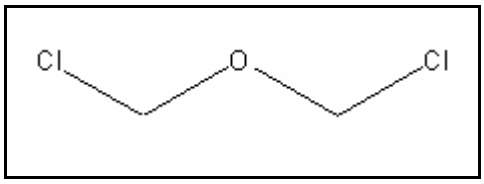
Indiana Department of Environmental Management
Office of Water – Water Quality Standards Section

TIER I HUMAN HEALTH CANCER CRITERIA

BIS(CHLOROMETHYL) ETHER

CAS RN:	542-88-1
Water Solubility:	22,000 mg/L
Log K_{ow}:	1.04^{P}
Risk Associated Dose:	4.5×10^{-8} mg/kg/day
Carcinogenicity Weight-of-Evidence Classification:	Class A; Human Carcinogen



Standard

The human health cancer bis(chloromethyl)ether criterion for drinking water sources is 0.0016 µg/L. The human health cancer criterion for nondrinking water sources is 0.11 µg/L.

Calculations

Bioaccumulation Factor:

BAF predicted based on Log K_{ow}

Log K_{ow} = 1.04 (CLOGP), K_{ow} = 10.96

Trophic level 3 FCM = 1.0; trophic level 4 FCM = 1.0

$f_{fd} = 1/(1+(0.00000024\ kg/L)(K_{ow})) = 1.00$

Baseline $BAF_{T3} = (FCM)(K_{ow}) = (1.0)(10.96) = 10.96$

Baseline $BAF_{T4} = (1.000)(10.96) = 10.96$

Human health $BAF_{T3} = [(10.96)(0.0182)+1](1.00) = 1.200$

Human health BAF_{T4} = [(10.96)(0.0310)+1](1.00) =1.340

Acceptable Daily Exposure:

From the IRIS database:

Critical Effect: Liver and kidney pathology

$RAD = 0.00001/q1^* = 0.00001/220$
$= 4.5 \times 10^{-8}$

Where:

RAD = Risk Associated Dose (mg/kg/day)
$q1^*$ = Cancer Slope Factor

Calculation of Criteria:

Non Drinking Water HCC =$[(4.5 \times 10^{-8})(70)]/0.01+[(0.0036)(1.200)+(0.0114)(1.340)]$

= **0.11 μg/L**

Drinking Water HCC = $[(4.5 \times 10^{-8})(70)]/2+[(0.0036)(1.200)+(0.0114)(1.340)]$

= **0.0016 μg/L**

References

1. USEPA 1991. Integrated Risk Information System (IRIS database) chemical file for BCME (CASRN 542-88-1).

2. Leo,A. and D.Weininger 1997. Daylight Software CLogP Version 3.15+ for Unix Pomona Medical Chemistry Project, Pomona College, Claremont, CA. Distributed by Daylight Chemical Information Systems, Inc., 3952 Claremont St., Irving, CA 92714 (Reference for the Log K_{ow})

Acronyms

ADE	Acceptable Daily Exposure
BAF	Bioaccumulation Factor
CAS RN	Chemical Abstract Service Registry Number
FCM	Food Chain Multiplier
IRIS	Integrated Risk Information System
K_{ow}	Octanol-Water Partition Coefficient
LOAEL	Lowest observed adverse effect level
NOAEL	No observed adverse effect level
P (superscript)	Predicted value
UF	Uncertainty factor

Revision History

June 18, 1999 - Criteria first developed
March 31, 2000 – Criteria rechecked (no modifications). Fact sheet updated.

Contact Information

David B. Kallander
Water Quality Standards Section
Indiana Department of Environmental Management
100 North Senate Ave., P.O. Box 6015
Indianapolis, IN 46206-6015
(317) 233-2472
Email: dkalland@dem.state.in.us