



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON D.C. 20460

OFFICE OF THE ADMINISTRATOR
SCIENCE ADVISORY BOARD

March 26, 2007

EPA-CASAC-07-002

Honorable Stephen L. Johnson
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Subject: Clean Air Scientific Advisory Committee's (CASAC) Review of the Agency's
Final Ozone Staff Paper

Dear Administrator Johnson:

The Clean Air Scientific Advisory Committee (CASAC or Committee), augmented by subject-matter-expert Panelists — collectively referred to as the CASAC Ozone Review Panel (Ozone Panel) — completed its review of the Agency's 2nd Draft Ozone Staff Paper in October 2006 (EPA-CASAC-07-001). In that letter, dated October 24, 2006, the CASAC indicated it would review the Agency's Final Ozone Staff Paper and offer additional, unsolicited advice to the Agency on the chapters concerned with setting the primary and secondary National Ambient Air Quality Standards (NAAQS) for ozone.

On March 5, 2007, the Ozone Panel met via a public teleconference to review EPA's *Final Review of the National Ambient Air Quality Standards for Ozone: Policy Assessment of Scientific and Technical Information* (Final Ozone Staff Paper, January 2007). The Panel focused on Chapter 6 (The Primary O₃ NAAQS) and Chapter 8 (The Secondary O₃ NAAQS). The CASAC roster is attached as found in Appendix A, the Ozone Panel roster is provided as Appendix B, and Ozone Panel members' individual review comments are found in Appendix C.

Members of the CASAC Ozone Review Panel were pleased to review EPA's Final Ozone Staff Paper. The members of CASAC and the Ozone Panel were unanimous in their praise of both the responsiveness of the Agency to our previous recommendations and of the clarity of this document. While the CASAC recognizes that the Ozone Staff Paper is a final document, the Committee offers the following advice to aid the Administrator and Agency staff in developing EPA's proposed rule for ozone and related photochemical oxidants, to be published in June 2007.

Primary Standard

- The CASAC Ozone Review Panel agreed with the choice of indicator, statistical form and averaging time for the primary Ozone NAAQS suggested by Agency staff.
- The Final Ozone Staff Paper recommended that “consideration be given to a standard level within the range of somewhat below 0.080 ppm to 0.060 ppm,” adding that “[s]tandard levels within this range that were considered in staff analyses of air quality, exposure, and risk include 0.074, 0.070, and 0.064 ppm, representative of levels within the upper, middle, and lower parts of this range, respectively.” Reiterating what was stated in the CASAC’s previous letter to you on this review (EPA-CASAC-07-001), *Ozone Panel members were unanimous in recommending that the level of the current primary ozone standard should be lowered from 0.08 ppm to no greater than 0.070 ppm.* The above-referenced CASAC letter (from October 24, 2006), in addition to EPA’s own findings in the Final Ozone Air Quality Criteria Document (AQCD) and the Final Ozone Staff Paper, provide overwhelming scientific evidence for this recommendation. *Furthermore, the Ozone Panel recommends that the NAAQS should be specified to the third decimal place of the ppm scale to avoid any rounding issues* — as indicated by the standard levels that the Agency itself considered in the Final Ozone Staff Paper.
- Pursuant to the Clean Air Act, the primary NAAQS for criteria air pollutants must be set to protect the public health with an adequate margin of safety. *Significantly, the Final Ozone Staff Paper does not address the issue of a margin of safety.* (On page 6-86, the authors conclude that the proposed standard would “...provide an appropriate degree of public health protection...;” however, there is no explicit mention of a margin of safety, *per se.*) Such a discussion should be added to the document and taken into consideration in setting the primary ozone standard.
- There is an underestimation of the affected population when one considers only twelve urban “Metropolitan Statistical Areas” (MSAs). The CASAC acknowledges that EPA may have intended to illustrate a range of impacts rather than be comprehensive in their analyses. However, it must be recognized that ozone is a regional pollutant that will affect people living outside these 12 MSAs, as well as inside and outside other urban areas.
- *There is an urgent need to fund more research on the effects on sensitive subpopulations of low levels of the photochemical oxidant mixture for which ozone is used as a surrogate.* In addition to the three field studies pointing to higher responses to the oxidant mixtures than to pure ozone that the Agency has already referenced in the Final Ozone AQCD (1–3), three other such studies are referenced below (4–6). More information on the effects of low levels of oxidant mixtures on public health is essential to inform the future decision-making process.
- Finally, with respect to policy-relevant background (PRB), the Ozone Panel wishes to point out that the Final Ozone Staff Paper does not provide a sufficient base of evidence from the peer-reviewed literature to suggest that the current approach to determining a PRB is the best method to make this estimation. One reason is that part of the PRB is not

controllable by EPA. It would require international cooperation beyond the bounds of North America. A better scientific understanding of the PRB and its relationship to intercontinental transport of air pollutants could serve as the basis for a more concerted effort to control its growth and preserve the gains in air quality achieved by control efforts within the U.S. In any case, there is no apparent need to define PRP in the context of establishing a health-based (primary) ozone NAAQS. The effects of inhaled ozone on decreases in respiratory function have been seen in healthy children exposed to ozone within ambient air mixtures in summer camps (1-6). Furthermore, the concentration-response functions above 40 ppb are either linear, or indistinguishable from linear. Thus, PRB is irrelevant to the discussion of where along the concentration-response function a NAAQS with an 8-hour averaging time that provides enhanced public health protection should be.

Secondary Standard

- *The CASAC Ozone Review Panel members were unanimous in supporting the recommendation in the Final Ozone Staff Paper that protection of managed agricultural crops and natural terrestrial ecosystems requires a secondary Ozone NAAQS that is substantially different from the primary ozone standard in averaging time, level and form.*
- The recommended metric for the secondary ozone standard is the (sigmoidally-weighted) W126 index, accumulated over at least the 12 "daylight" hours and over at least the three maximum ozone months of the summer "growing season."
- The Ozone Panel agrees with EPA Staff recommendations that the lowest bound of the range within which a seasonal W126 welfare-based (secondary) ozone standard should be considered is 7.5 ppm-hrs; however, it *does not* agree with Staff's recommendations that the upper bound of the range should be as high as 21 ppm-hours. Rather, the Panel recommends that the upper bound of the range considered should be no higher than 15 ppm-hour, which the Panel estimates is approximately equivalent to a seasonal 12-hour SUM06 level of 20 ppm-hours.
- Multi-year averaging to promote a "stable" secondary Ozone NAAQS is less appropriate for a cumulative, seasonal secondary standard than for a primary standard based on maximum eight-hour concentrations. If multi-year averaging is employed to increase the stability of the secondary standard, the level of the standard should be revised downward to assure that the desired threshold is not exceeded in individual years.
- There was an effective, Federally-funded program of ozone environmental effects research during the 1970s and 1980s, but such research support has been neglected in recent years. It is reasonable to conclude that changes in the distribution and genetic makeup of crop cultivars and naturally occurring plant species has and will take place over time along with modification of levels and distribution of ambient ozone exposures. Therefore, future refinements of the secondary Ozone NAAQS will require both: (1) a significant future investment in effects research to ensure that data for plant response to ozone are representative of the species and genetic composition of current crop and forest

species utilized by society; and (2) a clear understanding of the sources and propagation of uncertainty in the results of that research.

Additional details on the general recommendations listed above are provided in the comments of the individual members of the Ozone Panel that are included in Appendix C.

The CASAC appreciate this opportunity to work with the Agency is using science to help inform the setting of primary and secondary NAAQS to protect public health. While this is the last of a long series of Agency NAAQS-related staff papers, the Committee will continue to provide you with scientific advice related to setting criteria air pollutant standards protective of the public health and public welfare under EPA's revised NAAQS review process. As always, the CASAC wishes the Agency well in this important endeavor.

Sincerely,

/Signed/

Dr. Rogene Henderson, Chair
Clean Air Scientific Advisory Committee

Appendix A – Roster of the Clean Air Scientific Advisory Committee

Appendix B – Roster of the CASAC Ozone Review Panel

Appendix C – Review Comments from Individual CASAC Ozone Review Panel Members

References

1. Spector, D.M., Lippmann, M., Liroy, P.J., Thurston, G.D., Citak, K., James, D.J., Bock, N., Speizer, F.E., and Hayes, C. Effects of ambient ozone on respiratory function in active normal children. *Am. Rev. Respir. Dis.* 137:313-320 (1988).
2. Spector, D.M., Lippmann, M., Thurston, G.D., Liroy, P.J., Stecko, J., O'Connor, G., Garshick, E., Speizer, F.E., and Hayes, C. Effects of ambient ozone on respiratory function in healthy adults exercising outdoors. *Am. Rev. Respir. Dis.* 138:821-828 (1988).
3. Thurston, G.D., Lippmann, M., Scott, M.B., and Fine, J.M. Summertime haze air pollution and children with asthma. *Am. J. Respir. Crit. Care Med.* 155:654-660 (1997).
4. Lippmann, M. Health effects of ozone: A critical review. *JAPCA* 39:672-695 (1989).
5. Spector, D.M., Thurston, G.D., Mao, J., He, D., Hayes, C., and Lippmann, M. Effects of single and multi-day ozone exposures on respiratory function in active normal children. *Environ. Res.* 55:107-122 (1991).
6. Lippmann, M. Health effects of tropospheric ozone: Implications of recent research findings to ambient air quality standards. *J. Exposure Anal. Environ. Epidemiol.* 3:103-129 (1993).