Fact Sheet Date: March 12, 1998

NEW YORK STATE
- HUMAN HEALTH FACT SHEET -

Ambient Water Quality Value for
Protection of Sources of Potable Water

SUBSTANCE: 3,4-Dichlorobenzotrifluoride **CAS REGISTRY NUMBER:** 328-84-7

AMBIENT WATER QUALITY VALUE: 5 ug/L

BASIS: Principal Organic Contaminant (Groundwater)

Principal Organic Contaminant Classes (Surface Water)

SUMMARY OF INFORMATION

Introduction

3,4-Dichlorobenzotrifluoride (DCBTF), a substituted halobenzene, is also known as 3,4-dichloro-a,a,a-trifluorotoluene (DCTFT). It is a clear, colorless liquid with a molecular weight of 215. DCBTF has a sweet pleasant odor, a vapor pressure of 2 mm Hg at 25^{o}C and is slightly soluble in water (11.6 mg/L at 25^{o}C).[1,2] The compound is used as an intermediate in the production of certain herbicides. No information was found on taste and odor thresholds of DCBTF in water.

Pharmacokinetics

No information was found.

Acute Toxicity

Data on the acute toxic effects of DCBTF in humans and animals are limited. Eye or skin contact with liquid DCBTF may cause irritation, and exposure to DCBTF vapors may cause irritation of the nose and throat.[2]

Reported oral LD_{50} values in rats range from 1.15 to 3.3 g/kg.[2,4] Acute symptoms included tremors, lethargy, and body rigidity; among non-survivors, autopsy findings included darkened liver and hemorrhagic lungs. An inhalation LC_{50} of more than 2,000 ppm (1-hour exposure) has been reported in rats. In rabbits, the dermal LD_{50} is greater than 5.0 g/kg (24-hour contact).

Chronic Toxicity

Data on chronic toxicity are limited. Two subchronic (14-day) studies were submitted by Occidental Chemical Corp. to the U.S. EPA.[4] In both studies, DCBTF in corn oil was administered daily by gavage to rats at doses of 0, 7.5, 15, 30, 60 or 120 mg/kg/day (three males and three female Sprague-Dawley rats per group in one study and five males and five female CD rats per group in the other study). No significant differences were observed between controls and DCBTF-treated Sprague Dawley rats with respect to hematologic (e.g., total and differential white cell counts, red blood cell counts) and clinical chemistry parameters (e.g., serum oxaloacetic transaminase, blood urea nitrogen). Blood samples for these analyses, however, were collected from only one animal per sex per group prior to sacrifice. Autopsies performed on all rats did not reveal any dose-related lesions and no significant differences were observed in spleen, kidney or liver weights. In the other study, no significant differences in hematologic parameters were observed among animals of the various dose groups. In males, the liver weight and liver-to-body weight ratio in the high dose group (120 mg/kg/day) and the liver weight in the mid dose group (30 mg/kg/day) were significantly increased over controls. Autopsy indicated no statistically significant increase in lung or liver lesions in DCBTF-treated male or female rats relative to controls. There was, however, suggestive evidence of compound-related kidney lesions in male rats.

Longer term studies to evaluate the chronic toxicity of DCBTF were not found.

Reproductive/Developmental Toxicity

Data on humans were not found. Animal data are limited to a modified 90-day, oral reproductive study in rats (1981) submitted by Occidental Chemical Corp. to U.S. EPA. The study is marked by procedural flaws and errors, including reported misdosing, but apparently shows slight liver and kidney enlargement in some offspring.[4] The U.S. EPA noted that this study indicates that DCBTF may affect pup survival.[1]

Genotoxicity

DCBTF gave negative results in several short-term tests (with and without metabolic activation) for mutagenicity.[4] Negative mutagenicity results were observed in the Ames test using a number of strains of Salmonella typhimurium. Negative results were also observed in E. coli W3110/polA$^+$ and P3478/polA$^-$ and in Saccharomyces cerevisiae D_4. DCBTF (with or without metabolic activation) did not produce an effect in the mouse lymphoma forward mutation assay (TK locus in L5178Y cells). DCBTF (without metabolic activation),

however, did induce weak positive responses in an in vitro assay that is indicative of DNA damage, namely, sister chromatid exchange (SCE), whereas metabolically activated DCBTF produced significant dose-related increases in SCE Frequency.

An in vitro/in vitro mouse urine assay on DCBTF was reported to result in no increase in the number of reverse mutations compared to controls. DCBTF was administered by gavage to male CD-1 mice (50, 167 and 500 mg/kg over a 2-day period; 7 animals per group). Aliquots of urine from treated animals resulted in no increase compared to controls in the number of reverse mutations per plate.[4]

Oncogenicity

No data on the oncogenic potential of DCBTF were found.

Current Standards and Guidelines

Under the State Sanitary Code (10 NYCRR Part 5, Public Water Supplies), the New York State Department of Health has established a maximum contaminant level of 5 ug/L for "Principal Organic Contaminants" such as DCBTF in drinking water.[3]

DERIVATION OF VALUE

Groundwater

3,4-Dichlorobenzotrifluoride is a principal organic contaminant with a maximum contaminant level of 5 ug/L under New York State Department of Health regulations as described above. The ambient groundwater standard for 3,4-dichlorobenzotrifluoride is 5 ug/L because former groundwater regulations included 10 NYCRR Subpart 5-1 general standards by reference.

Surface Water

3,4-Dichlorobenzotrifluoride belongs to one of the principal organic contaminant classes as defined in 6NYCRR 700.1. The most stringent value that can be derived for this substance using the procedures in 6NYCRR 702.3 through 702.7 is 5 ug/L, required under 702.3(b) for substances belonging to any principal organic contaminant class. Therefore, the ambient surface water quality value for 3,4-dichlorobenzotrifluoride is 5 ug/L.

REFERENCES

U.S. Environmental Protection Agency (U.S. EPA). 1987. Testing consent order on 3,4-Dichlorobenzotrifluoride and response to the Interagency Testing Committee. Final Rule. Fed. Reg. 52: 23547-23548. June 23, 1987.

Information Review #346 (Draft). 1983. 3,4-Dichlorobenzotrifluoride. TSCA Interagency Testing Committee. U.S. EPA. Washington, D.C.

10 NYCRR Part 5, Drinking Water Supplies (Statutory Authority: Public Health Law Section 225). Subpart 5-1. January, 1989. New York State Department of Health.

Technical Support Document. 1985. 3,4-Dichlorobenzotrifluoride. SRC-TR-85-226. Syracuse Research Corp. Prepared for Test Rules Development Branch. Office of Toxic Substances. Washington, D.C.

SEARCH STRATEGY

The following reference sources were reviewed:

- Index Medicus, 1981 - Feb. 1991.
- Chemical Abstracts, 1979-1988.
- The following databases through 3/91: Toxline, Toxlit 65 and Toxlit, Chemline, and Hazardous Substances Data Bank (HSDB).
- U.S. Environmental Protection Agency. 1991. Integrated Risk Information System (IRIS) Database. Washington, DC: Office of Health and Environmental Assessment. (March 1, 1991).
- National Research Council. Drinking Water and Health, Volumes 1-9. Safe Drinking Water Committee, Board on Toxicology and Environmental Health Hazards, Commission on Life Sciences. Washington, DC: National Academy Press.
- International Agency for Research on Cancer (IARC). IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Volumes 1-47. Lyon, France: IARC.

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