

VALUE(S) ADDED 7-24-85

FACT SHEET REVISED _____

VALUE(S) REMOVED _____

STANDARDS DOCUMENTATION

CHEMICAL: 1,1,2,2-Tetrachloroethane

CAS NO.(s): 79-34-5

BASIS (Human/Aquatic): Human

WATER CLASSIFICATION: AA; AA-s; A; A-s

STANDARD: 0.2 ug/l **Note A**

REMARKS:

SUMMARY INFORMATION:

The toxicologic data base for this compound has been reviewed.^{1,2} It is an animal oncogen as defined in Part 701.1(p). Chronic exposure of laboratory animals to gavage doses of this compound has resulted in a significant increase in the incidence of liver tumors in male and female mice.³ It has also shown genotoxic activity in short-term tests.⁴

STANDARD DERIVATION:

Dose-response data from a National Cancer Institute³ carcinogenesis bioassay were used for extrapolation. Using the protocol in Part 701.4 and a linearized multistage extrapolation procedure (GLOBAL82)⁶, a 1,1,2,2-tetrachloroethane concentration of 0.2 ug/l in water was calculated to correspond to an increased human cancer risk of 1×10^{-6} over a lifetime (see calculations below). The recommended ambient water quality standard for 1,1,2,2-tetrachloroethane is 0.2 ug/l.

Calculations:

1. National Cancer Institute Bioassay Data

The incidence of liver tumors in female mice given time-weighted average doses of 0, 142 and 282 mg/kg of 1,1,2,2-tetrachloroethane via gavage on 5 days each week during the exposure period is the dose-response data for the most sensitive tumor type in the most sensitive species and sex, occurring at a statistically significant level.

2. Average Daily Intake (for animals)*

Average Daily Intake
During Lifetime

0 mg/kg/day
88 mg/kg/day
175 mg/kg/day

*Exposure was only for 5 days a week; therefore, time-weighted average doses on treatment days were multiplied by 5/7 to calculate average daily doses during the exposure period. In addition, mice lived an additional 12 weeks without exposure after being exposed for 78 weeks; therefore, average daily doses during exposure were multiplied by 0.87 to calculate average daily doses during lifetime.

3. Data Input for GLOBAL82 Computer Program

<u>Dose</u> <u>(mg/kg/day)</u>	<u>Number of animals</u> <u>with tumors</u>	<u>Number of</u> <u>experimental animals</u>
0	0	20
88	30	48
175	43	47

4. GLOBAL82 Result (for animals)

The lower 95% confidence limit value of the 1,1,2,2-tetrachloroethane dose corresponding to an increased lifetime cancer risk of 1×10^{-6} for the experimental animals was 0.067 ug/kg/day.

5. Conversion of the animal dose (ug/kg/day) to a human dose using surface area conversion rule

rodent dose (ug/kg/day) $\times \left(\frac{\text{animal body wt. (kg)}}{\text{human body wt. (kg)}} \right)^{0.33} =$ human dose (ug/kg/day)

0.067 ug/kg/day $\times \left(\frac{0.035 \text{ kg}}{70 \text{ kg}} \right)^{0.33} =$ 0.0054 ug/kg/day

6. Calculation of the 1,1,2,2-tetrachloroethane level in water corresponding to an increased cancer risk of 1×10^{-6} for a 70 kg human ingesting 2 liters of contaminated water per day over a lifetime.

$$\frac{0.0054 \text{ ug/kg/day} \times 70 \text{ kg}}{2 \text{ l/day}} = 0.19 \text{ ug/l}$$

REFERENCES:

- (1) International Agency for Research on Cancer. 1979. IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. 20: 477-489.
- (2) U.S. Environmental Protection Agency. 1980. Ambient water quality criteria for chlorinated ethanes. NTIS No. PB81-117400.
- (3) National Cancer Institute. 1978. Bioassay of 1,1,2,2-tetrachloroethane for possible carcinogenicity. Carcinogenesis Tech. Rep. Ser. No. 27.
- (4) Brem, H. et al. 1974. The mutagenicity and DNA-modifying effect of haloalkanes. Cancer Res. 34: 2576-2579.
- (5) Howe, R.B. and K.S. Crump. 1982. GLOBAL82 Computer Program. Science Research Systems, Inc., Ruston, LA.

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