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## CHAPTER 7. REGULATIONS AND GUIDELINES

Pertinent international and national regulations, advisories, and guidelines regarding DDT, DDE, and DDD in air, water, and other media are summarized in Table 7-1. This table is not an exhaustive list, and current regulations should be verified by the appropriate regulatory agency.

ATSDR develops MRLs, which are substance-specific guidelines intended to serve as screening levels by ATSDR health assessors and other responders to identify contaminants and potential health effects that may be of concern at hazardous waste sites. See Section 1.3 and Appendix A for detailed information on the MRLs for DDT, DDE, and DDD.

**Table 7-1. Regulations and Guidelines Applicable to DDT, DDE, and DDD**

Agency	Description	Information	Reference
<b>Air</b>			
EPA	RfC	No data	IRIS <a href="#">2002a</a> , <a href="#">2002b</a> , <a href="#">2003</a>
WHO	Air quality guidelines	No data	<a href="#">WHO 2010</a>
<b>Water &amp; Food</b>			
EPA	Drinking water standards and health advisories	No data	<a href="#">EPA 2012</a>
	National primary drinking water regulations	No data	<a href="#">EPA 2009</a>
	RfD		<a href="#">IRIS 2002a</a>
	<i>p,p'</i> -DDT	$5 \times 10^{-4}$ mg/kg/day <sup>a</sup>	
WHO	Drinking water quality guidelines for DDT and metabolites		<a href="#">WHO 2017</a>
	Guideline value	0.001 mg/L (1 µg/L) <sup>b,c</sup>	
	Provisional tolerable daily intake	0.01 mg/kg-body weight <sup>d</sup>	
FDA	EAFUS	No data <sup>e</sup>	<a href="#">FDA 2013</a>
<b>Cancer</b>			
HHS	Carcinogenicity classification DDT	Reasonably anticipated to be a human carcinogen <sup>g</sup>	<a href="#">NTP 2016</a>
EPA	Carcinogenicity classification <i>p,p'</i> -DDT, <i>p,p'</i> -DDE, <i>p,p'</i> -DDD	Group B2 <sup>h</sup>	IRIS <a href="#">2002a</a> , <a href="#">2002b</a> , <a href="#">2003</a>
	Oral slope factor <i>p,p'</i> -DDT	$3.4 \times 10^{-1}$ per mg/kg/day	IRIS <a href="#">2002a</a>
	<i>p,p'</i> -DDE	$3.4 \times 10^{-1}$ per mg/kg/day	IRIS <a href="#">2003</a>
	<i>p,p'</i> -DDD	$2.4 \times 10^{-1}$ per mg/kg/day	IRIS <a href="#">2002b</a>

## 7. REGULATIONS AND GUIDELINES

**Table 7-1. Regulations and Guidelines Applicable to DDT, DDE, and DDD**

Agency	Description	Information	Reference
IARC	Carcinogenicity classification DDT	Group 2A <sup>i,j</sup>	<a href="#">IARC 2017</a>
<b>Occupational</b>			
OSHA	PEL (8-hour TWA) for general industry, shipyards, and construction DDT	1 mg/m <sup>3 k</sup>	OSHA <a href="#">2017a</a> , <a href="#">2017b</a> , <a href="#">2017c</a>
NIOSH	REL (up to 10-hour TWA) DDT	0.5 mg/m <sup>3 l</sup>	<a href="#">NIOSH 2016</a>
	IDLH DDT	500 mg/m <sup>3 l,m</sup>	<a href="#">NIOSH 2014</a>
<b>Emergency Criteria</b>			
EPA	AEGLs-air	No data	<a href="#">EPA 2016</a>
DOE	PACs-air DDT		<a href="#">DOE 2016a</a>
	PAC-1 <sup>n</sup>	3 mg/m <sup>3</sup>	
	PAC-2 <sup>n</sup>	34 mg/m <sup>3</sup>	
	PAC-3 <sup>n</sup>	210 mg/m <sup>3</sup>	
	DDE		
	PAC-1 <sup>n</sup>	6.5 mg/m <sup>3</sup>	
	PAC-2 <sup>n</sup>	72 mg/m <sup>3</sup>	
	PAC-3 <sup>n</sup>	170 mg/m <sup>3</sup>	
	DDD		
	PAC-1 <sup>n</sup>	2.4 mg/m <sup>3</sup>	
	PAC-2 <sup>n</sup>	26 mg/m <sup>3</sup>	
	PAC-3 <sup>n</sup>	160 mg/m <sup>3</sup>	

<sup>a</sup>Based on liver lesions; point of departure = NOEL = 5x10<sup>-2</sup> mg/kg/day; composite uncertainty factor = 100; confidence = medium.

<sup>b</sup>Detected in surface water at concentrations <1 µg/L; also detected in drinking-water at 100-fold lower concentrations.

<sup>c</sup>Based on a 10-kg child consuming 1 L of drinking water per day, because infants and children may be exposed to greater amounts of chemicals in relation to their body weight and because of concern over the bioaccumulation of DDT.

<sup>d</sup>Based on a NOAEL of 1 mg/kg-body weight/day for developmental toxicity in rats, applying an uncertainty factor of 100 (for interspecies and intraspecies variation).

<sup>e</sup>The EAFUS list of substances contains ingredients added directly to food that FDA has either approved as food additives or listed or affirmed as GRAS.

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

<sup>g</sup>Based on sufficient evidence of carcinogenicity from studies in experimental animals.

<sup>h</sup>Based on sufficient evidence of carcinogenicity in animals. DDT: liver tumors in seven mouse studies of various strains and three rat studies. DDE: increased incidence of liver tumors in two strains of mice and in hamsters and thyroid tumors in female rats by diet. DDD: increased incidence of lung tumors in male and female mice, liver tumors in male mice and thyroid tumors in male rats.

<sup>i</sup>Group 2A: probably carcinogenic to humans.

<sup>j</sup>Based on sufficient evidence of cancer in experimental animals and limited evidence of carcinogenicity in humans.

<sup>k</sup>Skin designation.

<sup>l</sup>Potential occupational carcinogen.

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**Table 7-1. Regulations and Guidelines Applicable to DDT, DDE, and DDD**

Agency	Description	Information	Reference
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<sup>m</sup>Based on acute toxicity data in humans.

<sup>n</sup>Definitions of PAC terminology are available from U.S. Department of Energy (DOE 2016b).

AEGL = acute exposure guideline levels; DOE = Department of Energy; EAFUS = Everything Added to Food in the United States; EPA = Environmental Protection Agency; FDA = Food and Drug Administration; GRAS = generally recognized as safe; HHS = Department of Health and Human Services; IARC = International Agency for Research on Cancer; IDLH = immediately dangerous to life or health concentrations; IRIS = Integrated Risk Information System; NIOSH = National Institute for Occupational Safety and Health; NOAEL = no-observed-adverse-effect level; NOEL = no-observed-effect level; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PAC = Protective Action Criteria; PEL = permissible exposure limit; REL = recommended exposure limit; RfC = inhalation reference concentration; RfD = oral reference dose; TWA = time-weighted average; WHO = World Health Organization