1,1-DICHLOROETHYLENE

FACT SHEET ON A DRINKING WATER CHEMICAL CONTAMINANT

GENERAL INFORMATION

Synonyms:
- 1,1-DCE; Vinylidene Chloride; Dichloroethene

Chemical Description:
- Synthetic organic compound; no natural sources

Properties:
- Clear, highly volatile liquid
- Limited solubility in water
- Boiling point, 31.5°C

Production and Use:
- Production in 1980 was about 200 million pounds
- Major use is as a chemical intermediate in manufacturing polyvinylidene copolymers, which are used for such things as food wrap

ENVIRONMENTAL PROFILE

Occurrence:
- Not commonly found in drinking water, but may occur at levels of 0.1 parts per million (ppm) or more in surface water
- Quantities as high as 40 ppm reported in wells contaminated with other chlorinated solvents
- No information available on 1,1-DCE concentrations in food, but because 1,1-DCE is volatile, no contamination of food is expected
- Air in urban areas may contain 1,1-DCE in the parts per trillion concentration range; air near manufacturing may contain 1,1-DCE in parts per billion range

Releases:
- Enters the environment primarily by evaporation during manufacturing; industrial effluents to water and land may contain small amounts of 1,1-DCE

Environmental Fate:
- Persistent and mobile in soils; is expected to migrate with ground water
- Based on information about similar compounds, 1,1-DCE is expected to evaporate rapidly from surface waters and degrade within hours in air
- Expected to remain in ground water for months or years
- Not likely to bioaccumulate in individual animals or food chains

HEALTH EFFECTS

Humans:
- At high concentrations in air—central nervous system (CNS) depression and unconsciousness
- In exposed occupational workers—CNS and liver defects
- Data are inadequate to assess the carcinogenic potential of 1,1-DCE in humans; it is currently classified as a group C: Possible human carcinogen because evidence is limited in animals and absent in humans

Experimental Animals:
- Single oral doses in rats—adverse liver effects
- Long-term oral exposure in rats—adverse liver and kidney effects
- Toxic to fetuses; developmental effects absent in rodents after oral or inhalation exposure
- Mutagenic in *in vitro* bacterial tests after metabolic activation, but not in mammalian assay systems
- No reports of tumors from oral ingestion of 1,1-DCE; however, mammary and kidney tumors reported in rats exposed to 1,1-DCE in air; 1,1-DCE is a skin tumor initiator (no tumors by subcutaneous route)

REGULATORY HISTORY

Existing Standards:

- **Clean Air Act (CAA):** Not available
- **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 1,1-DCE = 0.007 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 1,1-DCE = 0.007 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 = 1 mg/L
Longer-term HA for a child = 1 mg/L
Longer-term HA for an adult = 3.5 mg/L

ANALYTICAL METHODS

- Gas chromatography
  EPA Method 502

WATER TREATMENT

Permanent Treatment:

Best Available Technology:

- granular activated carbon adsorption
- packed tower aeration
- 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 might remove but not degrade 1,1-DCE—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