NESCAUM
www.nescaum.org

The Clean Air Association of the Northeast States
101 Merrimac Street, 10th Floor Boston, MA 02114
Phone 617-259-2000 Fax 617-742-9162
Arthur N. Marin, Executive Director

May 13, 2005

Dr. Rogene Henderson
Attention: Mr. Fred Butterfield, Designated Federal Officer
EPA Science Advisory Board (1400A)
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Re: NESCAUM Comments on CASAC PM Review Panel to review and approve the Panel's report from its April 6-7, 2005 meeting

Dear Dr. Henderson:

NESCAUM appreciates the opportunity to provide comments relating to the public teleconference of the Clean Air Scientific Advisory Committee (CASAC) Particulate Matter (PM) Review Panel. Our comments consist of additional technical materials relevant to understanding the behavior and protectiveness of alternative levels and forms of the $PM_{2.5}$ national ambient air quality standards (NAAQS). We wish to discuss three points relating to the Panel's draft advice and recommendations in Chapter 5 for the primary $PM_{2.5}$ standard:

1. Endorsing a 98^{th} percentile form rather than a 99^{th} percentile form results in a 24-hour standard less stringent by 5 $\mu g/m^3$.
2. In the Northeast U.S., the difference between a 13/30 and 13/35 $\mu g/m^3$ annual/24-hour (98^{th} percentile) standard amounts to a substantial difference in protectiveness (37% of the total Northeast population). For the entire U.S., the difference is 12%. For a 14/30 and 14/35 $\mu g/m^3$ standard, the difference is 48% (Northeast) and 17% (U.S.).
3. In many areas in the U.S., lowering only one standard without a matching reduction of the other standard will result in a wide range of 24-hour or annual levels permitted for the non-controlling standard.

Thank you for considering these comments as you conclude this important issue.

Sincerely,

Philip Johnson
Public Health Analyst

cc: NESCAUM Directors, Air Toxics and Public Health Committee, Attainment Planning Committee

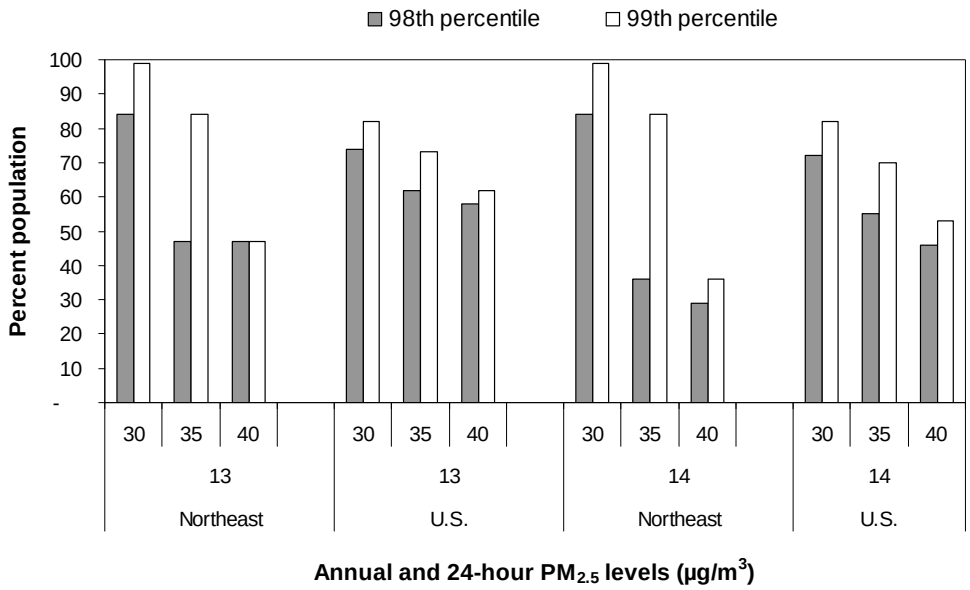
Figure 1 is similar in concept to Dr. Miller's useful three-dimensional figures created at the April meeting. The figure shows the percent of Northeast and total U.S. populations that would benefit from compliance with annual/24-hour ranges of 13/30-35 µg/m^3 and 14/30-35 µg/m^3. The CASAC Panel's draft recommended these standard ranges (using a 98th percentile form). (The Northeast as defined here comprises New England, New Jersey, and New York.)

First, note that 24-hour standards with a 99th percentile form are about 5 µg/m^3 more protective than equivalent standards with a 98th percentile form.

Second, the lowest 24-hour standard level within the range (30 µg/m^3) is associated with a sizeable increase in protection for Northeast populations; 35 and 40 µg/m^3 offer essentially the same level of protection. This behavior occurs because most Northeast monitoring site 24-hour averages cluster in the 30-35 µg/m^3 range. Therefore the implications of selecting a 24-hour standard of either 30 µg/m^3 or 35 µg/m^3 are substantially greater for Northeast populations than the U.S. as a whole.

A standard combination of 14/30 would protect 48% more of the Northeast's population than a combination of 14/35. A combination of 13/30 would protect 37% more of the Northeast's population than 13/35 pairing. This compares to 17% and 12% for the U.S. population as a whole. We would add that the majority of the Northeast population that would benefit from a more protective standard live in the most densely populated region of the U.S., an urban corridor that experiences the Northeast's highest fine particulate concentrations.

Figure 1: Percent total population in Northeast U.S. vs. total U.S. that would benefit from $PM_{2.5}$ levels in compliance with alternative combinations of annual and 24-hr standards (µg/m^3)



Source: U.S.: EPA 2nd Draft PM Staff Paper, January 2005; Northeast: Johnson and Graham, NESCAUM, *Environmental Health Perspectives*, in press [available at http://ehp.niehs.nih.gov/members/2005/7822/7822.pdf]

Figures 2 and 3 demonstrate the extent to which unmatched annual and 24-hour standards will leave broad areas of the U.S. with unequal protection as described next.[1]

The CASAC Panel's draft notes that some cities have relatively high annual PM concentrations, but without much variation in concentrations from day to day. Based on the figures below, many monitoring areas across the U.S. will experience a wide range of PM concentrations on an annual or 24-hour basis when satisfying one or the other standard.

In Figure 2, the x-axis represents 24-hour ranges of 5 $\mu g/m^3$ centered about integer mass values from 23 to 52 $\mu g/m^3$. Six annual average range categories are used to create the bar chart; each bin is centered around annual levels in 1 $\mu g/m^3$ (11-15) intervals. The y-axis gives the percent of monitors in each annual range that fall in each 24-hour range on the x-axis. 51% of U.S. sites in the figure with an annual range of 13.5-14.49 $\mu g/m^3$ experience 24-hour averages ranging from 33-37 $\mu g/m^3$. An additional 14% of U.S. sites range from 38-47 $\mu g/m^3$.

In Figure 3, the x-axis represents annual ranges of 1 $\mu g/m^3$ centered about integer mass values from 8 to 20. Six 24-hour average range categories are used to create the bar chart; five of the bins are centered around 24-hour levels in 5 μg intervals (25, 30, 35, 40 and 45) with a sixth bin representing values at or above 48 $\mu g/m^3$. The y-axis gives the percent of monitors in each 24-hour range that fall in each annual range on the x-axis. 24 % of U.S. sites in the figure with a 24-hour range of 33-37 $\mu g/m^3$ experience annual averages ranging from 13.5-14.49 $\mu g/m^3$. An additional 44% of U.S. sites range from 14.5-18.49 $\mu g/m^3$.

If the annual standard were 14 $\mu g/m^3$ and controlling, 14% of sites would experience daily 24-hour 98^{th} percentile values equal to or greater than 38 $\mu g/m^3$ (Figure 2). If the daily standard were 35 $\mu g/m^3$ and controlling, 44% of monitors would experience annual averages at or above 14.5 $\mu g/m^3$ (Figure 3). By pairing these two standard levels, the upper distributions of 24-hour and annual ranges could be constrained, providing more uniform protection across the country.

Note that sites with a 24-hour range of 28-32 $\mu g/m^3$ experience annual means predominately ranging from 9.50-15.49 $\mu g/m^3$. The three lower 24-hour solid color bins (23-27, 28-32, 33-37) show the highest percentages in the middle of the ranges, with the peak bar occurring at a 24-hour to annual ratio of about 2.5. The three higher bins show evidence of bimodal behavior. One mode is similar to that seen in the lower bins, where the ratio of daily to annual is ~2.5, while the other mode has a ratio closer to 4. The existence of these modes implies that the phenomena driving fine particle levels are different at different sites and may reflect differences in the relative locations of sources to monitors, periodicity of source strength, and meteorological or topographical effects.

It is also worth noting that this analysis shows substantial standard grouping variability across the U.S. for a 3-year average (2000-2002); variability would be more pronounced were data presented for individual years.

[1] Based on materials in a manuscript submitted to the *Journal of the Air & Waste Management Association* for possible publication. N= 1137 monitors (years 2000, 2001, and 2002).

Figure 2: Frequency of alternative 24-hour 98th percentile and annual $PM_{2.5}$ stringency ranges for 1137 FRM monitoring sites in U.S. (µg/m³) (2000-2002)

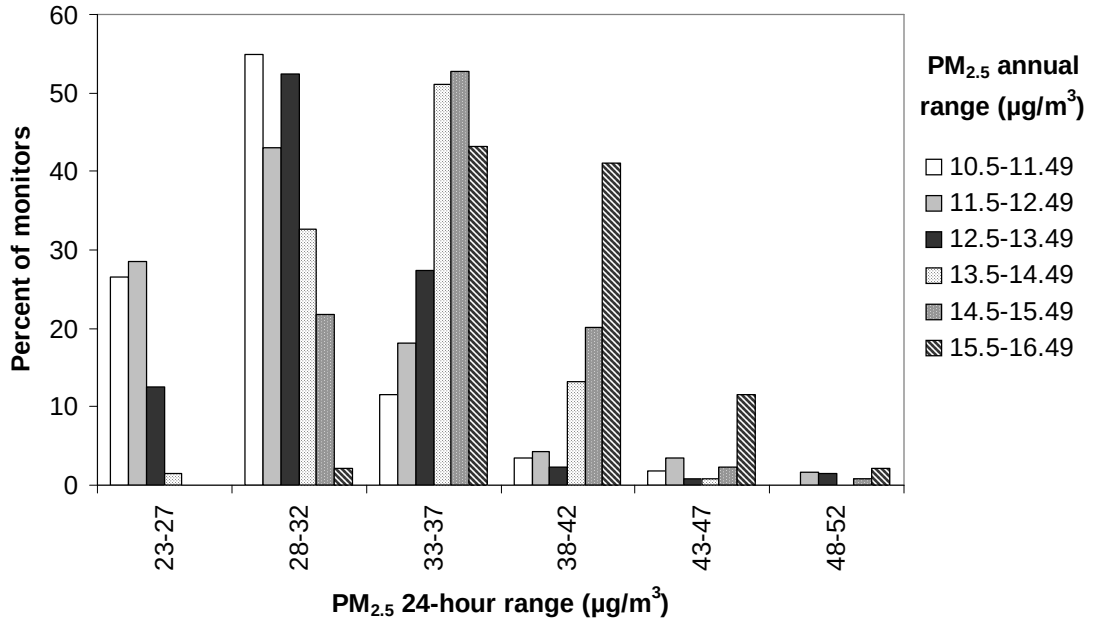


Figure 3: Frequency of alternative annual and 24-hour 98th percentile $PM_{2.5}$ stringency ranges for 1137 FRM monitoring sites in U.S. (µg/m³) (2000-2002)