Fact Sheet Date: March 12, 1998

NEW YORK STATE
- AQUATIC FACT SHEET -

Ambient Water Quality Value for Protection of Aquatic Life

SUBSTANCE: gamma-Hexachlorocyclohexane **CAS REGISTRY NUMBER:** 58-89-9

TYPE:	BASIS:	FRESHWATER AMBIENT WATER QUALITY VALUE (ug/L):
Acute	Survival	0.95

INTRODUCTION

This value applies to the water column and is derived to protect aquatic life from the effects of waterborne contaminants. Values for the protection of survival of aquatic life are referred to as Aquatic (Acute) or A(A) values.

SUMMARY OF INFORMATION AND DERIVATION OF VALUE

U.S. EPA (1995a,b) has derived an acute aquatic life criterion for gamma-hexachlorocyclohexane (lindane) for the Great Lakes Water Quality Initiative (GLI). The Department has reviewed this criterion and determined that it is based on appropriate data and derived according to the scientific procedures in current and proposed 6 NYCRR Part 702. It is thus determined to be an appropriate ambient water quality value for protection of aquatic life for New York State.

The attachment to this fact sheet provides U.S. EPA's derivation of the value. U.S. EPA's Criterion Maximum Concentration (CMC) is equivalent to New York's Aquatic (Acute) value.

REFERENCES

U.S. EPA (Environmental Protection Agency). 1995a. Final Water Quality Guidance for the Great Lakes System. 60 Federal Register: 15366 - 15425. March 23, 1995.

U.S. EPA (Environmental Protection Agency) 1995b. Great Lakes Water Quality Initiative Criteria Documents for the Protection of Aquatic Life in Ambient Water. EPA-820-B-95-004. March 1995.

New York State Department of Environmental Conservation
Division of Water
SJS
January 28, 1997

ATTACHMENT

GREAT LAKES WATER QUALITY INITIATIVE

Tier 1 Aquatic Life Criterion for Lindane

The new acceptable acute data for lindane are given in Table I1; no new acceptable chronic data were found. These new data were used with those given in Tables 1 and 2 of the criteria document for lindane (U.S. EPA 1980) to obtain the values given in Table I2.

Criterion Maximum Concentration (CMC)

The Final Acute Value (FAV) was calculated using the four lowest Genus Mean Acute Values given in Table I2, resulting in a FAV of 1.903 ug/L. This value did not need to be lowered to protect a commercially or recreationally important species of the Great Lakes System. The CMC was calculated by dividing the FAV by 2, resulting in a CMC of 0.9515 ug/L.

Criterion Continuous Concentration (CCC)

Three ACRs were given in U.S. EPA (1980) but the ACR for the fathead minnow was considered unacceptable for use here. No new ACRs were available and so a FCV could not be calculated using either the eight-family procedure or the FACR procedure. Therefore, a CCC could not be determined.

The Criterion

The procedures described in the GLI Tier 1 methodology indicate that, except possibly where a locally important species is very sensitive, aquatic organisms should not be affected unacceptably by acute toxicity if the one-hour average concentration of lindane does not exceed 0.9515 ug/L more than once every three years on the average.

Table I1. New Acute Values for Lindane

Species	Method*	Test Duration (hrs)	Acute Value (ug/L)	Reference
Cladoceran, Daphnia magna	S,U	48	516	Randall et al. 1979
Cladoceran, Daphnia magna	S,M	48	1000	Hermens et al. 1984
Amphipod, Gammarus lacustris	S,U	96	88	Mayer and Ellersieck 1986
Snail, Lymnaea stagnalis	S,U	96	3.3	Bluzat and Senge 1979
Stonefly, Pteronarcys californicus	S,U	96	4.5	Mayer and Ellersieck 1986
Stonefly, Pteronarcys californicus	S,U	96	1	Mayer and Ellersieck 1986
Damselfly, Lestes congener	S,U	96	20	Federle and Collins 1976
Backswimmer, Notonecta undulata	S,U	96	3	Federle and Collins 1976
Crawling water beetle, Peltodytes sp.	S,U	96	20	Federle and Collins 1976
Coho salmon, Oncorhynchus kisutch	S,U	96	23	Mayer and Ellersieck 1986
Lake trout, Salvelinus namaycush	S,U	96	32	Mayer and Ellersieck 1986
Lake trout, Salvelinus namaycush	S,U	96	24	Mayer and Ellersieck 1986
Brown trout, Salmo trutta	S,U	96	24	Mayer and Ellersieck 1986
Brown trout, Salmo trutta	S,U	96	25	Mayer and Ellersieck 1986
Brown trout, Salmo trutta	FT,U	96	22	Mayer and Ellersieck 1986

Table I1. (Cont).

Species	Method*	Test Duration (hrs)	Acute Value (ug/L)	Reference
Rainbow trout, Oncorhynchus mykiss	FT,M	96	22	Tooby and Durbin 1975

Rainbow trout, Oncorhynchus mykiss	S,U	96	18**	Mayer and Ellersieck 1986
Rainbow trout, Oncorhynchus mykiss	S,U	96	24**	Mayer and Ellersieck 1986
Rainbow trout, Oncorhynchus mykiss	S,U	96	31**	Mayer and Ellersieck 1986
Rainbow trout, Oncorhynchus mykiss	S,U	96	41**	Mayer and Ellersieck 1986
Rainbow trout, Oncorhynchus mykiss	FT,M	96	30	Tooby and Durbin 1975
Bluegill, Lepomis macrochirus	S,U	96	57	Randall et al. 1979
Bluegill, Lepomis macrochirus	S,U	96	56	Mayer and Ellersieck 1986
Green sunfish, Lepomis cyanellus	S,U	96	70	Mayer and Ellersieck, 1986
Green sunfish, Lepomis cyanellus	S,U	96	83	Mayer and Ellersieck 1986
Yellow perch, Perca flavescens	FT,U	96	23	Mayer and Ellersieck 1986
Fathead minnow, Pimephales promelas	FT,U	96	77	Mayer and Ellersieck 1986
Fathead minnow, Pimephales promelas	S,U	96	67	Mayer and Ellersieck 1986
Fathead minnow, Pimephales promelas	S,U	96	86	Mayer and Ellersieck 1986
Goldfish, Carassius auratus	S,U	96	90	Macek and McAllister 1970

Table I1. (Cont).

Species	Method*	Test Duration (hrs)	Acute Value (ug/L)	Reference
Goldfish, Carassius auratus	S,U	96	105	Mayer and Ellersieck 1986
Channel catfish, Ictalurus punctatus	S,U	96	49	Mayer and Ellersieck 1986
Fowlers toad, Bufo woodhousei fowleri	S,U	96	3200	Mayer and Ellersieck 1986
Western chorus frog, Pseudacris triseriata	S,U	96	2650	Mayer and Ellersieck 1986

* S = static, FT = flow-through, U = unmeasured, M = measured.
** Not used in the calculation of the SMAV because data were available for this species from a "FT,M" test.

Table I2. Ranked Genus Mean Acute Values for Lindane

Rank*	Genus Mean Acute Value (ug/L)	Species	Species Mean Acute Value (ug/L)	Species Mean Acute-Chronic Ratio
23	3200	Fowlers toad, Bufo woodhousi fowleri	3200	-----
22	2650	Western chorus frog, Pseudacris triseriata	2650	-----
21	676	Cladoceran, Simocephalus serrulatus	676	-----
20	538	Cladoceran, Daphnia magna	630	33
		Cladoceran, Daphnia pulex	460	-----
19	207	Midge, Chironomus tentans	207	63
18	138	Guppy, Poecilia reticulata	138	-----
17	117	Goldfish, Carassius auratus	117	-----
16	90	Carp, Cyprinus carpio	90	-----
15	72	Fathead minnow, Pimephales promelas	72	-----
14	71	Bluegill, Lepomis macrochirus	56	-----
		Redear sunfish, Lepomis microlophus	83	-----
		Green sunfish, Lepomis cyanellus	76	-----
13	55	Channel catfish, Ictalurus punctatus	46	-----
		Black bullhead, Ictalurus melas	64	-----

Table I2. (Cont.)

Rank*	Genus Mean Acute Value (ug/L)	Species	Species Mean Acute Value (ug/L)	Species Mean Acute-Chronic Ratio
12	40	Yellow perch, Perca flavescens	40	-----
11	35	Brook trout, Salvelinus fontinalis	44	-----
		Lake trout, Salvelinus namaycush	28	-----
10	33	Rainbow trout, Oncorhynchus mykiss	26	-----
		Coho salmon, Oncorhynchus kisutch	36	-----
		Chinook salmon, Oncorhynchus tsawytscha	40	-----
9	32	Largemouth bass, Micropterus salmoides	32	-----
8	26.11	Amphipod, Gammarus fasciatus	10.49	-----
		Amphipod, Gammarus lacustris	65	-----
7	20	Damselfly, Lestes congener	20	-----
6	20	Crawling water beetle, Peltodytes sp.	20	-----
5	13	Brown trout, Salmo trutta	13	-----
4	10	Isopod, Asellus brevicaudus	10	-----
3	3.3	Snail, Lymnaea stagnalis	3.3	-----
2	3	Backswimmer, Notonecta undulata	3	-----

Table I2. (Cont.)

Rank*	Genus Mean Acute Value (ug/L)	Species	Species Mean Acute Value (ug/L)	Species Mean Acute-Chronic Ratio
1	2.1	Stonefly, Pteronarcys californicus	2.1	-----

* Ranked from most resistant to most sensitive based on Genus Mean Acute Value.

FAV = 1.903 ug/L

CMC = FAV/2 = 0.9515 ug/L

References

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