



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711
August 13, 1985

MEMORANDUM

SUBJECT: Denver Carbon Monoxide Modeling

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

TO: John Notar
Regional Meteorologist, Region VIII

In response to your request, we have reviewed the information included with your June 5, 1985 letter and further information provided by Frank Rogers of the Colorado Department of Health regarding the use of the Urban Airshed Model for carbon monoxide assessment in Denver, Colorado. Based upon this review, we find that 8-hour exceedances to the carbon monoxide NAAQS occur during the period beginning with the evening rush traffic and extending to midnight on cold clear winter nights with strong nighttime radiation inversions and very light and variable winds. Under these conditions, we believe that the 8-hour exceedances are areawide in nature as evidenced by six to ten of the 15 monitoring stations measuring exceedances of the CO NAAQS.

The rapid change in mixing height and stability and light and variable winds that lead to high areawide 8-hour carbon monoxide concentrations from 4:00 P.M. to midnight appear to be handled adequately by the Urban Airshed Model, as adapted to Denver. This numerical model provides a better treatment than Gaussian models of the time dependent changes in meteorological conditions that lead to 8-hour exceedances of the CO NAAQS in Denver, although the spatial resolution of the model is not sufficient for evaluating individual line source impacts. Thus, we support the proposal to use the Urban Airshed Model only for the assessment of areawide carbon monoxide controls for Denver, Colorado providing an adequate protocol is developed for choosing the days to be modeled and evaluating the performance of the model.

We are concerned that the areawide solution described may mask "hot spot" problems which will not be detected by the urban scale analysis, and thus areawide controls may not be sufficient to eliminate all carbon monoxide exceedances. Therefore, the influence of congested highways, intersections, or street canyons on measured 8-hour exceedances of the CO NAAQS must be investigated through the use of appropriate "hot spot" modeling techniques.

If you have any questions or if we can be of further assistance, please contact Tom Braverman at FTS 629-5690.

cc: Dean Wilson
Regional Modeling Contact, Regions I-X