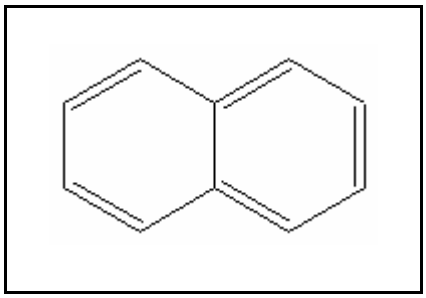
Indiana Department of Environmental Management
Office of Water - Water Quality Standards Section

TIER I HUMAN HEALTH NONCANCER CRITERIA

NAPHTHALENE

CAS RN:	91-20-3
Water Solubility:	0.0031 g/100 mL
Log K_{ow}:	3.25^{P}
Reference Dose:	0.024 mg/kg/day
Carcinogenicity Weight-of-Evidence Classification:	Class C; Possible human Carcinogen



Standard

The human health noncancer naphthalene criterion for drinking water sources is 490 µg/L. The human health noncancer criterion for nondrinking water sources is 1,900 µg/L.

Calculations

BAF predicted based on Log K_{ow} and measured BCF (from Stephan 1993)
Log K_{ow} = 3.35 (generator-column method), K_{ow} = 2,239
BCF = 16.5, Percent lipid = 1.0; Trophic level 3 FCM = 1.067
Trophic level 4 FCM = 1.014;

$f_{fd} = 1/(1+(0.00000024\ kg/L)(K_{ow})) = 0.999$

Baseline $BAF_{T3} = (1.067)[(16.5/0.999)-1](1/0.01) = 1,656$

Baseline $BAF_{T4} = (1.014)[(16.5/0.999)-1](1/0.01) = 1,573$

Human health $BAF_{T3} = [(1,656)(0.0182)+1](0.999) = 31.11$

Human health BAF_{T4} = [(1,573)(0.0310)+1](0.999) = 49.71

Acceptable Daily Exposure:

From the IRIS database:

Critical Effect: Decreased mean terminal body weight in males

$$ADE = \frac{NOAEL}{UF} = \frac{71 \text{ mg/kg-day}}{3000} = 0.023667 \text{ mg/kg/d}$$

Calculation of Criteria:

Non Drinking Water HNC = [(0.023667)(70)(0.8)]/0.01+[(0.0036)(31.11)+(0.0114)(49.71)]

= **1,900 μg/L**

Drinking Water HNC = [(0.023667)(70)(0.8)]/2+[(0.0036)(31.11)+(0.0114)(49.71)]

= **490 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. 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

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

October 1, 1998 - Criteria first developed
July 26, 2000 – Fact sheet updated. No modifications to criteria.

Contact Information

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