

Review of National Ambient Air Quality Standards for Lead: Final Staff Paper and Human Exposure and Risk Assessment Report

Action

- On November 1, 2007, the Environmental Protection Agency's (EPA) Office of Air Quality Planning and Standards (OAQPS) released the final Staff Paper and final Human Exposure and Health Risk Assessment for lead.
- The staff is recommending that EPA strengthen the existing lead standards to improve public health protection.
- The final Staff Paper presents the conclusions and recommendations of OAQPS staff for the EPA Administrator to consider in reviewing the existing primary (health-based) and secondary (welfare-based) lead air quality standards. It reflects comments received from the Clean Air Scientific Advisory Committee (CASAC) and the public following the December 2006 release of the first draft Staff Paper.
- The final human exposure and health risk assessment document describes the design, methodology, and results of the human exposure and health risk assessments for lead. The final document reflects both CASAC and public comments on earlier drafts.
- These documents are part of the agency's on-going review of the national ambient air quality standards (NAAQS) for lead. They are available on EPA's Web site at: http://www.epa.gov/ttn/naaqs/standards/pb/s_pb_index.html.

Staff Conclusions and Recommendations – Primary Standard

- The final Staff Paper concludes that the overall body of evidence on lead health effects:
 - Clearly calls into question the adequacy of the current standard, and
 - Provides strong support for consideration of a lead standard that would provide greater health protection for sensitive groups, especially for children.
- The final Staff Paper recommends that EPA not remove lead from the list of six criteria pollutants and also not revoke the lead NAAQS.
- The Staff Paper recommends that the Administrator consider:
 - Appreciably lowering the level of the current primary standard for lead (the current standard is 1.5 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$)).
 - The Staff Paper recommends consideration of a range of levels, from levels that are currently seen in many urban areas across the United States (approximately 0.1-0.2 $\mu\text{g}/\text{m}^3$) to the lowest levels evaluated in the Exposure and Health Risk Assessment (0.02 to 0.05 $\mu\text{g}/\text{m}^3$).
 - Staff recognizes the substantial complexity in the assessment of exposures and risks, as well as the increasing uncertainty in the risk estimates at the

lowest levels evaluated.

- The Staff Paper also recommends the Administrator consider:
 - Retaining lead in total suspended particulates (TSP-Pb) as the indicator for lead.
 - Revising the averaging time to monthly (or retaining the current averaging time of a calendar quarter).
 - “Averaging time” refers to the amount of time used to determine whether an area is meeting a standard. For example, the current lead standard is $1.5 \mu\text{g}/\text{m}^3$ over each calendar quarter, meaning monitored levels of lead in the air are averaged over the quarter. Areas above $1.5 \mu\text{g}/\text{m}^3$ over a calendar quarter would exceed the current standard for the year.

- These conclusions and recommendations are based on the following key observations:
 - Lead in the air contributes to lead in blood via inhalation and via ingestion of lead deposited from the air (e.g. from soil and indoor dust).
 - A large body of new scientific studies shows that adverse effects in young children occur at much lower blood lead levels than was understood when the current standard was set in 1978.
 - Current health effects evidence does not indicate a level of lead exposure below which adverse health effects may not occur.
 - The current evidence demonstrates the occurrence of a variety of adverse health effects associated with lead, including those on the developing nervous system. IQ loss in children was the key health effect addressed in the staff paper.
 - Estimated lead exposure and the resulting risk of IQ loss in children associated with levels allowed by the current standard are large enough to be considered important from a public health perspective. This is true not only because of the serious nature of IQ loss during childhood years, but also because of the potential long-term adverse consequences of childhood IQ effects over a lifetime.
 - Scientific evidence shows other health effects in young children at similar exposures to or higher exposures than those that result in neurological effects. The evidence also shows associations between lead exposure and adverse health effects in adults.

OAQPS Staff Conclusions and Recommendations – Secondary Standard

- The final Staff Paper concludes that the overall body of evidence of lead effects on the environment calls into question the adequacy of the current secondary standard.

- Staff concluded that the agency lacks the relevant data to provide a clear, quantitative basis for setting a secondary lead standard that differs from the primary standard in terms of indicator, averaging time, level or form.

- The Staff Paper recommends the Administrator consider setting the secondary standard equal to a strengthened primary standard to provide increased protection against adverse environmental effects.

Next Steps

- To date, the lead NAAQS review has followed EPA's traditional approach to reviewing NAAQS, including the issuance of a criteria document and a Staff Paper. The agency is now moving forward to implement a new, more efficient process for conducting NAAQS reviews.
- As part of this new NAAQS process, EPA will also issue an Advance Notice of Proposed Rulemaking (ANPR) for the lead NAAQS review. The purpose of the ANPR is to invite comment from CASAC and all interested parties on policy options related to the agency's ongoing review of the lead NAAQS before the agency issues its proposal. EPA will sign the ANPR by the end of November 2007 for publication in the Federal Register.
- The Staff Paper is one of several important pieces of information the Administrator will consider as he determines whether the current lead standard is adequate and appropriate – or whether it needs to change. The Administrator also will look at the best available science, at recommendations from EPA's science advisors, and at public comment, before making any decisions.
- EPA will meet the current court-ordered schedule to propose action to revise or retain the current lead standards no later than May 1, 2008, with a target date of March 2008, and to take final action by September 1, 2008.

Background

- The Clean Air Act requires EPA to set National Ambient Air Quality Standards for "criteria pollutants." Currently, lead and five other major pollutants are listed as criteria pollutants. (The others are ozone, nitrogen oxides, carbon monoxide, sulfur oxides, and particulate matter.) The law also requires EPA to periodically review the standards to ensure that they provide adequate health and environmental protection, and to update those standards as necessary.
- In response to a case filed by the Missouri Coalition for the Environment, the U.S. District Court for the Eastern District of Missouri, Eastern Division, issued a decision in September 2005 that a review of the lead NAAQS should be completed by September 1, 2008. The court-ordered schedule requires EPA to propose whether to revise the standards by May 1, 2008, and issue a final rule by Sept. 1, 2008.
- Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead 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 in the nation's motor vehicle gasoline

supply. Some general aviation planes still use leaded fuel; additionally, lead is a trace contaminant in diesel fuel and gasoline.

- Larger industrial sources of lead emissions currently include metals processing, particularly primary and secondary lead smelters, among others. EPA's lead air quality monitoring strategy generally focuses on areas surrounding these industrial sources.
- Lead concentrations in the air we breathe have decreased dramatically. Available data show that from 1980 to 2005, the national annual maximum quarterly average of lead in the air has dropped 96 percent. Only two areas, the East Helena, Mont. Area (including Lewis and Clark counties), and part of Jefferson County in Herculaneum, Mo. 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.
- In addition to dramatically decreased 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, blood lead concentration for children aged one to five have dropped significantly, from about 15 µg/dL to less than 2 µg/dL.
- The risk assessment estimates that the majority of children's lead exposure comes from non-air sources such as ingesting lead-based paint from paint chips or toys, drinking water from pipes with lead solder, and/or eating food contaminated during processing with lead.

For More Information

- To download the Staff Paper, "Review of National Ambient Air Quality Standards for Lead: Policy Assessment of Scientific and Technical Information" go to http://www.epa.gov/ttn/naaqs/standards/pb/s_pb_index.html. Click on "Staff Papers."
- To download the Risk Assessment Document, "Lead: Human Exposure and Health Risk Assessments for Selected Case Studies," go to http://www.epa.gov/ttn/naaqs/standards/pb/s_pb_index.html. Click on "Technical Documents."