



BARIUM

FACT SHEET ON A DRINKING WATER CHEMICAL CONTAMINANT

GENERAL INFORMATION

Synonyms

- None

Chemical Description:

- Naturally occurring chemical, typically found as an inorganic salt

Properties:

- Exists in nature only in combined forms. (e.g. Barite - BaSO_4)
- Solubility of barium salts is compound specific
- Mineral forms have very low vapor pressures

Production and Use:

- Barium salts are used for a number of purposes such as drilling mud, pigments, photographic papers and x-ray contrast medium, plastic stabilizers, flares and fireworks, lubricating oil additive, permanent magnets, and glass manufacturing

ENVIRONMENTAL PROFILE

Occurrence:

- Occurs at low levels in most surface and ground water sources, typically less than 0.34 mg/L
- Barium compounds occur in most geologic materials at levels between 0.3-0.5 mg/L
- In 1987, EPA survey data indicated that barium was typically present in drinking water supplies at levels less than 0.2 mg/L

Releases:

- Contamination of drinking water supplies by barium is usually the result of naturally occurring barium rather than industrial releases
- Released to the atmosphere mainly by the industrial processes of mining, refining, and production of barium and barium based chemicals, also released to air by burning of coal and oil

Environmental Fate:

- Highly persistent in water
- Not likely to bioaccumulate

HEALTH EFFECTS

Humans:

- Low acute oral toxicity, high doses may cause gastrointestinal disturbances and muscular weakness
- Chronic exposure difficult to quantify due to lack of effects in existing data

Experimental Animals:

- Lack of data from short-term studies
- Long-term studies indicate that barium may have hypertensive effects (high blood pressure)
- No adequate studies on the mutagenic and carcinogenic potential of barium have been identified

REGULATORY PROFILE

Existing Standards:

- Clean Air Act (CAA): Not regulated
- Clean Water Act (CWA):
Criteria established
- Resource Conservation and Recovery Act (RCRA):
Not regulated
- Superfund (CERCLA):
 - Not regulated
 - SARA: Toxic chemical
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA):
Registered (Barium compounds)
- Toxic Substances Control Act (TSCA):
Not regulated

HEALTH INFORMATION

Maximum Contaminant Level Goals (MCLG):

- Non-enforceable levels based solely on an evaluation of possible health risks and exposure, and taking into consideration a margin for public safety
- Set at 2 mg/L to protect against detrimental cardiovascular effects

**MCLG for Barium = 2 mg/L
(effective January 1993)**

Maximum Contaminant Levels (MCL):

- Legally enforceable levels for contaminants in public drinking water supplies
- Based on health risks associated with the contaminants, analytical methods for their assay, and water treatment feasibility and practicality aspects
- Exceedance of the MCL in drinking water may result in adverse effects which will depend upon the contaminant concentration in water, amount of water/contaminant ingested, length of exposure, and other biological parameters
- Current MCL = 1 mg/L

**MCL for Barium = 2 mg/L
(effective January 1993)**

EPA Health Advisories (HA):

- **Short-term HAs:** Provide acceptable concentrations of contaminants in water for up to 10 day exposures, primarily to evaluate the public health risk resulting from an accidental spill or an emergency contamination situation
- **Longer-term HAs:** Provide guidance for persistent water contamination situations to cover a period of up to 7 years
- **Lifetime HAs:** Derived in the same way as an MCLG

Health Advisories:
(Values currently under review)

ANALYTICAL METHODS

- Graphite Furnace Atomic Absorption
EPA Method 208.2
- Direct Aspiration Atomic Absorption
EPA Method 208.1
- Inductively Coupled Plasma
EPA Method 200.7

WATER TREATMENT

Permanent Treatment:

Best Available Technology (BAT):

- Ion Exchange
- Lime Softening
- Reverse Osmosis
- Electrodialysis Reversal

SHORT-TERM HAZARD ELIMINATION

- If the drinking water standards are exceeded install BAT or use an alternative drinking water supply such as bottled water

ADDITIONAL HELP

- State or county health officials can indicate a certified laboratory for testing
- Experts in the state Department of Environmental Protection or Natural Resources may also be of help
- The EPA has toll-free numbers for further information on drinking water quality, treatment technologies, for obtaining Health Advisories, and for other regulatory information
- EPA Hotlines are available Monday through Friday
 - **Safe Drinking Water:** 800-426-4791
 - **National Pesticides:** 800-858-7378
 - **Superfund/RCRA:** 800-424-9346
- For information on the Clean Water Act, call (202) 260-7301
- For information on the Toxic Substances Control Act, call (202) 554-1404
- For information on the Clean Air Act call (919) 541-2777