

Additional Preliminary Comments from Dr. Ted Russell on EPA's Integrated Science Assessment for Oxides of Nitrogen, Oxides of Sulfur, and Particulate Matter – Ecological Criteria (First External Review Draft)

NOx-SOx Secondary ISA Review-Addendum

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Charge Question 1: The Executive Summary and Chapter 1 provide overviews of the ISA. The Executive Summary is intended to be a concise synopsis of key findings targeted to a broad audience, whereas Chapter 1 is a more detailed synthesis of the ISA's most policy-relevant findings.

- a. Please comment on the extent to which the Executive Summary and Chapter 1 meet their Objectives

Response: Generally, the ES and Chapter 1 meet their objectives, and do meet the criteria for "concise" (though, so far as an Executive Summary goes, this one is large). What they miss are generally less well covered in the rest of the ISA, e.g., more on a comparison of the CLs and estimated depositional fluxes. In terms of Chapter 1, I was looking to have more on the work conducted as part of the last review, e.g., the AAI, along with the various related issues. I am not sure where else this would be found in the ISA.

- b. The causality determinations are summarized in the Executive Summary and Chapter 1, please comment on the extent to which the causal framework is appropriately applied to evidence for each of the effect categories in chapters 3-12 to form causal determinations.

Response: I find the causality framework to be appropriately applied and well presented. It would be good to expand on the relationship to the current conditions or past, and the degree to which this will likely be the case in the future and below the current standards.

Other additional comments.

I found the first paragraph at the beginning of each chapter useful. While it may not be usual to have a paragraph before the Introduction, this is a useful addition. It is missing from Chapter 2.

Chapter 2 should also look to provide more quantitative information on how depositional fluxes will respond to specific emissions changes to provide a feel for how the atmosphere responds.

The comparison of 2000-2002 vs. 2011-2013 provides some of that, but there is so much else going on that a more direct assessment of the spatial pattern of response would be insightful. Also, the result from Dennis et al., about how much of the emitted N is transported away from the US is important and deserves a bit more discussion, e.g., is that mostly due to the N emitted within 100 or 200 kms of the East Coast?

Upon re-reading section 2-9, it really does not come to much of a conclusion, except to say “there is uncertainty”. One thing it might discuss further is that there is a mass balance in the atmosphere, and reactive nitrogen and sulfur emissions have limited lifetimes in the atmosphere, such that a decrease in the transference ratio does not lead to a similar decrease in the flux. The issue of lifetimes should be further discussed in the Chapter. A useful set of figures would be the annual oxidized nitrogen, oxidized sulfur and reduced nitrogen emission fluxes, in the same units as the deposition fluxes using the CMAQ grids along with the deposition fields just to show how closely the two match. This could be in Appendix A.

Chapter 13: First, the title of this chapter is not quite right given the content, and I was expecting a bit more. Climate Modification could (and probably should) include both how climate change will impact ecosystem response to N & S, and also how N&S will alter climate (covered some elsewhere). This chapter should include both. Also, while the excerpt from Greaver et al. (2016), contains appropriate information, this approach is a bit awkward and, along with the following subsection, leads to a rather limited chapter. This puts it in stark contrast to other chapters. I would look to this chapter being more developed (and have a synthesis).

Chapter 14: While I think I know what is meant by “written within the context of what was known in the 2008 ISA”, there is no explanation as to why it is written in that context. Why limit it to that context? It then goes on to review newer work beyond that in the 2008 ISA. Is the 2008 ISA setting the framework?

Section 14.2. This section should be re-written with much of the text (i.e., the bullets and such) moved to an appendix: summarize in the text.

A potentially valuable exercise to help target the ISA would be for the staff to identify what are the key scientific issues to be reviewed and their importance both to providing the necessary knowledge of how causal determinations were reached and to supporting subsequent policy documents, with some rankings as to their relative importance, and then to make sure that the ISA aligns with the rankings. At present, some chapters are very, very large, others less so.

Additional Detailed Comments

5/23/17 Preliminary draft comments from individual members of the CASAC Secondary NAAQS Review Panel for Oxides of Nitrogen and Sulfur. These comments do not represent consensus CASAC advice or EPA policy. DO NOT CITE OR QUOTE

Fig. 2-35: What do you mean, “enhancements” in this context. Clarify.

2-83;13: Awkward sentence

14-19;30: profiles

14-19; Last paragraph. Not sure created is the best word. Compiled? Developed?