

1.1 **Pollution Control Agency**

1.2 **Adopted Permanent Rules Relating to Human Health Methods for Water Quality**

1.3 The rules proposed and published at State Register, Volume 38, Number 51, pages
1.4 1634-1656, June 16, 2014 (38 SR 1634), are adopted with the following modifications:

1.5 **7050.0150 DETERMINATION OF WATER QUALITY, BIOLOGICAL AND**
1.6 **PHYSICAL CONDITIONS, AND COMPLIANCE WITH STANDARDS.**

1.7 Subp. 7. **Impairment of waters relating to fish for human consumption.**

1.8 B. If CS_{ft} has not been established for a pollutant with chronic standards (CS)
1.9 applicable in water (CS_{dff} , CS_{dev} , or CS_{fr} , as defined in parts 7050.0218, subpart 3, item Q,
1.10 and 7050.0219, subpart 13, item B), the residue levels in fish muscle tissue established by
1.11 the Minnesota Department of Health must be used to identify surface waters supporting
1.12 fish for which the Minnesota Department of Health recommends a reduced frequency of
1.13 fish consumption for the protection of public health. A water body will be considered
1.14 impaired when the recommended consumption frequency is less than one meal per week,
1.15 such as one meal per month, for any member of the population. That is, a water body will
1.16 not be considered impaired if the recommended consumption frequency is one meal per
1.17 week, or any less restrictive recommendation such as two meals per week, for all members
1.18 of the population. The impaired condition must be supported with measured data on
1.19 the contaminant levels in the resident fish.

1.20 **7050.0218 FOR TOXIC POLLUTANTS: DEFINITIONS AND METHODS FOR**
1.21 **DETERMINATION OF HUMAN HEALTH-BASED NUMERIC STANDARDS**
1.22 **AND SITE-SPECIFIC NUMERIC CRITERIA FOR AQUATIC LIFE, HUMAN**
1.23 **HEALTH, AND FISH-EATING WILDLIFE.**

1.24 Subp. 3. **Definitions.** For the purposes of parts 7050.0217 to 7050.0227, the
1.25 following terms have the meanings given them.

Q. "Chronic criterion" or "CC" and "chronic standard" or "CS" mean the highest water concentration or fish tissue concentration of a toxicant or effluent to which aquatic life, humans, or wildlife, or other organisms can be exposed indefinitely without causing chronic toxicity. CC represents a site-specific chronic criterion developed under this part and part 7050.0219 or part 7052.0110. CS represents a chronic standard listed in parts 7050.0220 and 7050.0222 or in part 7052.0100. CC and CS are further distinguished by the organisms they are developed to protect and medium in which they apply:

OO. "No observable adverse effect level" or "NOAEL" means an the highest exposure level at which there is no statistically or biologically significant increase in the frequency or severity of adverse effects between the exposed population and its appropriate control group.

RR. "Reference dose" or "RfD" means an estimate of a dose for a given duration to the human population, including susceptible subgroups such as infants, that is likely to be without an appreciable risk of adverse effects during a lifetime. It is derived from a suitable dose level at which there are few or no statistically or biologically significant increases in the frequency or severity of an adverse effect between the dosed population and its associated control group. The RfD includes one or more divisors, applied to the suitable dose level, accounting for:

(5) uncertainty associated with deficiencies in the available data.
The product of the divisors is not to exceed 3,000 in an RfD used for a chronic standard.
The RfD is expressed in units of daily dose as milligrams of chemical per kilogram of body weight-day or mg/kg-day.

7050.0219 HUMAN HEALTH-BASED CRITERIA AND STANDARDS.

Subp. 13. **Algorithms for Class 2A or 2Bd surface waters.** This subpart describes human health-based criteria or standards for classes of surface waters designated for drinking water, fish consumption, and recreational use. To develop a final chronic criteria

(CC_{dfr}) or standard (CS_{dfr}) applicable to surface waters designated Class 2A or 2Bd, items A to D must be evaluated for use based on the pollutant's toxicological profile: noncarcinogen or nonlinear carcinogen (NLC); developmental susceptibility; or linear carcinogen (C).

B. Supplemental algorithm for developmental susceptibility for noncarcinogenic or NLC chemicals applicable to surface waters designated Class 2A or 2Bd to calculate:

CC_{dev} or CS_{dev} =

$$\frac{\text{RfD}_{\text{duration (acute, short-term, or subchronic)}} \text{ (mg/kg-d)} \times \text{RSC (no units)} \times 1,000 \text{ } \mu\text{g/mg}}{\text{DWIR}_{\text{duration (acute, short-term, or subchronic)}} \text{ (L/kg-d)}}$$

where: CC_{dev} or CS_{dev} = developmental-based drinking water chronic criterion or standard in $\mu\text{g/L}$ applied when shorter duration adverse effects and exposure parameters result in a more stringent chronic criterion or standard than calculated from item A

RfD_{duration} = reference dose for acute, short-term, or subchronic duration in mg/kg-day

DWIR_{duration} = drinking water intake rate for acute, short-term, or subchronic duration in L/kg-d; drinking water intake rate for the acute, short-term, and subchronic durations based on a 95th percentile time-weighted average from MDH; rate may be chemical-specific with sufficient data or use default rates of 0.289, 0.289, and 0.077 L/kg-d, respectively

Other variables as defined under item A

7050.0222 SPECIFIC WATER QUALITY STANDARDS FOR CLASS 2 WATERS OF THE STATE; AQUATIC LIFE AND RECREATION.

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

D. Concentrations of noncarcinogenic or nonlinear carcinogenic (NLC) chemicals in water or fish tissue from point or nonpoint sources, singly or in mixtures, must be below levels expected to produce known adverse effects. This is accomplished through the application of an additive noncancer health risk index using common health

risk index endpoints or health endpoints. Mixtures of chemicals with listed CS or site-specific CC are evaluated using the following approach:

Chemicals must be grouped according to medium (water or fish) and each health endpoint. Chemicals for which no health endpoint is specified are not grouped. Chemicals that are also linear carcinogens must be grouped as described under item E. Using the following equation, a noncancer health risk index must be determined for each group of two or more chemicals that have a common health endpoint listed in this part. To meet the protection objectives in part 7050.0217, the noncancer health risk index must not exceed a value of one.

$$\text{Noncancer health risk index by common health endpoint} = \frac{C_1}{\frac{CS_1 \text{ or } CC_1}{CC_1}} + \frac{C_2}{\frac{CS_2 \text{ or } CC_2}{CC_2}} + \dots + \frac{C_n}{\frac{CS_n \text{ or } CC_n}{CC_n}} \leq 1$$

where: C_n is the concentration of the first to the n^{th} chemical by common health endpoint and medium

$CS_1 \dots CS_n$ is the drinking water plus fish consumption and recreation chronic standard (CS_{dfr} or CS_{dev}), fish consumption and recreation chronic standard (CS_{fr}), or fish tissue chronic standard (CS_{ft}) for the first to n^{th} chemical by common health endpoint

$CC_1 \dots CC_n$ is the drinking water plus fish consumption and recreation chronic criterion (CC_{dfr} or CC_{dev}), fish consumption and recreation chronic criterion (CC_{fr}), or fish tissue chronic criterion (CC_{ft}) for the first to n^{th} chemical by common health endpoint

E. Concentrations of carcinogenic chemicals from point or nonpoint sources, singly or in mixtures, must not exceed an incremental or additional excess risk level of one in 100,000 (10^{-5}) in surface waters or fish tissue. Carcinogenic chemicals will be considered additive in their effect according to the following equation unless an alternative model is supported by available scientific evidence. The additive equation applies to chemicals that have a human health-based chronic standard (CS) or site-specific chronic

criterion (CC) calculated with a cancer potency slope factor. To meet the protection objectives in part 7050.0217, the cancer health risk index must not exceed a value of one.

$$\text{Cancer health risk index} = \frac{C_1}{\frac{CS_1 \text{ or } CC_1}{CC_1}} + \frac{C_2}{\frac{CS_2 \text{ or } CC_2}{CC_2}} + \dots + \frac{C_n}{\frac{CS_n \text{ or } CC_n}{CC_n}} \leq 1$$

where: $C_1 \dots C_n$ is the concentration of the first to the n^{th} carcinogen in water or fish tissue

$CS_1 \dots CS_n$ is the drinking water plus fish consumption and recreation chronic standard (CS_{dfr}), fish consumption and recreation chronic standard (CS_{fr}), or fish tissue chronic standard (CS_{ft}) for the first to n^{th} carcinogenic chemical

$CC_1 \dots CC_n$ is the drinking water plus fish consumption and recreation chronic criterion (CC_{dfr}) fish consumption and recreation chronic criterion (CC_{fr}), or fish tissue chronic criterion (CC_{ft}) for the first to n^{th} carcinogenic chemical