

SPIR COM 2, 788
12/21/99

Model Clearinghouse Information Storage and Retrieval System

Record Information Report

Record Number: 00-X -02 Fiscal Year: 1900 Region: 10 Last Update:
Name: Spokane CO SIP-Nov 99 12/21/99

State(s): WASHINGTON
Pollutant(s): CO
Regulation(s): SIP
Source(s): Roadway
Model(s): AIRSHED
CALINE-4
Subject(s): Time Scaling
Urban/Rural: Urban Only
Oral/Written: Oral
Terrain: Low Terrain (below stack height)
Guideline: Guideline
Database: Off-site
Involvement: Review and Comment
Record Comments:

11/23/99

Issue: The Spokane local agency is in the process of developing a CO SIP for the area. They are using AIRSHED for the area wide estimates. As part of the that process they need to estimate 8 hour intersection hot spot concentrations. How should they do that based on 1-hour estimates?

C/H Comments:

11/23/99

To: Wayne Elson/R10/USEPA/US@EPA

Hi Wayne--After we talked I downloaded and looked at 2 documents: 1. The screening procedures document which we discussed and 2. G/L for modeling CO from Roadway intersections.

Attached are excerpts from these 2 documents which seem to suggest that a factor of .7 should be used for time scaling from 1 to 8 hours. The CO Intersection G/L also states that it is consistent with Volume 9, from which I believe you were questioning the language. I don't have Volume 9 in hand, but if you want to fax (520-818-0465) or LAN me the language that is troubling you, maybe we can talk about it together. If need be, we

can call Tom Braverman.

Dean

EXCERPTS FROM SCREENING PROCEDURES FOR ESTIMATING THE AIR

QUALITY IMPACTS OF STATIONARY SOURCES, REVISED

Step 5. Obtain concentration estimates for the averaging times of concern. The maximum 1-hour concentration (1) is the highest of the concentrations estimated in Step 4, Procedures (a) - (c). For averaging times greater than 1-hour, the maximum concentration will generally be less than the 1-hour value. The following discussion describes how the maximum 1-hour value may be used to make an estimate of maximum concentrations for longer averaging times.

The ratio between a longer-term maximum concentration and a 1-hour maximum will depend upon the duration of the longer averaging time, source characteristics, local climatology and topography, and the meteorological conditions associated with the 1-hour maximum. Because of the many ways in which such factors interact, it is not practical to categorize all situations that will typically result in any specified ratio between the longer-term and 1-hour maxima. Therefore, ratios are presented here for a "general case" and the user is given some flexibility to adjust those ratios to represent more closely any particular point source application where actual meteorological data are used. To obtain the estimated maximum concentration for a 3-, 8-, 24-hour or annual averaging time, multiply the 1-hour maximum (1) by the indicated factor:

Averaging Time	
Multiplying Factor	
3 hours	0.9
(±0.1)	
8 hours	0.7
(±0.2)	
24 hours	0.4

(±0.2)

Annual

0.08

(±0.02)

The numbers in parentheses are recommended limits to which one may diverge from the multiplying factors representing the general case. For example, if aerodynamic downwash or terrain is a problem at the facility, or if the emission height is very low, it may be necessary to increase the factors (within the limits

specified in parentheses). On the other hand, if the stack is relatively tall and there are no

terrain or downwash problems, it may be appropriate to decrease the factors.

Agreement

should be reached with the Regional Office prior to modifying the factors.

The multiplying factors listed above are based upon general experience with elevated point sources. The factors are only intended as a rough guide for estimating maximum concentrations for averaging times

greater than one hour. A degree of conservatism is incorporated in the factors to provide

reasonable assurance that maximum concentrations for 3-, 8-, 24-hour and annual values

will not be underestimated.

EXCERPT FROM THE GUIDELINE FOR MODELING CO FROM ROADWAY

INTERSECTIONS

4.7.2 Estimating 8-Hour Concentrations from 1-Hour Concentrations

The calculation of 8-hour concentration estimates from 1-hour concentration

estimates is a technique that has been used since the initial distribution of Volume 9 in

1975. The primary focus in this calculation is on the relationship between 1-hour and 8-

hour traffic volumes and meteorological conditions. Because the ratio of the 8-hour to 1-

hour concentration estimate (persistence factor) represents a combination of the variability

in both traffic and meteorological conditions, the ratio of measured monitored concentrations should be used to determine the persistence factor, since monitoring data

include the effects of variability in both traffic and meteorological conditions.

The following specifications for the use of a persistence factor to estimate 8-

hour concentrations from predicted maximum 1-hour CO concentrations are for application to the intersection techniques described in this document. The preferred method is to use monitoring data. The persistence factor should be based on values obtained using the ratio of the 8-hour to the maximum 1-hour measured CO concentration within the 8-hour period. This persistence factor should be calculated for each of the 10 highest non-overlapping 8-hour concentrations obtained from the latest three CO seasons of monitoring data and averaged. A CO season is generally defined as the period from October through April, but it may be longer or shorter in some areas of the country. If less than three CO seasons are not available then the use of one or two seasons of data would be allowed. If monitoring data are not available at all or there are less than 3 months of one CO season of data available, then use a 0.7 default factor to convert from a peak 1-hour concentration to a peak 8-hour concentration. The 0.7 factor is a reasonably conservative persistence factor based on studies of monitoring data throughout many regions of the country. Thus, EPA recommends the use of a 0.7 persistence factor in a local area where monitoring data are not available. If a persistence factor other than 0.7 is obtained through the use of monitored data in a local area, it should be used rather than 0.7.

4.7.3 Background Concentrations

Total CO concentrations are a combination of the intersection of interest and background concentrations due to other local sources (i.e., more distant roadways and parking lots or industrial sources). The contributions from other sources may be determined from monitoring data or urban areawide modeling.

For the purposes of this guidance, two levels of background determination are recommended on the basis of the study type.

1)

State Implementation Plan (SIP)

For SIP analysis, urban area

modeling using UAM or RAM should be used in conjunction with both current and projected (future) CO emission inventories to estimate background. The UAM or RAM CO concentration in the grid square where the intersection is located should be used for background.

From: <Elson.Wayne@epamail.epa.gov>

To: RTP10.RTP10SD(WILSON-DEAN)

Date: 11/24/99 11:25am

Subject: Re: Spokane CO SIP

Dean, Spokane definitely want to calculate their own persistence factor. The "Guideline for Modeling CO. . ." suggests this as well. The language in question is as follows:

4.7.2 "The following specifications for the use of a persistence factor to estimate 8-hour concentrations from predicted maximum 1-hour CO concentrations are for application to the intersection techniques described in this document. The preferred method is to use monitoring data. The persistence factor should be based on values obtained using the ratio of the 8-hour to the maximum 1-hour measured CO concentration within the 8-hour period. This persistence factor should be calculated for each of the 10 highest non-overlapping 8-hour concentrations obtained from the latest three CO seasons of monitoring data and averaged."

They have found examples that took different approaches to calculating this based on the same guidance. Are there examples that we could give them that nail it down.

-Wayne Elson

(6)

Follow Up

12/6/99

Discussion between C/H (D. Wilson) and Region X (Wayne Elson). Wayne will follow up with the local agency to find out whether they want to follow up any further with the C/H on this issue. The C/h again suggested that the appropriate follow up would be a call with Tom Braverman of AQMG.

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