Preliminary Comments from Dr. James Boylan on
EPA's *Policy Assessment for the Review of the Ozone National Ambient Air Quality Standards (External Review Draft – October 2019)*

Chapter 2 – Air Quality

To what extent does the CASAC find that the information in Chapter 2 is clearly presented and that it provides useful context for the review?

O_3 and Photochemical Oxidants in the Atmosphere (Section 2.1)

This section should discuss how the precursor emissions listed in this section (NOx, VOCs, CO, and CH_4) are important for ozone formation. An overview of the chemical mechanism should be presented and important chemical reactions should be highlighted. The relative importance of each precursor should be discussed with respect to urban ozone formation vs. ozone formation in the remote troposphere. Also, the relative importance of NOx vs. VOCs should be discussed with respect to geographic location in the U.S. (e.g., SE, NE, Central, Midwest, West).

Sources and Emissions of O_3 Precursors (Section 2.2)

This section presents estimated national values for 2014 NEI emissions. However, there is no detailed discussion on the uncertainty associated with each pollutant or source sector. Some pollutants and sectors will be much more uncertain than others. For example, NOx emissions from electric generating units (EGUs) have low uncertainty since they are typically captured by hourly CEMs. On the other hand, other source sectors and pollutants may be highly uncertain. The uncertainties in the emissions inventory (magnitude, spatial allocation, and temporal allocation) should be discussed for each pollutant and source sector. In addition, it would be helpful to add national maps containing county-level emissions for NOx, VOCs, CO, and CH_4 to show the variability across the country.

It is not clear if CH_4 is included in the VOC emissions or not. The text should clearly state if CH_4 is included or excluded from the VOC emissions discussed in this Chapter.

Ozone in Ambient Air (Section 2.4)

This section should include a discussion on ozone precursor trends in addition to ozone trends. Specifically, trends in NOx, VOCs, and CO measurements from national monitoring networks (AQS, near-road, NCore, and PAMS) should be included and discussed.

It is stated on page 2-19, "B shows the seasonal pattern for an urban site in Baton Rouge, LA. Throughout the southeastern U.S., the highest O_3 concentrations are often observed in April and May due to the onset of warm temperatures combined with abundant emissions of biogenic VOCs at the start of the growing season. This is often followed by lower concentrations during the summer months, which

is associated with high humidity levels that tend to suppress O_3 formation." While this statement might be true for Baton Rouge, it does not apply to the entire southeastern U.S. In addition, a reference should be provided to support the statement that high humidity levels suppress O_3 formation.

EPA's 2016 Exceptional Events Rule allows certain ozone measurements due to natural events to be excluded from the official design values when compared to the NAAQS. In some cases, identical exceptional events can be treated differently in one location vs. another based on how close the area is to the standard. In both locations, people are impacted by adverse health effects, but the data is removed in one location and not the other. The PA should discuss how exceptional events are accounted for in health studies and risk analyses.

Background O_3 (Section 2.5)

EPA used the CMAQ chemical transport model with the zero-out approach to estimate U.S. background, international, and natural contributions. Figures 2-22, 2-23, and 2-24 should add a 100% line. EPA should add explanations for values over the 100% line. The caption in Figure 2-26 is incorrect. The figures and tables containing USB contribution on the average of the top 10 predicted O_3 days and the 4^{th} highest O_3 days are very useful and relevant to policy decision. These values should be compared to previous work by Jaffe (2018) and Parrish (2017, 2019). In Appendix 2B, the scale used in Figure 2B-15 should be reduced from 100% to a lower value to allow the reader to see the differences between monitoring sites.

Chapter 3 – Review of the Primary Standard

What are the CASAC views on the approach described in chapter 3 to considering the health effects evidence and the risk assessment in order to inform preliminary conclusions on the primary standard? What are the CASAC views regarding the key considerations for the preliminary conclusions on the current primary standard?

The more detailed discussion on selection of study areas should be moved from Section 3D.2.1 to Section 3C.2 since Appendix3C is presented prior Appendix 3D. It appears that Sacramento (2017 design value = 86 ppb) does not meet the second selection criteria listed on page 3D-14, "Combined statistical area (CSA)/metropolitan statistical area (MSA) ambient air 24 monitor design values are between 60-80 ppb, thus having minimal adjustment needed to just meet the current 8-hr O3 NAAQS". A reason for selecting this study area should be added to the document.

It appears that the CAMx chemical transport model was only run with 2016 meteorology while the APEX exposure model was run using 2015-2017 meteorological data. The document should explain how these two models were combined to generate 2015-2017 exposures.

A comparison of 2016 emissions used in the CAMx model (Table 3C-4) to the 2014 NEI emissions (Figure 2-1) show similar emissions for CO and VOCs (after adjusting for year specific biogenic

emissions). However, the anthropogenic NOx emissions in 2016 are 20% lower than the anthropogenic NOx emissions in 2014. This large difference should be explained.

EPA performed an ozone model performance evaluation (MPE) for each study area. However, additional explanation is needed to describe the time series plots shown in pages 3C-34 – 3C-61. It appears that the measured MDA8 is averaged for all monitors in an area and compared to the modeled MDA8 average for all monitors in the area. The document should explain how the modeled MDA8 average is calculated when observations are missing. For example, do the corresponding model results get removed or do they remain in the average? Also, it appears that the "# of sites" included in the top right corner of each plot includes both CSA and "buffer" sites. It would be more appropriate to only include CSA sites since this would better match with the study areas used in the exposure modeling. The "# of sites" shown in Figure 3C-25 for January is "14". However, Georgia only has two year-round monitors in the state. For each study area and season, it would be useful to plot all hourly observed and modeled concentrations in a single 24-hour diurnal plot with means and standard deviations (similar plot as Figure 3C-67).

The document should include the number of monitors used in each model performance summary table contained on pages 3C-31 – 3C-59. It is unclear if the "buffer" sites are included along with the CSA sites. Again, it would be most appropriate to only include CSA sites.

In addition to the ozone MPE, it would useful to perform a model performance evaluation for the ozone precursors (NOx and VOCs). If the precursor concentrations don't match the observations, the HDDM sensitivity results may not be accurate even if the ozone concentrations match observations.

Figures 3C-67 and 3C-75 for Atlanta are both missing the "75 ppb" ozone distributions. Although NOx emissions were not adjusted in Atlanta for the 75 ppb scenario, the modeling results for the 75 ppb scenario should still be included.

Section 3C.5.2.2.3 should discuss why NOx reductions alone were selected for adjusting design values. In many cases, VOC reductions occur simultaneously with NOx reductions. Also, many areas of the county are equally as sensitive to VOC reductions as NOx reductions.

Section 3C.6 discusses interpolation of adjusted air quality using Voronoi Neighbor Averaging (VNA). A justification for choosing VNA over other methods should be included and its uncertainty quantified.

The exposure and risk results from the 7 study areas that are in common with the previous ozone HREA review should be compared and similarities/differences discussed in this document.

Chapter 4 – Review of the Secondary Standard

What are the CASAC views on the approach described in chapter 4 to considering the evidence for welfare effects in order to inform preliminary conclusions on the secondary standard? What are the

CASAC views regarding the key considerations for the preliminary conclusions on the current secondary standard?

On August 23, 2019, the D.C. Circuit Court issued an opinion concluding, in relevant part, that EPA had not provided a sufficient rationale for aspects of its decision on the 2015 secondary standard (Murray Energy v. EPA, 936 F.3d 597 [D.C. Cir. 2019]). Accordingly, the court remanded the secondary standard to EPA for further justification or reconsideration, particularly in relation to its decision to focus on a 3-year average for consideration of the cumulative exposure, in terms of W126, identified as providing requisite public welfare protection, and its decision to not identify a specific level of air quality related to visible foliar injury. It is not clear if EPA has fully addressed this concern in this document.

Chapters 3 and 4

What are the CASAC views regarding the areas for additional research identified in Chapters 3 and 4? Are there additional areas that should be highlighted?

PAMS monitoring season should be extended from 3 months (June, July, August) to 6 months (mid-April, May, June, July, August, September, mid-October) in ozone nonattainment areas since peak ozone concentrations have been shifting from summer to late spring and early fall. Ozone exceedances that occur in the late spring and early fall may be impacted by different VOC species than ozone exceedances that occur in the summer.

References

Jaffe D. A., et al. (2018) Scientific assessment of background ozone over the U.S.: Implications for air quality management. Elem. Sci. Anth., 6 56 doi.org/10.1525/elementa.309.

Parrish, D. D., Young, L. M., Newman, M. H., Aikin, K. C., and Ryerson, T. B. (2017) Ozone Design Values in Southern California's Air Basins: Temporal Evolution and U.S. Background Contribution, J. Geophys. Res.-Atmos., 122, 11166–11182, https://doi.org/10.1002/2016JD026329.

Parrish, D. D. and C. A. Ennis (2019). Estimating background contributions and US anthropogenic enhancements to maximum ozone concentrations in the northern US, Atmos. Chem. Phys., 19, 12587–12605, https://doi.org/10.5194/acp-19-12587-2019.