

toxics release inventory

Chemical Profile

*Environment
Science & Technology Development*

Antimony

What is antimony?

Antimony (Sb) is a silvery-white metal that is brittle. In nature, antimony combines with other elements to form antimony compounds. Small amounts of antimony are naturally present in rocks, soils, water, and underwater sediments.

Antimony combines with other metals to form mixtures called alloys. For example, antimony mixed with lead forms a strong, hard alloy that is used in lead acid storage batteries. Antimony alloys are also used in solder, sheet and pipe metal, bearings, bullets, metal type, and pewter. Antimony trioxide is used to flameproof textiles, paper, and plastics. Physicians prescribe organic antimony compounds to treat schistosomiasis, a disease caused by blood vessel parasites. Tiny amounts of pure antimony are added to semiconductors to alter their properties.

How is antimony released by electric utilities?

Trace amounts of antimony are present in coal and oil. When electric utilities burn these fuels at their power plants, antimony is released. Most of this antimony 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. Antimony-carrying

ash captured by these devices is usually sent to ash ponds or land disposal sites.

The amount of antimony that U.S. power plants release into the air each year is presently unknown.

Is antimony also released by other sources?

Antimony is released into the air by soils as they erode in wind and rain. It is released into water and soil by eroding rocks and ores.

Antimony released into the environment by human activities comes mainly from metal production facilities, chemical manufacturing plants, oil refineries, industrial boilers that burn coal and oil, incinerators that burn refuse and sewage sludge, and vehicles that burn gasoline. Industries reporting to the U.S. Environmental Protection Agency (EPA) released about 24 tons of antimony into the environment in 1997. About 56% was released to the soil.

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

Ash particles carrying antimony settle to the ground after they are released into the air from power plants. Most antimony reaches the ground through gravity and air turbulence. Antimony does not dissolve in water and it does not seem to build up in the flesh of fish.

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

How might people be exposed to antimony?

People are commonly exposed to small amounts of antimony naturally present in the air they breathe, the water they drink, and the foods they eat. For example, meats, vegetables, and seafood are natural sources of antimony in people's diets. Industrial workers may breathe antimony dust or fumes, or touch substances that contain antimony. For example, workers who manufacture lead acid storage batteries may breathe stibine, a poisonous gas released when antimony contacts acid.

What are the potential effects of antimony on human health?

Breathing large amounts of antimony for a short time can irritate the throat, lungs, and eyes, and cause a skin rash called antimony spots. People who breathe antimony for a long time may develop bronchitis, high blood pressure, heart muscle damage, and stomach ulcers. Eating or drinking large amounts of antimony can cause vomiting and diarrhea.

Although research is ongoing, it is unclear whether antimony can cause cancer in people. Workers exposed for up to 31 years did not develop more cancers from breathing antimony dust and fumes than people who were not exposed. However, the International Agency for Research on Cancer has classified the compound, antimony

trioxide, as a “possible human carcinogen.”

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

It is unlikely that antimony from power plants poses a significant risk to human health. EPA has evaluated the potential health risks of breathing antimony compounds for people who live near power plants that burn coal or oil. In EPA’s initial screening assessment, these risks were so low that the Agency eliminated utility antimony from further analysis as an inhalation health hazard.

Since airborne ash particles carrying antimony are widely scattered before they settle to the ground, it is unlikely that ash from power plants significantly increases the amount of antimony in soil, water, or food.

How is antimony regulated?

EPA has established limits for antimony in drinking water. EPA also requires that 5000 pounds or more of antimony be reported if it is spilled or released without a permit. Under the National Pollutant Discharge Elimination System, federal and state regulators determine how much antimony each power plant may release in wastewater discharges. The Occupational Safety and Health Administration and the National Institute for Occupational Safety and Health have set limits on the amount of antimony in workplace air.

Where can I get more information about antimony?

The Agency for Toxic Substances and Disease Registry (ATSDR) has a fact sheet with answers to frequently asked health questions about antimony. It is available through the ATSDR Information Center at 1-800-447-1544, or on the Internet at <http://www.atsdr.cdc.gov/tfacts23.html>

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