

Health Risk Limit Proposed Rules Amendments, 2022/2023

REVISOR'S ID NUMBER 4587 NARRATIVE DESCRIPTION

January 10, 2023

Overview

The following tables provide a description of the proposed changes to the Health Risk Limit (HRL) Rules for 2022/2023. The HRL Rules reflect concentrations of a contaminant in groundwater that are expected to pose little to no risk when the water is consumed for the certain time period.

This document does not represent a certified copy of the proposed rules. This document is provided only as an alternative way to access information that will be provided in the certified copy of the proposed HRL Rules. The traditional use of strikethrough and underlining to indicate changes cannot be read by screen readers and some other assistive technologies. The words "Delete" and "Add" are therefore used in place of strikethrough and underlines that indicate changes. A scan of the certified copy of the proposed rules with strikethrough and underlining will be also posted when it is available from the Office of the Revisor. If you have questions about the proposed rules or require access to the proposed rules in a different format, please contact the Health Risk Assessment Unit at health.risk@state.mn.us.

Abbreviations:

(Many of the terms below are further defined in the [Health-Based Water Guidance Glossary \(https://www.health.state.mn.us/communities/environment/risk/docs/rules/hrlglossary.pdf\)](https://www.health.state.mn.us/communities/environment/risk/docs/rules/hrlglossary.pdf))

ADAF = Age-Dependent Adjustment Factor

AFlifetime = Lifetime Adjustment Factor

HRL = Health Risk Limit

NA = Not Applicable

ND = Not Derived

RfD = Reference Dose

RSC = Relative Source Contribution

SF = Slope Factor

Subp - Subpart

Minnesota Rules part 4717.7500 Table of Health Risk Limits

Subparts 11, 15, 34a, 45a, 54, 58a, 61 will be deleted and added to Minnesota Rules 4717.7860. Subpart 58a will be repealed and not replaced. For n-hexane (in subpart 58a), MDH has developed new Risk Assessment Advice to replace the former HRL value. In addition, Minnesota Rules 4717.7850, subpart 2, item E for setting the HRL for 1,1,2,2-Tetrachloroethylene to the federal Maximum Contaminant Level will be repealed. This is because Minnesota Department of Health (MDH) has reviewed 1,1,2,2-Tetrachloroethylene and is setting its own new HRL.

Subpart	CAS RN	RfD* (milligrams per kilogram per day)	Slope factor* (the inverse of milligrams per kilogram per day)	Health Risk Limit (micrograms per liter)
Minnesota Rules part 4717.7500 subpart 11: 1,1-Biphenyl (Diphenyl)	[Delete: 92-52-4]	[Delete: 0.05]	[Delete: -]	[Delete: 300]
Minnesota Rules part 4717.7500 subpart 15: Bromodichloromethane	[Delete: 75-27-4]	[Delete: --]	[Delete: 0.062]	[Delete: 6]
Minnesota Rules part 4717.7500 subpart 34a: 1,4-Dichlorobenzene (para)	[Delete: 106-46-7]	[Delete: --]	[Delete: 0.024]	[Delete: 10]
Minnesota Rules part 4717.7500 subpart 45a: 1,2-Dichloropropane	[Delete: 78-87-5]	[Delete: --]	[Delete: 0.068]	[Delete: 5]
Minnesota Rules part 4717.7500 subpart 54: Fluorene (9H-Fluorene)	[Delete: 86-73-7]	[Delete: 0.04]	[Delete: -]	[Delete: 300]
Minnesota Rules part 4717.7500 subpart 58a: Hexane (n-hexane)	[Delete: 110-54-3]	[Delete: 0.06]	[Delete: --]	[Delete: 400]
Minnesota Rules part 4717.7500 subpart 61: Manganese	[Delete: 7439-96-5]	[Delete: 0.005]	[Delete: -]	[Delete: 100]

Minnesota Rules part 4717.7860 Health Risk Limits Table

Subp. 3c. Acetone

CAS number: 67-64-1

Year Adopted: [Delete: 2011, Add: 2023]

Volatility: Moderate

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	[Delete: 9,000 Add: 5,000]	[Delete: 8,000 Add: 5,000 (2)]	[Delete: 4,000 Add: 3,000]	NA
RfD (mg/kg-day)	--	[Delete: 5.0 Add: 3.1]	[Delete: 3.0 Add: (2)]	[Delete: 0.90 Add: 0.69]	--
RSC	--	0.5	[Delete: 0.2 Add: (2)]	0.2	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF _{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	[Delete: 0.289 Add: 0.290]	[Delete: 0.077 Add: (2)]	[Delete: 0.043 Add: 0.045]	--
Endpoints	--	renal (kidney) system	[Delete: hematological (blood) system renal (kidney) system	hematological (blood) system [Add: hepatic (liver) system, renal (kidney) system	--

For text of subparts 3d to 4, see [Minnesota Rules 4717.7860](#)

Subp. 4a. Aminomethylphosphonic acid (AMPA).

CAS number: 1066-51-9

Year Adopted: 2023

Volatility: Nonvolatile

[Add table below for Aminomethylphosphonic acid (AMPA).]

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	ND	3,000	1,000	NA
RFD (mg/kg-day)	--	--	0.96	0.32	--
RSC	--	--	0.2	0.2	--
SF (per mg/kg-day)	--	--	--	--	1
ADAF or AF _{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	--	0.074	0.045	--
Endpoints	--	--	hepatic (liver) system, renal (kidney) system	hepatic (liver) system, renal (kidney) system	--

For text of subparts 5 to 6b, see [Minnesota Rules 4717.7860](#)

Subp. 6c. Benzo[a]pyrene.

CAS number: 50-32-8

Year Adopted: 2023

Volatility: Low

[Add table below for Benzo[a]pyrene.]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	0.5	0.5 (2)	0.5 (2)	0.1
RFD (mg/kg-day)	--	0.00031	(2)	(2)	--
RSC	--	0.5	(2)	(2)	--
SF (per mg/kg-day)	--	--	--	--	1

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short-term	Subchronic	Chronic	Cancer
ADAF or AF_{lifetime}	--	--	--	--	10 (ADAF _{<2}) 3 (ADAF _{2 to <16}) 1 (ADAF ₁₆₊)
Intake Rate (L/kg-day)	--	0.290	(2)	(2)	0.155 _{<2} 0.040 _(2 to <16) 0.042 ₍₁₆₊₎
Endpoints	--	developmental, nervous system	developmental, nervous system	developmental, nervous system	cancer

Subp. 6d. Benzophenone.

CAS number: 119-61-9

Year Adopted: 2023

Volatility: Low

[Add table below for Benzophenone.]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	900	100	100 (3)	NA
RFD (mg/kg-day)	--	0.52	0.053	(3)	--
RSC	--	0.5	0.2	(3)	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF_{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	0.290	0.074	(3)	--
Endpoints	--	developmental	hepatic (liver) system, renal (kidney) system	hepatic (liver) system, renal (kidney) system	--

HEALTH RISK LIMITS, PROPOSED RULES

Subp. 6e. 1H-Benzotriazole

CAS number: 95-14-7

Year Adopted: 2023

Volatility: Low

[Add table below for 1H-Benzotriazole.]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	20	20 (2)	20 (2)	NA
RFD (mg/kg-day)	--	0.023	(2)	(2)	--
RSC	--	0.2	(2)	(2)	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF_{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	0.290	(2)	(2)	--
Endpoints	--	developmental	developmental	developmental	--

Subp. 6f. Biphenyl.

CAS number: 92-52-4

Year Adopted: 2023

Volatility: Moderate

[Add table below for Biphenyl.]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	400	100	100 (2)	100 (2)	10
RFD (mg/kg-day)	0.58	0.18	(2)	(2)	--
RSC	0.2	0.2	(2)	(2)	--

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short-term	Subchronic	Chronic	Cancer
SF (per mg/kg-day)	--	--	--	--	0.008
ADAF or AF _{lifetime}	--	--	--	--	10 (ADAF _{<2}) 3 (ADAF _{2 to <16}) 1 (ADAF ₁₆₊)
Intake Rate (L/kg-day)	0.290	0.290	(2)	(2)	0.155 _(<2) 0.040 _(2 to <16) 0.042 ₍₁₆₊₎
Endpoints	renal (kidney) system	renal (kidney) system	renal (kidney) system	renal (kidney) system	cancer

Renumber subpart for Bisphenol A (BPA) from Subp. 6e. to Subp. 6g.

Subp. 6h. Bromodichloromethane. (BDCM)

CAS number: 75-27-4

Year Adopted: 2023

Volatility: High

[Add table below for Bromodichloromethane (BDCM).]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	400	30	30 (2)	30	3
RFD (mg/kg-day)	0.073	0.039	(2)	0.0075	--
RSC	0.2	0.2	(2)	0.2	--
SF (per mg/kg-day)	--	--	--	--	0.035
ADAF or AF _{lifetime}	--	--	--	--	10 (ADAF _{<2}) 3 (ADAF _{2 to <16}) 1 (ADAF ₁₆₊)

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short-term	Subchronic	Chronic	Cancer
Intake Rate (L/kg-day)	0.038	0.290	(2)	0.045	0.155 _(<2) 0.040 _(2 to <16) 0.042 ₍₁₆₊₎
Endpoints	female reproductive system (E)	immune system, spleen	immune system, spleen	hepatic (liver) system	cancer

Renumber subpart for Benzyl Butyl Phthalate from Subp. 6d. to Subp. 6i.

Renumber Subp. 6e. to Subp. 6j. Cadmium.

Renumber Subp. 6f. to Subp. 6k. Carbamazepine.

Renumber Subp. 6g. to Subp. 6l. Carbon Tetrachloride.

For text of subparts 7 to 8e, see [Minnesota Rules 4717.7860](#)

Subp. 8f. 1,4-Dichlorobenzene

CAS number: 106-46-7

Year Adopted: 2023

Volatility: High

[Add table below for 1,4-Dichlorobenzene.]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	50	50 (2)	50 (2)	NA
RFD (mg/kg-day)	--	0.069	(2)	(2)	--
RSC	--	0.2	(2)	(2)	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF_{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	0.290	(2)	(2)	--

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short-term	Subchronic	Chronic	Cancer
Endpoints	--	developmental, hepatic (liver) system, nervous system	developmental, hepatic (liver) system, nervous system	developmental, hepatic (liver) system, nervous system	--

Renumber subpart for Dichlorodifluoromethane from Subp. 8f to Subp. 8g.

Renumber subpart for 1,2-Dichloroethane from Subp. 8g to Subp. 8h.

Renumber subpart for trans-1,2-Dichloroethene from Subp. 8h to Subp. 8i

Subp. 8i. trans-1,2-Dichloroethane

CAS number: 156-60-5

Year Adopted: [Delete: 2013, Add: 2023]

Volatility: High

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	ND	[Delete: 200 Add: 50]	[Delete: 40 Add: 9]	NA
RFD (mg/kg-day)	--	--	[Delete: 0.091 Add: 0.020]	[Delete: 0.0091 Add: 0.0020]	--
RSC	--	--	0.2	0.2	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF _{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	--	[Delete: 0.077 Add: 0.074]	[Delete: 0.043 Add: 0.045]	--
Endpoints	--	--	immune system	immune system	--

Renumber subpart for 1,1-Dichloroethylene. (Vinylidene chloride) from Subp. 8i to Subp. 8j

Subp. 8j. 1,1-Dichloroethylene. (Vinylidene chloride)

CAS number: 75-35-4

HEALTH RISK LIMITS, PROPOSED RULES

Change Year Adopted: [Delete: 2011, Add: 2023]

Volatility: High

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	ND	200	200	NA
RFD (mg/kg-day)	--	--	[Delete: 0.090 Add: 0.069]	[Delete: 0.046 Add: 0.040]	--
RSC	--	--	0.2	0.2	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF _{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	--	[Delete: 0.077 Add: 0.074]	[Delete: 0.043 Add: 0.045]	--
Endpoints	--	--	hepatic (liver) system	hepatic (liver) system	--

Subp. 8k. 1,2-Dichloropropane.

CAS number: 78-87-5

Year Adopted: 2023

Volatility: High

[Add table below for 1,2-Dichloropropane]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	20	20 (2)	20 (2)	3
RFD (mg/kg-day)	--	0.029	(2)	(2)	--
RSC	--	0.2	(2)	(2)	--
SF (per mg/kg-day)	--	--	--	--	0.037

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short-term	Subchronic	Chronic	Cancer
ADAF or AF_{lifetime}	--	--	--	--	10 (ADAF _{<2}) 3 (ADAF _{2 to <16}) 1 (ADAF ₁₆₊)
Intake Rate (L/kg-day)	--	0.290	(2)	(2)	0.155 _{<2} 0.040 _(2 to <16) 0.042 ₍₁₆₊₎
Endpoints	--	developmental	developmental	developmental	cancer

For text of subparts 9 to 12, see [Minnesota Rules 4717.7860](#)

Subp. 12a. 17 α -Ethinylestradiol

CAS number: 57-63-6

Year Adopted: 2023

Volatility: Nonvolatile

[Add table below for 17 α -Ethinylestradiol]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL ($\mu\text{g/L}$)	ND	0.0005	0.0002	0.0002	NA
RFD (mg/kg-day)	--	1.7×10^{-7}	1.4×10^{-8}	1.4×10^{-8}	--
RSC	--	0.8	0.8	0.8	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF_{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	0.290	0.074	0.045	--

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short-term	Subchronic	Chronic	Cancer
Endpoints	--	developmental (E), female reproductive system (E), male reproductive system (E)	developmental	developmental	--

Renumber: Subp. 12a. to Subp. 12b. Ethylbenzene

Subp. 12b. Ethylbenzene

CAS number: 100-41-4

[Year Adopted: Delete: 2011, Add: 2023]

Volatility: High

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	[Delete: 50 Add: 40]	[Delete: 50 (2) Add: 40 (2)]	[Delete: 50 (2) Add: 40 (2)]	NA
RFD (mg/kg-day)	--	[Delete: 0.075 Add: 0.06]	(2)	(2)	--
RSC	--	0.2	(2)	(2)	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF_{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	[Delete: 0.289 Add: 0.290]	(2)	(2)	--
Endpoints	--	hepatic (liver) system, renal (kidney) system	hepatic (liver) system, renal (kidney) system	hepatic (liver) system, renal (kidney) system	--

HEALTH RISK LIMITS, PROPOSED RULES

Renumber: Subp. 12b. to Subp. 12c. S-Ethyl-N,N-dipropylthiocarbamate (EPTC).

Renumber: Subp. 12c. to Subp. 12d. Ethylene Glycol

Subp. 12d. Ethylene Glycol

CAS number: 107-21-1

[Year Adopted: Delete: 2011, Add: 2023]

Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	[Delete: 4,000 Add: ND]	[Delete: 4,000 Add: 2,000]	2,000	2,000	NA
RFD (mg/kg-day)	[Delete: 0.76 Add: --]	[Delete: 0.76 Add: 0.33]	[Delete: 0.72 Add: (2)]	[Delete: 0.5 Add: (2)]	--
RSC	[Delete: 0.2 Add: --]	0.2	[Delete: 0.2 Add: (2)]	[Delete: 0.2 Add: (2)]	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF _{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	[Delete: 0.043 Add: --]	[Delete: 0.043 Add: 0.038]	[Delete: 0.077 Add: (2)]	[Delete: 0.043 Add: (2)]	--
Endpoints	[Delete: developmental Add: --]	developmental	developmental, renal (kidney) system	developmental [Add: male reproductive system] renal (kidney) system]	--

HEALTH RISK LIMITS, PROPOSED RULES

Renumber: Subp. 12d. to Subp. 12e. Fluoranthene

Subp. 12f. Fluorene (9H-Fluorene)

CAS number: 86-73-7

Year Adopted: 2023

Volatility: Moderate

[Add the table below for Fluorene]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	ND	200	80	NA
RFD (mg/kg-day)	--	--	0.058	0.018	--
RSC	--	--	0.2	0.2	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF_{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	--	0.074	0.045	--
Endpoints	--	--	hematological (blood) system, spleen	hematological (blood) system, spleen	--

Subp. 12g. Fomesafen

CAS number: 72178-02-0

Year Adopted: 2023

Volatility: Nonvolatile

[Add the table below for Fomesafen]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	200	200 (2)	20	NA

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short-term	Subchronic	Chronic	Cancer
RFD (mg/kg-day)	--	0.12	(2)	0.005	--
RSC	--	0.5	(2)	0.2	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF _{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	0.290	(2)	0.045	--
Endpoints	--	developmental, hepatic (liver) system, immune system	developmental, hepatic (liver) system, immune system	hepatic (liver) system	--

Subp. 12h. Imidacloprid

CAS number: 138261-41-3

Year Adopted: 2023

Volatility: Nonvolatile

[Add the table below for Imidacloprid]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	100	2	2 (2)	2 (2)	NA
RFD (mg/kg-day)	0.15	0.0036	(2)	(2)	--
RSC	0.2	0.2	(2)	(2)	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF _{lifetime}	--	--	--	--	--

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short-term	Subchronic	Chronic	Cancer
Intake Rate (L/kg-day)	0.290	0.290	(2)	(2)	--
Endpoints	nervous system	immune system	immune system	immune system	--

Subp. 12i. Manganese

CAS number: 7439-96-5

Year Adopted: 2023

Volatility: Nonvolatile

[Add the table below for Manganese]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	100	ND	ND	NA
RFD (mg/kg-day)	--	0.083	--	--	--
RSC	--	0.5	--	--	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF_{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	0.290	--	--	--
Endpoints	--	developmental, nervous system	--	--	--

Renumber Subp. 12e. to Subp. 12j. Metolachlor and S-Metolachlor

Change: Subp. 12j. Metolachlor and s-Metolachlor

CAS number: 51218-45-2; 87392-12-9

Change Year Adopted: [Delete: 2011, Add: 2023]

Volatility: Nonvolatile

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	[Delete: 400 Add: ND]	[Delete: 400 Add: 300]	300 (2)	300 [Delete: (3) Add: (2)]	NA
RFD (mg/kg-day)	[Delete: 0.24 Add: --]	[Delete: 0.24 Add: 0.19]	[Delete: 0.097 Add: (2)]	[Delete: (3) Add: (2)]	--
RSC	[Delete: 0.5 Add: --]	0.5	[Delete: 0.2 Add: (2)]	[Delete: (3) Add: (2)]	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF _{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	[Delete: 0.289 Add: --]	[Delete: 0.289 Add: 0.290]	[Delete: 0.077 Add: (2)]	[Delete: (3) Add: (2)]	--
Endpoints	[Delete: developmental Add: --]	developmental	[Delete: none Add: developmental]	[Delete: none Add: developmental]	--

Renumber Subp. 12f. to Subp. 12k. Metolachlor ESA

Change Subp. 12k. Metolachlor ESA

CAS number: 171118-09-5

Change Year Adopted: [Delete: 2011, Add: 2023]

Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	ND	[Delete: 4,000 Add: 7,000]	[Delete: 800 Add: 1,000]	NA
RFD (mg/kg-day)	--	--	[Delete: 1.7 Add: 2.7]	[Delete: 0.17 Add: 0.27]	--
RSC	--	--	0.2	0.2	--

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short-term	Subchronic	Chronic	Cancer
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF _{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	--	[Delete: 0.077 Add: 0.074]	[Delete: 0.043 Add: 0.045]	--
Endpoints	--	--	hepatic (liver) system	hepatic (liver) system	--

Renumber Subp. 12g. to Subp. 12l. Metolachlor OXA

Change Subp. 12l. Metolachlor OXA

CAS number: 152019-73-3

Change Year Adopted: [Delete: 2011, Add: 2023]

Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	[Delete: 3,000 Add: 5,000]	[Delete: 3,000 Add: 5,000 (2)]	[Delete: 800 Add: 1,000]	NA
RFD (mg/kg-day)	--	[Delete: 1.7 Add: 2.7]	(2)	[Delete: 0.17 Add: 0.27]	--
RSC	--	0.5	(2)	0.2	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF _{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	[Delete: 0.289 Add: 0.290]	(2)	[Delete: 0.043 Add: 0.045]	--
Endpoints	--	none	none	none	--

Renumber: Subp. 12h. to Subp. 12m. Metribuzin**Renumber: Subp. 12i. to Subp. 12n. Naphthalene**For text of subpart 13, see [Minnesota Rules 4717.7860](#)**Subp. 13a. p-Nonylphenol (4-Nonylphenol)**

CAS number: 84852-15-3

Year Adopted: 2023

Volatility: Low

[Add table below for p-Nonylphenol]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	100	40	20	NA
RFD (mg/kg-day)	--	0.21	0.016	0.0049	--
RSC	--	0.2	0.2	0.2	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF_{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	0.290	0.074	0.045	--
Endpoints	--	developmental, female reproductive system	renal (kidney) system	renal (kidney) system	--

Subp. 13b. 4-tert-Octylphenol

CAS number: 140-66-9

Year Adopted: 2023

Volatility: Low

[Add table below for tert-Octylphenol]

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	100	100 (2)	100 (2)	NA
RFD (mg/kg-day)	--	0.17	(2)	(2)	--
RSC	--	0.2	(2)	(2)	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF _{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	0.290	(2)	(2)	--
Endpoints	--	developmental	developmental	developmental	--

For text of subpart 14, see [Minnesota Rules 4717.7860](#)

Subp. 14a. Perfluorobutane sulfonate (PFBS)

CAS number: [**Add:** 45187-15-3 (anion);] 375-73-5 (free acid); [**Add:** 29420-49-3 (potassium salt); 68259-10-9 (ammonium salt); 60453-92-1 (sodium salt)]

Year Adopted: [**Delete:** 2011, **Add:** 2023]

Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	[Delete: ND Add: 0.1]	[Delete: 9 Add: 0.1 (2)]	[Delete: 7 Add: 0.1 (2)]	NA
RFD (mg/kg-day)	--	[Delete: -- Add: 0.00084]	[Delete: 0.0042 Add: (2)]	[Delete: 0.0014 Add: (2)]	--
RSC	--	[Delete: -- Add: 0.5]	[Delete: 0.5 Add: (2)]	[Delete: 0.2 Add: (2)]	--
SF (per mg/kg-day)	--	--	--	--	--

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short-term	Subchronic	Chronic	Cancer
ADAF or AF _{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	[Delete: -- Add: 0.290]	[Delete: 0.245 Add: (2)]	[Delete: 0.043 Add: (2)]	--
Endpoints	--	[Delete: --, Add: thyroid (E)]	[Delete: hepatic (liver) system, hematological (blood) system, renal (kidney) system] [Add: thyroid (E)]	[Delete: hepatic (liver) system, hematological (blood) system] [Add: thyroid (E)]	--

For text of subpart 14b, see [Minnesota Rules 4717.7860](#)

Subp. 14c. Perfluorohexane sulfonate (PFHxS) and salts

CAS number: 108427-53-8; 355-46-4; 3871-99-6

Year Adopted: 2023

Volatility: Moderate

[Add the table below for Perfluorohexane sulfonate (PFHxS)]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	NA	0.047	0.047	0.047	NA
RFD (mg/kg-day)	--	0.0000097	0.0000097	0.0000097	--
RSC	--	0.5	--	--	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF _{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	*	*	*	--

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short-term	Subchronic	Chronic	Cancer
Endpoints	--	hepatic (liver) system, thyroid (E)	hepatic (liver) system, thyroid (E)	hepatic (liver) system, thyroid (E)	--

* 95th percentile water intake rates (Tables 3-1, 3-3, and 3-5 Environmental Protection Agency, Exposure Factors Handbook, 2019) or upper percentile breastmilk intake rates (Table 15-1, Environmental Protection Agency, Exposure Factors Handbook, 2011), and MDH background information.

Subp. 14d. Perfluorohexanoate (PFHxA) and salts

CAS number: 92612-52-7; 307-24-4; 21615-47-4; 2923-26-4

Year Adopted: 2023

Volatility: Nonvolatile

[Add the table below for Perfluorohexane sulfonate (PFHxA)]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	0.2	0.2 (2)	0.2 (2)	NA
RFD (mg/kg-day)	--	0.00032	(2)	(2)	--
RSC	--	0.2	(2)	(2)	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF_{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	0.290	(2)	(2)	--
Endpoints	--	developmental, thyroid (E)	developmental, thyroid (E)	developmental, thyroid (E)	--

For text of subparts 15 to 16a, see [Minnesota Rules 4717.7860](#)

Subp. 16b. Quinoline

CAS number: 91-22-5

Year Adopted: 2023

Volatility: Low

HEALTH RISK LIMITS, PROPOSED RULES

[Add the table below for Quinoline]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	ND	ND	4	0.03
RFD (mg/kg-day)	--	--	--	0.00079	--
RSC	--	--	--	0.2	--
SF (per mg/kg-day)	--	--	--	--	3
ADAF or AF _{lifetime}	--	--	--	--	10 (ADAF<2) 3 (ADAF2 to <16) 1 (ADAF16+)
Intake Rate (L/kg-day)	--	--	--	0.045	0.155 _(<2) 0.040 _(2 to <16) 0.042 ₍₁₆₊₎
Endpoints	--	--	--	hematological (blood) system, hepatic (liver) system, renal (kidney) system, respiratory system, and spleen	cancer

For text of subparts 17 and 17a, see [Minnesota Rules 4717.7860](#)

Change: Subp. 18. Tetrachloroethylene (PCE or PERC)

CAS number: 127-18-4

Year Adopted: [~~Delete:~~ 2009, **Add:** 2023]

Volatility: High

[~~Delete:~~ MCL-Based HRL: 5 µg/L]

[Add the table below for Tetrachloroethylene]

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	ND	7	7 (3)	4
RFD (mg/kg-day)	--	--	0.0026	(3)	--
RSC	--	--	0.2	(3)	--
SF (per mg/kg-day)	--	--	--	--	0.0249
ADAF or AF _{lifetime}	--	--	--	--	10 (ADAF<2) 3 (ADAF2 to <16) 1 (ADAF16+)
Intake Rate (L/kg-day)	--	--	0.074	(3)	0.155 _(<2) 0.040 _(2 to <16) 0.042 ₍₁₆₊₎
Endpoints	--	--	nervous system	nervous system	cancer

For text of subparts 18a and 18b, see [Minnesota Rules 4717.7860](#)

Subp. 18c. Toluene

CAS number: 108-88-3

Year Adopted: [Delete: 2011, Add: 2023]

Volatility: High

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	[Delete: 200 Add: 70]	[Delete: 200 (2) Add: 70 (2)]	[Delete: 200 (2) Add: 70 (2)]	NA
RFD (mg/kg-day)	--	[Delete: 0.22 Add: 0.10]	(2)	(2)	--
RSC	--	0.2	(2)	(2)	--
SF (per mg/kg-day)	--	--	--	--	--

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short-term	Subchronic	Chronic	Cancer
ADAF or AF _{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	[Delete: 0.289 Add: 0.290]	(2)	(2)	--
Endpoints	--	immune system, nervous system	immune system, nervous system	immune system, nervous system	--

For text of subparts 18d to 21a, see [Minnesota Rules 4717.7860](#)

Subp. 21b. 1,2,3-Trimethylbenzene

CAS number: 526-73-8

Year Adopted: 2023

Volatility: High

[Add the table below for 1,2,3-Trimethylbenzene]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	30	30 (2)	30 (2)	NA
RFD (mg/kg-day)	--	0.042	(2)	(2)	--
RSC	--	0.2	(2)	(2)	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF _{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	0.290	(2)	(2)	--
Endpoints	--	nervous system	nervous system	nervous system	--

Subp. 21c. 1,2,4-Trimethylbenzene

CAS number: 95-63-6

HEALTH RISK LIMITS, PROPOSED RULES

Year Adopted: 2023

Volatility: High

[Add the table below for 1,2,4-Trimethylbenzene]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	30	30 (2)	30 (2)	NA
RFD (mg/kg-day)	--	0.042	(2)	(2)	--
RSC	--	0.2	(2)	(2)	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF _{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	0.290	(2)	(2)	--
Endpoints	--	nervous system	nervous system	nervous system	--

Subp. 22. 1,3,5-Trimethylbenzene

CAS number: 108-67-8

Year Adopted: ~~2009~~, Add: 2023

Volatility: High

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	100 Add: 30	100 Add: 30 (2)]	100 Add: 30 (2)]	NA
RFD (mg/kg-day)	ND --	0.14 Add: 0.042	(2)	(2)	--
RSC	--	0.2	(2)	(2)	--
SF (per mg/kg-day)	--	--	--	--	--

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short-term	Subchronic	Chronic	Cancer
ADAF or AF _{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	[Delete: 0.289 Add: 0.290]	(2)	(2)	--
Endpoints	--	[Delete: hepatic (liver) system,] [Add: nervous system]	[Delete: hepatic (liver) system, renal (kidney) system] [Add: nervous system]	[Delete: hepatic (liver) system, renal (kidney) system] [Add: nervous system]	--

Subp. 22a. Tris(1,3-dichloroisopropyl) phosphate (TDCPP)

CAS number: 13674-87-8

Year Adopted: 2023

Volatility: Nonvolatile

[Add the table below for Tris(1,3-dichloroisopropyl) phosphate (TDCPP)]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	ND	20	8	0.8
RFD (mg/kg-day)	--	--	0.0067	0.0019	--
RSC	--	--	0.2	0.2	--
SF (per mg/kg-day)	--	--	--	--	0.13
ADAF or AF _{lifetime}	--	--	--	--	10 (ADAF<2) 3 (ADAF2 to <16) 1 (ADAF16+)

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short-term	Subchronic	Chronic	Cancer
Intake Rate (L/kg-day)	--	--	0.074	0.045	0.155 _(<2) 0.040 _(2 to <16) 0.042 ₍₁₆₊₎
Endpoints	--	--	hepatic (liver) system; kidney system	male reproductive system; renal (kidney) system	cancer

Subp. 22b. Tris(2-butoxyethyl) phosphate (TBEP)

CAS number: 78-51-3

Year Adopted: 2023

Volatility: Nonvolatile

[Add the table below for tris(2-butoxyethyl) phosphate (TBEP)]

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	30	30 (2)	30	NA
RFD (mg/kg-day)	--	0.043	(2)	0.0074	--
RSC	--	0.2	(2)	0.2	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF_{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	0.290	(2)	0.045	--
Endpoints	--	hepatic (liver) system	hepatic (liver) system	hepatic (liver) system	--

HEALTH RISK LIMITS, PROPOSED RULES

Renumber Subp. 22a. to Subp. 22c. Tris(2-chloroethyl) phosphate.

Subp. 22d. Venlafaxine

CAS number: 93413-69-5 (free base), 99300-78-4 (HCl salt)

Year Adopted: 2023

Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	10	10 (2)	10 (2)	NA
RFD (mg/kg-day)	--	0.0054	(2)	(2)	--
RSC	--	0.8	(2)	(2)	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF _{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	--	0.290	(2)	(2)	--
Endpoints	--	developmental, gastrointestinal system, male reproductive system, nervous system (E)	developmental, gastrointestinal system, male reproductive system, nervous system (E)	developmental, gastrointestinal system, male reproductive system, nervous system (E)	--

For text of subparts 23, see [Minnesota Rules 4717.7860](#)

Change Subp. 23a. Xylenes

CAS number: 1330-20-7

Year Adopted: [~~Delete: 2011~~; **Add: 2023**]

Volatility: High

HEALTH RISK LIMITS, PROPOSED RULES

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	[Delete: 800 Add: 700]	300	300 [Delete: (2)]	[Deleted: 300 (2) Add: 300 (3)]	NA
RFD (mg/kg-day)	[Delete: 1.2 Add: 1.0]	[Delete: 0.50 Add: 0.38]	[Delete: (2) Add: 0.12]	[Delete: (2) Add: (3)]	--
RSC	0.2	0.2	[Delete: (2) Add: 0.2]	[Delete: (2) Add: (3)]	--
SF (per mg/kg-day)	--	--	--	--	--
ADAF or AF _{lifetime}	--	--	--	--	--
Intake Rate (L/kg-day)	[Delete: 0.289 Add: 0.290]	[Delete: 0.289 Add: 0.290]	[Delete: (2) Add: 0.074]	[Delete: (2) Add: (3)]	--
Endpoints	nervous system	[Add: developmental,] nervous system	[Add: developmental,] nervous system, renal (kidney system]	[Add: developmental,] nervous system, renal (kidney system]	--

Other resources:

Rules Amendments Contaminants:

<https://www.health.state.mn.us/communities/environment/risk/rules/water/chemicals.html>

Health Risk Limits rules, Minnesota Rules 4717.7860 (<https://www.revisor.mn.gov/rules/4717.7860>)

1/10/2023

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