

RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
WATER RESOURCES

APPENDIX B

**RIDEM AMBIENT WATER QUALITY
CRITERIA AND GUIDELINES FOR TOXIC POLLUTANTS**

Promulgated: August 6, 1997
Amended: March 25, 1999
Amended June 23, 2000

WATER QUALITY REGULATIONS

APPENDIX B

I. General

Section 304(a)(1) of the Federal Clean Water Act (CWA) requires the USEPA to develop and publish water quality criteria. The USEPA has published criteria for a number of the pollutants listed pursuant to Section 307(a)(1) of the CWA, as well as for other toxic substances, based on available toxicological information on the pollutants. Section 303(c)(2)(B) of the CWA, as amended by the Water Quality Act of 1987, requires states to adopt numeric criteria to protect the uses of their waters from all toxic pollutants listed pursuant to Section 307(a)(1) for which criteria have been published pursuant to Section 304(a)(1), and which are present, or could reasonably be expected to be present, at levels that would impair the uses. This Appendix contains the ambient chemical-specific numeric criteria and guidelines for aquatic life and human health which satisfies the requirements of Section 303(c)(2)(B).

Table 1 contains the acute and chronic aquatic life criteria and minimum data base guidelines for freshwater and saltwater and two sets of human health criteria. In Table 1, the first column of human health criteria represents criteria applicable to waters designated as public drinking water supplies, where the potential for water and fish consumption exists. The second column under human health represents criteria applicable to all other waters, where the designated route of exposure is due only to fish consumption.

For parameters which have both aquatic life and human health criteria or guidelines, the applicable criteria or guideline is determined by using the more stringent of the aquatic life or human health criteria or guidelines, according to the use of the waterbody.

Aquatic life criteria may be subject to site-specific modification procedures, as referenced in rules 8.D.(2) and 8.D.(3) of these Regulations, in accordance with RIDEM's most current "Site-Specific Aquatic Life Water Quality Criteria Development Policy" and EPA's "Determination and Use of WERS for Metals, EPA-823-B-94-001, February 1994. Aquatic life guidelines may be modified by adding to the database following the procedures outlined on page B-4 of this Appendix. Human health criteria are subject to site-specific criteria development utilizing the methodology in the EPA guidance manual, "Assessing Human Health Risk from Chemically-Contaminated Fish and Shellfish" (EPA - 503/8-89-002), and the methodology published in the Federal Register on November 28, 1980 (45 FR 79347) entitled "Water Quality Criteria Documents; Availability, Appendix C - Guidelines and Methodology used in Preparation of Health Effect Assessment Chapters of the Consent Decree Water Criteria Documents", or the most recent EPA documentation.

In addition to these criteria and guidelines, Table 5 of this Appendix contains a complete list of "priority pollutants."

II. Aquatic Life Criteria

The aquatic life criteria in Table 1 represents the EPA water quality criteria for the protection of aquatic life, pursuant to Section 304(a) of the CWA, for acute and chronic exposure to toxics in freshwater and saltwater. These toxics are priority metals, organics, pesticides, PCBs and cyanide. To protect aquatic life, the one hour average concentration of a pollutant should not exceed the acute criteria more than once every three years on the average. An exclusion to this rule are the pesticides and PCBs acute criteria which are considered instantaneous values (See footnote \$ to Table 1). The four day average

concentration of a pollutant should not exceed the chronic criteria more than once every three years on the average. These aquatic life criteria shall be achieved in all waters, except mixing zones, regardless of the waters' classification.

The acute and chronic aquatic life criteria for freshwaters shall not be exceeded at or above the lowest average 7 consecutive day low flow with an average recurrence frequency of once in 10 years (7Q10). For non-flowing freshwaters, the acute and chronic aquatic life criteria shall not be exceeded under the most adverse conditions which will be determined on a case-by case basis.

The acute and chronic aquatic life criteria for seawater shall not be exceeded beyond the boundary of the mixing zone(s), as defined and determined by rules 8.D.(1).e. and 8.D.(1).f. of the Water Quality Regulations, and thence throughout the waterbody. If a mixing zone has not been established, these criteria shall not be exceeded in any portion of the receiving water.

For purposes of calculating freshwater aquatic life criteria for metals from the equations in Table 2, the minimum hardness allowed for use in those equations shall be 25 mg/l, as calcium carbonate, even if the actual ambient hardness is less than 25 mg/l as calcium carbonate. The hardness values used shall be consistent with the design flow conditions established in rules 8.D. and 8.E. of the Regulations. For waters in which the salinity is equal to or less than one part per thousand, the applicable criteria are the freshwater criteria. For waters in which the salinity is equal to or greater than ten parts per thousand, the applicable criteria are the saltwater criteria. For waters in which the salinity is between one and ten parts per thousand, the applicable criteria are the more stringent of the freshwater or saltwater criteria. However, for those waters between one and ten parts per thousand, the Department may deviate from the general rule if scientifically defensible information and data demonstrates that on a site-specific basis the biology of the waterbody is dominated by freshwater aquatic life and that freshwater criteria are more appropriate; or conversely, the biology of the waterbody is dominated by saltwater aquatic life and that saltwater criteria are more appropriate.

The acute and chronic freshwater criteria for 10 metals and the acute and chronic saltwater criteria for 11 metals listed in Table 1 are presented as dissolved metal criteria (see footnotes #5 and #6 on Table 1). For these metals, the dissolved metal, as opposed to the total recoverable metal, more closely approximates the bioavailable fraction of the metal in the water column. The conversion factors (CF) to calculate dissolved metal from total metal concentrations as listed in footnotes #5 and #6 are based on current EPA guidance (Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria, October 1, 1993; "Derivation of Correction Factors for the Calculation of Dissolved Freshwater Aquatic Life Criteria for Metals", Stephan, USEPA, March 31, 1995; "Derivation of Conversion Factors for the Calculation of Dissolved Saltwater Aquatic Life Criteria for Metals", USEPA, March 31, 1995; Federal Register, Vol. 60, No. 68, Thursday May 4, 1995, p. 22228-22237) and are subject to change as more data becomes available. The following formulas are used for calculating dissolved metals criteria:

$$\text{Acute Criteria}_{\text{dissolved}} = \text{Acute Criteria}_{\text{total recoverable}} \times \text{Acute Conversion Factor}$$

$$\text{Chronic Criteria}_{\text{dissolved}} = \text{Chronic Criteria}_{\text{total recoverable}} \times \text{Chronic Conversion Factor}$$

It should be noted that the chronic saltwater and chronic freshwater criteria for mercury are presented as total recoverable because the mercury criteria is based on mercury residues in aquatic organisms rather than toxicity. The saltwater criteria for Copper are based on new data outlined in current EPA guidance ("Ambient Water Quality Criteria - Copper, Addendum EPA 1995"; and Federal Register, Vol. 60, No. 68, Thursday, May 4, 1995, p. 22228-22237).

III. Site Specific Criteria

Section 131.11(b)(1)(ii) of the Federal water quality standards regulation provides States with the opportunity to adopt water quality criteria that are modified to reflect local environmental conditions. Following the procedures outlined in RIDEM's "Site Specific Aquatic Life Water Quality Criteria Development Policy", as amended, and EPA's "Interim Guidance on Determination and Use of Water-Effect Ratios for Metals", (February 1994, EPA-823-B-94-001), acute Water Effect Ratios (WERs) were developed for 5 metals; cadmium, copper, lead, silver and zinc (Table 4). The WER procedure provides for the use of a WER that is intended to take into account relevant differences between the toxicities of the chemical in laboratory dilution water and in site water. These WERs are then used to derive acute site specific criteria from the State aquatic life criteria as indicated in Table 4. Chronic site specific criteria are then calculated using the derived acute site specific criteria, as indicated in Table 4. The "RI Site Specific Criteria Development Policy" and the WER procedures were applied using total recoverable metals and therefore, the calculated site specific criteria are in the form of total recoverable metals. The conversion factors for converting total recoverable metal criteria to dissolved metal criteria cannot be applied to these site specific criteria.

The criteria derived from these WERs (Table 4), and therefore not the criteria listed in Tables 1 and 2, apply to the segments of the Pawtuxet River classified as B1 (see Appendix A).

IV. Freshwater Minimum Data Base Guidelines

RIDEM has derived freshwater guidelines for many pollutants for which EPA water quality criteria are not available. In order for guidelines to be derived, the toxicity data base for the pollutants must meet minimum requirements. These guidelines are given in Table 1 and are marked with an asterisk (*).

The data base must contain at least two acute toxicity test results expressed as either an EC₅₀ or an LC₅₀ as specified in the EPA Water Quality Criteria Guidelines (45 FR 79343, 1980 and amendments). "LC₅₀" is defined as the concentration of a test material in a suitable diluent at which 50 percent of the exposed organisms die during a specified time period. "EC₅₀" is defined as the concentration of a test material in a suitable diluent at which 50 percent of the exposed organisms exhibit a specified response during a specified time period.

The two acute toxicity test results shall consist of:

1. One daphnid (D. magna or D. pulex)
2. One fish, either:
 - (a) fathead minnow (Pimephales promelas)
 - (b) bluegill (Lepomis macrochirus)
 - (c) rainbow trout (Salmo gairdneri)

For every pollutant which meets these minimum data requirements, acute and chronic guidelines are derived using the following equations:

$$\text{Lowest LC}_{50} \text{ or EC}_{50} \times 0.05 = \text{Acute Guideline}$$

$$\text{Acute Guideline} \div 45 = \text{Chronic Guideline}$$

The uncertainty factor, 0.05, is intended to provide an adequate margin of safety to protect most aquatic organisms from acutely toxic effects. The uncertainty factor was selected by calculating uncertainty factor guidelines for those pollutants with EPA Water Quality Criteria. These guidelines were most similar to the EPA Water Quality Criteria when an uncertainty factor of 0.05 was used.

The acute guideline is divided by an acute to chronic ratio of 45 to yield the chronic guideline. This ratio was derived by the State of Michigan using all available acute to chronic values for priority pollutant tests performed on freshwater species. It was determined that 80% of the pollutants would have a geometric mean acute to chronic ratio of 45 or less.

V. Human Health Criteria

The human health criteria in Table 1 represent the EPA water quality criteria which would not result in a significant risk to public health. For almost all of the pollutants, bioaccumulation properties are used to assess the relative extent of human exposure to the pollutant either directly through ingestion or indirectly through consumption of aquatic organisms. As research continues on reference dose factors and cancer potency factors, new or updated human health criteria may be established by EPA and utilized by RIDEM. These new or updated human health criteria are maintained in EPA's electronic database known as Integrated Risk Information System (IRIS).

Ambient water quality criteria for human health are primarily based on two types of biological endpoints: (1) carcinogenicity and; (2) toxicity (i.e., all other adverse effects other than cancer). There are essentially two procedures for assessing health effects; one which addresses carcinogens and one which addresses non-carcinogens. The reason for having two methodologies is that, for the purpose of deriving ambient water quality criteria, carcinogenicity is regarded as a non-threshold phenomenon, whereas toxicity is regarded as having a threshold below which there will not be an effect. For those toxic substances which are identified as carcinogens, the criteria have been established at a risk level of 10^{-5} assuming a lifetime exposure to a 70 kg male consuming 6.5 grams per day of fish and shellfish product and ingesting 2.0 liters of water per day. For those toxic substances which are identified as non-carcinogens, the human health criteria are best estimates of concentrations which are not expected to produce adverse effects in human health assuming a lifetime exposure of a 70 kg male consuming 6.5 grams per day of fish and shellfish products and ingesting 2.0 liters of water per day.

These criteria represent the chronic criteria necessary to protect human health. Non-carcinogen human health criteria are developed assuming that effects occur after days or weeks of exposure. It is assumed that, up to a certain point, the body's natural defense mechanisms can adequately protect the exposed organ(s). Therefore, the design flow to be utilized for freshwater non-carcinogen criteria is the lowest average thirty consecutive day low flow with an average recurrence frequency of once in five years (30Q5). Freshwater carcinogenic criteria are developed assuming exposure over a lifetime (70 years). The design flow to be used with these criteria is the harmonic mean flow which is a long term mean flow value calculated by dividing the number of daily flows analyzed by the sum of the reciprocals of those daily flows. For non-flowing freshwaters, the human health criteria shall not be exceeded under the most adverse conditions which will be determined on a case-by case basis. For seawaters, the ambient human health water quality criteria for carcinogens and non-carcinogens are applicable when the most adverse hydrographic and pollution conditions occur at the particular point of evaluation.

VI. Priority Pollutants Without Criteria or Guidelines

Any pollutant listed on the most recent EPA priority pollutant list published in accordance with Section 307(a)(1) of the Clean Water Act (Table 5 of this Appendix) or additional criteria EPA has established for non-priority pollutants, for which there is no RIDEM ambient water quality criteria or guideline, shall be regulated in accordance with rules 8.D.(2) and 8.D.(3) of the Regulations.

Table 1. RIDEM Ambient Water Quality Criteria and Guidelines.

CHEMICAL NAME	AQUATIC LIFE CRITERIA (µg/l)				CARCINOGEN ?	HUMAN HEALTH CRITERIA (µg/l) ²	
	FRESHWATER		SALTWATER			Class A waters - Water and Fish Consumption	All other waters- Fish Consumption Only
	ACUTE	CHRONIC	ACUTE	CHRONIC			
ACENAPHTHENE	85*	1.9*	-	-	no	1200	2700
ACROLEIN	2.9*	0.06*	-	-	no	320	780
ACRYLONITRILE	378*	8.4*	-	-	yes	0.59	6.6
ALDRIN	3.0 [§]	-	1.3 [§]	-	yes	1.3 ng/l	1.4 ng/l
ALUMINUM	750 [■]	87 [■]	-	-		-	-
AMMONIA	#	#	#	#	no	-	-
ANTIMONY	450*	10*	-	-	no	14	4300
ARSENIC ^{5,6}	360	190	69	36	yes	50	50
ASBESTOS	-	-	-	-	yes	7x10 ⁶ fibers/l	
BENZENE	265*	5.9*	-	-	yes	12	710
BENZIDINE	-	-	-	-	yes	1.2 ng/l	5.4 ng/l
BERYLLIUM	7.5*	0.17*	-	-	yes	-	-
CADMIUM ^{5,6}	@	@	42	9.3	no	-	-
CARBON TETRACHLORIDE	1365*	30*	-	-	yes	2.5	44
CHLORDANE	2.4 [§]	0.0043	0.09 [§]	0.004	yes	5.7 ng/l	5.9 ng/l
CHLORINE	19	11	13	7.5			
CHLORINATED BENZENES							
CHLOROBENZENE	795*	18*	-	-	no	680	21 mg/l
HEXACHLOROBENZENE	-	-	-	-	yes	7.5 ng/l	7.7 ng/l
1,2,4-trichlorobenzene	75*	1.7*	-	-		-	-
1,2,3,5-tetrachlorobenzene	321*	7.1*	-	-		-	-
pentachlorobenzene	13*	0.28*	-	-		-	-
CHLORINATED ETHANES							
1,2-DICHLOROETHANE	5900*	131*	-	-	yes	3.8	990
1,1,1-TRICHLOROETHANE	-	-	-	-	no	-	-

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CHEMICAL NAME	AQUATIC LIFE CRITERIA				CARCINOGEN ?	HUMAN HEALTH CRITERIA	
	(µg/l)					Class A waters - Water and Fish Consumption	All other waters- Fish Consumption Only
	FRESHWATER		SALTWATER				
	ACUTE	CHRONIC	ACUTE	CHRONIC			
1,1,2-TRICHLOROETHANE	900*	20*	-	-	yes	6.0	420
HEXACHLOROETHANE	49*	1.1*	-	-	yes	19	89
1,1,2,2-TETRACHLOROETHANE	466*	10*	-	-	yes	1.7	110
1,1,1,2-TETRACHLOROETHANE	980*	22*	-	-		-	-
PENTACHLOROETHANE	362*	8.0*	-	-		-	-
CHLORINATED PHENOLS							
2,4,6-TRICHLOROPHENOL	16*	0.36*	-	-	yes	21	65
2-CHLOROPHENOL	-	-	-	-	no	120	400
4-CHLOROPHENOL	192*	4.3*	-	-		-	-
2,4,5-TRICHLOROPHENOL	23*	0.51*	-	-		-	-
2,3,4,6-TETRACHLOROPHENOL	7*	0.16*	-	-		-	-
2,3,5,6-TETRACHLOROPHENOL	8.5*	0.19*	-	-		-	-
4-CHLORO-2-METHYLPHENOL	15*	0.32*	-	-		-	-
2,4-DICHLORO-6-METHYLPHENOL	22*	0.48*	-	-		-	-
CHLOROALKYL ETHERS							
BIS(2-CHLOROETHYL)ETHER	-	-	-	-	yes	0.31	14
BIS(2-CHLOROISOPROPYL)ETHER	-	-	-	-	no	1400	170 mg/l
CHLOROFORM	1445*	32*	-	-	yes	57	4700
1-CHLORONAPHTHALENE	80*	1.8*	-	-		-	-
2-CHLORONAPHTHALENE	-	-	-	-	no	1700	4800
2-CHLOROPHENOL	129*	2.9*	-	-	no	-	-
CHROMIUM III ⁵	@	@	-	-	no	-	-
CHROMIUM VI ^{5,6}	15	10	1100	50	no	-	-
COPPER ^{5,6}	@	@	4.8	3.1	no	1300	-

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	(µg/l)					Class A waters - Water and Fish Consumption	All other waters- Fish Consumption Only
	FRESHWATER		SALTWATER				
	ACUTE	CHRONIC	ACUTE	CHRONIC			
CYANIDE	22	5.2	1.0	1.0	no	700	220 mg/l
4,4-DDT	1.1 ^S	0.001	0.13 ^S	0.001	yes	5.9 ng/l	5.9 ng/l
4,4-DDE	-	-	-	-	yes	5.9 ng/l	5.9 ng/l
4,4-DDD	-	-	-	-	yes	8.3 ng/l	8.4 ng/l
DICHLOROBENZENES							
1,2-DICHLOROBENZENE	79*	1.8*	-	-	no	2700	17 mg/l
1,3-DICHLOROBENZENE	390*	8.7*	-	-	no	400	2600
1,4-DICHLOROBENZENE	56*	1.2*	-	-	no	400	2600
DICHLOROBENZIDINES							
3,3-DICHLOROBENZIDENE	-	-	-	-	yes	0.40	0.77
DICHLOROETHYLENES							
1,1-DICHLOROETHYLENE	580*	13*	-	-	yes	0.57	32
2,4-DICHLOROPHENOL	101*	2.2*	-	-	no	93	790
1,3-DICHLOROPROPYLENE	-	-	-	-	no	10	1700
DIELDRIN	2.5 ^S	0.0019	0.71 ^S	0.0019	yes	1.4 ng/l	1.4 ng/l
1,2-TRANS-DICHLOROETHYLENE	-	-	-	-	no	700	-
2,4-DIMETHYLPHENOL	106*	2.4*	-	-	no	540	2300
DICHLOROPROPANES							
1,1-DICHLOROPROPANE	1150*	26*	-	-	-	-	-
1,2-DICHLOROPROPANE	2625*	58*	-	-	yes	5.2	390
1,3-DICHLOROPROPANE	303*	6.7*	-	-	-	-	-
DINITROTOLUENES							
2,4-DINITROTOLUENE	1550*	34*	-	-	yes	1.1	91
2,3-DINITROTOLUENE	17*	0.37*	-	-	-	-	-

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	(µg/l)					Class A waters - Water and Fish Consumption	All other waters- Fish Consumption Only
	FRESHWATER		SALTWATER				
	ACUTE	CHRONIC	ACUTE	CHRONIC			
2,3,7,8-TCDD (Dioxin)	-	-	-	-	yes	0.00000013	0.00000014
1,2-DIPHENYLHYDRAZINE	14*	0.31*	-	-	yes	0.40	5.4
ENDOSULFAN (alpha, beta)	0.22 ^S	0.056	0.034 ^S	0.0087	no	0.93	2.0
ENDOSULFAN (sulfate)	-	-	-	-	no	0.93	2.0
ENDRIN	0.18 ^S	0.0023	0.037 ^S	0.0023	no	0.76	0.81
ENDRIN ALDEHYDE	-	-	-	-	no	0.76	0.81
ETHYLBENZENE	1600*	36*	-	-	no	3100	29 mg/l
FLUORANTHENE	199*	4.4*	-	-	no	300	370
HALOMETHANES							
BROMOFORM	1465*	33*	-	-	yes	43	3600
BROMOMETHANE (methyl bromide)	-	-	-	-	no	48	4000
CHLORODIBROMOMETHANE	-	-	-	-	yes	4.1	340
CHLOROMETHANE (methyl chloride)	-	-	-	-	yes	-	-
METHYLENE CHLORIDE	9650*	214*	-	-	yes	47	16 mg/l
DICHLOROBROMOMETHANE	-	-	-	-	yes	2.7	220
4-BROMOPHENYL PHENYL ETHER	18*	0.4*	-	-		-	-
HEPTACHLOR	0.52 ^S	0.0038	0.053 ^S	0.0036	yes	2.1 ng/l	2.1 ng/l
HEPTACHLOR EPOXIDE	0.52 ^S	0.0038	0.053 ^S	0.0036	yes	1.0 ng/l	1.1 ng/l
HEXACHLOROBUTADIENE	-	-	-	-	yes	4.4	500
HEXACHLOROCYCLOPENTADIENE	0.35*	0.008*	-	-	no	240	17000
HEXACHLOROCYCLOHEXANE							
Alpha BHC	-	-	-	-	yes	39 ng/l	130 ng/l
Beta BHC	-	-	-	-	yes	140 ng/l	460 ng/l
Gamma BHC (Lindane)	2 ^S	0.08	0.16 ^S	-	yes	190 ng/l	630 ng/l

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	(µg/l)					Class A waters - Water and Fish Consumption	All other waters- Fish Consumption Only
	FRESHWATER		SALTWATER				
	ACUTE	CHRONIC	ACUTE	CHRONIC			
ISOPHORONE	5850*	130*	-	-	yes	84	6000
LEAD ^{5,6}	@	@	210	8.1	no	-	-
MERCURY ^{5,6}	2.1	0.0122	1.8	0.025	no	0.14	0.15
NICKEL ^{5,6}	@	@	74	8.2	no	610	4600
NAPHTHALENE	115*	2.6*	-	-		-	-
NITROBENZENE	1350*	30*	-	-	no	17	1900
NITROPHENOLS							
2,4-DINITROPHENOL	31*	0.69*	-	-	no	70	14 mg/l
4,6-DINITRO-2-METHYL PHENOL (4,6-dinitro-o-cresol)	-	-	-	-	no	13.4	765
4-NITROPHENOL	-	-	-	-		-	-
2,4,6-TRINITROPHENOL	4235	94	-	-		-	-
2,4-DINITRO-6-METHYL PHENOL	12	0.26	-	-		-	-
NITROSAMINES							
N-NITROSODI-N-PROPYLAMINE	-	-	-	-	yes	0.05	14.0
N-NITROSODIMETHYLAMINE	-	-	-	-	yes	6.9 ng/l	81
N-NITROSODIPHENYLAMINE	293*	6.5*	-	-	yes	50	160
PENTACHLOROPHENOL	@	@	13	7.9	yes	2.8	82
PHENOL	251*	5.6*	-	-	no	21 mg/l	4600mg/l
PHTHALATE ESTERS							
BUTYL BENZYL PHTHALATE	85*	1.9*			no	3000	5200
BIS(2-ETHYLHEXYL)PHTHALATE	555*	12*	-	-	yes	18	59
DI-n-BUTYL PHTHALATE	-	-	-	-	no	2700	12 mg/l
DIETHYL PHTHALATE	2605*	58*	-	-	no	23 mg/l	120 mg/l

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	(µg/l)					Class A waters - Water and Fish Consumption	All other waters- Fish Consumption Only
	FRESHWATER		SALTWATER				
ACUTE	CHRONIC	ACUTE	CHRONIC				
DIMETHYL PHTHALATE	1650*	37*	-	-	no	313 mg/l	2.9 g/l
POLYCHLORINATED BIPHENYLS ³	-	0.014	-	0.03	yes	0.44 ng/l	0.44 ng/l
POLYCYCLIC AROMATIC HYDROCARBONS ⁴	-	-	-	-	yes	0.028	0.31
ANTHRACENE	-	-	-	-	no	9600	110 mg/l
FLUORENE	-	-	-	-	no	1300	14000
PYRENE	-	-	-	-	no	960	11 mg/l
SELENIUM ⁶	20	5	290	71	no	-	-
SILVER ^{5,6}	@	-	1.9	-	no	-	-
TETRACHLOROETHYLENE	240*	5.3*	-	-	yes	8.0	88.5
THALLIUM	46*	1.0*	-	-	no	1.7	6.3
TOLUENE	635*	14*	-	-	no	6800	200 mg/l
TOXAPHENE	0.73	0.0002	0.21	0.0002	yes	7.3 ng/l	7.5 ng/l
TRICHLOROETHYLENE	1950*	43*	-	-	yes	27	810
VINYL CHLORIDE	-	-	-	-	yes	20	5250
ZINC ^{5,6}	@	@	90	81	no	-	-

Table 1. RIDEM Ambient Water Quality Criteria and Guidelines.

KEY:

* = RIDEM minimum database guidelines.

■ = Freshwater criteria for aluminum are for waters in which the pH is between 6.5 and 9.

= See Table 3 for ammonia criteria

@ = see Table 2 for criteria equations

- = No criteria recommendation.

\$ = The aquatic life criteria for these compounds were issued in 1980 utilizing the 1980 Guidelines for criteria development. The acute values shown are final acute values which, by the 1980 Guidelines, are instantaneous values as contrasted with a Criteria Maximum Concentration (CMC) which is a one-hour average.

¹ = carcinogens calculated at 10⁻⁵ risk

² = criteria are in µg/l unless otherwise noted

µg/l = micrograms/liter

ng/l = nanograms/liter

mg/l = milligrams/liter

³ = Polychlorinated Biphenyls criteria apply

to each of the following:

PCB 1016 PCB 1248 PCB 1242 PCB 1232

PCB 1254 PCB 1260 PCB 1221

⁴ = Polycyclic Aromatic Hydrocarbons criteria apply to each of the following:

indeno(1,2,3-cd)pyrene

dibenzo(ah)anthracene

benzo(a)anthracene

benzo(a) pyrene

benzo(b)fluoranthene

benzo(k)fluoranthene

chrysene

(Key is continued on next page)

Table 1. RIDEM Ambient Water Quality Criteria and Guidelines.

Key (continued):

⁵ = Freshwater values in Table 1 for the following parameters represent dissolved criteria using the EPA recommended conversion factors (CF), as listed below:

<u>Metal</u>	<u>Acute CF</u>	<u>Chronic CF</u>
Arsenic	1.000	1.000
Cadmium	$1.136672 - [(\ln H) \times 0.041838]$	$1.101672 - [(\ln H) \times 0.041838]$
Chromium III	0.316	0.86
Chromium VI	0.982	0.962
Copper	0.96	0.96
Lead	$1.46203 - [(\ln H) \times 0.145712]$	$1.46203 - [(\ln H) \times 0.145712]$
Mercury	0.85	N/A (see Note below)
Nickel	0.998	0.997
Silver	0.85	(no freshwater criteria)
Zinc	0.978	0.986

NOTE: (ln H) = natural log of Hardness, using any hardness as appropriate.

N/A = chronic criteria for mercury cannot be converted to dissolved because it is based on mercury residues in aquatic organisms rather than toxicity.

⁶ = Saltwater values in Table 1 for the following parameters represent dissolved criteria using the EPA recommended conversion factors, as listed below:

<u>Metal</u>	<u>Conversion Factor</u>
Arsenic	1.000
Cadmium	0.994
Chromium III	(no saltwater criteria)
Chromium VI	0.993
Copper	0.83
Lead	0.951
Mercury	0.85 (see Note below)
Nickel	0.990
Selenium	0.998
Silver	0.85
Zinc	0.946

NOTE: Conversion factors on this table were calculated for acute criteria only. Conversion factors for chronic criteria are not currently available. In the absence of chronic conversion factors saltwater acute conversion factors are used. Chronic criteria for mercury cannot be converted to dissolved because it is based on mercury residues rather than toxicity.

Table 2. Freshwater Criteria Equations and Base e Exponential Values

Parameter	ACUTE (µg/l)			CHRONIC (µg/l)		
	$CF \times e^{(m_a [\ln \text{Hardness}] + b_a)}$			$CF \times e^{(m_c [\ln \text{Hardness}] + b_c)}$		
	CF =	m _a =	b _a =	CF =	m _c =	b _c =
Cadmium	@	1.128	-3.828	@	0.7852	-3.49
Chromium III	0.316	0.8190	3.688	0.86	0.819	1.561
Copper	0.96	0.9422	-1.464	0.96	0.8545	-1.465
Lead	#	1.273	-1.46	#	1.273	-4.705
Nickel	0.998	0.846	3.3612	0.997	0.846	1.1645
Silver	0.85	1.72	-6.52	-	-	-
Zinc	0.978	0.8473	0.8604	0.986	0.8473	0.7614
Pentachlorophenol*	-	1.005	-4.83	-	1.005	-5.29

• Hardness values are in mg/l as CaCO₃

- = no recommended value

• Lowest Hardness to be used with these equations is **25 mg/l** as CaCO₃

@ = Cadmium Conversion Factors:

acute CF = 1.136672 - [(ln H) x 0.041838]

chronic CF = 1.101672 - [(ln H) x 0.041838]

* substitute pH for hardness in the equations for pentachlorophenol

CF = Conversion Factor to calculate dissolved metal from total metal concentrations

= Lead Conversion Factors:

acute and chronic CF = 1.46203 - [(ln H) x 0.145712]

[ln H] = natural log of hardness

EXAMPLE:

If you wish to calculate the acute criteria for Copper at a hardness of 30 mg/l, the equation value for m_a = 0.9422, b_a = -1.464, and CF = 0.96 from Table 2.

The acute criteria equation for dissolved Copper is therefore:

$$0.96 \times e^{(0.9422[\ln 30] + (-1.464))} = 5.47$$

Result : The acute criteria for Dissolved Copper at a hardness of 30 mg/l is = 5.47 µg/l

Table 3 Ammonia Criteria

A. Freshwater

1. Acute Criteria as Total Ammonia Nitrogen (mg N/L)

pH	Acute Criterion with Salmonids present	Acute Criterion with Salmonids absent
6.5	32.6	48.8
6.6	31.3	46.8
6.7	29.8	44.6
6.8	28.1	42.0
6.9	26.2	39.1
7.0	24.1	36.1
7.1	22.0	32.8
7.2	19.7	29.5
7.3	17.5	26.2
7.4	15.4	23.0
7.5	13.3	19.9
7.6	11.4	17.0
7.7	9.65	14.4
7.8	8.11	12.1
7.9	6.77	10.1
8.0	5.62	8.40
8.1	4.64	6.95
8.2	3.83	5.72
8.3	3.15	4.71
8.4	2.59	3.88
8.5	2.14	3.20
8.6	1.77	2.65
8.7	1.47	2.20
8.8	1.23	1.84
8.9	1.04	1.56
9.0	0.885	1.32

Table 3. Ammonia Criteria

A. Freshwater

2. Chronic Criteria for Fish Early Life Stages Present, mg N/L

Temperature and pH-Dependent Values of the Chronic Criterion for Fish Early Life Stages Present										
pH	Temperature, C									
	0	14	16	18	20	22	24	26	28	30
6.5	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

Table 3. Ammonia Criteria

A. Freshwater (continued)

3. Chronic Criteria for Fish Early Life Stages Absent, mg N/L

Temperature and pH-Dependent Values of the CCC (Chronic Criterion) for Fish Early Life Stages Absent										
pH	Temperature, C									
	0-7	8	9	10	11	12	13	14	15*	16*
6.5	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46	6.06
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36	5.97
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25	5.86
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10	5.72
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93	5.56
7.0	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73	5.37
7.1	9.20	8.63	8.09	8.58	7.11	6.67	6.25	5.86	5.49	5.15
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22	4.90
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92	4.61
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59	4.30
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23	3.97
7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85	3.61
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47	3.25
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71	2.54
8.0	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36	2.21
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03	1.91
8.2	2.91	2.73	2.56	2.40	2.25	2.11	1.98	1.85	1.74	1.63
8.3	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48	1.39
8.4	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17
8.5	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.06	0.990
8.6	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.951	0.892	0.836
8.7	1.26	1.18	1.11	1.04	0.976	0.915	0.858	0.805	0.754	0.707
8.8	1.07	1.01	0.944	0.885	0.829	0.778	0.729	0.684	0.641	0.601
8.9	0.917	0.86	0.806	0.756	0.709	0.664	0.623	0.584	0.548	0.513
9.0	0.790	0.740	0.694	0.651	0.610	0.572	0.536	0.503	0.471	0.442

At 15 C and above, the criterion for fish ELS absent is the same as the criterion for fish ELS present.

NOTE:

1. Averaging Periods and Frequency of Exceedances

Chronic Criteria - The ambient concentration, averaged over a period of 30 days, shall not exceed the chronic criterion more than once every three years on average. The highest four-day average ambient concentration should not exceed a concentration 2.5 times greater than the chronic criterion.

Acute Criteria - The ambient concentrations, averaged over one hour shall not exceed the acute criterion more than once every three years on average.

Early Life Stage Absent (ELS-Absent) Provision

This provision allows for a relaxation of the chronic criteria when early life stages (ELS) of fish are not present, since, at low ambient water temperatures, adult and juvenile fish are less sensitive to ammonia toxicity than are early life stages of fish. In accordance with EPA's guidance, *1999 Update of Ambient Water Quality Criteria for Ammonia*, it is appropriate to relax the ammonia chronic criterion, as ambient water temperature decreases, in waterbodies where it is determined, to the Director's satisfaction, that early life stages are not present. The chronic criteria applicable when ELS are absent are found in Table 3.A.3. The Director has determined that the ELS-Absent Provision applies, but is not limited, to:

- ii. The entire Blackstone River during the period November 1 to April 30.
- iii. The main stem of the Pawtuxet River during the period November 1 to April 30.
- iv. The Woonasquatucket River from Georgiaville Pond to the confluence with the Moshassuck River during the period November 1 to April 30.

Table 3 continued

B. Saltwater: criteria as total ammonia (mg/l)

1. Acute Water Quality Criteria for Saltwater Aquatic Life Based on Total Ammonia (mg/l).
(To convert these values to mg/liter N, multiply by 0.822).

		Temperature (°C)							
		0	5	10	15	20	25	30	35
pH	Salinity = 10 g/kg								
7.0	270	191	131	92	62	44	29	21	
7.2	175	121	83	58	40	27	19	13	
7.4	110	77	52	35	25	17	12	8.3	
7.6	69	48	33	23	16	11	7.7	5.6	
7.8	44	31	21	15	10	7.1	5.0	3.5	
8.0	27	19	13	9.4	6.4	4.6	3.1	2.3	
8.2	18	12	8.5	5.8	4.2	2.9	2.1	1.5	
8.4	11	7.9	5.4	3.7	2.7	1.9	1.4	1.0	
8.6	7.3	5.0	3.5	2.5	1.8	1.3	0.98	0.75	
8.8	4.6	3.3	2.3	1.7	1.2	0.92	0.71	0.56	
9.0	2.9	2.1	1.5	1.1	0.85	0.67	0.52	0.44	
		Salinity = 20 g/kg							
7.0	291	200	137	96	64	44	31	21	
7.2	183	125	87	60	42	29	20	14	
7.4	116	79	54	37	27	18	12	8.7	
7.6	73	50	35	23	17	11	7.9	5.6	
7.8	46	31	23	15	11	7.5	5.2	3.5	
8.0	29	20	14	9.8	6.7	4.8	3.3	2.3	
8.2	19	13	8.9	6.2	4.4	3.1	2.1	1.6	
8.4	12	8.1	5.6	4.0	2.9	2.0	1.5	1.1	
8.6	7.5	5.2	3.7	2.7	1.9	1.4	1.0	0.77	
8.8	4.8	3.3	2.5	1.7	1.3	0.94	0.73	0.56	
9.0	3.1	2.3	1.6	1.2	0.87	0.69	0.54	0.44	
		Salinity = 30 g/kg							
7.0	312	208	148	102	71	48	33	23	
7.2	196	135	94	64	44	31	21	15	
7.4	125	85	58	40	27	19	13	9.4	
7.6	79	54	37	25	21	12	8.5	6.0	
7.8	50	33	23	16	11	7.9	5.4	3.7	
8.0	31	21	15	10	7.3	5.0	3.5	2.5	
8.2	20	14	9.6	6.7	4.6	3.3	2.3	1.7	
8.4	12.7	8.7	6.0	4.2	2.9	2.1	1.6	1.1	
8.6	8.1	5.6	4.0	2.7	2.0	1.4	1.1	0.81	
8.8	5.2	3.5	2.5	1.8	1.3	1.0	0.75	0.58	
9.0	3.3	2.3	1.7	1.2	0.94	0.71	0.56	0.46	

Table 3 continued

B. Saltwater:

2. Chronic Water Quality Criteria for Saltwater Aquatic Life Based on Total Ammonia (mg/l).
(To convert these values to mg/liter N, multiply by 0.822).

Temperature (°C)								
	0	5	10	15	20	25	30	35
pH	Salinity = 10 g/kg							
7.0	41	29	20	14	9.4	6.6	4.4	3.1
7.2	26	18	12	8.7	5.9	4.1	2.8	2.0
7.4	17	12	7.8	5.3	3.7	2.6	1.8	1.2
7.6	10	7.2	5.0	3.4	2.4	1.7	1.2	0.84
7.8	6.6	4.7	3.1	2.2	1.5	1.1	0.75	0.53
8.0	4.1	2.9	2.0	1.40	0.97	0.69	0.47	0.34
8.2	2.7	1.8	1.3	0.87	0.62	0.44	0.31	0.23
8.4	1.7	1.2	0.81	0.56	0.41	0.29	0.21	0.16
8.6	1.1	0.75	0.53	0.37	0.27	0.20	0.15	0.11
8.8	0.69	0.50	0.34	0.25	0.18	0.14	0.11	0.08
9.0	0.44	0.31	0.23	0.17	0.13	0.10	0.08	0.07
	Salinity = 20 g/kg							
7.0	44	30	21	14	9.7	6.6	4.7	3.1
7.2	27	19	13	9.0	6.2	4.4	3.0	2.1
7.4	18	12	8.1	5.6	4.1	2.7	1.9	1.3
7.6	11	7.5	5.3	3.4	2.5	1.7	1.2	0.84
7.8	6.9	4.7	3.4	2.3	1.6	1.1	0.78	0.53
8.0	4.4	3.0	2.1	1.5	1.0	0.72	0.50	0.34
8.2	2.8	1.9	1.3	0.94	0.66	0.47	0.31	0.24
8.4	1.8	1.2	0.84	0.59	0.44	0.30	0.22	0.16
8.6	1.1	0.78	0.56	0.41	0.28	0.20	0.15	0.12
8.8	0.72	0.50	0.37	0.26	0.19	0.14	0.11	0.08
9.0	0.47	0.34	0.24	0.18	0.13	0.10	0.08	0.07
	Salinity = 30 g/kg							
7.0	47	31	22	15	11	7.2	5.0	3.4
7.2	29	20	14	9.7	6.6	4.7	3.1	2.2
7.4	19	13	8.7	5.9	4.1	2.9	2.0	1.4
7.6	12	8.1	5.6	3.7	3.1	1.8	1.3	0.90
7.8	7.5	5.0	3.4	2.4	1.7	1.2	0.81	0.56
8.0	4.7	3.1	2.2	1.6	1.1	0.75	0.53	0.37
8.2	3.0	2.1	1.4	1.0	0.69	0.50	0.34	0.25
8.4	1.9	1.3	0.90	0.62	0.44	0.31	0.23	0.17
8.6	1.2	0.84	0.59	0.41	0.30	0.22	0.16	0.12
8.8	0.78	0.53	0.37	0.27	0.20	0.15	0.11	0.09
9.0	0.50	0.34	0.26	0.19	0.14	0.11	0.08	0.07

Table 4. Freshwater Water Effect Ratios and Site Specific Criteria Equations

Parameter	<u>Acute</u>			<u>Chronic</u>
	$WER \times e^{(m_a [\ln \text{Hardness}] + b_a)}$			(Acute Site Specific x 2) ÷ National Acute:Chronic Ratio
	WER [@]	m _a =	b _a =	National Acute:Chronic Ratio
Cadmium	2.2	1.128	-3.828	--
Copper	4.77	0.9422	-1.464	2.823
Lead	0.19	1.273	-1.46	51.29
Silver	2.85	1.72	-6.52	--
Zinc	1.63	0.8473	0.8604	2.208

[@] WER = Water Effect Ratio

-- = no recommended value, use chronic value as calculated in Table 2.

NOTE: 1). Resulting acute and chronic site specific criteria are as total recoverable metals. The conversion factors noted in Tables 1 and 2 cannot be applied to site specific criteria.

2). These WERs and resulting site specific criteria apply only to the segments of the Pawtuxet River classified as B1 (see Appendix A).

Table 5. 126 Priority Pollutants

The following comprise the list of toxic pollutants designated pursuant to Section 307(a)(1) of the Act

1. acenaphthene
2. acrolein
3. acrylonitrile
4. benzene
5. benzidine
6. carbon tetrachloride (tetrachloromethane)

Chlorinated Benzenes

7. chlorobenzene
8. 1,2,4-trichlorobenzene
9. hexachlorobenzene

Chlorinated Ethanes

10. 1,2-dichloroethane
11. 1,1,1-trichloroethane
12. hexachloroethane
13. 1,1-dichloroethane
14. 1,1,2-trichloroethane
15. 1,1,2,2-tetrachloroethane
16. chloroethane

Chloroalkyl Ethers

17. bis(2-chloroethyl) ether
18. 2-chloroethyl vinyl ether

Chlorinated Napthalene

19. 2-chloronapthalene

Chlorinated Phenols

20. 2,4,6-trichlorophenol
21. 4-chloro-3-methylphenol
22. chloroform (trichloromethane)
23. 2-chlorophenol

Dichlorobenzenes

24. 1,2-dichlorobenzene
25. 1,3-dichlorobenzene
26. 1,4-dichlorobenzene

Dichlorobenzidine

27. 3,3-dichlorobenzidine

Dichloroethylenes

28. 1,1-dichloroethylene
29. 1,2-trans-dichloroethylene
30. 2,4-dichlorophenol

Table 5. 126 Priority Pollutants, cont.

Dichloropropane and Dichloropropene

- 31. 1,2-dichloropropane
- 32. 1,3-dichloropropene (cis and trans isomers)

- 33. 2,4-dimethylphenol

Dinitrotoluene

- 34. 2,4-dinitrotoluene
- 35. 2,6-dinitrotoluene

- 36. 1,2-diphenylhydrazine
- 37. ethylbenzene
- 38. fluoranthene

Haloethers

- 39. 4-chlorophenyl phenyl ether
- 40. 4-bromophenyl phenyl ether
- 41. bis(2-chloroisopropyl) ether
- 42. bis(2-chlorethoxy) methane

Halomethanes

- 43. methylene chloride (dichloromethane)
- 44. methyl chloride (chloromethane)
- 45. methyl bromide (bromomethane)
- 46. bromoform (tribromomethane)
- 47. dichlorobromomethane
- 48. chlorodibromomethane

- 49. hexachlorobutadiene
- 50. hexachlorocyclopentadiene
- 51. isophorone
- 52. naphthalene
- 53. nitrobenzene

Nitrophenols

- 54. 2-nitrophenol
- 55. 4-nitrophenol
- 56. 2,4-dinitrophenol

- 57. 4,6-dinitro-2-methylphenol

Nitrosamines

- 58. N-nitrosodimethylamine
- 59. N-nitrosodiphenylamine
- 60. N-nitrosodi-n-propylamine

- 61. pentachlorophenol
- 62. phenol

Table 5. 126 Priority Pollutants, cont.

Phthalate Esters

- 63. bis-(2-ethylhexyl) phthalate
- 64. butyl benzyl phthalate
- 65. di-n-butyl phthalate
- 66. di-n-octyl phthalate
- 67. diethyl phthalate
- 68. dimethyl phthalate

Polynuclear Aromatic Hydrocarbons

- 69. benzo(a)anthracene (1,2-benzanthracene)
- 70. benzo(a)pyrene (3,4-benzopyrene)
- 71. 3,4-benzofluoranthene
- 72. benzo(k)fluorathene (11,12-benzofluoranthene)
- 73. chrysene
- 74. acenaphthylene
- 75. anthracene
- 76. benzo(ghi)perylene (1,12-benzoperylene)
- 77. fluorene
- 78. phenanthrene
- 79. dibenzo(ah)anthracene (1,2,5,6-dibenzanthracene)
- 80. indeno (1,2,3-cd) pyrene (2,3-o-phenylenepyrene)
- 81. pyrene

- 82. tetrachloroethylene
- 83. toluene
- 84. trichloroethylene
- 85. vinyl chloride (chloroethylene)

Pesticides and Metabolites

- 86. aldrin
- 87. dieldrin
- 88. chlordane (technical mixture and metabolites)

DDT and Metabolites

- 89. 4,4' -DDT
- 90. 4,4' -DDE (p,p' -DDE)
- 91. 4,4' -DDD (p,p' -TDE)

Endosulfan and Metabolites

- 92. a-endosulfan-Alpha
- 93. b-endosulfan-Beta
- 94. endosulfan sulfate

Endrin and Metabolites

- 95. endrin
- 96. endrin aldehyde

Heptachlor and Metabolites

- 97. heptachlor
- 98. heptachlor epoxide

Table 5. 126 Priority Pollutants, cont.

Hexachlorocyclohexane

- 99. a-BHC-Alpha
- 100. b-BHC-Beta
- 101. g-BHC (lindane) Gamma
- 102. d-BHC-Delta

Polychlorinated Biphenyls (PCBs)

- 103. PCB-1242 (Arochlor 1242)
- 104. PCB-1254 (Arochlor 1254)
- 105. PCB-1221 (Arochlor 1221)
- 106. PCB-1232 (Arochlor 1232)
- 107. PCB-1248 (Arochlor 1248)
- 108. PCB-1260 (Arochlor 1260)
- 109. PCB-1016 (Arochlor 1016)
- 110. toxaphene

Metals, Asbestos and Cyanide

- 111. antimony and compounds
- 112. arsenic and compounds
- 113. asbestos
- 114. beryllium and compounds
- 115. cadmium and compounds
- 116. chromium and compounds
- 117. copper and compounds
- 118. cyanides
- 119. lead and compounds
- 120. mercury and compounds
- 121. nickel and compounds
- 122. selenium and compounds
- 123. silver and compounds
- 124. thallium and compounds
- 125. zinc and compounds
- 126. 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)