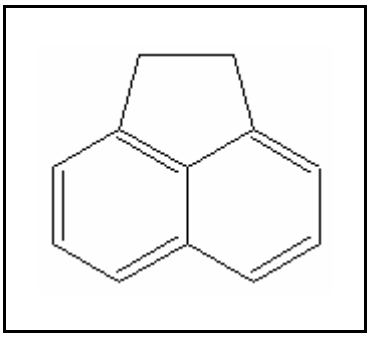
Indiana Department of Environmental Management
Office of Water - Water Quality Standards Section

TIER I HUMAN HEALTH NONCANCER CRITERIA

ACENAPHTHENE

CAS RN:	83-32-9
Water Solubility:	3.47 mg/L
Log K_{ow}:	3.92
Reference Dose:	0.058 mg/kg/day
Carcinogenicity Weight-of-Evidence Classification:	None



Standard

The human health noncancer acenaphthene criterion for drinking water sources is 1200 µg/L.
The human health noncancer criterion for nondrinking water sources is 4200 µg/L.

Calculations

Bioaccumulation Factor:

BAF predicted based on Log K_{ow} and measured BCF (from Stephan 1993)
Log K_{ow} = 3.92 (generator-column method), K_{ow} = 8318, BCF = 80.6, Percent lipid = 4.8
Trophic level 4 FCM = 1.202; trophic level 3 FCM = 1.054

$f_{fd} = 1/(1+(0.00000024\ kg/L)(K_{ow})) = 0.998$

Baseline $BAF_{T3} = (1.202)[(80.6/0.998)-1](1/0.048) = 1,997$

Baseline $BAF_{T4} = (1.054)[(80.6/0.998)-1](1/0.048) = 1751$

Human health $BAF_{T3} = [(1,997)(0.0182)+1](0.998) = 37.27$

Human health BAF_{T4} = [(1,751)(0.0310)+1](0.998) = 55.17

Acceptable Daily Exposure:

From the IRIS database:

Critical Effect: Hepatotoxicity

$$ADE = \frac{NOAEL}{UF} = \frac{175\ mg/kg\text{-}day}{3000} = 0.05833\ mg/kg/d$$

Calculation of Criteria:

Non Drinking Water HNC = [(0.05833)(70)(0.8)]/0.01+[(0.0036)(37.27)+(0.0114)(55.17)]

= **4200 μg/L**

Drinking Water HNC = [(0.05833)(70)(0.8)]/2+[(0.0036)(37.27)+(0.0114)(55.17)]

= **1200 μg/L**

References

1. Stephen, C.E. 1993. Derivation of Proposed Human Health and Wildlife Bioaccumulation Factors for the Great Lakes Initiative. Environmental Research Laboratory, Office of Research and Development, U.S. EPA, Duluth, MN.

2. USEPA 1996. Integrated Risk Information System (IRIS database) chemical file for acenaphthene (83-32-9). Oral RfD assessment verfication date 11/15/89.

3. Miller, M.M., S.P. Wasik, G.-L. Huang, W.-Y. Shiu, and D. Mackay 1985. Relationships between octanol-water coefficient and aqueous solubility. Environ. Sci. Technol. 19: 522-529. (Reference for the Log K_{ow})

Acronyms/Abbreviations

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

July 7, 1997 - Criteria first developed
March 20, 2000 – Criteria rechecked (no modifications). Fact sheet updated.

Contact Information

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