JUL 10 1985

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Mr. James E. Evans
Chief, Construction-Operations Division
Department of the Army
Chicago District, Corps of Engineers
219 South Dearborn
Chicago, Illinois 60604-1797

Dear Mr. Evans:

In accordance with our responsibilities as a cooperating agency on the North-South Tollway project, we have responded to a request from Envirodyne Engineers, Inc. for guidance regarding the methodologies to be used for assessment of the air quality impacts of the proposed project. At our last meeting on July 1, 1985, Envirodyne agreed to follow the steps listed below as part of their modeling of impacts on air quality:

1) Use the MOBILE3 emissions model

2) Use winter temperatures, emission factors, and inversion level as data inputs to the model

3) Perform a 180° carbon monoxide (CO) analysis at major interchanges

4) Use a 1.0 parts per million (ppm) background CO concentration

5) Use a conversion factor of 0.7 to adjust one-hour average CO concentrations obtained from the model to eight-hour average concentrations

6) Locate all receptors to be modeled at the edge of the right-of-way.

The U.S Environmental Protection Agency (USEPA), in turn, agreed to perform the following tasks:

1) To review the intersection configurations, land use maps, and Year 2008 traffic data to identify the locations at which modeling of air quality parameters should be performed, both at mainline and off-line locations

2) To comment on Envirodyne's proposal to perform a second-worst-hour analysis for CO, so that improvements in local air quality due to the construction of the toll road might become more apparent

3) To review the Illinois Deparment of Transportation (IDOT) Air Quality Manual to determine if the lead analysis procedure described in the manual is adequate for this project

4) To recommend the amount of modeling to be done for the total pollutant burden analysis

5) To prepare a letter documenting the decisions made at the meeting and the results of the above four tasks.

This letter has been prepared to fulfill Task No. 5. We have reviewed and returned the materials provided on loan by Envirodyne. Our recommendations in each of the four topical areas in which guidance was requested are as follows.

TASK 1: IDENTIFY RECEPTOR LOCATIONS FOR CO MODELING

Interchange Receptors - As currently planned, Envirodyne would model the worst-case receptor at each of the interchanges indicated below. In addition, one receptor would be modeled at each interchange at which ramps to and from the south (indicated by the letter S) and to and from the north (indicated by the letter N) are located, as well as the two mainline toll plazas (one located between North Avenue and Fullerton Avenue and one located south of 83rd Street). The total number of receptors modeled along the mainline would be 22.

Army Trail Road
(Toll Plaza)
North Avenue (S)
Roosevelt Road (S)
Butterfield Road (S)
East-West Tollway
Ogden Avenue (N) (and ramp to E-W Tollway)
Maple Avenue (N)
63rd Street (N)
75th Street (N)
87th Street
(Toll Plaza)
Boughton Road
Interstate 55

We suggest that consideration be given to modeling a second receptor at the end of the longest queue for each interchange, as well as at the edge of the closest right-of-way. (For some locations, it is possible that this would be the same receptor.)

Mainline Receptors - We also suggest that modeling be done for an additional receptor along two or three of the mainline segments on which the traffic volumes are projected to be the greatest. The modeling should estimate ambient air concentrations at the edge of the right-of-way, using a receptor in the worst-case section, as identified on the basis of worst-case traffic and wind direction.

Off-line Receptors - We suggest that at least one receptor be located at the intersection of the major cross-streets listed above and the nearest major parallel roadway on both sides of the proposed tollway. This analysis should characterize the impact of the project on other highways in the vicinity.

TASK 2: COMMENT ON PROPOSED SECOND-WORST-HOUR ANALYSIS FOR CO

Envirodyne personnel indicated that they were considering expanding their investigation of the CO concentrations to determine if concentrations would be reduced because of more freely flowing traffic conditions due to diversion of traffic to the proposed tollway. Current plans involve a worst-case-hour analysis and using a conversion factor to obtain eight-hour concentrations. Envirodyne is considering a second-worst-hour analysis. We believe that, because CO concentrations would be modeled only for the worst-case-hour analysis, and extrapolated for an additional hour, a noticeable change would not be apparent until several more hours had passed. Therefore, if Envirodyne's intent is to obtain data to show such a change, each of the eight worst hours should be modeled in order to obtain an eight-hour average concentration. This modeling for worst-case analyses should be performed for receptors at the locations discussed previously.

TASK 3: REVIEW IDOT AIRBORNE LEAD ANALYSIS PROCEDURE

The tables of lead concentrations on pages 9-7, 9-8, and 9-9 in Chapter 9 of the IDOT Air Quality Manual, which are intended to be used for estimation of airborne lead concentrations, are based on annual average concentrations. The current National Standard for lead is expressed as a calendar quarter average (arithmetic mean over three months), and not as an annual average, as the look-up tables imply. Therefore, the numbers given in the tables are lower than the value required for comparison with the standard. These data also are based on monitoring data obtained from a study conducted in New Jersey, and may not be representative of the Du Page County area. In addition, site restrictions often preclude the placement of monitors in the highest impact area. The number of monitors used in the New Jersey study may have been appropriate for an ambient air monitoring study, but are not sufficient for a modeling study. Also, the data in the tables assume a constant vehicle speed, but emission factors for lead vary with vehicle speed. Because of these limitations, we have severe reservations concerning the accuracy of using the procedure in the IDOT manual.

We recommend that modeling for lead be performed using the receptors selected for the CO modeling, but only after the CO results have been obtained. Using the CO values obtained as a guide, only the five to ten worst intersections in the project area (in terms of high pollutant concentrations) would need to be modeled. Because the CALINE3 model is to be used for determining the one-hour average CO concentrations, and a calendar quarter value is necessary for comparison to the National Standard for lead, we recommend that the Illinos State Toll Highway Authority (ISTHA) investigate the use of another model for the estimation of airborne lead concentrations. The Illinois Environmental Protection Agency (IEPA) has the capability to do this type of modeling. We suggest that ISTHA contact Mr. Michael Hayes of IEPA at 219/785-1735.

It is necesary to use a background concentration of lead for use in the calculations. The background level given in the IDOT Air Quality Manual is 0.008 micrograms per cubic meter. The background levels in the Chicago area, including Du Page County, are considerably higher. Monitoring data collected by IEPA at Elmhurst in Du Page County in 1984 indicate a background concentration of 0.2 micrograms per cubic meter. Because IEPA currently uses this value in modeling for Du Page County, we recommend that it also be used in the modeling of lead concentrations for the North-South Tollway project.

Also, a study currently is being coordinated by the Argonne National Laboratory of soil lead concentrations in parks along urban, suburban, and rural highways in Illinois. The results of this study may be relevant to the North-South Tollway project, and should be examined when the study report becomes available in the autumn of 1985.

TASK 4: RECOMMEND MODELING FOR TOTAL POLLUTANT BURDEN ANALYSIS

Modeling should be performed for all perpendicular roadway (crossroad) segments in the project area network where the total traffic level is projected to increase (by approximately 5% or more) over the no-build (baseline) level and for all parallel roadway segments where the traffic is projected to decrease (by approximately 5% or more) from the no-build level. Modeling should be performed for the base year (1985), the year of completion (1989), and the design year (2008), for all four scenarios. Traffic volume, traffic speed, and vehicle mix should be identified for each leg in the network as inputs to this modeling.

We are willing to meet with Envirodyne, ISTHA, and other agencies as necessary if additional guidance is required. Please contact Ms. Kathleen Brennan of my staff if you have any questions concerning our recommendations.

Sincerely yours,

William D. Franz, Chief
Environmental Review Branch
Planning and Management Division

cc: C. Dovas, Envirodyne Engineers, Inc.
M. Hillier, ISTHA
N. Hayes, IEPA