The language in this preliminary draft is formatted to be easy to read.
The formal draft CR 102 draft will look different by virtue of formatting.

Washington Department of Ecology, Water Quality Program

Toxics Language and Table

Preliminary Draft—WAC 173-201A-240

September 30, 2014

[Note: Preliminary draft revisions to section WAC 173-201A-240 are shown below using underline and strikeout. Sub-sections 3 & 4 below are not new; they have been moved up in the section to come before the table of toxics criteria. The current Table 240(3), Toxic Substances Criteria for aquatic life, will be deleted in its entirety and replaced with a new Table 240 to include both aquatic life and human health criteria. ***Aquatic life criteria and related footnotes remain the same as what is in current rule****. New human health criteria are found in the new Table 240, with associated new footnotes below the table.]*

WAC 173-201A-240 Toxic substances. (1) Toxic substances shall not be introduced above natural background levels in waters of the state which have the potential either singularly or cumulatively to adversely affect characteristic water uses, cause acute or chronic toxicity to the most sensitive biota dependent upon those waters, or adversely affect public health, as determined by the department.

(2) The department shall employ or require chemical testing, acute and chronic toxicity testing, and biological assessments, as appropriate, to evaluate compliance with subsection (1) of this section and to ensure that aquatic communities and the existing and designated uses of waters are being fully protected.

(3) USEPA Quality Criteria for Water, 1986, as revised, shall be used in the use and interpretation of the values listed in Table 240 of this section.

(4) Concentrations of toxic, and other substances with toxic propensities not listed in Table 240 of this section shall be determined in consideration of USEPA Quality Criteria for Water, 1986, and as revised, and other relevant information as appropriate.

(5~~3~~) The following criteria, found in Table 240~~(3)~~, shall be applied to all surface waters of the state of Washington ~~for the protection of aquatic life~~. Values are µg/L for all substances except Ammonia and Chloride which are mg/L.

(a) **Aquatic Life Protection.** The department may revise the following criteria for aquatic life on a statewide or water body-specific basis as needed to protect aquatic life occurring in waters of the state and to increase the technical accuracy of the criteria being applied. The department shall formally adopt any appropriate revised criteria as part of this chapter in accordance with the provisions established in chapter 34.05 RCW, the Administrative Procedure Act. The department shall ensure there are early opportunities for public review and comment on proposals to develop revised criteria. ~~Values are µg/L for all substances except Ammonia and Chloride which are mg/L:~~.

(b) **Human Health Protection.** The following provisions apply to the human health criteria in Table 240. All waters shall maintain a level of water quality when entering downstream waters that provides for the attainment and maintenance of the water quality standards of those downstream waters, including the waters of another state. The human health criteria in the tables were calculated using a fish consumption rate of 175 g/day. The human health criteria calculations and variables include chronic durations of exposure up to 70 years. All human health criteria for metals are for total metal concentrations, unless otherwise noted. Dischargers have the obligation to reduce toxics in discharges through the use of AKART.

The language in this preliminary draft is formatted to be easy to read.
The formal draft CR 102 draft will look different by virtue of formatting.

[The Table 240(3) for aquatic life criteria currently in rule will be deleted and replaced with a new Table 240 to include both the currently approved aquatic life, which will not change, and new preliminary draft human health criteria. See Table 240 below for preliminary draft numbers and information. ***Please note that the aquatic life criteria and associated footnotes found in this new Table 240, do not change and are the same as those found in the current standards at Table 240(3), at****: http://app.leg.wa.gov/WAC/default.aspx?cite=173-201A-240.]*

Table 240
Toxic Substances Criteria

Compound/chemical	Chemical Abstracts Service #	Category	Aquatic life criteria - Freshwater		Aquatic life criteria - Marine water		Human Health Criteria for consumption of:	
			Acute	Chronic	Acute	Chronic	Water & Organisms	Organisms only
Antimony	7440360	Metals, cyanide, and total phenols	-	-	-	-	14 (A)	180
Arsenic	7440382	Metals, cyanide, and total phenols	360.0 (c,dd)	190.0 (d,dd)	69.0 (c,ll,dd)	36.0 (d,cc,ll,dd)	10 (B)	10 (B)
Asbestos	1332214	Toxic pollutants and hazardous substances	-	-	-	-	7,000,000 fibers/L (D)	-
Beryllium	7440417	Metals, cyanide, and total phenols	-	-	-	-	-	-
Cadmium	7440439	Metals, cyanide, and total phenols	(l, c,dd)	(l, c,dd)	42.0 c,dd	9.3 (d,dd)	-	-
Chromium (III)	16065831	Metals, cyanide, and total phenols	(m, c,gg)	(n, d,gg)			-	-
Chromium (VI)	18540299	Metals, cyanide, and total phenols	15.0 (c, l, ii,dd)	10.0 (d, jj,dd)	1,100.0 (c,l,ll,dd)	50.0 (d,ll,dd)	-	-
Copper	7440508	Metals, cyanide, and total phenols	(o, c,dd)	(p, d,dd)	4.8 (c,ll,dd)	3.1 (d,ll,dd)	1,300* (D)	-
Lead	7439921	Metals, cyanide, and total phenols	(q, c,dd)	(r, d,dd)	210.0 (c,ll,dd)	8.1 (d,ll,dd)	-	-
Mercury	7439976	Metals, cyanide, and total phenols	2.1 (c, kk, dd)	0.012 (d, ff,s)	1.8 (c,ll,dd)	0.025 (d,ff,s)	(H)	(H)
Methylmercury	22967926	Nonconventional	-	-	-	-	-	-
Nickel	7440020	Metals, cyanide, and total phenols	(t, c,dd)	(u, d,dd)	74.0 (c,ll,dd)	8.2 (d,ll,dd)	160	190
Selenium	7782492	Metals, cyanide, and total phenols	20.0 (c, ff)	5.0 (d, ff)	290 (c,ll,dd)	71.0 (d, x,ll,dd)	140	480
Silver	7440224	Metals, cyanide, and total phenols	(y, a,dd)	-	1.9 (a,ll,dd)	-	-	-
Thallium	7440280	Metals, cyanide, and total phenols	-	-	-	-	0.24	0.27
Zinc	7440666	Metals, cyanide, and total phenols	(aa, c,dd)	(bb, d,dd)	90.0 (c,ll,dd)	81.0 (d,ll,dd)	2,300	2,900
1,1,1-Trichloroethane	71556	Volatile	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	79345	Volatile	-	-	-	-	0.17 (A, C)	4.6 (C)
1,1,2-Trichloroethane	79005	Volatile	-	-	-	-	0.60 (A, C)	18 (C)

Compound/chemical	Chemical Abstracts Service #	Category	Aquatic life criteria - Freshwater		Aquatic life criteria - Marine water		Human Health Criteria for consumption of:	
			Acute	Chronic	Acute	Chronic	Water & Organisms	Organisms only
1,1-Dichloroethane	75343	Volatile						
1,1-Dichloroethylene	75354	Volatile					0.057 (A)	3.2 (A)
1,2,4-Trichlorobenzene	120821	Base/neutral compounds					36	40
1,2-Dichlorobenzene	95501	Volatile					610	740
1,2-Dichloroethane	107062	Volatile					0.38 (A, C)	42 (C)
1,2-Dichloropropane	78875	Volatile					4.4 (C)	17 (C)
1,3-Dichloropropene	542756	Volatile					10 (A)	72
1,2-Diphenylhydrazine	122667	Base/neutral compounds					0.040 (A, C)	0.23 (C)
1,2-Trans-Dichloroethylene	156605	Volatile					700	5,800
1,3-Dichlorobenzene	541731	Volatile					91	110
1,4-Dichlorobenzene	106467	Volatile					91	110
2,3,7,8-TCDD (Dioxin)	1746016	Dioxin					0.000000013 (A)	0.000000014 (A)
2,4,6-Trichlorophenol	88062	Acid compounds					2.1 (A, C)	2.8 (C)
2,4-Dichlorophenol	120832	Acid compounds					26	34
2,4-Dimethylphenol	105679	Acid compounds					87	97
2,4-Dinitrophenol	51285	Acid compounds					70 (A)	610
2,4-Dinitrotoluene	121142	Base/neutral compounds					0.11 (A, C)	3.9 (C)
2,6-Dinitrotoluene	606202	Base/neutral compounds						
2-Chloroethyvinyl Ether	110758	Volatile						
2-Chloronaphthalene	91587	Base/neutral compounds					170	180
2-Chlorophenol	95578	Acid compounds					16	17
2-Methyl-4,6-Dinitrophenol (4,6-dinitro-o-cresol)	534521	Acid compounds					11	32
2-Nitrophenol	88755	Acid compounds						
3,3'-Dichlorobenzidine	91941	Base/neutral compounds					0.031 (C)	0.033 (C)
3-Methyl-4-Chlorophenol (parachlorometa cresol)	59507	Acid compounds						
4,4'-DDD	72548	Pesticides/PCBs					0.00036 (C)	0.00036 (C)
4,4'-DDE	72559	Pesticides/PCBs					0.00025 (C)	0.00025 (C)
4,4'-DDT	50293	Pesticides/PCBs					0.00025 (C)	0.00025 (C)
4,4'-DDT (and metabolites)		Pesticides/PCBs	1.1 (a)	0.001 (b)	0.13 (a)	0.001 (b)		
4-Bromophenyl Phenyl Ether	101553	Base/neutral compounds						
4-Chorophenyl Phenyl ether	7005723	Base/neutral compounds						
4-Nitrophenol	100027	Acid compounds						
Acenaphthene	83329	Base/neutral compounds					110	110
Acenaphthylene	208968	Base/neutral compounds						
Acrolein	107028	Volatile					1.0	1.1

Compound/chemical	Chemical Abstracts Service #	Category	Aquatic life criteria - Freshwater		Aquatic life criteria - Marine water		Human Health Criteria for consumption of:	
			Acute	Chronic	Acute	Chronic	Water & Organisms	Organisms only
Acrylonitrile	107131	Volatile	-	-	-	-	0.059 (A, C)	0.28 (C)
Aldrin	309002	Pesticides/PCBs	2.5 (a,e)	0.0019(b, e)	0.71 (a,e)	0.0019 (b,e)	0.000057 (C)	0.000058 (C)
alpha-BHC	319846	Pesticides/PCBs	-	-	-	-	0.0039 (A, C)	0.0056 (C)
alpha-Endosulfan	959988	Pesticides/PCBs	-	-	-	-	0.93 (A)	2.0 (A)
Anthracene	120127	Base/neutral compounds	-	-	-	-	3,300	4,600
Benzene	71432	Volatile	-	-	-	-	1.2 (A, C)	59 (C)
Benzidine	92875	Base/neutral compounds	-	-	-	-	0.00012 (A, C)	0.00023 (C)
Benzo(a) Anthracene	56553	Base/neutral compounds	-	-	-	-	0.0028 (A, C)	0.021 (C)
Benzo(a) Pyrene	50328	Base/neutral compounds	-	-	-	-	0.0028 (A, C)	0.021 (C)
Benzo(b) Fluoranthene	205992	Base/neutral compounds	-	-	-	-	0.0028 (A, C)	0.021 (C)
Benzo(ghi) Perylene	191242	Base/neutral compounds	-	-	-	-	-	-
Benzo(k) Fluoranthene	207089	Base/neutral compounds	-	-	-	-	0.0028 (A, C)	0.021 (C)
beta-BHC	319857	Pesticides/PCBs	-	-	-	-	0.014 (A, C)	0.020 (C)
beta-Endosulfan	33213659	Pesticides/PCBs	-	-	-	-	0.93 (A)	2.0 (A)
Bis(2-Chloroethoxy)Methane	111911	Base/neutral compounds	-	-	-	-	-	-
Bis(2-Chloroethyl) Ether	111444	Base/neutral compounds	-	-	-	-	0.031 (A, C)	0.60 (C)
Bis(2-Chloroisopropyl) Ether	108601	Base/neutral compounds	-	-	-	-	1,300	7,400
Bis(2-Ethylhexyl) Phthalate	117817	Base/neutral compounds	-	-	-	-	1.8 (A, C)	2.5 (C)
Bromoform	75252	Volatile	-	-	-	-	4.3 (A, C)	150 (C)
Butylbenzyl Phthalate	85687	Base/neutral compounds	-	-	-	-	210	220
Carbon Tetrachloride	56235	Volatile	-	-	-	-	0.25 (A, C)	1.9 (C)
Chlordane	57749	Pesticides/PCBs	2.4 (a)	0.0043 (b)	0.09 (a)	0.004 (b)	0.00057 (A, C)	0.00059 (A, C)
Chlorobenzene	108907	Volatile	-	-	-	-	420	890
Chlorodibromomethane	124481	Volatile	-	-	-	-	0.41 (A, C)	15 (C)
Chloroethane	75003	Volatile	-	-	-	-	-	-
Chloroform	67663	Volatile	-	-	-	-	5.7 (A)	470 (A)
Chrysene	218019	Base/neutral compounds	-	-	-	-	0.0028 (A, C)	0.021 (C)
Cyanide	57125	Metals, cyanide, and total phenols	22.0 (c,ee)	5.2 (d,ee)	1.0 (c,mm,ee)	(d,mm,ee)	700 (A, E)	9,100 (E)
delta-BHC	319868	Pesticides/PCBs	-	-	-	-	-	-
Dibenzo(a,h) Anthracene	53703	Base/neutral compounds	-	-	-	-	0.0028 (A, C)	0.021 (C)
Dichlorobromomethane	75274	Volatile	-	-	-	-	0.27 (A, C)	20 (C)
Dieldrin	60571	Pesticides/PCBs	2.5 (a,e)	0.0019 (b,e)	0.71 (a,e)	0.0019 (b,e)	0.000061 (C)	0.000061 (C)
Diethyl Phthalate	84662	Base/neutral compounds	-	-	-	-	4,300	5,000
Dimethyl Phthalate	131113	Base/neutral compounds	-	-	-	-	96,000	130,000

Compound/chemical	Chemical Abstracts Service #	Category	Aquatic life criteria - Freshwater		Aquatic life criteria - Marine water		Human Health Criteria for consumption of:	
			Acute	Chronic	Acute	Chronic	Water & Organisms	Organisms only
Di-n-Butyl Phthalate	84742	Base/neutral compounds	-	-	-	-	460	510
Di-n-Octyl Phthalate	117840	Base/neutral compounds	-	-	-	-	-	-
Endosulfan	-	Pesticides/PCBs	0.22 (a)	0.056 (b)	0.034 (a)	0.0087 (b)		-
Endosulfan Sulfate	1031078	Pesticides/PCBs	-	-	-	-	0.93 (A)	2.0 (A)
Endrin	72208	Pesticides/PCBs	0.18 (a)	0.0023 (b)	0.037 (a)	0.0023 (b)	0.034	0.035
Endrin Aldehyde	7421934	Pesticides/PCBs	-	-	-	-	0.034	0.035
Ethylbenzene	100414	Volatile	-	-	-	-	930	1,200
Fluoranthene	206440	Base/neutral compounds	-	-	-	-	16	16
Fluorene	86737	Base/neutral compounds	-	-	-	-	440	610
Hexachlorocyclohexane (gamma-BHC; Lindane)	58899	Pesticides/PCBs	2.0 (a)	0.08 (b)	0.16 (a)	-	0.019 (A)	0.063 (A)
Heptachlor	76448	Pesticides/PCBs	0.52 (a)	0.0038 (b)	0.053 (a)	0.0036 (b)	0.000091 (C)	0.000091 (C)
Heptachlor Epoxide	1024573	Pesticides/PCBs	-	-	-	-	0.000045 (C)	0.000045 (C)
Hexachlorobenzene	118741	Base/neutral compounds	-	-	-	-	0.00033 (C)	0.00033 (C)
Hexachlorobutadiene	87683	Base/neutral compounds	-	-	-	-	0.44 (A, C)	21 (C)
Hexachlorocyclopentadiene	77474	Base/neutral compounds	-	-	-	-	170	630
Hexachloroethane	67721	Base/neutral compounds	-	-	-	-	1.9 (A, C)	3.8 (C)
Indeno(1,2,3-cd) Pyrene	193395	Base/neutral compounds	-	-	-	-	0.0028 (A, C)	0.021 (C)
Isophorone	78591	Base/neutral compounds	-	-	-	-	8.4 (A, C)	600 (A, C)
Methyl Bromide	74839	Volatile	-	-	-	-	42	170
Methyl Chloride	74873	Volatile	-	-	-	-	-	-
Methylene Chloride	75092	Volatile	-	-	-	-	4.7 (A, C)	680 (C)
Napthalene	91203	Base/neutral compounds	-	-	-	-	-	-
Nitrobenzene	98953	Base/neutral compounds	-	-	-	-	16	79
N-Nitrosodimethylamine	62759	Base/neutral compounds	-	-	-	-	0.00069 (A, C)	3.4 (C)
N-Nitrosodi-n-Propylamine	621647	Base/neutral compounds	-	-	-	-	0.052 (C)	0.58 (C)
N-Nitrosodiphenylamine	86306	Base/neutral compounds	-	-	-	-	5.0 (A, C)	6.9 (C)
Pentachlorophenol (PCP)	87865	Acid compounds	(w, c)	(v, d)	13.0 c	7.9 (d)	0.28 (A, C)	3.5 (C)
Phenanthrene	85018	Base/neutral compounds	-	-	-	-	-	-
Phenol	108952	Acid compounds	-	-	-	-	11,000	98,000
Polychlorinated Biphenyls (PCBs)	-	Pesticides/PCBs	2.0 (b)	0.014 (b)	10.0 (b)	0.030 (b)	0.00017 (A, F)	0.00017 (A, F)
Pyrene	129000	Base/neutral compounds	-	-	-	-	330	460
Tetrachloroethylene	127184	Volatile	-	-	-	-	0.8 (A, C)	3.8 (C)
Toluene	108883	Volatile	-	-	-	-	4,100	8,500
Toxaphene	8001352	Pesticides/PCBs	0.73 (c, z)	0.0002 (d)	0.21 (c,z)	0.0002(d)	0.00032 (C)	0.00032 (C)
Trichloroethylene	79016	Volatile	-	-	-	-	2.7 (A, C)	34 (C)
Vinyl Chloride	75014	Volatile	-	-	-	-	0.26 (C,G)	2.8 (C, G)
Ammonia (hh)	-	Nonconventional	(f, c)	(g, d)	0.233 (h,c)	0.035 (h,d)	-	-

Compound/chemical	Chemical Abstracts Service #	Category	Aquatic life criteria - Freshwater		Aquatic life criteria - Marine water		Human Health Criteria for consumption of:	
			Acute	Chronic	Acute	Chronic	Water & Organisms	Organisms only
Chloride (dissolved) (k)		Nonconventional	860.0 (h, c)	230.0 (h,d)				
Chlorine (total residual)		Nonconventional	19.0 (c)	11.0 (d)	13.0 c	7.5 (d)		
Chlorpyrifos		Toxic pollutants and hazardous substances	0.083 (c)	0.041 (d)	0.011 c	0.0056 (d)		
Parathion		Toxic pollutants and hazardous substances	0.065 (c)	0.013 (d)				

~~N~~Footnotes for aquatic life criteria in~~to~~ Table 240~~(3)~~:

a. An instantaneous concentration not to be exceeded at any time.

b. A 24-hour average not to be exceeded.

c. A 1-hour average concentration not to be exceeded more than once every three years on the average.

d. A 4-day average concentration not to be exceeded more than once every three years on the average.

e. Aldrin is metabolically converted to Dieldrin. Therefore, the sum of the Aldrin and Dieldrin concentrations are compared with the Dieldrin criteria.

f. Shall not exceed the numerical value in total ammonia nitrogen (mg N/L) given by:

For salmonids present:

$$\frac{0.275}{1 + 10^{7.204-pH}} + \frac{39.0}{1 + 10^{pH-7.204}}$$

For salmonids absent:

$$\frac{0.411}{1 + 10^{7.204-pH}} + \frac{58.4}{1 + 10^{pH-7.204}}$$

g. Shall not exceed the numerical concentration calculated as follows:

Unionized ammonia concentration for waters where salmonid habitat is an existing or designated use:

$$0.80 \div (FT)(FPH)(RATIO)$$

where:

RATIO = 13.5; $7.7 \leq pH \leq 9$

RATIO = $(20.25 \times 10^{(7.7-pH)}) \div (1 + 10^{(7.4-pH)})$; $6.5 \leq pH \leq 7.7$

FT = 1.4; $15 \leq T \leq 30$

FT = $10^{[0.03(20-T)]}$; $0 \leq T \leq 15$

FPH = 1; $8 \leq pH \leq 9$

FPH = $(1 + 10^{(7.4-pH)}) \div 1.25$; $6.5 \leq pH \leq 8.0$

Total ammonia concentrations for waters where salmonid habitat is not an existing or designated use and other fish early life stages are absent:

$$Chronic\ Criterion = \left(\frac{0.0577}{1 + 10^{7.688-pH}} + \frac{2.487}{1 + 10^{pH-7.688}}\right) \times \left(1.45 \times 10^{0.028(25-A)}\right)$$

where: A = the greater of either T (temperature in degrees Celsius) or 7.

Applied as a thirty-day average concentration of total ammonia nitrogen (in mg N/L) not to be exceeded more than once every three years on average. The highest four-day average within the thirty-day period should not exceed 2.5 times the chronic criterion.

Total ammonia concentration for waters where salmonid habitat is not an existing or designated use and other fish early life stages are present:

$$Chronic\ Criterion = \left(\frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}}\right) \times B$$

where: B = the lower of either 2.85, or 1.45 x 100.028 x (25-T). T = temperature in degrees Celsius.

Applied as a thirty-day average concentration of total ammonia nitrogen (in mg N/L) not to be exceeded more than once every three years on the average. The highest four-day average within the thirty-day period should not exceed 2.5 times the chronic criterion.

h. Measured in milligrams per liter rather than micrograms per liter.

i. ≤ (0.944)(e(1.128[ln(hardness)]-3.828)) at hardness = 100. Conversion factor (CF) of 0.944 is hardness dependent. CF is calculated for other hardnesses as follows: CF = 1.136672 - [(ln hardness)(0.041838)].

j. ≤ (0.909)(e(0.7852[ln(hardness)]-3.490)) at hardness = 100. Conversions factor (CF) of 0.909 is hardness dependent. CF is calculated for other hardnesses as follows: CF = 1.101672 - [(ln hardness)(0.041838)].

k. Criterion based on dissolved chloride in association with sodium. This criterion probably will not be adequately protective when the chloride is associated with potassium, calcium, or magnesium, rather than sodium.

l. Salinity dependent effects. At low salinity the 1-hour average may not be sufficiently protective.

m. ≤ $(0.316)(e^{(0.8190[\ ln(hardness)]\ +\ 3.688)})$

n. ≤ $(0.860)(e^{(0.8190[\ ln(hardness)]\ +\ 1.561)})$

o. ≤ $(0.960)(e^{(0.9422[\ ln(hardness)]\ -\ 1.464)})$

p. ≤ $(0.960)(e^{(0.8545[\ ln(hardness)]\ -\ 1.465)})$

q. ≤ $(0.791)(e^{(1.273[\ ln(hardness)]\ -\ 1.460)})$ at hardness = 100. Conversion factor (CF) of 0.791 is hardness dependent. CF is calculated for other hardnesses as follows: CF = 1.46203 - [(ln hardness)(0.145712)].

r. ≤ $(0.791)(e^{(1.273[\ ln(hardness)]\ -\ 4.705)})$ at hardness = 100. Conversion factor (CF) of 0.791 is hardness dependent. CF is calculated for other hardnesses as follows: CF = 1.46203 - [(ln hardness)(0.145712)].

s. If the four-day average chronic concentration is exceeded more than once in a three-year period, the edible portion of the consumed species should be analyzed. Said edible tissue concentrations shall not be allowed to exceed 1.0 mg/kg of methylmercury.

t. ≤ $(0.998)(e^{(0.8460[\ ln(hardness)]\ +\ 3.3612)})$

u. ≤ $(0.997)(e^{(0.8460[\ ln(hardness)]\ +\ 1.1645)})$

v. ≤ $e^{[1.005(pH)\ -\ 5.290]}$

w. ≤ $e^{[1.005(pH)\ -\ 4.830]}$

x. The status of the fish community should be monitored whenever the concentration of selenium exceeds 5.0 ug/ l in salt water.

y. $\leq (0.85)(e^{(1.72[\ln(\text{hardness})] - 6.52)})$

z. Channel Catfish may be more acutely sensitive.

aa. $\leq (0.978)(e^{(0.8473[\ln(\text{hardness})] + 0.8604)})$

bb. $\leq (0.986)(e^{(0.8473[\ln(\text{hardness})] + 0.7614)})$

cc. Nonlethal effects (growth, C-14 uptake, and chlorophyll production) to diatoms (*Thalassiosira aestivalis* and *Skeletonema costatum*) which are common to Washington's waters have been noted at levels below the established criteria. The importance of these effects to the diatom populations and the aquatic system is sufficiently in question to persuade the state to adopt the USEPA National Criteria value (36 µg/L) as the state threshold criteria, however, wherever practical the ambient concentrations should not be allowed to exceed a chronic marine concentration of 21 µg/L.

dd. These ambient criteria in the table are for the dissolved fraction. The cyanide criteria are based on the weak acid dissociable method. The metals criteria may not be used to calculate total recoverable effluent limits unless the seasonal partitioning of the dissolved to total metals in the ambient water are known. When this information is absent, these metals criteria shall be applied as total recoverable values, determined by back-calculation, using the conversion factors incorporated in the criterion equations. Metals criteria may be adjusted on a site-specific basis when data are made available to the department clearly demonstrating the effective use of the water effects ratio approach established by USEPA, as generally guided by the procedures in USEPA Water Quality Standards Handbook, December 1983, as supplemented or replaced by USEPA or ecology. Information which is used to develop effluent limits based on applying metals partitioning studies or the water effects ratio approach shall be identified in the permit fact sheet developed pursuant to WAC 173-220-060 or 173-226-110, as appropriate, and shall be made available for the public comment period required pursuant to WAC 173-220-050 or 173-226-130(3), as appropriate. Ecology has developed supplemental guidance for conducting water effect ratio studies.

ee. The criteria for cyanide is based on the weak acid dissociable method in the 19th Ed. Standard Methods for the Examination of Water and Wastewater, 4500-CN I, and as revised (see footnote dd, above).

ff. These criteria are based on the total-recoverable fraction of the metal.

gg. Where methods to measure trivalent chromium are unavailable, these criteria are to be represented by total-recoverable chromium.

hh. The listed fresh water criteria are based on un-ionized or total ammonia concentrations, while those for marine water are based on un-ionized ammonia concentrations. Tables for the conversion of total ammonia to un-ionized ammonia for freshwater can be found in the USEPA's Quality Criteria for Water, 1986. Criteria concentrations based on total ammonia for marine water can be found in USEPA Ambient Water Quality Criteria for Ammonia (Saltwater)-1989, EPA440/5-88-004, April 1989.

ii. The conversion factor used to calculate the dissolved metal concentration was 0.982.

jj. The conversion factor used to calculate the dissolved metal concentration was 0.962.

kk. The conversion factor used to calculate the dissolved metal concentration was 0.85.

ll. Marine conversion factors (CF) which were used for calculating dissolved metals concentrations are given below. Conversion factors are applicable to both acute and chronic criteria for all metals except mercury. The CF for mercury was applied to the acute criterion only and is not applicable to the chronic criterion. Conversion factors are already incorporated into the criteria in the table. Dissolved criterion = criterion x CF

Metal	CF
Arsenic	1.000
Cadmium	0.994

Metal	CF
Chromium (VI)	0.993
Copper	0.83
Lead	0.951
Mercury	0.85
Nickel	0.990
Selenium	0.998
Silver	0.85
Zinc	0.946

mm. The cyanide criteria are: 2.8µg/l chronic and 9.1µg/l acute and are applicable only to waters which are east of a line from Point Roberts to Lawrence Point, to Green Point to Deception Pass; and south from Deception Pass and of a line from Partridge Point to Point Wilson. The chronic criterion applicable to the remainder of the marine waters is l µg/L.

Footnotes for human health criteria in Table 240:

A. The value for this chemical was originally calculated based on cancer or non-cancer risk, but because that calculation resulted in a higher concentration than that found in 40CFR131.36, the criterion defaulted to the concentration found in 40CFR131.36.

B. This criterion for total arsenic is the Maximum Contaminant Level (MCL) developed under the Safe Drinking Water Act. The MCL for total arsenic is applied to surface waters where consumption of organisms-only and where consumption of water + organisms reflect the designated uses. When the Department determines that an indirect or direct industrial discharge to surface waters designated for domestic water supply may be adding arsenic to its wastewater, the Department will require the discharger to develop and implement a pollution prevention plan to reduce arsenic through the use of AKART. Indirect discharges are industries that discharge wastewater to a privately or publicly owned wastewater treatment facility.

C. This criterion was calculated based on an additional lifetime cancer risk of one-in-one hundred thousand (1×10^{-5} risk level). For some chemicals the criterion value defaulted from the risk-based concentration to the 40CFR131.36 concentration, as indicated in footnote A above. In these cases the additional lifetime cancer risk associated with the criterion is less than one-in-one hundred thousand.

D. This criterion is based on a regulatory level developed under the Safe Drinking Water Act.

E. This recommended water quality criterion is expressed as total cyanide, even though the IRIS RFD used to derive the criterion is based on free cyanide. The multiple forms of cyanide that are present in ambient water have significant differences in toxicity due to their differing abilities to liberate the CN-moiety. Some complex cyanides require even more extreme conditions than refluxing with sulfuric acid to liberate the CN-moiety. Thus, these complex cyanides are expected to have little or no 'bioavailability' to humans. If a substantial fraction of the cyanide present in a water body is present in a complexed form (e.g., Fe4[Fe(CN)6]3), this criterion may be over conservative.

F. This criterion applies to total PCBs, (e.g., the sum of all congener or all isomer or homolog or Aroclor analyses~~.~~). The PCBs criteria were calculated using a 4×10^{-5} risk level, but because that calculation resulted in a higher concentration than that found in 40CFR131.36, the criterion concentration defaulted to the concentration found in 40CFR131.36, as indicated in footnote A above.

G. This criterion was derived using the cancer slope factor of 1.4 (LMS method, continuous lifetime exposure from birth).

H. The human health criteria for mercury are contained in 40CFR131.36 ~~(known as the National Toxics Rule)~~.

~~(4) USEPA Quality Criteria for Water, 1986, as revised, shall be used in the use and interpretation of the values listed in subsection (3) of this section.~~

~~(5) Concentrations of toxic, and other substances with toxic propensities not listed in subsection (3) of this section shall be determined in consideration of USEPA Quality Criteria for Water, 1986, and as revised, and other relevant information as appropriate. Human health-based water quality criteria used by the state are contained in 40 C.F.R. 131.36 (known as the National Toxics Rule).~~

~~(6) Risk-based criteria for carcinogenic substances shall be selected such that the upper-bound excess cancer risk is less than or equal to one in one million.~~