

1.1 **Department of Health**1.2 **Proposed Permanent Rules Relating to Health Risk Limits for Groundwater Standards**1.3 **4717.7860 HEALTH RISK LIMITS TABLE.**1.4 *[For text of subparts 1 to 3b, see Minnesota Rules]*1.5 **Subp. 3c. Acetone.**

1.6 CAS number: 67-64-1

1.7 Year Adopted: ~~2011~~ 2023

1.8 Volatility: Moderate

	<b>Acute</b>	<b>Short-term</b>	<b>Subchronic</b>	<b>Chronic</b>	<b>Cancer</b>
1.10 <b>HRL (µg/L)</b>	ND	<del>9,000</del> <u>5,000</u>	<del>8,000</del> <u>5,000</u> (2)	<del>4,000</del> <u>3,000</u>	NA
1.11 <b>RfD</b> 1.12 <b>(mg/kg-day)</b>	--	<del>5.0</del> <u>3.1</u>	<del>3.0</del> <u>(2)</u>	<del>0.90</del> <u>0.69</u>	--
1.13 <b>RSC</b>	--	0.5	<del>0.2</del> <u>(2)</u>	0.2	--
1.14 <b>SF (per</b> 1.15 <b>mg/kg-day)</b>	--	--	--	--	--
1.16 <b>ADAF or</b> 1.17 <b>AF<sub>lifetime</sub></b>	--	--	--	--	--
1.18 <b>Intake Rate</b> 1.19 <b>(L/kg-day)</b>	--	<del>0.289</del> <u>0.290</u>	<del>0.077</del> <u>(2)</u>	<del>0.043</del> <u>0.045</u>	--
1.20 <b>Endpoints</b> 1.21 1.22 1.23 1.24	--	renal (kidney) system	renal (kidney) system; <del>hematological</del> <del>(blood) system</del>	hematological (blood) system, <u>hepatic (liver)</u> <u>system, renal</u> (kidney) system	--

1.25 *[For text of subparts 3d to 4, see Minnesota Rules]*1.26 **Subp. 4a. Aminomethylphosphonic acid (AMPA).**1.27 CAS number: 1066-51-91.28 Year Adopted: 20231.29 Volatility: Nonvolatile

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>	
2.1						
2.2	<u>HRL (µg/L)</u>	<u>ND</u>	<u>ND</u>	<u>3,000</u>	<u>1,000</u>	<u>--</u>
2.3	<u>RfD</u>	<u>--</u>	<u>--</u>	<u>0.96</u>	<u>0.32</u>	<u>--</u>
2.4	<u>(mg/kg-day)</u>					
2.5	<u>RSC</u>	<u>--</u>	<u>--</u>	<u>0.2</u>	<u>0.2</u>	<u>--</u>
2.6	<u>SF (per</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
2.7	<u>mg/kg-day)</u>					
2.8	<u>ADAF or</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
2.9	<u>AF<sub>lifetime</sub></u>					
2.10	<u>Intake Rate</u>	<u>--</u>	<u>--</u>	<u>0.074</u>	<u>0.045</u>	<u>--</u>
2.11	<u>(L/kg-day)</u>					
2.12	<u>Endpoints</u>	<u>--</u>	<u>--</u>	<u>hepatic (liver)</u>	<u>hepatic (liver)</u>	<u>--</u>
2.13				<u>system, renal</u>	<u>system, renal</u>	
2.14				<u>(kidney) system</u>	<u>(kidney) system</u>	

2.15 *[For text of subparts 5 to 6b, see Minnesota Rules]*

2.16 Subp. 6c. Benzo[a]pyrene.

2.17 CAS number: 50-32-8

2.18 Year Adopted: 2023

2.19 Volatility: Low

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>	
2.20						
2.21	<u>HRL (µg/L)</u>	<u>ND</u>	<u>0.5</u>	<u>0.5 (2)</u>	<u>0.1</u>	
2.22	<u>RfD</u>	<u>--</u>	<u>0.00031</u>	<u>(2)</u>	<u>(2)</u>	<u>--</u>
2.23	<u>(mg/kg-day)</u>					
2.24	<u>RSC</u>	<u>--</u>	<u>0.5</u>	<u>(2)</u>	<u>(2)</u>	<u>--</u>
2.25	<u>SF (per</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>1</u>
2.26	<u>mg/kg-day)</u>					
2.27	<u>ADAF or</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>10 (ADAF<sub>&lt;2</sub>)</u>
2.28	<u>AF<sub>lifetime</sub></u>					<u>3 (ADAF<sub>2 to &lt;16</sub>)</u>
2.29						<u>1 (ADAF<sub>16+</sub>)</u>
2.30						

3.1	<b><u>Intake Rate</u></b> <b><u>(L/kg-day)</u></b>	--	<u>0.290</u>	<u>(2)</u>	<u>(2)</u>	<u>0.155</u> (<2)	
3.2							
3.3							<u>0.040</u> (2 to <16)
3.4							
3.5	<b><u>Endpoints</u></b>	--	developmental,	developmental,	developmental,	<u>cancer</u>	
3.6			<u>nervous</u>	<u>nervous</u>	<u>nervous</u>		
3.7			<u>system</u>	<u>system</u>	<u>system</u>		

3.8 Subp. 6d. **Benzophenone.**3.9 CAS number: 119-61-93.10 Year Adopted: 20233.11 Volatility: Low

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>	
3.12						
3.13	<u>HRL (µg/L)</u>	<u>ND</u>	<u>900</u>	<u>100</u>	<u>100 (3)</u>	<u>NA</u>
3.14	<u>RfD</u> <u>(mg/kg-day)</u>	--	<u>0.52</u>	<u>0.053</u>	<u>(3)</u>	--
3.15						
3.16	<u>RSC</u>	--	<u>0.5</u>	<u>0.2</u>	<u>(3)</u>	--
3.17	<u>SF (per</u> <u>mg/kg-day)</u>	--	--	--	--	--
3.18						
3.19	<u>ADAF or</u> <u>AF<sub>lifetime</sub></u>	--	--	--	--	--
3.20						
3.21	<b><u>Intake Rate</u></b> <b><u>(L/kg-day)</u></b>	--	<u>0.290</u>	<u>0.074</u>	<u>(3)</u>	--
3.22						
3.23	<b><u>Endpoints</u></b>	--	<u>developmental</u>	<u>hepatic (liver)</u>	<u>hepatic (liver)</u>	--
3.24				<u>system, renal</u>	<u>system, renal</u>	
3.25				<u>(kidney) system</u>	<u>(kidney) system</u>	

3.26 Subp. 6e. **1H-Benzotriazole.**3.27 CAS number: 95-14-73.28 Year Adopted: 20233.29 Volatility: Low

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>
4.1					
4.2	<u>HRL (µg/L)</u>	<u>ND</u>	<u>20</u>	<u>20 (2)</u>	<u>NA</u>
4.3	<u>RfD</u>	<u>--</u>	<u>0.023</u>	<u>(2)</u>	<u>--</u>
4.4	<u>(mg/kg-day)</u>				
4.5	<u>RSC</u>	<u>--</u>	<u>0.2</u>	<u>(2)</u>	<u>--</u>
4.6	<u>SF (per</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
4.7	<u>mg/kg-day)</u>				
4.8	<u>ADAF or</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
4.9	<u>AF<sub>lifetime</sub></u>				
4.10	<u>Intake Rate</u>	<u>--</u>	<u>0.290</u>	<u>(2)</u>	<u>--</u>
4.11	<u>(L/kg-day)</u>				
4.12	<u>Endpoints</u>	<u>--</u>	<u>developmental</u>	<u>developmental</u>	<u>developmental</u>

4.13 Subp. 6f. Biphenyl.

4.14 CAS number: 92-52-4

4.15 Year Adopted: 2023

4.16 Volatility: Moderate

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>
4.17					
4.18	<u>HRL (µg/L)</u>	<u>400</u>	<u>100</u>	<u>100 (2)</u>	<u>10</u>
4.19	<u>RfD</u>	<u>0.58</u>	<u>0.18</u>	<u>(2)</u>	<u>--</u>
4.20	<u>(mg/kg-day)</u>				
4.21	<u>RSC</u>	<u>0.2</u>	<u>0.2</u>	<u>(2)</u>	<u>--</u>
4.22	<u>SF (per</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>0.008</u>
4.23	<u>mg/kg-day)</u>				
4.24	<u>ADAF or</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>10 (ADAF<sub>&lt;2</sub>)</u>
4.25	<u>AF<sub>lifetime</sub></u>				<u>3 (ADAF<sub>2 to &lt;16</sub>)</u>
4.26					<u>1 (ADAF<sub>16+</sub>)</u>
4.27					
4.28	<u>Intake Rate</u>	<u>0.290</u>	<u>0.290</u>	<u>(2)</u>	<u>0.155 (&lt;2)</u>
4.29	<u>(L/kg-day)</u>				<u>0.040 (2 to &lt;16)</u>
4.30					

5.1					0.042 <sub>(16+)</sub>
5.2	<b>Endpoints</b>	<u>renal</u> <u>(kidney)</u> <u>system</u>	<u>renal (kidney)</u> <u>system</u>	<u>renal (kidney)</u> <u>system</u>	<u>cancer</u>
5.3					
5.4					

5.5 Subp. ~~6e~~ 6g. **Bisphenol A (BPA).**

5.6 CAS number: 80-05-7

5.7 Year Adopted: 2015

5.8 Volatility: Nonvolatile

5.9		<b>Acute</b>	<b>Short-term</b>	<b>Subchronic</b>	<b>Chronic</b>	<b>Cancer</b>
5.10	<b>HRL (µg/L)</b>	ND	100	20	20 (3)	NA
5.11	<b>RfD</b>	--	0.16	0.0065	(3)	--
5.12	<b>(mg/kg-day)</b>					
5.13	<b>RSC</b>	--	0.2	0.2	(3)	--
5.14	<b>SF (per</b>	--	--	--	--	--
5.15	<b>mg/kg-day)</b>					
5.16	<b>ADAF or</b>	--	--	--	--	--
5.17	<b>AF<sub>lifetime</sub></b>					
5.18	<b>Intake Rate</b>	--	0.289	0.077	(3)	--
5.19	<b>(L/kg-day)</b>					
5.20	<b>Endpoints</b>	--	developmental, female reproductive system (E), hepatic (liver) system, male reproductive system (E), renal (kidney) system, thyroid (E)	hepatic (liver) system, renal (kidney) system	hepatic (liver) system, renal (kidney) system	--
5.21						
5.22						
5.23						
5.24						
5.25						
5.26						
5.27						
5.28						
5.29						
5.30						

6.1 Subp. 6h. **Bromodichloromethane.**6.2 CAS number: 75-27-46.3 Year Adopted: 20236.4 Volatility: High

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>
6.5					
6.6	<u>HRL (µg/L)</u>	<u>400</u>	<u>30</u>	<u>30 (2)</u>	<u>30</u>
6.7	<u>RfD</u>	<u>0.073</u>	<u>0.039</u>	<u>(2)</u>	<u>0.0075</u>
6.8	<u>(mg/kg-day)</u>				<u>--</u>
6.9	<u>RSC</u>	<u>0.2</u>	<u>0.2</u>	<u>(2)</u>	<u>0.2</u>
6.10	<u>SF (per</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
6.11	<u>mg/kg-day)</u>				<u>0.035</u>
6.12	<u>ADAF or</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>10 (ADAF<sub>&lt;2</sub>)</u>
6.13	<u>AF<sub>lifetime</sub></u>				<u>3 (ADAF<sub>2 to &lt;16</sub>)</u>
6.14					<u>1 (ADAF<sub>16+</sub>)</u>
6.15					
6.16	<u>Intake Rate</u>	<u>0.038</u>	<u>0.290</u>	<u>(2)</u>	<u>0.045</u>
6.17	<u>(L/kg-day)</u>				<u>0.155 (&lt;2)</u>
6.18					<u>0.040 (2 to &lt;16)</u>
6.19					<u>0.042 (16+)</u>
6.20	<u>Endpoints</u>	<u>female</u>	<u>immune</u>	<u>immune</u>	<u>hepatic (liver)</u>
6.21		<u>reproductive</u>	<u>system,</u>	<u>system,</u>	<u>system</u>
6.22		<u>system (E)</u>	<u>spleen</u>	<u>spleen</u>	<u>cancer</u>

6.23 Subp. ~~6d~~ 6i. **Butyl benzyl phthalate.**6.24 CAS number: 85-68-76.25 Year Adopted: 20156.26 Volatility: Low

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>
6.27					
6.28	<u>HRL (µg/L)</u>	<u>100</u>	<u>100</u>	<u>100 (2)</u>	<u>100 (2)</u>
					<u>NA</u>

7.1	<b>RfD</b>	0.15	0.15	(2)	(2)	--
7.2	<b>(mg/kg-day)</b>					
7.3	<b>RSC</b>	0.2	0.2	(2)	(2)	--
7.4	<b>SF (per</b>	--	--	--	--	--
7.5	<b>mg/kg-day)</b>					
7.6	<b>ADAF or</b>	--	--	--	--	--
7.7	<b>AF<sub>lifetime</sub></b>					
7.8	<b>Intake Rate</b>	0.289	0.289	(2)	(2)	--
7.9	<b>(L/kg-day)</b>					
7.10	<b>Endpoints</b>	developmental	developmental	developmental	developmental	--
7.11		(E)	(E)	(E)	(E)	

7.12 Subp. ~~6e~~ 6j. **Cadmium.**

7.13 CAS number: 7440-43-9

7.14 Year Adopted: 2015

7.15 Volatility: Nonvolatile

7.16		<b>Acute</b>	<b>Short-term</b>	<b>Subchronic</b>	<b>Chronic</b>	<b>Cancer</b>
7.17	<b>HRL (µg/L)</b>	5	1	1	0.5	NA
7.18	<b>RfD</b>	0.0077	0.0016	0.00044	0.00011	--
7.19	<b>(mg/kg-day)</b>					
7.20	<b>RSC</b>	0.2	0.2	0.2	0.2	--
7.21	<b>SF (per</b>	--	--	--	--	--
7.22	<b>mg/kg-day)</b>					
7.23	<b>ADAF or</b>	--	--	--	--	--
7.24	<b>AF<sub>lifetime</sub></b>					
7.25	<b>Intake Rate</b>	0.289	0.289	0.077	0.043	--
7.26	<b>(L/kg-day)</b>					
7.27	<b>Endpoints</b>	developmental	developmental,	developmental,	renal (kidney)	--
7.28			nervous system,	skeletal	system, skeletal	
7.29			renal (kidney)			
7.30			system			

8.1 Subp. ~~6f~~ 6k. **Carbamazepine.**

8.2 CAS number: 298-46-4

8.3 Year Adopted: 2013

8.4 Volatility: Nonvolatile

	<b>Acute</b>	<b>Short-term</b>	<b>Subchronic</b>	<b>Chronic</b>	<b>Cancer</b>	
8.5						
8.6	<b>HRL (µg/L)</b>	40	40	40 (2)	40 (2)	NA
8.7	<b>RfD</b>	0.013	0.013	(2)	(2)	--
8.8	<b>(mg/kg-day)</b>					
8.9	<b>RSC</b>	0.8	0.8	(2)	(2)	--
8.10	<b>SF (per</b>	--	--	--	--	--
8.11	<b>mg/kg-day)</b>					
8.12	<b>ADAF or</b>	--	--	--	--	--
8.13	<b>AF<sub>lifetime</sub></b>					
8.14	<b>Intake Rate</b>	0.289	0.289	(2)	(2)	--
8.15	<b>(L/kg-day)</b>					
8.16	<b>Endpoints</b>	develop-	develop-	develop-	develop-	--
8.17		mental,	mental,	mental,	mental,	
8.18		nervous	hematological	hematological	hematological	
8.19		system	(blood)	(blood)	(blood)	
8.20			system,	system,	system,	
8.21			hepatic (liver)	hepatic (liver)	hepatic (liver)	
8.22			system,	system,	system,	
8.23			immune	immune	immune	
8.24			system,	system,	system,	
8.25			nervous	nervous	nervous	
8.26			system, male	system, male	system, male	
8.27			reproductive	reproductive	reproductive	
8.28			system (E),	system (E),	system (E),	
8.29			female	female	female	
8.30			reproductive	reproductive	reproductive	
8.31			system (E),	system (E),	system (E),	
8.32			thyroid (E)	thyroid (E)	thyroid (E)	



9.1 **Subp. ~~6g~~ 6l. Carbon tetrachloride.**

9.2 CAS number: 56-23-5

9.3 Year Adopted: 2013

9.4 Volatility: High

	<b>Acute</b>	<b>Short-term</b>	<b>Subchronic</b>	<b>Chronic</b>	<b>Cancer</b>	
9.5						
9.6	<b>HRL (µg/L)</b>	100	3	3 (2)	3 (2)	1
9.7	<b>RfD</b>	0.18	0.0037	(2)	(2)	--
9.8	<b>(mg/kg-day)</b>					
9.9	<b>RSC</b>	0.2	0.2	(2)	(2)	--
9.10	<b>SF (per</b>	--	--	--	--	0.07
9.11	<b>mg/kg-day)</b>					
9.12	<b>ADAF or</b>	--	--	--	--	10 (ADAF <sub>&lt;2</sub> )
9.13	<b>AF<sub>lifetime</sub></b>					3 (ADAF <sub>2 to &lt;16</sub> )
9.14						1 (ADAF <sub>16+</sub> )
9.15						
9.16	<b>Intake Rate</b>	0.289	0.289	(2)	(2)	0.137 (<2)
9.17	<b>(L/kg-day)</b>					0.047 (2 to <16)
9.18						0.039 (16+)
9.19						
9.20	<b>Endpoints</b>	develop-	hepatic (liver)	hepatic (liver)	hepatic (liver)	cancer
9.21		ment-	system	system	system	
9.22		al,				
9.23		hepatic				
9.24		(liver)				
		system				

9.25 *[For text of subparts 7 to 8e, see Minnesota Rules]*9.26 **Subp. 8f. 1, 4-Dichlorobenzene.**9.27 CAS number: 106-46-79.28 Year Adopted: 20239.29 Volatility: High

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>
10.1					
10.2	<u>HRL (µg/L)</u>	<u>ND</u>	<u>50</u>	<u>50 (2)</u>	<u>NA</u>
10.3	<u>RfD</u>	<u>--</u>	<u>0.069</u>	<u>(2)</u>	<u>--</u>
10.4	<u>(mg/kg-day)</u>				
10.5	<u>RSC</u>	<u>--</u>	<u>0.2</u>	<u>(2)</u>	<u>--</u>
10.6	<u>SF (per</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
10.7	<u>mg/kg-day)</u>				
10.8	<u>ADAF or</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
10.9	<u>AF<sub>lifetime</sub></u>				
10.10	<u>Intake Rate</u>	<u>--</u>	<u>0.290</u>	<u>(2)</u>	<u>--</u>
10.11	<u>(L/kg-day)</u>				
10.12	<u>Endpoints</u>	<u>--</u>	<u>developmental,</u>	<u>developmental,</u>	<u>developmental,</u>
10.13			<u>hepatic (liver)</u>	<u>hepatic (liver)</u>	<u>hepatic (liver)</u>
10.14			<u>system, nervous</u>	<u>system, nervous</u>	<u>system, nervous</u>
10.15			<u>system</u>	<u>system</u>	<u>system</u>

10.16 Subp. 8f 8g. **Dichlorodifluoromethane.**

10.17 CAS number: 75-71-8

10.18 Year Adopted: 2011

10.19 Volatility: High

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>
10.20					
10.21	<u>HRL (µg/L)</u>	<u>ND</u>	<u>ND</u>	<u>700</u>	<u>NA</u>
10.22	<u>RfD</u>	<u>--</u>	<u>--</u>	<u>0.15</u>	<u>--</u>
10.23	<u>(mg/kg-day)</u>				
10.24	<u>RSC</u>	<u>--</u>	<u>--</u>	<u>0.2</u>	<u>--</u>
10.25	<u>SF (per</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
10.26	<u>mg/kg-day)</u>				
10.27	<u>ADAF or</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
10.28	<u>AF<sub>lifetime</sub></u>				
10.29	<u>Intake Rate</u>	<u>--</u>	<u>--</u>	<u>0.043</u>	<u>--</u>
10.30	<u>(L/kg-day)</u>				
10.31	<u>Endpoints</u>	<u>--</u>	<u>--</u>	<u>None</u>	<u>--</u>

11.1 Subp. ~~8g~~ 8h. **1,2-Dichloroethane.**

11.2 CAS number: 107-06-2

11.3 Year Adopted: 2013

11.4 Volatility: High

	<b>Acute</b>	<b>Short-term</b>	<b>Subchronic</b>	<b>Chronic</b>	<b>Cancer</b>	
11.5 11.6	<b>HRL (µg/L)</b>	ND	200	200 (2)	60	1
11.7 11.8	<b>RfD (mg/kg-day)</b>	--	0.23	(2)	0.012	--
11.9	<b>RSC</b>	--	0.2	(2)	0.2	--
11.10 11.11	<b>SF (per mg/kg-day)</b>	--	--	--	--	0.091
11.12 11.13 11.14 11.15	<b>ADAF or AF<sub>lifetime</sub></b>	--	--	--	--	10 (ADAF <sub>&lt;2</sub> ) 3 (ADAF <sub>2 to &lt;16</sub> ) 1 (ADAF <sub>16+</sub> )
11.16 11.17 11.18 11.19	<b>Intake Rate (L/kg-day)</b>	--	0.289	(2)	0.043	0.137 (<2) 0.047 (2 to <16) 0.039 (16+)
11.20 11.21 11.22 11.23	<b>Endpoints</b>	--	hepatic (liver) system	hepatic (liver) system	renal (kidney) system, hepatic (liver) system	cancer

11.24 Subp. ~~8h~~ 8i. **trans-1,2-Dichloroethene.**

11.25 CAS number: 156-60-5

11.26 Year Adopted: ~~2013~~ 2023

11.27 Volatility: High

	<b>Acute</b>	<b>Short-term</b>	<b>Subchronic</b>	<b>Chronic</b>	<b>Cancer</b>	
11.28 11.29	<b>HRL (µg/L)</b>	ND	ND	<del>200</del> <u>50</u>	<del>40</del> <u>9</u>	NA

12.1	<b>RfD</b>	--	--	<del>0.091</del> <u>0.020</u>	<del>0.0091</del> <u>0.0020</u>	--
12.2	<b>(mg/kg-day)</b>					
12.3	<b>RSC</b>	--	--	0.2	0.2	--
12.4	<b>SF (per</b>	--	--	--	--	--
12.5	<b>mg/kg-day)</b>					
12.6	<b>ADAF or</b>	--	--	--	--	--
12.7	<b>AF<sub>lifetime</sub></b>					
12.8	<b>Intake Rate</b>	--	--	<del>0.077</del> <u>0.074</u>	<del>0.043</del> <u>0.045</u>	--
12.9	<b>(L/kg-day)</b>					
12.10	<b>Endpoints</b>	--	--	immune system	immune system	--

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

12.12 CAS number: 75-35-4

12.13 Year Adopted: ~~2011~~ 2023

12.14 Volatility: High

12.15		<b>Acute</b>	<b>Short-term</b>	<b>Subchronic</b>	<b>Chronic</b>	<b>Cancer</b>
12.16	<b>HRL (µg/L)</b>	ND	ND	200	200	NA
12.17	<b>RfD</b>	--	--	<del>0.090</del> <u>0.069</u>	<del>0.046</del> <u>0.040</u>	--
12.18	<b>(mg/kg-day)</b>					
12.19	<b>RSC</b>	--	--	0.2	0.2	--
12.20	<b>SF (per</b>	--	--	--	--	--
12.21	<b>mg/kg-day)</b>					
12.22	<b>ADAF or</b>	--	--	--	--	--
12.23	<b>AF<sub>lifetime</sub></b>					
12.24	<b>Intake Rate</b>	--	--	<del>0.077</del> <u>0.074</u>	<del>0.043</del> <u>0.045</u>	--
12.25	<b>(L/kg-day)</b>					
12.26	<b>Endpoints</b>	--	--	hepatic (liver)	hepatic (liver)	--
12.27				system	system	

13.1 Subp. 8k. 1, 2-Dichloropropane.13.2 CAS number: 78-87-513.3 Year Adopted: 202313.4 Volatility: High

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>
13.5					
13.6	<u>HRL (µg/L)</u>	<u>ND</u>	<u>20</u>	<u>20 (2)</u>	<u>3</u>
13.7	<u>RfD</u>	<u>--</u>	<u>0.029</u>	<u>(2)</u>	<u>--</u>
13.8	<u>(mg/kg-day)</u>				
13.9	<u>RSC</u>	<u>--</u>	<u>0.2</u>	<u>(2)</u>	<u>--</u>
13.10	<u>SF (per</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>0.037</u>
13.11	<u>mg/kg-day)</u>				
13.12	<u>ADAF or</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>10</u>
13.13	<u>AF<sub>lifetime</sub></u>				<u>(ADAF<sub>&lt;2</sub>)</u>
13.14					<u>3</u>
13.15					<u>(ADAF<sub>2</sub></u>
13.16					<u>to &lt;16)</u>
13.17					<u>1</u>
13.18					<u>(ADAF<sub>16+</sub>)</u>
13.19	<u>Intake Rate</u>	<u>--</u>	<u>0.290</u>	<u>(2)</u>	<u>0.155<sub>(&lt;2)</sub></u>
13.20	<u>(L/kg-day)</u>				<u>0.040<sub>(2 to</sub></u>
13.21					<u>≤16)</u>
13.22					<u>0.042<sub>(16+)</sub></u>
13.23	<u>Endpoints</u>	<u>--</u>	<u>developmental</u>	<u>developmental</u>	<u>developmental</u>
					<u>cancer</u>

13.24 [For text of subparts 9 to 12, see Minnesota Rules]13.25 Subp. 12a. 17α-Ethinylestradiol.13.26 CAS number: 57-63-613.27 Year Adopted: 202313.28 Volatility: Nonvolatile

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>
13.29					
13.30	<u>HRL (µg/L)</u>	<u>ND</u>	<u>0.0005</u>	<u>0.0002</u>	<u>NA</u>

14.1	<b>RfD</b>	--	<u>1.7 x 10<sup>-7</sup></u>	<u>1.4 x 10<sup>-8</sup></u>	<u>1.4 x 10<sup>-8</sup></u>	--
14.2	<b>(mg/kg-day)</b>					
14.3	<b>RSC</b>	--	<u>0.8</u>	<u>0.8</u>	<u>0.8</u>	--
14.4	<b>SF (per</b>	--	--	--	--	--
14.5	<b>mg/kg-day)</b>					
14.6	<b>ADAF or</b>	--	--	--	--	--
14.7	<b>AF<sub>lifetime</sub></b>					
14.8	<b>Intake Rate</b>	--	<u>0.290</u>	<u>0.074</u>	<u>0.045</u>	--
14.9	<b>(L/kg-day)</b>					
14.10	<b>Endpoints</b>	--	<u>developmental</u>	<u>developmental</u>	<u>developmental</u>	--
14.11			<u>(E), female</u>			
14.12			<u>reproductive</u>			
14.13			<u>system (E),</u>			
14.14			<u>male</u>			
14.15			<u>reproductive</u>			
14.16			<u>system (E)</u>			

14.17 Subp. ~~12a~~ 12b. **Ethylbenzene.**

14.18 CAS number: 100-41-4

14.19 Year Adopted: ~~2011~~ 2023

14.20 Volatility: High

	<b>Acute</b>	<b>Short-term</b>	<b>Subchronic</b>	<b>Chronic</b>	<b>Cancer</b>	
14.21						
14.22	<b>HRL (µg/L)</b>	ND	<del>50</del> <u>40</u>	<del>50 (2)</del> <u>40 (2)</u>	<del>50 (2)</del> <u>40 (2)</u>	NA
14.23	<b>RfD</b>	--	<del>0.075</del> <u>0.06</u>	(2)	(2)	--
14.24	<b>(mg/kg-day)</b>					
14.25	<b>RSC</b>	--	0.2	(2)	(2)	--
14.26	<b>SF (per</b>	--	--	--	--	--
14.27	<b>mg/kg-day)</b>					
14.28	<b>ADAF or</b>	--	--	--	--	--
14.29	<b>AF<sub>lifetime</sub></b>					

15.1	<b>Intake Rate (L/kg-day)</b>	--	<del>0.289</del> <u>0.290</u>	(2)	(2)	--
15.2						
15.3	<b>Endpoints</b>	--	hepatic (liver) system, renal (kidney) system	hepatic (liver) system, renal (kidney) system	hepatic (liver) system, renal (kidney) system	--
15.4						
15.5						

15.6 Subp. ~~12b~~ 12c. **S-Ethyl-N,N-dipropylthiocarbamate (EPTC).**

15.7 CAS number: 759-94-4

15.8 Year Adopted: 2018

15.9 Volatility: Moderate

15.10		<b>Acute</b>	<b>Short-term</b>	<b>Subchronic</b>	<b>Chronic</b>	<b>Cancer</b>
15.11	<b>HRL (µg/L)</b>	300	300	90	40	NA
15.12	<b>RfD (mg/kg-day)</b>	0.16	0.16	0.033	0.0083	--
15.13						
15.14	<b>RSC</b>	0.5	0.5	0.2	0.2	--
15.15	<b>SF (per mg/kg-day)</b>	--	--	--	--	--
15.16						
15.17	<b>ADAF or AF<sub>lifetime</sub></b>	--	--	--	--	--
15.18						
15.19	<b>Intake Rate (L/kg-day)</b>	0.285	0.285	0.070	0.044	--
15.20						
15.21	<b>Endpoints</b>	nervous system	developmental, female reproductive system, nervous system	cardiovascular system	cardiovascular system	--
15.22						
15.23						
15.24						
15.25						

15.26 Subp. ~~12e~~ 12d. **Ethylene glycol.**

15.27 CAS number: 107-21-1

15.28 Year Adopted: ~~2011~~ 2023

15.29 Volatility: Nonvolatile

	<b>Acute</b>	<b>Short-term</b>	<b>Subchronic</b>	<b>Chronic</b>	<b>Cancer</b>	
16.1						
16.2	<b>HRL (µg/L)</b>	4,000 <u>ND</u>	4,000 <u>2,000</u>	2,000	2,000	NA
16.3	<b>RfD</b>	0.76 <u>--</u>	0.76 <u>0.33</u>	0.72 <u>(2)</u>	0.50 <u>(2)</u>	--
16.4	<b>(mg/kg-day)</b>					
16.5	<b>RSC</b>	0.2 <u>--</u>	0.2	0.2 <u>(2)</u>	0.2 <u>(2)</u>	--
16.6	<b>SF (per</b>	--	--	--	--	--
16.7	<b>mg/kg-day)</b>					
16.8	<b>ADAF or</b>	--	--	--	--	--
16.9	<b>AF<sub>lifetime</sub></b>					
16.10	<b>Intake Rate</b>	0.043 <u>--</u>	0.043 <u>0.038</u>	0.077 <u>(2)</u>	0.043 <u>(2)</u>	--
16.11	<b>(L/kg-day)</b>					
16.12	<b>Endpoints</b>	<del>developmental</del>	developmental	developmental,	developmental,	--
16.13		--		renal (kidney)	<u>male</u>	
16.14			system		<u>reproductive</u>	
16.15					<u>system, renal</u>	
16.16					(kidney) system	

16.17 Subp. ~~12d~~ 12e. **Fluoranthene.**

16.18 CAS number: 206-44-0

16.19 Year Adopted: 2018

16.20 Volatility: Low

	<b>Acute</b>	<b>Short-term</b>	<b>Subchronic</b>	<b>Chronic</b>	<b>Cancer</b>	
16.21						
16.22	<b>HRL (µg/L)</b>	ND	ND	200	70	NA
16.23	<b>RfD</b>	--	--	0.053	0.016	--
16.24	<b>(mg/kg-day)</b>					
16.25	<b>RSC</b>	--	--	0.2	0.2	--
16.26	<b>SF (per</b>	--	--	--	--	--
16.27	<b>mg/kg-day)</b>					
16.28	<b>ADAF or</b>	--	--	--	--	--
16.29	<b>AF<sub>lifetime</sub></b>					



17.1	<b>Intake Rate</b>	--	--	0.070	0.044	--
17.2	<b>(L/kg-day)</b>					
17.3	<b>Endpoints</b>	--	--	hepatic (liver)	hepatic (liver)	--
17.4				system, renal	system, renal	
17.5				(kidney) system	(kidney) system	

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

17.7 CAS number: 86-73-7

17.8 Year Adopted: 2023

17.9 Volatility: Moderate

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>	
17.10						
17.11	<u>HRL (µg/L)</u>	<u>ND</u>	<u>ND</u>	<u>200</u>	<u>80</u>	<u>NA</u>
17.12	<u>RfD</u>	--	--	<u>0.058</u>	<u>0.018</u>	--
17.13	<u>(mg/kg-day)</u>					
17.14	<u>RSC</u>	--	--	<u>0.2</u>	<u>0.2</u>	--
17.15	<u>SF (per</u>	--	--	--	--	--
17.16	<u>mg/kg-day)</u>					
17.17	<u>ADAF or</u>	--	--	--	--	--
17.18	<u>AF<sub>lifetime</sub></u>					
17.19	<u>Intake Rate</u>	--	--	<u>0.074</u>	<u>0.045</u>	--
17.20	<u>(L/kg-day)</u>					
17.21	<u>Endpoints</u>	--	--	<u>hematological</u>	<u>hematological</u>	--
17.22				<u>(blood)</u>	<u>(blood)</u>	
17.23				<u>system, spleen</u>	<u>system,</u>	
17.24					<u>spleen</u>	

17.25 Subp. 12g. Fomesafen.

17.26 CAS number: 72178-02-0

17.27 Year Adopted: 2023

17.28 Volatility: Nonvolatile

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>	
17.29						
17.30	<u>HRL (µg/L)</u>	<u>ND</u>	<u>200</u>	<u>200 (2)</u>	<u>20</u>	<u>NA</u>

18.1	<b><u>RfD</u></b>	--	<u>0.12</u>	<u>(2)</u>	<u>0.005</u>	--
18.2	<b><u>(mg/kg-day)</u></b>					
18.3	<b><u>RSC</u></b>	--	<u>0.5</u>	<u>(2)</u>	<u>0.2</u>	--
18.4	<b><u>SF (per</u></b>	--	--	--	--	--
18.5	<b><u>mg/kg-day)</u></b>					
18.6	<b><u>ADAF or</u></b>	--	--	--	--	--
18.7	<b><u>AF<sub>lifetime</sub></u></b>					
18.8	<b><u>Intake Rate</u></b>	--	<u>0.290</u>	<u>(2)</u>	<u>0.045</u>	--
18.9	<b><u>(L/kg-day)</u></b>					
18.10	<b><u>Endpoints</u></b>	--	<u>developmental,</u>	<u>developmental,</u>	<u>hepatic</u>	--
18.11			<u>hepatic (liver)</u>	<u>hepatic (liver)</u>	<u>(liver) system</u>	
18.12			<u>system, immune</u>	<u>system,</u>		
18.13			<u>system</u>	<u>immune</u>		
18.14				<u>system</u>		

18.15 Subp. 12h. Imidacloprid.

18.16 CAS number: 138261-41-3

18.17 Year Adopted: 2023

18.18 Volatility: Nonvolatile

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>
18.20	<u>100</u>	<u>2</u>	<u>2 (2)</u>	<u>2 (2)</u>	<u>NA</u>
18.21	<u>0.15</u>	<u>0.0036</u>	<u>(2)</u>	<u>(2)</u>	--
18.22					
18.23	<u>0.2</u>	<u>0.2</u>	<u>(2)</u>	<u>(2)</u>	--
18.24	--	--	--	--	--
18.25					
18.26	--	--	--	--	--
18.27					
18.28	<u>0.290</u>	<u>0.290</u>	<u>(2)</u>	<u>(2)</u>	--
18.29					
18.30	<u>nervous system</u>	<u>immune system</u>	<u>immune</u>	<u>immune</u>	--
18.31			<u>system</u>	<u>system</u>	

19.1 Subp. 12i. Manganese.19.2 CAS number: 7439-96-519.3 Year Adopted: 202319.4 Volatility: Nonvolatile

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>
19.5					
19.6	<u>HRL (µg/L)</u>	<u>ND</u>	<u>100</u>	<u>ND</u>	<u>NA</u>
19.7	<u>RfD</u>	<u>--</u>	<u>0.083</u>	<u>--</u>	<u>--</u>
19.8	<u>(mg/kg-day)</u>				
19.9	<u>RSC</u>	<u>--</u>	<u>0.5</u>	<u>--</u>	<u>--</u>
19.10	<u>SF (per</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
19.11	<u>mg/kg-day)</u>				
19.12	<u>ADAF or</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
19.13	<u>AF<sub>lifetime</sub></u>				
19.14	<u>Intake Rate</u>	<u>--</u>	<u>0.290</u>	<u>--</u>	<u>--</u>
19.15	<u>(L/kg-day)</u>				
19.16	<u>Endpoints</u>	<u>--</u>	<u>developmental,</u>	<u>--</u>	<u>--</u>
19.17			<u>nervous system</u>		

19.18 Subp. ~~12e~~ 12j. Metolachlor and S-Metolachlor.19.19 CAS number: 51218-45-2; 87392-12-919.20 Year Adopted: ~~2011~~ 202319.21 Volatility: Nonvolatile

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>	
19.22						
19.23	<u>HRL (µg/L)</u>	<u>400 ND</u>	<u>400 300</u>	<u>300 (2)</u>	<u>300 (3) (2)</u>	<u>NA</u>
19.24	<u>RfD</u>	<u>0.24 --</u>	<u>0.24 0.19</u>	<u>0.097 (2)</u>	<u>(3) (2)</u>	<u>--</u>
19.25	<u>(mg/kg-day)</u>					
19.26	<u>RSC</u>	<u>0.5 --</u>	<u>0.5</u>	<u>0.2 (2)</u>	<u>(3) (2)</u>	<u>--</u>
19.27	<u>SF (per</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>	
19.28	<u>mg/kg-day)</u>					

20.1	<b>ADAF or</b>	--	--	--	--	--
20.2	<b>AF<sub>lifetime</sub></b>					
20.3	<b>Intake Rate</b>	<del>0.289</del> --	<del>0.289</del> <u>0.290</u>	<del>0.077</del> (2)	<del>(3)</del> (2)	--
20.4	<b>(L/kg-day)</b>					
20.5	<b>Endpoints</b>	<del>developmental</del> --	developmental	<del>none</del>	<del>none</del>	--
20.6				<u>developmental</u>	<u>developmental</u>	

20.7 Subp. ~~12f~~ 12k. **Metolachlor ESA.**

20.8 CAS number: 171118-09-5

20.9 Year Adopted: ~~2011~~ 2023

20.10 Volatility: Nonvolatile

	<b>Acute</b>	<b>Short-term</b>	<b>Subchronic</b>	<b>Chronic</b>	<b>Cancer</b>	
20.11						
20.12	<b>HRL (µg/L)</b>	ND	ND	<del>4,000</del> <u>7,000</u>	<del>800</del> <u>1,000</u>	NA
20.13	<b>RfD</b>	--	--	<del>1.7</del> <u>2.7</u>	<del>0.17</del> <u>0.27</u>	--
20.14	<b>(mg/kg-day)</b>					
20.15	<b>RSC</b>	--	--	0.2	0.2	--
20.16	<b>SF (per</b>	--	--	--	--	--
20.17	<b>mg/kg-day)</b>					
20.18	<b>ADAF or</b>	--	--	--	--	--
20.19	<b>AF<sub>lifetime</sub></b>					
20.20	<b>Intake Rate</b>	--	--	<del>0.077</del> <u>0.074</u>	<del>0.043</del> <u>0.045</u>	--
20.21	<b>(L/kg-day)</b>					
20.22	<b>Endpoints</b>	--	--	hepatic (liver)	hepatic (liver)	--
20.23				system	system	

20.24 Subp. ~~12g~~ 12l. **Metolachlor OXA.**

20.25 CAS number: 152019-73-3

20.26 Year Adopted: ~~2011~~ 2023

20.27 Volatility: Nonvolatile

	<b>Acute</b>	<b>Short-term</b>	<b>Subchronic</b>	<b>Chronic</b>	<b>Cancer</b>
21.1					
21.2	ND	<del>3,000</del> <u>5,000</u>	<del>3,000</del> <u>5,000</u>	<del>800</del> <u>1,000</u>	NA
21.3			(2)		
21.4	--	<del>1.7</del> <u>2.7</u>	(2)	<del>0.17</del> <u>0.27</u>	--
21.5					
21.6	--	0.5	(2)	0.2	--
21.7	--	--	--	--	--
21.8					
21.9	--	--	--	--	--
21.10					
21.11	--	<del>0.289</del> <u>0.290</u>	(2)	<del>0.043</del> <u>0.045</u>	--
21.12					
21.13	--	none	none	none	--

21.14 Subp. ~~12h~~ 12m. **Metribuzin.**

21.15 CAS number: 21087-64-9

21.16 Year Adopted: 2013

21.17 Volatility: Low

	<b>Acute</b>	<b>Short-term</b>	<b>Subchronic</b>	<b>Chronic</b>	<b>Cancer</b>
21.18					
21.19	30	10	10 (2)	10 (2)	NA
21.20	0.016	0.006	(2)	(2)	--
21.21					
21.22	0.5	0.5	(2)	(2)	--
21.23	--	--	--	--	--
21.24					
21.25	--	--	--	--	--
21.26					
21.27	0.289	0.289	(2)	(2)	--
21.28					
21.29	developmental,	thyroid (E)	thyroid (E)	thyroid (E)	--
21.30	nervous system				

22.1 Subp. ~~12i~~ 12n. **Naphthalene.**

22.2 CAS number: 91-20-3

22.3 Year Adopted: 2013

22.4 Volatility: Moderate

	<b>Acute</b>	<b>Short-term</b>	<b>Subchronic</b>	<b>Chronic</b>	<b>Cancer</b>	
22.5 22.6	<b>HRL (µg/L)</b>	70	70	70 (2)	70	NA
22.7 22.8	<b>RfD (mg/kg-day)</b>	0.038	0.038	(2)	0.016	--
22.9	<b>RSC</b>	0.5	0.5	(2)	0.2	--
22.10 22.11	<b>SF (per mg/kg-day)</b>	--	--	--	--	--
22.12 22.13	<b>ADAF or AF<sub>lifetime</sub></b>	--	--	--	--	--
22.14 22.15	<b>Intake Rate (L/kg-day)</b>	0.289	0.289	(2)	0.043	--
22.16 22.17	<b>Endpoints</b>	nervous system	nervous system	nervous system	nervous system, spleen	--

22.18 *[For text of subpart 13, see Minnesota Rules]*22.19 Subp. 13a. **p-Nonylphenol (4-Nonylphenol).**

22.20 CAS number: 84852-15-3

22.21 Year Adopted: 2023

22.22 Volatility: Low

	<b><u>Acute</u></b>	<b><u>Short-term</u></b>	<b><u>Subchronic</u></b>	<b><u>Chronic</u></b>	<b><u>Cancer</u></b>	
22.23 22.24	<b><u>HRL (µg/L)</u></b>	<u>ND</u>	<u>100</u>	<u>40</u>	<u>20</u>	<u>NA</u>
22.25 22.26	<b><u>RfD (mg/kg-day)</u></b>	--	<u>0.21</u>	<u>0.016</u>	<u>0.0049</u>	--
22.27	<b><u>RSC</u></b>	--	<u>0.2</u>	<u>0.2</u>	<u>0.2</u>	--
22.28 22.29	<b><u>SF (per mg/kg-day)</u></b>	--	--	--	--	--

23.1	<u>ADAF or</u>	==	==	==	==	==
23.2	<u>AF<sub>lifetime</sub></u>					
23.3	<u>Intake Rate</u>	==	<u>0.290</u>	<u>0.074</u>	<u>0.045</u>	==
23.4	<u>(L/kg-day)</u>					
23.5	<u>Endpoints</u>	==	<u>developmental,</u>	<u>renal (kidney)</u>	<u>renal (kidney)</u>	==
23.6			<u>female</u>	<u>system</u>	<u>system</u>	
23.7			<u>reproductive</u>			
23.8			<u>system</u>			

23.9 Subp. 13b. 4-tert-Octylphenol.

23.10 CAS number: 140-66-9

23.11 Year Adopted: 2023

23.12 Volatility: Low

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>
23.13					
23.14	<u>HRL (µg/L)</u>	<u>ND</u>	<u>100</u>	<u>100 (2)</u>	<u>NA</u>
23.15	<u>RfD</u>	==	<u>0.17</u>	<u>(2)</u>	==
23.16	<u>(mg/kg-day)</u>				
23.17	<u>RSC</u>	==	<u>0.2</u>	<u>(2)</u>	==
23.18	<u>SF (per</u>	==	==	==	==
23.19	<u>mg/kg-day)</u>				
23.20	<u>ADAF or</u>	==	==	==	==
23.21	<u>AF<sub>lifetime</sub></u>				
23.22	<u>Intake Rate</u>	==	<u>0.290</u>	<u>(2)</u>	==
23.23	<u>(L/kg-day)</u>				
23.24	<u>Endpoints</u>	==	<u>developmental</u>	<u>developmental</u>	<u>developmental</u>

23.25 *[For text of subpart 14, see Minnesota Rules]*

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

23.27 CAS number: 45187-15-3; 375-73-5; 29420-49-3; 68259-10-9; 60453-92-1

23.28 Year Adopted: ~~2011~~ 2023

23.29 Volatility: Nonvolatile

	<b>Acute</b>	<b>Short-term</b>	<b>Subchronic</b>	<b>Chronic</b>	<b>Cancer</b>	
24.1						
24.2	<b>HRL (µg/L)</b>	ND	<del>ND</del> <u>0.1</u>	<del>9</del> <u>0.1 (2)</u>	<del>7</del> <u>0.1 (2)</u>	NA
24.3	<b>RfD</b>	--	<del>--</del> <u>0.000084</u>	<del>0.0042</del> <u>(2)</u>	<del>0.0014</del> <u>(2)</u>	--
24.4	<b>(mg/kg-day)</b>					
24.5	<b>RSC</b>	--	<del>--</del> <u>0.5</u>	<del>0.5</del> <u>(2)</u>	<del>0.2</del> <u>(2)</u>	--
24.6	<b>SF (per</b>	--	--	--	--	--
24.7	<b>mg/kg-day)</b>					
24.8	<b>ADAF or</b>	--	--	--	--	--
24.9	<b>AF<sub>lifetime</sub></b>					
24.10	<b>Intake Rate</b>	--	<del>--</del> <u>0.290</u>	<del>0.245</del> <u>(2)</u>	<del>0.043</del> <u>(2)</u>	--
24.11	<b>(L/kg-day)</b>					
24.12	<b>Endpoints</b>	--	<del>--</del> <u>thyroid (E)</u>	<del>hepatic (liver)</del> <del>system;</del> <del>hematological</del> <del>(blood) system;</del> <del>renal (kidney)</del> <del>system</del> <u>thyroid</u> <u>(E)</u>	<del>hepatic (liver)</del> <del>system;</del> <del>hematological</del> <del>(blood) system;</del> <del>renal (kidney)</del> <del>system</del> <u>thyroid</u> <u>(E)</u>	--
24.13						
24.14						
24.15						
24.16						
24.17						
24.18						

24.19 *[For text of subpart 14b, see Minnesota Rules]*

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

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

24.22 Year Adopted: 2023

24.23 Volatility: Moderate

	<b><u>Acute</u></b>	<b><u>Short-term</u></b>	<b><u>Subchronic</u></b>	<b><u>Chronic</u></b>	<b><u>Cancer</u></b>	
24.24						
24.25	<b><u>HRL (µg/L)</u></b>	<u>NA</u>	<u>0.047</u>	<u>0.047</u>	<u>NA</u>	
24.26	<b><u>RfD</u></b>	--	<u>0.0000097</u>	<u>0.0000097</u>	<u>0.0000097</u>	--
24.27	<b><u>(mg/kg-day)</u></b>					
24.28	<b><u>RSC</u></b>	--	<u>0.5</u>	--	--	--
24.29	<b><u>SF (per</u></b>	--	--	--	--	--
24.30	<b><u>mg/kg-day)</u></b>					
24.31	<b><u>ADAF or</u></b>	--	--	--	--	--
24.32	<b><u>AF<sub>lifetime</sub></u></b>					



25.1	<b><u>Intake Rate</u></b>	--	*	*	*	--
25.2	<b><u>(L/kg-day)</u></b>					
25.3	<b><u>Endpoints</u></b>	--	<u>hepatic (liver)</u>	<u>hepatic (liver)</u>	<u>hepatic (liver)</u>	--
25.4			<u>system, thyroid</u>	<u>system, thyroid</u>	<u>system, thyroid</u>	
25.5			<u>(E)</u>	<u>(E)</u>	<u>(E)</u>	

25.6 \* 95th percentile water intake rates (Tables 3-1, 3-3, and 3-5 Environmental Protection  
 25.7 Agency, Exposure Factors Handbook, 2019) or upper percentile breast milk intake rates  
 25.8 (Table 15-1, Environmental Protection Agency, Exposure Factors Handbook, 2011), and  
 25.9 MDH background information.

25.10 Subp. 14d. **Perfluorohexanoate (PFHxA) and salts.**

25.11 CAS number: 92912-52-7; 307-24-4; 21615-47-4; 2923-26-4

25.12 Year Adopted: 2023

25.13 Volatility: Nonvolatile

	<b><u>Acute</u></b>	<b><u>Short-term</u></b>	<b><u>Subchronic</u></b>	<b><u>Chronic</u></b>	<b><u>Cancer</u></b>	
25.14						
25.15	<b><u>HRL (µg/L)</u></b>	<u>ND</u>	<u>0.2</u>	<u>0.2 (2)</u>	<u>0.2 (2)</u>	<u>NA</u>
25.16	<b><u>RfD</u></b>	--	<u>0.00032</u>	<u>(2)</u>	<u>(2)</u>	--
25.17	<b><u>(mg/kg-day)</u></b>					
25.18	<b><u>RSC</u></b>	--	<u>0.2</u>	<u>(2)</u>	<u>(2)</u>	--
25.19	<b><u>SF (per</u></b>	--	--	--	--	--
25.20	<b><u>mg/kg-day)</u></b>					
25.21	<b><u>ADAF or</u></b>	--	--	--	--	--
25.22	<b><u>AF<sub>lifetime</sub></u></b>					
25.23	<b><u>Intake Rate</u></b>	--	<u>0.290</u>	<u>(2)</u>	<u>(2)</u>	--
25.24	<b><u>(L/kg-day)</u></b>					
25.25	<b><u>Endpoints</u></b>	--	<u>developmental,</u>	<u>developmental,</u>	<u>developmental,</u>	--
25.26			<u>thyroid (E)</u>	<u>thyroid (E)</u>	<u>thyroid (E)</u>	

25.27 [For text of subparts 15 to 16a, see Minnesota Rules]

26.1 Subp. 16b. Quinoline.26.2 CAS number: 91-22-526.3 Year Adopted: 202326.4 Volatility: Low

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>
26.5					
26.6	<u>HRL (µg/L)</u>	<u>ND</u>	<u>ND</u>	<u>4</u>	<u>0.03</u>
26.7	<u>RfD</u>	<u>==</u>	<u>==</u>	<u>0.00079</u>	<u>==</u>
26.8	<u>(mg/kg-day)</u>				
26.9	<u>RSC</u>	<u>==</u>	<u>==</u>	<u>0.2</u>	<u>==</u>
26.10	<u>SF (per</u>	<u>==</u>	<u>==</u>	<u>==</u>	<u>3</u>
26.11	<u>mg/kg-day)</u>				
26.12	<u>ADAF or</u>	<u>==</u>	<u>==</u>	<u>==</u>	<u>10 (ADAF<sub>&lt;2</sub>)</u>
26.13	<u>AF<sub>lifetime</sub></u>				<u>3 (ADAF<sub>2 to &lt;16</sub>)</u>
26.14					<u>1 (ADAF<sub>16+</sub>)</u>
26.15					
26.16	<u>Intake Rate</u>	<u>==</u>	<u>==</u>	<u>0.045</u>	<u>0.155 (&lt;2)</u>
26.17	<u>(L/kg-day)</u>				<u>0.040 (2 to &lt;16)</u>
26.18					<u>0.042 (16+)</u>
26.19	<u>Endpoints</u>	<u>==</u>	<u>==</u>	<u>==</u>	<u>cancer</u>
26.20				<u>hematological</u>	
26.21				<u>(blood)</u>	
26.22				<u>system,</u>	
26.23				<u>hepatic (liver)</u>	
26.24				<u>system, renal</u>	
26.25				<u>(kidney)</u>	
26.26				<u>system,</u>	
26.27				<u>respiratory</u>	
26.28				<u>system, and</u>	
				<u>spleen</u>	

26.29 [For text of subparts 17 and 17a, see Minnesota Rules]

27.1 Subp. 18. ~~1,1,2,2-Tetrachloroethylene~~ (PCE or PERC).

27.2 CAS number: 127-18-4

27.3 Year Adopted: ~~2009~~ 2023

27.4 Volatility: High

27.5 ~~MCL-based HRL: 5 µg/L~~

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>
27.6					
27.7	<u>HRL (µg/L)</u>	<u>ND</u>	<u>ND</u>	<u>7 (3)</u>	<u>4</u>
27.8	<u>RfD</u>	<u>--</u>	<u>--</u>	<u>(3)</u>	<u>--</u>
27.9	<u>(mg/kg-day)</u>				
27.10	<u>RSC</u>	<u>--</u>	<u>--</u>	<u>(3)</u>	<u>--</u>
27.11	<u>SF (per</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>0.0249</u>
27.12	<u>mg/kg-day)</u>				
27.13	<u>ADAF or</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>10</u>
27.14	<u>AF<sub>lifetime</sub></u>				<u>(ADAF<sub>2</sub>)</u>
27.15					<u>3</u>
27.16					<u>(ADAF<sub>2</sub></u>
27.17					<u>to &lt;16)</u>
27.18					<u>1</u>
27.19					<u>(ADAF<sub>16+</sub>)</u>
27.20	<u>Intake Rate</u>	<u>--</u>	<u>--</u>	<u>0.074</u>	<u>0.155 (&lt;2)</u>
27.21	<u>(L/kg-day)</u>				<u>0.040 (2 to</u>
27.22					<u>&lt;16)</u>
27.23					<u>0.042</u>
27.24					<u>(16+)</u>
27.25	<u>Endpoints</u>	<u>--</u>	<u>--</u>	<u>nervous system</u>	<u>nervous system</u>
					<u>cancer</u>

27.26 *[For text of subparts 18a and 18b, see Minnesota Rules]*27.27 Subp. 18c. **Toluene.**

27.28 CAS number: 108-88-3

27.29 Year Adopted: ~~2011~~ 2023

27.30 Volatility: High

	<b>Acute</b>	<b>Short-term</b>	<b>Subchronic</b>	<b>Chronic</b>	<b>Cancer</b>	
28.1						
28.2	<b>HRL (µg/L)</b>	ND	<del>200</del> <u>70</u>	<del>200 (2)</del> <u>70 (2)</u>	<del>200 (2)</del> <u>70 (2)</u>	NA
28.3	<b>RfD</b>	--	<del>0.22</del> <u>0.10</u>	(2)	(2)	--
28.4	<b>(mg/kg-day)</b>					
28.5	<b>RSC</b>	--	0.2	(2)	(2)	--
28.6	<b>SF (per</b>	--	--	--	--	--
28.7	<b>mg/kg-day)</b>					
28.8	<b>ADAF or</b>	--	--	--	--	--
28.9	<b>AF<sub>lifetime</sub></b>					
28.10	<b>Intake Rate</b>	--	<del>0.289</del> <u>0.290</u>	(2)	(2)	--
28.11	<b>(L/kg-day)</b>					
28.12	<b>Endpoints</b>	--	immune system,	immune system,	immune system,	--
28.13			nervous system	nervous system	nervous system	

28.14 *[For text of subparts 18d to 21a, see Minnesota Rules]*

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

28.16 CAS number: 526-73-8

28.17 Year Adopted: 2023

28.18 Volatility: High

	<b><u>Acute</u></b>	<b><u>Short-term</u></b>	<b><u>Subchronic</u></b>	<b><u>Chronic</u></b>	<b><u>Cancer</u></b>	
28.19						
28.20	<b><u>HRL (µg/L)</u></b>	<u>ND</u>	<u>30</u>	<u>30 (2)</u>	<u>30 (2)</u>	<u>NA</u>
28.21	<b><u>RfD</u></b>	--	<u>0.042</u>	<u>(2)</u>	<u>(2)</u>	--
28.22	<b><u>(mg/kg-day)</u></b>					
28.23	<b><u>RSC</u></b>	--	<u>0.2</u>	<u>(2)</u>	<u>(2)</u>	--
28.24	<b><u>SF (per</u></b>	--	--	--	--	--
28.25	<b><u>mg/kg-day)</u></b>					
28.26	<b><u>ADAF or</u></b>	--	--	--	--	--
28.27	<b><u>AF<sub>lifetime</sub></u></b>					
28.28	<b><u>Intake Rate</u></b>	--	<u>0.290</u>	<u>(2)</u>	<u>(2)</u>	--
28.29	<b><u>(L/kg-day)</u></b>					
28.30	<b><u>Endpoints</u></b>	--	<u>nervous system</u>	<u>nervous system</u>	<u>nervous system</u>	--

29.1 Subp. 21c. 1,2,4-Trimethylbenzene.29.2 CAS number: 95-63-629.3 Year Adopted: 202329.4 Volatility: High

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>	
29.5						
29.6	<u>HRL (µg/L)</u>	<u>ND</u>	<u>30</u>	<u>30 (2)</u>	<u>30 (2)</u>	<u>NA</u>
29.7	<u>RfD</u>	<u>--</u>	<u>0.042</u>	<u>(2)</u>	<u>(2)</u>	<u>--</u>
29.8	<u>(mg/kg-day)</u>					
29.9	<u>RSC</u>	<u>--</u>	<u>0.2</u>	<u>(2)</u>	<u>(2)</u>	<u>--</u>
29.10	<u>SF (per</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
29.11	<u>mg/kg-day)</u>					
29.12	<u>ADAF or</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
29.13	<u>AF<sub>lifetime</sub></u>					
29.14	<u>Intake Rate</u>	<u>--</u>	<u>0.290</u>	<u>(2)</u>	<u>(2)</u>	<u>--</u>
29.15	<u>(L/kg-day)</u>					
29.16	<u>Endpoints</u>	<u>--</u>	<u>nervous system</u>	<u>nervous system</u>	<u>nervous system</u>	<u>--</u>

29.17 Subp. 22. 1,3,5-Trimethylbenzene.29.18 CAS number: 108-67-829.19 Year Adopted: ~~2009~~ 202329.20 Volatility: High

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>	
29.21						
29.22	<u>HRL (µg/L)</u>	<u>ND</u>	<del>100</del> <u>30</u>	<del>100 (2)</del> <u>30 (2)</u>	<del>100 (2)</del> <u>30 (2)</u>	<u>NA</u>
29.23	<u>RfD</u>	<del>ND</del> <u>--</u>	<del>0.14</del> <u>0.042</u>	<u>(2)</u>	<u>(2)</u>	<u>--</u>
29.24	<u>(mg/kg-day)</u>					
29.25	<u>RSC</u>	<u>--</u>	<u>0.2</u>	<u>(2)</u>	<u>(2)</u>	<u>--</u>
29.26	<u>SF (per</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
29.27	<u>mg/kg-day)</u>					
29.28	<u>ADAF or</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
29.29	<u>AF<sub>lifetime</sub></u>					

30.1	<b>Intake Rate</b>	--	<del>0.289</del> <u>0.290</u>	(2)	(2)	--
30.2	<b>(L/kg-day)</b>					
30.3	<b>Endpoints</b>	--	hepatic (liver) system nervous system	hepatic (liver) system, renal (kidney) system nervous system	hepatic (liver) system, renal (kidney) system nervous system	--
30.4						
30.5						
30.6						
30.7						
30.8						

30.9 Subp. 22a. **Tris(1,3-dichloro-2-propyl) phosphate (TDCPP)**

30.10 CAS number: 13674-87-8

30.11 Year Adopted: 2023

30.12 Volatility: Nonvolatile

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>
30.13					
30.14	<u>HRL (µg/L)</u>	<u>ND</u>	<u>ND</u>	<u>20</u>	<u>0.8</u>
30.15	<u>RfD</u>	--	--	<u>0.0067</u>	<u>0.0019</u>
30.16	<u>(mg/kg-day)</u>				
30.17	<u>RSC</u>	--	--	<u>0.2</u>	<u>0.2</u>
30.18	<u>SF (per</u>	--	--	--	<u>0.13</u>
30.19	<u>mg/kg-day)</u>				
30.20	<u>ADAF or</u>	--	--	--	<u>10</u>
30.21	<u>AF<sub>lifetime</sub></u>				<u>(ADAF<sub>2</sub>)</u>
30.22					<u>3</u>
30.23					<u>(ADAF<sub>2</sub></u>
30.24					<u>to &lt;16)</u>
30.25					<u>1</u>
30.26					<u>(ADAF<sub>16+</sub>)</u>
30.27	<u>Intake Rate</u>	--	--	<u>0.074</u>	<u>0.155<sub>(≤2)</sub></u>
30.28	<u>(L/kg-day)</u>				<u>0.040<sub>(2 to</sub></u>
30.29					<u>≤16)</u>
30.30					<u>0.042</u>
30.31					<u>(16+)</u>
30.32	<u>Endpoints</u>	--	--	hepatic (liver) system; kidney system	male reproductive system; renal (kidney) system
30.33					<u>cancer</u>
30.34					
30.35					

31.1 Subp. 22b. Tris(2-butoxyethyl) phosphate (TBEP)31.2 CAS number: 78-51-331.3 Year Adopted: 202331.4 Volatility: Nonvolatile

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>	
31.5 31.6	<u>HRL (µg/L)</u>	<u>ND</u>	<u>30</u>	<u>30 (2)</u>	<u>30</u>	<u>NA</u>
31.7 31.8	<u>RfD (mg/kg-day)</u>	<u>--</u>	<u>0.043</u>	<u>(2)</u>	<u>0.0074</u>	<u>--</u>
31.9	<u>RSC</u>	<u>--</u>	<u>0.2</u>	<u>(2)</u>	<u>0.2</u>	<u>--</u>
31.10 31.11	<u>SF (per mg/kg-day)</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
31.12 31.13	<u>ADAF or AF<sub>lifetime</sub></u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
31.14 31.15	<u>Intake Rate (L/kg-day)</u>	<u>--</u>	<u>0.290</u>	<u>(2)</u>	<u>0.045</u>	<u>--</u>
31.16 31.17	<u>Endpoints</u>	<u>--</u>	<u>hepatic (liver) system</u>	<u>hepatic (liver) system</u>	<u>hepatic (liver) system</u>	<u>--</u>

31.18 Subp. ~~22a~~ 22c. Tris(2-chloroethyl) phosphate.31.19 CAS number: 115-96-831.20 Year Adopted: 201331.21 Volatility: Low

	<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>	
31.22 31.23	<u>HRL (µg/L)</u>	<u>ND</u>	<u>300</u>	<u>200</u>	<u>200 (3)</u>	<u>5</u>
31.24 31.25	<u>RfD (mg/kg-day)</u>	<u>--</u>	<u>0.15</u>	<u>0.068</u>	<u>(3)</u>	<u>--</u>
31.26	<u>RSC</u>	<u>--</u>	<u>0.5</u>	<u>0.2</u>	<u>(3)</u>	<u>--</u>
31.27 31.28	<u>SF (per mg/kg-day)</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>0.02</u>

32.1	<b>ADAF or AF<sub>lifetime</sub></b>	--	--	--	--	10 (ADAF <sub>&lt;2</sub> )
32.2						
32.3						3 (ADAF <sub>2 to &lt;16</sub> )
32.4						1 (ADAF <sub>16+</sub> )
32.5	<b>Intake Rate (L/kg-day)</b>	--	0.289	0.077	(3)	0.137 (<2)
32.6						0.047 (2 to <16)
32.7						0.039 (16+)
32.8	<b>Endpoints</b>	--	renal (kidney)	renal (kidney)	renal (kidney)	cancer
32.9			system,	system	system	
32.10			nervous			
32.11			system,			
32.12			develop-			
32.13			mental			

32.14 Subp. 22d. Venlafaxine.32.15 CAS number: 93413-69-5 (free base), 93300-78-4 (HCl salt)32.16 Year Adopted: 202332.17 Volatility: Nonvolatile

32.18		<u>Acute</u>	<u>Short-term</u>	<u>Subchronic</u>	<u>Chronic</u>	<u>Cancer</u>
32.19	<u>HRL (µg/L)</u>	<u>ND</u>	<u>10</u>	<u>10 (2)</u>	<u>10 (2)</u>	<u>NA</u>
32.20	<u>RfD (mg/kg-day)</u>	--	<u>0.0054</u>	<u>(2)</u>	<u>(2)</u>	--
32.21						
32.22	<u>RSC</u>	--	<u>0.8</u>	<u>(2)</u>	<u>(2)</u>	--
32.23	<u>SF (per mg/kg-day)</u>	--	--	--	--	--
32.24						
32.25	<u>ADAF or AF<sub>lifetime</sub></u>	--	--	--	--	--
32.26						
32.27	<u>Intake Rate (L/kg-day)</u>	--	<u>0.290</u>	<u>(2)</u>	<u>(2)</u>	--
32.28						
32.29	<u>Endpoints</u>	--	<u>developmental,</u>	<u>developmental,</u>	<u>developmental,</u>	--
32.30			<u>gastrointestinal</u>	<u>gastrointestinal</u>	<u>gastrointestinal</u>	
32.31			<u>system, male</u>	<u>system, male</u>	<u>system, male</u>	
32.32			<u>reproductive</u>	<u>reproductive</u>	<u>reproductive</u>	



33.1		<u>system, nervous</u>	<u>system, nervous</u>	<u>system, nervous</u>	
33.2		<u>system (E)</u>	<u>system (E)</u>	<u>system (E)</u>	

33.3 *[For text of subpart 23, see Minnesota Rules]*

33.4 Subp. 23a. **Xylenes.**

33.5 CAS number: 1330-20-7

33.6 Year Adopted: ~~2011~~ 2023

33.7 Volatility: High

33.8		<b>Acute</b>	<b>Short-term</b>	<b>Subchronic</b>	<b>Chronic</b>	<b>Cancer</b>
33.9	<b>HRL (µg/L)</b>	<del>800</del> <u>700</u>	300	300 <del>(2)</del>	<del>300 (2)</del> <u>300</u> <u>(3)</u>	NA
33.10						
33.11	<b>RfD</b>	<del>1.2</del> <u>1.0</u>	<del>0.5</del> <u>0.38</u>	<del>(2)</del> <u>0.12</u>	<del>(2)</del> <u>(3)</u>	--
33.12	<b>(mg/kg-day)</b>					
33.13	<b>RSC</b>	0.2	0.2	<del>(2)</del> <u>0.2</u>	<del>(2)</del> <u>(3)</u>	--
33.14	<b>SF (per</b>	--	--	--	--	--
33.15	<b>mg/kg-day)</b>					
33.16	<b>ADAF or</b>	--	--	--	--	--
33.17	<b>AF<sub>lifetime</sub></b>					
33.18	<b>Intake Rate</b>	<del>0.289</del> <u>0.290</u>	<del>0.289</del> <u>0.290</u>	<del>(2)</del> <u>0.074</u>	<del>(2)</del> <u>(3)</u>	--
33.19	<b>(L/kg-day)</b>					
33.20	<b>Endpoints</b>	nervous system	<u>developmental,</u> nervous system	<u>developmental,</u> renal (kidney) system, nervous system	<u>developmental,</u> renal (kidney) system, nervous system	--
33.21						
33.22						
33.23						
33.24						
33.25						

33.26 *[For text of subpart 24, see Minnesota Rules]*

33.27 **REPEALER.** Minnesota Rules, parts 4717.7500, subparts 11, 15, 34a, 45a, 54, 58a, and

33.28 61; and 4717.7850, subpart 2, item E, are repealed.