



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

August 27, 1985

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MEMORANDUM

SUBJECT: Protocol for Model Performance Evaluation--Bunker Limited

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

TO: Robert B. Wilson,
Regional Meteorologist, Region X

David C. Bray, Acting Chief
Air Programs Development Section, Region X

In response to your request, we have reviewed your proposed performance evaluation to test the acceptability of a modification to LONGZ. This modified LONGZ model will be used to predict quarterly lead concentrations at the Bunker Limited Smelter. As we understand it, the reference model will be LONGZ urban/rural with a rotated wind rose, which was the model of choice from the previous performance evaluation documented in your May 23, 1984, memorandum to us. The proposed model will be this same model but with the individual volume/area sources replaced by a single volume source as described in your July 29, 1985, memorandum.

With these understandings we have three comments on your protocol:

1. A statement should be included which recognizes that the confidence interval test is only a rough approximation to "truth" for comparing the performance of the two models since the performance measures for each model are not independent on one another.

2. Given the small number of degrees of freedom in the statistics, one would expect the 95% confidence bands to be rather large. Thus most or even all of the tests could show no significant difference between the two models. We believe that it would be inappropriate to select the proposed model solely on the basis that it is significantly better for one performance measure while for the others there was no significant difference between the two models. Therefore, we recommend that a minimally acceptable score be established, say 35 points, before the proposed model could be accepted. In this case the decision would be made on the basis of at least two performance measures (other than the case where the bias of the maximum concentration was controlling).

3. We understand that you will generate all of the statistics for the proposed model that were calculated in your May 23, 1984 memorandum. It is not clear how these statistics will be used in the decision of which model is better.

Aside from the protocol, we have reservations about the technical merits of the modification to LONGZ described in your July 29, 1985 memorandum. Effectively, what was done was to replace a large number of area and volume sources with a single virtual point source. While this may reduce the estimates to more "reasonable" numbers (in light of the observations at the nearby Silver King School), we do not believe it is good science to take a detailed emission inventory and aggregate it into a single source. The link between the characterization of the sources and the possibility of building/terrain induced turbulent mixing is, in our opinion, weak. Also, it may be that the location of Silver King School is unique in that the model does not handle that situation well whereas in other directions, e.g. in the vicinity of the predicted maximum concentration, the same problem may not be occurring. It is our sense that a certain amount of "model tuning" is taking place in your modification to LONGZ.

While we have these reservations, we are deferring to your professional judgment on the choice of the proposed modification, since you are closer to the problem than we are. The technical defense of the merits of the model, however, rests with your Region. We support your performance evaluation protocol, provided that the three concerns above are adequately addressed.

If you have questions regarding these comments, please contact Dean Wilson at 629-5681.

cc: R. Rhoads
J. Silvasi

✓ bcc: Regional Modeling Contact, Regions I-IX
(Attached final evaluation results)