Comments of Deborah Shprentz
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EPA's Risk and Exposure Assessment (REA) to Support the Review of the
NO_2 Primary National Ambient Air Quality Standard
EPA-452/R-08-008a November 2008
Chapter 10: Evidence- and Exposure/Risk-Based Considerations
Related to the Primary NO_2 NAAQS

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The American Lung Association offers these comments on the policy options for revision the NAAQS for nitrogen dioxide (NO_2) discussed in chapter 10 of the Risk and Exposure Assessment (REA)..

In the REA, EPA suggests eliminating the annual average standard and replacing it with a 1-hour daily maximum concentration (98th or 99th percentile form) in the range of 50 to 200 ppb, with strongest support for a standard level between 50 and 100 ppb.

The American Lung Association recommends EPA:

- Add a 1-hour standard with a level set below 50 ppb using a tighter form than proposed here; and
- Retain, but strengthen the annual average standard.

Range of Potential 1-Hour Standards Should Be Changed

EPA relies on the Delfino et al., (2002) study to define a lower end of the range, focusing on the 98th and 99th percentile 1-hour daily maximum NO_2 concentrations in this study. We recommend that EPA look at the mean concentrations at which effects occurred (as well as 1 standard deviation below the mean) and set a standard below this level that incorporates a margin of safety to protect against the adverse effects.

The respiratory morbidity observed in this study did not just occur at the high end of the distribution. The adverse effects reported in this study occurred at the mean concentration, as well as above and below the mean. A standard based on the highest concentrations during the study period cannot possibly be protective of public health. A more appropriate statistic to focus on would be that mean concentration of 23.7 ppb.

Table 1 below notes the mean 1-hour daily maximum NO_2 concentrations for the other key epidemiological studies identified in Chapter 10. These studies clearly identify

adverse health effects such as emergency room visits and hospital admissions for respiratory causes at concentrations currently occurring in the U.S. Mean concentrations for all but one of these studies are about or below 50 ppb, suggesting that the standard must be set below this level to allow for a margin of safety.

Table 1: Mean 1-hr Daily Max NO_2 Concentrations Compared to 98th Percentile

Study	Mean 1-hr Daily Max (ppb)	98th Percentile
Delfino	23.7	50
Peel (study period 1)	45.9	87
Peel (study period 2)	43.2	85
Jaffee	51	86
Ito	52	94
Ostro	71-75	180 -170
Linn	72	178
NYC - Manhattan	50	86
NYC - Bronx	49	88

Source: Thompson R, Jenkins S. Memo to NO_2 NAAQS Review Docket, "Air Quality Statistics for Cities Referenced in Key U.S. Nitrogen Dioxide Epidemiology Papers"

We note that the highest mean concentration reported in this set of studies is 75 ppb. With that as the data boundary, these studies cannot be used to justify an upper end of the range of 100 ppb.

Further, we note that there no data are offered to suggest that a uniform relationship exists between mean and 98th percentile concentrations in regions throughout the United States.

The upper ranges considered in the REA have no basis in the evidence and should be eliminated from further consideration. The meta-analysis of the clinical studies reports adverse effects such as increased airway hyperreactivity at concentrations of 100 ppb, which is the lowest level that was studied. This suggests that the upper end of the range of 100 ppb cannot possibly be protective of public health because there is no margin of safety, and that the 200 ppb level is completely unjustified. Additionally, most controlled human exposure studies do not include severe asthmatics or young children, so the regulatory levels must be set below the lowest observed adverse effect levels.

Form of the 1-Hour Standard Should Be Strengthened

The Lung Association favors a no exceedance form of the standard as opposed to a 98th percentile form, which allows 7-8 exceedance days each year to be excused from nonattainment determinations. EPA seems hyper-focused on the "stability" of the

standard at the expense of precautionary protection of health—stability being defined areas that show consistency in their nonattainment status. The purpose of a short-term standard should be to prevent short-term spikes. Instead, the Agency suggests a 98th or 99th percentile form of the standard that would permit multiple exceedances each year. Furthermore, the Agency suggests that nonattainment be measured based on three years of monitoring data. This approach accounts for meteorological variation from year to year that can affect attainment determinations, creating the perverse situation where a standard based on peak exceedances allows 21 or more exceedances days in a three-year period to be completely ignored.

Annual Average Standard Should be Retained and Strengthened

The Lung Association concurs with EPA's conclusion that the current annual average standard is insufficient to protect public health with an adequate margin of safety. However, we believe that the annual standard should be strengthened, as well as supplemented with a short-term 1-hour standard.

EPA's review of the scientific evidence in the ISA concludes that there is "suggestive" evidence of respiratory morbidity, specifically decrements in long function growth associated with long-term exposure to NO_2. In light of this suggestive evidence, it would be prudent to retain and strengthen annual average standard. We note that based on a review of the same evidence considered by EPA, in 2008, California decided to establish a new annual average standard for NO_2, at a far lower concentration than the current NAAQS.

Improvements Needed in Monitoring

The current monitoring network is not sufficient. It fails to detect the maximum concentrations of NO_2 to which people may be exposed. The REA indicates that only 58 of 489 total NO_2 monitors are sited in areas of expected peak concentrations. More critically, it is evident that monitors are not routinely located near roadways where the REA indicates that the highest exposures are expected. Any revisions to the NAAQS must be accompanied to changes to the monitor siting criteria to ensure that attainment is measured against monitors that reflect peak exposures.