

VALUE(S) ADDED 7-24-85

FACT SHEET REVISED _____

VALUE(S) REMOVED _____

AMBIENT SURFACE WATER QUALITY
STANDARDS DOCUMENTATION

CHEMICAL: Bis(2-chloroethyl) ether (BCEE)

CAS NO.(s): 111-44-4

BASIS (Human/Aquatic): Human

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

STANDARD: 0.03 ug/l Note A

REMARKS:

SUMMARY INFORMATION:

The toxicologic data base for this compound has been reviewed.¹⁻³ It is an animal oncogen as defined in Part 701.1(p). Chronic exposure of laboratory animals to this compound via the diet has resulted in a significant increase in the incidence of liver tumors in two strains of mice.⁴

STANDARD DERIVATION:

Dose-response data from the Innes *et al.*⁴ bioassay were used for extrapolation. Using the protocol in Part 701.4 and a linearized multistage extrapolation procedure (GLOBAL82)⁵, a BCEE concentration of 0.03 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 BCEE is 0.03 ug/l.

Calculations:

1. Innes *et al.* Bioassay Data

The incidence of liver tumors in male mice dosed by gavage for three weeks (0 or 100 mg/kg/day) and fed BCEE in the diet at levels of 0 and 300 ppm during the remainder of 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)*

<u>Concentration in diet</u>	<u>Average Daily Intake During Lifetime</u>
0	0 mg/kg/day
300 ppm	33 mg/kg/day

*Since specific information on food consumption was not provided, the general formula ppm in diet x 0.10 = daily dose in mg/kg/day was used to calculate the average daily intake for mice at each dose level during dietary exposure. This dose was combined with the gavage dose to calculate time-weighted average daily doses during lifetime.

3. Data Input for GLOBAL82 Computer Program

<u>Dose (mg/kg/day)</u>	<u>Number of animals with tumors</u>	<u>Number of experimental animals</u>
0	8	79
33	14	16

4. GLOBAL82 Result (for animals)

The lower 95% confidence limit value of the BCEE dose corresponding to an increased lifetime cancer risk of 1×10^{-6} for the experimental animals was 9.8×10^{-3} ug/kg/day.

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

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

$$9.8 \times 10^{-3} \text{ ug/kg/day} \times \left(\frac{0.03 \text{ kg}}{70 \text{ kg}} \right)^{0.33} = 7.6 \times 10^{-4} \text{ ug/kg/day}$$

6. Calculation of the BCEE 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.

$$\frac{0.00076 \text{ ug/kg/day} \times 70 \text{ kg}}{2 \text{ l/day}} = 2.7 \times 10^{-2} \text{ ug/l}$$

REFERENCES:

- (1) National Academy of Sciences. 1977. Drinking Water and Health, Vol. 1. National Academy of Sciences. Washington, D.C.
- (2) International Agency for Research on Cancer. 1975. IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. 5: 117-123.
- (3) U.S. Environmental Protection Agency. 1980. Ambient water quality criteria for chloroalkyl ethers. NTIS No. PB81-117418.
- (4) Innes, J.R.M. et al. 1969. Bioassay of pesticides and industrial chemicals for tumorigenicity in mice; a preliminary note. J. Natl. Cancer Inst. 42: 1101-1114.
- (5) Howe, R.B. and K.S. Crump. 1982. GLOBAL82 Computer Program. Science Research Systems, Inc., Ruston, LA.

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