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Chemical Name: cis-1,2-Dichloroethene

CAS: 156-59-2

Synonyms: cis-1,2-Dichloroethylene

Acute Non-Cancer Health Risk Limit (nHRL_{acute}) = Not Derived (Insufficient data)

Short-Term Non-Cancer Health Risk Limit (nHRL_{short-term}) = 70 ug/L

$$\begin{aligned} &= \frac{(\text{Reference Dose, mg/kg/d}) \times (\text{Relative Source Contribution}) \times (\text{Conversion Factor})}{(\text{Short-term intake rate, L/kg/d})} \\ &= \frac{(0.097 \text{ mg/kg/d}) \times (0.2) \times (1000 \text{ ug/mg})}{0.289 \text{ L/kg-d}} \\ &= \mathbf{67 \text{ rounded to } 70 \text{ ug/L}} \end{aligned}$$

Reference Dose: 0.097 mg/kg/d (laboratory animal)
Source of toxicity value: MDH, 2007
Point of Departure: 97 mg/kg/d (NOAEL) (McCauley et al., 1995)
Human Equivalent Dose Adjustment: None (inadequate information)
Total uncertainty factor: 1000
UF allocation: 10 interspecies, 10 intraspecies, 10 database deficiencies
Critical effect(s): Decreased hematocrit levels
Co-critical effect(s): Taste aversion, increased relative liver weight (however, histopathology was negative at all dose levels therefore this effect was not considered adverse)
Additivity endpoint(s): Hematologic (blood) system
Secondary effect(s): Increased relative kidney weight

Subchronic Non-Cancer Health Risk Limit (nHRL_{subchronic}) = nHRL_{short-term} = 70 ug/L

$$\begin{aligned} &= \frac{(\text{Reference Dose, mg/kg/d}) \times (\text{Relative Source Contribution}) \times (\text{Conversion Factor})}{(\text{Subchronic intake rate, L/kg/d})} \\ &= \frac{(0.032 \text{ mg/kg/d}) \times (0.2) \times (1000 \text{ ug/mg})}{(0.077 \text{ L/kg-d})} \\ &= \mathbf{83 \text{ rounded to } 80 \text{ ug/L}} \end{aligned}$$

Reference Dose: 0.032 (laboratory animal)
 Source of toxicity value: MDH, 2007
 Point of Departure: 32 (NOAEL) (McCauley et al., 1995)
 Human Equivalent Dose Adjustment: None (inadequate information)
 Total uncertainty factor: 1000
 UF allocation: 10 interspecies, 10 intraspecies, 10 database deficiencies
 Critical effect(s): Decreased hematocrit levels
 Co-critical effect(s): Decreased body weight, increased relative liver weight (however, histopathology was negative at all dose levels therefore this effect was not considered adverse)
 Additivity endpoint(s): Hematologic (blood) system
 Secondary effect(s): Significantly decreased body weight

The Subchronic nHRL must be protective of the short-term exposures that occur within the subchronic period and therefore, the Subchronic nHRL is set equal to the Short-term nHRL of 70 ug/L. Additivity Endpoints: Hematological (Blood) system.

Chronic Non-Cancer Health Risk Limit (nHRL_{chronic}) = 50 ug/L

$$\begin{aligned}
 &= \frac{(\text{Reference Dose, mg/kg/d}) \times (\text{Relative Source Contribution}) \times (\text{Conversion Factor})}{(\text{Chronic intake rate, L/kg/d})} \\
 &= \frac{(0.011 \text{ mg/kg/d}) \times (0.2) \times (1000 \text{ ug/mg})}{(0.043 \text{ L/kg-d})} \\
 &= \mathbf{51 \text{ rounded to } 50 \text{ ug/L}}
 \end{aligned}$$

Reference Dose: 0.011 (laboratory animal)
 Source of toxicity value: MDH, 2007
 Point of Departure: 32 (NOAEL) (McCauley et al., 1995)
 Human Equivalent Dose Adjustment: None (inadequate information)
 Total uncertainty factor: 3000
 UF allocation: 10 interspecies, 10 intraspecies, 10 database deficiencies, 3 subchronic-to-chronic
 Critical effect(s): Decreased hematocrit levels
 Co-critical effect(s): Decreased body weight, increased relative liver weight (however, histopathology was negative at all dose levels therefore this effect was not considered adverse)
 Additivity endpoint(s): Hematologic (blood) system
 Secondary effect(s): Significantly decreased body weight

Cancer Health Risk Limit (cHRL) = Not Applicable

Cancer classification: D; not classifiable as to human carcinogenicity
Slope factor: NA (EPA 1995)
Source of slope factor: NA
Tumor site(s): NA

Volatile: Yes (highly volatile)

Summary of changes since 1993/1994 HRL promulgation:

The chronic nHRL is 1.4-fold lower than the 1993/94 nHRL (70 ug/L) as the result of: 1) utilizing more recent intake rates which incorporate higher intake rates during early life and 2) rounding to one significant digit. Short-term and subchronic nHRLs (70 ug/L) are new values.

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

	Endocrine	Immunotoxicity	Development	Reproductive	Neurotoxicity
Tested?	No	No	No	No	Yes
Effects?	--	--	--	--	Yes ¹

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:

¹ CNS depression was observed at the upper range of the doses tested in the critical study, and the HRL was developed to be protective against these effects.

References:

Agency for Toxic Substances and Disease Registry (ATSDR). Toxicological Profile for 1,2-Dichloroethene. August 1996. <http://www.atsdr.cdc.gov/toxprofiles/tp87.html>

EPA 1995. Environmental Protection Agency. Integrated Risk Information System. cis-1,2-Dichloroethylene; CASRN 156-59-2, Summary Report. Online: <http://www.epa.gov/ncea/iris/subst/0418.htm>

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Kallman, MJ., MR Lynch, and MR Landauer (1983). Taste aversions to several halogenated hydrocarbons. *Neurobehav. Toxicol. Teratol.* 5: 23-27.

McCauley, PT, et al., 1995. The Effects of Subacute and Subchronic Oral Exposure to cis-1,2-Dichloroethylene in Sprague-Dawley Rats. *Drug and Chem Toxicology* 18 (2 & 3): 171-184.