NESCAUM
www.nescaum.org

Northeast States for Coordinated Air Use Management
89 South Street, Suite 602 Boston, MA 02111
Phone 617-259-2000 Fax 617-742-9162
Arthur N. Marin, Executive Director

September 14, 2009

Lisa. P. Jackson, Administrator
U.S. Environmental Protection Agency
Mail Code 6102 T
1200 Pennsylvania Avenue, NW
Washington, DC 20460
Attention: Docket ID No. EPA-HQ-OAR-2006-0922

Re: Primary National Ambient Air Quality Standard for Nitrogen Dioxide – Proposed Rule

Dear Administrator Jackson:

The Northeast States for Coordinated Air Use Management (NESCAUM) offer the following comments on the U.S. Environmental Protection Agency's (EPA's) Notice of Proposed Rulemaking (NPR), published on July 15, 2009 in the Federal Register, entitled *Primary National Ambient Air Quality Standard for Nitrogen Dioxide* (74 FR 34404-34466). NESCAUM is the regional association of air pollution control agencies representing Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.

Since the last National Ambient Air Quality Standard (NAAQS) review for nitrogen dioxide (NO_2), new epidemiologic and toxicological data have supported the need for a short-term NO_2 standard and suggest that the current annual standard, without a supplemental short-term standard, may not be adequately protective of public health. In light of this evidence, the EPA Administrator and the Clean Air Scientific Advisory Committee (CASAC) have recognized the need for a short-term NO_2 standard. Furthermore, short-term NO_2 exposures (i.e., 30 minutes to 24 hours) have been linked to increased airway reactivity, worsened control of asthma, and increased incidences of respiratory illnesses and symptoms. Consequently, the current annual standard may not be adequate to protect the public health with an adequate margin of safety, particularly for asthmatics.

NESCAUM agrees that available health studies support strengthening the current NAAQS. Furthermore, NESCAUM agrees with EPA that concerns about near-roadway exposures to NO_2 warrant addressing the current lack of near-roadway NO_2 monitoring. NO_2 exposures near stationary sources such as diesel generators, industries, and airports, may cause similar concerns in some areas. The current void of near-roadway NO_2 measurements leaves much uncertainty regarding the relationship between near-roadway and area-wide NO_2 concentrations and the variability of near-roadway NO_2 levels due to atmospheric conditions (e.g., NO to NO_2 conversion rates influenced by ozone levels, temperature, humidity, etc.) as well as temporal (e.g., time of day, seasonal) and spatial (e.g., distance from road, height) factors. The lack of

near-roadway monitors also limits available data needed to develop direct exposure-health effects relationships for near-roadway exposures. Based upon the above, NESCAUM concludes that it is premature to establish a large near-roadway network until sufficient data are collected to address these uncertainties.

NESCAUM recommends that EPA and the states quickly establish a targeted monitoring program in selected urban areas to gather the data necessary to efficiently address both the monitor siting and health exposure uncertainties, given current resource constraints. Results can then be used to provide guidance for monitoring siting.

NESCAUM recommends that EPA establish a one-hour NO_2 NAAQS at a level no higher than 100 ppb, using the 99^{th} percentile option. The existing area-wide monitoring network should be used to identify initial nonattainment areas. Areas currently in compliance with the short-term NAAQS should be designated as unclassifiable until a near-roadway monitoring network is established.

More detailed comments are found in the sections that follow.

1. Primary NO_2 Standard

a. Level & Monitoring Locations

NESCAUM agrees with the EPA Administrator and CASAC determinations that the current NO_2 NAAQS should be strengthened. We further agree that near-roadway concentrations of NO_2 may be higher, on average, than concentrations away from roadways, and that roadway-associated environments could be responsible for short-term peak NO_2 exposures. We also concur with the EPA's assessment that concentrations near major roadways are dependent on local factors – such as traffic volume, meteorology, local topography, roadside features, and photochemical reactions – and that therefore peak NO_2 concentrations on or immediately adjacent to roads may be greater than concentrations monitored farther from the road. However, we would also like to suggest that maximum NO_2 concentrations may also occur in urban canyons, and, in certain situations, near stationary sources such as electric power plants (including peaking units), industrial facilities, and airports. Short-term concentrations of NO_2 near these sources may be the maximum concentrations in certain regions, rather than near roadways.

Current scientific studies clearly document that near-roadway exposures to air contaminants are a major public health concern. The scientific data included in this current NO_2 review, however, were based on area-wide monitoring data and exposures, not near-roadway studies. While the available data, particularly the epidemiological and the human exposure studies, demonstrate the need for a short term (e.g., one-hour) NO_2 standard, linking the level of the standard to near-roadways from area-wide monitoring data is not clear. At this time, we understand that there are no data that can link near-roadway and area-wide concentrations, nor are there data that can help

us understand the health effects of NO_2 exposures near major roadways. We urgently need data near major roadways to begin to understand the short-term health effects of NO_2 and how near-roadway exposures are correlated with area-wide concentrations. To this end, NESCAUM offers the following research questions:

- How do concentrations of near-roadway pollutants decrease with increasing distance from the road?
- Is NO_2 the primary pollutant of concern near roadways?
- How do near-roadway exposures correlate with neighborhood-scale exposures?

Without a deeper understanding of NO_2 concentrations near roadways and how near-roadway exposures correlate with area-wide concentrations, a near-roadway monitoring program may not be adequate to fully understand the spatial and temporal behavior of elevated NO_2 levels near roadways. NESCAUM strongly supports establishing a supplementary, targeted near-roadway monitoring network that would provide valuable data for assessing near-roadway exposure and health issues to be used in the next NO_2 NAAQS review in five years. This is elucidated in Section 4, below.

NESCAUM also strongly supports the need for near-roadway monitoring of several pollutants in addition to NO_2, such as adding robust near-roadway indicator measurements for black carbon and particle number concentration. Current scientific data clearly suggest that exposure to near-roadway pollution has health significant effects, but the causal pollutant(s) are unknown at this time.

NESCAUM agrees with the EPA Administrator and with the CASAC that the level of the proposed one-hour NO_2 standard should be no higher than 100 ppb. A short-term standard for NO_2 is imperative, since an annual standard is limited in its ability to protect sensitive populations (e.g., asthmatics) from short-term peak concentrations. Additionally, a short-term standard would help to protect the public health in areas near stationary sources that emit nitrogen oxides (NOx). We also agree with the EPA Administrator and the CASAC that the annual NO_2 standard of 53 ppb should be retained, provided that it is coupled with a short-term NO_2 standard.

b. Form of the NO_2 Standard

For the new one-hour NO_2 NAAQS, NESCAUM supports EPA's proposal to set the form of the standard as the three-year average of the 99^{th} percentile of the annual distribution of daily maximum one-hour average concentrations for determining NAAQS compliance with neighborhood-scale monitoring. Alternatively, if EPA elects to require NAAQS compliance monitoring near major roadways, NESCAUM supports the 98^{th} percentile of the annual distribution of the daily maximum one-hour average concentration, due to the high variability in near-roadway monitoring.

2. Public Health Messaging

EPA should update the Air Quality Index (AQI) to reflect a new short-term NO_2 NAAQS as expeditiously as possible. However, how a micro-scale near-roadway (e.g., within 50 meters or less of a roadway) concentration would be used in coordination with the AQI is unclear. The AQI is an important public health messaging service that has traditionally focused on protecting public health on a community-scale. It is not clear how this will be extended to include highly localized near-roadway exposures, and how areas would be identified for forecasting purposes. Furthermore, at this time state meteorologists cannot forecast near-roadway concentrations of NO_2.

3. Process Issues

NESCAUM notes that there was neither an EPA Staff Paper generated as part of the NO_2 NAAQS review, nor were there significant opportunities for the CASAC to discuss potential options prior to the issuance of the Notice of Proposed Rulemaking. These are critical resources that greatly assist us, given the wealth of scientific data that must factor into our deliberations. We recognize that this NAAQS review was initiated and conducted primarily under the aegis of the previous Administration. As such, it was implemented consistent with the NAAQS review process instituted by that Administration. EPA has since announced that it will change the NAAQS review process in the future. We support EPA's plans to reinstate the Staff Paper as well as re-engage the CASAC and allow for deliberations and recommendations to EPA prior to issuing the Notice of Proposed Rulemaking.

4. Monitoring Requirements

a. Network Configuration

EPA proposes to require the continued monitoring of area-wide NO_2 concentrations in Core Based Statistical Areas (CBSAs) with populations of one million or more. EPA also requests comments on two monitoring options: (1) a large network of compliance-oriented near-roadway NO_2 sites, resulting in the addition of 165 new NO_2 monitoring sites nationwide within 50 meters of major highways in cities with populations of 350,000 or more, and; (2) no near-roadway sites, with area-wide NO_2 monitoring supported with a tighter, more protective one-hour NO_2 NAAQS value in the range of 50–75 ppb. EPA has indicated its preference for Option 1 by including it in the proposed rule.

NESCAUM recommends that, for purposes of complying with the NO_2 NAAQS, area-wide monitoring sites be used and compliance with the NAAQS be based on exposures at that scale. If, however, EPA elects to require near-roadway NO_2 monitoring for NAAQS compliance, it should be tied to CBSA population thresholds of 2.5 million or greater, as discussed further below.

It is the NESCAUM states' position that, while near-roadway monitoring is important, not enough is known about the health effects of NO_2 and micro-scale near-roadway siting at this point in time. Due to our concern with near-roadway exposures, we urge that a supplementary and limited national pilot network of 10-15 sites be deployed that also measures other relevant near-roadway pollutants to assess exposure and siting issues. Chosen sites should be representative of different populations, highway configurations, vehicle types (e.g., percent of heavy duty diesel), industrial activities, land uses, and topographic characteristics throughout the country. This would provide the type of data needed prior to requiring larger near-roadway or other additional monitoring networks. Such near-roadway pilot sites should include additional highly time-resolved robust indicators of near-roadway pollution, such as black carbon, particle number concentration (for ultra-fine particles), and possibly trace CO and mobile source-related hydrocarbons (i.e., benzene, toluene, ethylbenzene, and xylenes (BTEX)) or non-methane total hydrocarbons (NMTHC), in addition to NO_2 and NOx. These indicator pollutants are essential to measure, as NO_2 by itself is not a robust near-roadway indicator pollutant. In fact, the majority of primary tailpipe NOx emissions is and will remain as nitric oxide (NO). While ozone rapidly oxidizes NO to NO_2, there is usually insufficient ozone to produce substantially elevated levels of NO_2 from this reaction in near-roadway exposure scenarios during morning rush hours, nighttime, and at least half of the year (during the non-ozone season).

If EPA proceeds with requiring a large near-roadway NO_2 network for NAAQS compliance purposes, NESCAUM states' support a larger CBSA population threshold than the 350,000 in the proposed regulation. Based on our concerns about the lack of a strong health-basis and limited air program resources, we support the use of a 2.5 million CBSA population threshold for near-roadway monitoring, consistent with EPA's proposed threshold for a second near-roadway NO_2 monitor in large CBSAs. Having a pair of near-roadway monitoring sites in each large urban area allows for a limited assessment of the potential for between-site variability, which is an important issue.

An additional component of any near-roadway monitoring would be to have a matching set of indicator pollutant measurements at area-wide sites. With some knowledge of the shape of the near-roadway indicator gradient from existing studies and the distance from the road for each site, this would also allow an estimate of the shape and extent of the near-roadway exposure gradient. Paired non-near-roadway measurements should be done at NCore[1] sites in order to avoid deploying additional intensive monitoring sites. Such work is also consistent with the goals of the NCore program.

Another rationale for enhancing near-roadway measurements is to assess the effects of significant mobile source control programs and future program needs. Rules regulating heavy-duty diesel engines, for example, will soon change the nature of near-roadway air pollution in

[1] EPA's NCore (National Core Multi-Pollutant Monitoring) Network objectives can be found at: http://www.epa.gov/ttnamti1/ncore/index.html.

many aspects not limited to NO_2. It is therefore important to assess these changes by deploying some ongoing longer term measurements of key near-roadway indicator pollutants to assess changes due to these mobile source programs and potential exposure impacts in an accountability framework.

b. Siting Parameters

A major concern with using a near-roadway NO_2 monitoring network for measurements is that there is little information on how to site monitors appropriately for characterizing near-roadway NO_2 exposures. In the proposal, EPA addresses distance from road and probe height. NESCAUM suggests that EPA constrain the proposed 50 meter limit for distance from the road, since the near-roadway signal drops off very rapidly with distance and is often nearly down to urban background by 100 meters. To allow estimation of the near-roadway gradient and to maximize comparability across sites, we recommend a range of 10 to 30 meters from the nearest active traffic lane.

NESCAUM is concerned about EPA's proposed microscale probe height range of two to seven meters, and supports a smaller range to minimize variation across sites. EPA needs to reconcile near-roadway NO_2 probe height requirements with the existing micro-scale near-roadway CO probe height requirement of 2.5 to 3.5 meters above prevailing terrain. NESCAUM supports using this existing height for all near-roadway pollution monitors, as it minimizes probe height effects on measurements, and allows for proper measurement of collocated particle number concentration (which requires a very short inlet, i.e., on the order of inches) and CO.

EPA's proposal does not address several important near-roadway siting variables. In addition to distance from roadway and probe height, roadway elevation relative to ground level terrain, traffic patterns (e.g., degree of congestion), prevailing wind speed and direction, and roadway vehicle type (e.g., percentage of heavy duty diesels), there are siting parameters that are more difficult to define, but should be addressed in any siting regulation to make the measurements comparable across cities and sites. At minimum, we recommend that EPA require near-roadway monitoring sites to be located on the predominately downwind side of the road.

NESCAUM does not support EPA's proposed requirement for three-dimensional sonic wind measurements at near-roadway sites. The existing three-dimensional sonic wind systems are not intended for long-term operation, especially in the harsh near-roadway environment. Unless there is a research component with indicator pollutants being measured that assess micro-scale horizontal and vertical gradients, these data would not provide sufficient value to justify the operational cost. A limited number of intensive research-grade sites would provide additional information for future network siting, but such intensive measurements would need specific funding.

c. Funding for Monitoring Networks

The NESCAUM states are concerned about resource constraints in the face of new monitoring requirements. As proposed, the near-roadway network monitoring sites would be expensive and inefficient to deploy. Siting of these monitors would be difficult, and the infrastructure required for each NO_2 monitor is substantial.

We are further concerned about near-roadway NO_2 network funding at a national scale. EPA estimates it would cost approximately $18 million to deploy its proposed network (at roughly $109,000 per site); this does not include operational costs of at least $10 million per year. In these challenging economic times, all state budgets are being reduced and it is becoming more and more difficult to sustain our existing air programs. States have no resources to fund this network. Additional air program funding must be added to cover the full cost of any additional monitoring.

5. Other Policy Considerations

The issues before EPA with regard to revising the NO_2 NAAQS are complex and challenging. Decisions about the form and level of the standard, monitoring requirements, and implementation policies are inextricably linked. Such dynamics are intensified with the introduction of a micro-scale approach, and the confounding factor that NO_2 is largely a secondary pollutant. In addition, should it be determined that an area is in nonattainment of the NO_2 NAAQS due to mobile source contributions, there are barriers that make it difficult for states to fully address the problem. Not only is it essential that EPA require consistency across the nation in siting NO_2 monitors, but it is critical that EPA be aware of the inherent disincentives facing states in siting monitors, and ensure that monitoring sites are appropriately chosen. Furthermore, should EPA require near-roadway monitoring, we urge that EPA issue guidance clarifying that such monitors would not be applicable for use in point source permit application analyses such as for New Source Review.

If you or your staff has any questions regarding the issues raised in this letter, please contact Paul Miller of NESCAUM at 617-259-2016.

Sincerely,

Arthur N. Marin
Executive Director

Cc: NESCAUM Directors
Lydia Wegman, EPA/OAQPS
Scott Jenkins, EPA/OAQPS
Richard Wayland, EPA/OAQPS
Lew Weinstock, EPA/OAQPS
Tim Watkins, EPA/ORD