OHIO EPA SURFACE WATER QUALITY CRITERION FACT SHEET

Chemical Name: Phenanthrene Developed by: Chris J. Skalski
CAS # 85-01-8 Data Retrieval Date: 4-17-01
Internal Code # 109 Fact Sheet Preparation Date: 3-01-06
Reviewed by: Bob Heitzman

ACUTE DATA

SPECIES	EC_{50}/LC_{50} (µg/l)	TEST TYPE[a]	DURATION (HOURS)	SMAV[b] (µg/l)	GMAV[b] (µg/l)	REFERENCE NUMBER
Cladoceran	207	S,U	48	558	609	1
Daphnia magna	383	S,U	48			2
	700	S,U	48			3
	843	S,U	48			4
	1,158	S,U	48			5
Cladoceran	350	S,U	48	664		6
Daphnia pulex	734	S,U	48			7
	1,140	S,M	48			8
Midge	490	S,M	48	490	490	3
Chironomus tentans						
Rainbow Trout	3,200	S,U	96	3,200	3,200	9
Oncorhynchus mykiss						

[a] S = static; U = unmeasured; M = measured.
[b] SMAV = Species Mean Acute Value; GMAV = Genus Mean Acute Value.

CHRONIC DATA

SPECIES	CHRONIC VALUE (µg/l)	METHOD	SMCV[a] (µg/l)	GMCV[a] (µg/l)	REFERENCE NUMBER
Rainbow Trout	38-75	Early Life Stage	53.39	53.39	10
Oncorhynchus mykiss	53.39				

[a] SMCV = Species Mean Chronic Value; GMCV = Genus Mean Chronic Value.

REFERENCES

1. Abernethy, S., A.M. Bobra, W.Y. Shiu, P.G. Wells and D. MacKay. 1986. Acute Lethal Toxicity of Hydrocarbons and Chlorinated Hydrocarbons to Two Planktonic Crustaceans: The Key Role of Organism-Water Partitioning. Aquat. Toxicol. 8(3):162-174.

2. Munoz, M.J. and J.V. Tarazona. 1993. Synergistic Effect of Two- and Four-Component Combinations of the Polycyclic Aromatic Hydrocarbons; Phenanthrene, Anthracene, Naphthalene and Acenaphthene on *Daphnia magna*. Bull. Environ. Contam. Toxicol. 50(3):363-368.

3. Millemann, R.E., W.J. Birge, J.A. Black, R.M. Cushman, K.L. Daniels, P.J. Franco, J.M. Giddings, J.F. McCarthy and A.J. Stewart. 1984. Comparative Acute Toxicity to Aquatic Organisms of Components of Coal-Derived Synthetic Fuels. Trans. Am. Fish. Soc. 113(1):74-85.

4. Eastmond, D.A., G.M. Booth and M.L. Lee. 1984. Toxicity, Accumulation, and Elimination of Polycyclic Aromatic Sulfur Hetercycles in *Daphnia magna*. Arch. Environ. Contam. Toxicol. 13(1):105-111.

5. Bobra, A.M., W.Y. Shiu and D. MacKay. 1983. A Predictive Correlation for the Acute Toxicity of Hydrocarbons and Chlorinated Hydrocarbons to the Water Flea (*Daphnia magna*). Chemosphere 12(9-10):1121-1129.

6. Smith, S.B., J.F. Savino and M.A. Blouin. 1988. Acute Toxicity to *Daphnia pulex* of Six Classes of Chemical Compounds Potentially Hazardous to Great Lakes Aquatic Biota. J. Great Lakes Res. 14(4):394-404.

7. Passino, D.R.M. and S.B. Smith. 1987. Acute Bioassays and Hazard Evaluation of Representative Contaminants Detected in Great Lakes Fish. Environ. Toxicol. Chem. 6(11):901-907.

8. Geiger, J.G. and A.L. Buikema, Jr. 1981. Oxygen Consumption and Filtering Rate of *Daphnia pulex* After Exposure to Water-Soluble Fractions of Naphthalene, Phenanthrene, No. 2 Fuel Oil, and Coal-Tar Creosote. Bull. Environ. Contam. Toxicol. 27:783-789.

9. Edsall, C.C. 1991. Acute Toxicities to Larval Rainbow Trout of Representative Compounds Detected in Great Lakes Fish. Bull. Environ. Contam. Toxicol. 46(2):173-178.

10. Passino-Reader, D.R., W.H. Berlin and J.P. Hickey. 1995. Chronic Bioassays of Rainbow Trout Fry with Compounds Representative of Contaminants in Great Lakes Fish. J. Great Lakes Res. 21(3):373-383.

Chemical Name: Phenanthrene Developed by: Chris J. Skalski
CAS # 85-01-8 Data Retrieval Date: 4-17-01
Internal Code # 109 Fact Sheet Preparation Date: 3-01-06
Reviewed by: Bob Heitzman

CALCULATION OF ACUTE AQUATIC VALUE (AAV)[a]

Data Requirement OAC 3745-1-36(A)(1)	SPECIES	GMAV (µg/l)
(a)	Rainbow Trout	3,200
(d)	*Daphnia sp.*	609
(f)	Midge	490

Secondary Acute Factor (SAF) = 8.0

Secondary Acute Value (SAV) = Lowest GMAV ÷ SAF
= 490 ÷ 8.0
= 61.25 = 61 µg/l

Tier II Acute Aquatic Value (AAV) = SAV ÷ 2
= 61.25 ÷ 2
= 31 µg/l

CALCULATION OF CHRONIC AQUATIC VALUE (CAV)[a]

Experimentally determined Acute-Chronic Ratios (ACRs):

SPECIES	ACUTE VALUE (µg/l)	CHRONIC VALUE (µg/l)	ACUTE-CHRONIC RATIO		SPECIES MEAN ACR
Rainbow Trout *Oncorhynchus mykiss*	3,200	53	60	60	

Secondary Acute-Chronic Ratio (SACR) = $\sqrt[3]{(59.94)(18)(18)} = 26.89$

Chronic Aquatic Value (CAV) = SAV ÷ SACR
= 61.25 ÷ 26.89
= 2.3 µg/l

Chemical Name: Phenanthrene Developed by: Chris J. Skalski
CAS # 85-01-8 Data Retrieval Date: 4-17-01
Internal Code # 109 Fact Sheet Preparation Date: 3-01-06
Reviewed by: Bob Heitzman

[a]See Ohio Administrative Code 3745-1-36 effective February 22, 2002.