



# 1,1,1-TRICHLOROETHANE

## FACT SHEET ON A DRINKING WATER CHEMICAL CONTAMINANT

### GENERAL INFORMATION

#### Synonyms:

- 1,1,1-TCA; Methyl Chloroform; Ethane; Methyl-trichloromethane

#### Chemical Description:

- Synthetic organic compound; no natural sources

#### Properties:

- Clear, volatile liquid
- Non-flammable
- Boiling point 74 °C

#### Production and Use:

- Used as a degreasing solvent in metal industries, a spot remover and film cleaner, and an additive in metal cutting oils; also used in the synthesis of other organic chemicals
- Fungicide and solvent in pesticide formulations
- Production in 1982 was 600 million pounds—about 70% used in metal cleaning

### ENVIRONMENTAL PROFILE

#### Occurrence:

- Ubiquitous in air at concentrations in the low parts per billion range
- Common contaminant in ground and surface waters
- About 3% of public drinking water supplies obtained from well water contain 0.5 µg/L or higher TCA; also found in drinking water derived from surface water but at lower levels

#### Releases:

- Releases to environment in industrialized areas primarily from volatilization during use as a metal degreaser; the majority of all TCA produced is released to the environment
- TCA contaminated with grease and oil has been disposed by burial in landfills or dumped on the ground and in sewers

#### Environmental Fate:

- Migrates readily to ground water; half life greater than 6 months in water
- TCA released to surface water migrates to atmosphere in few days or weeks
- No significant bioaccumulation in individual animals or food chains

### HEALTH EFFECTS

#### Humans:

- Acute lung damage and liver changes usually occur in fatal cases
- EPA cancer classification: group D, not classifiable (inadequate evidence of carcinogenicity)

#### Experimental Animals:

- High single oral doses in rats—depress liver metabolism and causes sleepiness and death
- Oral dose for 12 weeks in rats—central nervous system disturbances, reduced body weight gain, increased serum enzyme levels, and death
- Long-term oral exposure for 78 or 103 weeks in rats and mice—decreases body weight gain and survival time
- No reports of reproductive or developmental effects
- A draft study reports liver tumors in mice
- Mutagenic in some *in vitro* bacterial tests

### REGULATORY HISTORY

#### Existing Standards:

- **Clean Air Act (CAA):** Registered
- **Clean Water Act (CWA):** Registered
- **Resource Conservation and Recovery Act (RCRA):** Listed
- **Superfund (CERCLA):** Reportable Quantity 1,000 pounds
- **SARA:** Listed
- **Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA):** No more than 25% of a pesticide formulation can contain TCA
- **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 TCA = 0.002 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 TCA = 0.002 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 = 35 mg/L  
Longer-term HA for a child = 35 mg/L  
Longer-term HA for an adult = 125 mg/L  
Lifetime HA = 0.002 mg/L

## ANALYTICAL METHODS

- Gas chromatography  
EPA Method 502

## WATER TREATMENT

### Permanent Treatment:

#### Best Available Technology (BAT):

- granular activated carbon adsorption
- aeration
- boiling

## 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 effectively removes 96% of the TCA 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) 554-1404