Office of the Revisor of Statutes

Administrative Rules

TITLE: Adopted Permanent Rules Relating to Health Risk Limits for Groundwater Standards

AGENCY: Department of Health

MINNESOTA RULES: Chapter 4717

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RULE APPROVED
OFFICE OF ADMINISTRATIVE HEARINGS

August 20, 2013
DATE

ADMINSTRATIVE LAW JUDGE.

The attached rules are approved for
filing with the Secretary of State

Sandy Glass-Sirany

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Senior Assistant Revisor

140452

Department of Health

Adopted Permanent Rules Relating to Health Risk Limits for Groundwater Standards

4717.7860 HEALTH RISK LIMITS TABLE.

Subpart 1. **Generally.** This table lists the health risk limits derived from methods specified in parts 4717.7830, 4717.7840, and 4717.7850. For each chemical, this table specifies:

A. the chemical name;

B. the CAS number;

C. the year the HRL was adopted;

D. the volatility classification;

E. any noncancer HRL;

F. any cancer HRL;

G. the RfD and RSC used in the derivation of any noncancer HRL;

H. the slope factor and any ADAF or $AF_{lifetime}$ used in the derivation of any cancer HRL;

I. the intake rate used in the derivation of any noncancer or cancer HRL; and

J. the health endpoints.

[For text of subp 2, see M.R.]

Subp. 3. **Acetochlor.**

CAS number: 34256-82-1
Year Adopted: 2009
Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	40	40	40 (2)	9	NA
RfD (mg/kg-day)	0.021	0.021	(2)	0.002	–
RSC	0.5	0.5	(2)	0.2	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	0.289	0.289	(2)	0.043	–
Endpoints	developmental	developmental	developmental	hepatic (liver) system, male reproductive system, nervous system, renal (kidney) system, respiratory system	–

Subp. 3a. **Acetochlor ESA.**

CAS number: 187022-11-3

Year Adopted: 2011

Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	600	600	300	NA
RfD (mg/kg-day)	–	0.37	0.23	0.075	–
RSC	–	0.5	0.2	0.2	–
SF (per mg/kg-day)	–	–	–	–	–

ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	0.289	0.077	0.043	–
Endpoints	–	thyroid (E)	thyroid (E)	thyroid (E)	–

Subp. 3b. **Acetochlor OXA.**

CAS number: 184992-44-4

Year Adopted: 2011

Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	200	200	100	NA
RfD (mg/kg-day)	–	0.12	0.077	0.026	–
RSC	–	0.5	0.2	0.2	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	0.289	0.077	0.043	–
Endpoints	–	thyroid (E)	thyroid (E)	thyroid (E)	–

Subp. 3c. **Acetone.**

CAS number: 67-64-1

Year Adopted: 2011

Volatility: Moderate

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	9,000	8,000	4,000	NA
RfD (mg/kg-day)	–	5.0	3.0	0.90	–

RSC	–	0.5	0.2	0.2	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	0.289	0.077	0.043	–
Endpoints	–	renal (kidney) system	renal (kidney) system, hematological (blood) system	renal (kidney) system, hematological (blood) system	–

Subp. 3d. **6-Acetyl-1,1,2,4,4,7-hexamethyltetraline (AHTN).**

CAS number: 21145-77-7 or 1506-02-1

Year Adopted: 2013

Volatility: Moderate

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	100	30	20	NA
RfD (mg/kg-day)	–	0.070	0.011	0.0037	–
RSC	–	0.5	0.2	0.2	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	0.289	0.077	0.043	–
Endpoints	–	hepatic (liver) system	hepatic (liver) system	hepatic (liver) system	–

Subp. 4. **Alachlor.**

CAS number: 15972-60-8

Year Adopted: 2009

Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	200	30	5	NA
RfD (mg/kg-day)	–	0.1	0.01	0.001	–
RSC	–	0.5	0.2	0.2	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	0.289	0.077	0.043	–
Endpoints	–	renal (kidney) system	hepatic (liver) system, hematological (blood) system	hepatic (liver) system, hematological (blood) system	–

Subp. 5. **Atrazine.**

CAS number: 1912-24-9

Year Adopted: 2009

Volatility: Nonvolatile

MCL-based HRL: 3 µg/L

Subp. 6. **Benzene.**

CAS number: 71-43-2

Year Adopted: 2009

Volatility: High

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	10	10	3	3 (3)	2

RfD (mg/kg-day)	0.015	0.014	0.0013	(3)	–
RSC	0.2	0.2	0.2	(3)	–
SF (per mg/kg-day)	–	–	–	–	0.055
ADAF	–	–	–	–	10 ($ADAF_{<2}$) 3 ($ADAF_{2 \text{ to } <16}$) 1 ($ADAF_{16+}$)
Intake Rate (L/kg-day)	0.289	0.289	0.077	(3)	0.137 ($_{<2}$) 0.047 ($_{2 \text{ to } <16}$) 0.039 ($_{16+}$)
Endpoints	develop-mental	hemato-logical (blood) system, immune system	hemato-logical (blood) system, immune system	hemato-logical (blood) system, immune system	cancer

Subp. 6a. **Carbamazepine.**

CAS number: 298-46-4

Year Adopted: 2013

Volatility: Nonvolatile

	Acute	**Short-term**	**Subchronic**	**Chronic**	**Cancer**
HRL (µg/L)	40	40	40 (2)	40 (2)	NA
RfD (mg/kg-day)	0.013	0.013	(2)	(2)	–
RSC	0.8	0.8	(2)	(2)	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate	0.289	0.289	(2)	(2)	–

(L/kg-day)					
Endpoints	develop-mental, nervous system	develop-mental, hematological (blood) system, hepatic (liver) system, immune system, nervous system, male reproductive system (E), female reproductive system (E), thyroid (E)	develop-mental, hematological (blood) system, hepatic (liver) system, immune system, nervous system, male reproductive system (E), female reproductive system (E), thyroid (E)	develop-mental, hematological (blood) system, hepatic (liver) system, immune system, nervous system, male reproductive system (E), female reproductive system (E), thyroid (E)	–

Subp. 6b. **Carbon tetrachloride.**

CAS number: 56-23-5

Year Adopted: 2013

Volatility: High

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	100	3	3 (2)	3 (2)	1
RfD (mg/kg-day)	0.18	0.0037	(2)	(2)	–
RSC	0.2	0.2	(2)	(2)	–
SF (per mg/kg-day)	–	–	–	–	0.07
ADAF or $AF_{lifetime}$	–	–	–	–	10 ($ADAF_{<2}$) 3 ($ADAF_{2\ to\ <16}$) 1 ($ADAF_{16+}$)

Intake Rate (L/kg-day)	0.289	0.289	(2)	(2)	0.137 ($_{<2}$) 0.047 ($_{2 \text{ to } <16}$) 0.039 ($_{16+}$)
Endpoints	develop-mental, hepatic (liver) system	hepatic (liver) system	hepatic (liver) system	hepatic (liver) system	cancer

Subp. 7. **Chloroform.**

CAS number: 67-66-3

Year Adopted: 2009

Volatility: High

	Acute	**Short-term**	**Subchronic**	**Chronic**	**Cancer**
HRL (µg/L)	ND	30	30 (2)	30 (2)	NA
RfD (mg/kg-day)	–	0.05	(2)	(2)	–
RSC	–	0.2	(2)	(2)	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	0.289	(2)	(2)	–
Endpoints	–	developmental, hepatic (liver) system, immune system	developmental, hepatic (liver) system, immune system, male reproductive system	developmental, hepatic (liver) system, immune system, male reproductive system	–

Subp. 8. **Cyanazine.**

CAS number: 21725-46-2

Year Adopted: 2009

Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	2	2	2	1	NA
RfD (mg/kg-day)	0.001	0.001	0.00063	0.00026	–
RSC	0.5	0.5	0.2	0.2	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	0.289	0.289	0.077	0.043	–
Endpoints	developmental	developmental	hepatic (liver) system, renal (kidney) system	None	–

Subp. 8a. **Dichlorodifluoromethane.**

CAS number: 75-71-8

Year Adopted: 2011

Volatility: High

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	ND	ND	700	NA
RfD (mg/kg-day)	–	–	–	0.15	–
RSC	–	–	–	0.2	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–

Intake Rate (L/kg-day)	–	–	–	0.043	–
Endpoints	–	–	–	None	–

Subp. 8b. **1,2-Dichloroethane.**

CAS number: 107-06-2

Year Adopted: 2013

Volatility: High

	Acute	**Short-term**	**Subchronic**	**Chronic**	**Cancer**
HRL (µg/L)	ND	200	200 (2)	60	1
RfD (mg/kg-day)	–	0.23	(2)	0.012	–
RSC	–	0.2	(2)	0.2	–
SF (per mg/kg-day)	–	–	–	–	0.091
ADAF or $AF_{lifetime}$	–	–	–	–	10 ($ADAF_{<2}$) 3 ($ADAF_{2 \text{ to } <16}$) 1 ($ADAF_{16+}$)
Intake Rate (L/kg-day)	–	0.289	(2)	0.043	0.137 ($_{<2}$) 0.047 ($_{2 \text{ to } <16}$) 0.039 ($_{16+}$)
Endpoints	–	hepatic (liver) system	hepatic (liver) system	renal (kidney) system, hepatic (liver) system	cancer

Subp. 8c. **trans-1,2-Dichloroethene.**

CAS number: 156-60-5

Year Adopted: 2013

Volatility: High

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	ND	200	40	NA
RfD (mg/kg-day)	–	–	0.091	0.0091	–
RSC	–	–	0.2	0.2	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	–	0.077	0.043	–
Endpoints	–	–	immune system	immune system	–

Subp. 8d. **1,1-Dichloroethylene.**

CAS number: 75-35-4

Year Adopted: 2011

Volatility: High

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	ND	200	200	NA
RfD (mg/kg-day)	–	–	0.090	0.046	–
RSC	–	–	0.2	0.2	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	–	0.077	0.043	–
Endpoints	–	–	hepatic (liver) system	hepatic (liver) system	–

Subp. 9. **cis 1,2-Dichloroethylene.**

CAS number: 156-59-2

Year Adopted: 2009

Volatility: High

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	70	70 (2)	50	NA
RfD (mg/kg-day)	–	0.097	(2)	0.011	–
RSC	–	0.2	(2)	0.2	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	0.289	(2)	0.043	–
Endpoints	–	hematological (blood) system	hematological (blood) system	hematological (blood) system	–

Subp. 10. **Dichloromethane.**

CAS number: 75-09-2

Year Adopted: 2009

Volatility: High

MCL-based HRL: 5 µg/L

Subp. 11. **Dieldrin.**

CAS number: 60-57-1

Year Adopted: 2009

Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	0.2	0.2	0.2 (2)	0.2	0.006
RfD (mg/kg-day)	0.0001	0.0001	(2)	0.00005	–

RSC	0.5	0.5	(2)	0.2	–
SF (per mg/kg-day)	–	–	–	–	16
$AF_{lifetime}$	–	–	–	–	2.5
Intake Rate (L/kg-day)	0.289	0.289	(2)	0.043	0.043
Endpoints	developmental	developmental, immune system, nervous system	developmental, immune system, nervous system	hepatic (liver) system, nervous system	cancer

Subp. 11a. **N,N-Diethyl-meta-toluamide (DEET).**

CAS number: 134-62-3

Year Adopted: 2013

Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	200	200 (2)	200 (2)	NA
RfD (mg/kg-day)	–	0.23	(2)	(2)	–
RSC	–	0.2	(2)	(2)	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	0.289	(2)	(2)	–
Endpoints	–	developmental, nervous system	developmental, nervous system	developmental, nervous system	–

Subp. 11b. **1,4-Dioxane.**

CAS number: 123-91-1

Year Adopted: 2013

Volatility: Low

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	ND	300	100	1
RfD (mg/kg-day)	–	–	0.12	0.025	–
RSC	–	–	0.2	0.2	–
SF (per mg/kg-day)	–	–	–	–	0.1
ADAF or $AF_{lifetime}$	–	–	–	–	10 ($ADAF_{<2}$) 3 ($ADAF_{2 \text{ to } <16}$) 1 ($ADAF_{16+}$)
Intake Rate (L/kg-day)	–	–	0.077	0.043	0.137 ($_{<2}$) 0.047 ($_{2 \text{ to } <16}$) 0.039 ($_{16+}$)
Endpoints	–	–	hepatic (liver) system, renal (kidney) system, respiratory system	hepatic (liver) system, renal (kidney) system, respiratory system	cancer

Subp. 12. **Di-(2-ethylhexyl) phthalate.**

CAS number: 117-81-7

Year Adopted: 2009

Volatility: Moderate

MCL-based HRL: 6 µg/L

Subp. 12a. **Ethylbenzene.**

CAS number: 100-41-4

Year Adopted: 2011

Volatility: High

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	50	50 (2)	50 (2)	NA
RfD (mg/kg-day)	–	0.075	(2)	(2)	–
RSC	–	0.2	(2)	(2)	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	0.289	(2)	(2)	–
Endpoints	–	hepatic (liver) system, renal (kidney) system	hepatic (liver) system, renal (kidney) system	hepatic (liver) system, renal (kidney) system	–

Subp. 12b. **Ethylene glycol.**

CAS number: 107-21-1

Year Adopted: 2011

Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	4,000	4,000	2,000	2,000	NA
RfD (mg/kg-day)	0.76	0.76	0.72	0.50	–
RSC	0.2	0.2	0.2	0.2	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–

Intake Rate (L/kg-day)	0.043	0.043	0.077	0.043	–
Endpoints	developmental	developmental	renal (kidney) system, developmental	renal (kidney) system, developmental	–

Subp. 12c. **Metolachlor and S-Metolachlor.**

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

Year Adopted: 2011

Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	400	400	300	300 (3)	NA
RfD (mg/kg-day)	0.24	0.24	0.097	(3)	–
RSC	0.5	0.5	0.2	(3)	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	0.289	0.289	0.077	(3)	–
Endpoints	developmental	developmental	none	none	–

Subp. 12d. **Metolachlor ESA.**

CAS number: 171118-09-5

Year Adopted: 2011

Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	ND	4,000	800	NA
RfD (mg/kg-day)	–	–	1.7	0.17	–

RSC	–	–	0.2	0.2	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	–	0.077	0.043	–
Endpoints	–	–	hepatic (liver) system	hepatic (liver) system	–

Subp. 12e. **Metolachlor OXA.**

CAS number: 152019-73-3

Year Adopted: 2011

Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	3,000	3,000 (2)	800	NA
RfD (mg/kg-day)	–	1.7	(2)	0.17	–
RSC	–	0.5	(2)	0.2	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	0.289	(2)	0.043	–
Endpoints	–	none	none	none	–

Subp. 12f. **Metribuzin.**

CAS number: 21087-64-9

Year Adopted: 2013

Volatility: Low

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	30	10	10 (2)	10 (2)	NA
RfD (mg/kg-day)	0.016	0.006	(2)	(2)	–
RSC	0.5	0.5	(2)	(2)	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	0.289	0.289	(2)	(2)	–
Endpoints	developmental, nervous system	thyroid (E)	thyroid (E)	thyroid (E)	–

Subp. 12g. **Naphthalene.**

CAS number: 91-20-3

Year Adopted: 2013

Volatility: Moderate

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	70	70	70 (2)	70	NA
RfD (mg/kg-day)	0.038	0.038	(2)	0.016	–
RSC	0.5	0.5	(2)	0.2	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	0.289	0.289	(2)	0.043	–
Endpoints	nervous system	nervous system	nervous system	nervous system, spleen	–

Subp. 13. **Nitrate (as N).**

CAS number: 14797-55-8

Year Adopted: 2009

Volatility: Nonvolatile

MCL-based HRL: 10,000 µg/L

Subp. 14. **Pentachlorophenol.**

CAS number: 87-86-5

Year Adopted: 2009

Volatility: Nonvolatile

MCL-based HRL: 1 µg/L

Subp. 14a. **Perfluorobutane sulfonate (PFBS).**

CAS number: 375-73-5

Year Adopted: 2011

Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	ND	9	7	NA
RfD (mg/kg-day)	–	–	0.0042	0.0014	–
RSC	–	–	0.5	0.2	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	–	0.245	0.043	–
Endpoints	–	–	hepatic (liver) system, hematological (blood) system, renal (kidney) system	hepatic (liver) system, hematological (blood) system, renal (kidney) system	–

Subp. 14b. **Perfluorobutyrate (PFBA).**

CAS number: 375-22-4

Year Adopted: 2011

Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	7	7 (2)	7 (2)	NA
RfD (mg/kg-day)	–	0.0038	(2)	(2)	–
RSC	–	0.5	(2)	(2)	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	0.289	(2)	(2)	–
Endpoints	–	hepatic (liver) system, thyroid (E)	hepatic (liver) system, thyroid (E)	hepatic (liver) system, thyroid (E)	–

Subp. 15. **Perfluorooctane sulfonate (PFOS) and salts.**

CAS number: 1763-23-1; 29081-56-9; 2795-39-3; 70225-14-8; and 29457-72-5

Year Adopted: 2009

Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	ND	ND	0.3	NA
RfD (mg/kg-day)	–	–	–	0.00008	–
RSC	–	–	–	0.2	–
SF (per mg/kg-day)	–	–	–	–	–

ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	–	–	0.049	–
Endpoints	–	–	–	developmental, hepatic (liver) system, thyroid (E)	–

Subp. 16. **Perfluorooctanoic acid (PFOA) and salts.**

CAS number: 335-67-1; 3825-26-1; 2395-00-8; 335-93-3; and 335-95-5

Year Adopted: 2009

Volatility: Nonvolatile

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	ND	ND	0.3	NA
RfD (mg/kg-day)	–	–	–	0.000077	–
RSC	–	–	–	0.2	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	–	–	0.053	–
Endpoints	–	–	–	developmental, hepatic (liver) system, immune system	–

Subp. 17. **Simazine.**

CAS number: 122-34-9

Year Adopted: 2009

Volatility: Nonvolatile

MCL-based HRL: 4 µg/L

Subp. 18. **1,1,2,2-Tetrachloroethylene.**

CAS number: 127-18-4

Year Adopted: 2009

Volatility: High

MCL-based HRL: 5 µg/L

Subp. 18a. **Toluene.**

CAS number: 108-88-3

Year Adopted: 2011

Volatility: High

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	200	200 (2)	200 (2)	NA
RfD (mg/kg-day)	–	0.22	(2)	(2)	–
RSC	–	0.2	(2)	(2)	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	0.289	(2)	(2)	–
Endpoints	–	immune system, nervous system	immune system, nervous system	immune system, nervous system	–

Subp. 18b. **1,2,4-Trichlorobenezene.**

CAS number: 120-82-1

Year Adopted: 2013

Volatility: High

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	100	100 (2)	100	4
RfD (mg/kg-day)	–	0.17	(2)	0.021	–
RSC	–	0.2	(2)	0.2	–
SF (per mg/kg-day)	–	–	–	–	0.029
ADAF or $AF_{lifetime}$	–	–	–	–	10 ($ADAF_{<2}$) 3 ($ADAF_{2 \text{ to } <16}$) 1 ($ADAF_{16+}$)
Intake Rate (L/kg-day)	–	0.289	(2)	0.043	0.137 ($_{<2}$) 0.047 ($_{2 \text{ to } <16}$) 0.039 ($_{16+}$)
Endpoints	–	hepatic (liver) system, adrenal (E), hemato-logical (blood) system	hepatic (liver) system, adrenal (E), hemato-logical (blood) system	hepatic (liver) system, adrenal (E), renal (kidney) system	cancer

Subp. 19. **1,1,1-Trichloroethane.**

CAS number: 71-55-6

Year Adopted: 2009

Volatility: High

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	ND	20,000	9,000	NA
RfD (mg/kg-day)	–	–	7	2	–
RSC	–	–	0.2	0.2	–

SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	–	0.077	0.043	–
Endpoints	–	–	hepatic (liver) system, male reproductive system	hepatic (liver) system, male reproductive system	–

Subp. 20. **1,1,2-Trichloroethylene (TCE).**

CAS number: 79-01-6

Year Adopted: 2009

Volatility: High

MCL-based HRL: 5 µg/L

Subp. 21. **2(2,4,5-Trichlorophenoxy)propionic acid (2,4,5-TP or Silvex).**

CAS number: 93-72-1

Year Adopted: 2009

Volatility: Nonvolatile

MCL-based HRL: 50 µg/L

Subp. 21a. **1,2,3-Trichloropropane.**

CAS number: 96-18-4

Year Adopted: 2013

Volatility: Moderate

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	7	7	7 (2)	7 (2)	0.003
RfD (mg/kg-day)	0.0042	0.0042	(2)	(2)	–

RSC	0.5	0.5	(2)	(2)	–
SF (per mg/kg-day)	–	–	–	–	30
ADAF or $AF_{lifetime}$	–	–	–	–	10 ($ADAF_{<2}$) 3 ($ADAF_{2 \text{ to } <16}$) 1 ($ADAF_{16+}$)
Intake Rate (L/kg-day)	0.289	0.289	(2)	(2)	0.137 ($_{<2}$) 0.047 ($_{2 \text{ to } <16}$) 0.039 ($_{16+}$)
Endpoints	develop-mental	develop-mental	develop-mental	develop-mental	cancer

Subp. 22. **1,3,5-Trimethylbenzene.**

CAS number: 108-67-8

Year Adopted: 2009

Volatility: High

	Acute	**Short-term**	**Subchronic**	**Chronic**	**Cancer**
HRL (µg/L)	ND	100	100 (2)	100 (2)	NA
RfD (mg/kg-day)	ND	0.14	(2)	(2)	–
RSC	–	0.2	(2)	(2)	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	–	0.289	(2)	(2)	–
Endpoints	–	hepatic (liver) system	hepatic (liver) system, renal (kidney) system	hepatic (liver) system, renal (kidney) system	–

Subp. 22a. **Tris(2-chloroethyl) phosphate.**

CAS number: 115-96-8

Year Adopted: 2013

Volatility: Low

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	300	200	200 (3)	5
RfD (mg/kg-day)	–	0.15	0.068	(3)	–
RSC	–	0.5	0.2	(3)	–
SF (per mg/kg-day)	–	–	–	–	0.02
ADAF or $AF_{lifetime}$	–	–	–	–	10 ($ADAF_{<2}$) 3 ($ADAF_{2 \text{ to } <16}$) 1 ($ADAF_{16+}$)
Intake Rate (L/kg-day)	–	0.289	0.077	(3)	0.137 ($_{<2}$) 0.047 ($_{2 \text{ to } <16}$) 0.039 ($_{16+}$)
Endpoints	–	renal (kidney) system, nervous system, develop-mental	renal (kidney) system	renal (kidney) system	cancer

Subp. 23. **Vinyl Chloride.**

CAS number: 75-01-4

Year Adopted: 2009

Volatility: High

	Acute	Short-term	Subchronic	Chronic	Cancer
HRL (µg/L)	ND	ND	80	10	0.2

RfD (mg/kg-day)	–	–	0.03	0.003	–
RSC	–	–	0.2	0.2	–
SF (per mg/kg-day)	–	–	–	–	1.4
$AF_{lifetime}$	–	–	–	–	1
Intake Rate (L/kg-day)	–	–	0.077	0.043	0.043
Endpoints	–	–	hepatic (liver) system	hepatic (liver) system	cancer

Subp. 23a. **Xylenes.**

CAS number: 1330-20-7

Year Adopted: 2011

Volatility: High

	Acute	**Short-term**	**Subchronic**	**Chronic**	**Cancer**
HRL (µg/L)	800	300	300 (2)	300 (2)	NA
RfD (mg/kg-day)	1.2	0.5	(2)	(2)	–
RSC	0.2	0.2	(2)	(2)	–
SF (per mg/kg-day)	–	–	–	–	–
ADAF or $AF_{lifetime}$	–	–	–	–	–
Intake Rate (L/kg-day)	0.289	0.289	(2)	(2)	–
Endpoints	nervous system	nervous system	renal (kidney) system, nervous system	renal (kidney) system, nervous system	–

[For text of subp 24, see M.R.]

REPEALER. Minnesota Rules, part 4717.7500, subparts 23, 40, 42, 66, 66a, and 86, are repealed.