EPRI

toxics release inventory

Chemical Profile

Environment Division

Lead

What is lead?

Lead (Pb) is a bluish-gray metal that is softer than most other metals. Small amounts of lead are naturally present in soils and water.

Lead is used in batteries, ammunition, glass, roofing materials, x-ray shields, and electrical equipment. Because of concerns about heath effects, lead is no longer added to gasoline, paint, or ceramic glazes in the United States.

How is lead released by electric utilities?

Trace amounts of lead are present in coal and oil. When electric utilities burn these fuels at their power plants, lead is released in very small amounts. Most of this lead is carried by particles of ash.

Coal-burning power plants are equipped with devices to capture these particles before they reach the air. Particle control devices typically capture more than 99% of the ash, so very little ash enters the air. Lead-carrying ash captured by these devices is usually sent to ash ponds or land disposal sites.

Lead from power plants is about 1% of all the lead from human activities released into the air each year in the United States. The U.S. Environmental Protection Agency (EPA) estimates that U.S. power plants released about 63 tons of lead into the air in 1995—57 tons from burning coal and 6 tons from burning oil.

Is lead also released by other sources?

Lead is released into the air by soils as they erode in wind and rain, and by volcanoes when they erupt. These natural releases are insignificant compared to those from human activities.

Lead released into the environment by human activities comes mainly from metal production facilities, incinerators that burn refuse and sewage sludge, industrial boilers that burn coal and oil, and vehicles that burn gasoline. Industries reporting to EPA released 1534 tons of lead into the environment in 1995. About 75% was released to the soil.

What happens to lead after it is released by electric utilities?

Ash particles carrying lead settle to the ground after they are released into the air from power plants. Most lead reaches the ground through gravity and air turbulence. Lead compounds that dissolve in water are carried to the ground by rain and snow.

Ash pond wastewater discharged into public waterways may contain small amounts of lead, but these amounts are regulated by local permits.

How might people be exposed to lead?

People are commonly exposed to lead by drinking water or eating food that contains it. Lead in drinking water comes mainly from lead pipes, brass fixtures, and lead solder found in older plumbing. Lead in food comes mainly from airborne particles that fall directly on crops or contaminate the soil in which they grow. It also comes from leaded glazes on older ceramic dishware. People may be exposed to lead by eating shellfish, such as mussels, that accumulate it in their flesh.

Because it does not break down in the environment, lead released by past use of leaded gasoline or leaded paints and glazes remains in the soil today. Children are easily exposed to lead from these sources because they commonly put things that have contacted lead-contaminated soil into their mouths. They may also eat flaking paint chips that contain lead.

Those who smoke may inhale lead found in tobacco, and industrial workers may breathe lead dust.

What are the potential effects of lead on human health?

Lead affects people's health in the same way, whether they drink, eat, or breathe it. Short-term exposure to large amounts of lead can cause brain or kidney damage. Long-term exposure to small amounts of lead can increase blood pressure, alter the function of red blood cells to cause anemia, damage the brain and kidneys, and harm reproduction.

Children are especially sensitive to lead exposure, which can retard their

growth and intelligence. Babies whose mothers are exposed to lead during pregnancy have lower birth weights and slower development than other babies.

EPA has classified lead as a "probable human carcinogen." Although laboratory animals that ate lead had more kidney cancers than other animals, human studies have not confirmed that exposure to lead can cause cancer in people.

How likely is it that utility releases pose a risk to human health?

It is unlikely that lead from power plants poses a significant risk to human health. EPA has evaluated the potential health risks of breathing lead for people who live near power plants that burn coal and oil. EPA estimates that the highest lead exposures for people living near power plants are 250 times below the safe exposure level for breathing lead.

How is lead regulated?

EPA has established limits for lead in air and drinking water. Under the National Pollutant Discharge Elimination System, federal and state regulators determine how much lead each power plant may release in wastewater discharges. The Consumer Product Safety Commission ensures that school water coolers and drinking water are lead-free. The Food and Drug Administration regulates the amount of lead in pottery and ceramics. The Department of Housing and Urban Development ensures that federally funded housing is free of hazards posed by leaded pigments in paints. The Occupational Safety and Health Administration has set limits on the amount of lead in workplace air and measures lead in workers' blood where exposure is a potential problem. The Centers for Disease Control and Prevention recommends that all children age 6 or younger have yearly tests to measure lead in their blood.

Where can I get more information about lead?

The Agency for Toxic Substances and Disease Registry (ATSDR) has a fact sheet with answers to frequently asked health questions about lead. It is available through the ATSDR Information Center at 1-800-447-1544 or on the Internet at http://atsdr1.atsdr.cdc.gov:8080/tfacts13.html

EPA also has a fact sheet that is available on the Internet at http://www.epa.gov/ttnuatw1/hlthef/lead.html

This Toxics Release Inventory Chemical Profile is available by email at tricoord@epri.com. Funders of the Environment Division may download it from the Internet at http://www.epriweb.com/eg/funders/tri/index.html

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