

## 7. REGULATIONS AND ADVISORIES

The international, national, and state regulations and guidelines regarding trichloroethylene in air, water, and other media are summarized in Table 7- 1.

Trichloroethylene is on the list of chemicals appearing in “Toxic Chemicals Subject to Section 3 13 of the Emergency Planning and Community Right-to-Know Act of 1986” (EPA 1987i, 19%).

ATSDR has derived an acute-duration inhalation MRL of 2 ppm with an uncertainty factor of 30 based on neurological effects in humans (Stewart et al. 1970) and an intermediate-duration inhalation MRL of 0.1 ppm with an uncertainty factor of 300 based on neurological effects in rats (Arito et al. 1994a). An acute-duration oral MRL of 0.2 mg/kg/day with an uncertainty factor of 300 was derived based on developmental effects in mice (Fredriksson et al. 1993).

The oral reference dose (RfD) for trichloroethylene is currently under review by an EPA Workgroup (IRIS 1996). No inhalation reference concentration (RfC) has been derived (IRIS 1996). The National Center for Environmental Assessment, EPA has begun an effort to reassess the health risks associated with trichloroethylene.

In 1988, the Scientific Advisory Board for the EPA offered an opinion that the weight-of-evidence was on a C-B2 continuum (possible-probable human carcinogen). The cancer classification is currently under review by EPA (IRIS 1996).

Trichlorethylene has been nominated for listing in the National Toxicology Program (NTP) 9th Report on Carcinogens. Evaluation of this substance by the NTP review committees is ongoing (NTP 1997)

IARC designates trichloroethylene as Group 2A, or probably carcinogenic to humans (IARC 1995).

**Table 7-1. Regulations and Guidelines Applicable to Trichloroethylene**

Agency	Description	Information	References
<u>INTERNATIONAL</u>			
IARC	Carcinogenic classification	Group 2 <sup>a</sup>	IARC 1995
WHO	TWA	135 mg/m <sup>3</sup>	WHO 1981
	Ceiling limit value (15 minutes)	1000 mg/m <sup>3</sup>	WHO 1981
	Drinking water guidance level based on a carcinogenic end point	30 µg/L	WHO 1984
<u>NATIONAL</u>			
Regulations:			
a. Air:			
OSHA	PEL TWA	100 ppm	OSHA 1993
	STEL	300 ppm	OSHA 1993
b. Water:			
EPA ODW	MCL in drinking water (final)	0.005 mg/L	IRIS 1996
	Regulated under SDWA of 1986	Yes	FSTRAC 1990
c. Food:			
FDA	Indirect food additive for use only as a component of adhesives	Yes	FDA 1977a (21 CFR 175.105), 1977b
d. Other:			
EPA OERR	Reportable quantity	1000 pounds	EPA 1985a (40 CFR 302), 1986a (40 CFR 117), 1987h
	Proposed	100 pounds	
EPA OSW	Designated as a hazardous substance under Section 311(b)(2)(A) of the Federal Water Pollution Control Act	Yes	EPA 1978a (40 CFR 116.4), 1978b
	Designated as a toxic pollutant under Section 307(a)(1) of the Federal Water Pollution Control Act	Yes	EPA 1979c
	When used as a spent solvent, listed as a hazardous waste from nonspecific sources	Yes	EPA 1981c (40 CFR 261.13); EPA 1981e
	Listing as a hazardous waste: Column bottoms or heavy ends from the combined production of PCE and TCE	Yes	EPA 1981d (40 CFR 261.32); EPA 1981e

**Table 7-1. Regulations and Guidelines Applicable to Trichloroethylene (continued)**

Agency	Description	Information	References
<u>NATIONAL (contd.)</u>			
	Listing as a hazardous waste: Discarded commercial chemical products off-specification species, container residues, and spill residues thereof	Yes	EPA 1981b (40 CFR 261.33); EPA 1980b
	Listing as a Hazardous Constituent	Yes	EPA 1988a (40 CFR 261, Appendix VIII); EPA 1988b
	Listing as hazardous air pollutant under Section 112(b)(1) of the Clean Air Act	Yes	CAAA 1990
	Groundwater monitoring requirement	Yes	EPA 1987b (40 CFR 264, Appendix IX); EPA 1987f
EPA OTS	Toxic Chemical Release Reporting; Community Right-to-Know	Yes	EPA 1988c (40 CFR 372); EPA 1987i
Guidelines:			
a. Air:			
NIOSH	TWA	Lowest concentration feasible	NIOSH 1994b
ACGIH	TLV TWA	50 ppm	ACGIH 1996
	STEL	100 ppm	ACGIH 1996
	Carcinogenic classification	Group A5 <sup>b</sup>	ACGIH 1996
	Biological Exposure Index:		ACGIH 1996
	In urine at end of workweek	100 mg/L	
	In urine at end of shift at end of workweek	300 mg/L 4 mg/L	
	Free TCE in blood at end of shift at end of workweek	0.5 ppm	
	In end-exhaled air prior to last shift of workweek		
b. Water:			
EPA ODW	MCLG	0	EPA 1989b
	MCLG Category	I	EPA 1987g
	Health Advisories	No data	IRIS 1996
	Drinking Water Equivalent Level	0.26 mg/L	EPA 1987c

**Table 7-1. Regulations and Guidelines Applicable to Trichloroethylene (continued)**

Agency	Description	Information	References
<u>NATIONAL (contd.)</u>			
NAS	SNARL 24 hours 7 days	105 mg/L 15 mg/L	NAS 1980
EPA OWRS	Ambient Water Quality Criteria for Protection of Human Health <sup>c</sup>  Ingesting water and organisms: 10 <sup>-5</sup> 10 <sup>-6</sup> 10 <sup>-7</sup>  Ingesting organisms only: 10 <sup>-5</sup> 10 <sup>-6</sup> 10 <sup>-7</sup>	27 µg/L 2.7 µg/L 0.27 µg/L  807 µg/L 80.7 µg/L 8.07 µg/L	EPA 1991
c. Other: EPA	RfD (oral) Carcinogenic Classification <sup>d</sup> Unit risk (air) Unit risk (water)	Under review Under review Under review Under review	IRIS 1996 IRIS 1996 IRIS 1996 IRIS 1996
<u>STATE</u>			
Regulations and Guidelines:			
a. Air:	Acceptable Ambient Air Concentration (70 years)		NATICH 1994
Arizona	(1 hour) (24 hours) (1 year) (70 years)	11000 µg/m <sup>3</sup> 280 µg/m <sup>3</sup> 0.76 µg/m <sup>3</sup> 0.05 µg/m <sup>3</sup>	
Connecticut	(8 hours)	1350 µg/m <sup>3</sup>	
Florida	(8 hours) (1 year)	2700 µg/m <sup>3</sup> 0.77 µg/m <sup>3</sup>	
Illinois	(1 year)	0.588 µg/m <sup>3</sup>	
Indiana	(8 hours) (1 year)	2670 µg/m <sup>3</sup> 0.59 µg/m <sup>3</sup>	
Kansas	(1 year)	0.588 µg/m <sup>3</sup>	
Louisiana	(1 year)	58.8 µg/m <sup>3</sup>	
Maine	(1 year)	0.20 µg/m <sup>3</sup>	
Michigan	(1 year)	0.60 µg/m <sup>3</sup>	

**Table 7-1. Regulations and Guidelines Applicable to Trichloroethylene (continued)**

Agency	Description	Information	References
<u>STATE (contd.)</u>			
North Carolina	(1 year)	0.059 mg/m <sup>3</sup>	
North Dakota	(1 hour)	10700 µg/m <sup>3</sup>	
North Dakota	(8 hours)	2700 µg/m <sup>3</sup>	
Nevada	(8 hours)	6430 µg/m <sup>3</sup>	
New York	(1 year)	900 µg/m <sup>3</sup>	
Oklahoma	(24 hours)	13400 µg/m <sup>3</sup>	
Pennsylvania	(1 year)	76.9 µg/m <sup>3</sup>	
	(1 year)	6840 µg/m <sup>3</sup>	
	(1 year)	1200 ppb	
Rhode Island	(1 year)	0.30 µg/m <sup>3</sup>	
South Carolina	(24 hours)	6750 µg/m <sup>3</sup>	
South Dakota	(8 hours)	2700 µg/m <sup>3</sup>	
Texas	(30 minutes)	1350 µg/m <sup>3</sup>	
	(1 year)	135 µg/m <sup>3</sup>	
Vermont	(1 year)	0.42 µg/m <sup>3</sup>	
Virginia	(24 hours)	4500 µg/m <sup>3</sup>	
Washington	(1 year)	0.80 µg/m <sup>3</sup>	
Wisconsin	(24 hours)	6480 µg/m <sup>3</sup>	
Kentucky	Significant emission levels of toxic air pollutants	0.06889 pounds/hour	NREPC 1986 (401 KAR 63.021)
New Jersey	Emissions are prohibited unless equipment or operation is registered within 6 months of effective date	Yes	CELDS 1990
	Emissions are prohibited from source operations unless they are:		CELDS 1990
New Jersey (contd.)	Above grade	>40 feet	
	Higher than any human use area	>20 feet	
	Occupancy within	50 feet	
	Directed vertically upward at a discharge velocity of:	>3600 feet/minute	

**Table 7-1. Regulations and Guidelines Applicable to Trichloroethylene (continued)**

Agency	Description	Information	References
<u>STATE (contd.)</u>			
Wisconsin	Hazardous air contaminants with acceptable ambient concentrations: Emission points <25 feet Emission points $\geq$ 25 feet	22.485 pounds/hour 94.4160 pounds/hour	WAC 1988
b. Water:	Drinking water quality guidelines and standards		FSTRAC 1990
Alabama		5 $\mu$ g/L	
Arizona		3.2 $\mu$ g/L	
California		5 $\mu$ g/L	
Connecticut		5 $\mu$ g/L	
Florida		3 $\mu$ g/L	
Maine		5 $\mu$ g/L	
Minnesota		31.2 $\mu$ g/L	
New Hampshire		2.8 $\mu$ g/L	
New Jersey		1 $\mu$ g/L	
Rhode Island		5 $\mu$ g/L	
Vermont		5 $\mu$ g/L	
	MCL for Drinking Water		CELDS 1990
Alabama		0.005 mg/L	
North Dakota		0.005 mg/L	
Puerto Rico		50 ppb	
Texas		0.005 mg/L	
Oklahoma	MAL for Drinking Water	0.005 mg/L	CELDS 1990
Utah	Groundwater Quality Standards	0.005 mg/L	CELDS 1990
Washington, D.C.	Water Quality Standards		CELDS 1990
	Class C waters protected for aquatic life, waterfowl, shore birds, and water-oriented wildlife	1000 mg/L	

**Table 7-1. Regulations and Guidelines Applicable to Trichloroethylene (continued)**

Agency	Description	Information	References
<u>STATE (contd.)</u>			
	Class D waters protected for use as a raw water source for public water supply	3.0 mg/L	
Wisconsin	Public Health Groundwater Quality Standards	1.8 µg/L	WAC 1985
	Enforcement Standard	0.18 µg/L	
	Preventative Action Limit		
	Human cancer criteria		DNR 1987
	Public water supply:		
	Warm water sport fish communities	5 µg/L	
	Cold water communities	5 µg/L	
	Great Lake communities	5 µg/L	
	Nonwater supply:		DNR 1987
	Warm water sport fish communities	360 µg/L	
	Cold water communities	110 µg/L	
	Warm water forage and limited forage fish communities and limited aquatic life	3600 µg/L	

<sup>a</sup> Group 2A: Trichloroethylene is probably carcinogenic to humans.

<sup>b</sup> Group A5: Not suspected as a human carcinogen. Trichloroethylene is not suspected to be a human carcinogen on the basis of properly conducted epidemiologic studies in humans.

<sup>c</sup> Because of its carcinogenic potential, the EPA-recommended concentration for trichloroethylene in ambient water is zero. However, because attainment of this level may not be possible, levels that correspond to upper-bound incremental lifetime cancer risks of  $10^{-5}$ ,  $10^{-6}$ , and  $10^{-7}$  are estimated.

<sup>d</sup> The carcinogen classification has been withdrawn following further review by the Carcinogenicity-Risk Assessment Verification Endeavor (CRAVE) workgroup. Trichloroethylene was classified as B2, a probable human carcinogen.

ACGIH = American Conference of Governmental Industrial Hygienists; EPA = Environmental Protection Agency; FDA = Food and Drug Administration; IARC = International Agency for Research on Cancer; MAL = Maximum Allowable Level; MCL = Maximum Contaminant Level; MCLG = Maximum Contaminant Level Goal; NAS = National Academy of Sciences; NIOSH = National Institute for Occupational Safety and Health; ODW = Office of Drinking Water; OERR = Office of Emergency and Remedial Response; OSHA = Occupational Safety and Health Administration; OSW = Office of Solid Wastes; OTS = Office of Toxic Substances; OWRS = Office of Water Regulations and Standards; PCE = Tetrachloroethylene; PEL = Permissible Exposure Limit; RfD = Reference Dose; SDWA = Safe Drinking Water Act; SNARL = Suggest No-Adverse-Response Level; STEL = Short Term Exposure Limit; TCE = Trichloroethylene; TLV = Threshold Limit Value; TWA = Time-Weighted Average; WHO = World Health Organization

