



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL CENTER FOR ENVIRONMENTAL ASSESSMENT- RTP DIVISION
Research Triangle Park, NC 27711

OFFICE OF RESEARCH AND DEVELOPMENT

November 15, 2011

MEMORANDUM

SUBJECT: CASAC Review of Second External Review Draft Integrated Science Assessment for Ozone and Related Photochemical Oxidants

FROM: John Vandenberg, Ph.D.
Director
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Research Triangle Park Division (B243-01)

TO: Holly Stallworth, Ph.D.
Designated Federal Officer
Clean Air Scientific Advisory Committee
EPA Science Advisory Board Staff Office (1400R)

The *Second External Review Draft Integrated Science Assessment for Ozone and Related Photochemical Oxidants* (draft O₃ ISA) prepared by the Environmental Protection Agency's (EPA) National Center for Environmental Assessment – Research Triangle Park Division (NCEA –RTP) as part of EPA's ongoing review of the national ambient air quality standards (NAAQS) for ozone (O₃) was released on September 30, 2011. This second external review draft ISA integrates the scientific evidence for review of the primary (health-based) and secondary (welfare-based) NAAQS for O₃ and provides draft findings, conclusions and judgments on the strength, coherence and plausibility of the evidence. The ISA is intended to "accurately reflect the latest scientific knowledge useful in indicating the kind and extent of identifiable effects on public health which may be expected from the presence of [a] pollutant in ambient air" (Clean Air Act, Section 108; 42 U.S.C. 7408). The draft ISA will be reviewed by the Clean Air Scientific Advisory Committee (CASAC) O₃ NAAQS Review Panel (the O₃ CASAC Panel) at a public meeting on January 9-10, 2012. We have distributed the draft O₃ ISA to the O₃ CASAC Panel. I am requesting that you forward our charge to the O₃ CASAC Panel.

Following the review of the second external review draft ISA, NCEA-RTP staff will produce a final O₃ ISA projected for release in March 2012 that addresses comments received from the CASAC O₃ Panel and the public. The final O₃ ISA, in conjunction with additional technical assessments, will provide the scientific basis for EPA's decision regarding the adequacy of the current standards for O₃ to protect human health, public welfare, and the environment.

We look forward to the O₃ CASAC Panel review of the second draft ISA at the upcoming meeting. Should you have any questions regarding the draft O₃ ISA, please feel free to contact Dr. Mary Ross (919-541-5170, Ross.Mary@epa.gov) or Dr. James Brown (919-541-0765, Brown.James@epa.gov).

Charge to the O₃ CASAC Panel

This draft ISA includes revisions based on the comments and advice provided by the CASAC O₃ Panel and public comments on the first external review draft ISA. Specific revisions to the second draft O₃ ISA were described in more detail in EPA's recent response (October 18, 2011) to the CASAC O₃ Panel's review letter (August 10, 2011) for the first draft Ozone ISA. We have carefully considered all of the comments provided by the CASAC O₃ Panel members and the public in creating this second draft ISA. In addition, we have incorporated information on policy-relevant studies published since the release of the first external review draft ISA. Changes to the content and structure of the draft are described on a broad scale in the list below together with the new charge questions for this CASAC O₃ Panel review. These charge questions are not intended to limit the scope of the Panel's review, rather these charge questions are intended to assist the Panel by highlighting specific areas where the Agency has responded to prior comments of the Panel or where the Agency raises emerging issues to the attention of the Panel for comment.

Preface, Preamble, Chapters 1 (Executive Summary) and 2 (Integrative Overview)

The CASAC panel offered a number of recommendations to enhance the organization and presentation of the evidence in the ISA. An Executive Summary has been prepared and is put in the place of Chapter 1. As part of the development of the Executive Summary and restructuring of the integrative overview chapter, Chapter 1 materials have been revised and moved, specifically: (a) the more general sections on the development of the ISA and the causality framework are being placed in a Preamble that can support all ISAs; (b) the introductory sections specific to this ISA are placed at the beginning of Chapter 2; and (c) sections on legislative background and history of previous reviews are contained in a Preface in the front matter of the ISA. The intent was to bring the integrative overview discussion to the front of the document, thus making it more accessible to the reader.

Please review and comment on the effectiveness of these revisions. Please comment on the extent to which Chapters 1 and 2 comprise a useful and effective approach for presenting this summary information and conclusions. Please recommend any revisions that may improve the scientific accuracy of these summary sections and the conclusions therein.

Chapter 3 – Atmospheric Chemistry and Ambient Concentrations

Pertaining to estimates of background O₃ concentrations, Sections 3.4 and 3.9 were updated and expanded to more fully describe the scientific issues associated with estimating background concentrations as well as the limitations and uncertainties of the methods used to estimate them. Section 3.6 on ambient O₃ concentrations was revised to improve the description of variability in O₃ concentrations attributed to diurnal and seasonal patterns, and spatial differences in urban and non-urban locations.

Please comment on the adequacy of these and other changes to the chapter and recommend any revisions to improve the discussion of key information. In relation to ambient and background O₃ concentrations, is material clearly, succinctly, and accurately provided? Where appropriate, please provide guidance that may refine the scientific interpretation and/or improve the representation of the science.

Chapter 4 – Exposure to Ambient Ozone

Revisions made to Chapter 4 in response to CASAC comments include clarifying the discussion of the relevance of central-site monitoring data for epidemiologic studies, together with potential bias and uncertainty due to exposure error; revising the summary section to be more concise and focused on the main points of the chapter; and preparing tables to summarize field study data and facilitate comparison of exposure models. In addition, material has been added discussing averting behavior on high-O₃ concentration days.

Please comment on the adequacy of these and other changes in responding to the Panel's comments. Please provide comment on revisions that may further improve the utility of discussion for characterizing personal-ambient exposure relationships and for interpretation of epidemiologic results in subsequent chapters.

Chapter 5 – Dosimetry and Mode of Action

Chapter 5 was reorganized and updated in response to CASAC comments, including clarification of the linkage between dosimetry and mode of action, expanded discussion of species homology and key principles of O₃ uptake, increased emphasis on underlying mechanisms which link to effects discussed in Chapters 6 and 7, and expansion of summary sections.

Please comment on the extent to which these revisions help Chapter 5 provide the underlying mechanistic and dosimetric information for interpretation of effects evidence in later chapters and recommend any revisions to improve the discussion of key information.

Chapters 6-7 – Integrated Health Effects of Short- and Long-Term Ozone Exposure

In Chapters 6 and 7, references to and incorporation of information from previous assessments were expanded so that the evaluation of new health evidence is more clearly integrated with the substantial existing body of evidence on ozone-related health effects. Tables, figures, and text were revised and/or created to provide additional details related to design and results of studies. In Chapter 7, the discussion of long-term exposure and mortality has been expanded with the addition of new study findings that provide additional evidence for this association.

Please comment on the extent to which there is sufficient clarity in the presentation of study designs and results. Please provide guidance where the interpretation of the scientific evidence may be improved as well as on the soundness of conclusions in these chapters.

Chapter 8 – Populations Potentially at Increased Risk for Ozone-Related Health Effects

The introduction to Chapter 8 has been revised with expanded discussion to better capture the intricacies associated with characterizing populations potentially at greater risk for O₃-related health effects, utilizing the terms identified by the CASAC panel (i.e. intrinsic, extrinsic, increased dose, greater exposure).

Please comment on the adequacy of these revisions to clarify the consideration of potential at-risk populations, and recommend any revisions to improve the characterization of key findings and scientific conclusions.

Chapter 9 – Environmental Effects: Ozone Effects on Vegetation and Ecosystems

The discussion of effects in Chapter 9 has been reorganized and consolidated into fewer, but more integrated sections to lessen repetition and improve the clarity of presentation. More discussion of ecosystem modeling approaches and more consideration of ozone impacts on stomatal conductance and water cycling have been added to the chapter.

Please comment on the reorganization and content of this chapter and the adequacy, scientific soundness, and usefulness of the material presented. Please recommend any revisions to improve the discussion of key information.

Chapter 10 – The Role of Tropospheric Ozone in Climate Change and UV-B Effects

This chapter was made more concise, in part, by consolidating background material pertinent to both climate change and solar radiation into Section 10.1. Section 10.2 was expanded and refined to clearly reflect the processes by which ozone contributes to climate change and the competing influences of ozone precursors on climate.

Please comment on the reorganization of this chapter and the adequacy, scientific soundness, and usefulness of the material presented and recommend any revisions to improve the discussion of key information.

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