ENVIRONMENTAL DEFENSE
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August 5, 2005

Dear Dr. Henderson and Clean Air Scientific Advisory Committee members,

Thank you for the time and effort you have invested in reviewing the PM NAAQS and in particular for the extra attention you are paying to the $PM_{10-2.5}$ issue. We greatly appreciate your consideration of the following comments on EPA staffs' recommendation to set an urban $PM_{10-2.5}$ standard. These comments are submitted on behalf of more than 400,000 members of Environmental Defense.

In your June 6, 2005 comments on the Draft Staff Paper, you stated that "the Panel agreed that a 24-hour NAAQS for $PM_{10-2.5}$ was appropriate, especially in urban areas, with caveats to make exceptions for *those types of rural dusts thought to have low toxicity*. (Emphasis added.) Environmental Defense strongly supports your recommendation that EPA set a standard for $PM_{10-2.5}$ to protect Americans from the serious health effects that are associated with breathing coarse mode particles. We further appreciate the concern that your recommendation reflects for focusing resources and regulatory efforts on the most toxic components of PM. However, EPA's proposal to designate the $PM_{10-2.5}$ standard as an urban-only standard, exempting rural areas, is a deeply flawed approach for addressing this goal. All of the components of coarse PM that the Staff Paper found to be associated with health impacts – including metals, transition elements, polycyclic aromatic hydrocarbons, biological factors and fly ash – can also be found in rural areas, which do not lack for traffic, industrial sources, coal and oil combustion, biomass burning, or waste incineration. The 100,000 population cutoff that EPA has proposed for where the $PM_{10-2.5}$ standard would apply lacks a scientific basis, and represents an inadequate scheme for setting a National Ambient Air Quality Standard.

We urge you to recommend that EPA establish a $PM_{10-2.5}$ standard that will protect all Americans, regardless of where they live. Once such a standard has been established, EPA can use its discretion to waive $PM_{10-2.5}$ exceedances that are shown to have low toxicity based on their composition or source of origin.

The proposed urban-only $PM_{10-2.5}$ standard could leave millions of Americans unprotected from the negative health effects associated with coarse particles.

We believe the scientific evidence associating $PM_{10-2.5}$ with harmful health effects supports the designation of a new short term $PM_{10-2.5}$ standard to accompany the new $PM_{2.5}$ standard. However, we have strong concerns that EPA's proposal to create an urban-only $PM_{10-2.5}$ standard will lead to increased rural population exposures to harmful air pollution with attendant adverse health outcomes. The change proposed in EPA's Staff Paper would apparently eliminate NAAQS protections for particles greater than 2.5

microns in diameter for communities with a population of less than 100,000.[1] According to U.S. Census data from 2003, approximately 46 million Americans live outside Core Based Statistical Areas with populations of 100,000 or more.[2] The distinction EPA staff have made between "urban" and "rural" is arbitrary; there is no standard or rationale that establishes a population size of 100,000 as a meaningful cutoff in terms of specific air pollutants. This cutoff excludes, for example, Indio, CA (2004 pop. 63,000), which was the site of the Coachella Valley study that the Staff Paper cites as providing some of the strongest evidence for an association between $PM_{10-2.5}$ and mortality.[3]

In the Second Draft Staff Paper, EPA estimated that 36.1 million people live in areas where 98th percentile 24-h $PM_{10-2.5}$ concentrations exceed 60 $\mu g/m^3$ (the middle of the recommended range for what was then meant to be a nationally applicable standard); according to the final Staff Paper, only 22.7 million of them would be covered by an urban $PM_{10-2.5}$ standard.[4]

Substantial evidence indicates that rural $PM_{10-2.5}$ is associated with negative health impacts.

EPA's proposal is flawed in the first place because rural particles are not generally pure crustal material but rather are commonly contaminated with the same toxic components as particles found in urban areas.[5] The toxicological evidence cited in the

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[1] Environmental Protection Agency. (2005) Review of the National Ambient Air Quality Standards for Particulate Matter: Policy Assessment of Scientific and Technical Information – Final OAQPS Staff Paper. Available: http://www.epa.gov/ttn/naaqs/standards/pm/data/pmstaffpaper_20050630.pdf [June, 2005]. 5-59.

[2] U.S. Census Bureau, Population Division. Table 1: Annual Estimates of the Population of Metropolitan and Micropolitan Statistical Areas: April 1, 2000 to July 1, 2003 (CBSA-EST2003-01). Internet release date: June 7, 2005.

[3] Environmental Protection Agency. (2005) Review of the National Ambient Air Quality Standards for Particulate Matter: Policy Assessment of Scientific and Technical Information – Final OAQPS Staff Paper. 5-49.

Ostro, B. D.; Broadwin, R.; Lipsett, M. J. (2000) Coarse and fine particles and daily mortality in the Coachella Valley, CA: a follow-up study. J. Exposure Anal. Environ. Epidemiol. 10:412-419.

Ostro, B. D.; Broadwin, R.; Lipsett, M. J. (2003) Coarse particles and daily mortality in Coachella Valley, California. In: Revised analyses of time-series studies of air pollution and health. Special report. Boston, MA: Health Effects Institute; pp. 199-204. Available: http://www.healtheffects.org/Pubs/TimeSeries.pdf [18 October, 2004].

[4] Environmental Protection Agency. (2005) Review of the National Ambient Air Quality Standards for Particulate Matter: Policy Assessment of Scientific and Technical Information – Second Draft OAQPS Staff Paper. Available: http://www.epa.gov/ttn/naaqs/standards/pm/data/pm_staff_paper_2nddraft.pdf [January, 2005]. 5-70.

Environmental Protection Agency. (2005) Review of the National Ambient Air Quality Standards for Particulate Matter: Policy Assessment of Scientific and Technical Information – Final OAQPS Staff Paper. 5B-5.

[5] See for example:

Eleftheriadis, K., Colbeck, I. (2001) Coarse atmospheric aerosol: size distributions of trace elements. Atmos. Environ. 35(31):5321-5330.

Horvath, H., et al. (1996) The size distribution and composition of the atmospheric aerosol at a rural and nearby urban location. J. Aerosol Sci. 27(3):417-435.

staff paper for viewing "rural" $PM_{10-2.5}$ as benign, on the other hand, is limited to studies with Mt. St. Helens volcanic ash (CD 7-216), which is not relevant to the contaminated coarse PM that is found in many rural as well as urban areas. Moreover, the few epidemiological studies that EPA cites for the assertion that crustal PM is not associated with premature morbidity[6] are countered by investigations like the Coachella Valley study, which found a significant association between mortality and $PM_{10-2.5}$ that was predominantly crustal in origin.[7]

Even stronger evidence supports concerns about morbidity effects of rural particles. Some studies of short-term morbidity, such as exacerbation of heart disease, COPD, asthma and respiratory admissions, suggest an equal or greater effect from coarse particles compared to fine particles.[8] Toxicological studies indicate that part of the effect on respiratory health may be associated with endotoxin content,[9] which may commonly be higher in rural particles than urban ones. Endotoxin concentrations are very high in dust samples associated with rural anthropogenic sources, including grain elevators, pig, chicken and dairy farms, and slaughter houses.[10]

Milford, J.B., Davidson, C.I. (1985) The sizes of particulate trace elements in the atmosphere – a review. J. Air Pollution Control Assoc. 35(12)1249-1260.

Offenberg, J.H., Baker, J.E. (2000) Aerosol size distributions of elemental and organic carbon in urban and over-water samples. Atmos. Environ. 34:1509-1517.

Offenberg, J.H., Baker, J.E. (2000) Aerosol size distributions of polycyclic aromatic hydrocarbons in urban and over-water atmospheres. Environ. Sci. Technol. 33:3324-3331.

Paode, R.D., Sofuoglu, S.C., Sivadechathep, J., Noll, K.E., Holsen, T.M., Keeler, G.J. (1998) Dry deposition fluxes and mass size distributions of Pb, Cu, and Zn measured in Southern Lake Michigan during AEOLOS. Environ. Sci. Technol., 32(11): 1629-1635.

Poster, D.L., Hoff, R.M., Baker, J.E. (1995) Measurement of the particle size distributions of semivolatile organic contaminants in the atmosphere. Environ. Sci. Technol. 29:1990-1997.

[6]Schwartz, J.; Norris, G.; Larson, T.; Sheppard, L.; Claiborne, C.; Koenig, J. (1999) Episodes of high coarse particle concentrations are not associated with increased mortality. Environ. Health Perspect. 107: 339-342.

Laden, F.; Neas, L. M.; Dockery, D. W.; Schwartz, J. (2000) Association of fine particulate matter from different sources with daily mortality in six U.S. cities. Environ. Health Perspect. 108: 941-947.

Mar, T. F.; Norris, G. A.; Koenig, J. Q.; Larson, T. V. (2000) Associations between air pollution and mortality in Phoenix, 1995-1997. Environ. Health Perspect. 108:347-353.

Tsai, F. C.; Apte, M. G.; Daisey, J. M. (2000) An exploratory analysis of the relationship between mortality and the chemical composition of airborne particulate matter. Inhalation Toxicol. 12(suppl.): 121-135.

[7] Ostro, B. D.; Broadwin, R.; Lipsett, M. J. (2000) Coarse and fine particles and daily mortality in the Coachella Valley, CA: a follow-up study. J. Exposure Anal. Environ. Epidemiol. 10:412-419.

Ostro, B. D.; Broadwin, R.; Lipsett, M. J. (2003) Coarse particles and daily mortality in Coachella Valley, California. In: Revised analyses of time-series studies of air pollution and health. Special report. Boston, MA: Health Effects Institute; pp. 199-204. Available: http://www.healtheffects.org/Pubs/TimeSeries.pdf [18 October, 2004].

[8] Brunkreef, B.; Forsberg, F. (2005) Epidemiological evidence of effects of coarse airborne particles on health. Eur. Respir. J. 26:309-318.

[9] Id.

[10] American Thoracic Socieity (1998) Respiratory Health Hazards in Agriculture. Am. J. Respir. Care Med. 158:S1-S76.

While epidemiological studies of health effects from ambient pollution levels will be difficult to ever conduct in rural areas because of limited population sizes, there is extensive evidence of occupational risk due to exposure to PM from primarily "rural" sources, including agricultural and mining activities.[11] EPA dismisses this occupational health information as "not relevant" for lower level community exposures, but given the potency of biological factors such as endotoxin, there may well be a continuum of effects. Rural $PM_{10-2.5}$ is more apt than urban $PM_{10-2.5}$ to contain pesticides, molds, spores, bacteria and mycotoxins associated with agricultural activity and crystalline minerals associated with mining activity; EPA has not adequately addressed these concerns.

EPA already has mechanisms for exempting natural PM_{10} from consideration and similar mechanisms could be applied to $PM_{10-2.5}$.

EPA already has longstanding policies of exempting purely crustal or natural PM_{10} from consideration through its natural and exceptional events and wildfire emissions policies.[12] Under these policies, exceedances of the PM_{10} NAAQS are disregarded when circumstances indicate that the exceedance was due to a natural event such as a fire, volcanic eruption or dust storm, or due to an unusual event that is difficult to control and unlikely to be repeated. Section 188(f) of the Clean Air Act similarly allowed EPA to waive requirements applicable to serious PM_{10} nonattainment areas upon concluding that anthropogenic sources do not contribute significantly to the standard violation. Moreover, most states exempt many agricultural activities from air pollution regulations. Similar policies could be applied to $PM_{10-2.5}$.

An exemption or waiver policy would be highly preferable to an urban NAAQS, because with a waiver and exemption policy, rural communities or sources facing potential regulation would have an incentive to analyze $PM_{10-2.5}$ chemical composition and conduct source attribution studies. A waiver policy would also be appropriately based on a presumption that favors health protection for rural communities. In contrast, EPA's proposal to designate a $PM_{10-2.5}$ standard for urban areas only provides the wrong incentive, as it would discourage monitoring in rural areas rather than encouraging it.

An urban-only $PM_{10-2.5}$ standard could eliminate protection that currently exists from major industrial sources of $PM_{10-2.5}$ in rural areas.

While this outcome would be gravely misguided, an urban-only $PM_{10-2.5}$ standard could lead to weaker controls on industrial sources of $PM_{10}/PM_{10-2.5}$ in rural areas. The Staff Paper does not explain what might happen to the Prevention of Significant Deterioration program for PM in rural "attainment" areas if the $PM_{10-2.5}$ standard is defined as an urban-only standard. However, if the PM_{10} NAAQS is rescinded and an

[11] See for example, American Thoracic Society (1998) Respiratory Health Hazards in Agriculture. Am. J. Respir. Care Med. 158:S1-S76.

[12] Nichols, M.D., Areas Affected by Natural Events, May 30, 1996; EPA, Guideline on the Identification and Use of Air Quality Data Affected by Exceptional Events, July 1986; EPA, Interim Air Quality Policy on Wildland and Prescribed Fires, April 23, 1998.

urban $PM_{10-2.5}$ standard is simply deemed not to apply, rural areas could lose current PSD protections, including Best Available Control Technology (BACT) requirements for PM_{10} from industrial sources. Regardless of how EPA interprets the change, rural sources that emit $PM_{10-2.5}$ might well seek relief from BACT control requirements, if this category of PM is viewed as exonerated based arbitrarily on location.

Without a complementary national standard for PM greater than 2.5 microns in diameter, a $PM_{2.5}$ standard alone would not necessarily ensure that industrial sources in rural areas are controlled. At present, in fact, there are no PSD provisions in effect for $PM_{2.5}$. Even if EPA promulgates PSD regulations for $PM_{2.5}$, they would not necessarily encompass all sources that are currently subject to BACT requirements for PM_{10}, because size cut-offs for BACT applicability are 100 tons per year for listed source categories and 250 tons per year for other sources, regardless of the PM indicator. EPA's AP-42 size distribution data indicate that emissions in the $PM_{10-2.5}$ size range comprise a significant fraction of uncontrolled PM_{10} emissions from sources commonly found in rural areas. These sources include coal combustion (40-74% $PM_{10-2.5}$), paper mills (11-38% $PM_{10-2.5}$), hot mix asphalt plants (80-94% $PM_{10-2.5}$), and portland cement manufacturing (57-94% $PM_{10-2.5}$).[13] A significant amount of $PM_{10-2.5}$ could be emitted from these sources before BACT requirements would be triggered by their $PM_{2.5}$ emissions.

To ensure that existing protections for rural communities are not weakened, CASAC should make very clear that any exceptions made for "rural dusts thought to have low toxicity" should not extend to $PM_{10-2.5}$ produced from industrial sources that happen to be located in rural areas.

Conclusion

Environmental Defense deeply appreciates the CASAC's significant contributions to the scientific basis of the nation's NAAQS. We strongly encourage you to advise the EPA to avoid arbitrary exclusions to coverage by PM standards based on community population. Thank you for your attention to our concerns.

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[13] EPA Emissions Factors & AP42, Volume 1, Edition 5. Jan 1995. Available at www.epa.gov/ttn/chief/ap42.