

8. REGULATIONS AND ADVISORIES

Because of its potential to cause adverse health effects in exposed people, a number of regulations and advisory values have been established for carbon tetrachloride by various international, national, and state agencies. These values are summarized in Table 8-1.

ATSDR has calculated an intermediate inhalation MRL of 0.03 ppm based on a NOAEL of 5 ppm and a LOAEL of 10 ppm for liver effects in an intermediate-duration (187–192 days) inhalation study in rats exposed 7 hours/day, 5 days/week (Adams et al. 1952). The intermediate-duration MRL is expected to be protective also for acute-duration inhalation exposures. ATSDR has also calculated a chronic inhalation MRL of 0.03 ppm based on a NOAEL of 5 ppm and a LOAEL of 25 ppm for hepatic effects (increased liver weight, serum enzymes, and liver histopathology) in rats exposed for 6 hours/day, 5 days/week for 2 years (Japan Bioassay Research Center 1998; Nagano et al. 1998). ATSDR has also calculated an acute oral MRL of 0.02 mg/kg/day based on a LOAEL of 5 mg/kg/day over 10 days for minimal liver effects (vacuolar degeneration) in the rat (Smialowicz et al. 1991), and an intermediate oral MRL of 0.007 mg/kg/day based on a NOAEL of 1 mg/kg/day (0.71 mg/kg/day adjusted for intermittent exposure) and a LOAEL of 10 mg/kg/day for liver effects in rats dosed 5 days/week over 12 weeks (Bruckner et al. 1986). More information about the derivation of MRLs is found in Section 2.3 and Appendix A.

EPA has calculated a chronic oral reference dose (RfD) of 7×10^{-4} mg/kg/day for carbon tetrachloride based on a NOAEL of 1 mg/kg/day (converted to 0.71 mg/kg/day based on intermittent exposure) for rats in a 12-week study (Bruckner et al. 1986; IRIS 2003). The critical effect was liver toxicity. A subchronic oral RfD of 7×10^{-3} mg/kg/day was also calculated based on the same NOAEL used for the chronic RfD (EPA 1989b). It should be noted that EPA is currently developing new assessments for carbon tetrachloride that have not yet been released for public review.

8. REGULATIONS AND ADVISORIES

Table 8-1. Regulations and Guidelines Applicable to Carbon Tetrachloride

| Agency | Description | Information | Reference |
|-----------------------------|--|---|--|
| <u>INTERNATIONAL</u> | | | |
| Guidelines: | | | |
| IARC | Carcinogenicity classification | Group 2B ^a | IARC 1999 |
| WHO | Guideline value or tolerable concentration for air quality | 6.1 µg/m ³ | WHO 2000 |
| | Guideline for drinking water | 2 µg/L | WHO 1993 |
| <u>NATIONAL</u> | | | |
| Regulations and Guidelines: | | | |
| a. Air | | | |
| ACGIH | TLV (8-hour TWA) ^b | 5 ppm | ACGIH 2003 |
| | TLV-STEL (15-minute TWA) | 10 ppm | |
| EPA | Hazardous air pollutant pursuant to Section 112 of the Clean Air Act | Yes | EPA 2003e 40 CFR 61.01 |
| | Protection of stratospheric ozone; listed as a ozone-depleting chemical | Group IV | EPA 2003h 40 CFR 82, Subpart A, Appendix F |
| NIOSH | STEL (60-minute TWA) | 2 ppm | NIOSH 2003 |
| | IDLH | 200 ppm | |
| | Potential occupational carcinogen | Yes | |
| OSHA | PEL (8-hour TWA) for general industry | 2 mg/m ³ | OSHA 2003c 29 CFR 1910.1000, Table Z-1 |
| | PEL (8-hour TWA) | 10 ppm | OSHA 2003e |
| | Acceptable ceiling concentration | 25 ppm | 29 CFR 1910.1000, Table Z-2 |
| | Acceptable maximum peak above the acceptable ceiling concentration for an 8-hour shift | 200 ppm (maximum duration for 5 minutes in any 4 hours) | |
| | PEL (8-hour TWA) for construction industry ^c | 10 ppm | OSHA 2003f 29 CFR 1926.55, Appendix A |
| | PEL (8-hour TWA) for shipyard industry ^c | 10 ppm | OSHA 2003a 29 CFR 1915.1000 |
| USC | Hazardous air pollutant | Yes | USC 2003 42 USC 7412 |
| b. Water | | | |
| EPA | Drinking water health advisories | | EPA 2002 |
| | 1-day (10-kg child) | 4 mg/L | |
| | 10-day (10-kg child) | 0.2 mg/L | |
| | DWEL ^d | 0.03 mg/L | |
| | 10 ⁻⁴ Cancer risk ^e | 0.03 mg/L | |
| | Effluent guidelines and standards; toxic pollutants pursuant to Section 307(a)(1) of the Clean Water Act | Yes | EPA 2003c 40 CFR 401.15 |
| | Hazardous substance in accordance with Section 311 of the Clean Water Act | Yes | EPA 2003n 40 CFR 116.4 |

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| Agency | Description | Information | Reference |
|-------------------------|--|------------------------------|---|
| | National primary drinking water regulations—MCL | 5 µg/L | EPA 2003g 40 CFR 141.61 |
| NATIONAL (cont.) | | | |
| EPA | National primary drinking water regulations—MCLG | 0 µg/L | EPA 2003f 40 CFR 141.50 |
| | Pollutant of initial focus in the Great Lakes Water Quality Initiative | Yes | EPA 2003o 40 CFR 132, Table 6 |
| | Reportable quantity of hazardous substances designated pursuant to Section 311 of the Clean Water Act | 10 pounds | EPA 2003i 40 CFR 117.3 |
| c. Food | | | |
| FDA | Bottled drinking water allowable level | 5 µg/L | FDA 2003a 21 CFR 165.110 |
| | Indirect food additive; adhesives | Yes | FDA 2003b 21 CFR 175.105(c)(5) |
| | Indirect food additive; paper and paperboard components; anti-offset substances | Yes | FDA 2003c 21 CFR 176.130(c) |
| | Indirect food additive; components of paper and paperboard in contact with dry food | Yes | FDA 2003d 21 CFR 176.180(b)(2) |
| | Labeling; warning statements for prescription and restricted device products containing or manufactured with chlorofluorocarbons or other ozone-depleting substances | Yes | FDA 2003f 21 CFR 801.433 |
| | Labeling; medical devices; warning statements for devices containing or manufactured with chlorofluorocarbons and other class I ozone-depleting substances | Yes | FDA 2003e 21 CFR 801.63 |
| d. Other | | | |
| ACGIH | Carcinogenicity classification | A2 ^f | ACGIH 2003 |
| EPA | Carcinogenicity classification | B2 ^g | IRIS 2003 |
| | RfC | No data | IRIS 2003 |
| | RfD (chronic oral) | 7x10 ⁻⁴ mg/kg/day | IRIS 2003 |
| | Community right-to-know; release reporting; effective date of reporting | 01/01/87 | EPA 2003m 40 CFR 372.65 |
| | Criteria for municipal solid waste landfills; hazardous constituent | Yes | EPA 2003a 40 CFR 258, Appendix II |
| | Identification and listing of hazardous waste; regulatory level of the maximum concentration of contaminants for the toxicity characteristic | 0.5 mg/L | EPA 2003d 40 CFR 261.24 |

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|-------------------------|--|--|--|
| <u>NATIONAL (cont.)</u> | | | |
| EPA | Reportable quantity; designated as a hazardous substances pursuant to Section 307 and 311 of the Clean Water Act, Section 112 of the Clean Air Act, and Section 3001 of RCRA | 10 pounds | EPA 2003b 40 CFR 302.4 |
| | Standards for owners and operators of hazardous waste TSD facilities; groundwater monitoring | Suggested Method 8010 8240 5×10^{-3} mg/kg | EPA 2003l 40 CFR 264, Appendix IX |
| | Standards for owners and operators of hazardous waste TSD facilities; health-based limits for exclusion of waste-derived residues; residue concentration limit | | EPA 2003k 40 CFR 266, Appendix VII |
| | Standards for the management of specific hazardous waste and hazardous waste management facilities; risk specific dose | 6.7×10^{-1} $\mu\text{g}/\text{m}^3$ | EPA 2003j 40 CFR 266, Appendix V |
| NTP | Carcinogenicity classification | Reasonably anticipated to be a human carcinogen | NTP 2002 |
| <u>STATE</u> | | | |
| a. Air | No data | | |
| b. Water | | | |
| Arizona | Drinking water guideline | 0.27 $\mu\text{g}/\text{L}$ | |
| California | Drinking water standard | 0.5 $\mu\text{g}/\text{L}$ | HSDB 2003 |
| Connecticut | Drinking water guideline | 5 $\mu\text{g}/\text{L}$ | HSDB 2003 |
| Florida | Drinking water standard | 3 $\mu\text{g}/\text{L}$ | HSDB 2003 |
| Maine | Drinking water guideline | 2.7 $\mu\text{g}/\text{L}$ | HSDB 2003 |
| Minnesota | Drinking water guideline | 3 $\mu\text{g}/\text{L}$ | HSDB 2003 |
| New Jersey | Drinking water standard | 2 $\mu\text{g}/\text{L}$ | HSDB 2003 |
| c. Food | No data | | |

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| <u>STATE (cont.)</u> | | | |
| d. Other | No data | | |

^aGroup 2B: possibly carcinogenic to humans

^bSkin 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 or, of probable greater significance, by direct skin contact with the substance.

^cSkin designation

^dDWEL: a lifetime exposure concentration protection of adverse, non-cancer health effects, that assumes all of the exposure to a contaminant is from drinking water.

^e10⁻² Cancer risk: the concentration of a chemical in drinking water corresponding to an excess estimated lifetime cancer risk of 1 in 10,000.

^fA2: suspected human carcinogen

^gB2: probable human carcinogen

ACGIH = American Conference of Governmental Industrial Hygienists; CFR = Code of Federal Regulations; DWEL = drinking water equivalent level; EPA = Environmental Protection Agency; FDA = Food and Drug Administration; HSDB = Hazardous Substances Data Bank; 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; PQL = practical quantitation limit; OSHA = Occupational Safety and Health Administration; PEL = permissible exposure limit; RCRA = Resource Conservation and Recovery Act; RfC = inhalation reference concentration; RfD = oral reference dose; STEL = short-term exposure limit; TLV = threshold limit values; TSD = treatment, storage, and disposal; TWA = time-weighted average; USC = United States Codes; WHO = World Health Organization