



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

August 31, 1982

OFFICE OF
THE ADMINISTRATOR

Mrs. Anne M. Gorsuch
Administrator
U.S. Environmental Protection Agency
Washington, D.C. 20460

Dear Mrs. Gorsuch:

The Clean Air Scientific Advisory Committee (CASAC) met on July 6 to provide its advice on several issues related to the ambient air quality standard for carbon monoxide. The Committee had previously advised the Administrator of the scientific adequacy of the criteria document and staff paper in a closure memorandum dated October 9, 1979.

At its most recent meeting the Committee provided advice to the Agency on four issues. These included: 1) setting a revised eight-hour carbon monoxide standard that includes five allowable exceedances; 2) the role and significance of the 1981 study published by Dr. Wilbert Aronow; 3) sensitivity analysis and exposure analysis predictions of carboxyhemoglobin (COHb) levels and ambient CO concentrations under alternative air quality standards; 4) range of scientifically acceptable alternative standards for CO.

I would like to briefly summarize for you the Committee's views on each of these issues.

1. Development of a Multiple Exceedance 8-Hour Standard.

The CASAC reached a consensus that a multiple exceedance standard has both scientific as well as administrative merit. From a scientific point of view this approach recognizes the stochastic or random-like character of meteorological events; administratively, it reduces the element of chance in determining compliance with the standard. In recommending that you adopt a multiple exceedance standard, the Committee notes that an increase in the number of allowable exceedances will, in effect relax the existing standard if the standard level remains unchanged. In order to provide protection to the public health with an adequate margin of safety you should consider the impact of a multiple exceedance standard upon ambient CO concentrations and levels of blood COHb.

2. Role of the 1981 Aronow Study.

CASAC reached no overall consensus on the significance which the Agency ought to attribute to the Aronow study. The study reported a 10 percent reduction in the time to onset of angina during treadmill exercise at blood carboxyhemoglobin levels of 2 percent. CASAC discussed the fact that the response observed at 2.0% COHb was more subtle than that observed at higher levels (2.7 - 2.9% COHb) and speculated that even more subtle responses might be found at COHb levels below 2.0%. The Committee concluded that there may be no physiological response threshold for carbon monoxide. One CASAC consultant, while noting that the study data are solid and irrefutable, concluded that activity and exposure patterns of angina patients are far different from the general population. He also observed that there is no reason to believe that changes in the time of onset of angina during treadmill exercise are a valid biologic endpoint for the determination of an adverse health effect. Another Committee consultant, however, concluded that shortening of exercise time prior to the onset of an angina attack clearly is an adverse health effect.

While reaching no consensus on the role of this study, the Committee's earlier position as stated in the October 9, 1979 closure memorandum -- that the critical effects level for COHb occurs between 2.7% - 3.0% and that the onset of angina represents an adverse effect -- remains as the CASAC consensus on this issue.

3. Scientific and Technical Adequacy of Sensitivity and Exposure Analyses.

The sensitivity and exposure analyses were prepared by the Agency to compare the relationship between ambient CO concentrations and various levels of blood COHb. In addition, the analyses estimated the number and distribution of individuals who were projected to experience various COHb levels under alternative CO standards.

CASAC has reviewed the exposure and sensitivity analyses and has concluded that both are scientifically acceptable given the current state-of-the-art of the scientific community's ability to model physiological and other parameters related to this pollutant. Specifically, the Committee would draw to your attention two of its conclusions on these analyses: 1) the Agency's use of the Haldane constant with a value set at 218 is a reasonable selection among a variety of physiological parameters

discussed in the sensitivity analysis; and 2) the draft preamble states that an Agency objective is to keep 99% of the population below a COHb level of 2.5%. Since there may be no threshold concentration level for carbon monoxide below which no adverse effects will be experienced by anyone, and since one hundred percent protection is not feasible, a social policy choice must be made to limit societal risk from this pollutant. From a scientific standpoint the 99% objective is within the realm of reason, but there may be other than scientific factors you wish to consider in reaching a decision on this particular issue.

4. Scientifically Acceptable Range for the 8-Hour CO Standard.

In commenting upon the staff's proposals for a revised 8-hour CO standard set at 9 parts per million (p.p.m.) with five exceedances, or 12 p.p.m. with one exceedance, the Committee made the following consensus observations:

o a standard set at 12 p.p.m. with 5 exceedances is not scientifically acceptable

o a standard established at 12 p.p.m. with 1 exceedance would provide a very small margin of safety

o the scientific evidence alone cannot identify an exact level at which to set a standard for carbon monoxide. Given the need to protect sensitive members of the population from this pollutant, the Committee advises you to choose a standard level and a corresponding number of exceedances that will limit COHb below the critical effects level of 2.7 - 3.0%, with an adequate margin of safety.

The Committee appreciates the opportunity to advise you on the carbon monoxide standard and hopes that its comments will be useful as you finalize the standard. We urge you to proceed expeditiously in this matter because the criteria document and staff paper, reviewed by CASAC more than three years ago, will be increasingly subject to challenge because of any newly published literature on this pollutant. In addition, both the private sector and individual citizens need to know the standard level for the next five years for planning purposes and for reassurance that public health is being adequately protected.

Sincerely yours,



Sheldon K. Friedlander
Chairman, Clean Air Scientific
Advisory Committee

cc: Dr. John W. Hernandez
Kathleen Bennett
Dr. Terry F. Yosie