Fact Sheet Date: June 1998

NEW YORK STATE
- AQUATIC FACT SHEET -

Ambient Water Quality Value
For Protection of Aquatic Life

SUBSTANCE: Fluorene **CAS REGISTRY NUMBER:** 86-73-7

		Ambient Water Quality Value, ug/L	
TYPE:	**BASIS:**	**FRESHWATER**	**SALTWATER**
Chronic	Propagation	0.54	2.5
Acute	Survival	4.8	23

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

The U.S. EPA AQUIRE (**AQU**uatic toxicity **I**nformation **Re**treival System)(U.S. EPA, 1993) was searched for toxicity data on fluorene with EC_{50} or LC_{50} toxicity endpoints. The initial search identified 13 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 fluorene of one study with one freshwater species and one study with one marine species. Species Mean Acute Values (SMAVs) were determined from the acceptable fluorene toxicity studies obtained from the AQUIRE database. Ambient water quality values were then calculated in accordance with 6NYCRR Part 706.1.

DERIVATION OF ACUTE VALUES

As shown in Table 1, data are available for one of the eight families necessary to derive a Tier 1 freshwater value. Consequently, the data from the one family are used to derive a Tier 2 freshwater value. Similarly, Table 2 shows that data are available for only one 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 fluorene 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
Family Salmonidae	NDA		
A second Family in the Class Osteichthyes	NDA		
A third family from the phylum Chordata	NDA		
A planktonic crustacean	Daphnia pulex	212	3283
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 one data requirement was met, a secondary acute factor (SAF) of 21.9 is required. The Tier II guidance value was determined by dividing the SAV by two and rounding to two significant digits.

SAV = 212 ug/L / 21.9 = 9.6804 ug/L
Freshwater Tier II A(A) value = 9.6804 ug/L / 2 = 4.8402 ≈ 4.8 ug/L

Table 2. Saltwater toxicity data used to derive the fluorene 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	NDA		
A second family from the Phylum Chordata	NDA		
A family in a phylum other than Arthropoda or Chordata	Neanthes arenaceodentata	1000	5053
Either the Mysidae or Penaeidae family	NDA		
Three other families not in the family Chordata; may include Mysidae or Penaeidae, which ever was not used above	NDA		
	NDA		
	NDA		
Any other family	NDA		

Because one data requirement was met, a secondary acute factor (SAF) of 21.9 is required.

SAV = 1000 ug/L / 21.9 = 45.6621 ug/L
Saltwater Tier II A(A) value = 45.6621 ug/L / 2 = 22.8311 ≈ 23 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 SAV = 9.6804 ug/L / 18 = 0.5378 ug/L
Freshwater Tier II A(C) value = 0.5378 ug/L ≈ 0.54 ug/L

The saltwater SCV = 45.6621 ug/L / 18 = 2.5368 ug/L
Saltwater Tier II A(C) value = 2.5368 ug/L ≈ 2.5 ug/L

REFERENCES

U.S. EPA 1993. AQUIRE, AQUatic toxicity Information Retrieval Database, Technical Support Document. U.S. EPA Environmental Research Laboratory, Office of Research and Development, Duluth, Minnesota, September, 1993.

AQUIRE DATA CITATIONS

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REFERENCE NUMBER: 5053
Rossi,S.S. and J.M.Neff, 1978. Toxicity of Polynuclear Aromatic Hydrocarbons to the Polychaete Neanthes arenaceodentata. Mar. Pollut. Bull. 9(8):220-223 (903 Used As Reference)

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