

1 **Pollution Control Agency**

2 **Adopted Permanent Rules Relating to Water Quality Standards**

3 **7050.0185 NONDEGRADATION FOR ALL WATERS.**

4 [For text of subps 1 to 3, see M.R.]

5 Subp. 4. **Additional requirements for significant discharges.** If a person proposes a
6 new or expanded significant discharge from either a point or nonpoint source, the
7 agency shall determine whether additional control measures beyond those required by
8 subpart 3 can reasonably be taken to minimize the impact of the discharge on the
9 receiving water. In making the decision, the agency shall consider the importance of
10 economic and social development impacts of the project, the impact of the discharge on
11 the quality of the receiving water, the characteristics of the receiving water, the
12 cumulative impacts of all new or expanded discharges on the receiving water, the costs
13 of additional treatment beyond what is required in subpart 3, and other matters as shall
14 be brought to the agency's attention.

15 Subp. 5. **Determination of significance.** A person proposing a new or expanded
16 discharge of sewage, industrial waste, or other wastes shall submit to the commissioner
17 the information required to determine whether the discharge is significant under
18 subpart 2. If the discharge is sewage, the flow rate used to determine significance under
19 this part is the design average wet weather flow for the wettest 30-day period. For
20 discharges of industrial and other wastes, the flow rate to be used is the design
21 maximum daily flow rate. In determining the significance of a discharge to a lake or
22 other nonflowing receiving water, a mixing zone may be established under the
23 guidelines of part 7050.0210, subpart 5.

24 [For text of subps 6 to 9, see M.R.]

25 **7050.0200 WATER USE CLASSIFICATIONS FOR WATERS OF THE STATE.**

1 [For text of subps 1 to 7, see M.R.]

2 Subp. 8. **Class 7 waters, limited resource value waters.** Limited resource value
3 waters include surface waters of the state which have been subject to a use attainability
4 analysis and have been found to have limited value as a water resource. Water
5 quantities in these waters are intermittent or less than one cubic foot per second at the
6 once in ten year, seven-day low flow as defined in part 7050.0210, subpart 7. These
7 waters shall be protected so as to allow secondary body contact use, to preserve the
8 groundwater for use as a potable water supply, and to protect aesthetic qualities of the
9 water. It is the intent of the agency that very few waters be classified as limited resource
10 value waters. The use attainability analysis must take into consideration those factors
11 listed in Minnesota Statutes, section 115.44, subdivisions 2 and 3. The agency, in
12 cooperation and agreement with the Department of Natural Resources with respect to
13 determination of fisheries values and potential, shall use this information to determine
14 the extent to which the waters of the state demonstrate:

15 [For text of items A to C, see M.R.]

16 **7050.0210 GENERAL STANDARDS FOR DISCHARGERS TO WATERS OF THE**
17 **STATE.**

18 [For text of subps 1 to 6c, see M.R.]

19 Subp. 7. **Minimum stream flow.** Dischargers of sewage, industrial waste, or other
20 wastes shall be controlled so that the water quality standards will be maintained at all
21 stream flows which are equal to or exceeded by 90 percent of the seven consecutive
22 daily average flows of record (the lowest weekly flow with a once in ten-year recurrence
23 interval) for the critical month(s), except for the purpose of setting ammonia effluent
24 limits. Dischargers of ammonia in sewage, industrial waste, or other wastes shall be
25 controlled so that the ammonia water quality standard will be maintained at all stream
26 flows which are equal to or exceeded by 90 percent of the 30 consecutive daily average

1 flows of record (the lowest 30-day flow with a once in ten-year recurrence interval) for
2 the critical month(s). The period of record for determining the specific flow for the
3 stated recurrence interval, where records are available, shall include at least the most
4 recent ten years of record, including flow records obtained after establishment of flow
5 regulation devices, if any. The calculations shall not be applied to lakes and their
6 embayments which have no comparable flow recurrence interval. Where stream flow
7 records are not available, the flow may be estimated on the basis of available
8 information on the watershed characteristics, precipitation, run-off, and other relevant
9 data.

10 Allowance shall not be made in the design of treatment works for low stream flow
11 augmentation unless the flow augmentation of minimum flow is dependable and
12 controlled under applicable laws or regulations.

13 [For text of subps 9 and 10, see M.R.]

14 Subp. 12. **Liquid substances.** Liquid substances which are not commonly considered
15 to be sewage or industrial waste but which could constitute a pollution hazard shall be
16 stored in accordance with chapter 7151. Other wastes as defined by law or other
17 substances which could constitute a pollution hazards, including substances from
18 nonpoint sources and households, shall not be deposited in any manner such that the
19 same may be likely to gain entry into any waters of the state in excess of or contrary to
20 any of the standards herein adopted, or cause pollution as defined by law.

21 [For text of subps 13 to 18, see M.R.]

22 **7050.0211 FACILITY STANDARDS.**

23 Subpart 1. **Minimum secondary treatment for municipal point source and other**
24 **point source dischargers of sewage.** It is established that the agency shall require
25 secondary treatment as a minimum for all municipal point source dischargers and other
26 point source dischargers of sewage. For purposes of this part, municipal has the

1 adjective meaning of municipality as defined in part 7001.1020, subpart 18. Secondary
 2 treatment facilities are defined as works which will provide effective sedimentation,
 3 biochemical oxidation, and disinfection, or the equivalent, including effluents
 4 conforming to the following:

5 Substance or Characteristic	Limiting Concentration or Range*
6 7 Five-day carbonaceous 8 biochemical oxygen demand*	25 milligrams per liter
9 10 Fecal coliform group 11 organisms **	200 organisms per 100 milliliters
12 13 Total suspended solids*	30 milligrams per liter
14 15 Oil	Essentially free of visible oil
16 17 Phosphorus	See subpart 1a
18 19 pH range	6.0 - 9.0
20 21 Toxic or 22 corrosive pollutants	23 Concentrations of toxic 24 or corrosive pollutants 25 shall not cause acute 26 toxicity to humans or 27 other animals or plant 28 life or directly damage 29 real property or exceed 30 the final acute value 31 unless the effluent satisfies 32 the whole effluent toxicity 33 test below. If a whole 34 effluent toxicity test 35 performed on the effluent 36 results in less than 50 37 percent mortality of the 38 test organisms, the effluent 39 will not be considered 40 acutely toxic unless the 41 commissioner finds that the 42 test species do not represent 43 sensitive organisms in the affected surface water body or the whole effluent test

1 was performed on a sample
2 not representative of the
3 effluent quality. The final
4 acute value and whole effluent
5 toxicity test are defined
6 in part 7050.0218, subpart 3,
7 items O and HH,
8 respectively.

9 *The arithmetic mean for concentrations of five-day carbonaceous biochemical
10 oxygen demand and total suspended solids shall not exceed the stated values in any
11 calendar month. In any calendar week, the arithmetic mean for concentrations of
12 five-day carbonaceous biochemical oxygen demand shall not exceed 40 milligrams per
13 liter and total suspended solids shall not exceed 45 milligrams per liter.

14 **Disinfection of wastewater effluents to reduce the levels of fecal coliform organisms
15 to the stated value is required from April 1 through October 31 (Class 2 waters) and
16 May 1 through October 31 (Class 7 waters) except that where the effluent is discharged
17 25 miles or less upstream of a water intake supplying a potable water system, the
18 reduction to the stated value is required year around. The stated value is not to be
19 exceeded in any calendar month as determined by the geometric mean of all the
20 samples collected in a given calendar month. The application of the fecal coliform group
21 organism standards shall be limited to sewage or other effluents containing admixtures
22 of sewage and shall not apply to industrial wastes except where the presence of sewage,
23 fecal coliform organisms, or viable pathogenic organisms in such wastes is known or
24 reasonably certain. Analysis of samples for fecal coliform group organisms by either the
25 multiple tube fermentation or the membrane filter techniques is acceptable.

26 Subp. 1a. **Total phosphorus effluent limits.** Where the discharge of effluent is
27 directly to or affects a lake or reservoir, phosphorus removal to one milligram per liter
28 shall be required. The limit must be a calendar month arithmetic mean unless the
29 commissioner finds, after considering the ~~three~~ three criteria listed in items A to C and B, that
30 a different averaging period is acceptable. In no case shall the one milligram per liter

1 limit exceed a moving mean of 12 monthly values reported on a monthly basis, or a
2 simple mean for a specified period, not to exceed 12 months. Calendar month effluent
3 limits in effect on the effective date of this part must remain in effect unless an
4 assessment of the ~~following~~ ~~criteria indicates~~ listed in items A and B indicate a different
5 averaging period is acceptable. A different averaging period is acceptable when:

6 A. the effects of the phosphorus loading from the facility on the receiving water or
7 downstream water resources is generally not measurable; and

8 B. ~~the final recommendations to reduce total phosphorus loading to a watershed to~~
9 ~~achieve nutrient reduction goals established as part of a TMDL, or as part of an~~
10 ~~approved watershed plan, local water plan, or other equivalent planning process; and~~

11 ~~C. the overall~~ treatment technologies being considered offer environmental,
12 ~~treatment process; financial, or other benefits offered by the relevant technologies.~~

13 In addition, removal of nutrients from all wastes shall be provided to the fullest
14 practicable extent wherever sources of nutrients are considered to be actually or
15 potentially detrimental to preservation or enhancement of the designated water uses.
16 Dischargers required to control nutrients by this subpart are subject to the variance
17 provisions of part 7050.0190.

18 [For text of subps 2 and 3, see M.R.]

19 **7050.0213 ADVANCED WASTEWATER TREATMENT REQUIREMENTS.**

20 In any instance where it is evident that the minimal treatment specified in part
21 7050.0211, subpart 1, or 7050.0212 and dispersion are not effective in preventing
22 pollution, or if at the applicable flows it is evident that the specified stream flow is
23 inadequate to protect the specified water quality standards, the specific standards may
24 be interpreted as effluent standards for control purposes. In addition, the following
25 effluent standards may be applied without any allowance for dilution where stream
26 flow or other factors are such as to prevent adequate dilution, or where it is otherwise
27 necessary to protect the waters of the state for the stated uses:

7050.0213

1	Item	Limits*
2		
3	Five-day carbonaceous	5 milligrams per
4	biochemical oxygen demand	liter (arithmetic mean of
5		all samples taken during
6		any calendar month)
7		

8 *If a discharger is required by the commissioner to implement a pretreatment
9 program for the control of toxic pollutants from industrial contributors and the program
10 has not yet been implemented, the discharger's effluent limitation for total suspended
11 solids shall be five milligrams per liter until such time as the program has been
12 implemented.

13 The five milligram per liter limit shall not apply to discharges to surface waters
14 classified as limited resource value waters pursuant to parts 7050.0200, subpart 8, and
15 7050.0400 to 7050.0470.

16 The concentrations specified in part 7050.0211, subpart 1, or, if applicable, part
17 7050.0212 may be used in lieu of this limit if the discharge of effluent is restricted to the
18 spring flush or other high runoff periods when the stream flow rate above the discharge
19 point is sufficiently greater than the effluent flow rate to insure that the applicable water
20 quality standards are met during such discharge period.

21 If treatment works are designed and constructed to meet the specified limits given
22 above for a continuous discharge, at the discretion of the agency the operation of such
23 works may allow for the effluent quality to vary between the limits specified above and
24 in part 7050.0211, subpart 1, or, if applicable, part 7050.0212, provided the water quality
25 standards and all other requirements of the agency and the United States Environmental
26 Protection Agency are being met. Such variability of operation must be based on
27 adequate monitoring of the treatment works and the effluent and receiving waters as
28 specified by the agency.

29 **7050.0214 REQUIREMENTS FOR POINT SOURCE DISCHARGERS TO LIMITED**
30 **RESOURCE VALUE WATERS.**

1 Subpart 1. **Effluent limitations.** For point source discharges of sewage, industrial, or
 2 other wastes to surface waters classified as limited resource value waters pursuant to
 3 parts 7050.0200, subpart 8, and 7050.0400 to 7050.0470, the agency shall require
 4 treatment facilities which will provide effluents conforming to the following limitations:

Substance or Characteristic	Limiting Concentration*
Five-day carbonaceous biochemical oxygen demand	15 milligrams per liter (arithmetic mean of all samples taken during any calendar month)

5
6
7
8
9
10
11
12 *This limit shall not apply to discharges to limited resource value waters if the
 13 principal method of treatment is through stabilization ponds, in which case the
 14 limitations in parts 7050.0211, subpart 3, and 7050.0212, subpart 5, shall apply. All
 15 effluent limitations specified in part 7050.0211, subpart 1, shall also be applicable to
 16 dischargers of sewage to limited resource value waters, provided that toxic or corrosive
 17 pollutants shall be limited to the extent necessary to protect the designated uses of the
 18 receiving water or affected downstream waters.

19 [For text of subps 2 to 4, see M.R.]

20 **7050.0218 METHODS FOR PROTECTION OF SURFACE WATERS FROM TOXIC**
 21 **POLLUTANTS FOR WHICH NUMERICAL STANDARDS NOT PROMULGATED.**

22 [For text of subps 1 to 4, see M.R.]

23 Subp. 5. **Toxicity-based criteria.** Toxicity-based aquatic life criteria shall be
 24 determined using the methods in this subpart when no USEPA criterion is available.

25 [For text of items A to F, see M.R.]

26 G. If the acute data available do not meet the requirements in items A and B,
 27 toxicity-based criteria can be determined by the method in this item. This method is not
 28 applicable to ionizable organic chemicals, or to bioaccumulative organic chemicals and
 29 pesticides with BCFs greater than 5,000 or log K_{ow} values greater than 5.19.

1 (1) Acute data are assembled. A minimum of two acute values in the following
2 groups must be available:

3 (a) a member of the class Osteichthyes (fish); and

4 (b) a member of one of the following genera in the family Daphnidae:
5 *Daphnia*, *Ceriodaphnia*, *Simocephalus*.

6 (2) For insecticides, a third acute value must be available for an insect species in
7 addition to the acute values required in subitem (1).

8 (3) For herbicides, two acute values for plant species, one of which is an algal
9 species, must be available in addition to the acute values required in subitem (1).

10 (4) Data for saltwater species shall not be used except for purposes of
11 determining ACRs.

12 (5) SMAVs are calculated as the geometric mean of all the acute values for one
13 species.

14 (6) GMAVs are calculated as the geometric mean of the SMAVs.

15 (7) The lowest GMAV from among the available GMAVs is selected.

16 (8) The FAV is calculated by dividing the lowest GMAV by the appropriate
17 factor listed below, depending on the number of GMAVs available that meet the
18 minimum data requirements in subitems (2) and (3) and in item A.

Number of GMAVs	Factor
2	13.0
3	8.0
4	7.0
5	6.1
6	5.2
7	4.3

26 (9) The MC is calculated by dividing the FAV by two.

27 (10) A final ACR is determined as described in item F, except that the default
28 ACR shall be 18 for all chemicals for which this method is applicable as specified in this
29 item.

1 (11) The CC is calculated by dividing the FAV by the appropriate ACR.

2 (12) If chronic data are available, they are used to determine measured ACRs as
3 described in item F, and chronic data are compared to the CC.

4 [For text of subps 6 to 10, see M.R.]

5 **7050.0220 SPECIFIC STANDARDS OF QUALITY AND PURITY BY ASSOCIATED**
6 **USE CLASSES.**

7 Subpart 1. **General.** The numerical and narrative water quality standards in parts
8 7050.0221 to 7050.0227 prescribe the qualities or properties of the waters of the state that
9 are necessary for the designated public uses and benefits. If the standards in this part
10 are exceeded, it is considered indicative of a polluted condition which is actually or
11 potentially deleterious, harmful, detrimental, or injurious with respect to designated
12 uses or established classes of the waters of the state.

13 Standards for metals are expressed as total metal but must be converted to dissolved
14 metal standards to determine water quality-based effluent limits. Water quality-based
15 effluent limits for metals are expressed as total metal. Conversion factors for converting
16 total to dissolved metal standards are listed in part 7050.0222, subpart 9. The conversion
17 factor for metals not listed in part 7050.0222, subpart 9, is one. The dissolved metal
18 standard equals the total metal standard times the conversion factor.

19 The standards are listed for associated classes in tables under subparts 3a to 6a:

20 A. subpart 3a, Classes 1B, 2A, 3A or 3B, 4A and 4B, and 5;

21 B. subpart 4a, Classes 1B or 1C, 2Bd, 3A or 3B, 4A and 4B, and 5;

22 C. subpart 5a, Classes 2B, 2C, or 2D; 3A, 3B, 3C, or 3D; 4A and 4B or 4C; and 5; and

23 D. subpart 6a, Classes 3C, 4A and 4B, 5, and 7.

24 Subp. 2. **Explanation of tables.** Class 1 standards listed in the tables in subparts 3a
25 and 4a are the United States Environmental Protection Agency primary (maximum

1 contaminant levels) and secondary drinking water standards, as contained in Code of
 2 Federal Regulations, title 40, part 141, subparts B and G, and part 143 (1992); and
 3 sections 141.61 and 141.62 as amended through July 17, 1992, excluding the
 4 bacteriological, radiological, treatment technological, and water treatment additive
 5 standards.

6 The tables include the following abbreviations and acronyms:

- 7 AN means aesthetic enjoyment and navigation, Class 5
 8 waters
 9
- 10 (c) means the chemical is assumed to be a human carcinogen
 11
- 12 CS or "chronic standard" means the highest water
 13 concentration of a toxicant to which organisms can be
 14 exposed indefinitely without causing chronic toxicity
 15
- 16 DC means domestic consumption (drinking water),
 17 Class 1 waters
 18
- 19 exp. () means the natural antilogarithm (base e) of the
 20 expression in parenthesis
 21
- 22 FAV or "final acute value" means an estimate of the
 23 concentration of a pollutant corresponding to the
 24 cumulative probability of 0.05 in the distribution of
 25 all the acute toxicity values for the genera or species
 26 from the acceptable acute toxicity tests conducted on a
 27 pollutant
 28
- 29 IC means industrial consumption, Class 3 waters
 30
- 31 IR means agriculture irrigation use, Class 4A waters
 32
- 33 LS means agriculture livestock and wildlife use,
 34 Class 4B waters
 35
- 36 MS or "maximum standard" means the highest concentration
 37 of a toxicant in water to which aquatic organisms can
 38 be exposed for a brief time with zero to slight
 39 mortality. The MS equals the FAV divided by two
 40
- 41 (S) means the associated value is a secondary drinking

- 1 water standard
- 2
- 3 su means "standard unit." It is the reporting
- 4 unit for pH
- 5
- 6 TH means total hardness in mg/l, which is the sum of the
- 7 calcium and magnesium concentrations expressed as CaCO₃
- 8
- 9 TON means threshold odor number
- 10 For the FAV and MS values noted with an asterisk (*), see part 7050.0222, subpart 7,
- 11 item E.

12 Important synonyms or acronyms for some chemicals are listed in parentheses below
 13 the primary name. Standards that vary with total hardness or pH are in the form of
 14 formulas and are listed as numbered notes at the end of the tables.

15 When two or more use classes have standards for the same pollutant, the most
 16 stringent standard applies pursuant to part 7050.0450. All surface waters are protected
 17 for Class 6, but this class has no numerical standards so it is not included in the tables.

18 Subp. 3. [See repealer.]

19 Subp. 3a. **Water quality standards applicable to use Classes 1B, 2A, 3A or 3B, 4A**
 20 **and 4B, and 5.**

21 Rules as Proposed (all new material)

22 A. MISCELLANEOUS SUBSTANCE OR CHARACTERISTIC

23 STANDARDS FOR USE CLASSES

24	2A	2A	2A	1B	3A/3B	4A	4B	5
25	CS	MS	FAV	DC	IC	IR	LS	AN

27	(1) Ammonia, un-ionized as N - Units: µg/l							
28	16	none	none	-	-	-	-	-
29	(2) Asbestos, >10 µm (c) - Units: fibers/l							
30	-	-	-	7.0e+06	-	-	-	-
31	(3) Bicarbonates (HCO ₃) - Units: meq/l							

1	-	-	-	-	-	5	-	-
2	(4) Chloride - Units: mg/l							
3	230	860	1720	250(S)	50/100	-	-	-
4	(5) Chlorine, total residual - Units: µg/l							
5	11	19	38	-	-	-	-	-
6	(6) Color - Units: Pt-Co							
7	30	none	none	15(S)	-	-	-	-
8	(7) Cyanide, free - Units: µg/l							
9	5.2	22	45	200	-	-	-	-
10	(8) Dissolved oxygen - Units: mg/l							
11	-	7 as a	-	-	-	-	-	-
12		daily						
13		minimum						
14	(9) Fecal coliform organisms - See Note No. 1 below							
15	(10) Fluoride - Units: mg/l							
16	-	-	-	4	-	-	-	-
17	2A	2A	2A	1B	3A/3B	4A	4B	5
18	CS	MS	FAV	DC	IC	IR	LS	AN
19								
20	(11) Fluoride - Units: mg/l							
21	-	-	-	2(S)	-	-	-	-
22	(12) Foaming agents - Units: µg/l							
23	-	-	-	500(S)	-	-	-	-
24	(13) Hardness, Ca+Mg as CaCO ₃ - Units: mg/l							
25	-	-	-	-	50/250	-	-	-
26	(14) Hydrogen sulfide - Units: mg/l							
27	-	-	-	-	-	-	-	0.02
28	(15) Nitrate, as N - Units: mg/l							
29	-	-	-	10	-	-	-	-
30	(16) Nitrite, as N - Units: mg/l							
31	-	-	-	1	-	-	-	-
32	(17) Nitrate + Nitrite, as N - Units: mg/l							
33	-	-	-	10	-	-	-	-

1	(18) Odor - Units: TON								
2	-	-	-	3(S)	-	-	-	-	-
3	(19) Oil - Units: µg/l								
4	500	5000	10000	-	-	-	-	-	-
5	(20) pH, low - Units: su								
6	6.5	none	none	6.5(S)	6.5/6.0	6.0	6.0	6.0	
7	2A	2A	2A	1B	3A/3B	4A	4B	5	
8	CS	MS	FAV	DC	IC	IR	LS	AN	
9									
10	(21) pH, high - Units: su								
11	8.5	none	none	8.5(S)	8.5/9.0	8.5	9.0	9.0	
12	(22) Radioactive materials - See Note No. 2 below								
13	(23) Salinity, total - Units: mg/l								
14	-	-	-	-	-	-	1000	-	
15	(24) Sodium - Units: meq/l								
16	-	-	-	-	-	60% of	-	-	
17							total	-	-
18							cations	-	-
19	(25) Sulfate - Units: mg/l								
20	-	-	-	250(S)	-	-	-	-	
21	(26) Sulfates, wild rice present - Units: mg/l								
22	-	-	-	-	-	10	-	-	
23	(27) Specific conductance, at 25°C - Units: µmhos/cm								
24	-	-	-	-	-	1000	-	-	
25	(28) Temperature - Units: °F - No material increase								
26	(29) Total dissolved salts - Units: mg/l								
27	-	-	-	-	-	700	-	-	
28	(30) Total dissolved solids - Units: mg/l								
29	-	-	-	500(S)	-	-	-	-	
30	(31) Turbidity - Units: NTU								
31	10	none	none	1-5	-	-	-	-	
32	B. METALS AND ELEMENTS SUBSTANCE OR CHARACTERISTIC								

STANDARDS FOR USE CLASSES

	2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B LS	5 AN
1								
2								
3								
4								
5	(1) Aluminum - Units: µg/l							
6	87	748	1496	50-200	-	-	-	-
7				(S)				
8	(2) Antimony - Units: µg/l							
9	5.5	90	180	6	-	-	-	-
10	(3) Arsenic - Units: µg/l							
11	2.0	360	720	50	-	-	-	-
12	(4) Barium - Units: µg/l							
13	-	-	-	2000	-	-	-	-
14	(5) Beryllium - Units: µg/l							
15	-	-	-	4.0	-	-	-	-
16	(6) Boron - Units: µg/l							
17	-	-	-	-	-	500	-	-
18	(7) Cadmium - Units: µg/l - See Note No. 3 below							
19	-	-	-	5	-	-	-	-
20	(8) Chromium, +3 - Units: µg/l - See Note No. 4 below							
21	(9) Chromium, +6 - Units: µg/l							
22	11	16	32	-	-	-	-	-
23	(10) Chromium, total - Units: µg/l							
24	-	-	-	100	-	-	-	-
25	2A	2A	2A	1B	3A/3B	4A	4B	5
26	CS	MS	FAV	DC	IC	IR	LS	AN
27								
28	(11) Cobalt - Units: µg/l							
29	2.8	436	872	-	-	-	-	-
30	(12) Copper - Units: µg/l - See Note No. 5 below							
31	-	-	-	1000(S)	-	-	-	-
32	(13) Iron - Units: µg/l							
33	-	-	-	300(S)	-	-	-	-

1	(14) Lead - Units: µg/l - See Note No. 6 below							
2	(15) Manganese - Units: µg/l							
3	- - -	50(S)	-	-	-	-	-	-
4	(16) Mercury - Units: µg/l							
5	0.0069 2.4* 4.9* 2	-	-	-	-	-	-	-
6	(17) Nickel - Units: µg/l - See Note No. 7 below							
7	- - -	100	-	-	-	-	-	-
8	(18) Selenium - Units: µg/l							
9	5.0 20 40 50	-	-	-	-	-	-	-
10	(19) Silver - Units: µg/l - See Note No. 8 below							
11	0.12 - -	100(S)	-	-	-	-	-	-
12	(20) Thallium - Units: µg/l							
13	0.28 64 128 2	-	-	-	-	-	-	-
14	(21) Zinc - Units: µg/l - See Note No. 9 below							
15	- - -	5000(S)	-	-	-	-	-	-

C. ORGANICS SUBSTANCE OR CHARACTERISTIC

STANDARDS FOR USE CLASSES

18	2A	2A	2A	1B	3A/3B	4A	4B	5
19	CS	MS	FAV	DC	IC	IR	LS	AN
20	<hr/>							

21	(1) Acenaphthene - Units: µg/l							
22	20 56 112	-	-	-	-	-	-	-
23	(2) Acrylonitrile (c) - Units: µg/l							
24	0.38 1140* 2281*	-	-	-	-	-	-	-
25	(3) Alachlor (c) - Units: µg/l							
26	3.8 800* 1600*	2	-	-	-	-	-	-
27	(4) Aldicarb - Units: µg/l							
28	- - -	3	-	-	-	-	-	-
29	(5) Aldicarb sulfone - Units: µg/l							
30	- - -	2	-	-	-	-	-	-
31	(6) Aldicarb sulfoxide - Units: µg/l							

1	-	-	-	4	-	-	-	-
2	(7) Anthracene - Units: µg/l							
3	0.035	0.32	0.63	-	-	-	-	-
4	(8) Atrazine (c) - Units: µg/l							
5	3.4	323	645	3	-	-	-	-
6	(9) Benzene (c) - Units: µg/l							
7	9.7	4487*	8974*	5	-	-	-	-
8	(10) Benzo(a)pyrene - Units: µg/l							
9	-	-	-	0.2	-	-	-	-
10	2A	2A	2A	1B	3A/3B	4A	4B	5
11	CS	MS	FAV	DC	IC	IR	LS	AN
12								
13	(11) Bromoform - Units: µg/l							
14	33	2900	5800	-	-	-	-	-
15	(12) Carbofuran - Units: µg/l							
16	-	-	-	40	-	-	-	-
17	(13) Carbon tetrachloride (c) - Units: µg/l							
18	1.9	1750*	3500*	5	-	-	-	-
19	(14) Chlordane (c) - Units: ng/l							
20	0.073	1200*	2400*	2000	-	-	-	-
21	(15) Chlorobenzene (Monochlorobenzene) - Units: µg/l							
22	20	423	846	100	-	-	-	-
23	(16) Chloroform (c) - Units: µg/l							
24	53	1392	2784	100	-	-	-	-
25	(17) Chlorpyrifos - Units: µg/l							
26	0.041	0.083	0.17	-	-	-	-	-
27	(18) Dalapon - Units: µg/l							
28	-	-	-	200	-	-	-	-
29	(19) DDT (c) - Units: ng/l							
30	0.11	550*	1100*	-	-	-	-	-
31	(20) 1,2-Dibromo-3-chloropropane (c) - Units: µg/l							
32	-	-	-	0.2	-	-	-	-
33	2A	2A	2A	1B	3A/3B	4A	4B	5

	CS	MS	FAV	DC	IC	IR	LS	AN
1								
2								
3								
4	-	-	-	600	-	-	-	-
5								
6	-	-	-	75	-	-	-	-
7								
8	3.5	45050*	90100*	5	-	-	-	-
9								
10	-	-	-	7	-	-	-	-
11								
12	-	-	-	70	-	-	-	-
13								
14	-	-	-	100	-	-	-	-
15								
16	-	-	-	70	-	-	-	-
17								
18	-	-	-	5	-	-	-	-
19								
20	0.0065	1300*	2500*	-	-	-	-	-
21								
22	-	-	-	400	-	-	-	-
23	2A	2A	2A	1B	3A/3B	4A	4B	5
24	CS	MS	FAV	DC	IC	IR	LS	AN
25								
26								
27	1.9	none*	none*	6	-	-	-	-
28								
29	30	825	1650	-	-	-	-	-
30								
31	-	-	-	7	-	-	-	-
32								
33	-	-	-	20	-	-	-	-

1	(35) Endosulfan - Units: µg/l							
2	0.0076	0.084	0.17	-	-	-	-	-
3	(36) Endothall - Units: µg/l							
4	-	-	-	100	-	-	-	-
5	(37) Endrin - Units: µg/l							
6	0.0039	0.090	0.18	2	-	-	-	-
7	(38) Ethylbenzene (c) - Units: µg/l							
8	68	1859	3717	700	-	-	-	-
9	(39) Ethylene dibromide - Units: µg/l							
10	-	-	-	0.05	-	-	-	-
11	(40) Fluoranthene - Units: µg/l							
12	1.9	3.5	6.9	-	-	-	-	-
13	2A	2A	2A	1B	3A/3B	4A	4B	5
14	CS	MS	FAV	DC	IC	IR	LS	AN
15								
16	(41) Glyphosate - Units: µg/l							
17	-	-	-	700	-	-	-	-
18	(42) Heptachlor (c) - Units: ng/l							
19	0.10	260*	520*	400	-	-	-	-
20	(43) Heptachlor epoxide (c) - Units: ng/l							
21	0.12	270*	530*	200	-	-	-	-
22	(44) Hexachlorobenzene (c) - Units: ng/l							
23	0.061	none*	none*	1000	-	-	-	-
24	(45) Hexachlorocyclopentadiene - Units: µg/l							
25	-	-	-	50	-	-	-	-
26	(46) Lindane (c) (Hexachlorocyclohexane, gamma-) - Units: µg/l							
27	0.0087	1.0*	2.0*	0.2	-	-	-	-
28	(47) Methoxychlor - Units: µg/l							
29	-	-	-	40	-	-	-	-
30	(48) Methylene chloride (c) (Dichloromethane) - Units: µg/l							
31	45	13875*	27749*	5	-	-	-	-
32	(49) Oxamyl (Vydate) - Units: µg/l							

1	-	-	-	200	-	-	-	-
2	(50) Naphthalene - Units: µg/l							
3	81	409	818	-	-	-	-	-
4	2A	2A	2A	1B	3A/3B	4A	4B	5
5	CS	MS	FAV	DC	IC	IR	LS	AN
6								
7	(51) Parathion - Units: µg/l							
8	0.013	0.07	0.13	-	-	-	-	-
9	(52) Pentachlorophenol - Units: µg/l							
10	0.93	See Note	-	1	-	-	-	-
11	-	No. 10	-	-	-	-	-	-
12		below						
13	(53) Phenanthrene - Units: µg/l							
14	3.6	32	64	-	-	-	-	-
15	(54) Phenol - Units: µg/l							
16	123	2214	4428	-	-	-	-	-
17	(55) Picloram - Units: µg/l							
18	-	-	-	500	-	-	-	-
19	(56) Polychlorinated biphenyls (c) (PCBs, total) - Units: ng/l							
20	0.014	1000*	2000*	500	-	-	-	-
21	(57) Simazine - Units: µg/l							
22	-	-	-	4	-	-	-	-
23	(58) Styrene (c) - Units: µg/l							
24	-	-	-	100	-	-	-	-
25	(59) 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD-dioxin) - Units: ng/l							
26	-	-	-	0.03	-	-	-	-
27	(60) 1,1,2,2-Tetrachloroethane (c) - Units: µg/l							
28	1.1	1127*	2253*	-	-	-	-	-
29	2A	2A	2A	1B	3A/3B	4A	4B	5
30	CS	MS	FAV	DC	IC	IR	LS	AN
31								
32	(61) Tetrachloroethylene (c) - Units: µg/l							
33	3.8	428*	857*	5	-	-	-	-
34	(62) Toluene - Units: µg/l							

1	253	1352	2703	1000	-	-	-	-
2	(63) Toxaphene (c) - Units: ng/l							
3	0.31	730*	1500*	3000	-	-	-	-
4	(64) 2,4,5-TP (Silvex) - Units: µg/l							
5	-	-	-	50	-	-	-	-
6	(65) 1,2,4-Trichlorobenzene - Units: µg/l							
7	-	-	-	70	-	-	-	-
8	(66) 1,1,1-Trichloroethane - Units: µg/l							
9	329	2957	5913	200	-	-	-	-
10	(67) 1,1,2-Trichloroethane - Units: µg/l							
11	-	-	-	5	-	-	-	-
12	(68) 1,1,2-Trichloroethylene (c) - Units: µg/l							
13	25	6988*	13976*	5	-	-	-	-
14	(69) 2,4,6-Trichlorophenol - Units: µg/l							
15	2.0	102	203	-	-	-	-	-
16	(70) Trihalomethanes, total (c) (Bromodichloromethane) (Bromoform)							
17	(Chlorodibromomethane) (Chloroform) - Units: µg/l							
18	-	-	-	100	-	-	-	-
19	2A	2A	2A	1B	3A/3B	4A	4B	5
20	CS	MS	FAV	DC	IC	IR	LS	AN
21								
22	(71) Vinyl chloride (c) - Units: µg/l							
23	0.17	none*	none*	2	-	-	-	-
24	(72) Xylenes, total - Units: µg/l							
25	166	1407	2814	10000	-	-	-	-

26 Note No. 1, FECAL COLIFORM ORGANISMS

27 Not to exceed 200 organisms per 100 milliliters as a geometric mean of not less
 28 than five samples in any calendar month, nor shall more than ten percent of all
 29 samples taken during any calendar month individually exceed 400 organisms per
 30 100 milliliters. The standard applies only between April 1 and October 31.

31 Note No. 2, RADIOACTIVE MATERIALS

1 See parts 7050.0221, subparts 2, 3, 4, and 5; 7050.0222, subparts 4, 5, and 6; and
2 7050.0224, subparts 2, 3, and 4.

3 Note No. 3, CADMIUM

STANDARDS THAT VARY WITH TOTAL HARDNESS (TH)	EXAMPLE STANDARDS IN $\mu\text{g}/\text{l}$ AT TOTAL HARDNESS OF:				
	50	100	200	300	400
CS = exp.(0.7852[ln(TH mg/l)]-3.49)	0.66	1.1	2.0	2.7	3.4
MS = exp.(1.128[ln(TH mg/l)]-3.828)	1.8	3.9	8.6	14	19
FAV = exp.(1.128 [ln(TH mg/l)]-3.1349)	3.6	7.8	17	27	37

17 Note No. 4, CHROMIUM +3

STANDARDS THAT VARY WITH TOTAL HARDNESS (TH)	EXAMPLE STANDARDS IN $\mu\text{g}/\text{l}$ AT TOTAL HARDNESS OF:				
	50	100	200	300	400
CS = exp.(0.819[ln(TH mg/l)]+1.561)	117	207	365	509	644
MS = exp.(0.819[ln(TH mg/l)]+3.688)	984	1737	3064	4270	5405
FAV = exp.(0.819[ln(TH mg/l)]+4.380)	1966	3469	6120	8530	10797

31 Note No. 5, COPPER

STANDARDS THAT VARY WITH TOTAL HARDNESS (TH)	EXAMPLE STANDARDS IN $\mu\text{g}/\text{l}$ AT TOTAL HARDNESS OF:				
	50	100	200	300	400
CS = exp.(0.620[ln(TH mg/l)]-0.57)	6.4	9.8	15	19	23
MS = exp.(0.9422[ln(TH mg/l)]-1.464)	9.2	18	34	50	65
FAV =					

1 exp.(0.9422[ln(TH mg/l)]-0.7703) 18 35 68 100 131

2

3 Note. No. 6, LEAD

4 STANDARDS THAT VARY WITH
5 TOTAL HARDNESS (TH)

EXAMPLE STANDARDS IN µg/l
AT TOTAL HARDNESS OF:

6 50 100 200 300 400

7

8 CS =

9 exp.(1.273[ln(TH mg/l)]-4.705) 1.3 3.2 7.7 13 19

10

11 MS =

12 exp.(1.273[ln(TH mg/l)]-1.460) 34 82 197 331 477

13

14 FAV =

15 exp.(1.273[ln(TH mg/l)]-0.7643) 68 164 396 663 956

16

17 Note No. 7, NICKEL

18 STANDARDS THAT VARY WITH
19 TOTAL HARDNESS (TH)

EXAMPLE STANDARDS IN µg/l
AT TOTAL HARDNESS OF:

20 50 100 200 300 400

21

22 CS =

23 exp.(0.846[ln(TH mg/l)]+1.1645) 88 158 283 297 297

24

not to exceed 297 µg/l

25 MS =

26 exp.(0.846[ln(TH mg/l)]+3.3612) 789 1418 2549 3592 4582

27

28 FAV =

29 exp.(0.846[ln(TH mg/l)]+4.0543) 1578 2836 5098 7185 9164

30

31 Note No. 8, SILVER

32 STANDARDS THAT VARY WITH
33 TOTAL HARDNESS (TH)

EXAMPLE STANDARDS IN µg/l
AT TOTAL HARDNESS OF:

34 50 100 200 300 400

35

36

37 CS = 0.12 0.12 0.12 0.12 0.12

38

39 MS =

40 exp.(1.72[ln(TH mg/l)]-7.2156) 0.61 2.0 6.7 13 22

41

42 FAV =

1 exp.(1.72[ln(TH mg/l)]-6.520) 1.2 4.1 13 27 44
 2 The MS and FAV shall be no less than 0.12 µg/l
 3

4 Note No. 9, ZINC

5	STANDARDS THAT VARY WITH	EXAMPLE STANDARDS IN µg/l				
6	TOTAL HARDNESS (TH)	AT TOTAL HARDNESS OF:				
7		50	100	200	300	400
8		<hr/>				
9	CS =					
10	exp.(0.8473[ln(TH mg/l)]+0.7615)	59	106	191	269	343
11						
12	MS =					
13	exp.(0.8473[ln(TH mg/l)]+0.8604)	65	117	211	297	379
14						
15	FAV =					
16	exp.(0.8473[ln(TH mg/l)]+1.5536)	130	234	421	594	758
17						

18 Note No. 10, PENTACHLOROPHENOL

19	STANDARD THAT VARIES WITH pH	EXAMPLE STANDARDS IN µg/l				
20		AT pH OF:				
21		6.5	7.0	7.5	8.0	8.5
22		<hr/>				
23						
24	CS = 0.93	0.93	0.93	0.93	0.93	0.93
25						
26	MS =					
27	exp.(1.005(pH)-4.830)	5.5	9.1	15	25	41
28						
29	FAV =					
30	exp.(1.005(pH)-4.1373)	11	18	30	50	82
31						

32 Subp. 4. [See repealer.]

33 Subp. 4a. **Water quality standards applicable to use Classes 1B or 1C, 2Bd, 3A or 3B,**
 34 **4A and 4B, and 5.**

35 Rules as Proposed (all new material)

36 A. MISCELLANEOUS SUBSTANCE OR CHARACTERISTIC

37 STANDARDS FOR USE CLASSES

38	2Bd	2Bd	2Bd	1B/1C	3A/3B	4A	4B	5
39	CS	MS	FAV	DC	IC	IR	LS	AN

1									
2	(1) Ammonia, un-ionized as N - Units: µg/l								
3	40	none	none	-	-	-	-	-	-
4	(2) Asbestos, >10 µm (c) - Units: fibers/l								
5	-	-	-	7.0e+06	-	-	-	-	-
6	(3) Bicarbonates (HCO ₃) - Units: meq/l								
7	-	-	-	-	-	5	-	-	-
8	(4) Chloride - Units: mg/l								
9	230	860	1720	250(S)	50/100	-	-	-	-
10	(5) Chlorine, total residual - Units: µg/l								
11	11	19	38	-	-	-	-	-	-
12	(6) Color - Units: Pt-Co								
13	-	-	-	15(S)	-	-	-	-	-
14	(7) Cyanide, free - Units: µg/l								
15	5.2	22	45	200	-	-	-	-	-
16	(8) Dissolved oxygen - Units: mg/l - See part 7050.0222, subp. 3								
17	(9) Fecal coliform organisms - See Note No. 1 below								
18	(10) Fluoride - Units: mg/l								
19	-	-	-	4	-	-	-	-	-
20	2Bd	2Bd	2Bd	1B/1C	3A/3B	4A	4B	5	
21	CS	MS	FAV	DC	IC	IR	LS	AN	
22									
23	(11) Fluoride - Units: mg/l								
24	-	-	-	2(S)	-	-	-	-	-
25	(12) Foaming agents - Units: µg/l								
26	-	-	-	500(S)	-	-	-	-	-
27	(13) Hardness, Ca+Mg as CaCO ₃ - Units: mg/l								
28	-	-	-	-	50/250	-	-	-	-
29	(14) Hydrogen sulfide - Units: mg/l								
30	-	-	-	-	-	-	-	-	0.02
31	(15) Nitrate, as N - Units: mg/l								
32	-	-	-	10	-	-	-	-	-

1	(16) Nitrite, as N - Units: mg/l								
2	-	-	-	1	-	-	-	-	-
3	(17) Nitrate + Nitrite, as N - Units: mg/l								
4	-	-	-	10	-	-	-	-	-
5	(18) Odor - Units: TON								
6	-	-	-	3(S)	-	-	-	-	-
7	(19) Oil - Units: µg/l								
8	500	5000	10000	-	-	-	-	-	-
9	(20) pH, low - Units: su								
10	6.5	none	none	6.5(S)	6.5/6.0	6.0	6.0	6.0	
11	2Bd	2Bd	2Bd	1B/1C	3A/3B	4A	4B	5	
12	CS	MS	FAV	DC	IC	IR	LS	AN	
13									
14	(21) pH, high - Units: su								
15	9.0	none	none	8.5(S)	8.5/9.0	8.5	9.0	9.0	
16	(22) Radioactive materials - See Note No. 2 below								
17	(23) Salinity, total - Units: mg/l								
18	-	-	-	-	-	-	1000	-	-
19	(24) Sodium - Units: meq/l								
20	-	-	-	-	-	60% of	-	-	-
21						total			
22						cations			
23	(25) Specific conductance, at 25°C - Units: µmhos/cm								
24	-	-	-	-	-	1000	-	-	-
25	(26) Sulfate - Units: mg/l								
26	-	-	-	250(S)	-	-	-	-	-
27	(27) Sulfates, wild rice present - Units: mg/l								
28	-	-	-	-	-	10	-	-	-
29	(28) Temperature - Units: °F - See Note No. 3 below								
30	(29) Total dissolved salts - Units: mg/l								
31	-	-	-	-	-	700	-	-	-
32	(30) Total dissolved solids - Units: mg/l								

1	-	-	-	500(S)	-	-	-	-
2	(31) Turbidity - Units: NTU							
3	25	none	none	1-5/25	-	-	-	-
4	B. METALS AND ELEMENTS SUBSTANCE OR CHARACTERISTIC							
5	STANDARDS FOR USE CLASSES							
6	2Bd	2Bd	2Bd	1B/1C	3A/3B	4A	4B	5
7	CS	MS	FAV	DC	IC	IR	LS	AN
8	<hr/>							
9	(1) Aluminum - Units: µg/l							
10	125	1072	2145	50-200	-	-	-	-
11				(S)				
12	(2) Antimony - Units: µg/l							
13	5.5	90	180	6	-	-	-	-
14	(3) Arsenic - Units: µg/l							
15	2.0	360	720	50	-	-	-	-
16	(4) Barium - Units: µg/l							
17	-	-	-	2000	-	-	-	-
18	(5) Beryllium - Units: µg/l							
19	-	-	-	4	-	-	-	-
20	(6) Boron - Units: µg/l							
21	-	-	-	-	-	500	-	-
22	(7) Cadmium - Units: µg/l - See Note No. 4 below							
23	-	-	-	5	-	-	-	-
24	(8) Chromium, +3 - Units: µg/l - See Note No. 5 below							
25	(9) Chromium, +6 - Units: µg/l							
26	11	16	32	-	-	-	-	-
27	(10) Chromium, total - Units: µg/l							
28	-	-	-	100	-	-	-	-
29	2Bd	2Bd	2Bd	1B/1C	3A/3B	4A	4B	5
30	CS	MS	FAV	DC	IC	IR	LS	AN
31								
32	(11) Cobalt - Units: µg/l							

1	2.8	436	872	-	-	-	-	-
2	(12) Copper - Units: µg/l - See Note No. 6 below							
3	-	-	-	1000(S)	-	-	-	-
4	(13) Iron - Units: µg/l							
5	-	-	-	300(S)	-	-	-	-
6	(14) Lead - Units: µg/l - See Note No. 7 below							
7	(15) Manganese - Units: µg/l							
8	-	-	-	50(S)	-	-	-	-
9	(16) Mercury - Units: µg/l							
10	0.0069	2.4*	4.9*	2	-	-	-	-
11	(17) Nickel - Units: µg/l - See Note No. 8 below							
12	-	-	-	100	-	-	-	-
13	(18) Selenium - Units: µg/l							
14	5.0	20	40	50	-	-	-	-
15	(19) Silver - Units: µg/l - See Note No. 9 below							
16	1.0	-	-	100(S)	-	-	-	-
17	(20) Thallium - Units: µg/l							
18	0.28	64	128	2	-	-	-	-
19	(21) Zinc - Units: µg/l - See Note No. 10 below							
20	-	-	-	5000(S)	-	-	-	-

C. ORGANICS SUBSTANCE OR CHARACTERISTIC

STANDARDS FOR USE CLASSES

	2Bd	2Bd	2Bd	1B/1C	3A/3B	4A	4B	5
	CS	MS	FAV	DC	IC	IR	LS	AN

26	(1) Acenaphthene - Units: µg/l							
27	20	56	112	-	-	-	-	-
28	(2) Acrylonitrile (c) - Units: µg/l							
29	0.38	1140*	2281*	-	-	-	-	-
30	(3) Alachlor (c) - Units: µg/l							
31	4.2	800*	1600*	2	-	-	-	-

1	(4) Aldicarb - Units: $\mu\text{g/l}$							
2	-	-	-	3	-	-	-	-
3	(5) Aldicarb sulfone - Units: $\mu\text{g/l}$							
4	-	-	-	2	-	-	-	-
5	(6) Aldicarb sulfoxide - Units: $\mu\text{g/l}$							
6	-	-	-	4	-	-	-	-
7	(7) Anthracene - Units: $\mu\text{g/l}$							
8	0.035	0.32	0.63	-	-	-	-	-
9	(8) Atrazine (c) - Units: $\mu\text{g/l}$							
10	3.4	323	645	3	-	-	-	-
11	(9) Benzene (c) - Units: $\mu\text{g/l}$							
12	11	4487*	8974*	5	-	-	-	-
13	(10) Benzo(a)pyrene - Units: $\mu\text{g/l}$							
14	-	-	-	0.2	-	-	-	-
15	2Bd	2Bd	2Bd	1B/1C	3A/3B	4A	4B	5
16	CS	MS	FAV	DC	IC	IR	LS	AN
17								
18	(11) Bromoform - Units: $\mu\text{g/l}$							
19	41	2900	5800	-	-	-	-	-
20	(12) Carbofuran - Units: $\mu\text{g/l}$							
21	-	-	-	40	-	-	-	-
22	(13) Carbon tetrachloride (c) - Units: $\mu\text{g/l}$							
23	1.9	1750*	3500*	5	-	-	-	-
24	(14) Chlordane (c) - Units: ng/l							
25	0.29	1200*	2400*	2000	-	-	-	-
26	(15) Chlorobenzene (Monochlorobenzene) - Units: $\mu\text{g/l}$							
27	20	423	846	100	-	-	-	-
28	(16) Chloroform (c) - Units: $\mu\text{g/l}$							
29	53	1392	2784	100	-	-	-	-
30	(17) Chlorpyrifos - Units: $\mu\text{g/l}$							
31	0.041	0.083	0.17	-	-	-	-	-
32	(18) Dalapon - Units: $\mu\text{g/l}$							

1	-	-	-	200	-	-	-	-
2	(19) DDT (c) - Units: ng/l							
3	1.7	550*	1100*	-	-	-	-	-
4	(20) 1,2-Dibromo-3-chloropropane (c) - Units: µg/l							
5	-	-	-	0.2	-	-	-	-
6	2Bd	2Bd	2Bd	1B/1C	3A/3B	4A	4B	5
7	CS	MS	FAV	DC	IC	IR	LS	AN
8								
9	(21) Dichlorobenzene (ortho) - Units: µg/l							
10	-	-	-	600	-	-	-	-
11	(22) 1,4-Dichlorobenzene (para) (c) - Units: µg/l							
12	-	-	-	75	-	-	-	-
13	(23) 1,2-Dichloroethane (c) - Units: µg/l							
14	3.8	45050*	90100*	5	-	-	-	-
15	(24) 1,1-Dichloroethylene - Units: µg/l							
16	-	-	-	7	-	-	-	-
17	(25) 1,2-Dichloroethylene (cis) - Units: µg/l							
18	-	-	-	70	-	-	-	-
19	(26) 1,2-Dichloroethylene (trans) - Units: µg/l							
20	-	-	-	100	-	-	-	-
21	(27) 2,4-Dichlorophenoxyacetic acid (2,4-D) - Units: µg/l							
22	-	-	-	70	-	-	-	-
23	(28) 1,2-Dichloropropane (c) - Units: µg/l							
24	-	-	-	5	-	-	-	-
25	(29) Dieldrin (c) - Units: ng/l							
26	0.026	1300*	2500*	-	-	-	-	-
27	(30) Di-2-ethylhexyl adipate - Units: µg/l							
28	-	-	-	400	-	-	-	-
29	2Bd	2Bd	2Bd	1B/1C	3A/3B	4A	4B	5
30	CS	MS	FAV	DC	IC	IR	LS	AN
31								
32	(31) Di-2-ethylhexyl phthalate (c) - Units: µg/l							
33	1.9	none*	none*	6	-	-	-	-
34	(32) Di-n-Octyl phthalate - Units: µg/l							

1	30	825	1650	-	-	-	-	-
2	(33) Dinoseb - Units: µg/l							
3	-	-	-	7	-	-	-	-
4	(34) Diquat - Units: µg/l							
5	-	-	-	20	-	-	-	-
6	(35) Endosulfan - Units: µg/l							
7	0.029	0.28	0.56	-	-	-	-	-
8	(36) Endothall - Units: µg/l							
9	-	-	-	100	-	-	-	-
10	(37) Endrin - Units: µg/l							
11	0.016	0.090	0.18	2	-	-	-	-
12	(38) Ethylbenzene (c) - Units: µg/l							
13	68	1859	3717	700	-	-	-	-
14	(39) Ethylene dibromide - Units: µg/l							
15	-	-	-	0.05	-	-	-	-
16	(40) Fluoranthene - Units: µg/l							
17	1.9	3.5	6.9	-	-	-	-	-
18	2Bd	2Bd	2Bd	1B/1C	3A/3B	4A	4B	5
19	CS	MS	FAV	DC	IC	IR	LS	AN
20								
21	(41) Glyphosate - Units: µg/l							
22	-	-	-	700	-	-	-	-
23	(42) Heptachlor (c) - Units: ng/l							
24	0.39	260*	520*	400	-	-	-	-
25	(43) Heptachlor epoxide (c) - Units: ng/l							
26	0.48	270*	530*	200	-	-	-	-
27	(44) Hexachlorobenzene (c) - Units: ng/l							
28	0.24	none*	none*	1000	-	-	-	-
29	(45) Hexachlorocyclopentadiene - Units: µg/l							
30	-	-	-	50	-	-	-	-
31	(46) Lindane (c) (Hexachlorocyclohexane, gamma-) - Units: µg/l							
32	0.032	4.4*	8.8*	0.2	-	-	-	-
33	(47) Methoxychlor - Units: µg/l							

1	-	-	-	40	-	-	-	-
2	(48) Methylene chloride (c) (Dichloromethane) - Units: µg/l							
3	46	13875*	27749*	5	-	-	-	-
4	(49) Oxamyl (Vydate) - Units: µg/l							
5	-	-	-	200	-	-	-	-
6	(50) Naphthalene - Units: µg/l							
7	81	409	818	-	-	-	-	-
8	2Bd	2Bd	2Bd	1B/1C	3A/3B	4A	4B	5
9	CS	MS	FAV	DC	IC	IR	LS	AN
10								
11	(51) Parathion - Units: µg/l							
12	0.013	0.07	0.13	-	-	-	-	-
13	(52) Pentachlorophenol - Units: µg/l - See Note No. 11 below							
14	1.9	-	-	1	-	-	-	-
15	(53) Phenanthrene - Units: µg/l							
16	3.6	32	64	-	-	-	-	-
17	(54) Phenol - Units: µg/l							
18	123	2214	4428	-	-	-	-	-
19	(55) Picloram - Units: µg/l							
20	-	-	-	500	-	-	-	-
21	(56) Polychlorinated biphenyls (c) (PCBs, total) - Units: ng/l							
22	0.029	1000*	2000*	500	-	-	-	-
23	(57) Simazine - Units: µg/l							
24	-	-	-	4	-	-	-	-
25	(58) Styrene (c) - Units: µg/l							
26	-	-	-	100	-	-	-	-
27	(59) 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD-dioxin) - Units: ng/l							
28	-	-	-	0.03	-	-	-	-
29	(60) 1,1,2,2-Tetrachloroethane (c) - Units: µg/l							
30	1.5	1127*	2253*	-	-	-	-	-
31	2Bd	2Bd	2Bd	1B/1C	3A/3B	4A	4B	5
32	CS	MS	FAV	DC	IC	IR	LS	AN
33								
34	(61) Tetrachloroethylene (c) - Units: µg/l							

1	3.8	428*	857*	5	-	-	-	-
2	(62) Toluene - Units: µg/l							
3	253	1352	2703	1000	-	-	-	-
4	(63) Toxaphene (c) - Units: ng/l							
5	1.3	730*	1500*	3000	-	-	-	-
6	(64) 2,4,5-TP (Silvex) - Units: µg/l							
7	-	-	-	50	-	-	-	-
8	(65) 1,2,4-Trichlorobenzene - Units: µg/l							
9	-	-	-	70	-	-	-	-
10	(66) 1,1,1-Trichloroethane - Units: µg/l							
11	329	2957	5913	200	-	-	-	-
12	(67) 1,1,2-Trichloroethane - Units: µg/l							
13	-	-	-	5	-	-	-	-
14	(68) 1,1,2-Trichloroethylene (c) - Units: µg/l							
15	25	6988*	13976*	5	-	-	-	-
16	(69) 2,4,6-Trichlorophenol - Units: µg/l							
17	2.0	102	203	-	-	-	-	-
18	(70) Trihalomethanes, total (c) (Bromodichloromethane) (Bromoform)							
19	(Chlorodibromomethane) (Chloroform) - Units: µg/l							
20	-	-	-	100	-	-	-	-
21	2Bd	2Bd	2Bd	1B/1C	3A/3B	4A	4B	5
22	CS	MS	FAV	DC	IC	IR	LS	AN
23								
24	(71) Vinyl chloride (c) - Units: µg/l							
25	0.18	none*	none*	2	-	-	-	-
26	(72) Xylenes, total - Units: µg/l							
27	166	1407	2814	10000	-	-	-	-

Note No. 1, FECAL COLIFORM ORGANISMS

Not to exceed 200 organisms per 100 milliliters as a geometric mean of not less than five samples in any calendar month, nor shall more than ten percent of all samples taken during any calendar month individually exceed 2,000 organisms per 100 milliliters. The standard applies only between April 1 and October 31.

1 Note No. 2, RADIOACTIVE MATERIALS

2 See parts 7050.0221, subparts 2, 3, 4, and 5; 7050.0222, subparts 4, 5, and 6; and
3 7050.0224, subparts 2, 3, and 4.

4 Note No. 3, TEMPERATURE

5 Five degrees Fahrenheit above natural in streams and three degrees Fahrenheit
6 above natural in lakes, based on monthly average of maximum daily temperature,
7 except in no case shall it exceed the daily average temperature of 86 degrees
8 Fahrenheit.

9 Note No. 4, CADMIUM

STANDARDS THAT VARY WITH TOTAL HARDNESS (TH)	EXAMPLE STANDARDS IN $\mu\text{g/l}$ AT TOTAL HARDNESS OF:				
	50	100	200	300	400
CS = $\text{exp.}(0.7852[\ln(\text{TH mg/l})]-3.490)$	0.66	1.1	2.0	2.7	3.4
MS = $\text{exp.}(1.128[\ln(\text{TH mg/l})]-1.685)$	15	33	73	116	160
FAV = $\text{exp.}(1.128 [\ln(\text{TH mg/l})]-0.9919)$	31	67	146	231	319

23 Note No. 5, CHROMIUM +3

STANDARDS THAT VARY WITH TOTAL HARDNESS (TH)	EXAMPLE STANDARDS IN $\mu\text{g/l}$ AT TOTAL HARDNESS OF:				
	50	100	200	300	400
CS = $\text{exp.}(0.819[\ln(\text{TH mg/l})]+1.561)$	117	207	365	509	644
MS = $\text{exp.}(0.819[\ln(\text{TH mg/l})]+3.688)$	984	1737	3064	4270	5405
FAV = $\text{exp.}(0.819[\ln(\text{TH mg/l})]+4.380)$	1966	3469	6120	8530	10797

37 Note No. 6, COPPER

	STANDARDS THAT VARY WITH TOTAL HARDNESS (TH)	EXAMPLE STANDARDS IN $\mu\text{g/l}$ AT TOTAL HARDNESS OF:				
		50	100	200	300	400
1						
2						
3						
4						
5	CS =					
6	$\text{exp.}(0.620[\ln(\text{TH mg/l})]-0.57)$	6.4	9.8	15	19	23
7						
8	MS =					
9	$\text{exp.}(0.9422[\ln(\text{TH mg/l})]-1.464)$	9.2	18	34	50	65
10						
11	FAV =					
12	$\text{exp.}(0.9422[\ln(\text{TH mg/l})]-0.7703)$	18	35	68	100	131
13						
14	Note. No. 7, LEAD					

	STANDARDS THAT VARY WITH TOTAL HARDNESS (TH)	EXAMPLE STANDARDS IN $\mu\text{g/l}$ AT TOTAL HARDNESS OF:				
		50	100	200	300	400
15						
16						
17						
18						
19	CS =					
20	$\text{exp.}(1.273[\ln(\text{TH mg/l})]-4.705)$	1.3	3.2	7.7	13	19
21						
22	MS =					
23	$\text{exp.}(1.273[\ln(\text{TH mg/l})]-1.460)$	34	82	197	331	477
24						
25	FAV =					
26	$\text{exp.}(1.273[\ln(\text{TH mg/l})]-0.7643)$	68	164	396	663	956
27						
28	Note No. 8, NICKEL					

	STANDARDS THAT VARY WITH TOTAL HARDNESS (TH)	EXAMPLE STANDARDS IN $\mu\text{g/l}$ AT TOTAL HARDNESS OF:				
		50	100	200	300	400
29						
30						
31						
32						
33	CS =					
34	$\text{exp.}(0.846[\ln(\text{TH mg/l})]+1.1645)$	88	158	283	297	297
35	not to exceed 297 $\mu\text{g/l}$					
36	MS =					
37	$\text{exp.}(0.846[\ln(\text{TH mg/l})]+3.3612)$	789	1418	2549	3592	4582
38						
39	FAV =					
40	$\text{exp.}(0.846[\ln(\text{TH mg/l})]+4.0543)$	1578	2836	5098	7185	9164
41						
42	Note No. 9, SILVER					

	EXAMPLE STANDARDS IN $\mu\text{g/l}$				
	AT TOTAL HARDNESS OF:				
	50	100	200	300	400
1 STANDARDS THAT VARY WITH					
2 TOTAL HARDNESS (TH)					
3					
4					
5					
6 CS = 1.0	1.0	1.0	1.0	1.0	1.0
7					
8 MS =					
9 $\text{exp.}(1.72[\ln(\text{TH mg/l})]-7.2156)$	1.0	2.0	6.7	13	22
10					
11 FAV =					
12 $\text{exp.}(1.72[\ln(\text{TH mg/l})]-6.520)$	1.2	4.1	13	27	44
13 The MS and FAV shall be no less than 1.0 $\mu\text{g/l}$					
14					

Note No. 10, ZINC

	EXAMPLE STANDARDS IN $\mu\text{g/l}$				
	AT TOTAL HARDNESS OF:				
	50	100	200	300	400
16 STANDARDS THAT VARY WITH					
17 TOTAL HARDNESS (TH)					
18					
19					
20 CS =					
21 $\text{exp.}(0.8473[\ln(\text{TH mg/l})]+0.7615)$	59	106	191	269	343
22					
23 MS =					
24 $\text{exp.}(0.8473[\ln(\text{TH mg/l})]+0.8604)$	65	117	211	297	379
25					
26 FAV =					
27 $\text{exp.}(0.8473[\ln(\text{TH mg/l})]+1.5536)$	130	234	421	594	758
28					

Note No. 11, PENTACHLOROPHENOL

	EXAMPLE STANDARDS IN $\mu\text{g/l}$				
	AT pH OF:				
	6.5	7.0	7.5	8.0	8.5
30 STANDARD THAT VARIES WITH pH					
31					
32					
33					
34					
35 CS = 1.9	1.9	1.9	1.9	1.9	1.9
36					
37 MS =					
38 $\text{exp.}(1.005(\text{pH})-4.830)$	5.5	9.1	15	25	41
39					
40 FAV =					
41 $\text{exp.}(1.005(\text{pH})-4.1373)$	11	18	30	50	82
42					

Subp. 5. [See repealer.]

1 Subp. 5a. **Water quality standards applicable to use Classes 2B, 2C, or 2D; 3A, 3B,**
 2 **3C, or 3D; 4A and 4B or 4C; and 5.** See Note No. 1 below.

3 Rules as Proposed (all new material)

4 **A. MISCELLANEOUS SUBSTANCE OR CHARACTERISTIC**

5 **STANDARDS FOR USE CLASSES**

6	2B,C&D	2B,C&D	2B,C&D	3A/3B/3C	4A	4B	5
7	CS	MS	FAV	IC	IR	LS	AN

8

9 (1) Ammonia, un-ionized as N - Units: µg/l

10	40	none	none	-	-	-	-
----	----	------	------	---	---	---	---

11 (2) Bicarbonates (HCO₃) - Units: meq/l

12	-	-	-	-	5	-	-
----	---	---	---	---	---	---	---

13 (3) Chloride - Units: mg/l

14	230	860	1720	50/100/250	-	-	-
----	-----	-----	------	------------	---	---	---

15 (4) Chlorine, total residual - Units: µg/l

16	11	19	38	-	-	-	-
----	----	----	----	---	---	---	---

17 (5) Cyanide, free - Units: µg/l

18	5.2	22	45	-	-	-	-
----	-----	----	----	---	---	---	---

19 (6) Dissolved oxygen - Units: mg/l - See Note No. 2 below

20 (7) Fecal coliform organisms - See Note No. 3 below

21 (8) Hardness, Ca+Mg as CaCO₃ - Units: mg/l

22	-	-	-	50/250/500	-	-	-
----	---	---	---	------------	---	---	---

23 (9) Hydrogen sulfide - Units: mg/l

24	-	-	-	-	-	-	0.02
----	---	---	---	---	---	---	------

25 (10) Oil - Units: µg/l

26	500	5000	10,000	-	-	-	-
27	2B,C&D	2B,C&D	2B,C&D	3A/3B/3C	4A	4B	5
28	CS	MS	FAV	IC	IR	LS	AN

29

30 (11) pH, low - Units: su - See Note No. 4 below

31	6.5	-	-	6.5/6.0/6.0	6.0	6.0	6.0
----	-----	---	---	-------------	-----	-----	-----

1	(12) pH, high - Units: su - See Note No. 4 below						
2	9.0	-	-	8.5/9.0/9.0	8.5	9.0	9.0
3	(13) Radioactive materials - See Note No. 5 below						
4	(14) Salinity, total - Units: mg/l						
5	-	-	-	-	-	1000	-
6	(15) Sodium - Units: meq/l						
7	-	-	-	-	60% of	-	-
8					total		
9					cations		
10	(16) Specific conductance, at 25°C - Units: µmhos/cm						
11	-	-	-	-	1000	-	-
12	(17) Sulfates, wild rice present - Units: mg/l						
13	-	-	-	-	10	-	-
14	(18) Temperature - Units: °F - See Note No. 6 below						
15	(19) Total dissolved salts - Units: mg/l						
16	-	-	-	-	700	-	-
17	(20) Turbidity - Units: NTU						
18	25	none	none	-	-	-	-

B. METALS AND ELEMENTS SUBSTANCE OR CHARACTERISTIC

STANDARDS FOR USE CLASSES

22	2B,C&D	2B,C&D	2B,C&D	3A/3B/3C	4A	4B	5
23	CS	MS	FAV	IC	IR	LS	AN

25	(1) Aluminum - Units: µg/l						
26	125	1072	2145	-	-	-	-
27	(2) Antimony - Units: µg/l						
28	31	90	180	-	-	-	-
29	(3) Arsenic - Units: µg/l						
30	53	360	720	-	-	-	-
31	(4) Boron - Units: µg/l						

1	-	-	-	-	500		
2	(5) Cadmium - Units: µg/l - See Note No. 7 below						
3	(6) Chromium, +3 - Units: µg/l - See Note No. 8 below						
4	(7) Chromium, +6 - Units: µg/l						
5	11	16	32	-	-	-	-
6	(8) Cobalt - Units: µg/l						
7	5.0	436	872	-	-	-	-
8	(9) Copper - Units: µg/l - See Note No. 9 below						
9	(10) Lead - Units: µg/l - See Note No. 10 below						
10	2B,C&D	2B,C&D	2B,C&D	3A/3B/3C	4A	4B	5
11	CS	MS	FAV	IC	IR	LS	AN
12							
13	(11) Mercury - Units: µg/l						
14	0.0069	2.4*	4.9*	-	-	-	-
15	(12) Nickel - Units: µg/l - See Note No. 11 below						
16	(13) Selenium - Units: µg/l						
17	5.0	20	40	-	-	-	-
18	(14) Silver - Units: µg/l - See Note No. 12 below						
19	1.0	-	-	-	-	-	-
20	(15) Thallium - Units: µg/l						
21	0.56	64	128	-	-	-	-
22	(16) Zinc - Units: µg/l - See Note No. 13 below						

23 C. ORGANICS SUBSTANCE OR CHARACTERISTIC

24 STANDARDS FOR USE CLASSES

25	2B,C&D	2B,C&D	2B,C&D	3A/3B/3C	4A	4B	5
26	CS	MS	FAV	IC	IR	LS	AN
27	<hr/>						
28	(1) Acenaphthene - Units: µg/l						
29	20	56	112	-	-	-	-
30	(2) Acrylonitrile (c) - Units: µg/l						
31	0.89	1140*	2281*	-	-	-	-

1	(3) Alachlor - Units: µg/l							
2	59	800	1600	-	-	-	-	
3	(4) Anthracene - Units: µg/l							
4	0.035	0.32	0.63	-	-	-	-	
5	(5) Atrazine - Units: µg/l							
6	10	323	645	-	-	-	-	
7	(6) Benzene - Units: µg/l							
8	114	4487	8974	-	-	-	-	
9	(7) Bromoform - Units: µg/l							
10	466	2900	5800	-	-	-	-	
11	(8) Carbon tetrachloride (c) - Units: µg/l							
12	5.9	1750*	3500*	-	-	-	-	
13	(9) Chlordane (c) - Units: ng/l							
14	0.29	1200*	2400*	-	-	-	-	
15	(10) Chlorobenzene (Monochlorobenzene) - Units: µg/l							
16	20	423	846	-	-	-	-	
17	2B,C&D	2B,C&D	2B,C&D	3A/3B/3C	4A	4B	5	
18	CS	MS	FAV	IC	IR	LS	AN	
19								
20	(11) Chloroform - Units: µg/l							
21	155	1392	2784	-	-	-	-	
22	(12) Chlorpyrifos - Units: µg/l							
23	0.041	0.083	0.17	-	-	-	-	
24	(13) DDT (c) - Units: ng/l							
25	1.7	550*	1100*	-	-	-	-	
26	(14) 1,2-Dichloroethane (c) - Units: µg/l							
27	190	45050*	90100*	-	-	-	-	
28	(15) Dieldrin (c) - Units: ng/l							
29	0.026	1300*	2500*	-	-	-	-	
30	(16) Di-2-ethylhexyl phthalate (c) - Units: µg/l							
31	2.1	none*	none*	-	-	-	-	
32	(17) Di-n-Octyl phthalate - Units: µg/l							

1	30	825	1650	-	-	-	-
2	(18) Endosulfan - Units: µg/l						
3	0.031	0.28	0.56	-	-	-	-
4	(19) Endrin - Units: µg/l						
5	0.016	0.090	0.18	-	-	-	-
6	(20) Ethylbenzene (c) - Units: µg/l						
7	68	1859	3717	-	-	-	-
8	2B,C&D	2B,C&D	2B,C&D	3A/3B/3C	4A	4B	5
9	CS	MS	FAV	IC	IR	LS	AN
10							
11	(21) Fluoranthene - Units: µg/l						
12	1.9	3.5	6.9	-	-	-	-
13	(22) Heptachlor (c) - Units: ng/l						
14	0.39	260*	520*	-	-	-	-
15	(23) Heptachlor epoxide (c) - Units: ng/l						
16	0.48	270*	530*	-	-	-	-
17	(24) Hexachlorobenzene (c) - Units: ng/l						
18	0.24	none*	none*	-	-	-	-
19	(25) Lindane (c) (Hexachlorocyclohexane, gamma-) - Units: µg/l						
20	0.036	4.4*	8.8*	-	-	-	-
21	(26) Methylene chloride (c) (Dichloromethane) - Units: µg/l						
22	1940	13875	27749	-	-	-	-
23	(27) Naphthalene - Units: µg/l						
24	81	409	818	-	-	-	-
25	(28) Parathion - Units: µg/l						
26	0.013	0.07	0.13	-	-	-	-
27	(29) Pentachlorophenol - Units: µg/l - See Note No. 14 below						
28	(30) Phenanthrene - Units: µg/l						
29	3.6	32	64	-	-	-	-
30	2B,C&D	2B,C&D	2B,C&D	3A/3B/3C	4A	4B	5
31	CS	MS	FAV	IC	IR	LS	AN
32							
33	(31) Phenol - Units: µg/l						

1	123	2214	4428	-	-	-	-
2	(32) Polychlorinated biphenyls (c) (PCBs, total) - Units: ng/l						
3	0.029	1000*	2000*	-	-	-	-
4	(33) 1,1,2,2-Tetrachloroethane (c) - Units: µg/l						
5	13	1127	2253	-	-	-	-
6	(34) Tetrachloroethylene (c) - Units: µg/l						
7	8.9	428	857	-	-	-	-
8	(35) Toluene - Units: µg/l						
9	253	1352	2703	-	-	-	-
10	(36) Toxaphene (c) - Units: ng/l						
11	1.3	730*	1500*	-	-	-	-
12	(37) 1,1,1-Trichloroethane - Units: µg/l						
13	329	2957	5913	-	-	-	-
14	(38) 1,1,2-Trichloroethylene (c) - Units: µg/l						
15	120	6988	13976	-	-	-	-
16	(39) 2,4,6-Trichlorophenol - Units: µg/l						
17	2.0	102	203	-	-	-	-
18	(40) Vinyl chloride (c) - Units: µg/l						
19	9.2	none*	none*	-	-	-	-
20	2B,C&D	2B,C&D	2B,C&D	3A/3B/3C	4A	4B	5
21	CS	MS	FAV	IC	IR	LS	AN
22							
23	(41) Xylenes, total - Units: µg/l						
24	166	1407	2814	-	-	-	-
25	Note No. 1, CLASS 3D, 4C, and 5 STANDARDS, applicable to wetlands						

26 In general, if Class 3, 4, or 5 standards are exceeded, background conditions shall
 27 be maintained. See parts 7050.0223, subpart 5; 7050.0224, subpart 4; and 7050.0225,
 28 subpart 2.

29 Note No. 2, DISSOLVED OXYGEN

30 See part 7050.0222, subparts 4 and 5 for the Class 2B and 2C Dissolved Oxygen
 31 standards, respectively. Class 2D standard: If background is less than 5 mg/l, as a
 32 daily minimum, maintain background.

1 Note No. 3, FECAL COLIFORM ORGANISMS

2 Not to exceed 200 organisms per 100 milliliters as a geometric mean of not less
 3 than five samples in any calendar month, nor shall more than ten percent of all
 4 samples taken during any calendar month individually exceed 2,000 organisms per
 5 100 milliliters. The standard applies only between April 1 and October 31.

6 Note No. 4, pH

7 Class 2D standard: Maintain background.

8 Note No. 5, RADIOACTIVE MATERIALS

9 See parts 7050.0222, subparts 4, 5, and 6; and 7050.0224, subparts 2, 3, and 4.

10 Note No. 6, TEMPERATURE

11 Class 2B standard: Five degrees Fahrenheit above natural in streams and three
 12 degrees Fahrenheit above natural in lakes, based on monthly average of maximum
 13 daily temperature, except in no case shall it exceed the daily average temperature
 14 of 86 degrees Fahrenheit. Class 2C standard: five degrees Fahrenheit above natural
 15 in streams and three degrees Fahrenheit above natural in lakes, based on monthly
 16 average of maximum daily temperature, except in no case shall it exceed the daily
 17 average temperature of 90 degrees Fahrenheit. Class 2D standard: Maintain
 18 background.

19 Note No. 7, CADMIUM

20 STANDARDS THAT VARY WITH	EXAMPLE STANDARDS IN µg/l				
21 TOTAL HARDNESS (TH)	AT TOTAL HARDNESS OF:				
22	50	100	200	300	400
23	<hr/>				
24 CS =					
25 $\text{exp.}(0.7852[\ln(\text{TH mg/l})]-3.490)$	0.66	1.1	2.0	2.7	3.4
26					
27 MS =					
28 $\text{exp.}(1.128[\ln(\text{TH mg/l})]-1.685)$	15	33	73	116	160
29					
30 FAV =					
31 $\text{exp.}(1.128 [\ln(\text{TH mg/l})]-0.9919)$	31	67	146	231	319

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Note No. 8, CHROMIUM +3

STANDARDS THAT VARY WITH
TOTAL HARDNESS (TH)

EXAMPLE STANDARDS IN $\mu\text{g/l}$
AT TOTAL HARDNESS OF:

50 100 200 300 400

CS =
 $\text{exp.}(0.819[\ln(\text{TH mg/l})]+1.561)$

117 207 365 509 644

MS =
 $\text{exp.}(0.819[\ln(\text{TH mg/l})]+3.688)$

984 1737 3064 4270 5405

FAV =
 $\text{exp.}(0.819[\ln(\text{TH mg/l})]+4.380)$

1966 3469 6120 8530 10797

Note No. 9, COPPER

STANDARDS THAT VARY WITH
TOTAL HARDNESS (TH)

EXAMPLE STANDARDS IN $\mu\text{g/l}$
AT TOTAL HARDNESS OF:

50 100 200 300 400

CS =
 $\text{exp.}(0.620[\ln(\text{TH mg/l})]-0.570)$

6.4 9.8 15 19 23

MS =
 $\text{exp.}(0.9422[\ln(\text{TH mg/l})]-1.464)$

9.2 18 34 50 65

FAV =
 $\text{exp.}(0.9422[\ln(\text{TH mg/l})]-0.7703)$

18 35 68 100 131

Note. No. 10, LEAD

STANDARDS THAT VARY WITH
TOTAL HARDNESS (TH)

EXAMPLE STANDARDS IN $\mu\text{g/l}$
AT TOTAL HARDNESS OF:

50 100 200 300 400

CS =
 $\text{exp.}(1.273[\ln(\text{TH mg/l})]-4.705)$

1.3 3.2 7.7 13 19

MS =
 $\text{exp.}(1.273[\ln(\text{TH mg/l})]-1.460)$

34 82 197 331 477

FAV =

1 exp.(1.273[ln(TH mg/l)]-0.7643) 68 164 396 663 956

2

3 Note No. 11, NICKEL

4 STANDARDS THAT VARY WITH
5 TOTAL HARDNESS (TH)

EXAMPLE STANDARDS IN µg/l
AT TOTAL HARDNESS OF:

6 50 100 200 300 400

7

8 CS =
9 exp.(0.846[ln(TH mg/l)]+1.1645)

88 158 283 399 509

10

11 MS =
12 exp.(0.846[ln(TH mg/l)]+3.3612)

789 1418 2549 3592 4582

13

14 FAV =
15 exp.(0.846[ln(TH mg/l)]+4.0543)

1578 2836 5098 7185 9164

16

17 Note No. 12, SILVER

18 STANDARDS THAT VARY WITH
19 TOTAL HARDNESS (TH)

EXAMPLE STANDARDS IN µg/l
AT TOTAL HARDNESS OF:

20 50 100 200 300 400

21

22

23 CS = 1.0

1.0 1.0 1.0 1.0 1.0

24

25 MS =
26 exp.(1.72[ln(TH mg/l)]-7.2156)

1.0 2.0 6.7 13 22

27

28 FAV =
29 exp.(1.72[ln(TH mg/l)]-6.520)

1.2 4.1 13 27 44

30

31 The MS and FAV shall be no less than 1.0 µg/l

32

33 Note No. 13, ZINC

34 STANDARDS THAT VARY WITH
35 TOTAL HARDNESS (TH)

EXAMPLE STANDARDS IN µg/l
AT TOTAL HARDNESS OF:

36 50 100 200 300 400

37

38 CS =
39 exp.(0.8473[ln(TH mg/l)]+0.7615)

59 106 191 269 343

40

41 MS =
42 exp.(0.8473[ln(TH mg/l)]+0.8604)

65 117 211 297 379

43

1	FAV =					
2	exp.(0.8473[ln(TH mg/l)]+1.5536)	130	234	421	594	758
3						
4	Note No. 14, PENTACHLOROPHENOL					
5	STANDARD THAT VARIES WITH pH					
6						
7						
8						
9	CS =					
10	exp.(1.005(pH)-5.290)	3.5	5.5	5.5	5.5	5.5
11	not to exceed 5.5 µg/l					
12						
13	MS =					
14	exp.(1.005(pH)-4.830)	5.5	9.1	15	25	41
15						
16	FAV =					
17	exp.(1.005(pH)-4.1373)	11	18	30	50	82
18						
19	Subp. 6. [See repealer.]					

20 Subp. 6a. **Water quality standards applicable to use Classes 3C, 4A and 4B, 5, and 7.**

21 Rules as Proposed (all new material)

22 MISCELLANEOUS SUBSTANCE OR CHARACTERISTIC

23 STANDARDS FOR USE CLASSES

24	7	3C	4A	4B	5
25	LIMITED	IC	IR	LS	AN
26	RESOURCES				

28 (1) Bicarbonates (HCO₃) - Units: meq/l

29 - - 5 - -

30 (2) Boron - Units: µg/l

31 - - 500 - -

32 (3) Chloride - Units: mg/l

33 - 250 - -

34 (4) Dissolved oxygen - Units: mg/l - See Note No. 1 below

35 (5) Fecal coliform organisms - See Note No. 2 below

1	(6) Hardness, Ca+Mg as CaCO ₃ - Units: mg/l				
2	-	500	-	-	-
3	(7) Hydrogen sulfide - Units: mg/l				
4	-	-	-	-	0.02
5	(8) pH, low - Units: su				
6	6.0	6.0	6.0	6.0	6.0
7	(9) pH, high - Units: su				
8	9.0	9.0	8.5	9.0	9.0
9	(10) Radioactive materials - See Note No. 3 below				
10	7	3C	4A	4B	5
11	LIMITED	IC	IR	LS	AN
12	RESOURCES				
13					
14	(11) Salinity, total - Units: mg/l				
15	-	-	-	1000	-
16	(12) Sodium - Units: meq/l				
17	-	-	60% of	-	-
18			total		
19			cations		
20	(13) Specific conductance, at 25°C - Units: μmhos/cm				
21	-	-	1000	-	-
22	(14) Sulfates, wild rice present - Units: mg/l				
23	-	-	10	-	-
24	(15) Total dissolved salts - Units: mg/l				
25	-	-	700	-	-
26	(16) Toxic pollutants - See Note No. 4 below				

27
28 Note No. 1, DISSOLVED OXYGEN

29 At concentrations which will avoid odors or putrid conditions in the receiving
30 water or at concentrations at not less than 1 mg/l (daily average) provided that
31 measurable concentrations are present at all times.

32 Note No. 2, FECAL COLIFORM ORGANISMS

1 Not to exceed 1,000 organisms per 100 milliliters in any calendar month as
2 determined by a geometric mean of a minimum of five samples, nor shall more
3 than ten percent of all samples taken during any calendar month individually
4 exceed 2,000 organisms per 100 milliliters. The standard applies only between May
5 1 and October 31.

6 Note No. 3, RADIOACTIVE MATERIALS

7 See part 7050.0224, subparts 2, 3, and 4.

8 Note No. 4, TOXIC POLLUTANTS

9 Toxic pollutants shall not be allowed in such quantities or concentrations that will
10 impair the specified uses.

11 **7050.0221 SPECIFIC STANDARDS OF QUALITY AND PURITY FOR CLASS 1**
12 **WATERS OF THE STATE; DOMESTIC CONSUMPTION.**

13 [For text of subps 1 to 3, see M.R.]

14 Subp. 4. **Class 1C waters.** The quality of Class 1C waters of the state shall be such that
15 with treatment consisting of coagulation, sedimentation, filtration, storage, and
16 chlorination, or other equivalent treatment processes, the treated water will meet both
17 the primary (maximum contaminant levels) and secondary drinking water standards
18 issued by the United States Environmental Protection Agency as contained in Code of
19 Federal Regulations, title 40, part 141, subparts B and G, and part 143, (1992); and
20 sections 141.61 and 141.62, as amended through July 17, 1992; except that the
21 bacteriological standards shall not apply, and the turbidity standard shall be 25 NTU.
22 These Environmental Protection Agency standards, as modified in this part, are adopted
23 and incorporated by reference. These standards will ordinarily be restricted to surface
24 waters, and groundwaters in aquifers not considered to afford adequate protection
25 against contamination from surface or other sources of pollution. Such aquifers
26 normally would include fractured and channeled limestone, unprotected impervious

1 hard rock where water is obtained from mechanical fractures or joints with surface
2 connections, and coarse gravels subjected to surface water infiltration. These standards
3 shall also apply to these waters in the untreated state.

4 [For text of subps 5 and 6, see M.R.]

5 **7050.0222 SPECIFIC STANDARDS OF QUALITY AND PURITY FOR CLASS 2**
6 **WATERS OF THE STATE; AQUATIC LIFE AND RECREATION.**

7 Subpart 1. **General.** The numerical and narrative water quality standards in this part
8 prescribe the qualities or properties of the waters of the state that are necessary for the
9 aquatic life and recreation designated public uses and benefits. If the standards in this
10 part are exceeded in waters of the state that have the Class 2 designation, it is
11 considered indicative of a polluted condition which is actually or potentially
12 deleterious, harmful, detrimental, or injurious with respect to the designated uses.

13 Standards for metals are expressed as total metal but must be converted to dissolved
14 metal standards to determine water quality-based effluent limits. Water quality-based
15 effluent limits for metals are expressed as total metal. Conversion factors for converting
16 total to dissolved metal standards are listed in subpart 9. The conversion factor for
17 metals not listed in subpart 9 is one. The dissolved metal standard equals the total metal
18 standard times the conversion factor.

19 Subp. 2. **Class 2A waters; aquatic life and recreation.** The quality of Class 2A surface
20 waters shall be such as to permit the propagation and maintenance of a healthy
21 community of cold water sport or commercial fish and associated aquatic life, and their
22 habitats. These waters shall be suitable for aquatic recreation of all kinds, including
23 bathing, for which the waters may be usable. This class of surface waters is also
24 protected as a source of drinking water. The applicable standards are given below, with
25 substances considered carcinogenic followed by a (c). The basis columns to the right of
26 the chronic standards and to the right of the acute standards indicate whether the

1 chronic and acute standards, respectively, are based on the protection of the aquatic
 2 community from adverse toxic effects (Tox.), or the protection of human consumers of
 3 drinking water and sport-caught fish (HH). "NA" means not applicable. Subpart 7, item
 4 E, should be referenced for FAV and MS values and "none" noted with an asterisk (*):

5 6 7 8 9	Substance or Characteristic (c) = carcinogen	Units	Class 2A Chronic Standard		Class 2A Acute Standards		Basis
			CS	Basis	MS	FAV	
10	Acenaphthene	µg/l	20	HH	56	112	Tox.
11	Acrylonitrile (c)	µg/l	0.38	HH	1140*	2281*	Tox.
12	Alachlor (c)	µg/l	3.8	HH	800*	1600*	Tox.
13	Aluminum, total	µg/l	87	Tox.	748	1496	Tox.
14 15 16	Ammonia un-ionized as N	µg/l	16	Tox.	None	None	NA

17 The percent un-ionized ammonia can be calculated for any temperature and
 18 pH by using the following formula taken from Emerson, K., R.C. Russo, R.E.
 19 Lund, and R.V. Thurston. 1975. Aqueous ammonia equilibrium calculations;
 20 effect of pH and temperature. Journal of the Fisheries Research Board of
 21 Canada 32: 2379-2383.

$$22 \quad f = \frac{1}{10^{(pk_a - pH)} + 1} \times 100$$

26 where:

27 f = the percent of total ammonia in the un-ionized state

$$28 \quad pk_a = 0.09 + \frac{2730}{T}, \text{ dissociation constant for ammonia}$$

31 T = temperature in degrees Kelvin (273.16° Kelvin = 0° Celsius)

32 33 34 35 36	Substance or Characteristic (c) = carcinogen	Units	Class 2A Chronic Standard		Class 2A Acute Standards		Basis
			CS	Basis	MS	FAV	
37	Anthracene	µg/l	0.035	Tox.	0.32	0.63	Tox.
38	Antimony	µg/l	5.5	HH	90	180	Tox.
39	Arsenic, total	µg/l	2.0	HH	360	720	Tox.
40	Atrazine (c)	µg/l	3.4	HH	323	645	Tox.

1							
2	Benzene (c)	µg/l	9.7	HH	4487*	8974*	Tox.
3	Bromoform	µg/l	33	HH	2900	5800	Tox.
4							
5	Cadmium, total	µg/l	Formula	Tox.	Formula	Formula	Tox.

6
7 Cadmium, total
8 The CS shall not exceed: $\exp(0.7852[\ln(\text{total hardness mg/l})]-3.490)$
9 The MS shall not exceed: $\exp(1.128[\ln(\text{total hardness mg/l})]-3.828)$
10 The FAV shall not exceed: $\exp(1.128[\ln(\text{total hardness mg/l})]-3.1349)$
11 For hardness values greater than 400 mg/l, 400 mg/l shall be used to
12 calculate the standard.

13 Cadmium standards in µg/l for three hardness values:

14	Hardness (mg/l)		50	100	200	
15			<hr/>			
16						
17	Standard:	CS	0.66	1.1	2.0	
18		MS	1.8	3.9	8.6	
19		FAV	3.6	7.8	17	

20							
21	Carbon tetra-	µg/l	1.9	HH	1750*	3500*	Tox.
22	chloride(c)						
23	Chlordane (c)	ng/l	0.073	HH	1200*	2400*	Tox.
24	Chloride	mg/L	230	Tox.	860	1720	Tox.
25	Chlorine, total	µg/l	11	Tox.	19	38	Tox.
26	residual						

27
28 Chlorine standard applies to conditions of continuous exposure, where
29 continuous exposure refers to chlorinated effluents that are discharged for
30 more than a total of two hours in any 24-hour period.

31	Substance or		Class 2A		Class 2A		
32	Characteristic		Chronic		Acute		
33	(c) = carcinogen		Standard		Standards		
34		Units	CS	Basis	MS	FAV	Basis
35							
36	Chlorobenzene	µg/l	20	HH	423	846	Tox.
37	(Monochlorobenzene)						
38	Chloroform (c)	µg/l	53	HH	1392	2784	Tox.
39	Chlorpyrifos	µg/l	0.041	Tox.	0.083	0.17	Tox.
40	Chromium +3,	µg/l	Formula	Tox.	Formula	Formula	Tox.
41	total						

42
43 Chromium +3, total
44 The CS shall not exceed: $\exp(0.819[\ln(\text{total hardness mg/l})]+1.561)$

1 The MS shall not exceed: $\exp.(0.819[\ln(\text{total hardness mg/l})]+3.688)$
 2 The FAV shall not exceed: $\exp.(0.819[\ln(\text{total hardness mg/l})]+4.380)$
 3 For hardness values greater than 400 mg/l, 400 mg/l shall be used to
 4 calculate the standard.

5 Chromium +3 standards in $\mu\text{g/l}$ for three hardness values:

Hardness (mg/l)		50	100	200
Standard:	CS	117	207	365
	MS	984	1737	3064
	FAV	1966	3469	6120

Chromium +6, total	$\mu\text{g/l}$	11	Tox.	16	32	Tox.
Cobalt	$\mu\text{g/l}$	2.8	HH	436	872	Tox.
Color value	Pt/Co	30	NA	None	None	NA
Copper, total	$\mu\text{g/l}$	Formula	Tox.	Formula	Formula	Tox.

19 Copper, total

20 The CS shall not exceed: $\exp.(0.620[\ln(\text{total hardness mg/l})]-0.570)$
 21 The MS shall not exceed: $\exp.(0.9422[\ln(\text{total hardness mg/l})]-1.464)$
 22 The FAV shall not exceed: $\exp.(0.9422[\ln(\text{total hardness mg/l})]-0.7703)$
 23 For hardness values greater than 400 mg/l, 400 mg/l shall be used to
 24 calculate the standard.

25 Copper standards in $\mu\text{g/l}$ for three hardness values:

Hardness (mg/l)		50	100	200
Standard:	CS	6.4	9.8	15
	MS	9.2	18	34
	FAV	18	35	68

Substance or Characteristic (c) = carcinogen	Units	Class 2A Chronic Standard	Basis	Class 2A Acute Standards		Basis
		CS		MS	FAV	
Cyanide, free	$\mu\text{g/l}$	5.2	Tox.	22	45	Tox.
DDT (c)	ng/l	0.11	HH	550*	1100*	Tox.
1,2-Dichloro-ethane (c)	$\mu\text{g/l}$	3.5	HH	45,050*	90,100*	Tox.
Dieldrin (c)	ng/l	0.0065	HH	1300*	2500*	Tox.
Di-2-ethylhexyl	$\mu\text{g/l}$	1.9	HH	None*	None*	NA

1	phthalate (c)						
2	Di-n-octyl	µg/l	30	Tox.	825	1650	Tox.
3	phthalate						
4	Dissolved oxygen	mg/l	7.0 as a daily minimum				
5							
6	This dissolved oxygen standard requires compliance with the standard 50						
7	percent of the days at which the flow of the receiving water is equal to the						
8	lowest weekly flow with a once in ten-year recurrence interval (7Q10).						
9							
10	Endosulfan	µg/l	0.0076	HH	0.084	0.17	Tox.
11	Endrin	µg/l	0.0039	HH	0.090	0.18	Tox.
12	Ethylbenzene	µg/l	68	Tox.	1859	3717	Tox.
13							
14	Fecal coliform	Not to exceed 200 organisms per 100					
15	organisms	milliliters as a geometric mean of					
16		not less than five samples in any					
17		calendar month, nor shall more than ten					
18		percent of all samples taken during any					
19		calendar month individually exceed					
20		400 organisms per 100 milliliters.					
21		The standard applies only between					
22		April 1 and October 31.					
23							
24	Fluoranthene	µg/l	1.9	Tox.	3.5	6.9	Tox.
25							
26	Heptachlor (c)	ng/l	0.10	HH	260*	520*	Tox.
27	Heptachlor	ng/l	0.12	HH	270*	530*	Tox.
28	epoxide (c)						
29	Hexachloro-	ng/l	0.061	HH	None*	None*	Tox.
30	benzene (c)						

32	Substance or Characteristic (c) = carcinogen	Units	Class 2A Chronic Standard		Class 2A Acute Standards		Basis
33			CS	Basis	MS	FAV	
34							
35							
36							
37	Lead, total	µg/l	Formula	Tox.	Formula	Formula	Tox.

38

39 Lead, total

40 The CS shall not exceed: $\exp.(1.273[\ln(\text{total hardness mg/l})]-4.705)$

41 The MS shall not exceed: $\exp.(1.273[\ln(\text{total hardness mg/l})]-1.460)$

42 The FAV shall not exceed: $\exp.(1.273[\ln(\text{total hardness mg/l})]-0.7643)$

43 For hardness values greater than 400 mg/l, 400 mg/l shall be used to

44 calculate the standard.

45 Lead standards in µg/l for three hardness values:

1	Hardness (mg/l)		50	100	200		
2			<hr/>				
3							
4	Standard:	CS	1.3	3.2	7.7		
5		MS	34	82	197		
6		FAV	68	164	396		
7							
8	Lindane (c)	µg/l	0.0087	HH	1.0*	2.0*	Tox.
9	(Hexachlorocyclo-						
10	hexane, gamma-)						
11							
12	Mercury, total	µg/l	0.0069	HH	2.4*	4.9*	Tox.
13	Methylene	µg/l	45	HH	13,875*	27,749*	Tox.
14	chloride (c)						
15	(Dichloromethane)						
16							
17	Naphthalene	µg/l	81	Tox.	409	818	Tox.
18	Nickel, total	µg/l	Formula	Tox/HH	Formula	Formula	Tox.
19							

20 Nickel, total

21 The CS shall not exceed the human health-based standard of 297 µg/l. For
 22 waters with total hardness values less than 212 mg/l, the CS shall not exceed:
 23 $\text{exp}(.0.846[\ln(\text{total hardness mg/l})]+1.1645)$

24 The MS shall not exceed: $\text{exp}(.0.846[\ln(\text{total hardness mg/l})]+3.3612)$

25 The FAV shall not exceed: $\text{exp}(.0.846[\ln(\text{total hardness mg/l})]+4.0543)$

26 For hardness values greater than 400 mg/l, 400 mg/l shall be used to
 27 calculate the standard.

28 Nickel standards in µg/l for three hardness values:

29	Hardness (mg/l)		50	100	200	
30			<hr/>			
31						
32	Standard:	CS	88	158	283	
33		MS	789	1418	2549	
34		FAV	1578	2836	5098	
35						

36 Substance or	37 Characteristic	38 (c) = carcinogen	39 Class 2A		40 Class 2A		41 Basis	
			42 Chronic	43 Standard	44 Acute	45 Standards		
			Units	CS	Basis	MS	FAV	Basis
41	Oil		µg/l	500	NA	5000	10,000	NA
42								
43	Parathion		µg/l	0.013	Tox.	0.07	0.13	Tox.
44	Pentachlorophenol		µg/l	0.93	HH	Formula	Formula	Tox.
45								

1	Pentachlorophenol						
2	The CS shall not exceed: 0.93						
3	The MS shall not exceed: $\exp.(1.005[\text{pH}]-4.830)$						
4	The FAV shall not exceed: $\exp.(1.005[\text{pH}]-4.1373)$						
5	Pentachlorophenol standards in $\mu\text{g}/\text{l}$ for three pH values:						
6	pH (su)		7.0	7.5		8.0	
7			<hr/>				
8							
9	Standard:	CS	0.93	0.93		0.93	
10		MS	9.1	15		25	
11		FAV	18	30		50	
12							
13	pH (su)	Not less than 6.5 nor greater than 8.5					
14	Phenanthrene	$\mu\text{g}/\text{l}$	3.6	Tox.	32	64	Tox.
15	Phenol	$\mu\text{g}/\text{l}$	123	Tox.	2214	4428	Tox.
16	Polychlorinated	ng/l	0.014	HH	1000*	2000*	Tox.
17	biphenyls,						
18	total (c)						
19							
20	Radioactive	Not to exceed the lowest concentrations					
21	materials	permitted to be discharged to an uncontrolled					
22		environment as permitted by the appropriate					
23		authority having control over their use.					
24							
25	Selenium	$\mu\text{g}/\text{l}$	5.0	Tox.	20	40	Tox.
26	Silver, total	$\mu\text{g}/\text{l}$	0.12	Tox.	Formula	Formula	Tox.
27							
28	Silver, total						
29	The CS shall not exceed: 0.12						
30	The MS shall not exceed: $\exp.(1.720[\ln(\text{total hardness mg/l})]-7.2156)$						
31	The FAV shall not exceed: $\exp.(1.720[\ln(\text{total hardness mg/l})]-6.520)$						
32	provided that the MS and FAV shall be no less than 0.12 $\mu\text{g}/\text{l}$						
33	For hardness values greater than 400 mg/l, 400 mg/l shall be used to						
34	calculate the standard.						
35	Silver standards in $\mu\text{g}/\text{l}$ for three hardness values:						
36	Hardness (mg/l)		50	100		200	
37			<hr/>				
38							
39	Standard:	CS	0.12	0.12		0.12	
40		MS	0.61	2.0		6.7	
41		FAV	1.2	4.1		13	
42							
43	Substance or		Class 2Bd	Class 2Bd			
44	Characteristic		Chronic	Acute			

	(c) = carcinogen	Units	Standard	Basis	Standards		Basis
			CS		MS	FAV	
4	Temperature	No material increase					
5	1,1,2,2	µg/l	1.1	HH	1127*	2253*	Tox.
6	-Tetrachloroethane						
7	(c)						
8	Tetrachloroethylene	µg/l	3.8	HH	428*	857*	Tox.
9	(c)						
10	Thallium	µg/l	0.28	HH	64	128	Tox.
11	Toluene	µg/l	253	Tox.	1352	2703	Tox.
12	Toxaphene (c)	ng/l	0.31	HH	730*	1500*	Tox.
13	1,1,1	µg/l	329	Tox.	2957	5913	Tox.
14	-Trichloroethane						
15	1,1,2	µg/l	25	HH	6988*	13,976*	Tox.
16	-Trichloroethylene						
17	(c)						
18	2,4,6	µg/l	2.0	HH	102	203	Tox.
19	-Trichlorophenol						
20	Turbidity value	NTU	10	NA	None	None	NA
21							
22	Vinyl chloride (c)	µg/l	0.17	HH	None*	None*	NA
23							
24	Xylene, total m,p,o	µg/l	166	Tox.	1407	2814	Tox.
25							
26	Zinc, total	µg/l	Formula	Tox.	Formula	Formula	Tox.

28 Zinc, total
 29 The CS shall not exceed: $\exp.(0.8473[\ln(\text{total hardness mg/l})]+0.7615)$
 30 The MS shall not exceed: $\exp.(0.8473[\ln(\text{total hardness mg/l})]+0.8604)$
 31 The FAV shall not exceed: $\exp.(0.8473[\ln(\text{total hardness mg/l})]+1.5536)$
 32 For hardness values greater than 400 mg/l, 400 mg/l shall be used to
 33 calculate the standard.

34 Zinc standards in µg/l for three hardness values:

Hardness (mg/l)	50	100	200
Standard: CS	59	106	191
MS	65	117	211
FAV	130	234	421

42 Subp. 3. **Class 2Bd waters.** The quality of Class 2Bd surface waters shall be such as to
 43 permit the propagation and maintenance of a healthy community of cool or warm water.

1 sport or commercial fish and associated aquatic life and their habitats. These waters
 2 shall be suitable for aquatic recreation of all kinds, including bathing, for which the
 3 waters may be usable. This class of surface waters are also protected as a source of
 4 drinking water. The applicable standards are given below, with substances considered
 5 carcinogenic followed by a (c). The basis columns to the right of the chronic standards
 6 and to the right of the acute standards indicate whether the chronic and acute standards,
 7 respectively, are based on the protection of the aquatic community from adverse toxic
 8 effects (Tox.), or the protection of human consumers of drinking water and sport-caught
 9 fish (HH). "NA" means not applicable. Subpart 7, item E, should be referenced for FAV
 10 and MS values and "none" noted with an asterisk (*):

11 12 13 14 15	Substance or Characteristic (c) = carcinogen	Units	Class 2Bd Chronic Standard		Class 2Bd Acute Standards		Basis
			CS	Basis	MS	FAV	
16	Acenaphthene	µg/l	20	HH	56	112	Tox.
17	Acrylonitrile (c)	µg/l	0.38	HH	1140*	2281*	Tox.
18	Alachlor (c)	µg/l	4.2	HH	800*	1600*	Tox.
19	Aluminum, total	µg/l	125	Tox.	1072	2145	Tox.
20	Ammonia un-ionized	µg/l	40	Tox.	None	None	NA
21	as N						

22
 23 The percent un-ionized ammonia can be calculated for any temperature and
 24 pH as described in subpart 2.

25	Anthracene	µg/l	0.035	Tox.	0.32	0.63	Tox.
26	Antimony	µg/l	5.5	HH	90	180	Tox.
27	Arsenic, total	µg/l	2.0	HH	360	720	Tox.
28	Atrazine (c)	µg/l	3.4	HH	323	645	Tox.
29							
30	Benzene (c)	µg/l	11	HH	4487*	8974*	Tox.
31	Bromoform	µg/l	41	HH	2900	5800	Tox.
32							
33	Cadmium, total	µg/l	Formula	Tox.	Formula	Formula	Tox.

34
 35 Cadmium, total

36 The CS shall not exceed: $\exp.(0.7852[\ln(\text{total hardness mg/l})]-3.490)$

37 The MS shall not exceed: $\exp.(1.128[\ln(\text{total hardness mg/l})]-1.685)$

38 The FAV shall not exceed: $\exp.(1.128[\ln(\text{total hardness mg/l})]-0.9919)$

1 For hardness values greater than 400 mg/l, 400 mg/l shall be used to
 2 calculate the standard.

3 Cadmium standards in µg/l for three hardness values:

4	Hardness (mg/l)	50	100	200
5		<hr/>		
6				
7	Standard: CS	0.66	1.1	2.0
8	MS	15	33	73
9	FAV	31	67	146

11	Substance or 12 Characteristic 13 (c) = carcinogen	Units	Class 2Bd 14 Chronic 15 Standard		Class 2Bd 16 Acute 17 Standards		Basis
			CS	Basis	MS	FAV	
16	Carbon tetra- 17 chloride (c)	µg/l	1.9	HH	1750*	3500*	Tox.
18	Chlordane (c)	ng/l	0.29	HH	1200*	2400*	Tox.
19	Chloride	mg/l	230	Tox.	860	1720	Tox.
20	Chlorine, total 21 residual	µg/l	11	Tox.	19	38	Tox.

22
 23 Chlorine standard applies to conditions of continuous exposure, where
 24 continuous exposure refers to chlorinated effluents that are discharged for
 25 more than a total of two hours in any 24-hour period.

26	Chlorobenzene	µg/l	20	HH	423	846	Tox.
27	(Monochlorobenzene)						
28	Chloroform (c)	µg/l	53	HH	1392	2784	Tox.
29	Chlorpyrifos	µg/l	0.041	Tox.	0.083	0.17	Tox.
30	Chromium +3, 31 total	µg/l	Formula	Tox.	Formula	Formula	Tox.

32
 33 Chromium +3, total

34 The CS shall not exceed: $\exp.(0.819[\ln(\text{total hardness mg/l})]+1.561)$

35 The MS shall not exceed: $\exp.(0.819[\ln(\text{total hardness mg/l})]+3.688)$

36 The FAV shall not exceed: $\exp.(0.819[\ln(\text{total hardness mg/l})]+4.380)$

37 For hardness values greater than 400 mg/l, 400 mg/l shall be used to
 38 calculate the standard.

39 Chromium +3 standards in µg/l for three hardness values:

40	Hardness (mg/l)	50	100	200
41		<hr/>		
42				
43	Standard: CS	117	207	365
44	MS	984	1737	3064

1	FAV	1966	3469	6120			
2							
3	Substance or Characteristic (c) = carcinogen	Class 2Bd Chronic Standard		Class 2Bd Acute Standards		Basis	
4		Units	CS	Basis	MS		FAV
5	Chromium +6, total	µg/l	11	Tox.	16	32	Tox.
6	Cobalt	µg/l	2.8	HH	436	872	Tox.
7	Copper, total	µg/l	Formula	Tox.	Formula	Formula	Tox.

13 Copper, total
 14 The CS shall not exceed: $\exp.(0.620[\ln(\text{total hardness mg/l})]-0.570)$
 15 The MS shall not exceed: $\exp.(0.9422[\ln(\text{total hardness mg/l})]-1.464)$
 16 The FAV shall not exceed: $\exp.(0.9422[\ln(\text{total hardness mg/l})]-0.7703)$
 17 For hardness values greater than 400 mg/l, 400 mg/l shall be used to
 18 calculate the standard.

19 Copper standards in µg/l for three hardness values:

20	Hardness (mg/l)	50	100	200
21				
22				
23	Standard: CS	6.4	9.8	15
24	MS	9.2	18	34
25	FAV	18	35	68

26							
27	Cyanide, free	µg/l	5.2	Tox.	22	45	Tox.
28							
29	DDT (c)	ng/L	1.7	HH	550*	1100*	Tox.
30	1,2-Dichloro- ethane (c)	µg/l	3.8	HH	45,050*	90,100*	Tox.
31							
32	Dieldrin (c)	ng/l	0.026	HH	1300*	2500*	Tox.
33	Di-2-ethylhexyl phthalate (c)	µg/l	1.9	HH	None*	None*	NA
34							
35	Di-n-octyl phthalate	µg/l	30	Tox.	825	1650	Tox.
36							
37	Dissolved oxygen	mg/l	5 as a daily minimum				

38
 39 This dissolved oxygen standard may be modified on a site-specific basis
 40 according to subpart 8, except that no site-specific standard shall be less than
 41 5 mg/l as a daily average and 4 mg/l as a daily minimum. Compliance with
 42 this standard is required 50 percent of the days at which the flow of the
 43 receiving water is equal to the lowest weekly flow with a once in ten-year
 44 recurrence interval (7Q10).

45	Substance or	Class 2Bd	Class 2Bd
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1	Characteristic (c) = carcinogen	Units	Chronic	Basis	Acute		Basis
2			Standard		Standards	Standards	
3			CS		MS	FAV	
4							
5	Endosulfan	µg/l	0.029	HH	0.28	0.56	Tox.
6	Endrin	µg/l	0.016	HH	0.090	0.18	Tox.
7	Ethylbenzene	µg/l	68	Tox.	1859	3717	Tox.
8							
9	Fecal coliform	Not to exceed 200 organisms per 100					
10	organisms	milliliters as a geometric mean of					
11		not less than five samples in any					
12		calendar month, nor shall more than ten					
13		percent of all samples taken during any					
14		calendar month individually exceed					
15		2000 organisms per 100 milliliters.					
16		The standard applies only between					
17		April 1 and October 31.					
18							
19	Fluoranthene	µg/l	1.9	Tox.	3.5	6.9	Tox.
20							
21	Heptachlor (c)	ng/l	0.39	HH	260*	520*	Tox.
22	Heptachlor	ng/l	0.48	HH	270*	530*	Tox.
23	epoxide (c)						
24	Hexachloro-	ng/l	0.24	HH	None*	None*	Tox.
25	benzene (c)						
26							
27	Lead, total	µg/l	Formula	Tox.	Formula	Formula	Tox.
28							
29	Lead, total	The CS shall not exceed: $\exp.(1.273[\ln(\text{total hardness mg/l})]-4.705)$					
30		The MS shall not exceed: $\exp.(1.273[\ln(\text{total hardness mg/l})]-1.460)$					
31		The FAV shall not exceed: $\exp.(1.273[\ln(\text{total hardness mg/l})]-0.7643)$					
32		For hardness values greater than 400 mg/l, 400 mg/l shall be used to					
33		calculate the standard.					
34		Lead standards in µg/l for three hardness values:					
35		Lead standards in µg/l for three hardness values:					
36		Hardness (mg/l)	50	100	200		
37							
38							
39	Standard:	CS	1.3	3.2	7.7		
40		MS	34	82	197		
41		FAV	68	164	396		
42							
43	Substance or		Class 2Bd		Class 2Bd		
44	Characteristic		Chronic		Acute		
45	(c) = carcinogen		Standard		Standards		

	Units	CS	Basis	MS	FAV	Basis	
1 2 3 4 5 6 7 8 9 10 11	Lindane (c) (Hexachlorocyclo- hexane, gamma-)	µg/l	0.032	HH	4.4*	8.8*	Tox.
7 8 9 10 11	Mercury, total	µg/l	0.0069	HH	2.4*	4.9*	Tox.
8 9 10 11	Methylene chloride (c) (Dichloromethane)	µg/l	46	HH	13,875*	27,749*	Tox.
12 13 14	Naphthalene	µg/l	81	Tox.	409	818	Tox.
13 14	Nickel, total	µg/l	Formula	Tox/HH	Formula	Formula	Tox.

Nickel, total

The CS shall not exceed the human health-based standard of 297 µg/l. For waters with total hardness values less than 212 mg/l, the CS shall not exceed: $\exp.(0.846[\ln(\text{total hardness mg/l})]+1.1645)$

The MS shall not exceed: $\exp.(0.846[\ln(\text{total hardness mg/l})]+3.3612)$

The FAV shall not exceed: $\exp.(0.846[\ln(\text{total hardness mg/l})]+4.0543)$

For hardness values greater than 400 mg/l, 400 mg/l shall be used to calculate the standard.

Nickel standards in µg/l for three hardness values:

Hardness (mg/l)	50	100	200
Standard: CS	88	158	283
MS	789	1418	2549
FAV	1578	2836	5098

31 32	Oil	µg/l	500	NA	5000	10,000	NA
33	Parathion	µg/l	0.013	Tox.	0.07	0.13	Tox.
34	Pentachlorophenol	µg/l	1.9	HH	Formula	Formula	Tox.

Pentachlorophenol

The CS shall not exceed: 1.9

The MS shall not exceed: $\exp.(1.005[\text{pH}]-4.830)$

The FAV shall not exceed: $\exp.(1.005[\text{pH}]-4.1373)$

Pentachlorophenol standards in µg/l for three pH values:

pH (su)	7.0	7.5	8.0
Standard: CS	1.9	1.9	1.9

1		MS	9.1	15	25			
2		FAV	18	30	50			
3								
4	pH (su)		Not less than 6.5 nor greater than 9.0					
5	Phenanthrene	µg/l	3.6	Tox.	32	64	Tox.	
6	Phenol	µg/l	123	Tox.	2214	4428	Tox.	
7	Polychlorinated	ng/l	0.029	HH	1000*	2000*	Tox.	
8	biphenyls,							
9	total (c)							
10								
11	Substance or		Class 2Bd		Class 2Bd			
12	Characteristic		Chronic		Acute			
13	(c) = carcinogen		Standard		Standards			
14		Units	CS	Basis	MS	FAV	Basis	
15								
16	Radioactive		Not to exceed the lowest concentrations					
17	materials		permitted to be discharged to an uncontrolled					
18			environment as permitted by the appropriate					
19			authority having control over their use.					
20								
21	Selenium	µg/l	5.0	Tox.	20	40	Tox.	
22	Silver, total	µg/l	1.0	Tox.	Formula	Formula	Tox.	
23								
24	Silver, total							
25	The CS shall not exceed: 1.0							
26	The MS shall not exceed: $\exp.(1.720[\ln(\text{total hardness mg/l})]-7.2156)$							
27	The FAV shall not exceed: $\exp.(1.720[\ln(\text{total hardness mg/l})]-6.520)$							
28	Provided that the MS and FAV shall be no less than 1.0 µg/l							
29	For hardness values greater than 400 mg/l, 400 mg/l shall be used to							
30	calculate the standard.							
31	Silver standards in µg/l for three hardness values:							
32	Hardness (mg/l)		50	100	200			
33								
34								
35	Standard:	CS	1.0	1.0	1.0			
36		MS	1.0	2.0	6.7			
37		FAV	1.2	4.1	13			
38								
39	Temperature		5°F above natural in streams and 3°F					
40			above natural in lakes, based on monthly					
41			average of the maximum daily temperature,					
42			except in no case shall it exceed the daily					
43			average temperature of 86°F					
44								
45	1,1,2,2	µg/l	1.5	HH	1127*	2253*	Tox.	

1	-Tetrachloroethane						
2	(c)						
3	Tetrachloroethylene	µg/l	3.8	HH	428*	857*	Tox.
4	(c)						
5	Thallium	µg/l	0.28	HH	64	128	Tox.
6	Toluene	µg/l	253	Tox.	1352	2703	Tox.
7	Toxaphene (c)	ng/l	1.3	HH	730*	1500*	Tox.
8	1,1,1	µg/l	329	Tox.	2957	5913	Tox.
9	-Trichloroethane						
10	1,1,2	µg/l	25	HH	6988*	13,976*	Tox.
11	-Trichloroethylene						
12	(c)						
13	2,4,6	µg/l	2.0	HH	102	203	Tox.
14	-Trichlorophenol						
15	Turbidity value	NTU	25	NA	None	None	NA
16							
17	Substance or		Class 2Bd		Class 2Bd		
18	Characteristic		Chronic		Acute		
19	(c) = carcinogen		Standard		Standards		
20		Units	CS	Basis	MS	FAV	Basis
21							
22	Vinyl chloride (c)	µg/l	0.18	HH	None*	None*	NA
23							
24	Xylene, total m,p,o	µg/l	166	Tox.	1407	2814	Tox.
25							
26	Zinc, total	µg/l	Formula	Tox.	Formula	Formula	Tox.

27

28 Zinc, total

29 The CS shall not exceed: $\exp.(0.8473[\ln(\text{total hardness mg/l})]+0.7615)$

30 The MS shall not exceed: $\exp.(0.8473[\ln(\text{total hardness mg/l})]+0.8604)$

31 The FAV shall not exceed: $\exp.(0.8473[\ln(\text{total hardness mg/l})]+1.5536)$

32 For hardness values greater than 400 mg/l, 400 mg/l shall be used to

33 calculate the standard.

34 Zinc standards in µg/l for three hardness values:

35	Hardness (mg/l)	50	100	200	
36		<hr/>			
37					
38	Standard:	CS	59	106	191
39		MS	65	117	211
40		FAV	130	234	421

41

42 Subp. 4. **Class 2B waters.** The quality of Class 2B surface waters shall be such as to

43 permit the propagation and maintenance of a healthy community of cool or warm water

1 sport or commercial fish and associated aquatic life, and their habitats. These waters
 2 shall be suitable for aquatic recreation of all kinds, including bathing, for which the
 3 waters may be usable. This class of surface water is not protected as a source of drinking
 4 water. The applicable standards are given below, with substances considered
 5 carcinogenic followed by a (c). The basis columns to the right of the chronic standards
 6 and to the right of the acute standards, indicate whether the chronic and acute
 7 standards, respectively, are based on the protection of the aquatic community from
 8 adverse toxic effects (Tox.), or the protection of human consumers of sport-caught fish
 9 (HH). "NA" means not applicable. Subpart 7, item E, should be referenced for FAV and
 10 MS values and "none" noted with an asterisk (*):

11 12 13 14 15 16 17 18 19 20 21 22	Substance or Characteristic (c) = carcinogen	Units	Class 2B Chronic Standard		Class 2B Acute Standards		Basis
			CS	Basis	MS	FAV	
	Acenaphthene	µg/l	20	HH	56	112	Tox.
	Acrylonitrile (c)	µg/l	0.89	HH	1140*	2281*	Tox.
	Alachlor	µg/l	59	Tox.	800	1600	Tox.
	Aluminum, total	µg/l	125	Tox.	1072	2145	Tox.
	Ammonia un-ionized as N	µg/l	40	Tox.	None	None	NA

23 The percent un-ionized ammonia can be calculated for any temperature and
 24 pH as described in subpart 2.

25	Anthracene	µg/l	0.035	Tox.	0.32	0.63	Tox.
26	Antimony	µg/l	31	Tox.	90	180	Tox.
27	Arsenic, total	µg/l	53	HH	360	720	Tox.
28	Atrazine	µg/l	10	Tox.	323	645	Tox.
29							
30	Benzene	µg/l	114	Tox.	4487	8974	Tox.
31	Bromoform	µg/l	466	HH	2900	5800	Tox.
32							
33	Cadmium, total	µg/l	Formula	Tox.	Formula	Formula	Tox.

34
 35 Cadmium, total

36 The CS shall not exceed: $\exp.(0.7852[\ln(\text{total hardness mg/l})]-3.490)$

37 The MS shall not exceed: $\exp.(1.128[\ln(\text{total hardness mg/l})]-1.685)$

38 The FAV shall not exceed: $\exp.(1.128[\ln(\text{total hardness mg/l})]-0.9919)$

1 For hardness values greater than 400 mg/l, 400 mg/l shall be used to
2 calculate the standard.

3 Cadmium standards in µg/l for three hardness values:

4	Hardness (mg/l)	50	100	200
5				
6				
7	Standard: CS	0.66	1.1	2.0
8	MS	15	33	73
9	FAV	31	67	146

11	12 Substance or 13 Characteristic (c) = carcinogen	14 Units	15 Class 2B 16 Chronic 17 Standard		18 Class 2B 19 Acute 20 Standards		21 Basis
22			CS	Basis	MS	FAV	
23	Carbon tetra-	µg/l	5.9	HH	1750*	3500*	Tox.
24	chloride (c)						
25	Chlordane (c)	ng/l	0.29	HH	1200*	2400*	Tox.
26	Chloride	mg/l	230	Tox.	860	1720	Tox.
27	Chlorine, total	µg/l	11	Tox.	19	38	Tox.
28	residual						

23 Chlorine standard applies to conditions of continuous exposure, where
24 continuous exposure refers to chlorinated effluents that are discharged for
25 more than a total of two hours in any 24-hour period.

26	Chlorobenzene	µg/l	20	HH	423	846	Tox.
27	(Monochlorobenzene)						
28	Chloroform	µg/l	155	Tox.	1392	2784	Tox.
29	Chlorpyrifos	µg/l	0.041	Tox.	0.083	0.17	Tox.
30	Chromium +3,	µg/l	Formula	Tox.	Formula	Formula	Tox.
31	total						

32 Chromium +3, total

33 The CS shall not exceed: $\exp.(0.819[\ln(\text{total hardness mg/l})]+1.561)$

34 The MS shall not exceed: $\exp.(0.819[\ln(\text{total hardness mg/l})]+3.688)$

35 The FAV shall not exceed: $\exp.(0.819[\ln(\text{total hardness mg/l})]+4.380)$

36 For hardness values greater than 400 mg/l, 400 mg/l shall be used to
37 calculate the standard.

38 Chromium +3 standards in µg/l for three hardness values:

39	Hardness (mg/l)	50	100	200
40				
41				
42	Standard: CS	117	207	365
43	MS	984	1737	3064
44				

1	FAV	1966	3469	6120		
2						
3	Substance or	Class 2B	Class 2B			
4	Characteristic	Chronic	Acute			
5	(c) = carcinogen	Standard	Standards			
6	Units	CS	Basis	MS	FAV	Basis
8	Chromium +6, total	µg/l 11	Tox.	16	32	Tox
10	Cobalt	µg/l 5.0	Tox.	436	872	Tox.
11	Copper, total	µg/l Formula	Tox.	Formula	Formula	Tox.

13 Copper, total
 14 The CS shall not exceed: $\exp.(0.6200[\ln(\text{total hardness mg/l})]-0.570)$
 15 The MS shall not exceed: $\exp.(0.9422[\ln(\text{total hardness mg/l})]-1.464)$
 16 The FAV shall not exceed: $\exp.(0.9422[\ln(\text{total hardness mg/l})]-0.7703)$
 17 For hardness values greater than 400 mg/l, 400 mg/l shall be used to
 18 calculate the standard.

19 Copper standards in µg/l for three hardness values:

20	Hardness (mg/l)	50	100	200
23	Standard: CS	6.4	9.8	15
24	MS	9.2	18	34
25	FAV	18	35	68

27	Cyanide, free	µg/l 5.2	Tox.	22	45	Tox.
29	DDT (c)	ng/l 1.7	HH	550*	1100*	Tox.
30	1,2-Dichloro-ethane (c)	µg/l 1.90	HH	45,050*	90,100*	Tox.
32	Dieldrin (c)	ng/l 0.026	HH	1300*	2500*	Tox.
33	Di-2-ethylhexyl phthalate (c)	µg/l 2.1	HH	None*	None*	NA
35	Di-n-octyl phthalate	µg/l 30	Tox.	825	1650	Tox.
37	Dissolved oxygen	mg/l 5.0 as a daily minimum				

39 This dissolved oxygen standard may be modified on a site-specific basis
 40 according to subpart 8, except that no site-specific standard shall be less than
 41 5 mg/l as a daily average and 4 mg/l as a daily minimum. Compliance with
 42 this standard is required 50 percent of the days at which the flow of the
 43 receiving water is equal to the lowest weekly flow with a once in ten-year
 44 recurrence interval (7Q10). This standard applies to all Class 2B waters except
 45 for those portions of the Mississippi River from the outlet of the metro

1 wastewater treatment works in Saint Paul (River Mile 835) to Lock and Dam
 2 No. 2 at Hastings (River Mile 815). For this reach of the Mississippi River the
 3 standard is not less than 5 mg/l as a daily average from April 1 through
 4 November 30, and not less than 4 mg/l at other times.

5 6 7 8 9	Substance or Characteristic (c) = carcinogen	Class 2B Chronic Standard			Class 2B Acute Standards		Basis
		Units	CS	Basis	MS	FAV	
10	Endosulfan	µg/l	0.031	HH	0.28	0.56	Tox.
11	Endrin	µg/l	0.016	HH	0.090	0.18	Tox.
12	Ethylbenzene	µg/l	68	Tox.	1859	3717	Tox.
13							
14	Fecal coliform	Not to exceed 200 organisms per 100					
15	organisms	milliliters as a geometric mean of					
16		not less than five samples in any					
17		calendar month, nor shall more than ten					
18		percent of all samples taken during any					
19		calendar month individually exceed					
20		2,000 organisms per 100 milliliters.					
21		The standard applies only between					
22		April 1 and October 31.					
23							
24	Fluoranthene	µg/l	1.9	Tox.	3.5	6.9	Tox.
25							
26	Heptachlor (c)	ng/l	0.39	HH	260*	520*	Tox.
27	Heptachlor	ng/l	0.48	HH	270*	530*	Tox.
28	epoxide (c)						
29	Hexachloro-	ng/l	0.24	HH	None*	None*	Tox.
30	benzene (c)						
31							
32	Lead, total	µg/l	Formula	Tox.	Formula	Formula	Tox.
33							

34 Lead, total
 35 The CS shall not exceed: $\exp.(1.273[\ln(\text{total hardness mg/l})]-4.705)$
 36 The MS shall not exceed: $\exp.(1.273[\ln(\text{total hardness mg/l})]-1.460)$
 37 The FAV shall not exceed: $\exp.(1.273[\ln(\text{total hardness mg/l})]-0.7643)$
 38 For hardness values greater than 400 mg/l, 400 mg/l shall be used to
 39 calculate the standard.

40 Lead standards in µg/l for three hardness values:

41	Hardness (mg/l)	50	100	200
42				
43				
44	Standard: CS	1.3	3.2	7.7
45	MS	34	82	197

1	FAV	68	164	396			
2							
3	Substance or	Class 2B	Class 2B				
4	Characteristic	Chronic	Acute				
5	(c) = carcinogen	Standard	Standards				
6	Units	CS	Basis	MS	FAV	Basis	
7							
8	Lindane (c)	µg/l	0.036	HH	4.4*	8.8*	Tox.
9	(Hexachlorocyclo-						
10	hexane, gamma-)						
11							
12	Mercury, total	µg/l	0.0069	HH	2.4*	4.9*	Tox.
13	Methylene	µg/l	1940	HH	13,875	27,749	Tox.
14	chloride (c)						
15	(Dichloromethane)						
16							
17	Naphthalene	µg/l	81	Tox.	409	818	Tox.
18	Nickel, total	µg/l	Formula	Tox	Formula	Formula	Tox.
19							

20 Nickel, total
 21 The CS shall not exceed: $\exp.(0.846[\ln(\text{total hardness mg/l})]+1.1645)$
 22 The MS shall not exceed: $\exp.(0.846[\ln(\text{total hardness mg/l})]+3.3612)$
 23 The FAV shall not exceed: $\exp.(0.846[\ln(\text{total hardness mg/l})]+4.0543)$
 24 For hardness values greater than 400 mg/l, 400 mg/l shall be used to
 25 calculate the standard.

26 Nickel standards in µg/l for three hardness values:

27	Hardness (mg/l)	50	100	200
28				
29				
30	Standard: CS	88	158	283
31	MS	789	1418	2549
32	FAV	1578	2836	5098
33				

34	Oil	µg/l	500	NA	5000	10,000	NA
35							
36	Parathion	µg/l	0.013	Tox.	0.07	0.13	Tox.
37	Pentachloro-	µg/l	Formula	Tox.	Formula	Formula	Tox.
38	phenol			/HH			
39							

40 For waters with pH values greater than 6.95, the CS shall not exceed the
 41 human health-based standard of 5.5 µg/l. For waters with pH values less
 42 than 6.96, the CS shall not exceed: $\exp.(1.005[\text{pH}]-5.290)$
 43 The MS shall not exceed: $\exp.(1.005[\text{pH}]-4.830)$
 44 The FAV shall not exceed: $\exp.(1.005[\text{pH}]-4.1373)$

1	Pentachlorophenol standards in µg/l for three pH values:						
2	pH (su)		7.0	7.5		8.0	
3			<hr/>				
4							
5	Standard:	CS	5.5	5.5		5.5	
6		MS	9.1	15		25	
7		FAV	18	30		50	
8							
9	pH (su)	Not less than 6.5 nor greater than 9.0					
10	Phenanthrene	µg/l	3.6	Tox.	32	64	Tox.
11	Phenol	µg/l	123	Tox.	2214	4428	Tox.
12	Polychlorinated	ng/l	0.029	HH	1000*	2000*	Tox.
13	biphenyls,						
14	total (c)						
15							
16	Substance or		Class 2B		Class 2B		
17	Characteristic		Chronic		Acute		
18	(c) = carcinogen		Standard		Standards		
19		Units	CS	Basis	MS	FAV	Basis
20							
21							
22	Radioactive	Not to exceed the lowest concentrations					
23	materials	permitted to be discharged to an uncontrolled					
24		environment as permitted by the appropriate					
25		authority having control over their use.					
26							
27	Selenium	µg/l	5.0	Tox.	20	40	Tox.
28	Silver, total	µg/l	1.0	Tox.	Formula	Formula	Tox.
29							
30	Silver, total						
31	The CS shall not exceed: 1.0						
32	The MS shall not exceed: $\exp.(1.720[\ln(\text{total hardness mg/l})]-7.2156)$						
33	The FAV shall not exceed: $\exp.(1.720[\ln(\text{total hardness mg/l})]-6.520)$						
34	Provided that the MS and FAV shall be no less than 1.0 µg/l						
35	For hardness values greater than 400 mg/l, 400 mg/l shall be used to						
36	calculate the standard.						
37	Silver standards in µg/l for three hardness values:						
38	Hardness (mg/l)		50		100		200
39			<hr/>				
40							
41	Standard:	CS	1.0		1.0		1.0
42		MS	1.0		2.0		6.7
43		FAV	1.2		4.1		13
44							

1	Temperature		5°F above natural in streams and 3°F				
2			above natural in lakes, based on monthly				
3			average of the maximum daily temperature,				
4			except in no case shall it exceed the daily				
5			average temperature of 86°F				
6							
7	1,1,2,2	µg/l	13	HH	1127	2253	Tox.
8	-Tetrachloroethane						
9	(c)						
10	Tetrachloroethylene	µg/l	8.9	HH	428	857	Tox.
11	(c)						
12							
13	Substance or		Class 2B		Class 2B		
14	Characteristic		Chronic		Acute		
15	(c) = carcinogen		Standard		Standards		
16		Units	CS	Basis	MS	FAV	Basis
17							
18	Thallium	µg/l	0.56	HH	64	128	Tox.
19	Toluene	µg/l	253	Tox.	1352	2703	Tox.
20	Toxaphene (c)	ng/l	1.3	HH	730*	1500*	Tox.
21	1,1,1	µg/l	329	Tox.	2957	5913	Tox.
22	-Trichloroethane						
23	1,1,2	µg/l	120	HH	6988	13,976	Tox.
24	-Trichloroethylene						
25	(c)						
26	2,4,6	µg/l	2.0	HH	102	203	Tox.
27	-Trichlorophenol						
28	Turbidity value	NTU	25	NA	None	None	NA
29							
30	Vinyl chloride (c)	µg/l	9.2	HH	None*	None*	NA
31							
32	Xylene, total m,p,o	µg/l	166	Tox.	1407	2814	Tox.
33							
34	Zinc, total	µg/l	Formula	Tox.	Formula	Formula	Tox.
35							

Zinc, total

The CS shall not exceed: $\exp.(0.8473[\ln(\text{total hardness mg/l})]+0.7615)$

The MS shall not exceed: $\exp.(0.8473[\ln(\text{total hardness mg/l})]+0.8604)$

The FAV shall not exceed: $\exp.(0.8473[\ln(\text{total hardness mg/l})]+1.5536)$

For hardness values greater than 400 mg/l, 400 mg/l shall be used to calculate the standard.

Zinc standards in µg/l for three hardness values:

Hardness (mg/l)	50	100	200
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1	Standard:	CS	59	106	191
2		MS	65	117	211
3		FAV	130	234	421

4
5 Subp. 5. **Class 2C waters.** The quality of Class 2C surface waters shall be such as to
6 permit the propagation and maintenance of a healthy community of indigenous fish and
7 associated aquatic life, and their habitats. These waters shall be suitable for boating and
8 other forms of aquatic recreation for which the waters may be usable. The standards for
9 Class 2B waters listed in subpart 4 shall apply to these waters except as listed below:

10 Substance or Characteristic

11 Dissolved oxygen 5 mg/l as a daily minimum. This dissolved oxygen
12 standard may be modified on a site-specific basis according to subpart 8,
13 except that no site-specific standard shall be less than 5 mg/l as a daily
14 average and 4 mg/l as a daily minimum. Compliance with this standard is
15 required 50 percent of the days at which the flow of the receiving water is
16 equal to the lowest weekly flow with a once in ten-year recurrence interval
17 (7Q10).

18 This dissolved oxygen standard applies to all Class 2C waters except for
19 those portions of the Mississippi River from the outlet of the metro
20 wastewater treatment works in Saint Paul (River Mile 835) to Lock and Dam
21 No. 2 at Hastings (River Mile 815) and except for the reach of the Minnesota
22 River from the outlet of the Blue Lake wastewater treatment works (River
23 Mile 21) to the mouth at Fort Snelling. For this reach of the Mississippi River
24 the standard is not less than 5 mg/l as a daily average from April 1 through
25 November 30, and not less than 4 mg/l at other times. For the specified reach
26 of the Minnesota River the standard shall be not less than 5 mg/l as a daily
27 average year-round.

28 Temperature

29 5°F above natural in streams and 3°F above natural in lakes, based on
30 monthly average of the maximum daily temperature, except in no case shall it
31 exceed the daily average temperature of 90°F.

32 [For text of subp 6, see M.R.]

33 Subp. 7. **Additional standards.** The following additional standards and requirements
34 apply to all Class 2 waters.

35 [For text of items A to D, see M.R.]

36 E. For carcinogenic or highly bioaccumulative chemicals with BCFs greater than

1 5,000 or log Kow values greater than 5.19, the human health-based CS may be two or
 2 more orders of magnitude smaller than the acute toxicity-based MS. If the commissioner
 3 finds that a very large MS and FAV, relative to the CS for such pollutants is not
 4 protective of the public health, the MS and FAV shall be reduced according to the
 5 following guidelines:

6 If the ratio of the MS to the CS is greater than 100, the CS times 100 should be
 7 substituted for the applicable MS, and the CS times 200 should be substituted for the
 8 applicable FAV. Any effluent limitation derived using the procedures of this item shall
 9 only be required after the discharger has been given notice of the specific proposed
 10 effluent limitations and an opportunity to request a hearing as provided in part
 11 7000.1800. The relevant MS and FAV values, or if there is no MS or FAV, the word
 12 "none," are marked by an asterisk (*) in subparts 2 to 4 and part 7050.0220.

13 [For text of subp 8, see M.R.]

14 **Subp. 9. Conversion factors for dissolved metal standards.**

15 Metal	16 Chronic standard	17 Maximum standard and 18 Final Acute Value
18 Cadmium*	0.909	0.946
19 Chromium III	0.860	0.316
20 Chromium VI	0.962	0.982
21 Copper	0.960	0.960
22 Lead*	0.791	0.791
23 Mercury	1.0	0.850
24 Nickel	0.997	0.998
25 Silver	0.850	0.850
26 Zinc	0.986	0.978

27
 28 *Conversion factors for cadmium and lead are hardness dependent. The
 29 values shown in the table are for a total hardness of 100 mg/l (as CaCO₃). The
 30 hardness dependent conversion factors for cadmium are calculated using the
 31 following formulas:

32 Chronic standard: $1.101672 - [(\ln \text{ total hardness } (0.041838))]$

33 Maximum standard and final acute value: $1.136672 - [(\ln \text{ total hardness } (0.041838))]$
 34

1 The hardness dependent conversion factors for lead are calculated using the
2 following formula:

3 Chronic and maximum standards and final acute value: $1.46203 - [\ln(\text{total}$
4 $\text{hardness}) (0.145712)]$

5 **7050.0224 SPECIFIC STANDARDS OF QUALITY AND PURITY FOR CLASS 4**
6 **WATERS OF THE STATE; AGRICULTURE AND WILDLIFE.**

7 [For text of subpart 1, see M.R.]

8 Subp. 2. **Class 4A waters.** The quality of Class 4A waters of the state shall be such as
9 to permit their use for irrigation without significant damage or adverse effects upon any
10 crops or vegetation usually grown in the waters or area, including truck garden crops.
11 The following standards shall be used as a guide in determining the suitability of the
12 waters for such uses, together with the recommendations contained in Handbook 60
13 published by the Salinity Laboratory of the United States Department of Agriculture,
14 and any revisions, amendments, or supplements to it:

15 Substance or Characteristic	Class 4A Standard
16	
17 Bicarbonates (HCO_3)	5 milliequivalents per liter
18 Boron (B)	0.5 milligram per liter
19 pH value	6.0 - 8.5
20 Specific conductance	1,000 micromhos
21	per centimeter at 25°C
22 Total dissolved salts	700 milligrams per liter
23 Sodium (Na)	60% of total cations as
24	milliequivalents per liter
25 Sulfates (SO_4)	10 milligrams per liter,
26	applicable to water used for
27	production of wild rice during
28	periods when the rice may be
29	susceptible to damage by high
30	sulfate levels.
31 Radioactive materials	Not to exceed the lowest
32	concentrations permitted to be
33	discharged to an uncontrolled
34	environment as prescribed
35	by the appropriate authority
36	having control over their use.

37 [For text of subps 3 and 4, see M.R.]

1 **7050.0227 SPECIFIC STANDARDS OF QUALITY AND PURITY FOR CLASS 7**
 2 **WATERS OF THE STATE; LIMITED RESOURCE VALUE WATERS.**

3 [For text of subpart 1, see M.R.]

4 Subp. 2. **Class 7 waters; limited resource value waters.** The quality of Class 7 waters
 5 of the state shall be such as to protect aesthetic qualities, secondary body contact use,
 6 and groundwater for use as a potable water supply. Standards of substances or
 7 characteristics given below shall not be exceeded in the waters:

Substance or Characteristic	Class 7 Standard
Fecal coliform organisms	Not to exceed 1,000 organisms per 100 milliliters in any calendar month as determined by a geometric mean of a minimum of five samples, nor shall more than ten percent of all samples taken during any calendar month individually exceed 2,000 organisms per 100 milliliters. The standard applies only between May 1 and October 31.
pH value	Not less than 6.0 nor greater than 9.0
Dissolved oxygen	At concentrations which will avoid odors or putrid conditions in the receiving water or at concentrations at not less than 1 mg/l (daily average) provided that measurable concentrations are present at all times.
Toxic Pollutants	Toxic pollutants shall not be allowed in such quantities or concentrations that will impair the specified uses.

39 **7050.0420 TROUT WATERS.**

1 Trout lakes identified in part 6264.0050, subpart 2, as amended through [Date
2 Pending], are classified as trout waters and are listed under part 7050.0470. Trout
3 streams and their tributaries within the sections specified that are identified in part
4 6264.0050, subpart 4, as amended through [Date Pending], are classified as trout waters.
5 Trout streams are listed in part 7050.0470. Other lakes that are classified as trout waters
6 are listed in part 7050.0470. All waters listed in part 7050.0470 as Class 1B, 2A, and 3B
7 are also classified as Class 3C, 4A, 4B, 5, and 6 waters.

8 **7050.0470 CLASSIFICATIONS FOR WATERS IN MAJOR SURFACE WATER**
9 **DRAINAGE BASINS.**

10 Subpart 1. **Lake Superior Basin.** The water use classifications for the listed waters in
11 the Lake Superior Basin are as identified in items A, B, and D.

12 A. Streams:

13 [For text of subitems (1) to (11), see M.R.]

14 (12) Baptism River, West Branch, (T.57, R.7, S.7, 17, 18, 20; T.57, R.8, S.1, 2, 12;
15 T.58, R.8, S.2, 3, 4, 9, 10, 11, 15, 16, 20, 21, 22, 28, 33, 34, 35, 36; T.59, R.8, S. 34, 35): 1B, 2A,
16 3B;

17 [For text of subitems (13) to (23), see M.R.]

18 (24) Blind Temperance Creek, (T.60, R.4W, S.19, 29, 30, 32; T.60, R.5W, S.24, 25,
19 36): 1B, 2A, 3B;

20 [For text of subitems (25) to (34), see M.R.]

21 (35) Cabin Creek, (T.59, R.6W, S.19, 20; T.59, R.7, S.24): 1B, 2A, 3B;

22 (35) to (40) [Renumber as (36) to (41)]

23 (42) Cascade River, (T.60, R.2W, S.1; T.61, R.1W, S.19, 20, 21, 30, 31; T.61, R.2W,
24 S.1, 12, 13, 14, 24, 25, 26, 35, 36; T.62, R.2W, S.10, 11, 14, 15, 16, 22, 23, 24, 25, 36): 1B, 2A,
25 3B;

1 (42) to (57) [Renumber as (43) to (58)]

2 (59) Cross River, (T.58, R.4W, S.6; T.58, R.5W, S.1; T.59, R.4W, S.31; T.59, R.5W,
3 S.4, 5, 8, 9, 15, 16, 21, 22, 23, 25, 26, 35, 36; T.60, R.5W, S.30, 31, 32; T.60, R.6, S.13, 24, 25,
4 36): 1B, 2A, 3B;

5 (60) Crow Creek, (T.53, R.10, S.1, 2; T.54, R.10, S.15, 22, 23, 26, 35): 1B, 2A, 3B;

6 (61) Crown Creek, (T.57, R.8, S.2, 3, 4, 5, 9, 10, 11; T.58, R.8, S.5, 6, 7, 18, 19, 20,
7 29, 30, 31, 32, 33; T.58, R.9, S.1, 12, 13, 14, 24, 36; T.59, R.8, S.32): 1B, 2A, 3B;

8 [For text of subitems (62) to (80), see M.R.]

9 (82) and (83) [Renumber as (81) and (82)]

10 (83) Fry Creek, (T.62, R.2W, S.25; T.62, 1W, S.29, 30, 31): 1B, 2A, 3B;

11 [For text of subitems (84) to (92), see M.R.]

12 (93) Hockamin Creek, (T.57, R.7, S.17, 18, 19; T.57, R.8, S.13, 16, 20, 21, 22, 23, 24,
13 25, 26, 27, 28, 29, 32, 33): 1B, 2A, 3B;

14 [For text of subitems (94) to (106), see M.R.]

15 (107) Jonvick Creek, (T.60, R.2W, S.7, 19; T.60, R.3W, S.12, 13, 14, 24): 1B, 2A, 3B;

16 (108) Junco Creek, (T.62, R.1W, S.1, 2, 9, 10, 11, 12, 13, 14, 15, 16, 21, 28; T.62,
17 R.1E, S.6, 7; T.63, R.1E, S.20, 29, 30, 31; T.63, R.1W, S.24, 25, 35): 1B, 2A, 3B;

18 [For text of subitems (109) to (111), see M.R.]

19 (113) to (121) [Renumber as (112) to (120)]

20 (121) Lavi Creek, (T.52, R.15, S.21, 28): 1B, 2A, 3B;

21 (122) Leppanen Creek (Leskinen Creek), (T.57, R.7, S.15, 21, 22, 28): 1B, 2A, 3B;

22 (125) to (130) [Renumber as (123) to (128)]

23 (129) Manitou River, North Branch, (T.58, R.6, S.6; T.58, R.7, S.1, 2; T.59, R.6,
24 S.31; T.59, R.7, S.15, 16, 18, 19, 20, 21, 22, 25, 26, 27, 28, 33, 34, 35, 36; T.59, R.8, S.1, 2, 12,
25 13, 24, 25, 26): 1B, 2A, 3B;

- 1 (130) Manitou River, South Branch, (T.58, R.6, S.6; T.58, R.7, S.1, 4, 5, 6, 7, 8, 9, 10,
2 11, 12, 16, 17, 18; T.58, R.8, S.1; T.59, R.7, S.29, 30, 31, 32, 33): 1B, 2A, 3B;
- 3 (133) to (138) [Renumber as (131) to (136)]
- 4 (137) Mile Post Forty-Three Creek, (T.56, R.8, S.2, 3, 10, 11, 13, 14, 15): 1B, 2A, 3B;
- 5 (140) to (153) [Renumber as (138) to (151)]
- 6 (152) Murphy Creek, (T.56, R.11, S.4, 5, 8, 17, 18, 19; T.57, R.10, S.4, 7, 8, 9, 18;
7 T.57, R.11, S.13, 21, 22, 23, 24, 26, 27, 28, 33, 34): 1B, 2A, 3B;
- 8 (155) to (161) [Renumber as (153) to (159)]
- 9 (160) Nicadoo Creek (Nicado Creek), (T.56, R.7, S.7; T.56, R.8, S.1, 12; T.57, R.8,
10 S.27, 35, 36): 1B, 2A, 3B;
- 11 (163) to (194) [Renumber as (161) to (192)]
- 12 (193) Sawmill Creek, (T.57, R.6, S.18; T.57, R.7, S.12, 13, 22, 23, 24, 26, 27, 34): 1B,
13 2A, 3B;
- 14 (196) to (198) [Renumber as (194) to (196)]
- 15 (197) Section 16 Creek, (T.58, R.5W, S.16): 1B, 2A, 3B;
- 16 (202) to (211) [Renumber as (198) to (207)]
- 17 (208) Split Rock River, East Branch, (T.55, R.9, S.4, 5, 6, 9, 10, 14, 15, 22, 23, 24, 25,
18 26; T.56, R.9, S.30, 31, 32; T.56, R.10, S.1, 11, 12, 13, 14, 24, 25): 1B, 2A, 3B;
- 19 (213) to (229) [Renumber as (209) to (225)]
- 20 (226) Stump River, (T.64, R.4E, S.18; T.64, R.3E, S.8, 9, 13, 14, 15, 16, 17, 21, 22, 23,
21 24): 1B, 2A, 3B;
- 22 (230) to (245) [Renumber as (227) to (242)]
- 23 (243) Thirty-nine Creek, Big, (T.56, R.8, S.19, 30, 31; T.56, R.9, S.1, 2, 3, 11, 12, 13,
24 14, 15, 22, 23, 24, 25; T.57, R.9, S.22, 26, 27, 35, 36): 1B, 2A, 3B;

1 (247) to (259) [Renumber as (244) to (256)]

2 (257) Unnamed (Deer) Creek, (T.47, R.16, S.19, 29, 30; T.47, R.17, S.13, 14, 24): 1B,
3 2A, 3B;

4 (261) to (264) [Renumber as (258) to (261)]

5 (262) Unnamed Creek, (S-17-6), (T.53, R.11, S.30, 31, 32; T.53, R.12, S.25): 1B, 2A,
6 3B;

7 (263) Unnamed Creek, (S-17-9), (T.53, R.11, S.5; T.54, R.11, S.20, 29, 30, 32): 1B,
8 2A, 3B;

9 (265) to (271) [Renumber as (264) to (270)]

10 B. Lakes:

11 [For text of subitems (1) to (36), see M.R.]

12 (38) to (41) [Renumber as (37) to (40)]

13 (41) East Lake, (T.59, R.6W, S.1, 2): 1B, 2A, 3B;

14 (43) to (48) [Renumber as (42) to (47)]

15 (48) Feather Lake, (T.61, R.5W, S.35): 1B, 2A, 3B;

16 [For text of subitems (49) to (61), see M.R.]

17 (63) to (75) [Renumber as (62) to (74)]

18 (77) to (80) [Renumber as (75) to (78)]

19 (79) Mirror Lake, (T.52, R.14W, S.19, 30): 1B, 2A, 3B;

20 (81) to (85) [Renumber as (80) to (84)]

21 (87) to (120) [Renumber as (85) to (118)]

22 (119) Sonju Lake, (T.58, R.7W, S.27, 28): 1B, 2A, 3B;

23 (121) to (137) [Renumber as (120) to (136)]

24 (137) Trip Lake, (T.65, R.3W, S.32): 1B, 2A, 3B;

1 [For text of subitems (138) to (153), see M.R.]

2 [For text of items C and D, see M.R.]

3 Subp. 2. **Lake of the Woods Basin.** The water use classifications for the listed waters
4 in Lake of the Woods Basin are as identified in items A, B, and D.

5 A. Streams:

6 [For text of subitems (1) to (16), see M.R.]

7 (17) Hill Creek, (T.60, R.8, S.19, 30; T.60, R.9, S.24, 25): 1B, 2A, 3B;

8 (18) Indian Sioux River, Little, (T.65, R.15): 1B, 2Bd, 3B;

9 (19) Inga Creek, (T.60, R.9, S.2, 3; T.61, R.9, S.14, 22, 23, 27, 34, 35): 1B, 2A, 3B;

10 (20) *Inga Creek [11/5/84P] (T.61, R.9, S.11, 12): 1B, 2A, 3B;

11 (21) Isabella River, Little, (T.59, R.8, S.3, 4, 5, 6, 9, 10, 15, 16, 22; T.60, R.8, S.31, 32;
12 T.60, R.9, S.5, 6, 8, 9, 10, 15, 16, 22, 25, 26, 27, 36; T.61, R.9, S.9, 16, 17, 20, 21, 22, 29, 32):
13 1B, 2A, 3B;

14 (22) *Isabella River, Little, [11/5/84P] (T.61, R.9, S.3, 4, 9, 10; T.62, R.9, S.34);

15 (23) Island River, (T.61, R.7, 8): 1B, 2Bd, 3B;

16 (25) to (31) [Renumber as (24) to (30)]

17 (33) to (51) [Renumber as (31) to (49)]

18 (50) Snake Creek, (T.60, R.10, S.1; T.61, R.9, S.19, 30, 31; T.61, R.10, S.24, 25, 36):
19 1B, 2A, 3B;

20 (51) Snake River, (T.60, R.10, S.3; T.61, R.9, S.18, 19; T.61, R.10, S.23, 24, 26, 27,
21 34): 1B, 2A, 3B;

22 (54) to (70) [Renumber as (52) to (68)]

23 B. Lakes:

24 [For text of subitems (1) to (13), see M.R.]

- 1 (14) Beaver Hut Lake, (T.61, R.10W, S.30, 31; T.61, R.11, S.25, 36): 1B, 2A, 3B;
- 2 (14) to (45) [Renumber as (15) to (46)]
- 3 (47) Extortion Lake, (T.65, R.3W, S.31, 32): 1B, 2A, 3B;
- 4 (46) to (76) [Renumber as (48) to (78)]
- 5 (79) Indian Lake, (T.60, R.8W, S.35): 1B, 2A, 3B;
- 6 (77) to (161) [Renumber as (80) to (164)]
- 7 (165) Trip Lake, (T.65, R.3W, S.32): 1B, 2A, 3B;
- 8 (162) to (171) [Renumber as (166) to (175)]
- 9 (176) Unnamed (Pear) Lake, (T.60, R.11W, S.4): 1B, 2A, 3B;
- 10 (172) to (177) [Renumber as (177) to (182)]

11 [For text of items C and D, see M.R.]

12 Subp. 3. **Red River of the North Basin.** The water use classifications for the listed
13 waters in the Red River of the North Basin are as identified in items A, B, C, and D.

14 A. Streams:

15 [For text of subitems (1) to (10), see M.R.]

16 (11) County Ditch No. 6A-2, Rothsay, (T.135, R.45, S.21, 28, 33): 7 (see subitem
17 (68));

18 [For text of subitems (12) to (18), see M.R.]

19 (19) Felton Creek, (T.141, R.44, S.7, 8, 17; T.141, R.45, S.7, 8, 12, 13, 14, 15, 16, 17,
20 18, 22; T.141, R.46, S.12, 13, 14): 1B, 2A, 3B;

21 [For text of subitems (20) to (59), see M.R.]

22 (60) Toad River, (T.138, R.38, S.6, 7, 18, 19, 30; T.139, R.38, S.30, 31; T.139, R.39,
23 S.25, 36; T.138, R.39, S.25, 36): 1B, 2A, 3B;

24 [For text of subitems (61) to (67), see M.R.]

1 (68) Unnamed Creek, Rothsay, (T.135, R.45, S.21, 22, 23, 25, 26): 7 (see subitem
2 (11));

3 [For text of subitems (69) to (82), see M.R.]

4 [For text of items B to D, see M.R.]

5 Subp. 4. **Upper Mississippi River Basin.** The water use classifications for the listed
6 waters in the Upper Mississippi River Basin are as identified in items A, B, and D.

7 A. Streams:

8 [For text of subitems (1) to (22), see M.R.]

9 (23) Branch No. 3, Lateral 2, East Bethel, (T.33, R.23, S.29, 32): 7;

10 (23) to (29) [Renumber as (24) to (30)]

11 (31) Camp Ripley Brook, (T.132, R.29, S.18, 19; T.132, R.30, S.13, 24): 1B, 2A, 3B;

12 (31) to (40) [Renumber as (32) to (41)]

13 (42) County Ditch No. 17, St. Cloud, (T.124, R.29, S.13, 24, 25): 7;

14 (41) and (42) [Renumber as (43) and (44)]

15 (45) County Ditch No. 28, Ham Lake, (T.32, R.23, S.4, 5, 6; T.33, R.23, S.29, 32): 7;

16 (43) to (125) [Renumber as (46) to (128)]

17 (127) to (134) [Renumber as (129) to (136)]

18 (137) Pokety (Pickedee Creek), (T.144, R.32, S.29, 30; T.144, R.33, S.24, 25): 1B,
19 2A, 3B;

20 (135) to (152) [Renumber as (138) to (155)]

21 (154) to (180) [Renumber as (156) to (182)]

22 (183) Straight Creek, Upper, (T.140, R.36, S.6; T.141, R.36, S.30, 31; T.141, R.37,
23 S.24, 25): 1B, 2A, 3B;

24 (182) to (196) [Renumber as (184) to (198)]

1 (199) Trout Brook, St. Paul, (T.29, R.22, S.18, 19): 7;

2 (197) to (228) [Renumber as (200) to (231)]

3 (230) to (240) [Renumber as (232) to (242)]

4 B. Lakes:

5 [For text of subitems (1) to (21), see M.R.]

6 (23) to (62) [Renumber as (22) to (61)]

7 [For text of items C and D, see M.R.]

8 Subp. 5. **Minnesota River Basin.** The water use classifications for the listed waters in
9 the Minnesota River Basin are as identified in items A, B, C, and D.

10 A. Streams:

11 [For text of subitems (1) to (32), see M.R.]

12 (33) County Ditch No. 9 (see Hazel Creek);

13 (33) to (72) [Renumber as (34) to (73)]

14 (74) Hazel Creek (County Ditch No. 9), (T.115, R.39, 40, 41, 42): 2C;

15 (75) High Island Ditch, Arlington, (T.113, R.27, S.16, 17, 21, 22, 27): 7;

16 ~~(74) to (89) [Renumber as (76) to (91)]~~

17 ~~(92) Lateral 5 of Judicial Ditch No. 3, (see Unnamed Ditch, Green Isle);~~

18 ~~(90) to (139) [Renumber as (93) to (142)]~~ (74) to (139) [Renumber as (76) to (141)]

19 ~~(143)~~ (142) Unnamed Creek, Lake Town Township, (T.115, R.24, S.3, 10, 11;
20 T.116, R.24, S.27, 34): 7;

21 (140) to (158) [Renumber as ~~(144)~~ (143) to ~~(162)~~ (161)]

22 ~~(163)~~ (162) Unnamed Ditch, Arlington, (T.113, R.27, S.21): 7;

23 ~~(164)~~ (163) Unnamed Ditch, Near Fernando, Round Grove Coop Cry., (T.113,
24 R.30, S.5; T.114, R.29, S.19, 20, 30; T.114, R.30, S.25, 26, 27, 28, 29, 32): 7;

1 ~~(165)~~ (164) Unnamed Ditch, (~~Lateral 5 of Judicial Ditch No. 3~~), Green Isle, (T.114,
2 R.26, S.18, 19; T.114, R.27, S.11, 12, 13, 14, 24): 7;

3 (161) to (187) [Renumber as ~~(166)~~ (165) to ~~(192)~~ (191)]

4 B. Lakes:

5 [For text of subitems (1) to (14), see M.R.]

6 (15) Unnamed Swamp (Skauby Lake), Storden, (T.107, R.37, S.30): 7;

7 [For text of subitems (16) to (18), see M.R.]

8 [For text of items C and D, see M.R.]

9 Subp. 6. **Saint Croix River Basin.** The water use for the listed waters in the Saint
10 Croix River Basin are as identified in items A, B, and D.

11 A. Streams:

12 [For text of subitems (1) to (16), see M.R.]

13 (17) *Kettle River, [11/5/84R] (From the north Pine County line to the site of the
14 former dam at Sandstone, at quarter section line between the NW 1/4 and SW 1/4, S.22,
15 T.42, R.20): 2B, 3B;

16 (18) *Kettle River, [11/5/84P] (From the site of the former dam at Sandstone, at
17 quarter section line between the NW 1/4 and SW 1/4, S.22, T.42, R.20 to its confluence
18 with the Saint Croix River): 2B, 3B;

19 [For text of subitems (19) to (48), see M.R.]

20 [For text of items B to D, see M.R.]

21 Subp. 7. **Lower Mississippi River Basin.** The water use classifications for the listed
22 waters in the Lower Mississippi River Basin are as identified in items A, B, and C.

23 A. Streams:

24 [For text of subitems (1) to (3), see M.R.]

- 1 (4) Ballpark Creek, (T.102, R.4, S.19, 30; T.102, R.5, S.24): 1B, 2A, 3B;
- 2 (4) to (17) [Renumber as (5) to (18)]
- 3 (19) Burns Valley Creek, West Branch, (T.106, R.7, S.3, 4, 9, 16; T.107, R.7, S.34):
- 4 1B, 2A, 3B;
- 5 (19) to (27) [Renumber as (20) to (28)]
- 6 (29) Cedar Valley Creek, (T.105, R.6, S.6; T.106, R.6, S.1, 11, 12, 14, 15, 21, 22, 28,
- 7 29, 31, 32): 1B, 2A, 3B;
- 8 (30) Chub Creek, North Branch, (T.112, 113, R.19): 2C;
- 9 (31) Clear Creek, (T.111, R.14, S.3, 10, 15): 1B, 2A, 3B;
- 10 (30) to (45) [Renumber as (32) to (47)]
- 11 (47) to (55) [Renumber as (48) to (56)]
- 12 (57) Garvin Brook, (T.106, R.8, S.4, 5, 8, 17; T.107, R.8, S.10, 11, 14, 15, 23, 26, 27,
- 13 33, 34, 35): 1B, 2A, 3B;
- 14 (58) Gilbert Creek, (T.111, R.12, S.6; T.111, R.13, S.1, 2, 3, 4, 10, 11, 12; T.112, R.12,
- 15 S.31): 1B, 2A, 3B;
- 16 (58) to (61) [Renumber as (59) to (62)]
- 17 (63) Hamilton Creek, (T.103, R.13, NW 1/4 S.6; T.103, R.14, NE 1/4 S.1): 1B, 2A,
- 18 3B;
- 19 (63) to (65) [Renumber as (64) to (66)]
- 20 (67) Hay Creek, (T.111, R.15, S.4; T.112, R.14, S.19; T.112, R.15, S.1, 12, 13, 23, 24,
- 21 26, 27, 33, 34; T.113, R.15, S.24, 25, 36): 1B, 2A, 3B;
- 22 (67) to (140) [Renumber as (68) to (141)]
- 23 (142) Straight Creek, (T.107, R.9, S.2, 11, 12): 1B, 2A, 3B;
- 24 (141) to (166) [Renumber as (143) to (168)]

1 (168) to (175) [Renumber as (169) to (176)]

2 (177) Unnamed Creek (Wells Creek Trib. #9), (T.111, R.14, S.8, 17): 1B, 2A, 3B;

3 (178) Unnamed Ditch, Claremont, (T.107, R.18, S.27, 34): 7;

4 (179) Unnamed Ditch, Owatonna, (T.108, R.20, S.33): 7;

5 (177) to (187) [Renumber as (180) to (190)]

6 ~~(191) Wells Creek, (T.111, R.14, S.3, 4, 5, 6, 7, 8, 18; T.112, R.13, S.12, 13, 14, 15, 16,~~

7 ~~17, 19, 20, 21, 22, 23; T.112, R.14, S.24, 25, 33, 34, 35, 36): 1B, 2A, 3B;~~

8 (188) to (198) [Renumber as ~~(192)~~ (191) to ~~(202)~~ (201)]

9 [For text of items B to D, see M.R.]

10 Subp. 8. **Cedar-Des Moines Rivers Basin.** The water use classifications for the listed
11 waters in the Cedar-Des Moines Rivers Basin are as identified in items A, C, and D.

12 A. Streams:

13 [For text of subitems (1) to (7), see M.R.]

14 (8) County Ditch No. 53 (see Soldier Creek);

15 (8) to (20) [Renumber as (9) to (21)]

16 (22) Soldier Creek (Unnamed Stream and County Ditch No. 53), (T.101, R.32,
17 33): 2C, 3B;

18 (23) Turtle Creek, (T.103, R.18, 19, 20): 2C;

19 (24) Unnamed Creek, Emmons, (T.101, R.22, S.31): 7;

20 (25) Unnamed Creek, Brownsdale, (T.103, R.17, S.4, 9): 7;

21 (26) Unnamed Creek, Blooming Prairie, (T.104, R.18, S.5, 8, 9, 16; T.105, R.18,
22 S.31): 7;

23 (27) Unnamed Creek, Blooming Prairie, (T.105, R.19, S.25): 7;

24 (28) Unnamed Creek, Iona, (T.105, R.41, S.3, 4, 9; T.106, R.40, S.19, 29, 30, 32;
25 T.106, R.41, S.24, 25, 26, 34, 35): 7;

- 1 (29) Unnamed Ditch, Blooming Prairie, (T.105, R.19, S.25): 7;
2 (30) Unnamed Stream (see Soldier Creek);
3 (31) Wolf Creek, (T.103, R.16, 17, 18): 2C;
4 (32) Woodbury Creek, (T.101, 102, R.18, 19): 2C; and
5 (33) Woodson Creek, (T.102, R.18, S.14, 15): 1B, 2A, 3B.

6 [For text of items B to D, see M.R.]

7 [For text of subp 9, see M.R.]

8 **REPEALER.** Minnesota Rules, part 7050.0220, subparts 3, 4, 5, and 6, are repealed.