



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL CENTER FOR ENVIRONMENTAL ASSESSMENT
RESEARCH TRIANGLE PARK, NC 27711

MEMORANDUM

OFFICE OF
RESEARCH AND DEVELOPMENT

SUBJECT: CASAC Review of Second External Review Draft Integrated Science Assessment for Lead

FROM: John Vandenberg, Ph.D.
Director
National Center for Environmental Assessment
Research Triangle Park Division (B243-01)

TO: Aaron Yeow
Designated Federal Officer
Clean Air Scientific Advisory Committee
EPA Science Advisory Board Staff Office (1400R)

The Second External Review Draft Integrated Science Assessment for Lead (draft Pb 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 Lead was released on February 2, 2012.

This second external review draft ISA integrates the scientific evidence for review of the primary (health-based) and secondary (welfare-based) NAAQS for Pb 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) Pb NAAQS Review Panel (the Pb CASAC Panel) at a public meeting on April 10-11, 2012. I am requesting that you forward our charge to the Pb CASAC Panel.

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

We look forward to the Pb CASAC Panel review of the second draft ISA at the upcoming meeting. Should you have any questions regarding the draft Pb ISA, please feel free to contact Dr. Mary Ross (919-541-5170, Ross.Mary@epa.gov) or Dr. Ellen Kirrane (919-541-1340, Kirrane.ellen@epa.gov).

Charge to the Pb CASAC Panel

This draft ISA includes revisions based on the comments and advice provided by the CASAC Pb Panel and public comments on the first external review draft ISA. We have carefully considered all of the comments provided by the CASAC Pb 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, including studies published through September 2011. Changes to the content and structure of the draft are described on a broad scale below together with the new charge questions for this CASAC Pb 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 issues to the attention of the Panel for comment.

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

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 included as 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 describing the ISA development and scope 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, and to streamline the ISA organization.

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 or presentation of these summary sections and the conclusions therein.

In addition, please comment the extent to which the discussion of the health effects evidence in Chapters 1 and 2 reflects the revisions to Chapter 5, which were designed to characterize the weight of the evidence for specific endpoints as well as the strengths and limitations of the studies.

Chapter 3 – Source to Concentration

Revisions made to Chapter 3 in response to CASAC comments include elaboration of changes to the National Emissions Inventory between the 2006 Pb AQCD and the ISA (Section 3.2), discussion of the limitations of the current total suspended particulate federal reference method sampler and available alternatives (Section 3.4.1), removal of questionable data presented for particle size Pb comparisons (Section 3.5.3), addition of a background Pb section (Section 3.5.5),

and supplementation of studies to elucidate the relationship between air Pb and Pb in soil (Section 3.6.1).

Please comment on the adequacy of these and other changes to the chapter and recommend any revisions to improve the discussion of key information. 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, Toxicokinetics and Biomarkers

The exposure section of Chapter 4 includes additional discussion of the relationship between airborne Pb-particle size distribution and exposure by inhalation and ingestion (e.g., hand-to-mouth). Cross-referencing to Chapter 3 further emphasizes measurement errors and uncertainties that may affect exposure assessment for air Pb. A new section on exposure assessment methodologies was added that includes discussion of exposure representation within the IEUBK model and exposure modeling techniques.

The revised toxicokinetics section of Chapter 4 expands discussion on the effects of both past and current Pb exposure on blood Pb levels. Studies that followed blood Pb levels in individuals following cessation of high Pb exposure occupations and in children over the first several years of life were added. The section on bone Pb measurement was expanded. Air to blood slopes were reevaluated across the range of air Pb concentrations available in a given study with an emphasis on the central tendency of air Pb concentrations in each study.

With consideration of these revisions, please comment on the accuracy of the interpretation of the science. Are uncertainties and limitations of relevant data, methodologies and approaches adequately discussed? Where appropriate, please provide specific recommendations to refine the scientific interpretation and/or improve the representation of the science.

Chapter 5 – Integrated Health Effects of Lead

In Chapter 5, the integration/synthesis of evidence between epidemiologic and toxicological studies and across related outcomes has been expanded throughout the text and in summaries of individual endpoints. In the summary and causal determination sections, we have described more explicitly the weight of evidence for each endpoint within a broad outcome category and specified the particular endpoints that contribute most heavily to the determination of causality. We have noted, where applicable, uncertainties regarding the specific Pb exposure periods, levels, frequency and duration that contributed to epidemiologic observations and included additional details and discussion of study limitations.

Please comment on the extent to which the revised discussion of the evidence and the causal determinations accurately reflect the weight of evidence for endpoints within a major outcome category and the strengths and limitations of studies (e.g., study design, control for potential confounding, statistical analysis) that comprise the evidence base.

Please comment on the adequacy with which evidence has been integrated between toxicological and epidemiologic studies, in particular: the increased emphasis on toxicological findings most

relevant to Pb-associated effects in humans; the discussion of results from homologous or parallel tests (e.g., response inhibition, blood pressure, renal function); and discussion of evidence describing modes of action for Pb-associated health effects. Has the coherence of findings among related endpoints been sufficiently described? Please comment on the effectiveness of the integration of scientific evidence both within sections for specific endpoints and summary sections.

Please comment on the extent to which conclusions regarding the blood and bone Pb levels with which various health effects are associated in epidemiologic studies accurately reflect the weight of evidence given the study designs and statistical methods employed and populations examined (e.g., school-aged children, adolescents, adults without occupational exposure, adults with occupational exposure). Are inferences regarding the specific Pb exposure scenarios (e.g., level, timing, frequency, and duration) that contributed to the observed associations consistent with the evidence?

Chapter 6 – Potentially At-Risk Populations

The introduction to Chapter 6 has been revised with expanded discussion to better capture the intricacies associated with characterizing populations potentially at greater risk for Pb-related health effects. 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.

In addition, please comment on whether the designation of some factors as having limited evidence adequately reflects the knowledge base considered and strength of evidence available.

Chapter 7 – Ecological Effects of Lead

The causal statements for ecological effects discussed in Chapter 7 have been reevaluated as advised by CASAC. There are now separate causal determinations for terrestrial and aquatic biota for each endpoint under consideration. In addition, the chapter now incorporates additional findings from the 2006 Pb AQCD on the effects of Pb on ecosystem receptors, an enhanced discussion of bioavailability and bioaccessibility, and separate discussions of marine and freshwater toxicity in the aquatic ecosystem section.

Please comment on the adequacy of these various revisions and other changes to the chapter and recommend any revisions to improve the discussion of key information.