



# TRICHLOROETHYLENE

## FACT SHEET ON A DRINKING WATER CHEMICAL CONTAMINANT

### GENERAL INFORMATION

#### Synonyms:

- TCE; Trichloroethene; Acetylene Trichloride; Tri; Trilene

#### Chemical Description:

- Synthetic organic compound; no natural sources

#### Properties:

- Clear, volatile liquid
- Non-flammable
- Boiling point 86.7°C

#### Production and Use:

- U.S. production in 1982 was 200 million pounds
- Used as a degreaser in metal industry, a household and industrial solvent, an extracting agent in foods, and an inhalation anesthetic during some short-term surgical procedures

### ENVIRONMENTAL PROFILE

#### Occurrence:

- Ubiquitous in air at concentrations in the parts per billion to parts per trillion range
- Common contaminant in ground and surface waters
- About 3% of public drinking water supplies derived from well water contain 0.5 µg/L or higher TCE; also found in drinking water derived from surface water but at lower levels
- May occur in foods in the parts per million concentration range

#### Releases:

- Major source of environmental levels is from volatilization during use as a metal degreaser
- TCE contaminated with grease and oil has been buried in landfills and dumped on the ground and into sewers

#### Environmental Fate:

- Migrates readily to ground water where it may remain for months to years
- Degrades in air in a few days
- Photooxidation is the predominant fate of TCE
- No significant bioaccumulation in individual animals or food chains

### HEALTH EFFECTS

#### Humans:

- Causes vomiting and abdominal pain, followed by transient unconsciousness
- Long-term occupational exposures produce increased serum transaminases, indicating liver damage
- Data are inadequate to categorically state that TCE is a human carcinogen; however, there is ample animal data to classify TCE as a group B2 carcinogen, a probable human carcinogen

#### Experimental Animals:

- High single oral doses in rats—death
- Air exposure for 14 weeks in rats—increased liver weights
- No information available on reproductive or developmental effects
- Induces liver cancers in mice and rats with oral or inhalation exposures
- Mutagenic in some *in vitro* bacterial tests

### REGULATORY HISTORY

#### Existing Standards:

- **Clean Air Act (CAA):** Being considered
- **Clean Water Act (CWA):** Registered
- **Resource Conservation and Recovery Act (RCRA):** Listed for ground-water monitoring
- **Superfund (CERCLA):** Reportable Quantity 100 pounds
- **SARA:** Listed
- **Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA):** Not available
- **Toxic Substances Control Act (TSCA):** On inventory

## 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 zero for cancer-causing chemicals in water

MCLG for TCE = 0 mg/L

### 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

MCL for TCE = 0.005 mg/L (adopted 7/8/87)

### 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:

Short-term HA for a child = not determined

Longer-term HAS = not determined

## ANALYTICAL METHODS

- Gas chromatography  
EPA Method 502

## WATER TREATMENT

### Permanent Treatment:

#### Best Available Technology (BAT):

- granular activated carbon adsorption
- aeration
- boiling
- air stripping

## SHORT-TERM HAZARD ELIMINATION

- If the drinking water standards are exceeded, install BAT or use an alternative drinking water supply such as bottled water
- Boiling water for 5 minutes is effective in removing 95% of the TCE originally present—potential inhalation hazard

## 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, 8:30 a.m. to 4:30 p.m. EST:
  - **Safe Drinking Water:** 800-426-4791
  - **Air Quality:** 800-631-2700
  - **National Pesticides:** 800-858-PEST
  - **Superfund/RCRA:** 800-424-9346  
800-343-3958
- For information on the Clean Water Act, call (202) 260-7301
- For information on the Toxic Substances Control Act, call (202) 554-140