MAR 09 1988

Mr. Joseph Laznow, Chief
Bureau of Air Quality Planning and
Evaluation
New Jersey Department of
Environmental Protection
401 East State Street, CN-027
Trenton, New Jersey 08625

Dear Mr. Laznow:

Following up on yesterday's meeting in your offices I have attached a draft protocol for modeling carbon monoxide concentrations at intersections. The currently approved modeling techniques for these situations are described in EPA's Guidelines for Air Quality Models (attached). In our discussions you indicated that use of the screening techniques contained in the guidelines would likely result in the prediction of air quality violations. In situations where screening models predict violations the guidelines recommend the use of refined modeling techniques.

In an effort to guide you in the selection and use of an appropriate refined analysis technique I have drafted a protocol for your consideration. At the same time I am forwarding a copy of this protocol to EPA's Office of Air Quality Planning and Standards model clearinghouse for a review to ensure that it is consistent with current national modeling policy. I will make it clear to the model clearinghouse that it is New Jersey's intention to use this information to redesignate areas presently designated nonattainment to attainment for carbon monoxide. As we discussed yesterday the draft post-87 policy may, when finalized, require some type of demonstration that is not apparent at this time. Nevertheless, we will endeavor, to the best of our ability, to anticipate this by obtaining the advice and counsel of EPA's model clearinghouse. I will advise you on the results of their review.

In preparing this guidance my staff and I are suggesting an approach that would take credit for the progress New Jersey has made in inspection/maintenance and anti-tampering programs and uses the data base that has already been prepared by your staff.

At yesterday's meeting you expressed the desire to use contractors to develop this analysis and thought that New Jersey may be interested in using EPA's level of effort procedures to secure contractual

services. I have marked up a copy of the Department's scope of work for your comment. For the most part it already conforms to the draft protocol. If the Department chooses to pursue the level of effort contract mechanism which is available through EPA, please review the attached scope of work and contact Mr. John Filippelli at 212-264-2517.

If you have any comments or questions on the attached protocol please contact me or Steve Sambol at 212-264-2517.

Sincerely yours,

Raymond Werner, Chief
Impact Assessment Section

Attachments

cc: H. Wortreich
J. Elston
W. Baker
J. Filippelli
S. Sambol

Ray#4:item#3

6.2.2 Models for Carbon Monoxide

Carbon monoxide modeling for the development of SIP-required control strategies should follow the guidance provided in the "Carbon Monoxide Hot Spot Guidelines"[34] or in Volume 9 of the "Guidelines for Air Quality Maintenance Planning and Analysis."[35] These volumes provide screening techniques for locating and quantifying worst case carbon monoxide concentrations, and for establishing background values; they also provide methods for assessing carbon monoxide concentrations at multiple locations across the urban area. If results from screening techniques or measured carbon monoxide levels in an urban area are clearly well below the standards and expected to remain below the standard, or it can be demonstrated that the Federal Motor Vehicle Control Program will provide the needed CO reductions, then urban area-wide strategies may be evaluated using a modified rollback or proportional model approach.

Project analysis of mobile source emissions of carbon monoxide should first include an analysis using the screening techniques referenced above. If concentrations using these techniques exceed the NAAQS, then refined techniques are needed to determine compliance with the standards. CALINE3 (see Appendix A) is the preferred model for use when refined analyses are required. For free flow sources, the latest version of mobile source emission factors are required for input to CALINE3, and for interrupted flow sources (i.e., signalyzed intersections), procedures to calculate modal emission factors as contained in Worksheet 2 of the "Guidelines for Air Quality Maintenance Planning and Analysis, Volume 9"[35] are recommended.

Situations that require the use of refined techniques on an urban-wide basis should be considered on a case-by-case basis. If a suitable model is available and the data and technical competence required for its use are available, then such a model should be considered.

Where point sources of CO are of concern, they should be modeled using the screening and preferred techniques of Sections 4 or 5.

REFINED INTERSECTION MODELING
DRAFT PROTOCOL
3/8/88

This protocol will be used to support redesignations of five cities in New Jersey which are currently designated nonattainment but which air quality data over the last eight quarters indicate is in attainment of air quality standard.

Critical intersections in these cities will be modeled using refined modeling techniques.

These intersections include those selected in the 1982 SIP based on screening modeling. NJDEP will consult with appropriate state or local transportation or planning agencies to determine if these intersections are still critical and whether additional intersections need to be reviewed. The guiding principle here is to show that the area is in attainment because a representative sample of critical intersections is in attainment.

The emission estimates will be based on 1987 or 1988 traffic counts.

The CALINE 3 model will be used.

The emission rates will be calculated using worksheet 2 of Volume 9 with updated emission factors.

The updated emission factors are Mobile 3 emission factors adjusted to account for New Jersey's I/M and anti-tampering programs.

The emission data will be entered into CALINE 3 using pseudolinks for excess emissions.

Background carbon monoxide concentrations, receptor placement, and meteorological data should be selected according to EPA's Guidelines for Air Quality Models.

6.0 SCOPE OF WORK

The Contractor shall develop a detailed proposal which will address the following:

6.1 Task I - Analysis to be Performed

Using updated traffic information collected by NJDOT or its Contractor at intersections identified as carbon monoxide hot spots in the 1982 State Implementation Plan (SIP), and other sites identified by ~~and not expected to attain the National Ambient Air Quality Standard (NAAQS) by December 31, 1987~~ NJDEP ~~according to demonstrations in the SIP,~~ the Contractor will perform modeling for up to 50 intersections. The ~~latest available~~ EPA approved version of ~~CALINE (i.e.,~~ CALINE 3 ~~or CALINE 4)~~ is to be used, as authorized by NJDEP at the time of the modeling. Refer to the attached protocol for additional guidance on conducting this modeling. The intersections to be modeled by CALINE 3~~/4~~ under this scope of work will be selected by NJDEP following collection of updated traffic information by NJDOT and hot spot verification by NJDEP using the EPA Carbon Monoxide Hot Spot Guidelines. The purpose of the CALINE 3~~/4~~ modeling is to determine current attainment status of intersections where the hot spot verification indicates the potential for exceedance of the eight hour carbon monoxide NAAQS. At least eight wind directions and four receptor sites are to be modeled for each intersection to determine the maximum carbon monoxide concentration.

6.1.1 Interim Reports

Prepare and submit Interim Reports monthly, beginning one month after receipt of information supplied on the first intersections to be modeled. These reports shall include (1) a table showing the intersections on which information has been received from NJDEP, status of the modeling effort for each intersection, and maximum eight (8) hour carbon monoxide concentration at the intersection determined by the CALINE 3/4 modeling completed to date; and (2) sketch, labeled to clearly show each link and receptor location, copies of the printouts of CALINE 3/4 model inputs and results, and Worksheet 2 from Volume 9 (see Section 6.2.4) for each intersection modeled since the last Interim Report.

6.2 Information to be Supplied

The following information will be supplied to the Contractor for each intersection to be modeled:

6.2.1 Dimensional Sketch

Dimensional sketch of intersection geometry showing number of lanes of traffic observed per direction, including turning lanes, lane widths, parking lanes, shoulders, medians, sidewalks, receptor sites, distance from intersection where

parking is prohibited, distance to next intersections (if available).

6.2.2 Traffic Counts

Peak hour approach traffic volumes for each leg of the intersection including turning movements. (Traffic counts are to be made over an eight (8) hour period, beginning at approximately 10 a.m. and ending at approximately 6 p.m. The peak hour traffic volumes will be determined by NJDEP from these counts).

6.2.3 Additional Information

6.2.3.1 Posted speed limit on main road and cross road.

6.2.3.2 Traffic signal operation (signal timing and phasing).

6.2.3.3 Queue lengths for each approach during the peak hour at specified intersections.

6.2.3.4 Whether intersection is surrounded by buildings of four (4) stories or more.

6.2.3.5 Free-flow vehicle cruise speed, based on the posted speed limit and the EPA Hot Spot Guidelines.

6.2.3.6 Vehicle classification by vehicle type (% of Light Duty Gas Vehicles, % Light Duty Gas Trucks, % Heavy Duty Vehicles). Default values from 1982 SIP will be used.

6.2.3.7 Vehicle mode operation (hot starts, cold starts). Default values from 1982 SIP will be used.

6.2.4 Consistency of Information

The above information is to be consistent with the requirements of the EPA Carbon Monoxide Hot Spot Guidelines, Volume III, Workbook, EPA 450/3-78-035, August 1978, Section III, pages 52-69, and the requirements of CALINE 3 (Report No. FHWA/CA/TL-79/23). The traffic information is to be provided to the contractor as available for use in modeling the selected intersections.

In accordance with the EPA Guidelines on Air Quality Models (Revised), for interrupted flow sources (i.e. signalized intersections), procedures to calculate emission factors as contained in Worksheet 2 of the "Guidelines for Air Quality Maintenance Planning and Analysis, Volume 9" are recommended.

The latest emission correction factors available from EPA and provided by NJDEP are to be used in conjunction with Worksheet 2.

(Insert A)

6.3 Task II - Final Report

Prepare and submit an original and ten (10) copies of a final report, including the following:

Description of methodology

Discussion of results

Summary Table arranged by county, showing name of municipality, intersections analyzed, CALINE 3~~/3~~ modeling results indicating maximum eight (8) hour carbon monoxide concentration at the intersection, whether intersection does or does not meet the eight (8) hour carbon monoxide standard.

Listing of assumption used in modeling, including background concentration.

Appendix, including the following for each intersection modeled:

Sketch, labeled to clearly show each link and receptor location.

Table showing total eight (8) hour carbon monoxide concentration at each receptor for each wind direction examined.

Printout of CALINE ~~3/3~~ model inputs and results.

Worksheet 2 from Volume 9 (see Section 6.2.4).

All traffic and intersection data supplied for Contractor's use in the modeling is to be returned with the final report.

Insert A These emission factors are to be adjusted to take into account New Jersey's Inspection Maintenance and anti-tampering programs.

6.4 Schedule

The CALINE 3/4 modeling is to be completed according to the following schedule:

1988 CARBON MONOXIDE HOT SPOT CALINE 3/4 MODELING PROJECT TIME SCHEDULE

Traffic information on initial intersections for CALINE 3/4 modeling transmitted to Contractor	July 1, 1988
Traffic information on final intersections for CALINE 3/4 modeling transmitted to Contractor	January 15, 1989
CALINE 3/4 modeling completed	February 15, 1989
Preparation and submittal of Final Report on CALINE 3/4 modeling results	March 15, 1989

redo as appropriate

NOTE: Interim reports are to be submitted monthly (see Section 6.1.1)