STATEMENT OF JOHN J. JANSEN
TO THE
CLEAN AIR SCIENTIFIC ADVISORY COMMITTEE
on
"INTEGRATED SCIENCE ASSESSMENT FOR OZONE AND RELATED PHOTOCHEMICAL OXIDANTS (2nd External Review Draft)"
(January 9, 2012)

Good morning. I am John Jansen, Principal Scientist for Southern Company. I am speaking to you today on behalf of UARG -- the Utility Air Regulatory Group -- concerning background levels of ozone.

The background level of ozone in ambient air is a key question in this review of the National Ambient Air Quality Standards ("NAAQS") for ozone. Indeed, *InsideEPA*'s "Outlook 2012" identifies background air pollution as a growing issue for the NAAQS program this year. Characterization of background air quality affects whether the NAAQS are attainable which may not be something that EPA can legally consider when deciding whether and how to revise a NAAQS. It also affects what, if any, benefits might be expected as a result of implementation of any revisions of the NAAQS which is the key issue when deciding whether revision of a NAAQS is appropriate.

I'm going to address two issues related to determining background ozone levels. First, how should it be defined? EPA previously referred to Policy Relevant Background or PRB, which referred to ozone levels predicted to occur in the United States in the absence of any North American anthropogenic emissions of the ozone precursors VOCs, NOx, and CO. In the second draft of the ISA, EPA now refers to "North American Background" or simply "background." These new terms, however, are defined in a way that is essentially indistinguishable from that of PRB -- ozone attributable to natural sources everywhere (including stratospheric-tropospheric exchange of ozone) and from anthropogenic sources outside continental North America.

This definition of background ozone levels -- whether it is called PRB or North American background or simply background -- is inappropriate. It zeros out emissions of ozone precursors in Canada and Mexico as if they could be controlled under the Clean Air Act's NAAQS program. EPA's justification for this approach is apparently the Agency's perception that such emissions can be controlled through international agreements with Canada and Mexico. While it may theoretically be true that the U.S. could enter into a treaty with Canada and Mexico (or indeed with other countries) to reduce emissions of ozone precursors, such a treaty would not be part of the Clean Air Act. Negotiating and implementing it would not be tied to the deadlines in the Clean Air Act for NAAQS attainment. Nor would it be likely to require elimination of all emissions of ozone precursors in those countries.

Instead, background should be defined as the level of ozone that could be achieved in the U.S. if all anthropogenic emissions of ozone precursors in this country were eliminated. In other words, it would assume current emission rates of ozone precursors outside of the U.S. would continue or, perhaps, increase. And it would assume continuing natural emissions of ozone precursors world-wide. This scenario is still conservative, because it is virtually inconceivable that all U.S. emissions of ozone precursors could be eliminated, but it would at least be theoretically possible to implement the Clean Air Act in a way that would require that result. I should note that applying this definition may, in some key cases, produce estimates of background ozone levels that are considerably higher than those produced by EPA's unrealistic approach. In work done for EPA by ICF, for example, the summer average maximum daily 8-

hour background ozone level in the Northeast was 8.58 ppb higher using my definition of background than using EPA's definition.[1]

Once this more realistic definition for background ozone is agreed upon, the next question is what the actual background level (or levels) of ozone are, as so defined. EPA argues that modeling must be used to determine background ozone levels because even remote monitoring sites are affected by the long-range transport of anthropogenic sources of ozone within North America. The same argument could probably be made -- although with somewhat less force -- for effects of long-range transport of ozone due to anthropogenic sources within the U.S. But that should not mean that data from such remote monitoring sites should be ignored in favor of predictions produced by chemical transport models -- let alone the predictions of the single GEOS-Chem model. As the ISA itself recognizes, chemical transport models (including GEOS-Chem) have their own uncertainties and inaccuracies. A recently-published paper by Emery and others concluded that wildfires, lightning and stratospheric-tropospheric exchange contribute significantly to uncertainty in modeled predictions of background ozone both when GEOS-Chem was used on its own and when it was used together with the CAMx model.[2]

What should be done, then, is to derive background concentrations (and perhaps a range of plausible background concentrations) using predictions produced by a variety of models and using monitoring data as a check on the plausibility of those predictions. I note that this use of model predictions and monitoring data is consistent with the recommendations of McDonald-Buller, and others in a recent critical review concerning means for establishing background

[1] ICF International, *Modeling for North American Background Concentrations* 166, Table 6-2(g).

[2] Emery, Christopher, Jaegen Jung, Nicole Downey, Jeremiah Johnson, Michele Jimenez, Greg Yarwood, & Ralph Morris, *Regional and global modeling estimates of policy relevant background ozone over the United States*, Atmos. Environ. 47: 206 (2012).

ozone concentrations.[3] Furthermore, background ozone levels must be specified in a manner that is relevant to the NAAQS, which is currently specified as the 3-year average of the 4th highest daily maximum 8-hour ozone concentrations. Simply looking at seasonal or even annual average background levels is inadequate. Seasonal or annual averages will almost certainly understate the importance of background ozone to measured exceedances of the standard. Given the present standard, the relevant averaging period for estimates of background ozone concentrations is 8 hours. And the key question is what the contribution of background ozone is to the 4th-highest ozone values at sites where that value exceeds the 75 ppb level of the standard or other levels that may be under consideration..

[3] McDonald-Buller, Elena C., David T. Allen, Nancy Brown, Daniel J. Jacob, Daniel Jaffe, Charles E. Kolb, Allen s. Lefohn, Samuel Oltmans, David D. Parrish, Greg Yarwood, & Lin Zhang, *Establishing Policy Relevant Background (PRB) Ozone Concentrations in the United States*, Environ. Sci. Technol. 45: 9484 (2011).