United States Environmental Protection Agency | Office of Water 4601 | EPA 811-F-95-002j- T October 1995

National Primary Drinking Water Regulations

Antimony

Chemical/ Physical Properties

CAS Number: 1440-36-0 (metal)

Color/ Form/Odor: Antimony is a metal which occurs in nature only in the combined state

Soil sorption coefficient: N/A

Bioconcentration Factor: BCF up to 300; may accumulate in some aquatic organisms

Solubilities:

stibine-	slightly soluble
trifluoride-	4.4 kg/L at 20 deg C
trioxide-	slightly soluble
trisulfide-	1.8 mg/L at 18 deg C

Common Ores: trioxide- Valentinite; sulfide- Stibnite; Other ores/natural sources: cervantite, livingstonite, jamisonite, kermesite, petroleum

Drinking Water Standards

MCLG: 0.006 mg/l

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HAL(child): 1- to 10-day: 0.01 mg/L

Longer-term: 0.01 mg/L

Health Effects Summary

Acute: EPA has found antimony to potentially cause the following health effects from acute exposures at levels above the MCL: nausea, vomiting and diarrhea.

Short-term exposures in drinking water considered "safe" for a 10-kg (22 lb.) child consuming one liter of water per day: a long-term (upto 7 years) exposure to 0.01 mg/L.

Chronic: Antimony has the potential to cause the following health effects from long-term exposures at levels above the MCL: decreased longevity, altered blood levels of glucose and cholesterol.

Cancer: There is inadequate evidence to state whether or not antimony has the potential to cause cancer from lifetime exposures in drinking water.

Usage Patterns

In 1984, 64.5 million lbs. antimony ore was mined and refined. Production of the most commonly used antimony compound, the trioxide, increased during the 1980s to bout 31 million lbs, reported in 1985.

In 1985, it was estimated that industries consumed antimony trioxide as follows: Flame retardant, 76%; catalyst, 6%; pigments, 5%; glass, 8%; miscellaneous, 5%. Primary antimony was used as follows: Flame retardant, 60%; transportation (including batteries), 10%; ceramics/glass, 10%; other uses, 10%.

Toxic Release Inventory - Releases to Water and Land: 1987 to 1993

	Water	Land
TOTALS (in pounds)	330,064	12,003,373
***Top Ten States** *		
AZ	505	7,074,128
MT	0	2,338,697
TX	24,817	840,392
LA	55,414	344,762
WI	1,445	392,000
MO	784	188,266
WA	63,220	99,915
ID	2,600	140,250
TN	687	108,325
AL	27,536	69,503
***Major Industries** *		
Copper smelting, refining	505	7,074,128
Other nonferrous smelt.	17,015	2,383,947
Sec. nonferrous smelt.	1,459	803,398
Misc Indust. Organics	18,424	581,465
Porcelain plumb. fixtures	1,445	392,000
Petroleum refining	111,527	202,251
Misc Inorganic chems.	4,962	140,250
Plastics, resins	20	60,372
Storage batteries	0	45,952
Synthetic fibers	26,803	12,535

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

Release Patterns

The most common antimony ores are the sulfide, stibnite, and the trioxide, valentinite. Other ores include cervantite, livingstonite, jamisonite, and kermesite. Antimony is also a common component of coal and petroleum.

Industrial dust and exhaust gases of cars and oil fuels are the main sources of antimony in urban air. Substantial amounts of antimony trioxide are released to the atmosphere during processing of antimony materials including smelting of ores, molding and incineration of products, as well as the combustion of fossil fuels which are utilize the high temperatures needed to volatilize antimony trioxide.

From 1987 to 1993, according to the Toxics Release Inventory antimony and antimony compound releases to land and water totalled over 12 million lbs., of which nearly all was to land. These releases were primarily from copper and other nonferrous smelting and refining industries. The largest releases occurred in Arizona and Montana. The greatest releases to water occurred in Washington and Louisiana.

Environmental Fate

Little information is available on the transformations and transport of antimony in various media. The mobility of antimony in soils is not clearly understood. The strength of its adsorption to soil and sediments depends upon a variety of factors such as pH, organic matter content, as well as the oxidation state of the particular salt. Some studies indicate that antimony is highly mobile, while others conclude that it strongly adsorbs to soil. In water, it usually adheres to sediments.

There is no evidence of bioconcentration of most antimony compounds, though one report states that the tribromide can be concentrated by certain forms of marine life to over 300 times its concentration in water.

Other Regulatory Information

Monitoring:

- For Ground Water Sources:
  - Initial Frequency- 1 sample once every 3 years
  - Repeat Frequency- If no detections for 3 rounds, once every 9 years
- For Surface Water Sources:
  - Initial Frequency- 1 sample annually
  - Repeat Frequency- If no detections for 3 rounds, once every 9 years
- Triggers - If detect at > 0.006 mg/L, sample quarterly.

Analysis

Reference Source	Method Number
EPA 600/4-79-020	204.2
NTIS PB 91-231498	200.9; 200.8
Standard Methods	3113
ASTM	D3697-87

Treatment

Best Available Technologies

Ion Exchange, Lime Softening, Reverse Osmosis, Electrodialysis

For Additional Information:

- EPA can provide further regulatory and other general information:
  - EPA Safe Drinking Water Hotline - 800/426-4791
- Other sources of toxicological and environmental fate data include:
  - Toxic Substance Control Act Information Line - 202/554-1404
  - Toxics Release Inventory, National Library of Medicine - 301/496-6531
  - Agency for Toxic Substances and Disease Registry - 404/639-6000