

**Summary Minutes of the
U.S. Environmental Protection Agency
Clean Air Scientific Advisory Committee (CASAC)
Ozone Review Panel
Public Meeting
Carolina Inn, 211 Pittsboro Street, Chapel Hill NC 27516
May 19 - 20, 2011**

Ozone Review Panel Members:

Dr. Jonathan Samet, Chair
Dr. Ted Russell
Dr. Christopher Frey
Mr. George Allen
Dr. Ed Avol
Dr. John Bailar
Dr. Michelle Bell
Dr. Joe Brain
Dr. David Chock
Dr. William Mike Foster
Dr. Judy Graham
Dr. David Grantz
Dr. Jack Harkema
Dr. Daniel Jacob
Dr. Steven Kleeberger
Dr. Fred Miller
Dr. Howard Neufeld
Dr. Helen Suh
Dr. James Ultman
Dr. Sverre Vedal (by phone)
Dr. Kathleen Weathers (by phone)
Dr. Peter Woodbury

Purpose: To provide advice on EPA's *Integrated Science Assessment for Ozone and Related Photochemical Oxidants* (March 2011) and conduct a consultation on EPA's *Ozone National Ambient Air Quality Standards: Scope and Methods Plan for Health Risk and Exposure Assessment* (April 2011) and *Ozone National Ambient Air Quality Standards: Scope and Methods Plan for Welfare Risk and Exposure Assessment* (April 2011)

Designated Federal Officer: Dr. Holly Stallworth, Designated Federal Officer

Other EPA Staff: Meredith Lassiter, Doug Johns, Tom Luben, Jason Sachs, Tom Long, Mary Ross, Christal Bowman, Jen Richmond-Bryant, Steven Dutton, Jead-Jacques Dubois, James Brown, Molini Patel, Debra Walsh, Lisa Vinikoor-Imler, Beth Osterling Owens, Connie Mecham, John Vandenberg, Jeff Herrick, Zach Pekar, Lauren Tuttle,

Barbara Buckley, Lydia Wegman, Susan Stone, Ellen Kirrane, Pradeep Rajan, Travis Smith, Lisa Baxter, Bryan Hubbell, Kris Novak, Rebecca Clark, Joann Rice, David Svendsgaard, Erin Hines, Lingh Lin, Amy Lamson

Public: Cindy Langworthy (Hunton & Williams), Allen Lefohn (ASL Associates), Ted Steichen (American Petroleum Institute), Chris Rabideau (Chevron), Cosima Wrese (Misericordia University), Milan Hazucha (UNC), Julie Goodman (Gradient), Roger Christy (Chevron), Bob Hermanson (British Petroleum), Philip Bromberg (University of North Carolina), Harvey Richmond (Abt Associates)

Meeting Webpage: The following items may be found posted at URL below:

<http://yosemite.epa.gov/sab/sabproduct.nsf/bf498bd32a1c7fdf85257242006dd6cb/923c0d21b54c133e852577d10050f5c6!OpenDocument&Date=2011-05-19>

- Federal Register Notice announcing the meeting
- Agenda
- Agency Charge Memos
- Agency Review Documents (listed above)
- Ozone Review Panel Roster
- List of public speakers
- Agency Briefing Material:
 - EPA Presentation on Ozone Health Assessment Plan: Scope and Methods for Exposure Analysis and Risk Assessment by John Langstaff and Zach Pekar
 - EPA Presentation on Ozone Welfare Assessment Plan: Scope and Methods for Exposure Analysis and Risk Assessment presented by Travis Smith
 - EPA Presentation on the NAAQS review process, ozone reconsideration and 2011 Ozone ISA by John Vandenberg, James Brown, Lydia Wegman and Debra Walsh
 - EPA Presentation on the Scope and Methods Plan for Health Risk Assessment, Updated 5-18-11. Zachary Pekar, OAQPS
- Panelists' Comments:
 - Comment on the Scope and Methods Plans by Dr. Ted Russell
 - Comments from Dr. Sverre Vedal on the ISA
 - Comments on the ISA from Dr. Christopher Frey
 - Ozone Health Scope and Methods Plan Preliminary Comments as of 5-17-11
 - Ozone ISA Preliminary Comments as of 5-17-11
 - Comments from Dr. Ted Russell Comments on Health and Welfare Plans, 5-18-11
 - Ozone Welfare Scope and Methods Plan Preliminary Comments as of 5/17/11
- Public Comments:
 - American Petroleum Institute Comments on the ISA presented by Julie Goodman
 - American Petroleum Institute Comments on the Scope and Methods Plan presented by Julie Goodman

- British Petroleum Comments on Policy Relevant Background presented by Nicole Downey, Earth System Sciences, LLC
- Comments on the ISA and Policy-Relevant Background Concentrations from Allen S. Lefohn (A.S.L. & Associates) and Samuel J. Oltmans
- Comments on the ISA from Milan Hazucha (University of North Carolina) and Allen S. Lefohn (A.S. L. & Associates).
- Sam Oltman's Presentation on Policy-Relevant Background
- Utility Air Regulatory Group Comments on Policy Relevant Background presented by George Wolff

Meeting Summary

The discussion followed the plan presented in the meeting agenda.

THURSDAY, MAY 19, 2011

Dr. Stallworth made a statement declaring the Panel's compliance with the Federal Advisory Committee Act and federal conflict of interest laws. Dr. Samet asked everyone to introduce themselves and reviewed the agenda.

Dr. John Vandenberg of EPA's Office of Research and Development's National Center for Environmental Assessment presented the overall context for the review of the *Integrated Science Assessment for Ozone and Related Photochemical Oxidants* (ISA, March 2011). Ms. Lydia Wegman of EPA's Office of Air Quality Planning and Standards (OAQPS) presented an overview of the National Ambient Air Quality Standards (NAAQS) process and the schedule for this review of the Ozone standard as well as the current reconsideration of the ozone standard promulgated in 2008. According to Ms. Wegman, the reconsidered ozone standard should be issued in late July 2011. Ms. Wegman also said the schedule for the current ozone NAAQS review is expected to end with a final rule in June 2014. Dr. James Brown then walked the Panel through the charge questions on the ISA of March 2011. Ms. Debra Walsh updated the Panel on the new Health and Environmental Research Online (HERO) system and encouraged panelists to take advantage of their access to HERO.

In the public comment period, Dr. Allen Lefohn presented information on estimating the policy relevant background (PRB) concentration of ozone, emphasizing hourly averages as a preferred metric and the role of stratospheric-to-troposphere transport processes that contribute to ozone background concentrations. Dr. Lefohn said his work had been funded by the American Petroleum Institute. Dr. Julie Goodman, on behalf of the American Petroleum Institute, presented comments disputing EPA's conclusion (as stated in the ISA) of a causal relationship between ozone exposure and respiratory morbidity, cardiovascular (CV) morbidity, or mortality at exposure levels below the current National Ambient Air Quality Standards (NAAQS). Mr. George Wolff, on behalf of the Utility Air Regulatory Group, presented comments suggesting that EPA had previously underestimated the stratospheric and free tropospheric contribution, natural NO_x emissions and the Asian/Pacific contribution of NO_x emissions. Mr. Wolff said the PRB should be redefined to include Canadian and Mexican anthropogenic contributions. By

telephone, Mr. Samuel Oltmans presented ozone measurements from the National Oceanic and Atmospheric Administration's Observatory at Trinidad Head, California. Mr. Oltmans stated that air flowing into Trinidad Head represents the Pacific "background." Mr. Oltmans also showed the influence of Eurasian biomass burning in the surface ozone measurements at Denali National Park in Alaska.

Following the meeting agenda, the Panel began with a discussion of the ISA's framework for causal determination, with some panelists offering suggestions for where the language of the ISA might be improved. On the subject of ambient concentrations, panelists were generally positive toward the ISA's coverage of this issue, with some questions asked about the ISA's coverage of policy relevant background and the operation of the GEOS-Chem, a global-scale chemical transport model. One panelist called for more attention to be given to characterization of ozone at lower levels (20 – 60 ppb) given the potential future direction of the primary ozone standard and the secondary (W126) standard. Another panelist pondered the reliability of central site monitors. Panelists generally agreed that the PRB would have to be calculated from models. One panelist challenged the general assumption that background ozone levels would increase over time given the aggressive emissions controls underway in China.

On the subject of environmental effects, panelists agreed that the ISA captured the major effects and pathways of ozone on species and ecosystems while making the correct conclusions about causal relationships. Panelists also positively reviewed the ISA's summary of the effects of tropospheric ozone on UV-B radiation impacts.

With respect to exposure, one panelist called for an assessment of what data is missing. Other panelists discussed the local variability that can exist with ozone measurements and called for more attention to be given to the adequacy of central site monitors for use in epidemiological studies. One panelist suggested EPA look into the byproducts of ozone decomposition in indoor air.

With respect to the ISA's coverage of dosimetry and mode of action, one panelist called for a better explanation of dosimetric principles while another panelist called for more discernment to focus on the studies of greater importance. In discussing short-term and long-term health effects, panelists supported the ISA's conclusions on causal relationships while offering some suggestions for improvement in the presentation. One panelist in particular was troubled by the omission of animal toxicology studies directed at longer-term exposures.

In discussing the section on susceptible populations, panelists agreed that the characteristics included with the broad susceptibility categories were appropriate; however, some panelists questioned the definition of "susceptible" in the ISA as conflating individual characteristics that increase susceptibility with those population-level characteristics that increase the probability of exposure (e.g., time spent outdoors). EPA representatives provided some history on the evolution of the definition of "susceptible" and "vulnerable" in the various NAAQS review documents.

Before adjourning for the day, panelists discussed the integrative summary (Chapter 2) and the overall length of the document. In general, panelists called for more “integration” in the integrative summary, preferring a narrative to a mirror of the other sections of the ISA. Different opinions were voiced on the length of the document. While some panelists believed its length was appropriately reflective of the science, others offered ideas for how to shorten the document.

FRIDAY, MAY 20, 2011

The Panel reassembled at 8:30am with Dr. Christopher Frey chairing as Dr. Samet joined in by phone from California. Dr. Bryan Hubbell, Dr. John Langstaff and Dr. Zach Pekar presented EPA’s draft *Ozone NAAQS: Scope and Methods Plan for Health Risk and Exposure Assessment* (April 2011). During the public comment period, Dr. Nicole Downey, on behalf of British Petroleum, presented information to show that peak PRB concentrations are underestimated and challenged the form of the PRB as a mean rather than the 4th highest 3-year average ozone reading (the form of the current standard). Dr. Julie Goodman, on behalf of the American Petroleum Institute, criticized EPA’s *Scope and Methods Plan for Health Risk and Exposure Assessment* for its use of the McDonnell et al. (2010) model which was based on studies that did not evaluate exposures at ozone concentrations less than 80 ppb.

The Panel’s discussion began with a concern about statements in the *Scope and Methods Plan for Health Risk and Exposure Assessment* that said EPA will undertake a planned activity if there are sufficient resources. Panelists queried EPA as to whether it had a priority list that identifies the most important steps that will be done and then which additional analyses will sequentially be added if funds are available.

In discussing the exposure analysis issues in the *Scope and Methods Plan*, one panelist offered ideas on how to use CASTNET sites to apportion the bias in the modeled estimates of PRB to different sources. Another panelist expressed some concern about the use of data from 2008 – 2010 given the atypical ozone concentrations experienced in those years. One panelist worried about the use of “old” data from the Consolidated Human Activity Database (CHAD) given lifestyle changes in recent years (e.g. video games for children). Panelists queried EPA on how it would be able to meet its criteria with selecting just 3 areas for risk estimates. Panelists pondered how “averting behavior” would be treated in EPA’s risk estimates given there was a cost to staying indoors and not exercising.

In discussing issues associated with the health risk assessment, a tiered approach to the uncertainty analysis with qualitative considerations was commended as an example to follow. Some panelists shared their thoughts with EPA on whether to include long-term mortality in the formal risk assessment, given the dependence on a single study based on chronic obstructive pulmonary disease (COPD) mortality for which smoking acts as a confounding factor. EPA representatives spoke about the difficulty of choosing endpoints that fit neatly in the ISA’s tiered conclusions about causality.

After lunch, Dr. J. Travis Smith presented the *Scope and Methods Plan for Welfare Risk and Exposure Assessment* and explained that EPA planned to assess the effects of the W126 standard using the same GEOS-Chem model. Again, one panelist pointed out the potential problem with using the relatively “clean” years of 2009 – 2010. In response, EPA representatives discussed ways to de-trend the data given the recent downward trend in ozone concentrations. One panelist pondered how “background” W126 would be determined and offered observations on how the exposure modeling for welfare effects would differ from exposure modeling for health effects. EPA was cautioned against using “scale” through the document without defining it as spatial or temporal. The use of data from the Forest Inventory and Analysis (FIA) national program was suggested to quantify the location of different species. It was noted that the secondary of “cascading” effects of ozone on ecosystems (e.g. effects on hydrologic cycles, fire frequency or pest attacks) are likely to be more important than direct effects of ozone on vegetation but much more difficult to measure or model accurately. EPA was commended for considering these complex interactions despite the challenges in quantifying effects. One panelist noted that on adult trees, foliar injury is usually not obvious to the casual observer given that it is 150 feet high and observed on leaves rather than flowers. Finally, EPA was asked to be as transparent as possible in its use of models for the welfare analysis.

On Behalf of the Committee,
Respectfully Submitted,

Holly Stallworth, Ph.D. /s/
Designated Federal Officer

Certified as True:

Jonathan M. Samet, M.D. /s/
Chair, Clean Air Scientific Advisory Committee
Sulfur Oxides Primary NAAQS Review Panel

NOTE AND DISCLAIMER: The minutes of this public meeting reflect diverse ideas and suggestions offered by committee members during the course of deliberations within the meeting. Such ideas, suggestions, and deliberations do not necessarily reflect definitive consensus advice from the panel members. The reader is cautioned to not rely on the minutes represent final, approved, consensus advice and recommendations offered to the Agency. Such advice and recommendations may be found in the final advisories, commentaries, letters, or reports prepared and transmitted to the EPA Administrator following the public meetings.