

## **Preliminary Comments on the REA Planning Document from Dr. Alison Cullen**

The focus of these comments is *Chapter 4 Plan for the Current Health Risk and Exposure Assessment* (Section 4.1 Population Based Exposure Assessment pages 4-1 to 4-30)

This section of Chapter 4 is very informative and lays out the approach EPA proposes for assessing exposure in a systematic way. Below I outline questions/comments intended to sharpen details and answer remaining questions.

- For the assessment of human exposure to SO<sub>2</sub>, EPA has selected study areas to represent the US. Over 100 potential areas fit the selection criteria related to air quality data availability and design values however only nine satisfied the population size criteria, so clearly population size is a pivotal criterion. Please say something about the choice of 100,000 as the cut point for population size. What impact would a different cut point be expected to have on the study area selection and ultimately the analysis? Also, please expand on the extent to which the final four study areas are representative of exposure locations of concern regarding SO<sub>2</sub> sources and how these areas reflect on the broader characteristics related to exposure, given the application of the set of selection criteria.
- Further, regarding the selection criteria, either refer to another section of the REA or explain here why 75% is considered to be complete enough to be the cut point for completeness. Also, clarify the impact that a different value would have. Finally, a separate point to address/clarify - why are areas with more complete data prioritized given that a model approach is ultimately used? Some acknowledgement of the most “relevant” data or the most “valuable” data may be as important as raw “completeness”.
- The equations used to estimate missing 5 minute concentrations of SO<sub>2</sub> introduce an important role for the maximum 5 minute concentration and its position relative to the average. Please say more about the impact of this choice.
- In Figure 4-6 given that the one or two data points at the top of the percentile distribution for daily maximum one hour SO<sub>2</sub> are very influential on the fit of the slope of the regression line for each of the four locations – say more about the applicability of these derived relationships.
- Although the exclusion of children under the age of 5 in the at risk population assessment is consistent with other REAs for other pollutants as stated in the REA for SO<sub>2</sub>, and its justification is outlined, please say something further about the impact of this exclusion on the NAAQS.
- Asthma status is obviously important when considering SO<sub>2</sub> exposure and risk. Given that the 2014 REA for O<sub>3</sub> is referenced for its improved treatment of asthma and geographic level differences please say a bit more about the approach so that this REA can stand alone (while not repeating all previous content). Are the four study areas representative of the US national range in asthma prevalence? Is it possible to add gender breakdowns to Table 4-5?

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- 1       - Clarify on page 4-28 or earlier how interactions between asthma status and exertion level
- 2       will be handled, given the limitations of CHAD.
- 3       - Refer readers to a fuller discussion in this REA (outside of the US EPA 2012 b reference
- 4       which is a full treatment) of how the population diversity statistic D and the within-
- 5       person autocorrelation statistic A are applied (page 4-29).
- 6       - Interdependencies are very important as noted in section 4.1.6.5. Personal Attributes, but
- 7       the language is vague. How and when will these interdependencies be taken into account
- 8       (beyond just “where possible”)?
- 9       - Is asthma status a physical attribute which could be referenced in section 4.1.6.5.2
- 10      Physical Attributes or does it belong elsewhere in the overall section 4.1.6?
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