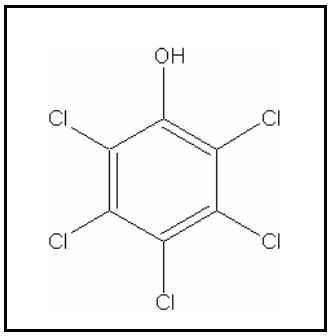
Indiana Department of Environmental Management
Office of Water - Water Quality Standards Section

TIER I HUMAN HEALTH CANCER CRITERIA

PENTACHLOROPHENOL

CAS RN:	87-86-5
Water Solubility:	0.0014 g/100 mL
Log K_{ow}:	5.01
Risk Associated Dose:	8.333 x 10^{-5} mg/kg/day
Carcinogenicity Weight-of-Evidence Classification:	Class B2; Probable human carcinogen



Standard

The human health cancer pentachlorophenol criterion for drinking water sources is 2.8 µg/L.
The human health cancer criterion for nondrinking water sources is 84 µg/L.

Calculations

Bioaccumulation Factor:

BAF predicted based on Log K_{ow} and measured BCF (from Stephan 1993)
Log K_{ow} = 5.01 (RPLC), K_{ow} = 102,329, BCF = 40.63, Percent lipid = 1
Trophic level 3 FCM = 3.181; trophic level 4 FCM = 2.612

f_{fd} = 1/(1+(0.00000024 kg/L)(K_{ow})) = 0.9760

Baseline BAF_{T3} = (3.181)[(40.63/0.9760)-1](1/0.01) = 129.2

Baseline BAF_{T4} = (2.612)[(40.63/0.9760)-1](1/0.01) = 106.1

Human health BAF_{T3} = [(129,2)(0.0182)+1](0.9760) = 3.272

Human health BAF_{T4} = [(106.1)(0.0310)+1](0.9760) = 4.187

Risk Associated Dose:

From the IRIS database:

$RAD = 0.00001/q1^* = 0.00001/0.12$
$= 8.333 \times 10^{-5}$

Where:

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

Calculation of Criteria:

Non Drinking Water HCC = $[(8.333 \times 10^{-5})(70)]/0.01+[(0.0036)(3.272)+(0.0114)(4.187)]$

= **84 µg/L**

Drinking Water HCC = $[(8.333 \times 10^{-5})(70)]/2+[(0.0036)(3.272)+(0.0114)(4.187)]$

= **2.8 µg/L**

References

1. USEPA 1993. Integrated Risk Information System (IRIS database) chemical file for pentachlorophenol (87-86-5).

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

September 14, 2000 - Criteria first developed.

Contact Information

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