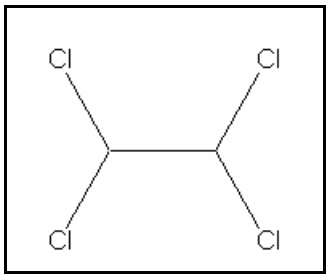
Indiana Department of Environmental Management
Office of Water - Water Quality Standards Section

TIER II HUMAN HEALTH CANCER VALUES

1,1,2,2-TETRACHLOROETHANE

CAS RN:	75-27-4
Water Solubility:	0.2962 g/100 mL
Log K_{ow}:	2.644^{P}
Risk Associated Dose:	5 x 10^{-5} mg/kg/day
Carcinogenicity Weight-of-Evidence Classification:	Class C; Possible human carcinogen



Standard

The human health cancer 1,1,2,2-tetrachloroethane value for drinking water sources is 1.6 µg/L. The human health cancer value for nondrinking water sources is 17 µg/L.

Calculations

Bioaccumulation Factor:

BAF predicted based on Log K_{ow} and measured BCF (from Stephan 1993)
Log K_{ow} = 2.644 (CLOGP), K_{ow} = 440.6, BCF = 8, Percent lipid = 4.8
Trophic level 4 FCM = 1.010; trophic level 3 FCM = 1.002

f_{fd} = 1/(1+(0.00000024 kg/L)(K_{ow})) = 1.0

Baseline BAF_{T3} = (1.010)[(8/1.0)-1](1/0.048) = 147.3

Baseline BAF_{T4} = (1.002)[(8/1.0)-1](1/0.048) = 146.1

Human health BAF_{T3} = [(147.3)(0.0182)+1](0.998) = 3.681

Human health BAF_{T4} = [(146.1)(0.0310)+1](0.998) = 5.530

Risk Associated Dose:

From the IRIS database:

$RAD = 0.00001/q1^{*} = 0.00001/ 0.2$
$= 5 \times 10^{-5}$ mg/kg/day

Where:

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

Calculation of Criteria:

Non Drinking Water HCV = $[(5 \times 10^{-5})(70)]/0.01+[(0.0036)(3.681)+(0.0114)(5.530)]$

= **17 μg/L**

Drinking Water HCV = $[(5 \times 10^{-5})(70)]/2+[(0.0036)(3.681)+(0.0114)(5.530)]$

= **1.6 μg/L**

References

1. USEPA 1994. Integrated Risk Information System (IRIS database) chemical file for 1,1,2,2-tetrachloroethane (CAS # 79-34-5).

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
RPLC	Reverse-phase Liquid Chromatography
UF	Uncertainty factor

Revision History

September 29, 2000 - Values first developed. Noncancer criteria withdrawn.

Contact Information

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