

Document No. 4887
DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
CHAPTER 61

Statutory Authority: 1976 Code Sections 48-1-10 et seq.

61-68. Water Classifications and Standards.

Synopsis:

R.61-68 establishes appropriate goals and water uses to be achieved, maintained, and protected, general rules and water quality criteria to protect classified and existing water uses, and an antidegradation policy to protect and maintain the levels of water quality necessary to support and maintain those existing and classified uses. Section 303(c)(2)(B) of the federal Clean Water Act (“CWA”) requires South Carolina’s water quality standards be reviewed and revised, where necessary, at least once every three years. Referred to as the triennial review, this required process consists of reviewing and adopting, where appropriate, the Environmental Protection Agency’s updated numeric and narrative criteria according to Section 304(a) and Section 307(a) of the CWA. The Department of Health and Environmental Control (“Department”) amends R.61-68 to adopt these criteria the Department deemed necessary to comply with federal regulatory recommendations and revisions. The Department adopts a revised standard for aquatic life ambient water quality criteria for cadmium, a revised recreational water quality criteria for enterococci, a standard for aquatic life ambient water quality criteria for carbaryl, and a standard for human health recreational ambient water quality criteria for microcystins and cylindrospermopsin to reflect the most current final published criteria in accordance with Sections 304(a) and 307(a) of the CWA. The Department also makes stylistic changes for overall improvement of the text of the regulation.

The Department had a Notice of Drafting published in the February 22, 2019, *South Carolina State Register*.

Instructions:

Amend R.61-68 pursuant to each individual instruction provided with the text of the amendments below.

Text:

61-68. Water Classifications and Standards.

(Statutory Authority: 1976 Code Sections 48-1-10 et seq.)

Amend 61-68.E.14.c(10) to read:

(10) In order to protect recreational uses in Class SB saltwaters of the State, NPDES permit effluent limitations shall be specified as indicated below:

i. Monthly Average (enterococci)	35 MPN per 100 mL
ii. Daily Maximum (enterococci)	104 MPN per 100 mL (see c(12) below)
iii. Class SA recreational daily maximum and/or shellfish protection	Class SA daily maximum (see c(9)ii. above) recreational use requirements for enterococci and/or Class SFH requirements (see c(11)i. and c(11)ii. below) for fecal coliform may be specified (in addition to the limits above) for the protection of upstream and/or downstream waters (regardless of their individual classification).
iv. Municipal separate storm sewer systems	For municipal separate storm sewer systems (as described in R.61-9.122.26.a.) compliance with the bacterial

506 FINAL REGULATIONS

	standards shall be determined in accordance with c(13) below.
v. Protection of upstream and/or downstream waters	Permit limitations may include (in addition to the requirements listed in c(10)i. and c(10)ii. above) one or more bacterial limitations for fecal coliform, E. coli and /or enterococci to protect both uses in the specific receiving water body and also to protect any upstream or downstream uses that may be required. If more than one bacterial limit is required, the conditions associated with each section above or below shall apply independently regardless of the water classification at the point of discharge.
vi. Class ORW or ONRW protection	For Class ORW or ONRW waters, the bacterial requirements shall be those applicable to the classification of the waterbody immediately prior to reclassification to either ORW or ONRW, including consideration of natural conditions. See G.5 and G.7 for prohibitions.

Add 61-68.E.14.d(7) to read:

(7) The assessment of total microcystins for purposes of issuing a swimming advisory for freshwater recreational use will be based on the single sample maximum of 8 µg/L. Once issued, the swimming advisory will remain in effect until resample results indicate the toxin concentration falls below 8 µg/L.

Add 61-68.E.14.d(8) to read:

(8) The assessment of total microcystins for purposes of Section 303(d) listing determinations for recreational uses shall be based on no more than three (3) swimming advisories in a three (3)-year assessment period.

Add 61-68.E.14.d(9) to read:

(9) The assessment of cylindrospermopsin for purposes of issuing a swimming advisory for freshwater recreational use will be based on the single sample maximum of 15 µg/L. Once issued, the swimming advisory will remain in effect until resample results indicate the toxin concentration falls below 15 µg/L.

Add 61-68.E.14.d(10) to read:

(10) The assessment of cylindrospermopsin for purposes of Section 303(d) listing determinations for recreational uses shall be based on no more than three (3) swimming advisories in a three (3)-year assessment period.

Amend 61-68.G.9. and 10. to read:

9. The standards below protect the uses of Natural and Put, Grow, and Take trout waters.

Quality Standards for Trout Waters	
ITEMS	STANDARDS
a. Garbage, cinders, ashes, oils, sludge, or other refuse	None allowed.
b. Treated wastes, toxic wastes, deleterious substances, colored, or	None alone or in combination with other substances or wastes in sufficient amounts to be injurious to reproducing trout populations in natural waters or stocked populations in put, grow, and take waters, or in any manner adversely

other wastes except those given in a. above.	affecting the taste, color, odor, or sanitary condition thereof or impairing the waters for any other best usage as determined for the specific waters which are assigned to this class.
c. Toxic pollutants listed in the appendix.	As prescribed in Section E of this regulation.
d. Stormwater, and other nonpoint source runoff, including that from agricultural uses, or permitted discharge from aquatic farms, concentrated aquatic animal production facilities, and uncontaminated groundwater from mining.	Allowed if water quality necessary for existing and classified uses shall be maintained and protected consistent with Antidegradation Rules.
e. Dissolved oxygen.	Not less than 6 mg/L.
f. E. coli	Not to exceed a geometric mean of 126/100 mL based on at least four samples collected from a given sampling site over a 30 day period, nor shall a single sample maximum exceed 349/100 mL.
g. pH.	Between 6.0 and 8.0.
h. Temperature.	Not to vary from levels existing under natural conditions, unless determined that some other temperature shall protect the classified uses.
i. Turbidity.	Not to exceed 10 Nephelometric Turbidity Units (NTUs) or 10% above natural conditions, provided uses are maintained.
j. Total microcystins	Not to exceed 8 µg/L. For freshwater primary contact recreational use notifications and advisories samples shall not exceed 8 µg/L.
k. Cylindrospermopsin	Not to exceed 15 µg/L. For freshwater primary contact recreational use notifications and advisories samples shall not exceed 15 µg/L.

10. Freshwaters are freshwaters suitable for primary and secondary contact recreation and as a source for drinking water supply after conventional treatment in accordance with the requirements of the Department. Suitable for fishing and the survival and propagation of a balanced indigenous aquatic community of fauna and flora. Suitable also for industrial and agricultural uses.

Quality Standards for Freshwaters	
ITEMS	STANDARDS
a. Garbage, cinders, ashes, oils, sludge, or other refuse	None allowed.
b. Treated wastes, toxic wastes, deleterious substances, colored, or other wastes except those given in a. above.	None alone or in combination with other substances or wastes in sufficient amounts to make the waters unsafe or unsuitable for primary contact recreation or to impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

508 FINAL REGULATIONS

c. Toxic pollutants listed in the appendix.	As prescribed in Section E of this regulation.
d. Stormwater, and other nonpoint source runoff, including that from agricultural uses, or permitted discharge from aquatic farms, concentrated aquatic animal production facilities, and uncontaminated groundwater from mining.	Allowed if water quality necessary for existing and classified uses shall be maintained and protected consistent with Antidegradation Rules.
e. Dissolved oxygen.	Daily average not less than 5.0 mg/L with a low of 4.0 mg/L.
f. E. coli	Not to exceed a geometric mean of 126/100 mL based on at least four samples collected from a given sampling site over a 30 day period, nor shall a single sample maximum exceed 349/100 mL.
g. pH.	Between 6.0 and 8.5.
h. Temperature.	As prescribed in E.12. of this regulation.
i. Turbidity. Except for Lakes. Lakes only.	Not to exceed 50 NTUs provided existing uses are maintained. Not to exceed 25 NTUs provided existing uses are maintained.
j. Total microcystins	Not to exceed 8 µg/L. For freshwater primary contact recreational use notifications and advisories samples shall not exceed 8 µg/L.
k. Cylindrospermopsin	Not to exceed 15 µg/L. For freshwater primary contact recreational use notifications and advisories samples shall not exceed 15 µg/L.

Amend 61-68.G.13. to read:

13. Class SB are tidal saltwaters suitable for primary and secondary contact recreation, crabbing, and fishing, except harvesting of clams, mussels, or oysters for market purposes or human consumption. Also suitable for the survival and propagation of a balanced indigenous aquatic community of marine fauna and flora.

Quality Standards for Class SB Waters	
ITEMS	STANDARDS
a. Garbage, cinders, ashes, oils, sludge, or other refuse	None allowed.
b. Treated wastes, toxic wastes, deleterious substances, colored, or other wastes except those given in a. above.	None alone or in combination with other substances or wastes in sufficient amounts to make the waters unsafe or unsuitable for primary contact recreation or to impair the waters for any other best usage as determined for the specific waters which are assigned to this class.
c. Toxic pollutants listed in the appendix.	As prescribed in Section E of this regulation.

d. Stormwater, and other nonpoint source runoff, including that from agricultural uses, or permitted discharge from aquatic farms, and concentrated aquatic animal production facilities.	Allowed if water quality necessary for existing and classified uses shall be maintained and protected consistent with Antidegradation Rules.
e. Dissolved oxygen.	Not less than 4.0 mg/L.
f. Enterococci.	Not to exceed a geometric mean of 35/100 ml based on at least four samples collected from a given sampling site over a 30 day period; nor shall a single sample maximum exceed 104/100 mL. Additionally, for beach monitoring and notification activities for CWA Section 406 only, samples shall not exceed a single sample maximum of 104/100 mL.
g. pH.	Shall not vary more than one-half of a pH unit above or below that of effluent-free waters in the same geological area having a similar total salinity, alkalinity and temperature, but not lower than 6.5 or above 8.5
h. Temperature.	As prescribed in E.12. of this regulation.
i. Turbidity.	Not to exceed 25 NTUs provided existing uses are maintained.

j. The Department shall protect existing shellfish harvesting uses found in Class SB waters consistent with the antidegradation rule, Section D.1.a. of this regulation and shall establish permit limits in accordance with Section E.14.c(8), (9), (10), and (11) and Section G.11.f. of this regulation.

510 FINAL REGULATIONS

Amend R.61-68 Appendix: Water Quality Numeric Criteria for the Protection of Aquatic Life and Human Health “Priority Toxic Pollutants” table and footnotes to read:

APPENDIX: WATER QUALITY NUMERIC CRITERIA FOR THE PROTECTION OF AQUATIC LIFE AND HUMAN HEALTH

This appendix contains three charts (priority pollutants, nonpriority pollutants, and organoleptic effects) of numeric criteria for the protection of human health and aquatic life. The appendix also contains three attachments which address hardness conversions and application of ammonia criteria. Footnotes specific to each chart follow the chart. General footnotes pertaining to all are at the end of the charts prior to the attachments. The numeric criteria developed and published by EPA are hereby incorporated into this regulation. Please refer to the text of the regulation for other general information and specifications in applying these numeric criteria.

PRIORITY TOXIC POLLUTANTS

Priority Pollutant	CAS Number	Freshwater Aquatic Life		Saltwater Aquatic Life		Human Health			FR Cite/ Source	
		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	For Consumption of:				
						Water & Organism (µg/L)	Organism Only (µg/L)	MCL (µg/L)		
1	Antimony	7440360				5.6 B, ee	640 B, ee	6 ee	65FR66443 SDWA	
2	Arsenic	7440382	340 A, D, K	150 A, D, K	69 A, D, Y	36 A, D, Y	10 C	10 C	10 C	65FR31682 57FR60848 SDWA
3	Beryllium	7440417						4 ee	65FR31682 SDWA	
4	Cadmium	7440439	0.49 D, E, Y	0.25 D, E, Y	33 D, Y	7.9 D, Y	J, ee	J, ee	5 ee	81FR19176 SDWA
5a	Chromium III	16065831	580 D, E, K	28 D, E, K			J, ee	J, ee	100 ee Total	EPA820/B-96-001 65FR31682 SDWA
5b	Chromium VI	18540299	16 D, K	11 D, K	1,100 D, Y	50 D, Y	J, ee	J, ee	100 ee Total	65FR31682 SDWA
6	Copper	7440508	3.8 D, E, K, Z, II	2.9 D, E, K, Z, II	5.8 D, Z, Y, cc	3.7 D, Z, Y, cc	1,300 T, ee			65FR31682
7	Lead	7439921	14 D, E, Y	0.54 D, E, Y	220 D, Y	8.5 D, Y				65FR31682

FINAL REGULATIONS 511

Priority Pollutant	CAS Number	Freshwater Aquatic Life		Saltwater Aquatic Life		Human Health			FR Cite/ Source	
		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	For Consumption of:				
						Water & Organism (µg/L)	Organism Only (µg/L)	MCL (µg/L)		
8	Mercury	7439976	1.6 D, K, dd	0.91 D, K, dd	2.1 D, bb, dd	1.1 D, bb, dd	0.050 B, ee	0.051 B, ee	2 ee	65FR31682 SDWA
9	Nickel	7440020	150 D, E, K	16 D, E, K	75 D, Y	8.3 D, Y	610 B, ee	4, 600 B, ee		65FR31682
10	Selenium	7782492	L, Q, S	5.0 S	290 D, aa	71 D, aa	170 Z, ee	4,200 ee	50 ee	65FR31682 65FR66443 SDWA
11	Silver	7440224	0.37 D, E, G		2.3 D, G					65FR31682
12	Thallium	7440280					0.24	0.47	2 ee	68FR75510 SDWA
13	Zinc	7440666	37 D, E, K	37 D, E, K	95 D, Y	86 D, Y	7,400 T, ee	26,000 T, ee		65FR31682 65FR66443
14	Cyanide	57125	22 K, P	5.2 K, P	1 P, Y	1 P, Y	140 ee, jj	140 ee, jj	200 ee	EPA820/B-96-001 57FR60848 68FR75510 SDWA
15	Asbestos	1332214							7 million fibers/L l, ee	57FR60848
16	2, 3, 7, 8-TCDD (Dioxin)	1746016						0.046 ppq O, C	30ppq O, C	State Standard SDWA
17	Acrolein	107028	3	3			6 ee, nn	9 ee, nn		74FR27535 74FR46587
18	Acrylonitrile	107131					0.051 B, C	0.25 B, C		65FR66443
19	Benzene	71432					2.2 B, C	51 B, C	5 C	IRIS 01/19/00 65FR66443 SDWA

512 FINAL REGULATIONS

Priority Pollutant	CAS Number	Freshwater Aquatic Life		Saltwater Aquatic Life		Human Health			FR Cite/ Source
		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	For Consumption of:			
						Water & Organism (µg/L)	Organism Only (µg/L)	MCL (µg/L)	
20	Bromate	15541454						10 C	SDWA
21	Bromoform	75252				4.3 B, C	140 B, C	80 Total THMs C	65FR66443 SDWA
22	Bromoacetic acid	79083						60 Total HAA5 C,mm	SDWA
23	Carbon Tetrachloride	56235				0.23 B, C	1.6 B, C	5 C	65FR66443 SDWA
24	Chlorite	67481						100	SDWA
25	Chlorobenzene	108907				130T, ee	1,600 T, ee	100 T, ee	68FR75510 SDWA
26	Chlorodibromomethane	124481				0.40 B, C	13 B, C	80 Total THMs C	65FR66443 SDWA
27	Chloroform	67663				5.7 B, C, hh	470 B, C, hh	80 Total THMs C	62FR42160 SDWA
28	Dibromoacetic acid	631641						60 Total HAA5 C, mm	SDWA
29	Dichloroacetic acid	79436						60 Total HAA5 C,mm	SDWA
30	Dichlorobromomethane	75274				0.55 B, C	17 B, C	80 Total THMs C	65FR66443 SDWA
31	1, 2-Dichloroethane	107062				0.38 B, C	37 B, C	5 C	65FR66443 SDWA
32	1, 1-Dichloroethylene	75354				330 ee	7,100 ee	7 C	68FR75510 SDWA

Priority Pollutant	CAS Number	Freshwater Aquatic Life		Saltwater Aquatic Life		Human Health			FR Cite/ Source
		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	For Consumption of:			
						Water & Organism (µg/L)	Organism Only (µg/L)	MCL (µg/L)	
33	1, 2-Dichloropropane	78875				0.50 B, C	15 B, C	5 C	65FR66443 SDWA
34	1, 3-Dichloropropene	542756				0.34 ee	21 ee		68FR75510
35	Ethylbenzene	100414				530 ee	2,100 ee	700 ee	68FR75510 SDWA
36	Methyl Bromide	74839				47 B, ee	1,500 B, ee		65FR66443
37	Methylene Chloride	75092				4.6 B, C	590 B, C	5 C	65FR66443 SDWA
38	Monochloroacetic acid	79118						60 Total HAA5 C,mm	SDWA
39	1, 1, 2, 2-Tetrachloroethane	79345				0.17 B, C	4.0 B, C		65FR66443
40	Tetrachloroethylene	127184				0.69 C	3.3 C	5 C	65FR66443 SDWA
41	Toluene	108883				1,300 ee	15,000 ee	1000 ee	68FR75510 SDWA
42	1,2-Trans- Dichloroethylene	156605				140 ee	10,000 ee	100 ee	68FR75510 SDWA
43	Trichloroacetic acid	79039						60 Total HAA5 C,mm	SDWA
44	1, 1, 1-Trichloroethane	71556				J, ee	J, ee	200 ee	65FR31682 SDWA

514 FINAL REGULATIONS

Priority Pollutant	CAS Number	Freshwater Aquatic Life		Saltwater Aquatic Life		Human Health			FR Cite/ Source	
		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	For Consumption of:				
						Water & Organism (µg/L)	Organism Only (µg/L)	MCL (µg/L)		
45	1, 1, 2-Trichloroethane	79005				0.59 B, C	16 B, C	5 C	65FR66443 SDWA	
46	Trichloroethylene	79016				2.5 C	30 C	5 C	65FR66443 SDWA	
47	Vinyl Chloride	75014				0.025 kk	2.4 kk	2 C	68FR75510 SDWA	
48	2-Chlorophenol	95578				81 B, T, ee	150 B, T, ee		65FR66443	
49	2, 4-Dichlorophenol	120832				77 B, T, ee	290 B, T, ee		65FR66443	
50	2, 4-Dimethylphenol	105679				380 B, T, ee	850 B, T, ee		65FR66443	
51	2-Methyl- Di 4, 6-nitrophenol	534521				13 ee	280 ee		65FR66443	
52	2, 4-Dinitrophenol	51285				69 B, ee	5,300 B, ee		65FR66443	
53	Pentachlorophenol	87865	19 F, K	15 F, K	13 Y	7.9 Y	0.27 B, C	3.0 B, C, H	1 C	65FR31682 65FR66443 SDWA
54	Phenol	108952				10,000 T, ee, nn	860,000 T, ee, nn		74FR27535 74FR46587	
55	2, 4, 6-Trichlorophenol	88062				1.4 B, C, T	2.4 B, C		65FR66443	
56	Acenaphthene	83329				670 B, T, ee	990 B, T, ee		65FR66443	
57	Anthracene	120127				8,300 B, ee	40,000 B, ee		65FR66443	

Priority Pollutant	CAS Number	Freshwater Aquatic Life		Saltwater Aquatic Life		Human Health			FR Cite/ Source	
		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	For Consumption of:				
						Water & Organism (µg/L)	Organism Only (µg/L)	MCL (µg/L)		
58	Benzidine	92875				0.00086 B, C	0.00020 B, C		65FR66443	
59	Benzo (a) Anthracene	56553				0.0038 B, C	0.018 B, C		65FR66443	
60	Benzo (a) Pyrene	50328				0.0038 B, C	0.018 B, C	0.2 C	65FR66443 SDWA	
61	Benzo (b) Fluoranthene	205992				0.0038 B, C	0.018 B, C		65FR66443	
62	Benzo (k) Fluoranthene	207089				0.0038 B, C	0.018 B, C		65FR66443	
63	Bis-2-Chloroethyl Ether	111444				0.030 B, C	0.53 B, C		65FR66443	
64	Bis-2-Chloroisopropyl Ether	108601				1,400 B, ee	65,000 B, ee		65FR66443	
65	Bi-s2-Ethylhexyl Phthalate (DEHP)	117817	v	v	v	v	1.2 B, C	2.2 B, C	6 C	65FR66443 SDWA
66	Butylbenzene Phthalate	85687	ii	ii	ii	ii	1,500 B, ee	1,900 B, ee	65FR66443	
67	2-Chloronaphthalene	91587					1,000 B, ee	1,600 B, ee	65FR66443	
68	Chrysene	218019					0.0038 B, C	0.018 B, C	65FR66443	
69	Dibenzo(a,h)Anthracene	53703					0.0038 B, C	0.018 B, C	65FR66443	

516 FINAL REGULATIONS

Priority Pollutant	CAS Number	Freshwater Aquatic Life		Saltwater Aquatic Life		Human Health			FR Cite/ Source
		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	For Consumption of:			
						Water & Organism (µg/L)	Organism Only (µg/L)	MCL (µg/L)	
70	1, 2-Dichlorobenzene	95501				420 ee	1,300 ee	600 ee	68FR75510 SDWA
71	1, 3-Dichlorobenzene	541731				320 ee	960 ee		65FR66443
72	1, 4-Dichlorobenzene	106467				63 ee	190 ee	75 ee	68FR75510 SDWA
73	3, 3'-Dichlorobenzidine	91941				0.021 B, C	0.028 B, C		65FR66443
74	Diethyl Phthalate	84662	ii	ii	ii	17,000 B, ee	44,000 B, ee		65FR66443
75	Dimethyl Phthalate	131113	ii	ii	ii	270,000 B, ee	1,100,000 B, ee		64FR66443
76	Di-n-butyl Phthalate	84742	ii	ii	ii	2,000 B, ee	4,500 B, ee		65FR66443
77	2, 4-Dinitrotoluene	121142				0.11 C	3.4 C		65FR66443
78	1, 2-Diphenylhydrazine	122667				0.036 B, C	0.20 B, C		65FR66443
79	Fluoranthene	206440				130 B, ee	140 B, ee		65FR66443
80	Fluorene	86737				1,100 B, ee	5,300 B, ee		65FR66443
81	Hexachlorobenzene	118741				0.00028 B, C	0.00029 B, C	1 C	65FR66443 SDWA

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		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	For Consumption of:			
						Water & Organism (µg/L)	Organism Only (µg/L)	MCL (µg/L)	
82	Hexachlorobutadiene	87683				0.44 B, C	18 B, C		65FR66443
83	Hexachlorocyclopentadiene	77474				40 T, ee	1100 T, ee	50 ee	68FR75510 SDWA
84	Hexachloroethane	67721				1.4 B, C	3.3 B, C		65FR66443
85	Indeno 1,2,3(cd) Pyrene	193395				0.0038 B, C	0.018 B, C		65FR66443
86	Isophorone	78591				35 B, C	960 B, C		65FR66443
87	Nitrobenzene	98953				17 B, ee	690 B, H, T, ee		65FR66443
88	N-Nitrosodimethylamine	62759				0.00069 B, C	3.0 B, C		65FR66443
89	N-Nitrosodi-n-Propylamine	621647				0.0050 B, C	0.51 B, C		65FR66443
90	N-Nitrosodiphenylamine	86306				3.3 B, C	6.0 B, C		65FR66443
91	Pyrene	129000				830 B, ee	4,000 B, ee		65FR66443
92	1, 2, 4-Trichlorobenzene	120821				35 ee	70 ee	70 ee	68FR75510 SDWA
93	Aldrin	309002	3.0 G, X		1.3 G, X	0.000049 B, C	0.000050 B, C		65FR31682 65FR66443

518 FINAL REGULATIONS

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		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	For Consumption of:				
						Water & Organism (µg/L)	Organism Only (µg/L)	MCL (µg/L)		
94	alpha-BHC	319846				0.0026 B, C	0.0049 B, C		65FR66443	
95	beta-BHC	319857				0.0091 B, C	0.017 B, C		65FR66443	
96	gamma-BHC (Lindane)	58899	0.95 K		0.16 G	0.98 ee	1.8 ee	0.2 C	65FR31682 68FR75510 SDWA	
97	Chlordane	57749	2.4 G	0.0043 G, X	0.09 G	0.004 G, X	0.00080 B, C	0.00081 B, C	2 C	65FR31682 65FR66443 SDWA
98	4, 4'-DDT	50293	1.1 G, gg	0.001 G, X, gg	0.13 G, gg	0.001 G, X, gg	0.00022 B, C	0.00022 B, C		65FR31682 65FR66443
99	4, 4'-DDE	72559				0.00022 B, C	0.00022 B, C		65FR66443	
100	4, 4'-DDD	72548				0.00031 B, C	0.00031 B, C		65FR66443	
101	Dieldrin	60571	0.24 K	0.056 K, N	0.71 G	0.0019 G, X	0.000052 B, C	0.000054 B, C		65FR31682 65FR66443
102	alpha-Endosulfan	959988	0.22 G, W	0.056 G, W	0.034 G, W	0.0087 G, W	62 B, ee	89 B, ee		65FR31682 65FR66443
103	beta-Endosulfan	33213659	0.22 G, W	0.056 G, W	0.034 G, W	0.0087 G, W	62 B, ee	89 B, ee		65FR31682 65FR66443
104	Endosulfan Sulfate	1031078				62 B, ee	89 B, ee		65FR31682 65FR66443	
105	Endrin	72208	0.086 K	0.036 K, N	0.037 G	0.0023 G, X	0.059 ee	0.060 ee	2 ee	68FR75510 SDWA

Priority Pollutant	CAS Number	Freshwater Aquatic Life		Saltwater Aquatic Life		Human Health			FR Cite/ Source	
		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	For Consumption of:				
						Water & Organism (µg/L)	Organism Only (µg/L)	MCL (µg/L)		
106	Endrin Aldehyde	7421934				0.29 B, ee	0.30 B, H, ee		65FR66443	
107	Heptachlor	76448	0.52 G	0.0038 G, X	0.053 G	0.0036 G, X	0.000079 B, C	0.000079 B, C	0.4 C	65FR31682 65FR66443 SDWA
108	Heptachlor Epoxide	1024573	0.52 G, U	0.0038 G, U, X	0.053 G, U	0.0036 G, U, X	0.000039 B, C	0.000039B, C	0.2 C	65FR31682 65FR66443 SDWA
109	Polychlorinated Biphenyls PCBs	--		0.014 M, X		0.03 M, X	0.000064 B, C, M	0.000064 B, C, M	0.5 C	65FR31682 65FR66443 SDWA
110	Toxaphene	8001352	0.73	0.0002 X	0.21	0.0002 X	0.00028 B, C	0.00028 B, C	3 C	65FR31682 65FR66443 SDWA

Footnotes:

- A This water quality criterion was derived from data for arsenic (III), but is applied here to total arsenic, which might imply that arsenic (III) and arsenic (V) are equally toxic to aquatic life and that their toxicities are additive. In the arsenic criteria document (EPA 440/5-84-033, January 1985), Species Mean Acute Values are given for both arsenic (III) and arsenic (V) for five species and the ratios of the SMAVs for each species range from 0.6 to 1.7. Chronic values are available for both arsenic (III) and arsenic (V) for one species; for the fathead minnow, the chronic value for arsenic (V) is 0.29 times the chronic value for arsenic (III). No data are known to be available concerning whether the toxicities of the forms of arsenic to aquatic organisms are additive.
- B This criterion has been revised to reflect The Environmental Protection Agency’s q1* or RfD, as contained in the Integrated Risk Information System (IRIS) as of May 17, 2002. The fish tissue bioconcentration factor (BCF) from the 1980 Ambient Water Quality Criteria document was retained in each case.
- C This criterion is based on carcinogenicity of 10-6 risk. As prescribed in Section E of this regulation, application of this criterion for permit effluent limitations requires the use annual average flow or comparable tidal condition as determined by the Department.
- D Freshwater and saltwater criteria for metals are expressed in terms of total recoverable metals. As allowed in Section E of this regulation, these criteria may be expressed as dissolved metal for the purposes of deriving permit effluent limitations. The dissolved metal water quality criteria value may be calculated by using these 304(a) aquatic life criteria expressed in terms of total recoverable metal, and multiplying it by a conversion factor (CF). The term “Conversion Factor” (CF) represents the conversion factor for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column. (Conversion Factors for saltwater CCCs are not currently available. Conversion factors derived for saltwater CMCs have been used for both saltwater CMCs and CCCs). See “Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic

520 FINAL REGULATIONS

- Life Metals Criteria”, October 1, 1993, by Martha G. Prothro, Acting Assistant Administrator for Water, available from the Water Resource center, USEPA, 401 M St., SW, mail code RC4100, Washington, DC 20460; and 40CFR§131.36(b)(1). Conversion Factors can be found in Attachment 1 – Conversion Factors for Dissolved Metals.
- E The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. The value given here corresponds to a hardness of 25 mg/L as expressed as CaCO₃. Criteria values for other hardness may be calculated from the following: CMC (dissolved) = $\exp\{m_A [\ln(\text{hardness})] + b_A\}$ (CF), or CCC (dissolved) = $\exp\{m_C [\ln(\text{hardness})] + b_C\}$ (CF) and the parameters specified in Attachment 2 – Parameters for Calculating Freshwater Dissolved Metals Criteria That Are Hardness- Dependent. As noted in footnote D above, the values in this appendix are expressed as total recoverable, the criterion may be calculated from the following: CMC (total) = $\exp\{m_A [\ln(\text{hardness})] + b_A\}$, or CCC (total) = $\exp\{m_C [\ln(\text{hardness})] + b_C\}$.
- F Freshwater aquatic life values for pentachlorophenol are expressed as a function of pH, and are calculated as follows: CMC = $\exp(1.005(\text{pH}) - 4.869)$; CCC = $\exp(1.005(\text{pH}) - 5.134)$. Values displayed in table correspond to a pH of 7.8.
- G This criterion is based on 304(a) aquatic life criterion issued in 1980, and was issued in one of the following documents: Aldrin/Dieldrin (EPA 440/5-80-019), Chlordane (EPA 440/5-80-027), DDT (EPA 440/5-80-038), Endosulfan (EPA 440/5-80-046), Endrin (EPA 440/5-80-047), Heptachlor (440/5-80-052), Hexachlorocyclohexane (EPA 440/5-80-054), Silver (EPA 440/5-80-071). The Minimum Data Requirements and derivation procedures were different in the 1980 Guidelines than in the 1985 Guidelines. For example, a “CMC” derived using the 1980 Guidelines was derived to be used as an instantaneous maximum. If assessment is to be done using an averaging period, the values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.
- H No criterion for protection of human health from consumption of aquatic organisms excluding water was presented in the 1980 criteria document or in the 1986 Quality Criteria for Water. Nevertheless, sufficient information was presented in the 1980 document to allow the calculation of a criterion, even though the results of such a calculation were not shown in the document.
- I This criterion for asbestos is the Maximum Contaminant Level (MCL) developed under the Safe Drinking Water Act (SDWA) and the National Primary Drinking Water Regulation (NPDWR).
- J EPA has not calculated a 304(a) human health criterion for this contaminant. The criterion is the Maximum Contaminant Level developed under the Safe Drinking Water Act (SDWA) and the National Primary Drinking Water Regulation (NPDWR).
- K This criterion is based on a 304(a) aquatic life criterion that was issued in the *1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water*, (EPA-820-B-96-001, September 1996). This value was derived using the GLI Guidelines (60FR15393-15399, March 23, 1995; 40CFR132 Appendix A); the difference between the 1985 Guidelines and the GLI Guidelines are explained on page iv of the 1995 Updates. None of the decisions concerning the derivation of this criterion were affected by any considerations that are specific to the Great Lakes.
- L The CMC = $1/[(f_1/\text{CMC}_1) + (f_2/\text{CMC}_2)]$ where f_1 and f_2 are the fractions of total selenium that are treated as selenite and 520elenite, respectively, and CMC₁ and CMC₂ are 185.9 µg/l and 12.82 µg/l, respectively.
- M This criterion applies to total PCBs, (e.g., the sum of all congener or all isomer or homolog or Aroclor analyses.)
- N The derivation of the CCC for this pollutant did not consider exposure through the diet, which is probably important for aquatic life occupying upper trophic levels.
- O This state criterion is also based on a total fish consumption rate of 0.0175 kg/day.
- P This water quality criterion is expressed as µg free cyanide (as CN)/L.
- Q This value was announced (61FR58444-58449, November 14, 1996) as a proposed GLI 303 I aquatic life criterion
- S This water quality criterion for selenium is expressed in terms of total recoverable metal in the water column. It is scientifically acceptable to use the conversion factor (0.996 – CMC or 0.922 – CCC) that was used in the GLI to convert this to a value that is expressed in terms of dissolved metal.
- T The organoleptic effect criterion is more stringent than the value for priority toxic pollutants.
- U This value was derived from data for heptachlor and the criteria document provides insufficient data to estimate the relative toxicities of heptachlor and heptachlor epoxide.
- V There is a full set of aquatic life toxicity data that show that DEHP is not toxic to aquatic organisms at or below its solubility limit.
- W This value was derived from data for endosulfan and is most appropriately applied to the sum of alpha-endosulfan and beta-endosulfan.
- X This criterion is based on a 304(a) aquatic life criterion issued in 1980 or 1986, and was issued in one of the following documents: Aldrin/Dieldrin (EPA440/5-80-019), Chlordane (EPA 440/5-80-027), DDT (EPA 440/5-80-038), Endrin (EPA 440/5-80-047), Heptachlor (EPA 440/5-80-052), Polychlorinated Biphenyls (EPA 440/5- 80-068), Toxaphene (EPA 440/5-86-006). This CCC is based on the Final Residue value procedure in the 1985 Guidelines. Since the publication of the Great Lakes Aquatic Life Criteria Guidelines in 1995 (60FR15393-15399, March 23, 1995), the EPA no longer uses the Final Residue value procedure for deriving CCCs for new or revised 304(a) aquatic life criteria.
- Y This water quality criterion is based on a 304(a) aquatic life criterion that was derived using the 1985 Guidelines (*Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses*, PB85-227049, January 1985) and was issued in one of the following criteria documents: Arsenic (EPA 440/5-84-033), Cadmium (EPA-820-R-16-002), Chromium (EPA 440/5-84-029), Copper (EPA 440/5-84-031), Cyanide (EPA 440/5-84-028), Lead (EPA 440/5-84-027), Nickel (EPA 440/5-86-004), Pentachlorophenol (EPA 440/5-86-009), Toxaphene, (EPA 440/5-86-006), Zinc (EPA 440/5-87- 003).
- Z When the concentration of dissolved organic carbon is elevated, copper is substantially less toxic and use of Water-Effect Ratios might be appropriate.
- aa The selenium criteria document (EPA 440/5-87-006, September 1987) provides that if selenium is as toxic to saltwater fishes in the field as it is to freshwater fishes in the field, the status of the fish community should be monitored whenever the concentration of selenium exceeds 5.0 7g/L in salt water because the saltwater CCC does not take into account uptake via the food chain.

- bb This water quality criterion was derived on page 43 of the mercury criteria document (EPA 440/5-84-026, January 1985). The saltwater CCC of 0.025 µg/L given on page 23 of the criteria document is based on the Final Residue value procedure in the 1985 Guidelines. Since the publication of the Great Lakes Aquatic Life criteria Guidelines in 1995 (60FR15393-15399, March 23, 1995), the EPA no longer uses the Final Residue value procedure for deriving CCCs for new or revised 304(a) aquatic life criteria.
- cc This water quality criterion was derived in *Ambient Water Quality Criteria Saltwater Copper Addendum* (Draft, April 14, 1995) and was promulgated in the Interim Final National Toxics Rule (60FR22228-222237, May 4, 1995).
- dd This water quality criterion was derived from data for inorganic mercury (II), but is applied here to total mercury. If a substantial portion of the mercury in the water column is methylmercury, this criterion will probably be under protective. In addition, even though inorganic mercury is converted to methylmercury and methylmercury bioaccumulates to a great extent, this criterion does not account for uptake via the food chain because sufficient data were not available when the criterion was derived.
- ee This criterion is a noncarcinogen. As prescribed in Section E of this regulation, application of this criterion for determining permit effluent limitations requires the use of 7Q10 or comparable tidal condition as determined by the Department.
- gg This criterion applies to DDT and its metabolites (i.e., the total concentration of DDT and its metabolites should not exceed this value).
- hh Although a new RfD is available in IRIS, the surface water criteria will not be revised until the National Primary Drinking Water Regulations: Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) is completed, since public comment on the relative source contribution (RSC) for chloroform is anticipated.
- ii Although EPA has not published a completed criteria document for phthalate, it is EPA's understanding that sufficient data exist to allow calculation of aquatic life criteria.
- jj This recommended water quality criterion is expressed as total cyanide, even though the IRIS RfD the EPA 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 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., $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$), this criterion may be overly conservative.
- kk This recommended water quality criterion was derived using the cancer slope factor of 1.4 (Linear multi-stage model (LMS) exposure from birth).
- ll Freshwater copper criteria may be calculated utilizing the procedures identified in EPA-822-R-07-001.
- mm HAA5 means five haloacetic acids (monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, bromoacetic acid and dibromoacetic acid).
- nn This criterion has been revised to reflect the EPA's cancer slope factor (CSF) or reference dose (RfD), as contained in the Integrated Risk Information System (IRIS) as of (Final FR Notice June 10, 2009). The fish tissue bioconcentration factor (BCF) from the 1980 Ambient Water Quality Criteria document was retained in each case.

522 FINAL REGULATIONS

Amend R.61-68 APPENDIX, Water Quality Numeric Criteria for the Protection of Aquatic Life and Human Health, “Non Priority Pollutants” table and footnotes to read:

NON PRIORITY POLLUTANTS

Non Priority Pollutant	CAS Number	Freshwater Aquatic Life		Saltwater Aquatic Life		Human Health			FR Cite/Source	
		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	For Consumption of:		MCL (µg/L)		
						Water & Organism (µg/L)	Organism Only (µg/L)			
1	Alachlor							2 M	SDWA	
2	Ammonia	7664417	CRITERIA ARE pH AND TEMPERATURE DEPENDENT – SEE DOCUMENT FOR DETAILS c							EPA822-R99-014 EPA440/5-88-004
3	Aesthetic Qualities		NARRATIVE STATEMENT AND NUMERIC CRITERIA – SEE TEXT							Gold Book
4	Atrazine							3 M	SDWA	
5	Bacteria		FOR PRIMARY CONTACT RECREATION AND SHELLFISH USES – SEE TEXT							Gold Book
6	Barium	7440393					1,000 A, L	2,000 L	Gold Book	
7	Carbofuran	1563662						40 L	SDWA	
8	Chlorine	7782505	19	11	13	7.5		G	Gold Book SDWA	
9	Chlorophenoxy Herbicide 2, 4, 5, -TP	93721					10 A, L	50 L	Gold Book SDWA	
10	Chlorophenoxy Herbicide 2, 4-D	94757					100 A, L	70 L	Gold Book SDWA	
11	Chlorophyll <i>a</i>		NARRATIVE STATEMENT AND NUMERIC CRITERIA – SEE TEXT							State Standard

Non Priority Pollutant	CAS Number	Freshwater Aquatic Life		Saltwater Aquatic Life		Human Health			FR Cite/Source
		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	For Consumption of:		MCL (µg/L)	
						Water & Organism (µg/L)	Organism Only (µg/L)		
12	Chloropyrifos	2921882	0.083 F	0.041 F	0.011 F	0.0056 F			Gold Book
13	Color		NARRATIVE STATEMENT – SEE TEXT						State Standard
14	Dalapon	75990						200 L	SDWA
15	Demeton	8065483		0.1 E		0.1 E			Gold Book
16	1,2-Dibromo-3-chloropropane (DBCP)	96128						0.2 M	SDWA
17	Di(2-ethylhexyl) adipate	103231						400 L	SDWA
18	Dinoseb	88857						7 L	SDWA
19	Dinitrophenols	25550587					69 L	5,300 L	65FR66443
20	Nonylphenol	1044051	28	6.6	7.0	1.7			71FR9337
21	Diquat	85007						20 L	SDWA
22	Endothall	145733						100 L	SDWA
23	Ether, Bis Chloromethyl	542881					0.00010 D, M	0.00029 D, M	65FR66443
24	Cis-1, 2-dichloroethylene	156592						70 L	SDWA

524 FINAL REGULATIONS

Non Priority Pollutant	CAS Number	Freshwater Aquatic Life		Saltwater Aquatic Life		Human Health			FR Cite/Source	
		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	For Consumption of:		MCL (µg/L)		
						Water & Organism (µg/L)	Organism Only (µg/L)			
25	Ethylene dibromide							0.05 M	SDWA	
26	Fluoride	7681494						4000 L	SDWA	
27	Glyphosate	1071836						700 L	SDWA	
28	Guthion	86500		0.01 E		0.01 E			Gold Book	
29	Hexachlorocyclo-hexane-Technical	608731				0.0123 L	0.0414 L		Gold Book	
30	Malathion	121755		0.1 E		0.1 E			Gold Book	
31	Methoxychlor	72435		0.03 E		0.03 E	100 A, L	40 L	Gold Book SDWA	
32	Mirex	2385855		0.001 E		0.001 E			Gold Book	
33	Nitrates	14797558				10,000 L		10,000 L	SDWA Gold Book	
34	Nitrites	14797650						1,000 L	SDWA	
35	Nitrogen, Total		NARRATIVE STATEMENT AND NUMERIC CRITERIA - SEE TEXT							State Standard
36	Nitrosamines					0.0008 L	1.24 L		Gold Book	
37	Nitrosodibutylamine, N	924163				0.0063 A, M	0.22 A, M		65FR66443	

Non Priority Pollutant	CAS Number	Freshwater Aquatic Life		Saltwater Aquatic Life		Human Health			FR Cite/Source	
		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	For Consumption of:		MCL (µg/L)		
						Water & Organism (µg/L)	Organism Only (µg/L)			
38	Nitrosodiethylamine, N	55185					0.0008 A, M	1.24 A, M		Gold Book
39	Nitrosopyrrolidine, N	930552					0.016 M	34 M		65FR66443
40	Oil and Grease		NARRATIVE STATEMENT – SEE TEXT							Gold Book
41	Oxamyl	23135220							200 L	SDWA
42	Oxygen, Dissolved	7782447	WARMWATER, COLDWATER, AND EXCEPTIONS FOR NATURAL CONDITIONS - SEE TEXT K							Gold Book State Standard
43	Diazinon	333415	0.17	0.17	0.82	0.82				71FR9336
44	Parathion	56382	0.065 H	0.013 H						Gold Book
45	Pentachlorobenzene	608935					1.4 E	1.5 E		65FR66443
46	PH		SEE TEXT I							Gold Book State Standard
47	Phosphorus, Total		NARRATIVE STATEMENT AND NUMERIC CRITERIA - SEE TEXT							State Standard
48	Picloram	1918021							500 L	SDWA
49	Salinity		NARRATIVE STATEMENT - SEE TEXT							Gold Book

526 FINAL REGULATIONS

Non Priority Pollutant	CAS Number	Freshwater Aquatic Life		Saltwater Aquatic Life		Human Health			FR Cite/Source	
		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	For Consumption of:		MCL (µg/L)		
						Water & Organism (µg/L)	Organism Only (µg/L)			
50	Simazine	122349						4 L	SDWA	
51	Solids,Suspended,and Turbidity		NARRATIVE STATEMENT AND NUMERIC CRITERIA - SEE TEXT							Gold Book State Standard
52	Styrene	100425						100 L	SDWA	
53	Sulfide-Hydrogen Sulfide	7783064		2.0 E		2.0 E			Gold Book	
54	Tainting Substances		NARRATIVE STATEMENT - SEE TEXT							Gold Book
55	Temperature		SPECIES DEPENDENT CRITERIA - SEE TEXT J							Red Book
56	1, 2, 4, 5-Tetrachlorobenzene	95943					0.97 D	1.1 D		65FR66443
57	Tributyltin (TBT)	688733	0.46	0.063	0.37	0.010				EPA 822-F-00-008
58	2, 4, 5-Trichlorophenol	95954					1,800 B, D	3,600 B, D		65FR66443
59	Xylenes, Total								10, 000 L	SDWA
60	Uranium								30	SDWA
61	Beta particles and photon emitters								4 Millirems/ yr	SDWA

Non Priority Pollutant	CAS Number	Freshwater Aquatic Life		Saltwater Aquatic Life		Human Health			FR Cite/Source
		CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	For Consumption of:		MCL (µg/L)	
						Water & Organism (µg/L)	Organism Only (µg/L)		
62	Gross alpha particle activity							15 picocuries per liter (pCi/l)	SDWA
63	Radium 226 and Radium 228 (combined)							5 pCi/l	SDWA
64	Carbaryl	63252	2.1	2.1	1.6				77FR30280

Footnotes:

- A This human health criterion is the same as originally published in the Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value is now published in the Gold Book.
- B The organoleptic effect criterion is more stringent than the value presented in the non priority pollutants table.
- C According to the procedures described in the *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses*, except possibly where a very sensitive species is important at a site, freshwater aquatic life should be protected if both conditions specified in Attachment 3 - Calculation of Freshwater Ammonia Criterion are satisfied.
- D This criterion has been revised to reflect The Environmental Protection Agency’s q1* or RfD, as contained in the Integrated Risk Information System (IRIS) as of April 8, 1998. The fish tissue bioconcentration factor (BCF) used to derive the original criterion was retained in each case.
- E The derivation of this value is presented in the Red Book (EPA 440/9-76-023, July, 1976).
- F This value is based on a 304(a) aquatic life criterion that was derived using the 1985 Guidelines (*Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses*, PB85-227049, January 1985) and was issued in the following criteria document: Chloropyrifos (EPA 440/5-86-005).
- G A more stringent Maximum Residual Disinfection Level (MRDL) has been issued by EPA under the Safe Drinking Water Act. Refer to S.C. Regulation 61-58, *State Primary Drinking Water Regulations*.
- H This value is based on a 304(a) aquatic life criterion that was issued in the *1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water* (EPA-820-B-96-001). This value was derived using the GLI Guidelines (60FR15393-15399, March 23, 1995; 40CFR132 Appendix A); the differences between the 1985 Guidelines and the GLI Guidelines are explained on page iv of the 1995 Updates. No decision concerning this criterion was affected by any considerations that are specific to the Great Lakes.
- I South Carolina has established some site-specific standards for pH. These site-specific standards are listed in S.C. Regulation 61-69, *Classified Waters*.
- J U.S. EPA, 1976, Quality Criteria for Water 1976.
- K South Carolina has established numeric criteria in Section G for waters of the State based on the protection of warmwater and coldwater species. For the exception to be used for waters of the State that do not meet the numeric criteria established for the waterbody due to natural conditions, South Carolina has specified the allowable deficit in Section D.4. and used the following document as a source. U.S. EPA, 1986, Ambient Water Quality Criteria for Dissolved Oxygen, EPA 440/5-86-003, National Technical Information Service, Springfield, VA. South Carolina has established some site-specific standards for DO. These site-specific standards are listed in S.C. Regulation 61-69, *Classified Waters*.

528 FINAL REGULATIONS

- L This criterion is a noncarcinogen. As prescribed in Section E of this regulation, application of this criterion for determining permit effluent limitations requires the use of 7Q10 or comparable tidal condition as determined by the Department
- M This criterion is based on an added carcinogenicity risk. As prescribed in Section E of this regulation, application of this criterion for permit effluent limitations requires the use annual average flow or comparable tidal condition as determined by the Department.

Amend R.61-68 APPENDIX, Water Quality Numeric Criteria for the Protection of Aquatic Life and Human Health, “Attachment 2 – Parameters for Calculating Freshwater Dissolved Metals Criteria That Are Hardness-Dependent Criteria” to read:

Attachment 2 - Parameters for Calculating Freshwater Dissolved Metals Criteria That Are Hardness-Dependent

Chemical	m _A	b _A	m _C	b _C	Freshwater Conversion Factors (CF)	
					Acute	Chronic
Cadmium	0.9789 A	-3.866 A	0.7977 A	-3.909 A	1.136672-[ln (hardness)(0.041838)]	1.101672-[ln (hardness)(0.041838)]
Chromium III	0.8190	3.7256	0.8190	0.6848	0.316	0.860
Copper	0.9422	-1.700	0.8545	-1.702	0.960	0.960
Lead	1.273	-1.460	1.273	-4.705	1.46203-[ln (hardness)(0.145712)]	1.46203-[ln (hardness)(0.145712)]
Nickel	0.8460	2.255	0.8460	0.0584	0.998	0.997
Silver	1.72	-6.52	--	--	0.85	--
Zinc	0.8473	0.884	0.8473	0.884	0.978	0.986

Hardness-dependent metals criteria may be calculated from the following:

CMC (total) = exp{m_A [ln(hardness)]+ b_A}, or CCC (total) = exp{m_C [ln(hardness)]+ b_C}

CMC (dissolved) = exp{m_A [ln(hardness)]+ b_A} (CF), or CCC (dissolved) = exp{m_C [ln (hardness)]+ b_C} (CF).

Footnotes:

A This parameter was issued by the EPA in Aquatic Life Ambient Water Quality Criteria Cadmium - 2016 (EPA-820-R-16-002).

530 FINAL REGULATIONS

Amend 61-68 APPENDIX, Water Quality Numeric Criteria for the Protection of Aquatic Life and Human Health, to add “Attachment 4 – Calculation of the Sample Specific Freshwater Acute and Chronic Criterion for Metals”

Attachment 4 - Calculation of the Sample Specific Freshwater Acute and Chronic Criterion for Metals

As provided in R.61-68.E.14.d(3), in order to “appropriately evaluate the ambient water quality for the bioavailability of the dissolved portion of hardness dependent metals, the Department may utilize a federally-approved methodology to predict the dissolved fraction or partitioning coefficient in determining compliance with the water quality standards.” Per R.61-68.E.14.a(3), the Criterion Maximum Concentration (CMC) and the Criterion Continuous Concentration (CCC) are based on a hardness of 25 mg/L if the ambient stream hardness is equal to or less than 25 mg/L. Concentrations of hardness less than 400 mg/L may be based on the stream hardness if it is greater than 25 mg/L and less than 400 mg/L, and 400 mg/L if the ambient stream hardness is greater than 400 mg/L. In absence of actual stream hardness it is assumed to be 25 mg/l.

1. Conversion Factor for Dissolved Metals

Refer to R.61-68, *Water Classifications and Standards*, Attachment 2 - Parameters for Calculating Freshwater Dissolved Metals Criteria that are Hardness-Dependent to determine the appropriate parameters and conversion factor. Both CMC and CCC may be expressed as total recoverable or dissolved using the appropriate equations found in Attachment 2.

2. Partitioning Coefficient (Translator)

The partitioning coefficient (K_P) is a translator for the fraction of the total recoverable metal that is bound to adsorbents in the water column, i.e. TSS. The calculation of partitioning coefficients is determined using the following equation.

$$K_P = K_{PO} \times (TSS_b)^\alpha$$

where K_P has units of L/kg
 TSS_b = In-stream Total Suspended Solids concentration in mg/L

Parameters for default partition coefficient estimation equations (K_{PO} and α) are provided from Table 3 of *The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From A Dissolved Criterion*, EPA 823-B-96-007.

Metal	Lakes		Streams	
	K_{PO}	α	K_{PO}	α
Cadmium	3.52E+06	-0.9246	4.00E+06	-1.1307
Chromium III	2.17E+06	-0.2662	3.36E+06	-0.9304
Copper	2.85E+06	-0.9000	1.04E+06	-0.7436
Lead	2.0E+06	-0.5337	2.80E+06	-0.8
Nickel	2.21E+06	-0.7578	4.90E+05	-0.5719
Zinc	3.34E+06	-0.6788	1.25E+06	-0.7038

3. Final Sample Specific Total Recoverable CMC or CCC (µg/L) Adjusted for In-Situ Hardness and TSS

The instream total recoverable concentration is determined using Equation 6.4 of *The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From A Dissolved Criterion*, EPA 823-B-96-007.

$$\text{CMC (total recoverable adjusted)} = \text{CMC (dissolved)} \times \{1 + (K_P \times \text{TSS}_b \times 10^{-6})\}$$

where $\text{CMC (dissolved)} = \exp\{m_A [\ln(\text{hardness})] + b_A\}$ (CF)

$$K_P = K_{PO} \times (\text{TSS}_b)^\alpha$$

TSS_b = In-stream Total Suspended Solids concentration in mg/L

10^{-6} = Units conversion factor to express CCC (total recoverable adjusted) in $\mu\text{g/L}$

$$\text{CCC (total recoverable adjusted)} = \text{CCC (dissolved)} \times \{1 + (K_P \times \text{TSS}_b \times 10^{-6})\}$$

where $\text{CCC (dissolved)} = \exp\{m_C [\ln(\text{hardness})] + b_C\}$ (CF)

$$K_P = K_{PO} \times (\text{TSS}_b)^\alpha$$

TSS_b = In-stream Total Suspended Solids concentration in mg/L

10^{-6} = Units conversion factor to express CCC (total recoverable adjusted) in $\mu\text{g/L}$.

Note: The background TSS is assumed to be the measured instream data (mg/L) or 1 mg/L in the absence of actual instream data (based on the 5th percentile of ambient TSS data on South Carolina waterbodies from 1993-2000).

If the ambient stream metals result exceeds CMC (total recoverable adjusted) or CCC (total recoverable adjusted) based on the measured TSS and hardness collected with the metal sample it constitutes a standard exceedance. Lacking actual instream TSS and hardness data, a metals result exceeding CMC (total recoverable adjusted) or CCC (total recoverable adjusted) based on the default hardness of 25 mg/L and the default TSS value of 1 mg/L constitutes a potential standard exceedance.

Fiscal Impact Statement:

No costs to the State or significant cost to its political subdivisions as a whole should be incurred by these amendments.

Statement of Need and Reasonableness:

The following presents an analysis of the factors listed in 1976 Code Sections 1-23-115(C)(1)-(3) and (9)-(11):

DESCRIPTION OF REGULATION: 61-68, Water Classifications and Standards.

Purpose: Amendments of R.61-68, as the triennial review, will clarify, strengthen, and improve the overall quality of the existing regulation and make appropriate revisions of the State’s water quality standards in accordance with 33 U.S.C. Section 303(c)(2)(B) of the federal CWA.

Legal Authority: 1976 Code Sections 48-1-10 et seq.

Plan for Implementation: The DHEC Regulation Development Update (accessible at <http://www.scdhec.gov/Agency/RegulationsAndUpdates/RegulationDevelopmentUpdate/>) provides a summary of and link to this amendment. Additionally, printed copies are available for a fee from the Department’s Freedom of Information Office. Upon taking legal effect, Department personnel will take appropriate steps to inform the regulated community of the amendment and any associated information.

DETERMINATION OF NEED AND REASONABLENESS OF THE REGULATION BASED ON ALL FACTORS HEREIN AND EXPECTED BENEFITS:

532 FINAL REGULATIONS

Section 303(c)(2)(B) of the federal CWA requires South Carolina's water quality standards be reviewed and revised, where necessary, at least once every three years. Referred to as the triennial review, this required process consists of reviewing and adopting, where appropriate, the Environmental Protection Agency's updated numeric and narrative criteria according to Section 304(a) and Section 307(a) of the CWA. The Department amends R.61-68 to adopt these criteria as the Department deemed necessary to comply with federal regulatory recommendations and revisions.

DETERMINATION OF COSTS AND BENEFITS:

Existing Department staff and resources will be utilized to implement these amendments to the regulation. No anticipated additional cost will be incurred by the State if the revisions are implemented, and no additional State funding is being requested.

Overall cost impact to the State's political subdivisions and regulated community is not likely to be significant. Existing standards would have incurred similar cost. Furthermore, standards required under the amendments will be substantially consistent with the current guidelines and review guidelines utilized by the Department.

UNCERTAINTIES OF ESTIMATES:

The uncertainties associated with the estimation of benefits and burdens are minimal to moderate, due to possible differences in the extent to which Municipal Separate Storm Sewer Systems ("MS4s") currently meet the lower standard.

EFFECT ON THE ENVIRONMENT AND PUBLIC HEALTH:

Implementation of these amendments will not compromise the protection of the environment or the health and safety of the citizens of the State. The amendments to R.61-68 seek to promote and protect aquatic life and human health by the regulation of pollutants into waters of the State.

DETRIMENTAL EFFECT ON THE ENVIRONMENT AND PUBLIC HEALTH IF THE REGULATION IS NOT IMPLEMENTED:

Failure by the Department to incorporate appropriately protective water quality standards in R.61-68 that are the basis for issuance of National Pollutant Discharge Elimination System ("NPDES") permits, stormwater permits, wasteload and load allocations, groundwater remediation plans, and multiple other program areas will lead to contamination of the waters of the State with detrimental effects on the health of flora and fauna in the State, as well as the citizens of South Carolina.

Statement of Rationale:

Here below is the Statement of Rationale pursuant to S.C. Code Section 1-23-110(A)(3)(h):

R.61-68 establishes appropriate goals and water uses to be achieved, maintained, and protected; general rules and water quality criteria to protect classified and existing water uses; and an antidegradation policy to protect and maintain the levels of water quality necessary to support and maintain those existing and classified uses. Section 303(c)(2)(B) of the federal CWA requires South Carolina's water quality standards be reviewed and revised, where necessary, at least once every three years. Referred to as the triennial review, this required process consists of reviewing and adopting, where appropriate, the Environmental Protection Agency's updated numeric and narrative criteria according to Section 304(a) and Section 307(a) of the CWA. The Department amends R.61-68 to adopt these criteria the Department deemed necessary to comply with federal regulatory recommendations and revisions. The Department adopts a revised standard for aquatic life ambient water quality criteria for cadmium, a revised recreational water quality criteria for enterococci, a standard for aquatic life ambient water quality criteria for carbaryl, and a standard for human health recreational ambient water quality

criteria for microcystins and cylindrospermopsin to reflect the most current final published criteria in accordance with Sections 304(a) and 307(a) of the CWA.