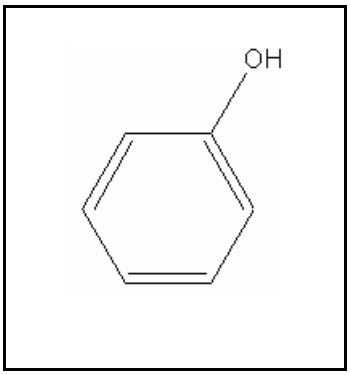
Indiana Department of Environmental Management
Office of Water Quality - Water Quality Standards Section

TIER I ACUTE AND TIER II CHRONIC AQUATIC LIFE VALUES

PHENOL

CAS RN: 108-95-2
Water Solubility: 8.28 g/100 mL
Log K_{ow}: 1.46



Standard

The procedures described in the Tier I and Tier II methodologies indicate that, except possibly where a locally important species is very sensitive, aquatic organisms should not be affected unacceptably if the four (4) day average concentration of phenol does not exceed 180 µg/L more than once every three (3) years on the average and if the one (1) hour average concentration does not exceed 1,300 µg/L more than once every three (3) years on the average.

Calculations

Acute Aquatic Life:

Four Lowest GMAVs:

Bluegill	20,393 µg/L
White Sucker	10,600 µg/L
Rainbow Trout	10,073 µg/L
Cladoceran	3,100 µg/L

$S^2 = 49.7691$

$S = 7.0547$

L = 6.3132

A = 7.8907

FAV = 2,672

CMC = FAV/2 = **1,300 μg/L**

Chronic Aquatic Life:

SCV = SAV/SACR

SACR = 14.75 (geometric mean of 18, 18, and 9.898)

SCV = 2,672/14.75 = **180 μg/L**

Calculation of ACR's

Fathead Minnow

MATC = 2,556 μg/L (geometric mean of LOEC and NOEC)

ACR = LC_{50}/MATC = 25,300/2,556 = 9.898

Data

Table 1. GMAVs and SMAVs for phenol

Genus Mean Acute Value (μg/L)	Species	Species Mean Acute Value (μg/L)	Acute-Chronic Ratio	Reference Number
30,772	Fathead Minnow Pimephales promelas	28,000		1
	Fathead Minnow Pimephales promelas	24,900		2
	Fathead Minnow Pimephales promelas	23,000		3
	Fathead Minnow Pimephales promelas	43,700		3

	Fathead Minnow Pimephales promelas	31,200	3
	Fathead Minnow Pimephales promelas	25,600	4
	Fathead Minnow Pimephales promelas	34,300	5
	Fathead Minnow Pimephales promelas	32,000	5
	Fathead Minnow Pimephales promelas	28,800	6
	Fathead Minnow Pimephales promelas	32,400	6
	Fathead Minnow Pimephales promelas	49,700	6
	Fathead Minnow Pimephales	25,300	15
10,073	Rainbow Trout Oncorhynchus mykiss	8,900	2
	Rainbow Trout Oncorhynchus mykiss	9,900	7
	Rainbow Trout Oncorhynchus mykiss	11,600	8
20,393	Bluegill Lepomis macrochirus	23,900	5
	Bluegill Lepomis macrochirus	17,400	15
39,200	Guppy Poecilia reticulata	39,200	5
44,500	Goldfish Carassius auratus	44,500	5

36,300	Flagfish Jordanella floridae	36,300	8
34,823	Cladoceran Daphnia magna	15,000	9
	Cladoceran Daphnia magna	14,500	10
	Cladoceran Daphnia magna	13,300	10
	Cladoceran Daphnia magna	11,200	10
	Cladoceran Daphnia magna	12,000	11
	Cladoceran Daphnia magna	19,800	4
	Cladoceran Daphnia magna	6,600	12
	Cladoceran Daphnia magna	4,240	13
	Cladoceran Daphnia magna	10,700	13
	Cladoceran Daphnia magna	12,600	15
	Cladoceran Daphnia pulicaria	109,000	2
3,100	Cladoceran Ceriodaphnia dubia	3,100	14
10,600	White Sucker Catostomus commersoni	10,600	15
>51,100	Midge Tanytarsus dissimilis	>51,100	15
>51,100	Snail Aplexa hypnorum	>51,100	15

>51,100	Clawed Frog Xenopus laevis	>51,100	15
25,000	Isopod Asellus intermedius	25,000	16
>100,000	Annelid Lumbriculus variegatus	>100,000	16

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Acronyms/Abbreviations

CAS RN	Chemical Abstract Service Registry Number
K_{ow}	Octanol-Water Partition Coefficient
P (superscript)	Predicted value

SAV	Secondary Acute Value
GMAV	Genus Mean Acute Value
SAF	Secondary Acute Factor
SMC	Secondary Maximum Concentration
SCC	Secondary Continuous Concentration
SACR	Secondary Acute-Chronic Ratio
FT	Flow-through
S	Static
U	Unmeasured
M	Measured
EVISTRA	Evaluation and Interpretation of Suitable Test Results in AQUIRE (EPA quality checking method/database)

Revision History

April 7, 1999	Values first developed
September 19, 2001	New search for data. No studies added.
May 22, 2002	Isopod and annelid data added. Tier I acute criterion calculated.

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