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TECHNICAL BULLETIN

HEALTH EFFECTS INFORMATION

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ENVIRONMENTAL TOXICOLOGY SECTION

April 1994

(PCE)
Tetrachloroethylene

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What is Tetrachloroethylene ?

Tetrachloroethylene (abbreviated as PCE) is a man-made chemical widely used as a cleaning agent in the dry cleaning industry and as a metal degreaser in the manufacturing industry. It is also used as a building block for making other chemicals in the chemical manufacturing industry. Other names that may be used for tetrachloroethylene include: perchloroethylene, perc, perclene, and perchlor. PCE evaporates readily and produces a sharp, sweet smell.

How do people come into contact with PCE?

Most PCE enters the environment by evaporating into the air from factories, storage tanks, hazardous waste sites or other contaminated areas. Once in air, PCE can take anywhere from 1 hour to 2 months to be broken down by sunlight, or it may wash back down to the soil through rainfall.

PCE may also enter soil and groundwater when contaminated materials leak or spill. PCE in the soil will tend to quickly evaporate to the air. Some PCE may travel through the soil and contaminate groundwater. Once PCE enters the groundwater, it breaks down very slowly.

Humans can be exposed to PCE in groundwater if they use contaminated water for drinking or cooking. Another route of exposure is via inhalation during the use of PCE contaminated water for showering, watering lawns, or crop irrigation. There is little information on whether PCE accumulates in plants or animals exposed to PCE in ground or surface water. PCE exposure may also occur through direct physical contact with contaminated water or soil.

How does exposure to PCE affect human health?

Information on health effects from short-term exposure to PCE comes from experience in workers who come into contact with PCE on the job. Health effects associated with inhaling PCE include dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking. The inhalation of high concentrations of PCE can cause unconsciousness and death. Skin irritation has been seen in workers who have had repeated or extended contact with high concentrations of PCE.

Health effects from exposure to PCE over long periods of time have been studied in animals. These animal studies have determined that PCE can cause liver and

kidney damage, and certain types of cancer such as liver cancer, kidney cancer, and leukemia. Based on information in these animal studies, PCE is considered to be a "probable human carcinogen."

What can be done to prevent exposure to PCE?

Although the maximum allowable level for PCE is very protective of human health, the Health Division recommends that exposure to PCE be kept as low as possible. To accomplish this, public water suppliers or other affected persons can take a variety of actions including closing contaminated wells, finding other water supplies, or installing treatment systems at contaminated wells consisting of granular activated carbon filtration or aeration.

People whose water exceeds the standard or who do not wish to consume even small amounts of PCE can take several actions for short-term protection including using bottled water or using in-home treatment devices to treat water used for drinking and cooking.

In addition, it may be prudent not to give livestock or household pets contaminated water to drink since similar toxic effects may be observed.

What regulations are there for PCE?

The U.S. Environmental Protection Agency (EPA) sets Maximum Contaminant Levels (MCLs) for chemicals in drinking water. These MCLs represent the highest concentration of a contaminant which is allowed in drinking water supplied by public water systems. Water from private wells may not meet these standards. MCLs are based on all the available toxicity information for the chemical and some very conservative assumptions to ensure that even the most sensitive populations are protected. These assumptions include a lifetime of 70 years and an ingestion rate of 2 liters (approximately 2 quarts) of water consumed everyday during this 70 year lifetime. In the case of cancer-causing chemicals (carcinogens), the MCL is set so that a lifetime exposure to the contaminant at the MCL would result in no more than 1-100 excess cases of cancer per million people exposed. The EPA has set the MCL for PCE to be 5 ppb (0.005 ppm or mg/L).

For Additional Information Contact the Drinking Water Section of the Department of Human Services at (971)-673-0408.