

8. REGULATIONS AND ADVISORIES

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

As discussed in Chapter 2 and Appendix A, several MRLs for naphthalene (chronic-duration inhalation, acute-duration oral, and intermediate-duration oral) and chronic-duration oral MRLs for 1-methylnaphthalene and 2-methylnaphthalene have been derived.

An MRL of 0.0007 ppm (3×10^{-3} mg/m³) for chronic inhalation exposure to naphthalene is based on a LOAEL for nasal lesions in rats (Abdo et al. 2001; NTP 2000; $\text{LOAEL}_{[\text{human equivalent concentration}]} = 0.2$ ppm), and a total uncertainty factor of 300 (10 for the use of a LOAEL, 3 for extrapolation from animals to humans using dosimetric adjustment, and 10 for human variability). An MRL of 0.6 mg/kg/day for acute oral exposure to naphthalene is based on a minimal LOAEL of 50 mg/kg/day for clinical signs of toxicity in pregnant rats and a total uncertainty factor of 90 (3 for the use of a minimal LOAEL, 10 for extrapolation from animals to humans, and 3 for human variability). The acute-duration oral MRL of 0.6 mg/kg/day is adopted as the intermediate-duration oral MRL for naphthalene.

For chronic-duration oral exposure to 1-methylnaphthalene, an MRL of 0.07 mg/kg/day was derived based on a LOAEL of 71.6 mg/kg/day for pulmonary alveolar proteinosis in female mice exposed to 1-methylnaphthalene in the diet for 81 weeks and an uncertainty factor of 1,000 (10 for using a LOAEL, 10 for extrapolating from animals to humans, and 10 for human variability).

For chronic-duration oral exposure to 2-methylnaphthalene, an MRL of 0.04 mg/kg/day was derived based on the lower 95% confidence limit on a benchmark dose associated with 5% extra risk ($\text{BMDL}_{05} = 4$ mg/kg/day) for pulmonary alveolar proteinosis in male mice exposed to 2-methylnaphthalene in the diet for 81 weeks and an uncertainty factor of 100 (10 for extrapolation from animals to humans and 10 for human variability).

The EPA calculated an oral exposure RfD of 2×10^{-2} mg/kg/day for naphthalene based on a NOAEL of 100 mg/kg/day for the absence of decreased mean terminal body weight in male rats exposed by gavage for 13 weeks (IRIS 2005; NTP 1980b). An inhalation RfC of 3×10^{-3} mg/m³ for naphthalene was derived

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based on a LOAEL of 10 ppm ($\text{LOAEL}_{[\text{human equivalent concentration}]}=9.3 \text{ mg/m}^3$) for nasal lesions in mice exposed by inhalation for 2 years (IRIS 2005; NTP 1992a).

The EPA (2003r) calculated an oral exposure RfD of 0.004 mg/kg-day for 2-methylnaphthalene based on a value of 3.5 mg/kg-day for a 95% lower confidence limit on a dose associated with 5% extra risk (BMDL_{05}) for pulmonary alveolar proteinosis in mice exposed to 2-methylnaphthalene in the diet for 81 weeks.

The EPA is currently conducting a comprehensive review of the available environmental and toxicity data of naphthalene as part of its FIFRA re-registration process. The results of this review are expected in March 2008.

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Table 8-1. Regulations and Guidelines Applicable to Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene

Agency	Description	Information	Reference
INTERNATIONAL			
Guidelines:			
IARC	Carcinogenicity classification	Group 2B ^a	IARC 2002
WHO	Drinking water guideline	No data	
NATIONAL			
Regulations and Guidelines:			
a. Air:			
ACGIH	TLV (8-hour TWA) Naphthalene ^b	10 ppm	ACGIH 2003
	STEL	15 ppm	
EPA	Hazardous air pollutant	Naphthalene	EPA 2003g 40 CFR 63, Table 1
	National emission standards for hazardous air pollutants		EPA 2003h 40 CFR 61.134
	Naphthalene processing, final coolers, and final-cooler cooling towers at coke by-product recovery plants	No (zero) emissions are allowed	
NIOSH	REL (10-hour TWA) Naphthalene	10 ppm	NIOSH 2003
	STEL	15 ppm	
	IDLH	250 ppm	
OSHA	PEL (8-hour TWA) for general industry Naphthalene	10 ppm	OSHA 2003a 29 CFR 1910.1000, Table Z-1
	PEL (8-hour TWA) for construction industry Naphthalene	10 ppm	OSHA 2003c 29 CFR 1926.55, Appendix A
	PEL (8-hour TWA) for shipyard industry Naphthalene	10 ppm	OSHA 2003b 29 CFR 1915.1000
USC	Hazardous air pollutant	Naphthalene	USC 2003 42 USC 7412
b. Water			
EPA	Drinking water health advisories		EPA 2002a
	1-day (10-kg child)	0.5 mg/L	
	10-day (10-kg child)	0.5 mg/L	
	DWEL ^c	0.7 mg/L	
	Life-time ^d	0.1 mg/L	
	Effluent guidelines and standards; toxic pollutants pursuant to Section 307(a)(1) of the Clean Water Act	Naphthalene	EPA 2003c 40 CFR 401.15
	Hazardous substance designated in accordance with Section 311 (b)(2)(A) of the Clean Water Act	Naphthalene	EPA 2003p 40 CFR 116.4

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Agency	Description	Information	Reference
<u>NATIONAL</u> (cont.)			
	Pollutants of initial focus in the Great Lakes Water Quality Initiative	Naphthalene	EPA 2003q 40 CFR 132, Table 6
	Reportable quantities of hazardous substances (naphthalene) designated pursuant to Section 311 of the Clean Water Act	100 pounds	EPA 2003j 40 CFR 117.3
c. Food	No data		
d. Other			
ACGIH	Carcinogenicity classification	A4 ^e	
EPA	Carcinogenicity classification	Group C ^f	IRIS 2005
	RfD (oral)	2.0x10 ⁻² mg/kg/day	IRIS 2005
	RfC (inhalation)	3.0x10 ⁻³ mg/m ³	IRIS 2005
	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	Naphthalene and 2-Methylnaphthalene	EPA 2003a 40 CFR 258, Appendix II
	Identification and listing of hazardous waste; hazardous waste number		EPA 2003d 40 CFR 261, Appendix VIII
	Naphthalene	U165	
	Land disposal restrictions; universal treatment standards for naphthalene		EPA 2003e 40 CFR 268.48
	Waste water standard	0.059 mg/L	
	Non-waste water standard	5.6 mg/L TCLP	
EPA	Landfills point source effluent limitations attainable by the application of the best practicable control technology currently available		EPA 2003f 40 CFR 445.11
	Maximum daily	0.059 mg/L	
	Maximum monthly average	0.022 mg/L	
	Reportable quantity of hazardous substance in accordance with Section 311 (b)(2) and 307(a) of the Clean Water Act, Section 112 of RCRA, and Section 112 of the Clean Air Act for naphthalene	100 pounds	EPA 2003b 40 CFR 302.4
	Standards for owners and operators of hazardous waste TSD facilities; groundwater monitoring	Suggested	EPA 2003k 40 CFR 264, Appendix IX
		<u>Method</u>	<u>PQL</u>
	Naphthalene	8100	200 µg/L
		8270	10 µg/L
	2-Methylnaphthalene	8270	10 µg/L

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Agency	Description	Information	Reference
<u>NATIONAL</u> (cont.)			
	Standards for owners and operators of hazardous waste TSD facilities; health-based limits for exclusion of waste-derived residues; residue concentration limit	10 mg/kg	EPA 2003l 40 CFR 266, Appendix VII
	TSCA chemical information rules; health and safety data reporting for naphthalene		EPA 2003n 40 CFR 712.30
	Effective date	08/04/95	
	Reporting date ^g	10/03/95	
	TSCA health and safety data reporting for naphthalene ^h		EPA 2003o 40 CFR 716.120
	Effective date	08/04/95	
	Sunset date	10/03/95	
NTP	Carcinogenicity classification	Naphthalene is reasonably anticipated to be a human carcinogen (Group 2)	NTP 2005
<u>STATE</u>			
a. Air	No data		
b. Water			
Maine	Drinking water guideline	25 µg/L	HSDB 2004
Minnesota	Drinking water guideline	300 µg/L	HSDB 2004
New Jersey	Drinking water standard	300 µg/L	HSDB 2004
Washington	Drinking water guideline	14 µg/L	HSDB 2004
Wisconsin	Drinking water guideline	40 µg/L	HSDB 2004
Florida	Drinking water guideline	6.8 µg/L	HSDB 2004

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<u>STATE</u> (cont.)			
c. Food	No data		
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.

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

^dLife-time: the concentration of a chemical in drinking water that is not expected to cause any adverse noncarcinogenic effects for a lifetime of exposure. The lifetime HA is based on exposure of a 70-kg adult consuming 2 L water/day.

^eA4: not classifiable as a human carcinogen

^fGroup C: a possible human carcinogen

^gReporting date: manufacturers and importers of naphthalene must submit a Preliminary Assessment Information Manufacturer's Report for each site at which they manufacture or import naphthalene by the reporting date.

^hTSCATS health and safety data reporting: naphthalene is subject to all provisions of part 716. Manufacturers, importers, and processors of naphthalene are subject to the reporting requirements of subpart A.

ACGIH = American Conference of Governmental Industrial Hygienists; CFR = Code of Federal Regulations; DWEL = drinking water equivalent level; EPA = Environmental Protection Agency; HSDB = Hazardous Substances Data Bank; IARC = International Agency for Research on Cancer; IDLH = immediately dangerous to life or health; IRIS = Integrated Risk Information System; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = permissible exposure limit; PQL = practical quantitation level; RCRA = Resource Conservation and Recovery Act; REL = recommended exposure limit; RfC = reference concentration; RfD = reference dose; STEL = short-term exposure limit; TCLP = toxicity characteristic leachate procedure; TLV = threshold limit values; TSCA = Toxic Substances Control Act; TSD = treatment, storage, and disposal; TWA = time-weighted average; USC = United States Code; WHO = World Health Organization