

**Comments on EPA's Second External Review Draft
"Policy Assessment for the Review of the Secondary
National Ambient Air Quality Standards for NO_x and SO_x"**

**Jon M. Heuss and George T. Wolff
Air Improvement Resource, Inc.
October 6, 2010**

I am Jon Heuss with AIR, Inc. George Wolff and I will be providing written comments on the second draft PA for the Alliance of Automobile Manufacturers. The PA revisits the appropriateness and feasibility of setting secondary NAAQS to address effects resulting from deposition.

Comments on appropriateness

In previous reviews, EPA decided the secondary national air quality standards were not an appropriate approach to address deposition effects. Instead both EPA and Congress have regulated deposition through Title IV of the Clean Air Act. Nothing has changed to alter the fundamental limitations that led to those decisions. The PA glosses over or omits the reasons given in past reviews as to why secondary NAAQS cannot adequately address deposition issues.

Even with the increased understanding of deposition issues, as summarized in the ISA, there are still fundamental obstacles to using secondary NAAQS to address deposition concerns.

- First, acid deposition is a regional, not a national concern. Therefore, a uniform national ambient standard is not appropriate. The ecological indicator the PA recommends is a measure of water quality and cannot substitute for a uniform national ambient standard.
- Second, the criteria pollutants NO_x and SO_x cover only a portion of the S and N compounds that cause deposition-related effects. In particular, reduced N is important and included in the acidification index but is not subject to regulation as a criteria pollutant.
- Third, the air quality indicator in the scheme described in the PA, NO_y, includes both regulated and unregulated compounds.
- Fourth, there is no unique link between ground-level NO_x and SO_x concentrations and the deposition that may lead to effects.
- The assumption that surface-based measurements of NO_y, SO_x and NH_x at any site are indicative of the surface-based deposition of these species at the site has not been demonstrated and is likely to be flawed (see

Figure 4-21 in the PA which shows no relationship between either NO_y or NO₂ and total oxidized nitrogen deposition). Total deposition at most sites is dominated by wet deposition and the chemical composition of the precipitation is determined largely by in-cloud reactions. Thus wet deposition of the NO_y, SO_x and NH_x species will be a function of the gas and particle concentrations of these species at cloud level, not at surface level. Unless the boundary layer is well mixed and extends to the clouds and there are no local sources of NO_y, SO_x and NH_x, there will be vertical gradients of these species.

- Another concern is that even if CMAQ provided reasonable estimates of total deposition of NO_y and SO_x species, it appears to do it for the wrong reasons. First, at two of the CASTNet sites in the eastern US, Great Smokey and Shenandoah, CMAQ predicts that about two-thirds of the total deposition of NO_y and SO_x is from dry deposition. Clearly this is at odds with the observations that show that wet deposition accounts for about two-thirds of the total. In addition, CMAQ attributes the wet NO_y deposition almost entirely to the deposition of particulate nitrate whereas in reality it is due to nitric acid.
- Consequently the approach that is being proposed by EPA appears to be flawed. Until CMAQ passes a rigorous model performance evaluation for all important deposition species, it should not be considered for attainment demonstrations or as the basis for the development of ambient air quality standards.
- Fifth, the beneficial effects of N deposition need to be weighed along with any adverse impacts in the Administrator's decision.

Issues with the formulation

The AAPI is a complex scheme to link ambient air quality to deposition to ecosystem effects. In essence it is a regional deposition standard for total N and S deposition that is linked to ambient concentrations through a model-derived transformation ratio. A number of the issues regarding appropriateness noted above provide severe practical limitations to the approach. There is also significant uncertainty at each stage of the analysis.

The PA indicates that the model is used because the current measurements of the important constituents in sensitive areas are limited or non-existent. For example, EPA states "we are unable to use current ambient monitoring data to adequately link measured current atmospheric concentrations to ecological effects transmitted through deposition." However, there is no fundamental acidifying potential for the NO_y indicator. The ground-level atmospheric concentrations of the individual components of NO_y will determine the dry deposition of those components, but ground-level concentrations of NO_y are not a satisfactory link to wet deposition and are not even a satisfactory link to

dry deposition since a different mix of NO_y components will result in a different amount of N deposition since the deposition velocities for NO_y component species vary widely. In addition, the model being used has substantial shortcomings in this application. There are limitations of CMAQ re ammonia and NO_y species and neither NO_y nor NO₂ concentrations correlate well with total oxidized nitrogen deposition (Figure 4-21).

While there is discussion of subdividing the nation into from 1 to 83 different ecoregions and developing a deposition metric for each region, the PA offers no view on how many separate regions might be chosen by the Administrator. The supplemental material posted on September 23 does not answer this question. While there is some discussion of the measurements to be made in each ecoregion, there is no discussion of the extent and location where the appropriate ambient measurements should be made in an ecoregion.

Issues with implementation

If an AAPI standard were set, a new monitoring network would need to be put in place. The appropriate monitoring methods and appropriate standards are not in place so considerable work would be required before any monitoring could take place. Since the PA recommends three to five years of monitoring, any designations would not occur in the foreseeable future. It is also not clear how the spatial extent of the control area would be determined and a SIP would be developed. In the meantime, however, the PSD provisions of the Act would be triggered. The PA also notes that the CMAQ model will need to undergo revisions and updates to deal with known problems. All these issues will add complexity and confusion to the implementation of the standard and will of necessity delay any additional controls under the standard until after the next five year review is completed.

In the meantime, NO_x and SO_x emissions will continue downward under various existing and already proposed control programs. For example, on-road vehicle NO_x emissions will be reduced by over 50 % from current levels by 2015. In addition, the EPA Transport Rule calls for a 70 % reduction in annual power plant SO₂ emissions and a 50 % reduction in annual NO_x emissions in 2014 compared to 2005 baseline in a 28 state area. The PA does not address the important question of whether all these programs are sufficient to adequately protect the public welfare. It should. In addition, the recently promulgated 1-hour primary NO₂ and SO₂ standards may trigger additional controls before a new secondary standard would.

Conclusions

Based on AIR's review, the proposed approach is a regional deposition standard dressed up and sold as a national ambient air quality standard. The approach is incompatible with the NAAQS provisions of the Clean Air Act. EPA should revise the PA to address public and CASAC comments and turn the information in the PA into a Report to Congress as an update of the 1995 Report to Congress on the feasibility of acid deposition standards under Title IV. In addition, nothing is keeping states from working together using regional agreements to address any remaining acid deposition concerns.