ready when Jayme discovered that the RTDAC model had been improperly coded. Specifically, the model internally converted terrain elevations from feet to meters even though the input file specified that terrain elevations be input as meters. Jayme investigated further and determined that all of the model comparisons had been completed with the terrain error.

After lengthy discussions, TRC agreed to re-perform the model evaluation with correct terrain elevation specification. In essence TRC had to start over. The remodeling has recently been completed. Attachment 3 is a package of four letters from TRC summarizing the model comparisons. The model MPMOD was found to perform better than either ShortZ (the reference model) or RTDAC. The model MPMOD is the MPTER derivative of MPTAC, described in the protocol, which is modified to calculate concentrations over a uniform 22.5 degree sector.

The MPMOD model performs reasonably well in the Hazelwood area and generally overpredicts the maximum concentrations. In the lower Mon Valley, however, the model underpredicts the maximum observed concentrations, even after high values known to be caused by upset conditions at the Clairton Coke Works are removed. However, both predicted and observed concentrations are well within the NAAQS. Tabulated below are the highest second-highest concentrations predicted by MPMOD and observed:

Stn	Three-Hour		24-Hour		Annual	
	Predicted	Observed	Predicted	Observed	Predicted	Observed
1	823	854	271	319	37.7	44.7
2	2370	1997	591	467	80.8	77.4
3	3823	1438	803	476	109.8	106.6
4	3161	1170	592	302	54.6	78.1
5	1678	705	378	263	52.7	54.2
8	348	511	102	160	Annual average only considered at the 5 highest stations, according to protocol.	
9	428	721	111	230		

The existing protocol only requires underprediction corrections to be made based upon the station(s) showing the highest concentration(s). This would limit underprediction concern to stations 2 - 5, the Hazelwood sites where the only predicted or observed violations occurred. However, the model generally overpredicted in this area and, therefore no correction is necessary. Region III is concerned that a control strategy which sets emission limits in the lower Mon Valley using MPMOD may not adequately protect the SO₂ NAAQS. Based on this concern, the Region considered the following options:

- 1) Accept MPMOD according to the agreed upon protocol. Demonstrate attainment and establish SIP emission limits in the Mon Valley using the MPMOD model;
- 2) Limit the use of MPMOD to the Hazelwood (nonattainment) area, where it is shown to perform well, and defer action in the remainder of the valley, designated as unclassifiable; or
- 3) Require the use of Guideline techniques.

We have discussed these options with the BAPC. Our first recommendation was to select option 2. The BAPC, however, objected to this approach. They maintain that the residual underprediction is a result of an inadequate emission inventory. When the study began, the Clairton Coke Works was operating well below capacity. By the end of the study, the economy was improving and many of the higher concentrations at stations 8 and 9 can be related to emissions unaccounted for during startup of additional coke oven batteries.

Because all of the monitored SO₂ NAAQS violations in recent years, in the Lower Mon Valley, are directly associated with malfunctions or non-function of the coke-oven-gas desulfurizer at the Clairton Coke Works, we do not consider normal operations to be a problem. For that reason, we recommend that the control strategy process continue using MPMOD. The area to be modeled should be the study region depicted in attachment 4. Previous studies have shown that the areas of concern, all related to terrain impaction, are contained within this region.

Because of our concern about the adequacy and accuracy of the MPMOD model in the lower Mon Valley we propose the following:

- (1) A parallel effort, along with the modeling, to evaluate the emissions during the study period. The evaluation would confirm or refute the contention that uninventoried emissions are the cause of the underpredicted high concentrations; and
- (2) Do not approve any revised emission limit for sources in the lower Mon Valley, the Clairton Coke Works in particular, until the adequacy of the attainment demonstration is established.

If you have questions about this matter please contact Denis Lohman at FTS 597-8375.

attachments (4)

cc: J. Graham (BAPC)
R. Londergan (TRC)