

**Preliminary comments on Chapter 2 (health) of the Pb REA-Planning document
George Allen, July 20, 2011**

The health related questions to be addressed in this consultation in the 6/28/11 memo to the DFO) are:

1. The overview of the previous health risk assessment and presentation of results from the last review of the lead NAAQS.
2. The staff evaluation of elements of the risk assessment that were considered in determining the need for an updated quantitative risk assessment (e.g., advances in methods for modeling exposure including the estimation of air-related pathways of exposure, prediction of blood Pb, updated/refined concentration-response functions for IQ loss).
3. The decision to rely on the quantitative health risk assessment from the previous review, interpreted within the context of newly available evidence and information.

General comments:

The document is well written and organized. Questions 1 and 3 have brief answers as follows.

- (1) The overview of the previous REA and NAAQS review are adequate and useful.
- (3) I agree with the decision to rely on the previous health risk assessment for this review. Published research since the last REA does not change any of the outcomes for the quantitative health risk assessment. New literature is relatively sparse, and some is not directly relevant or useful to this review.

Question 2 (chapter 2) is the core of this consultation for health risk assessment. Overall, the staff evaluation of risk elements are adequate and appropriate. There are many assumptions and uncertainties (both from sparse data and modeling) that make up the overall REA process. This chapter addresses them clearly. The review of recent relevant literature (which is also sparse) is appropriately summarized.

One component of the exposure assessment that is not entirely clear to me is what Pb air sources make up policy relevant background (PRB -- that exposure that can not be controlled by changes in current or future air Pb concentrations. Pb from soil is a factor here. The "air" Pb contribution from re-suspended soil or soil brought into the home is a mix of current and historical deposition of air Pb. In essence, Pb from "old" air deposition can become new Pb in the air if it is re-suspended in an exposure-relevant context. But "old" air Pb is not effected by changes in contemporary air Pb concentrations; does that mean it should be considered as PRB Pb?

Section 2.2.1, Pg. 2-2 defines controllable Pb as:

"... sources and pathways for which ambient air has played [note tense] a role ("air-related") ... these are exposures with the potential to be affected (over some time frame) by an adjustment to the Pb NAAQS."

and PRB Pb as:

“... those pathways not associated with Pb originally emitted to the ambient air are considered policy relevant background since an adjustment to the Pb NAAQS is not likely to have an impact on these exposures...” [underlining mine]

This is also discussed in section 2.1.4, pg 2-14, where the terms “recent air” and “past air” are used, and both are considered to be controllable, described as “hav[ing] the potential to respond relatively more quickly to changes in air Pb”.

This brings into focus the importance of the fate of Pb in soils, as discussed in detail in the ISA. Old soil air-Pb can not be controlled, but it also doesn't quite fit into the framework of PRB Pb. The link between these is the phrase “over some time frame”, presumably meaning that lowering air Pb will “eventually” lower soil Pb. But “over some time frame” is very vague. Old soil lead presumably does get lower over time (ignoring losses from resuspension), but that time is both uncertain and spatially variable for many reasons as noted in the ISA. So yes, old soil Pb can be a part of relevant [controllable] air lead sources, but it's not clear how much over shorter (a few years?) time frames that are relevant to a NAAQS review. The REA could benefit from a discussion of this component of controllable exposures.

On page 2-15, the REA says:

“The assessment did not simulate decreases in “past air” exposure pathways (e.g., reductions in outdoor soil Pb levels following reduction in ambient air Pb levels and a subsequent decrease in exposure through incidental soil ingestion and the contribution of outdoor soil to indoor dust). These exposures were held constant across all air quality scenarios.”

Why was “past air” exposure held constant? Elsewhere it is assumed that soil Pb would respond [eventually] to decreases in air Pb.

Pg. 2-6 and 2-8, primary Pb smelter exposures. This case study is from a single (very old) primary smelter in MO. Emissions from that smelter are from combustion and mechanical sources - e.g., both fine and coarse modes. But that smelter has tall stacks (550 ft.); little to none of the stack emissions impact the 1.5 km zone used in the case study. Pb of any size or mode in that zone is essentially all from fugitive emissions. The REA says: “children's air-related exposures are most impacted by emissions associated with the Pb smelter from which air Pb concentrations were estimated.” For emissions used in the case study, was this taken into account, or were total emissions used? Figure 2-2 lumps them together.