Fact Sheet Date: June 1998

NEW YORK STATE
- AQUATIC FACT SHEET -

Ambient Water Quality Value
For Protection of Aquatic Life

SUBSTANCE: Naphthalene **CAS REGISTRY NUMBER:** 91-20-3

TYPE:	BASIS:	Ambient Water Quality Value, ug/L FRESHWATER	SALTWATER
Chronic	Propagation	13	16
Acute	Survival	110	140

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

The U.S. EPA AQUIRE (**AQU**uatic toxicity **I**nformation **R**etreival System)(U.S. EPA, 1993) was searched for toxicity data on naphthalene with EC_{50} or LC_{50} toxicity endpoints. The initial search identified 120 toxicity test records. From that original group, only data with a documentation code of C (Complete methods and results documentation), and 96 hour LC_{50} or 48 hour EC_{50} endpoints were selected. If both flow-through and static test toxicity data were available for the same species, only flow-through data was used. Static toxicity test data was used only if flow-through data was not available. This second screening resulted in a final acute toxicity database for naphthalene of seven studies with four freshwater species and six studies with seven marine species. Species Mean Acute Values (SMAVs) were determined from the acceptable naphthalene toxicity studies obtained from the AQUIRE database. Ambient water quality guidance values were then calculated in accordance with 6NYCRR Part 706.1.

DERIVATION OF ACUTE VALUES

As shown in Table 1, data are available for four of the eight families necessary to derive a Tier 1 freshwater value. Consequently, the data from the four families are used to derive a Tier 2 freshwater value. Similarly, Table 2 shows that data are available for seven of the eight families necessary to derive a Tier 1 saltwater value, so those data are used to derive a Tier 2 saltwater value.

Table 1. Freshwater toxicity data used to derive the naphthalene acute value. When only an SMAV is listed, the SMAV was the LC_{50} of the test species indicated. NDA means no data was available.

Data Requirement	Species	LC_{50} ug/L	SMAV ug/L	References
Family Salmonidae	Rainbow trout		1600	15131
A second Family in the Class Osteichthyes	Fathead minnow	6080	6656.30	10954
		6140		12447
		7900		15131
A third family from the phylum Chordata	Mosquitofish		150000	508
A planktonic crustacean	Daphnia magna	4663	11497.36	3283
		19556.8		6489
		16666		11936
A benthic crustacean	NDA			
An insect	NDA			
A family in a phylum other than Arthropoda or Chordata	NDA			
A family in any order of insect or any other phylum not already represented	NDA			

The lowest SMAV was divided by the SAF to determine the secondary acute value (SAV). Because four data requirements were met, a secondary acute factor (SAF) of 7.0 is required. The Tier II value was determined by dividing the SAV by two and

rounding to two significant digits.

SAV = 1600 / 7.0 = 228.5714 ug/L
Freshwater Tier II A(A) = 228.5714 ug/L / 2 = 114.2857 ≈ 110 ug/L

Table 2. Saltwater toxicity data used to derive the naphthalene acute value. When only an SMAV is listed, the SMAV was the LC_{50} of the test species indicated. NDA means no data was available.

Data Requirement	Species	SMAV, ug/L	References
A family from the phylum Chordata	Pink salmon	1200	10567
A second family from the Phylum Chordata			
A family in a phylum other than Arthropoda or Chordata	Neanthes arenaceodentata	3800	5053
Either the Mysidae or Penaeidae family	Brown shrimp	2500	420
Three other families not in the family Chordata; may include Mysidae or Penaeidae, which ever was not used above	Dungeness crab	>2000	5035
	Daggerblade grass shrimp	2350	420
	Humpy shrimp	1289	5030
Any other family	Elasmopus pectinicrus	2680	5013

Because seven data requirements were met, a secondary acute factor (SAF) of 4.3 is required.

SAV = 1200 ug/L / 4.3 = 279.0698 ug/L
Saltwater Tier II A(A) = 279.0698 ug/L /2 = 139.5349 ≈ 140 ug/L

DERIVATION OF CHRONIC VALUES

The secondary chronic value (SCV) is determined by dividing the SAV by the secondary acute to chronic ratio (SACR). The Tier II A(C) value is equal to the SCV. A species acute to chronic ratio (ACR) is an acute LC_{50} divided by a chronic value for the same species. The chronic value is the geometric mean of the NOEC (No Observed

Effects Concentration) and LOEC (Lowest Observed Effects Concentration) values. A minimum of three species ACRs are required to derive a SACR. If three species ACRs are not available, 6NYCRR Part 706.1 requires that a species ACR value of 18 should be substituted for each missing species ACR. The SACR is equal to the cube root of the product of the three species ACRs. Both saltwater and freshwater species data are used to derive a common SACR. No studies could be found in the AQUIRE database that provided adequate acute and chronic data to determine an acute to chronic ratio as required by 6NYCRR Part 706.1 so the SCV was determined by dividing the SAV by a SACR of 18.

The freshwater SCV = 228.5714 ug/L / 18 = 12.6984 ug/L
Freshwater Tier II A(C) value = 12.6984 ≈ 13 ug/L

The saltwater SCV = 279.0698 ug/L / 18 = 15.5039 ug/L
Saltwater Tier II A(C) value = 15.5039 ≈ 16 ug/L

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DFWMR/ts/2-98