Fact Sheet Date: June 1998

NEW YORK STATE
- AQUATIC FACT SHEET -

Ambient Water Quality Value
For Protection of Aquatic Life

SUBSTANCE: Xylene* **CAS REGISTRY NUMBER:** 1330-20-7

		Ambient Water Quality Value, ug/L	
TYPE:	**BASIS:**	**FRESHWATER**	**SALTWATER**
Chronic	Propagation	65	19
Acute	Survival	590	170

*mixture of ortho-, para-, and meta- isomers

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 xylene with EC_{50} or LC_{50} toxicity endpoints. The initial search identified 98 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 xylene of four studies with four freshwater species and one study with one marine species. Species Mean Acute Values (SMAVs) were determined from the acceptable xylene 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 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 xylene 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	Rainbow trout	8200	666
A second Family in the Class Osteichthyes	Bluegill sunfish	15700	7398
A third family from the phylum Chordata	Fathead minnow	13400	3217
A planktonic crustacean	Daphnia magna	150000	5718
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 = 8200 / 7.0 = 1171.4286 ug/L
Freshwater Tier II A(A) = 1171.4286 ug/L / 2 = 585.7143 ≈ 590 ug/L

Table 2. Saltwater toxicity data used to derive the xylene 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	NDA		
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	Daggerblade grass shrimp	7400	420
	NDA		
	NDA		
Any other family	NDA		

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

SAV = 7400 ug/L / 21.9 = 337.8995 ug/L
Saltwater Tier II A(A) = 337.8995 ug/L / 2 = 168.9498 ≈ 170 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 = 1171.4286 ug/L / 18 = 65.0794 ug/L
Freshwater Tier II A(C) = 65.0794 ≈ 65 ug/L

The saltwater SCV = 337.8995 ug/L / 18 = 18.7722 ug/L
Saltwater Tier II A(C) value = 18.7722 ≈ 19 ug/L.

REFERENCES

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