**Fact Sheet Date: March 12, 1998**

# NEW YORK STATE
# - HUMAN HEALTH FACT SHEET -

## Ambient Water Quality Value for Protection of Sources of Potable Water

**SUBSTANCE:** Antimony **CAS REGISTRY NUMBER:** 7440-36-0

**AMBIENT WATER QUALITY VALUE:** 3 micrograms/liter (3 ug/L)

**BASIS:** Non-Oncogenic Effects

## INTRODUCTION

The physical, chemical, and toxicological properties of antimony have been reviewed (ATSDR, 1992; US EPA, 1988, 1990a,b,c, 1992b, 1995; Winship, 1987). The following ambient water quality values were derived using these and other references and the procedures outlined in 6 NYCRR 702.2 through 702.7.

## SPECIFIC MCL AND PRINCIPAL ORGANIC CONTAMINANT CLASS (702.3)

Antimony does not have a Specific MCL (maximum contaminant level) as defined in 6 NYCRR 700.1 and is not in a principal organic contaminant class as defined in 6 NYCRR 700.1. Therefore, a water quality value cannot be derived under 6 NYCRR 702.3.

## ONCOGENIC EFFECTS (702.4)

The overall evidence regarding the potential oncogenicity of antimony when ingested in drinking water is inconclusive (US EPA, 1990b, 1992a). Thus, the data are insufficient to determine whether ingested antimony causes oncogenic effects. Increased incidences of lung tumors were reported in female rats intermittently exposed to antimony trioxide and antimony ore concentrate by inhalation for 52 weeks (Groth et al., 1986). Limited data on workers exposed to antimony during smelting and related activities prior to 1961 suggest an increased incidence of lung cancer (NIOSH, 1978).

## NON-ONCOGENIC EFFECTS (702.5)

Antimony damages the heart, lungs, gastrointestinal tract, liver and blood of humans and laboratory animals (ATSDR, 1992; US EPA, 1988, 1990a,c, 1995). In 1985, the U.S. EPA established an oral reference dose (equivalent to an acceptable daily intake) of 0.4 micrograms per kilogram of body weight per day (0.4 ug/kg/day) for antimony (Exhibit 1, taken from US EPA, 1995), using procedures consistent with those outlined in paragraphs (a) and (b) of 6 NYCRR 702.5. The reference dose, which was rounded from a value of 0.35 ug/kg/day (US EPA, 1995), was derived by application of a 1,000-fold uncertainty factor to a lowest-observed-effect level (LOEL) of 0.35 milligrams per kilogram per day (0.35 mg/kg/day) for decreased longevity, decreased blood glucose levels and increased cholesterol levels in rats exposed to antimony in drinking water throughout their lifetimes (Schroeder et al., 1970). The uncertainty factor of 1,000 was used to account for variability among humans, differences between animals and humans and the use of a LOEL instead of a no-observed-effect level to derive the reference dose. A value of 3 ug/L is derived using the procedure outlined in paragraph (e) of 6 NYCRR 702.5 and allowing 20% of the acceptable daily intake to come from drinking water (6 NYCRR 702.5(c)).

## CHEMICAL CORRELATION (702.7)

Deriving values based on chemical correlation is not applicable for antimony.

## OTHER STANDARDS AND GUIDELINES

Under the Safe Drinking Water Act, the federal maximum contaminant level goal (MCLG) and the MCL for antimony are both 6 ug/L (rounded from 5.6 ug/L) (US EPA, 1990b, 1992a), assuming a 70-kg adult drinks 2 L/day and allocating 40% of the U.S. EPA reference dose (0.4 ug/kg/day) to drinking water. The U.S. EPA used a 40% allocation of the reference dose to drinking water based on occurrence and exposure data for antimony (US EPA, 1990b, 1992a). However, the U.S. EPA (1992b) lifetime health advisory for antimony is 3 ug/L, using the same reference dose but assuming a relative source contribution of water of 20%. The basis for this change was not provided.

The World Health Organization (WHO) derived a guideline value of 3 ug/L for antimony in drinking water (rounded from 2.6 ug/L), assuming a 60-kg adult drinks 2 L/day and allocating 10% of the WHO tolerable daily intake (TDI) of 0.86 ug/kg/day to drinking water. This TDI is based on the same study as the U.S. EPA reference dose and the application of an uncertainty factor of 500 to a lowest-observed-adverse-effect level (LOAEL) of 0.43 mg/kg/day (slightly higher than the U.S. EPA LOEL of 0.35 mg/kg/day). The choice of 500 represents 100 for inter- and intraspecies variation and 5 for the use of a LOAEL. Based on analytical considerations, however, the WHO provisional guideline value for antimony in drinking water is 5 ug/L (WHO, 1993).

## SELECTION OF VALUE

According to 6 NYCRR 702.2(b), the selected ambient water quality value shall be the most stringent of the values derived using the procedures found in 6 NYCRR 702.3 through 702.7. This value is 3 ug/L (based on non-oncogenic effects) and is the value selected as the water quality value for antimony.

**REFERENCES**

ATSDR (Agency for Toxic Substances and Disease Registry). 1992. Toxicological Profile for Antimony and Compounds. TP-91/02. Atlanta, GA: U.S. Department of Health and Human Services, U.S. Public Health Service.

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NIOSH (National Institute for Occupational Safety and Health). 1978. Criteria for a Recommended Standard....Occupational Exposure to Antimony. Cincinnati, OH: U.S. Department of Health, Education and Welfare, U.S. Public Health Service.

6 NYCRR (New York State Codes, Rules and Regulations). Water Quality Regulations, Surface Water and Groundwater Classifications and Standards: Title 6 NYCRR, Chapter X, Parts 700 - 705. Albany, NY: New York State Department of Environmental Conservation.

10 NYCRR (New York State Codes, Rules and Regulations). Public Water Systems: Title 10 NYCRR, Chapter 1, State Sanitary Code, Subpart 5-1. Albany, NY: New York State Department of Health, Bureau of Public Water Supply Protection.

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WHO (World Health Organization). 1993. Guidelines for Drinking-Water Quality, 2nd Edit., Vol. 1: Recommendations. Geneva, Switzerland: World Health Organization.

Winship, K.A. 1987. Toxicity of antimony and its compounds. Adv. Drug React. Ac. Pois. Rev. 2:67-90.

## SEARCH STRATEGY: ON-LINE TOXICOLOGIC DATABASE

Toxline (1981 to March, 1995) was searched linking the CAS Registry Number of antimony with the keyword "toxicity."

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