

## 8. REGULATIONS AND ADVISORIES

The international and national regulations and guidelines regarding 1,1,2,2-tetrachloroethane in air, water, and other media are summarized in Table 8-1.

ATSDR has derived an intermediate-duration oral MRL of 0.5 mg/kg/day for 1,1,2,2-tetrachloroethane based on a liver effect (minimal hepatocyte necrosis) in female rats administered the chemical in the diet for 14 weeks (NTP 2004). The MRL was derived using benchmark dose modeling of the critical end point. The BMD corresponding to a BMR of 10% extra risk is 82.89 mg/kg/day; the corresponding BMDL<sub>10</sub> is 53.88 mg/kg/day. An uncertainty factor of 100 (10 for interspecies extrapolation and 10 for human variability) was applied to the BMDL<sub>10</sub> to calculate the MRL.

An EPA oral reference dose (RfD) and inhalation reference concentration (RfC) for 1,1,2,2-tetrachloroethane have not been derived.

The IARC classification for 1,1,2,2-tetrachloroethane is Group 3, not classifiable with regard to its carcinogenicity to humans (IARC 2004). The EPA cancer classification for 1,1,2,2-tetrachloroethane is Group C, possible human carcinogen (IRIS 2006). The National Toxicology Program has not classified 1,1,2,2-tetrachloroethane for human carcinogenicity (NTP 2005). The American Conference of Governmental Industrial Hygienists (ACGIH) has classified 1,1,2,2-tetrachloroethane as an A3 carcinogen (confirmed animal carcinogen with unknown relevance to humans) (ACGIH 2005).

OSHA requires employers of workers who are occupationally exposed to 1,1,2,2-tetrachloroethane to institute engineering controls and work practices to reduce and maintain employee exposure at or below permissible exposure limits (PEL) (OSHA 2006c). The employer must use engineering and work practice controls to reduce exposure to or below an 8-hour time-weighted average (TWA) of 5 ppm (OSHA 2006c). Respirators must be provided and used during the time period necessary to install or implement feasible engineering and work practice controls (OSHA 2006c). ACGIH (2005) and NIOSH (2005) recommend a TWA exposure limit of 1 ppm for occupational exposure.

1,1,2,2-Tetrachloroethane is regulated by the Clean Water Effluent Guidelines as stated in Title 40, Section 400–475, of the Code of Federal Regulations. For each point source category, 1,1,2,2-tetrachloroethane may be regulated as one of a group of chemicals controlled as Total Toxic Organics, or may

## 8. REGULATIONS AND ADVISORIES

have a Zero Discharge Limitation. The point source categories for which 1,1,2,2-tetrachloroethane is controlled as a Total Toxic Organic include electroplating, metal finishing, and coil coating; see electronic Code of Federal Regulations for a complete listing (NARA 2006).

EPA regulates 1,1,2,2-tetrachloroethane under the Clean Air Act (CAA) and has designated it as a hazardous air pollutant (HAP) (EPA 2006a). 1,1,2,2-Tetrachloroethane is on the list of chemicals appearing in "The Emergency Planning and Community Right-to-Know Act of 1986" (EPCRA) (EPA 2006c) and has been assigned a reportable quantity (RQ) limit of 100 pounds (EPA 2006b). The RQ represents the amount of a designated hazardous substance which, when released to the environment, must be reported to the appropriate authority.

## 8. REGULATIONS AND ADVISORIES

**Table 8-1. Regulations and Guidelines Applicable to 1,1,2,2-Tetrachloroethane**

Agency	Description	Information	Reference
<u>INTERNATIONAL</u>			
Guidelines:			
IARC	Carcinogenicity classification	Group 3 <sup>a</sup>	IARC 2004
WHO	Air quality guidelines	No data	WHO 2000
	Drinking water quality guidelines	No data	WHO 2004
<u>NATIONAL</u>			
Regulations and Guidelines:			
a. Air			
ACGIH	TLV (8-hour TWA)	1 ppm <sup>b</sup>	ACGIH 2005
EPA	AEGL	No data	EPA 2006a
	Hazardous air pollutant	Yes	EPA 2006a 42 USC 7412
NIOSH	REL (10-hour TWA)	1 ppm <sup>c,d</sup>	NIOSH 2005
	IDLH	100 ppm <sup>c</sup>	
OSHA	PEL (8-hour TWA) for general industry	5 ppm <sup>e</sup>	OSHA 2006c 29 CFR 1910.1000
	PEL (8-hour TWA) for construction industry	5 ppm <sup>e</sup>	OSHA 2006b 29 CFR 1926.55, Appendix A
	PEL (8-hour TWA) for shipyard industry	5 ppm <sup>e</sup>	OSHA 2006a 29 CFR 1915.1000
b. Water			
DOT	Marine pollutant	Yes	DOT 2005 9 CFR 172.101, Appendix B
EPA	Drinking water standards and health advisories		EPA 2004
	1-day health advisory for a 10-kg child	0.04 mg/L	
	10-day health advisory for a 10-kg child	0.04 mg/L	
	DWEL	0.002 mg/L	
	Lifetime	3x10 <sup>-4</sup> mg/L	
	10 <sup>-4</sup> Cancer risk	0.02 mg/L	
	National primary drinking water standards	No data	EPA 2003
	Toxics criteria for those states not complying with Clean Water Act Section 303(c)(2)(B) for human health (10 <sup>-6</sup> risk for carcinogens) for consumption of:		EPA 2006g 40 CFR 131.36
	Water + organism	0.17 µg/L	
	Organism only	11 µg/L	

## 8. REGULATIONS AND ADVISORIES

**Table 8-1. Regulations and Guidelines Applicable to 1,1,2,2-Tetrachloroethane**

Agency	Description	Information	Reference
<u>NATIONAL</u> (cont.)			
EPA	Water quality criteria for human health consumption of:		EPA 2006d
	Water + organism	0.17 µg/L	
	Organism only	4 µg/L	
c. Food			
FDA	Bottled drinking water	No data	FDA 2005 21 CFR 165.110
d. Other			
ACGIH	Carcinogenicity classification	A3 <sup>f</sup>	ACGIH 2005
EPA	Carcinogenicity classification	Group C <sup>g</sup>	IRIS 2006
	Oral slope factor	2x10 <sup>-1</sup> per mg/kg/day	
	Inhalation unit risk	5.8x10 <sup>-5</sup> per µg/m <sup>3</sup>	
	RfC	No data	
	RfD	No data	
	Identification and listing of hazardous waste; hazardous waste number	U209	EPA 2006c 40 CFR 261, Appendix VIII
	Superfund, emergency planning, and community right-to-know		
	Designated CERCLA hazardous substance	Yes	EPA 2006b 40 CFR 302.4
	Reportable quantity	100 pounds	
	Effective date of toxic chemical release reporting	01/01/87	EPA 2006d 40 CFR 372.65
NTP	Carcinogenicity classification	No data	NTP 2005

<sup>a</sup>Group 3: not classifiable as to carcinogenicity to humans

<sup>b</sup>Skin notation: refers to the potential significant contribution to the overall exposure by the cutaneous route, including mucous membranes and the eyes, either by contact with vapors, liquids, or solids.

<sup>c</sup>Potential occupational carcinogen

<sup>d</sup>Skin designation: indicates the potential for dermal absorption; skin exposure should be prevented as necessary through the use of good work practices, gloves, coveralls, goggles, and other appropriate equipment.

<sup>e</sup>Skin designation

<sup>f</sup>A3: confirmed animal carcinogen with unknown relevance to humans

<sup>g</sup>Group C: possible human carcinogen

ACGIH = American Conference of Governmental Industrial Hygienists; AEGL = Acute Exposure Guideline Level; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; CFR = Code of Federal Regulations; DOT = Department of Transportation; DWEL = drinking water equivalent level; EPA = Environmental Protection Agency; FDA = Food and Drug Administration; IARC = International Agency for Research on Cancer; IDLH = immediately dangerous to life or health; IRIS = Integrated Risk Information System; MCL = maximum contaminant level; MCLG = maximum contaminant level goal; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = permissible exposure limit; REL = recommended exposure limit; RfC = inhalation reference concentration; RfD = oral reference dose; STEL = short-term exposure limit; TLV = threshold limit values; TWA = time-weighted average; USC = United States Code; WHO = World Health Organization