



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D C 20460

SAB-CASAC-87-022

February 19, 1987

The Honorable Lee M. Thomas  
Administrator  
U.S. Environmental Protection  
Agency  
Washington, DC 20460

Dear Mr. Thomas:

The Clean Air Scientific Advisory Committee (CASAC) has completed its review of the 1986 Addendum to the 1982 Staff Paper on Sulfur Oxides (Review of the National Ambient Air Quality Standards for Sulfur Oxides: Updated Assessment of Scientific and Technical Information) prepared by the Agency's Office of Air Quality Planning and Standards (OAQPS).

The Committee unanimously concludes that this document is consistent in all significant respects with the scientific evidence presented and interpreted in the combined Air Quality Criteria Document for Particulate Matter/Sulfur Oxides (1982) and its 1986 Addendum, on which CASAC issued its closure letter on December 15, 1986. The Committee believes that the 1986 Addendum to the 1982 Staff Paper on Sulfur Oxides provides you with the kind and amount of technical guidance that will be needed to make appropriate decisions with respect to the standards. The Committee's major findings and conclusions concerning the various scientific issues and studies discussed in the Staff Paper Addendum are contained in the attached report.

Thank you for the opportunity to present the Committee's views on this important public health and welfare issue.

Sincerely,

A handwritten signature in cursive script that reads "Morton Lippmann".

Morton Lippmann, Ph.D.  
Chairman  
Clean Air Scientific Advisory  
Committee

cc: A. James Barnes  
Gerald Emison  
Lester Grant  
Vaun Newill  
John O'Connor  
Craig Potter  
Terry Yosie

SUMMARY OF MAJOR SCIENTIFIC ISSUES AND CASAC  
CONCLUSIONS ON THE 1986 DRAFT ADDENDUM  
TO THE 1982 SULFUR OXIDES STAFF PAPER

The Committee found the technical discussions contained in the Staff Paper Addendum to be scientifically thorough and acceptable, subject to minor editorial revisions. This document is consistent in all significant respects with the scientific evidence presented in the 1982 combined Air Quality Criteria Document for Particulate Matter/Sulfur Oxides and its 1986 Addendum, on which the Committee issued its closure letter on December 15, 1986.

Scientific Basis for Primary Standards

The Committee addressed the scientific basis for a 1-hour, 24-hour, and annual primary standards at some length in its August 26, 1983 closure letter on the 1982 Sulfur Oxides Staff Paper. That letter was based on the scientific literature which had been published up to 1982. The present review has examined the more recently published studies.

It is clear that no single study of SO<sub>2</sub> can fully address the range of public health issues that arise during the standard setting process. The Agency has completed a thorough analysis of the strengths and weaknesses of various studies and has derived its recommended ranges of interest by evaluating the weight of the evidence. The Committee endorses this approach.

The Committee wishes to comment on several major issues concerning the scientific data that are available. These issues include:

- o Recent studies more clearly implicate particulate matter than SO<sub>2</sub> as a longer-term public health concern at low exposure levels.
- o A majority of Committee members believe that the effects reported in the clinical studies of asthmatics represent effects of significant public health concern.
- o The exposure uncertainties associated with a 1-hour standard are quite large. The relationship between the frequency of short-term peak exposures and various scenarios of asthmatic responses is not well understood. Both EPA and the electric power industry are conducting further analyses of a series of exposure assessment issues. Such analyses have the potential to increase the collective understanding of the relationship between SO<sub>2</sub> exposures and responses observed in subgroups of the general population.
- o The number of asthmatics vulnerable to peak exposures near electric power plants, given the protection afforded by the current standards, represents a small number of people. Although the Clean Air Act requires that sensitive population groups receive protection, the size of such groups has not been defined. CASAC believes that this issue represents a legal/policy matter and has no specific scientific advice to provide on it.

CASAC's advice on primary standards for three averaging times is presented below:

1-Hour Standard - It is our conclusion that a large, consistent data base exists to document the bronchoconstrictive response in mild to moderate asthmatics subjected in clinical chambers to short-term, low levels of sulfur dioxide while exercising. There is, however, no scientific basis at present to support or dispute the hypothesis that individuals participating in the SO<sub>2</sub> clinical studies are surrogates for more sensitive asthmatics. Estimates of the size of the asthmatic population that experience exposures to short-term peaks of SO<sub>2</sub> (0.2 - 0.5 parts per million (ppm) SO<sub>2</sub> for 5-10 minutes) during light to moderate exercise, and that can be expected to exhibit a bronchoconstrictive response, varies from 5,000 to 50,000.

The majority of the Committee believes that the scientific evidence supporting the establishment of a new 1-hour standard is stronger than it was in 1983. As a result, and in view of the significance of the effects reported in these clinical studies, there is strong, but not unanimous support for the recommendation that the Administrator consider establishing a new 1-hour standard for SO<sub>2</sub> exposures. The Committee agrees that the range suggested by EPA staff (0.2 - 0.5 ppm) is appropriate, with several members of the Committee suggesting a standard from the middle of this range. The Committee concludes that there is not a scientifically demonstrated need for a wide margin of safety for a 1-hour standard.

24-Hour Standard - The more recent studies presented and analyzed in the 1986 Staff Paper Addendum, in particular the episodic lung function studies in children (Dockery et al., and Dassen et al.), serve to strengthen our previous conclusion that the rationale for reaffirming the 24-hour standard is appropriate.

Annual Standard - The Committee reaffirms its conclusion, voiced in its 1983 closure letter, that there is no quantitative basis for retaining the current annual standard. However, a decision to abolish the annual standard must be considered in the light of the total protection that is to be offered by the suite of standards that will be established.

The above recommendations reflect the consensus position of CASAC. Not all CASAC reviewers agree with each position adopted because of the uncertainties associated with the existing scientific data. However, a strong majority supports each of the specific recommendations presented above, and the entire Committee agrees that this letter represents the consensus position.

#### Secondary Standards

The 3-hour secondary standard was not addressed at this review.