

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

Additional Preliminary Individual Comments on the Policy Assessment

For the Review of the Ozone NAAQS (Second Draft)

CASAC Ozone Review Panel

Updated March 23, 2014

Contents

George Allen	2
Ted Russell	8
Peter Woodbury	11

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

George Allen

Preliminary Comments from George Allen on EPA's February 2014 Second Draft Policy Assessment Document for Ozone

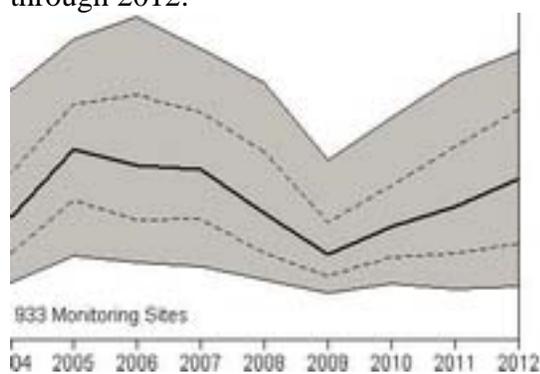
Revised March 23, 2014

These comments focus primarily on Chapter 2, Air Quality, followed by comments on Chapter 1.

Charge Questions on O₃ Monitoring and Air Quality (Chapter 2).

Ch. 2, Q #1. To what extent does the Panel agree that the most relevant information on monitoring (section 2.1), emissions and atmospheric chemistry (section 2.2), and common patterns of O₃ concentrations (section 2.3) is presented, and to what extent is the information presented appropriately characterized and clearly communicated?

Section 2.1, Monitoring. National trends of annual 4th highest max 8-hour values are plotted in Figure 2-2, page 2-4. Section 2.1 appropriately notes the distinct drop between 2002 and 2004, consistent with the drop in summer NO_x emissions due to the "NO_x SIP call", and notes the decreasing trend between 2000 and 2009. While that time period does appear to have a distinct downward trend, it is also informative to look at this same plot constrained to the period from 2004 through 2012:



This 9-year time period starting after the NO_x SIP call drop in O₃ shows no indication of a trend, and leads to a very different conclusion. While both this time window and EPA's interpretation of O₃ trends over 2000 through 2009 are valid, the latter is totally driven by a one-time intervention; since then there does not appear to be any progress in reducing O₃ concentrations. Year to year variations in summer meteorological conditions can play a large role in "raw" trends

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

of less than 15 to 20 years duration. In the past EPA has presented trend estimates that include adjustments for meteorology; it may be helpful to present such “adjusted trend” data to better assess progress since the NO_x SIP call. 2013 O₃-season data is now in AQS; even though those data will not be “certified” for another 3 months, it would be informative to add that data for 2013 to this trend plot.

Section 2.2, Emissions and Atmospheric Chemistry. This section is a clearly written and concise summary of this topic. It makes the interesting point regarding the co-benefit from NO_x emission reductions for O₃, NO₂, and PM_{2.5}.

Section 2.3, Air Quality Concentrations. This section is a clearly written and concise summary of this topic. Footnote 7, page 2-10, makes the sometimes overlooked point that since O₃ is measured seasonally in most areas, the 4th highest day’s value is similar to the 98th percentile annual metric form used for some other criteria pollutants.

Section 2.4, Background O₃.

Ch. 2, Q #2. With regard to information on estimating O₃ concentrations associated with nonanthropogenic sources or “background O₃” (section 2.4), to what extent is this information appropriately characterized and clearly communicated?

This section is the core of this chapter. Estimates of background O₃ now play a minimal role in the REA document given the new approach to estimating risk under various emission reduction scenarios using the HDDM rollback method and total O₃ concentrations.

Background O₃ is still a factor in the Policy Assessment however, since a 2002 court decision allows EPA to consider background levels when evaluating risk for alternative (lower) standards (section 1.3.1, page 1-26, lines 17-19). But case law also states that “that attainability and technical feasibility are not relevant considerations in the setting of a NAAQS” (section 1.2.1, page 1-4 lines 19-21, API v. Costle, 1981). It is unclear how EPA might navigate between these two legal guidelines in terms of how background O₃ would be used in a policy and standard-setting context.

EPA performed new 2007 base “year” (7-months) zero-out and CAM_x source apportionment modeling that is presented in this section. Section 2.4.2 (page 2-16, lines 6-14) introduces the concept of “apportionment-based US background” O₃ (AB-USB?) as the most relevant metric for estimation of a “fractional background” metric. Overall this chapter is difficult to follow. It seems the new modeling’s utility is to confirm earlier outcomes using these improved modeling approaches. It would be helpful if the chapter could better focus on these specific issues.

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

Section 2.4.3: The discussion on page 2-17, lines 1-12, is helpful in understanding the fractional contribution of background O₃ on days with elevated O₃.

Figures 2-13 and 2-14 on page 2-19 could benefit from the addition of “N” (# of site-days) to each bin. Figure 2-13 is difficult to interpret without this information.

Section 2.4.4 presents background O₃ in the context of the 12 urban case study areas. Table 2-2 (page 2-21) seems to be the most relevant presentation, but is only for site-days > 60 ppb; it would be helpful to also include this information for site-days >65 and > 70.

Section 2.4.5 presents background O₃ in the context of a W126 secondary standard form for four locations (2 are large urban areas). Page 2-22 lines 10-12 refer to figure 2-7 (page 2-7) as showing high observed 2010-2012 W126 values for these four sites. These sites can not readily be identified on this map, so these values also need to be provided in a text form.

Other Comments.

Chapter 1, Section 1.2.2 (History of O₃ NAAQS reviews): This section is a useful summary of recent actions and court rulings regarding the O₃ NAAQS review process. There are two topics regarding the 2008 NAAQS revision and subsequent reconsideration process that I would like to expand on that may be relevant to the current review.

First is the “Reconsideration” of the 2008 O₃ primary NAAQS, discussed on page 1-9. It is not widely known that in the summer of 2011, EPA sent a final rule to OMB/ORIA with 65 ppb as the standard. This and the role that ORIA played in the process was detailed in a New York Times article on Nov. 17, 2011:

www.nytimes.com/2011/11/17/science/earth/policy-and-politics-collide-as-obama-enters-campaign-mode.html?pagewanted=all

It is worth noting that EPA proposed this standard (in the middle of the CASAC range of 60 to 70 ppb) based on the scientific literature used for the 2008 rule – e.g., new studies since 2006 could not be considered in this reconsidered rulemaking. EPA subsequently posted the full preamble of what was to be the final Summer 2011 rule, as well as the draft impact analysis at:

<http://www.epa.gov/glo/actions.html>

Lisa Heinzerling, who served as Associate Administrator of EPA’s Office of Policy from July 2009 to December 2010, wrote an article in March 2013 in the Yale Journal on Regulation titled

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

“Who Will Run the EPA?” that provides additional detail of the relationship between the EPA administrator and the head of OMB:

<http://jreg.common.yale.edu/who-will-run-the-epa/>

While this background material is not directly relevant to the current review process, it provides some useful context for the political process that led to dropping the reconsideration process in September 2011, and may be of interest to members of CASAC and the current O3 panel.

The second topic is the court’s 7/23/2013 decision (reissued 12/11/13) regarding the 2008 O3 NAAQS rule. While this ruling upheld the 2008 primary NAAQS of 75 ppb, it did so based on an unusual interpretation of CASAC’s intent in saying a range of 60 to 70 ppb was appropriate to consider. This may have implications on how future CASAC advisory reviews are written. Although this issue is not part of the PA review, it would be helpful if EPA staff could provide some guidance to CASAC on how to avoid future perceived ambiguity in its recommendations.

On page 1-10 lines 10-14, the court’s rationale for the 0.075 ppm not being inconsistent with CASAC advice is correctly explained. However it is informative to look more closely at the detailed wording of this argument, especially since it may require the CASAC to be more explicit in future letters regarding this issue. The court decision is summarized at:

<http://www.lawandenvironment.com/2013/07/mississippi-v-epa-support-of-the-clean-air-science-advisory-committee-is-not-necessary-to-affirm-epas-naaqs/>

The decision itself:

<http://www.lawandenvironment.com/wp-content/uploads/2013/07/08-1200-1447980.pdf>

The essence of the decision, on page 41:

“...in order for EPA to explain adequately its reasons for disagreeing with CASAC, CASAC itself must be precise about the basis for its recommendations. Because in this case CASAC failed to specify whether the 0.070 ppm level it recommended as a maximum rested on a scientific conclusion about the existence of adverse health effects at that level, EPA’s invocation of scientific uncertainty and more general public health policy considerations satisfies its obligations under the statute.”

Additional excerpts from the decision relevant to CASAC follow.

Pages 38-39:

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

EPA did not make such a specific scientific determination about the 0.070 ppm level that served as the ceiling of CASAC's recommendation; instead, EPA referred generally to declining certainty below 0.075 ppm. Had CASAC reached a scientific conclusion that adverse health effects were likely to occur at the 0.070 ppm level, EPA's failure to justify its uncertainty regarding the existence of adverse health effects at this level would be unacceptable. Indeed, it is a familiar principle that agencies may not "merely recite the terms 'substantial uncertainty' as a justification for [their] actions"; instead, they "must explain the evidence which is available, and must offer a rational connection between the facts found and the choice made." *State Farm*, 463 U.S. at 52 (internal quotation marks omitted). In other words, EPA must explain why the evidence on which CASAC relied cannot support the degree of confidence CASAC placed in it. This is especially true given the added layer of stringency imposed by EPA's obligations under section 307(d)(6).

But we are unable to determine whether CASAC reached any such scientific conclusion. Although CASAC stated that "overwhelming scientific evidence" supported its recommendation that the standard be set no higher than 0.070 ppm, Mar. 2007 CASAC Letter, at 2, it never explained whether this proposal was based on its scientific judgment that adverse health effects would occur at that level or instead based on its more qualitative judgment that the range it proposed would be appropriately protective of human health with an adequate margin of safety. Indeed, although CASAC concluded that "there is no longer significant scientific uncertainty regarding [its] conclusion that the current 8-hr primary NAAQS must be lowered," given the "large body of data clearly demonstrat[ing] adverse human health effects at the current level," CASAC recognized that "[s]cientific uncertainty does exist with regard to the lower level of ozone exposure that would be fully-protective of human health." Oct. 2006 CASAC Letter, at 5.

To be sure, EPA's statutory obligation to respond to CASAC does not evaporate whenever CASAC exercises judgment amidst scientific uncertainty. Quite to the contrary, had CASAC acknowledged uncertainty in the scientific evidence but explained that, based on its expert scientific judgment, it nonetheless believed adverse health effects were likely to occur at the 0.070 ppm level, then section 307(d)(6) would have required EPA to explain why it disagreed with this scientific conclusion. Put differently, to the extent that CASAC has exercised scientific judgment, EPA must respond in kind. But because CASAC never made clear the precise basis for its recommendation, all we know for certain is this: both CASAC and EPA believed the existence of adverse health effects to be certain at the 0.08 ppm level and reached differing conclusions about what level below 0.08 ppm was requisite to protect the public health with an adequate margin of safety.
[end quote]

Page 41:

Absent a definitive scientific conclusion from CASAC that adverse health effects would occur at

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

the 0.070 ppm level, we must assume that it too took these same considerations into account and simply exercised its judgment to recommend a standard set at a lower level. Although both CASAC and EPA must exercise public health policy judgment when confronted with scientific evidence that does not direct it to a specific outcome, it is to EPA's judgment that we must defer.

And (as noted earlier):

But in order for EPA to explain adequately its reasons for disagreeing with CASAC, CASAC itself must be precise about the basis for its recommendations. Because in this case CASAC failed to specify whether the 0.070 ppm level it recommended as a maximum rested on a scientific conclusion about the existence of adverse health effects at that level, EPA's invocation of scientific uncertainty and more general public health policy considerations satisfies its obligations under the statute.

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

Ted Russell

Review of the Ozone PA

Overall, I found the PA informative and providing much of the information needed to inform the Administrator in regards to potentially modifying the ozone NAAQS. It generally has a good discussion on the adequacy of the current health and welfare standards, and potential revisions. Further, the preliminary revisions are in line with the evidence provided in the ISA and the analyses in the two REAs. The current presentation, for the most part, picks a reasonable balance between the desire to make the PA readable, concise and to the point, and providing sufficient information. The greatest need has to deal with issues involving the increases in lower levels of ozone in response to controls designed to reduce higher ozone levels. This issue impacts the risk and exposure assessments and the form of the standard.

In regards to the questions:

- To what extent is the most relevant information on monitoring, emissions and chemistry, and common patterns of ozone concentrations is presented, etc.:

The current Chapter 2 is very streamlined; too much so. At present, it focuses primarily on the issues involving background ozone, which is an appropriate discussion, but there is at least one larger issue that needs to be addressed here in some detail, that being the response of lower level ozone levels to controls. As shown in the Health REA this is a very important consideration, and should be discussed in more detail in Chapter 2 as it is an important consideration in the potential form of a standard, and the possible limitations of the current form. As such, the PA should provide a discussion of how the observed ozone levels at various percentiles have been found to be evolving, e.g., the decreases in higher levels and increases in lower levels. This should be augmented with results from the modeling. The PA should provide the Administrator with a firm understanding that controls oriented at reducing the peak levels of ozone (e.g., the 4th highest annual MDA8) may not be that effective at reducing more typical levels and may actually increase ozone levels on lower ozone levels and also increase 24 hour levels on a broader range of days.

Chapter 2 needs an overall summary. What are the major take-home points for the Administrator (and others) from Chapter 2?

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

- Is the discussion of Background Ozone appropriately characterized and adequately communicated?

The discussion of background ozone is much more extensive than any other part of the air quality characterization. None-the-less, there are some missing pieces. First, the method by which the NB is calculated (e.g., models used) should be further described. The discussion of the source apportionment model estimates is much too minimal to really understand what is being done. Provide an extra sentence or two. The sentences beginning on 2-16, line 9 going to line 14 are not clear. The potential use of monitoring to estimate background should be discussed. I would also include a bit more on the range of controversy surrounding this issue. This should be recapped later on as well. In general, however, the discussion does provide a good and reasonably thorough assessment of the “background ozone” issue on setting a standard.

In the PA, I would also bring forward more of the results on the levels of controls needed to just meet various levels of the standards being assessed, both for the health and welfare standards. One could use the two tables from the Appendices for the H-REA (Table 2 of Appendix 4) and the W-REA (Table 4A-2). This could be part of a synthesis as well.

Page 2-16, line 16: It is not apparent that the difference between 66 and 59 is due to the definitional approach versus the difference in model .

2-17, 121-23: What exactly does this mean? In particular, does “but for” mean if background sources were not present, there would not be an exceedance, or does it mean, if only background sources were present, there would be an exceedance?

2-9, 134: When discussing specific metrics, be very careful as to what is being said as to not be ambiguous.

2-9 | 14. I think you mean “intrusions” not “inversions”

Chapter 4: Form of the health based standard. Given the potential for controls to increase lower levels of ozone, one might consider a different form of the standard that would be protective at lowering high levels of ozone and also decreasing mid and lower levels. This should at least be discussed at a level that could lead the Administrator/reader to confidently say that the current

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

form is appropriate. Indeed, one might come to the conclusion that another form would be better.

Chapter 6. One of the conclusions of the W-REA was that just meeting the current standard (75 ppb) leads to very similar ozone levels as a W126 of 15. This should be brought out more. Indeed, I am not sure that the difference is beyond the uncertainties in the approaches used. Given that a W126 of 15 roughly corresponds to a 75 ppb standard, the rationale for considering a W126 of 17 should be further discussed.

The PA could use a synthesis as well. The Synthesis should include how the health and welfare standards might work together. Further, it could identify the critical findings that would likely drive the decision to keep or revise the standards, including the characterization of the likely benefits of various choices of the standards and the uncertainties that are key. Maybe this will be included as part of the Executive Summary in the next draft. At present, the Executive Summary is a bit too short and weak. For example, it currently uses the phrase “call in to question”, which might be stated as finds that the current standard is inadequate to protect health, and provide the specific evidence to suggest so. One thing that the synthesis could provide is the similarities in ozone fields at different levels of the health and welfare standards under consideration. It could also include tables showing the levels of control to meet those levels.

Executive Summary:

As noted above, the ES is rather short, and appears to be a work in progress. Compared to the ES's for the two REAs, this one does not stand up. It really does not do the PA justice. An important point from the W-REA should be made here, that being that a W126 of 15 ppm-hrs is very similar to just meeting the current standard. The ES could also use a synthesis.

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

Peter Woodbury

**Review of the Second Draft Policy Assessment for Ozone
by Peter Woodbury, 23 March 2014**

[NOTE: As of 23 March, I have added additional comments beyond the 22 March version. These new comments are preceded by “[23Mar14]” All comments since the March 10 version are shown as “tracked changes].

Executive Summary

[23Mar14] Page ES-2, line 26. I don’t think suggesting that values “somewhat above” 15 ppm-hrs is appropriate. If the EPA staff judge that a value above 15 ppm-hrs for W126 should be considered, then the analysis throughout the WREA and the PA should include a specific value above 15 ppm-hrs so that this suggestion can be reviewed by CASAC and others.

Introduction (Chapter 1): This chapter provides context for the review, including the background of past reviews, as well as the scope and approach for the current review. This includes discussion of the basis for the current standard.

1. Does the Panel find the introductory and background material (sections 1.1 and 1.2) to be appropriately characterized and clearly communicated?

Yes, this material is important and the coverage is appropriate.

2. In section 1.3, we describe the general approach for the review. This includes the key aspects of the approach employed in the last review in judging the adequacy of the then-existing standards and in selecting revised standards.

Does the Panel find this description of the approach in the previous review adequate and clear?

Yes, this material is important and the coverage is appropriate.

Does the summary of the approach in the current review appropriately describe important considerations in this review?

Overall, this summary is cogent and useful. However, regarding the secondary standard, certain important conclusions are misleading and require revision. For example, on page 1-27, lines 7-10 states that the “magnitude of the response becomes increasingly uncertain”. A similar

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

statement is made on page 1-36, lines 24-27. This is somewhat misleading. Data such as the concentration-response functions for individual tree seedling species, supported by results from other methods such as FACE and naturally occurring gradients demonstrate that some species are very sensitive to ozone and show decreased growth at very low chronic exposure levels, while other species show little response to much higher levels. A similar result is found for crop species. Thus there is strong evidence of decreased growth and yield of some common tree and crop species at very low ozone levels. The more important source of uncertainty at these low levels is determining what degree of growth decrement should be considered unacceptable to protect public welfare. This issue extends throughout the PA, and the PA could be strengthened by more specifically quantifying the spatial extent and degree of impact expected at current ozone exposures, the current standard, and at the alternate standards. For example, rather than focusing on the “median RBL”, quantify the number of counties containing sensitive tree species that are expected to have growth loss of greater than 1%, 2%, etc.

O3 Monitoring and Air Quality (Chapter 2): This chapter provides a description of the current O3 monitoring network and recent concentrations, information on emissions and atmospheric chemistry, common patterns and variability in O3 concentrations, as well as, discussion of current information on estimating O3 concentrations associated with non-anthropogenic sources.

1. To what extent does the Panel agree that the most relevant information on monitoring (section 2.1), emissions and atmospheric chemistry (section 2.2), and common patterns of O3 concentrations (section 2.3) is presented, and to what extent is the information presented appropriately characterized and clearly communicated?

2. With regard to information on estimating O3 concentrations associated with non-anthropogenic sources or “background O3” (section 2.4), to what extent is this information appropriately characterized and clearly communicated?

The large difference in “counterfactual” vs “source apportionment” methods for estimating backgrounds, is important for W126 (p. 2-23 and elsewhere). This issue is challenging to describe, but is done reasonably well. In particular, the summary on Page 2-26 and 2-27 is helpful..

“Anthropogenic” emissions of VOCs are distinguished from “natural” sources. However, as mentioned on Page 2-7 (lines 19-20) and 2-8 (lines 1-4), “natural” emissions can include human-influenced emissions from fire, agriculture, forestry, and other land management practices. This issue of definitions should be further clarified (see my further comment below). Even more importantly, the extent to which such human-influenced emissions are included in “natural background” or other “background” ozone scenarios, should be clarified, and preferably quantified since it could affect interpretation of what portion of ozone is potentially controllable.

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

On a more minor but related point, the terms “anthropogenic”, “man-made” and “manmade” all seem to be used to mean the same thing, with “anthropogenic” being the most commonly used term. Perhaps the term “man-made” should be used throughout for emissions directly from human activity, with the term “anthropogenic” used more broadly to include indirect human-influenced emissions such as from agriculture, forestry, and other land management practices. Or if the term “anthropogenic” is used throughout then, make it clear that this narrower and I believe non-standard definition is being used.

Adequacy of the Secondary Standard (Chapter 5): This chapter discusses key aspects of the welfare effects evidence and exposure/risk information, particularly relevant to consideration of adequacy of the current secondary standard and specifically describes staff’s consideration of this information in reaching preliminary conclusions about the adequacy of the current standard.

1. To what extent does the information in sections 5.1 through 5.5 capture and appropriately characterize the key aspects of the evidence for ozone welfare effects assessed and integrated in the ISA?

In general, the information from the ISI is presented appropriately. The brief quotes are particularly helpful, as are the references to specific portions of the ISI. To what extent does the information in section 5.1 (Nature of Effects and Biologically Relevant Exposure Metric) appropriately summarize the nature of ozone welfare effects and to what extent does it appropriately characterize the evidence with regard to biologically relevant exposures?

[23Mar14] In general, Section 5.1 is useful and appropriate, and the use of questions and answers is a good format. However, I suggest rearranging the order of material within each subsection such that the question is answered at the end of the section discussing each question. For example, the current section on page 5-1, lines 21-33 should be placed just before Page 5-3, line 9. Furthermore, each question should be clearly answered. For example, Page 5-7, before Line 1, there should be a short paragraph that directly answers the question about appropriate paradigm posed on Page 5-5, lines 29-30.

Page 5-2, line 25. Replace “vegetative species” with “many species of vegetation”.

Page 5-13, line 5. Delete “although”

2. To what extent is staff’s consideration of the welfare effects evidence, including the implications of reported vegetation effects with regard to adversity to public welfare technically sound and clearly communicated at an appropriate level of detail?

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

In general, the draft is appropriate and substantially improved from the previous draft, with some caveats. First, it is important to appropriately address the fact that the sensitivity of most tree species and many crop species has not been quantified in terms of a C-R function. It should not be assumed that species of unknown sensitivity are not sensitive to ozone. For example, on page 5-18, lines 28-29, discusses “if present in these specially protected areas”, referring to 7 of the 12 tree species for which C-R functions are available. More appropriately, it should state that “if ozone-sensitive species are present”. This may sound like a minor point about language, but I believe it is actually an important point about how to apply the available scientific data to ecosystems, and it has large implications. For example, stating that “Half (6/12) of species with known C-R functions would have growth decreases greater than 5%, and of these species are representative of responses of unmeasured species, this degree of impact would occur in [state percentage of studied locations with this level of response]. In brief, it is important not to assume that unmeasured species are not sensitive to ozone, it is much more appropriate to assume that the sensitivity of species without C-R functions might be similar to the range of sensitivity for those species with C-R functions.

In the Panel’s view has the information been appropriately interpreted for the purpose of assessing the adequacy of the current standard?

Please see comments above.

3. With regard to the presentation of the exposure and risk information for the purpose of assessing the adequacy of the current standard, to what extent is the information, including associated limitations and uncertainties, sufficiently characterized, appropriately interpreted and clearly communicated?

The choice of the word “paradigm” seems odd in question on p. 5-5, but I don’t have a suggestion of a better term.

Make sure not to define “adverse” effects too narrowly (p. 5-6), loss of biomass growth could be important even if the species is not harvested for timber or fiber. This topic is mentioned elsewhere, and on Page 5-12 this issue is appropriately broadened, but perhaps on p. 5-6 some mention of other effects could be made, or a reference to other locations that address these broader impacts.

p. 5-13, line 5 delete “although”

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

Figure 5-1 should be improved by moving the legend to the right of the main figure panel and arranging the legend species in the same order (top to bottom) as in the main figure panel.

p. 5-14, line 16 and elsewhere. As I mentioned in comments on the previous drafts, it is difficult to interpret a “median” response for both ozone-sensitive and relatively insensitive species. Instead, it makes sense to characterize the expected impacts on the sensitive species, and quantify the spatial extent and effect on biomass growth for (1) known sensitive species (i.e., those that are shown to be particularly sensitive with their C-R functions, and (2) the same result assuming that the 12 species with known C-R functions represent all tree species. A more complex scheme could be developed to try to extrapolate known species to unknown species based on physiological characteristics, as was done for crops in the FASOM analysis, but there would be substantial uncertainty in such extrapolation.

p. 5-21. I think that the “modeling regions” in Table 5-4, are the 9 large US climate regions shown in Fig. 4-6, but this should be made explicit (the term “modeling region” doesn’t seem to be defined in the text currently).

p. 5-24. As in my comments on the first draft WREA and PA, and second draft WREA (Section 6.8) I still have a question about the RBL values weighted by basal area. Does the denominator basal area in the calculation include only the 12 species with C-R functions or does it include all species? If the latter, it is biased. If the former, the interpretation will vary depending on what fraction of the basal area is for species without C-R functions. Furthermore, if the goal is to assess ozone effects on total biomass growth of a mixed-species forest, then this value is not very informative because it will overestimate impacts in mixed species forests because of not including competition between sensitive and insensitive species (see previous comments on competition). If the purpose is to assess ozone impacts on sensitive species, this value is also not informative because it underestimates impacts on sensitive species for the same reason. A comparatively small growth decline in a sensitive species (e.g. 2%) based on a seedling study may translate into a larger effect at the stand scale.

Page 5-25. The method used with FASOM for forest growth is based on individual species C-R functions, but that is only appropriate for mono-specific stands. For mixed-species stands, overall forest growth will not be affected as much as would be implied by a weighted average of the growth rates (or yield losses) from individual C-R functions. This is because of competition among species with different sensitivity to ozone. This is a serious limitation in the approach for mixed-species forests that are common in many parts of the USA.

I still don’t agree about ignoring impacts on farmers and forest owners in high ozone areas just because national assessments include winners and losers. An example of such a calculation is

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

presented on page 5-32, line 9-12 for soybean for 2 counties in Kansas. The number of counties in which yield loss is predicted to exceed 1, 2% or 5% could be tabulated for alternative standards. See comment for Chapter 6 of the WREA related to this topic. Summaries of county-scale information could be added to Table 6-4.

p. 5-30 line 31 etc. Clarify that NCLAN covered multiple locations in the USA and multiple crops, with multiple O₃ exposure levels using consistent methods – all of these factors are very important because they mean that the results are highly valuable for national risk assessments.

Check for occurrences of “PSDI”, should be “PDSI” throughout.

p. 5-41, line 6. Change “by of” to “by”.

Figure 5-5 (page 5-48). In figure legend, provide some information about the sites.

EPA should assure that uncertainties are not suggested or implied to always weaken the case for a more stringent standard. For example, the paucity of data on ozone sensitivity of most US plant species should be considered as “anticipated” that there are a large number of unidentified sensitive species, as well as of course many less sensitive species.

Page 5-62, replace “commiserate” with “commensurate”.

Page 5-63, beginning line 31. Rephrase the sentence on line 31 to be more definite (replace “might be” with “are”).

Page 5-65, lines 20-23. Replace “likelihood and magnitude of a response become increasingly uncertain” with “magnitude of effects become smaller”. As discussed above, the evidence is very strong for tree biomass loss and crop yield loss for sensitive species at W126 values of 5-10. It is the magnitude of the effect that is smaller. And for less sensitive species, there will be little or no biomass loss at low ozone exposure values. Again the important uncertainty is determining what magnitude of an effect is important for welfare, not whether there are any effects at lower ozone exposure levels. This is an important distinction.

4. In the Panel’s view, does the discussion in section 5.7 provide an appropriate and sufficient rationale to support staff’s preliminary conclusion that the current evidence and exposure/risk information call into question the adequacy of the current standard and that it is appropriate to consider revising the standard to achieve additional public welfare protection?

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

[23Mar14] In general, this section is appropriate. However, because it is a summary section, many comments on other sections of this chapter should also be applied to this section. Also, note my specific comments above for this section (i.e. Pages 5-59 through 5-65).

Consideration of Potential Alternative Secondary Standards (Chapter 6): This chapter discusses key aspects of the welfare effects evidence and exposure/risk information particularly relevant to consideration of potential alternative secondary standards and specifically describes staff's consideration of this information in reaching preliminary conclusions on alternative standards appropriate to consider.

1. In the Panel's view, has the evidence and exposure/risk information, including associated limitations and uncertainties, been appropriately characterized and interpreted for the purpose of considering levels of protection and potential alternative standards?

[23Mar14] In general, yes, except for a few points. First, I don't understand the suggestion of values "somewhat above" 15 ppm-hrs. If the EPA staff judge that a value above 15 ppm-hrs for W126 should be considered, then the analysis throughout the WREA and the PA should include a specific value above 15 ppm-hrs so that this suggestion can be reviewed by CASAC and others. Second, there needs to be greater attention paid to sensitive species. While there is analysis of both sensitive crop and tree species, much of the focus is on a median response, for example for tree species. And even when sensitive species are discussed, it is with statements such as 7 of 12 species had a relative yield loss of X below an ozone exposure value of y. However, with trees, the two most sensitive species had a substantial yield loss well below this value. Thus more attention should be paid to including information about commonly occurring sensitive species. Third, more attention should be paid to crop yield loss and tree biomass growth losses at smaller spatial scales such as counties. If yield of a sensitive crop such as soybean is greater than 5% in a county, it affects the farmers in that county, even if at larger regional or national scales there are smaller impacts on yield or on producer surpluses. Fourth, the suggestion to use a 3 year averaging period is not supported by the available data, nor has it been supported by CASAC. The only justification for a 3-year averaging period is to improve the stability of the classification of regions as being in or out of compliance. Greater attention should be paid to accounting for cumulative impacts of a 1% or 2% loss in growth of tree species and other impacts if a 3-year averaging period is to be used. Specifically, a lower value of the standard would be appropriate for a longer averaging period than 1 year. See also detailed comments below.

Additionally it seems to me that there is likely to be a strong bias effect of using across-the-board NOx reductions (see comments for Chapter 4 of WREA). For the large climate regions used, there is a wide variation in ozone exposure values throughout the region. If "across-the-board" cuts are used to reduce ozone exposure in the highest locations, then ozone exposure in locations where it

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

is lower to start with will tend to become very low. But an actual targeted control strategy would likely only reduce NO_x in the locations necessary to bring the high ozone-exposure locations into compliance, thus having much less effect on other locations than would across-the-board cuts. If this bias is large, then it strongly affects all of the risk analyses based on the alternate standards, because impacts of ozone under the alternate standards would be underestimated because ozone exposure values are underestimated for much of each region. If this bias is substantial it could mean that the ozone exposure is underestimated and thus the benefit of the alternate standards might all be underestimated. This could mean that the benefits of any of the alternate standards compared to “just meeting” the current standard and are underestimated as well.

Page 6-8, line 4-5. Change to “extremely highly correlated metrics, with Pearson correlation coefficients of 0.99”.

Page 6-9, line 16-17. I don’t find that this conclusion is warranted – the data support an annual time frame. There should be some compelling reason to use a multi-year time frame. Note that the proposed form already includes a 3-month period, so it is not as sensitive as an hourly or 8-hour period to extreme events.

Page 6-9, lines 18-36. As in my comments in the previous 1st draft PA, it is not appropriate to assume that the only welfare effect of crop yield loss is total producer and consumer surpluses. I think that a goal of avoiding yield losses of sensitive crops of 5% or greater for each county would be appropriate to protect welfare. Farmers growing sensitive crops in high ozone locations can be considered a “sensitive population” for welfare impacts, and their crop yields should be protected. Furthermore, I do not find any support herein for the idea that the data do not support an annual time period for yield losses in annual crops.

Page 6-12. The argument that stability of compliance is of value is stated on this page. I agree with the previous CASAC statement (lines 26-29) that if a multi-year period is chosen for stability purposes, the level of the standard should be lowered to prevent exceedences of a threshold of impact. This is a very important point as it affects the choice of a level depending on the averaging time (1 versus 3 years).

Page 6-17 and 6-18. This discussion of individual species responses to different W126 levels is very helpful and informative, as is Table 6-1. However, I think Table 6-1 could be reformatted to make it easier to read by moving much of the text into column headings, and increasing the number of columns. For example “ppm-hrs” should appear at the top of the first column, under the column heading rather than be repeated on every row. And “median species” could be a column heading for both tree seedlings and crops, as could “loss”. These changes would

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

make it easier to see the actual values in the table. Also, it is not clear to me what “varying lower” means in the table.

Page 6-24, lines 10-24. See previous comments herein and for the first draft PA regarding a question with the weighted RBL scheme.

Page 6-25, line 14. Change “great” to “greater”.

Page 6-30, lines 14-18. It would be helpful to include here and elsewhere the fraction of US forests represented by the species with C-R functions (probably using basal area) as well as the fraction of US crop area covered by the crop species with C-R functions. This helps quantify the uncertainty, which is quite different for crops and forest tree species. This information is available in the REA and could be summarized here as well.

Beginning page 6-30 line 6 and onward. While it is useful to list the various uncertainties, it would be more helpful to give some idea of how the uncertainty might affect the interpretation. I realize that this is challenging, but my concern that it is important to communicate what is known with reasonable certainty versus what is really unknown. I commend the staff for accomplishing this challenging task well in the REA in Table 7-23. There is quite a lot of certainty in estimates of biomass loss for forest tree seedling species and crop species for which C-R functions have been developed. Because several dominant crop species have C-R functions, there is a quite a lot of certainty about impacts of ozone on crop yield across most annual cropland in the USA. But it is much more uncertain to extrapolate from the 12 forest tree species to all forest tree species in the US. For uncertainty in ozone exposure, while it is true that the sparseness of rural monitors means that in many regions there is uncertainty, there are large portions of the US where monitors are dense enough, and where there are not large mountains or other features that make interpolation more difficult, such that regional estimates of ozone exposure are pretty certain, even if there are somewhat larger uncertainties for individual locations.

Page 6-39, lines 29-31. This is a non-sequitur. The difficulty in determining the degree of impact that is important for welfare is not related to the question of averaging the standard across 1 or 3 years. Also, as quoted in the PA (page 6-36, line 19), the CASAC said “averaging across years is not recommended”.

Page 6-43, line 13-14. As for the tree species, crop results should focus on both a group (such as median) response and also individual species response. This is important because sensitive species such as soybean are very widespread and important crops. Also, there is little attention given in the PA and WREA to non-crop annual species. The results for annual crops can be considered as also indicators for a very large number of annual non-crop species that may have

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

many welfare values. While I appreciate the much greater attention to effects on crop yield in this second draft compared to the first draft, I still think a bit more attention to crops is warranted given the strength of the database on crop yield response to ozone.

Page 6-43, line 35 and elsewhere. While the EPA chose to focus on 2% biomass loss for forest species, greater acknowledgement should be made that CASAC recommended 1 to 2%. This is particularly important in conjunction with the decision by EPA to focus on a 3-year rather than annual averaging time as recommended by CASAC.

Page 6-44, line 21. I think it is worth discussing the implications of focusing on sensitive tree species in addition to the existing focus on median and majority species. I think it is misleading for example on line 14-15 to say “less than 9 or 10” without including that the 2 remaining species have much higher predicted biomass losses. I am not suggesting that these sensitive species should be the primary focus, but rather including them for consideration rather than not including them, as happens with the current emphasis. As for sensitive crop species, these sensitive tree species are ecologically important and widespread. Furthermore, they may also serve as indicators for the high likelihood that there are other sensitive tree species for which C-R functions have not been developed. As an example of how information on sensitive species might be included, the human health section of this PA includes estimates of the number of not just all children, but also asthmatics for example in Table 4-45, to better represent sensitive populations.

Page 6-45, lines 21-23. I don't understand why these lines are here. The EPA has selected a range of appropriate alternate values for the standard, and it is in accord with many previous CASAC recommendations. But this sentence says that the Administrator can reasonably choose a value beyond this range. This is a very open ended statement, and I don't understand what it is based on. If the EPA staff judge that a value above 15 ppm-hrs for W126 should be considered, then the analysis throughout the WREA and the PA should include a specific value above 15 ppm-hrs so that this suggestion can be reviewed by CASAC and others.

Page 6-45 lines 24-35. This is very helpful, pointing out the implications of choosing different values for the standard among the values put forward by EPA and by CASAC.

Page 6-46, lines 3-5 and 13-14. As mentioned above for the previous page, I don't understand the suggestion of values “somewhat above”. If the EPA staff judge that a value above 15 ppm-hrs for W126 should be considered, then the analysis throughout the WREA and the PA should include a specific value above 15 ppm-hrs so that this suggestion can be reviewed by CASAC and others.

03-23-14 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel on the Policy Assessment (Second Draft). These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

Page 6-48, lines 12-13. The only support that I find in the PA for a 3-consecutive-year time frame is stability of compliance among years. As discussed in the PA and in my prior comments, CASAC specifically recommends NOT averaging across years, so I think this recommendation should be reconsidered or at least further qualified.

Page 6-48, line 18, Again I find the usage of “somewhat above” to be vague and misleading and impossible to evaluate, see comments above.

2. In the Panel’s view, does the discussion in section 6.5 provide an appropriate and sufficient rationale, supported by the discussions in sections 6.1 through 6.4, to support staff’s preliminary conclusions regarding alternative secondary standards (including the indicator, level, averaging time and form) that it is appropriate to consider?

For the most part yes, except for the issue of mentioning values “somewhat above 15 ppm-hrs (see comments above). Also, I think more attention needs to be paid to suggesting a lower value for the standard if using a 3-year rather than a 1-year averaging time.

3. Does the Panel have any recommendations regarding additional interpretations and conclusions based on the available information that would be appropriate for consideration beyond those discussed in this chapter?

Please see comments above.