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**Chemical Name: 1,1,1-Trichloroethane**

**CAS: 71-55-6**

**Synonyms: Methyl chloroform**

**Acute Non-Cancer Health Risk Limit (nHRL<sub>acute</sub>) = Not Derived (Insufficient Data)**

**Short-term Non-Cancer Health Risk Limit (nHRL<sub>short-term</sub>) = Not Derived (Insufficient Data)**

**Subchronic Non-Cancer Health Risk Limit (nHRL<sub>subchronic</sub>) = 20,000 ug/L**

$$= \frac{(\text{Reference Dose, mg/kg/d}) \times (\text{Relative Source Contribution}) \times (\text{Conversion Factor})}{(\text{Subchronic intake rate, L/kg/d})}$$

$$= \frac{(7 \text{ mg/kg/d}) \times (0.2) \times (1000 \text{ ug/mg})}{(0.077 \text{ L/kg-d})}$$

$$= 18,181 \text{ rounded to } \mathbf{20,000 \text{ ug/L}}$$

Reference Dose:	7 mg/kg-d (laboratory animal)
Source of Reference Dose:	EPA 2007 (IRIS)
Point of Departure (POD):	2155 mg/kg-d (BMDL <sub>10</sub> , NTP 2000)
Human Equivalent Dose Adjustment:	None (inadequate information)
Total uncertainty factor:	300
UF allocation:	10 interspecies; 10 intraspecies; 3 database insufficiencies (inadequate evaluation of neurological endpoint, identified as a sensitive endpoint in inhalation studies, in oral studies and oral reproductive/developmental studies conducted to date have not established a LOAEL)
Critical effect(s):	decreased body weight
Co-critical effect(s):	decreased relative liver weight; decreased epididymal spermatozoal concentration
Additivity endpoint(s):	Hepatic (liver) system; Male reproductive system
Secondary effect(s):	None

**Chronic Non-Cancer Health Risk Limit (nHRL<sub>chronic</sub>) = 9,000 ug/L**

$$= \frac{(\text{Reference Dose, mg/kg/d}) \times (\text{Relative Source Contribution}) \times (\text{Conversion Factor})}{(\text{Chronic intake rate, L/kg/d})}$$

$$= \frac{(2 \text{ mg/kg/d}) \times (0.2) \times (1000 \text{ ug/mg})}{(0.043 \text{ L/kg-d})}$$

$$= 9,302 \text{ rounded to } \mathbf{9,000 \text{ ug/L}}$$

Reference Dose:	2 mg/kg-d (laboratory animal)
Source of Reference Dose:	EPA 2007 (IRIS)
Point of Departure (POD):	2155 mg/kg-d (BMDL <sub>10</sub> , NTP 2000)
Human Equivalent Dose Adjustment:	Not available (inadequate information)
Total uncertainty factor:	1000
UF allocation:	10 interspecies; 10 intraspecies; 3 subchronic-to-chronic; 3 database insufficiencies (inadequate evaluation of neurological endpoint, identified as a sensitive endpoint in inhalation studies, in oral studies and oral reproductive/developmental studies conducted to date have not established a LOAEL)
Critical effect(s):	decreased body weight
Co-critical effect(s):	decreased relative liver weight; decreased epididymal spermatozoal concentration
Additivity endpoint(s):	Hepatic (liver) system; Male reproductive system
Secondary effect(s):	None

**Cancer Health Risk Limit (cHRL) = Not Applicable**

Cancer classification: "inadequate information to assess carcinogenic potential."  
Slope factor: NA (EPA 2007)  
Source of slope factor: NA

**Volatile: Yes (highly volatile)**

#### **Summary of changes since 1993/1994 HRL promulgation:**

The 1993/94 noncancer HRL (600 ug/L) was based on chronic exposure. Legislation passed in the 2007 regular session ([Chapter 147, Article 17, section 2](#)) established new Health Risk Limit (HRL) values, effective July 1, 2007, for chemicals when the federal standard determined by the United States Environmental Protection Agency (US EPA) is more stringent than the 1993/1994 HRL value. Maximum Contaminant Levels (MCLs) are federal standards adopted for regulation of public drinking water in Minnesota. However, MCLs incorporate a consideration of the costs required to reduce contaminant concentrations of a given level and the technological feasibility of reaching that level and therefore are not solely based on consideration of human health.

A comparison of 1993/94 HRL values to the current MCLs from the US EPA identified eleven chemicals, including 1,1,1-trichloroethane, that had a lower MCL value than a HRL value. The 1993/94 HRL value of 600 ug/L was revised to the MCL-based value of 200 ug/L as of July 1, 2007.

The noncancer subchronic (20,000 ug/L) and chronic HRLs (9,000 ug/L) are approximately 100 and 45 times higher, respectively, than the 2007 MCL-based HRL and 33 and 15 times higher, respectively, than the chronic 1993/94 HRL value as the result of: 1) using more recent, higher RfD values; 2) using more recent water intake rates that incorporate higher intake rates early in life; and 3) rounding to one significant digit.

**Summary of toxicity testing for health effects identified in the Health Standards Statute:**

	Endocrine	Immunotoxicity	Development	Reproductive	Neurotoxicity
Tested?	No	Yes	Yes	Yes	Yes
Effects?	--	No <sup>1</sup>	No <sup>2</sup>	Yes <sup>3</sup>	Yes <sup>4</sup>

Note: Even if testing for a specific health effect was not conducted for this chemical, information about that effect might be available from studies conducted for other purposes. Most chemicals have been subject to multiple studies in which researchers identify a dose where no effects were observed, and the lowest dose that caused one or more effects. A toxicity value based on the effect observed at the lowest dose across all available studies is considered protective of all other effects that occur at higher doses.

-- indicates that no specific tests for that effect were conducted, and that effect was not observed as a secondary effect in any other study used in the HRL evaluation.

**Comments on extent of testing or effects:**

<sup>1</sup> There are no oral immunotoxicity studies. Inhalation exposure to moderate to high concentrations did not produce effects on spleen or thymus histopathology. Based on this limited inhalation data 1,1,1-TCA may not produce toxic effects on the immune system, however, sensitive immunological endpoints have not been evaluated.

<sup>2</sup> Epidemiological studies have not observed adverse pregnancy outcome. Low level, oral exposure did not produced adverse effects in laboratory animals. Minor developmental delays, accompanied by maternal toxicity, have been reported at high inhalation doses. A database uncertainty factor to, in part, address the absence of an established LOAEL for developmental effects has been incorporated into the derivation of the subchronic and chronic RfDs.

<sup>3</sup> Epidemiological studies have not observed adverse pregnancy outcome. Decreased sperm concentrations have been observed in laboratory animals exposed to concentrations similar to the critical study LOAEL. These effects are listed as co-critical effects.

<sup>4</sup> Inhalation of 1,1,1-TCA produces central nervous system depression, increasing with exposure concentration from mild motor impairment to euphoria, unconsciousness and death. Rats given a bolus oral dose exhibited a short period of hyperactivity followed by a period of prolonged narcosis. No clinical signs of neurotoxicity were seen in rats receiving similar doses from diet or drinking water. Since these studies did not evaluate subtle neurological endpoints a database uncertainty factor was added to, in part, address this data gap.

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