

CLR-34 Neighborhoods Assn.

# VII. Addendum B: Health Impacts of Particulates

USR15-0027

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The following document from the US EPA describes some of the issues relating to the health impacts of small particle pollution. This issue is particularly relevant because of the large amount of fugitive dust that will be generated by the proposed operations. Even though a cloud of dust is dispersed as it is carried by the wind, the particulates do not simply disappear. Rather, they become even more insidious, as their lack of visibility may generate a false sense of safety.

There are numerous publications regarding this risk. At this point in time, it's becoming clear that even the EPA's enforcement levels are not likely to completely protect our citizens' health, especially the young and the elderly. In fact, a recent publication from the Harvard School of Public Health<sup>1</sup> indicates that the danger of exposure to PM<sub>2.5</sub> is present well below the current annual exposure limit of 12 mg/m<sup>3</sup>. The conclusions of that article state:

"In conclusion, the acute and chronic effects of low-concentration PM<sub>2.5</sub> were examined for Medicare population using a comprehensive exposure dataset from a satellite-based prediction model. Our findings show that both short- and long-term exposure to PM<sub>2.5</sub> were associated with all-cause mortality, even for exposure levels not exceeding the newly revised EPA standards, suggesting that adverse health effects occur at low levels of fine particles. The policy implication is that improving the air quality below the current EPA standards can still yield health benefit."

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<sup>1</sup> "Low Concentration PM<sub>2.5</sub> and Mortality: Estimating Acute and Chronic Effects in a Population-Based Study", Shi et al., Environmental Health Perspectives, To be published. <http://dx.doi.org/10.1289/ehp.1409111>

## REVISED AIR QUALITY STANDARDS FOR PARTICLE POLLUTION AND UPDATES TO THE AIR QUALITY INDEX (AQI)

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On Dec. 14, 2012 the U.S. Environmental Protection Agency (EPA) strengthened the nation's air quality standards for fine particle pollution to improve public health protection by revising the primary annual PM<sub>2.5</sub> standard to 12 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) and retaining the 24-hour fine particle standard of 35  $\mu\text{g}/\text{m}^3$ . Exposure to fine particle pollution can cause premature death and harmful cardiovascular effects such as heart attacks and strokes, and is linked to a variety of other significant health problems. Particle pollution also harms public welfare, including causing haze in cities and some of our nation's most treasured national parks.

EPA has issued a number of rules that will make significant strides toward reducing fine particle pollution (PM<sub>2.5</sub>). These rules will help the vast majority of U.S. counties meet the revised PM<sub>2.5</sub> standard without taking additional action to reduce emissions.

### AIR QUALITY STANDARDS

- The Clean Air Act requires EPA to set two types of outdoor air quality standards: *primary standards*, to protect public health, and *secondary standards*, to protect the public against adverse environmental effects. The law requires that primary standards be "requisite to protect public health with an adequate margin of safety," including the health of people most at risk from PM exposure. These include people with heart or lung disease, children, older adults and people of lower socioeconomic status. Secondary standards must be "requisite to protect the public welfare" from both known and anticipated adverse effects.

### Standards to Protect Public Health

- EPA reviewed thousands of studies as part of this review of the standards, including hundreds of new studies published since EPA completed the last review in 2006. The new evidence includes more than 300 new epidemiological studies, many of which report adverse health effects even in areas that meet the current PM<sub>2.5</sub> standards. EPA also considered analyses by agency experts, input from the independent Clean Air Scientific Advisory Committee (CASAC) and extensive public comments.
- In addition, the agency conducted a provisional review of significant new studies, including studies submitted during the public comment period on the proposed standards. New studies continue to report a wide range of health effects associated with both long- and short-term exposures to PM<sub>2.5</sub>.

## Primary (Health) Standards for Fine Particles:

- EPA has set both an annual and a 24-hour standard for PM<sub>2.5</sub>. These standards work together to protect public health from harmful health effects from both long- and short-term fine particle exposures.
- **Revised annual standard:** The primary annual fine particle standard is designed to protect against health effects associated with both long- and short- term exposure to PM<sub>2.5</sub>. The existing annual standard has been in place since 1997.
  - **EPA has determined that the current annual fine particle standard (set in 1997) is not adequate** to protect public health as required by law.
  - **The agency is strengthening the annual fine particle standard** by revising the level from the current level of 15.0 micrograms per cubic meter (µg/m<sup>3</sup>) to 12.0 µg/m<sup>3</sup>. An area will meet the standard if the three-year average of its annual average PM<sub>2.5</sub> concentration (at each monitoring site in the area) is less than or equal to 12.0 µg/m<sup>3</sup>.
  - As part of EPA's commitment to transparent, open government, EPA sought and received extensive public input on this standard, which provides critical health protection to tens of millions of Americans. The agency held two public hearings and received more than 230,000 public comments on the proposal.
- **Retained 24-hour standard:** The primary 24-hour fine particle standard is designed to work with the annual standard to provide supplemental health protection against short-term fine particle exposures, particularly in areas with high peak PM<sub>2.5</sub> concentrations. The current 24-hour PM<sub>2.5</sub> standard was issued in 2006.
  - **EPA is retaining the existing 24-hour fine particle standard, at 35 µg/m<sup>3</sup>**. An area meets the 24-hour standard if the 98th percentile of 24-hour PM<sub>2.5</sub> concentrations in one year, averaged over three years, is less than or equal to 35 µg/m<sup>3</sup>.

## Primary (Health) Standard for Coarse Particles

- Studies suggest that short-term exposure to coarse particles (PM<sub>10</sub>) may be linked to premature death and increased hospital admissions and emergency department visits for heart and lung disease.
- EPA is retaining the existing primary 24-hour standard for coarse particles at 150 µg/m<sup>3</sup>. An area meets the 24-hour PM<sub>10</sub> standard if it does not exceed the 150 µg/m<sup>3</sup> level more than once per year on average over a three-year period.

- The existing coarse particle standard has been in place since 1987.

### **Secondary Standards for Particle Pollution:**

- Particle pollution causes haze in cities and some of the country's most treasured national parks. In addition, particles such as nitrates and sulfates contribute to acid rain formation which makes lakes, rivers and streams unsuitable for many fish. Acid rain also erodes buildings, historical monuments and paint on cars. Particle pollution also can affect the climate by absorbing or reflecting sunlight, contributing to cloud formation and influencing rainfall patterns.
- EPA is retaining the levels of the existing secondary standards for PM<sub>2.5</sub> and PM<sub>10</sub> to address PM-related effects such ecological effects, damage to materials and climate impacts. Those standards are: an annual PM<sub>2.5</sub> standard of 15.0 µg/m<sup>3</sup>; a 24-hour PM<sub>2.5</sub> standard of 35 µg/m<sup>3</sup>; and a 24-hour standard of 150 µg/m<sup>3</sup> for PM<sub>10</sub>.
- The agency is relying on the existing secondary 24-hour PM<sub>2.5</sub> standard to protect against visibility impairment, and is not finalizing the separate standard to protect visibility that EPA proposed in June 2012.
  - EPA had proposed to add a separate secondary 24-hour standard for fine particles to protect visibility in urban areas. The agency proposed two alternative levels for that standard: 30 deciviews or 28 deciviews. A deciview is a yardstick for measuring visibility: the higher the deciview level, the hazier the air appears.
  - In today's rule, EPA is determining that 30 deciviews is the appropriate target level of protection for a visibility index with a 24-hour averaging time. However, after reviewing public comment on the proposal and further analyzing recent air quality monitoring data, the agency has concluded that the current secondary 24-hour PM<sub>2.5</sub> standard will provide visibility protection equal to, or greater than, 30 deciviews.

### **REVISIONS TO THE AIR QUALITY INDEX**

- EPA is updating the Air Quality Index (AQI) for fine particle pollution (PM<sub>2.5</sub>). The AQI is EPA's color-coded tool for telling the public how clean or polluted the air is, and steps they can take to reduce their daily exposure to pollution.
- The AQI converts concentrations for fine particles to a number on a scale from 0 to 500. EPA is changing the upper end of the range for the "Good" AQI category (an index value of 50) by setting it at the level of the revised annual PM<sub>2.5</sub> standard (12.0µg/m<sup>3</sup>).

- EPA also is setting the 100 value of the index at the level of the current 24-hour PM<sub>2.5</sub> standard, which is 35 µg/m<sup>3</sup>. An AQI of 100 is the upper end of the “Moderate” range, and the level above which EPA begins cautioning at-risk groups. In addition, EPA is setting the upper end of the “Unhealthy for Sensitive Groups” range (AQI of 150) at 55 µg/m<sup>3</sup>.
- EPA is retaining the existing level of 500 µg/m<sup>3</sup> for the upper end of the “Hazardous” category (AQI of 500). The agency also is retaining the existing levels of 150 µg/m<sup>3</sup> and 250 µg/m<sup>3</sup> for the upper ends of the “Unhealthy” (AQI of 200) and “Very Unhealthy” (AQI of 300) categories.
- The updates to the AQI take effect on the effective date of today’s rule, which is 60 days after publication in the Federal Register.
- The revised AQI breakpoints are outlined in the table below:

AQI Category	Index Values	Previous Breakpoints (1999 AQI) (µg/m <sup>3</sup> , 24-hour average)	Revised Breakpoints (µg/m <sup>3</sup> , 24-hour average)
<b>Good</b>	0 - 50	0.0 - 15.0	0.0 – 12.0
<b>Moderate</b>	51 - 100	>15.0 - 40	12.1 – 35.4
<b>Unhealthy for Sensitive Groups</b>	101 – 150	>40 – 65	35.5 – 55.4
<b>Unhealthy</b>	151 – 200	> 65 – 150	55.5 – 150.4
<b>Very Unhealthy</b>	201 – 300	> 150 – 250	150.5 – 250.4
<b>Hazardous</b>	301 – 400	> 250 – 350	250.5 – 350.4
	401 – 500	> 350 – 500	350.5 – 500

## BACKGROUND

- EPA has regulated particle pollution since 1971. The agency has revised the standards three times -- in 1987, 1997 and 2006 – to ensure they continue to protect public health and welfare. A [table of historical PM standards](http://www.epa.gov/ttn/naags/standards/pm/s_pm_history.html) is available at [http://www.epa.gov/ttn/naags/standards/pm/s\\_pm\\_history.html](http://www.epa.gov/ttn/naags/standards/pm/s_pm_history.html))

- The Clean Air Act requires EPA to review national air quality standards every five years to determine whether they should be retained or revised.
- The revisions to the primary annual PM<sub>2.5</sub> standard is a result of that regularly scheduled review. EPA proposed to revise the PM standards on June 14, 2012 under a court-ordered deadline.
  - In February 2012, the American Lung Association and the National Parks Conservation Association sued EPA for not completing the review of the standards within five years -- by October 2011. The states of California, Connecticut, Delaware, Maryland, Massachusetts, New Mexico, New York, Oregon, Rhode Island, Vermont and Washington filed a separate suit.
  - In June 2012, a federal judge issued a preliminary injunction ordering EPA to issue a proposal by June 14, 2012.
  - EPA and the litigants in the deadline lawsuit entered into a consent decree that required EPA to issue final standards by Dec. 14, 2012.
- EPA's final decisions on the PM standards also respond to a court remand of portions of the 2006 decision on the PM standards.
  - In February 2009, the U.S. Court of Appeals for the D.C. Circuit remanded the primary annual PM<sub>2.5</sub> standard and the secondary PM<sub>2.5</sub> standards to the agency.
    - For the primary annual PM<sub>2.5</sub> standard, the Court concluded that EPA had failed to adequately explain how the standard was sufficient to protect the public health with an adequate margin of safety, as the Clean Air Act requires.
    - For the secondary PM<sub>2.5</sub> standards, the Court said EPA had failed to adequately explain why the secondary standards provided the required protection from visibility impairment. The Court also said EPA had failed to identify a target level of visibility impairment that would be requisite to protect public welfare
    - The Court upheld EPA's decisions on the PM<sub>10</sub> standards.
    - EPA's decisions on the 24-hour primary PM<sub>2.5</sub> standards were not challenged.

**FOR MORE INFORMATION:**

- To read today's final rule, visit <http://www.epa.gov/airquality/particlepollution/actions.html>
- For technical documents related to this review of the standards, visit [http://www.epa.gov/ttn/naags/standards/pm/s\\_pm\\_index.html](http://www.epa.gov/ttn/naags/standards/pm/s_pm_index.html)