Fact Sheet Date: March 12, 1998

NEW YORK STATE
- AQUATIC FACT SHEET -

Ambient Water Quality Values for Protection of Aquatic Life

SUBSTANCE: Dieldrin **CAS REGISTRY NUMBER:** 60-57-1

TYPE:	BASIS:	FRESHWATER AMBIENT WATER QUALITY VALUE (ug/L):
Chronic	Propagation	0.056
Acute	Survival	0.24

INTRODUCTION

These values apply to the water column and are derived to protect aquatic life from the effects of waterborne contaminants. Values for the protection of propagation of aquatic life are referred to as Aquatic (Chronic) or A(C) values. 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 acute and chronic aquatic life criteria for dieldrin for the Great Lakes Water Quality Initiative (GLI). The Department has reviewed these criteria and determined that they are based on appropriate data and derived according to the scientific procedures in current and proposed 6 NYCRR Part 702. They are thus determined to be appropriate ambient water quality values for protection of aquatic life for New York State.

The attachment to this fact sheet provides U.S. EPA's derivation of the values. U.S. EPA's Criterion Continuous Concentration (CCC) and Criterion Maximum Concentration (CMC) are equivalent to New York's Aquatic (Chronic) and Aquatic (Acute) values respectively.

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 Dieldrin

The new acceptable acute data for dieldrin are given in Table G1; 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 dieldrin (U.S. EPA 1980) to obtain the values given in Table G2. Although results from the following publications were used in U.S. EPA (1980), they were not considered acceptable for use here: Santharam et al. (1976), Gaufin (1965), and Jensen and Gaufin (1964).

Criterion Maximum Concentration (CMC)

The Final Acute Value (FAV) was calculated using the four lowest Genus Mean Acute Values given in Table G2, resulting in a FAV of 0.4749 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 0.2374 ug/L.

Criterion Continuous Concentration (CCC)

Insufficient chronic toxicity data were available to calculate a Final Chronic Value (FCV) using the eight-family procedure. Sufficient chronic data were available to calculate a FCV by dividing the FAV by the Final Acute-Chronic Ratio (FACR). Two SMACRs were given in Table G2; a third SMACR of 6.2 was given in U.S. EPA (1980) for the saltwater mysid. These three were within a factor of 1.8. The FACR was calculated as the geometric mean of the three SMACRs and was 8.530. The FCV = FAV/FACR = (0.4749 ug/L)/(8.530) = 0.0557 ug/L. This value did not need to be lowered to protect a commercially or recreationally important species of the Great Lakes System. The CCC was 0.0557 ug/L.

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 if the four-day average concentration of dieldrin does not exceed 0.0557 ug/L more than once every three years on the average and if the one-hour average concentration does not exceed 0.2374 ug/L more than once every three years on the average.

Table G1. New Acute Values for Dieldrin

Species	Method*	Test Duration (hrs)	Acute Value (ug/L)	Reference
Cladoceran, Daphnia pulex	S,M	48	251	Daniels and Allan 1981
Cladoceran, Daphnia pulex	S,U	48	190	Mayer and Ellersieck 1986
Stonefly, Claassenia sabulosa	S,U	96	0.6	Mayer and Ellersieck 1986
Stonefly, Pteronarcys californica	S,U	96	0.5	Mayer and Ellersieck 1986
Stonefly, Pteronarcella badia	S,U	96	0.5	Mayer and Ellersieck 1986
Damselfly, Ischnura verticalis	S,U	96	12	Mayer and Ellersieck 1986
Annelid, Lumbriculus variegatus	FT,M	96	21.8	U.S. EPA 1991
Rainbow trout, Oncorhynchus mykiss	S,U	96	1.2**	Mayer and Ellersieck 1986
Rainbow trout, Oncorhynchus mykiss	FT,M	96	0.62	Shubat and Curtis 1986
Rainbow trout, Oncorhynchus mykiss	S,U	96	3**	Van Leeuwen et al. 1985
Goldfish, Carassius auratus	S,U	96	1.8	Mayer and Ellersieck 1986
Fathead minnow, Pimephales promelas	S,U	96	3.8	Mayer and Ellersieck 1986
Bluegill, Lepomis macrochirus	S,U	96	3.1	Mayer and Ellersieck 1986
Bluegill, Lepomis macrochirus	S,U	96	7	Sanders 1972
Pumpkinseed, Lepomis gibbosus	S,U	96	6.7	Cairns and Scheier 1964

Table G1. (Cont.)

Species	Method*	Test Duration (hrs)	Acute Value (ug/L)	Reference
Cutthroat trout, Oncorhynchus clarki	S,U	96	6	Mayer and Ellersieck 1986
Channel catfish, Ictalurus punctatus	S,U	96	4.5	Mayer and Ellersieck 1986
Largemouth bass, Micropterus salmoides	S,U	96	3.5	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 G2. Ranked Genus Mean Acute Values for Dieldrin

Rank*	Genus Mean Acute Value (ug/L)	Species	Species Mean Acute Value (ug/L)	Species Mean Acute-Chronic Ratio
18	740	Crayfish, Orconectes nais	740	-----
17	534	Amphipod, Gammarus lacustris	460	-----
		Amphipod, Gammarus fasciatus	620	-----
16	228	Cladoceran, Daphnia pulex	228	-----
15	214	Cladoceran, Simocephalus serrulatus	214	-----
14	21.8	Annelid, Lumbriculus variegatus	21.8	-----
13	20	Glass shrimp Palaemonetes kadiakensis	20	-----
12	17.7	Fathead minnow, Pimephales promelas	17.7	-----
11	12	Damselfly, Ischnura verticalis	12	-----
10	8.6	Goldfish, Carassius auratus	8.6	-----
9	8.5	Pumpkinseed, Lepomis gibbosus	6.7	-----
		Bluegill, Lepomis macrochirus	11.5	-----
		Green sunfish, Lepomis cyanellus	8.1	-----
8	5	Isopod, Asellus brevicaudus	5	-----
7	4.5	Channel catfish, Ictalurus punctatus	4.5	-----

Table G2. (Cont.)

Rank*	Genus Mean Acute Value (ug/L)	Species	Species Mean Acute Value (ug/L)	Species Mean Acute-Chronic Ratio
6	4.5	Guppy, Poecilia reticulata	4.5	9.1
5	3.5	Largemouth bass, Micropterus salmoides	3.5	-----
4	0.62**	Chinook salmon, Oncorhynchus tshawytscha	6.1	-----
		Coho salmon, Oncorhynchus kisutch	10.8	-----
		Cutthroat trout, Oncorhynchus clarki	6	-----
		Rainbow trout, Oncorhynchus mykiss	0.62	11
3	0.6	Stonefly, Claassenia sabulosa	0.6	-----
2	0.5	Stonefly, Pteronarcys californica	0.5	-----
1	0.5	Stonefly, Pteronarcella badia	0.5	-----

* Ranked from most resistant to most sensitive based on Genus Mean Acute Value.
** The GMAV was set equal to the lowest SMAV due to the large range in the SMAVs in this genus.

FAV = 0.4749 ug/L

CMC = FAV/2 = 0.2374 ug/L

FACR = 8.530

FCV = FAV/FACR = (0.4749 ug/L)/(8.530) = 0.0557 ug/L = CCC

References

Cairns, J., Jr., and A. Scheier. 1964. The Effect on the Sunfish, Lepomis gibbosus, of

Chronic Exposure to Lethal and Sublethal Concentrations of Dieldrin. Notulae Naturae 310:10

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U.S. EPA. 1991. Acute 96-hr Flow-Through Freshwater Exposures with Endrin and Dieldrin using an Annelid (Lumbriculus variegatus). Unpublished results.

Van Leeuwen, C.J., P.S. Griffioen, W.H.A. Vergouw, and J.L. Maas-Diepeveen. 1985. Differences in Susceptibility of Early Life Stages of Rainbow Trout (Salmo gairdneri) to Environmental Pollutants. Aquatic Toxicol. 7:59-78.