

**FACT SHEET  
FINAL REVISIONS TO THE  
NATIONAL AMBIENT AIR QUALITY STANDARDS FOR LEAD**

**SUMMARY OF ACTION**

- On October 15, 2008, EPA substantially strengthened the national ambient air quality standards (NAAQS) for lead. The revised standards are 10 times tighter than the previous standards and will improve health protection for at-risk groups, especially children.
- EPA has revised the level of the primary (health-based) standard from 1.5 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), to  $0.15 \mu\text{g}/\text{m}^3$ , measured as total suspended particles (TSP). EPA has revised the secondary (welfare-based) standard to be identical in all respects to the primary standard.
- Scientific evidence about lead and health has expanded dramatically since EPA issued the initial standard of  $1.5 \mu\text{g}/\text{m}^3$  in 1978. More than 6,000 new studies on lead health effects, environmental effects and lead in the air have been published since 1990. Evidence from health studies shows that adverse effects occur at much lower levels of lead in blood than previously thought.
- Children are particularly vulnerable to the effects of lead. Exposures to low levels of lead early in life have been linked to effects on IQ, learning, memory, and behavior. There is no known safe level of lead in the body.
- EPA estimates that the revised standards will yield health benefits valued between \$3.7 billion and \$6.9 billion. The benefits reflect an expected increase in lifetime earnings as a result of avoiding IQ loss. The agency estimates costs of implementing the standards at approximately \$150 million to \$2.8 billion.
- In conjunction with strengthening the lead NAAQS, EPA is improving the existing lead monitoring network by requiring monitors to be placed in areas with sources such as industrial facilities that emit one ton or more per year (tpy) of lead and in urban areas with more than 500,000 people.
- Also as part of this notice, EPA describes the approach for implementing the revised standards and provides an implementation timeline.

**REVISIONS TO THE STANDARDS**

*Primary (Health) Standard*

- Based on a review of the full body of evidence, EPA has determined that the 1978 standard of  $1.5\mu\text{g}/\text{m}^3$  is not sufficient to protect public health with an adequate margin of safety.
- The Agency is revising the level of the standard to  $0.15\mu\text{g}/\text{m}^3$  to provide increased protection for at-risk populations against a variety of adverse health effects, most notably effects on the developing nervous system.
- Like the 1978 standard, the new standard will be measured as the concentration of lead in TSP, reflecting evidence that lead particles of all sizes pose potential health risks.

### ***Secondary (Welfare) Standard***

- To provide increased protection against lead-related welfare effects, EPA is revising the current secondary standard to be identical to the proposed primary standard.
- A significant number of new studies have been conducted since 1978 that associate lead pollution with adverse effects on organisms and ecosystems. However, there was not enough evidence linking various effects to specific levels of lead in the air for EPA to select a different level for the secondary lead standard at this time.

## **DETERMINING COMPLIANCE WITH THE STANDARDS**

- EPA has revised the averaging time and form of the lead NAAQS. These are the air quality statistics that are compared to the level of the standards to determine whether an area meets or violates the standards.
- EPA changed the calculation method for the averaging time to use to ‘rolling’ three-month period with a maximum (not-to-be-exceeded) form, evaluated over a three-year period. This replaces the current approach of using calendar quarters. A rolling three-month average considers each of the 12 three-month periods associated with a given year, not just the four calendar quarters within that year.

## **LEAD AIR QUALITY MONITORING**

- EPA is redesigning the lead monitoring network to assess compliance with the revised the lead standards.
  - EPA will require state and local monitoring agencies to conduct monitoring taking into account lead sources that are expected to, or have been shown to, exceed the standards. At a minimum, monitors must be placed in areas with sources of lead emissions greater than or equal to one ton or more per year, to measure the maximum concentration.

- EPA also will require a monitor to be operated in each of the 101 urban areas with populations greater than 500,000 to gather information on the general population's exposure to lead in air and ensure protection against sources of airborne dust containing lead.
- EPA Regional Administrators may waive the source-oriented monitoring requirements if the monitoring agency can demonstrate that emissions from the source will not contribute to maximum air lead concentrations greater than 50 percent of the revised standard, or  $0.075 \text{ ug/m}^3$ .
- EPA estimates that 236 new or relocated monitoring sites will be necessary to satisfy these monitoring requirements. Approximately half of all newly required monitors are to be operational by January 1, 2010, with the other half of the monitors operational by January 1, 2011. In addition, some existing lead monitors will be left in place and will continue to be used as part of the lead monitoring network.
- EPA is requiring lead to be monitored as lead in total suspended particles (TSP). The Agency will allow the use of lead-PM<sub>10</sub> monitors instead of lead-TSP monitors under certain limited circumstances: where lead is not expected to occur as large (ultra-coarse) particles; and where three-month average lead concentrations are not expected to be greater than or equal to  $0.10 \text{ } \mu\text{g/m}^3$ .
  - If a lead-PM<sub>10</sub> monitor measures three-month average levels greater than or equal to  $0.10 \text{ } \mu\text{g/m}^3$ , then that monitoring agency must install and operate a lead-TSP monitor within six months
  - Lead- PM<sub>10</sub> measurements greater than the NAAQS are considered to be in violation of the standards.

## **IMPLEMENTING THE STANDARDS**

- In this notice, the Agency is describing its approach for implementing the revised lead standards.
- For counties with violating monitors, EPA will use the county boundary as the expected boundary for nonattainment areas. The Agency will consider adjustments to that boundary on a case-by-case basis.
- EPA is not establishing classifications for nonattainment areas based on the severity of lead violations.
- The Agency will retain the 1978 lead NAAQS until one year after designations for the new standards, except in current nonattainment areas. In those areas, EPA will retain the 1978

standard until the area submits, and EPA approves, attainment and/or maintenance demonstrations for the new standards. This will ensure continuous public health protection.

#### *Estimated Timeline for Implementing Revised Standards*

- States are required to make recommendations for areas to be designated attainment, nonattainment, or unclassifiable by October 2009. If tribes choose to submit recommendations, they must also provide them to EPA by October 2009.
- Final designations of all attainment, nonattainment and unclassifiable areas will be effective no later than January 2012. However, EPA intends to complete initial designations as soon as possible where data are sufficient from existing monitoring network.
- States are required to submit State Implementation Plans outlining how they will reduce pollution to meet the standards no later than June 2013.
- States are required to meet the standards no later than January 2017.

## **LEAD AND PUBLIC HEALTH**

- Lead that is emitted into the air can be inhaled or, after it settles out of the air, can be ingested. Ingestion of lead that has settled onto surfaces is the main route of human exposure to lead originally released into the air.
- Once in the body, lead is rapidly absorbed into the bloodstream and results in a broad range of health effects.
- Children are most vulnerable to the damaging effects of lead because they are more likely to ingest lead due to hand-to-mouth activity and their bodies are developing rapidly.
- No safe level of lead in the blood has been identified.
- Effects in children include:
  - Effects on the developing nervous system including the brain. This can lead to IQ loss, poor academic achievement, permanent learning disabilities, and delinquent behavior. The effects can generally persist into early adulthood and can affect lifetime education and achievement.
  - Damage to red blood cells
  - Weakened immune system
- Effects in adults include:
  - Increased blood pressure
  - Cardiovascular disease
  - Decreased kidney function

## **HEALTH BENEFITS AND COSTS**

- The Clean Air Act prohibits EPA from considering costs in setting or revising National Ambient Air Quality Standards. To inform the public, the Agency analyzes the benefits and costs of meeting the standards as required by Executive Order 12866 and guidance from the White House Office of Management and Budget.
- To estimate the costs of meeting the final NAAQS, EPA analyzed the cost of using both existing controls and controls that may be developed in the future for reducing lead from industrial sources.
- EPA estimates that at full implementation of the final lead NAAQS in 2016, the costs in that year will be approximately \$150 million to \$2.8 billion.
- To estimate the benefits of meeting the revised lead standards, EPA used peer-reviewed studies of health and welfare effects, and peer-reviewed studies of the dollar values of public health improvements.
- EPA calculated the benefits of avoiding IQ loss for children under age seven that would result from a revised lead NAAQS. Because expected lifetime earnings are related to IQ, we describe benefits as an expected increase in lifetime earnings at full implementation of the NAAQS in 2016. The estimate also includes co-benefits associated with other health improvements expected to occur as a result of fine particulate matter reductions resulting from controls applied to reduce lead levels. EPA estimates the revised standards will yield benefits between \$3.8 billion to \$6.9 billion.

## **BACKGROUND**

- The Clean Air Act requires EPA to set national ambient air quality standards (NAAQS) for “criteria pollutants,” which include lead, ozone, nitrogen oxides, carbon monoxide, sulfur oxides, and particulate matter. The law also requires EPA to periodically review the standards and revise them if appropriate to ensure that they provide the requisite amount of health and environmental protection.
- In response to a case filed by the Missouri Coalition for the Environment, the U.S. District Court for the Eastern District of Missouri in September 2005 ordered EPA to complete the lead NAAQS review by Sept. 1, 2008. The court agreed on April 29, 2008 to extend the deadline for signature of the final rule until Sept. 15, 2008. The court agreed on July 1, 2008 to further extend the signature deadline until October 15, 2008.
- Lead is a metal found naturally in the environment and present in some manufactured products. The major sources of lead air emissions have historically been motor vehicles (such as cars and trucks) and industrial sources. Motor vehicle emissions have been dramatically reduced with the phase-out of leaded gasoline, but lead is still used as an

additive in general aviation gasoline used in piston-engine aircraft and remains a trace contaminant in other fuels.

- Larger industrial sources of lead emissions currently include metals processing, particularly primary and secondary lead smelters. Lead is also emitted from industries such as: iron and steel foundries; primary and secondary copper smelting; industrial, commercial, and institutional boilers; waste incinerators; glass manufacturing; and cement manufacturing.
- Only two areas, the East Helena, Mont., area (including Lewis and Clark County), and Herculaneum, Mo. (in Jefferson County) are designated nonattainment for the current national ambient air quality standards for lead. The industrial facility contributing to the lead problem in the East Helena area closed in 2001.
- The United States has made tremendous progress in reducing lead concentrations in the outdoor air. Nationwide, average concentrations of lead in the air have dropped nearly 94 percent between 1980 and 2007. Much of this dramatic improvement occurred as a result of the permanent phaseout of lead in gasoline. However, lead continues to be emitted into the air from many different types of stationary and piston engine aircraft.
- In addition to dramatically decreased airborne lead concentrations, another indicator of progress in the reduction of airborne lead in the environment is the drop in children's blood lead levels over time. Since the late 1970s, average blood lead concentration for children aged 1 to 5 have dropped significantly, from about 15 micrograms per deciliter ( $\mu\text{g}/\text{dL}$ ) to less than 2  $\mu\text{g}/\text{dL}$ . However, new studies show that health effects occur even at very low blood lead levels.

#### **FOR MORE INFORMATION**

- To download a copy of the final rule, go to EPA's Web site at: <http://epa.gov/air/lead/actions.html>
- For more information about lead in the air, go to EPA's Web site at: <http://epa.gov/air/lead/>