COMPARISON OF WATER QUALITY CRITERIA – DRBC VS DE, NJ, PA VS US EPA

PARAMETER	Freshwater Objectives (µg/l)					
	Acute			Chronic		
	DRBC	DE, NJ, PA *exceptions in italics*	USEPA	DRBC	DE, NJ, PA ***exceptions in italics***	USEPA
Metals						
Aluminum	750	750	750	87	N/A *DE - 87*	87
Arsenic (trivalent)	360	340	340	190	150	150
Cadmium	$e^{(1.128*LN(Hardness)-3.828)}$ @H=74; **2.8**	*{1.136672-(In[H]x0.041838)}x Exp(1.128xln[H]-3.6867) @H=100; **4.3**	*{1.136672-(In[H]x0.041838)}x Exp(1.0166xln[H]-3.924) @H=100; **2.0**	$e^{(0.7852*LN(Hardness)-3.49)}$ @H=74; **0.9**	*{1.101672-(In[H]x0.041838)} x Exp(0.7852xln[H]-2.715) @H=100; **2.2**	*{1.101672-(In[H]x0.041838)} x Exp(0.7409xln[H]-4.719) @H=100; **0.25**
Chromium (trivalent)	$e^{(0.8190*LN(Hardness)+3.688)}$ @H=74; **1357**	*0.316Exp(0.819xln[H]+3.7256) @H=100; **570**	*$e^{(0.819xln[H]+3.7256)}$ @H=100; **570**	$e^{(0.8190*LN(Hardness)+1.561)}$ @H=74; **162**	*0.860xExp(0.819xln[H]+0.6848) @H=100; **74** NJ- None	*$e^{(0.819xln[H]+0.6848)}$ @H=100; **74**
Chromium (hexavalent)	16	*16 *NJ - 15*	16	11	NJ, DE -10 *PA-11*	11
Copper	$e^{(0.9422*LN(Hardness)-1.464)}$ @H=74; **13.3**	*0.960xExp(0.9422xln[H]-1.700) @H=100; **13** *NJ* **0.908xExp(0.9422xln[H]-1.700)* *@H=100; **7.9***	$e^{(0.9422xln[H]-1.700)}$ @H=100; **13**	$e^{(0.8545*LN(Hardness)-1.465)}$ @H=74; **9.1**	*0.960xExp(0.8545xln[H]-1.702) @H=100; **9.0** *NJ* **0.908xExp(0.8545xln[H]-1.702)* *@H=100; **5.6***	*$e^{(0.8545xln[H]-1.702)}$ @H=100; **9.0**
Cyanide (total)	22	22 (Cyanide, free)	22.36 (Cyanide, free)	5.2	5.2 (Cyanide, free)	5.221 (Cyanide, free)

Comparison of DRBC vs DE, NJ, PA vs USEPA Water Quality Criteria – Continued

PARAMETER	Acute *Freshwater Objectives (µg/l)*			Chronic		
	DRBC	**DE, NJ, PA** ***exceptions in italics***	**USEPA**	**DRBC**	**DE, NJ, PA** ***exceptions in italics***	**USEPA**
Lead	48	*{1.46203-(ln[H]x0.145712)}x Exp(1.273xln[H]-1.460) @H=100; **65** *NJ - 38*	*$e^{(1.273xln[H]-1.460)}$ @H=100; **65**	16	*{1.46203-(In[H]x0.145712)} x Exp(1.273xln[H]-4.705) @H=100; **2.5** **NJ - 5.4*	*$e^{(1.273xln[H]-4.705)}$ @H=100; **2.5**
Mercury	2.4	*1.4	*1.4	0.012	*0.77	*0.77
Nickel	$e^{(0.846*LN(Hardness)+3.3612)}$ @H=74; **1099**	*0.998xExp(0.846xln[H]+2.255) @H=100; **470** *NJ* **0.846xExp(0.846xln[H]+2.255) @H=100; 397*	*$e^{(0.846xln[H]+2.255)}$ @H=100; **470**	$e^{(0.846*LN(Hardness)+1.1645)}$ @H=74; **122**	*0.997xExp(0.846xln[H]+0.0584) @H=100; **52** *NJ - None*	* $e^{(0.846xln[H]+0.0584)}$ @H=100; **52**
Selenium	20	N/A	N/A	5.0	*5.0 PA -*4.6	5
Silver	$e^{(1.72*LN(Hardness)-6.52)}$ @H=74; **2.4**	*0.850xExp(1.72xln[H]-6.520) @H=100; **3.2** *PA* *0.850xExp(1.72xln[H]-6.59) @H=100; **3.5***	*$e^{(1.72xln[H]-6.520)}$ @H=100; **3.4**	N/A	N/A	N/A
Zinc	$e^{(0.8473*LN(Hardness)+0.8604)}$ @H=74; **90.7**	*0.978xExp(0.8473xln[H]+0.884) @H=100; **120**	*$e^{(0.8473xln[H]+0.884)}$ @H=100; **120**	$e^{(0.8473*LN(Hardness)+0.7614)}$ @H=74; **8.21**	*0.986xExp(0.8473xln[H]+0.884) @H=100; **120** NJ-None	$e^{(0.8473xln[H]+0.884)}$ @H=100; **120**

Comparison of DRBC vs DE, NJ, PA vs USEPA Water Quality Criteria – Continued

PARAMETER	Acute		*Freshwater*	*Objectives (µg/l)*	Chronic	
	DRBC	**DE, NJ, PA** ***exceptions in italics***	**USEPA**	**DRBC**	**DE, NJ, PA** ***exceptions in italics***	**USEPA**
Pesticides / PCBs						
Aldrin	1.5	3	3.0	-	DE, NJ- None *PA - 0.1*	N/A
gamma - BHC (Lindane)	1.0	0.95 *DE-None*	0.95	0.08	N/A	N/A
Chlordane	1.2	2.4 *DE-None*	2.4	0.0043	0.0043	0.0043
Chlorpyrifos (Dursban)	0.083	0.083 *PA -None*	0.083	0.041	DE,NJ – 0.041 *PA- None*	0.041
DDT and metabolites (DDE & DDD)	0.55	----4,4-DDT 1.1 ----4,4-DDE ----4,4-DDD	----4,4-DDT 1.1 ----4,4-DDE ----4,4-DDD	0.001	--4,4-DDT 0.001 --4,4-DDE --4,4-DDD	--4,4-DDT 0.001 --4,4-DDE --4,4-DDD
Dieldrin	1.25	0.24	0.24	0.0019	0.056	0.056
Endosulfan	0.11	DE, NJ -None *PA- 0.22 (as alpha- & beta-)*	0.22	0.056	0.056	0.056
Endrin	0.09	0.086	0.086	0.0023	0.036	0.036
Heptachlor	0.26	0.52	0.52	0.0038	0.0038	0.0038
PCBs (Total)	1.0	N/A	N/A	0.014	0.014	0.014
Parathion	0.065	DE, NJ- 0.065 *PA- None*	0.06495	0.013	None	0.01286
Toxaphene	0.73	0.73	0.73	0.0002	0.0002	0.0002
Acid Extractable Organics						
Pentachlorophenol	$e^{(1.005*pH-4.83)}$ @pH= 6.5 7.8 9.0 **5.5 20 68**	Exp(1.005x[pH]-4.869) @pH= 6.5 7.8 9.0 **5.3 19 65**	$e^{(1.005x[pH]-4.869)}$ @pH= 7.8; **19**	$e^{(1.005*pH-5.29)}$ **3.5 13 43**	Exp(1.005x[pH]-5.134) @pH= 6.5 7.8 9.0 **4.1 15 50**	$e^{(1.005x[pH]-5.134)}$ @pH= 7.8; **15**

* Indicates dissolved metal criterion; others are total recoverable metals. Each listed dissolved criterion is equal to the corresponding total recoverable criterion before rounding (from the EPA National Ambient Water Quality Criteria Documents) multiplied by the conversion factor (from the Conversions Factors Table); a criterion that is expressed as a hardness (H)-based equation is shown as the conversion factor (listed) multiplied by the hardness criterion equation; an example criterion is included.

InH- National Logarithm of the Hardness of stream at mg/l $CaCO_3$

[1] USEPA National Recommended Water Quality Criteria 2006

[2] Delaware Water Quality Standards regulation, amended July 11, 2005

[3] New Jersey Surface Water Quality Standards, adopted October 16, 2006

[4] Title 25, Chapter 16 of Pennsylvania Coe, Water Quality Toxics Management Strategy - amended Nov 2000 (in review)

[5] DRBC Water Quality Regulations, data October 23, 1996 (in review)