OHIO EPA SURFACE WATER QUALITY CRITERION FACT SHEET

Chemical Name: Cobalt Developed by: Chris J. Skalski
CAS # 7440-48-4 Data Retrieval Date: 1-29-98
Internal Code # Fact Sheet Preparation Date: 3-01-06

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	3,400	S,U	48	2,682	1,882	1
Daphnia magna	5,150	S,U	48			2
	6,830	S,U	48			2
	6,000[c]	S,U	48			3
	5,500	S,U	48			3
	1,490	S,U	48			5
	1,620	S,U	48			6
	1,110	S,U	48			6
	1,520	S,U	48			7
Cladoceran	1,320	S,U	48	1,320		8
Daphnia hyalina						
Copepod	15,500	S,U	48	15,500	15,500	8
Cyclops abyssorum						
Copepod	4,000	S,U	48	4,000	4,000	8
Eudiaptomus padanus						
Fathead Minnow	3,750	F,U	96	6,584	6,584	2
Pimephales promelas	3,460	F,U	96			2
	22,000	S,U	96			9
Goldfish	66,800	S,U	96	66,800	66,800	1
Carassius auratus						
Carp	82,700	S,U	96	82,700	82,700	1
Cyprinus carpio						
Flatworm	12,000	S,U	96	12,000	12,000	9
Dugesia tigrina						
Mayfly	16,000	S,U	96	16,000	16,000	4
Ephemerella subvaria						
Amphipod	39,200	R,U	96	39,200	39,200	10
Crangonyx pseudogracilis						
Crayfish	10,200	S,M	96	10,200	10,200	11
Orconectes limosus						

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

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Amphipod *Gammarus fasciatus*	>50,000	S,U	96	>50,000	>50,000	9
Snail *Helisoma trivolvis*	>50,000	S,U	96	>50,000	>50,000	9
Oligochaete *Lumbriculus variegatus*	>50,000	S,U	96	>50,000	>50,000	9
Isopod *Asellus intermedius*	>50,000	S,U	96	>50,000	>50,000	9
Tubificid Worm *Tubifex tubifex*	139,320	R,U	96	139,320	139,320	12
Frog *Rana hexadactyla*	17,590	R,U	96	17,590	17,590	13

[a] S = static; R = renewal; F = flow through; U = unmeasured; M = measured.
[b] SMAV = Species Mean Acute Value; GMAV = Genus Mean Acute Value.
[c] Duplicate data not used to calculate the SMAV.

CHRONIC DATA

SPECIES	CHRONIC VALUE (µg/l)	METHOD	SMCV[a] (µg/l)	GMCV[a] (µg/l)	REFERENCE NUMBER
Fathead Minnow *Pimephales promelas*	210-390 286	Embyro-Larval	286	286	2
Cladoceran *Daphnia magna*	2.8-9.3 5.1	Life Cycle	5.1	5.1	2

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

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CALCULATION OF ACUTE AQUATIC VALUE (AAV)[a]

Data Requirement OAC 3745-1-36(A)(1)	SPECIES	GMAV (µg/l)
(b)	Goldfish	66,800
(c)	Fathead Minnow	6,584
(d)	*Daphnia sp.*	1,882
(e)	Crayfish	10,200
(f)	Mayfly	16,000
(g)	Snail	>50,000
(h)	Flatworm	12,000

Secondary Acute Factor (SAF) = 4.3

Secondary Acute Value (SAV) = Lowest GMAV ÷ SAF
= 1,882 ÷ 4.3
= 438 = 440 µg/l

Tier II Acute Aquatic Value (AAV) = SAV ÷ 2
= 438 ÷ 2
= 219 = 220 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
Fathead Minnow *Pimephales promelas*	3,602	286	12.59	12.59[b]
Cladoceran *Daphnia magna*	5,931	5.1	1,163	1,163[b]

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

Chronic Aquatic Value (CAV) = SAV ÷ SACR
= 438 ÷ 18
= 24 µg/l

[a]See Ohio Administrative Code 3745-1-36 effective February 22, 2002.
[b]These ACRs cannot be averaged because they vary by more than a factor of 10. The default ACR is

therefore used in calculated the SACR.