

7. REGULATIONS AND ADVISORIES

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

ATSDR has derived an acute-duration inhalation minimal risk level (MRL) of 0.002 ppm for dichlorvos based on a NOAEL of 1.82 mg/m³ dichlorvos for inhibition of erythrocyte acetylcholinesterase (biomarker for dichlorvos neurotoxicity) in a study in male Sprague-Dawley rats which were exposed to atmospheres containing dichlorvos over a 3-day period (Schmidt et al. 1979).

ATSDR has derived an intermediate-duration inhalation MRL of 0.0003 ppm for dichlorvos based on a NOAEL of 0.03 ppm for the neurological effect of brain acetylcholinesterase inhibition in a study in pregnant Carworth E rats exposed to atmospheres containing dichlorvos during their 20-day gestation period (Thorpe et al. 1972).

ATSDR has derived a chronic-duration inhalation MRL of 0.00006 ppm for dichlorvos based on a NOAEL of 0.006 ppm in male rats for brain and erythrocyte acetylcholinesterase in a 2-year inhalation study in Carworth E rats (Blair et al. 1976). Females at this dose had a 12% reduction in erythrocyte acetylcholinesterase; this is also a NOAEL, since erythrocyte acetylcholinesterase inhibition of 20% or less is not considered an adverse effect.

ATSDR has derived an acute-duration oral MRL of 0.004 mg/kg/day for dichlorvos based on a LOAEL of 4 mg/kg/day for inhibition of brain acetylcholinesterase based on a 14-day study in male Sprague-Dawley rats that received 4 mg dichlorvos daily by gavage in corn oil (Teichert et al. 1976).

ATSDR has derived an intermediate-duration oral MRL of 0.003 mg/kg/day for dichlorvos based on a NOAEL of 0.033 mg/kg/day for inhibition of erythrocyte acetylcholinesterase in a 21-day study in male volunteers who consumed 0.033 mg/kg/day in either a capsule form or in a 3-ounce container of gelatin at meals (Boyer et al. 1977).

ATSDR has derived a chronic-duration oral MRL of 0.0005 mg/kg/day for dichlorvos based on a NOAEL of 0.05 mg/kg/day for inhibition of brain acetylcholinesterase in a 52-week feeding study in dogs which consumed 0.05 mg/kg/day by gelatin capsule (AVMAC Chemical Co. 1990; IRIS 1995).

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The EPA has established a reference concentration (RfC) of 0.0005 mg/m³ (0.0006 ppm) for dichlorvos (IRIS 1996). The EPA has established a reference dose (RfD) of 0.0005 mg/kg/day for dichlorvos (IRIS 1996).

The EPA has identified dichlorvos as a probable human carcinogen (IRIS 1995). The International Agency for Research on Cancer (IARC) has determined that dichlorvos is possibly carcinogenic to humans (IARC 1991). In studies conducted under the National Toxicology Program (NTP), female mice showed some evidence of carcinogenic effect; male rats and mice some evidence; and female rats equivocal evidence (NTP 1995).

Dichlorvos is one of the chemicals regulated under “The Emergency Planning and Community Right-to-Know Act of 1986” (EPCRA) (EPA 1987b). Section 313 of Title III of EPCRA requires owners and operators of certain facilities that manufacture, import, process, or otherwise use the chemicals on this list to report annually their release of those chemicals to any environmental media.

OSHA requires employers of workers who are occupationally exposed to dichlorvos to institute engineering controls and work practices to reduce and maintain employee exposure at or below permissible exposure limits (PEL). The employer must use engineering and work practice controls, if feasible, to reduce exposure to or below an 8-hour TWA of 1 mg/m³. Respirators must be provided and used during the time period necessary to install or implement feasible engineering and work practice controls (OSHA 1974).

Dichlorvos is designated a hazardous substance and subject to regulations implementing Section 311 of the Federal Water Pollution Act (EPA 1978) and Section 311 of the Clean Water Act (EPA 1986).

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Table 7-1. Regulations and Guidelines Applicable to Dichlorvos

Agency	Description	Information	References
<u>INTERNATIONAL</u>			
Guidelines:			
WHO		NA	
IARC	Group (cancer ranking)	2B ^a	IARC 1991
<u>NATIONAL</u>			
Regulations:			
a. Air:			
EPA OAR	Proposed Rule: De Minimis Emissions for Determinations Regarding Modifications to Major Sources	Yes	59 FR 15504 40 CFR 63 EPA 1994b
OSHA	Permissible Exposure Limit (TWA)	1 mg/m ³	29 CFR 1910.1000 OSHA 1974
b. Water			
EPA OW	Designation of Hazardous Substances	Yes	40 CFR 116.4 EPA 1978
	Reportable Quantities of Hazardous Substances Pursuant to the Clean Water Act	10 lbs.	40 CFR 117.3 EPA 1986
	National Pollutant Discharge Elimination System (NPDES) -- List of Toxic Pollutants and Hazardous Substances	Yes	40 CFR 122, App. D EPA 1983
	Instructions -- Form 2c, NPDES Criteria and Standards	Yes	40 CFR 125 EPA 1984
c. Other:			
EPA OERR	Reportable Quantity	10 lbs.	40 CFR 302.4 DOT 1989
	Threshold Planning Quantity (TPQ)	1,000 lbs.	40 CFR 355, App. A EPA 1987b
	Toxic Chemical Release Reporting: Community Right-to-Know	Yes	40 CFR 372.65 EPA 1988c
	Proposed Rule: Reportable Quantity Adjustments	Yes	58 FR 54836 40 CFR 302.4 EPA 1993c
EPA OPP	Deletion of Certain Uses and Directions	Yes	60 FR 19580 EPA 1995a
	Notice of Preliminary Determination to Cancel Certain Registrations and Draft Notice of Intent to Cancel	Yes	60 FR 50338 EPA 1995b
Guidelines:			
a. Air:			
ACGIH	Threshold Limit Value (TLV-TWA)	0.90 mg/m ³ (skin)	ACGIH 1994

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

Agency	Description	Information	References
<u>National (cont.)</u>			
NIOSH	Recommended Exposure Limit for Occupational Exposure (TWA)	1 mg/m ³ (skin)	NIOSH 1992
	Immediately Dangerous to Life & Health	200 mg/m ³	NIOSH 1990
OSHA	Carcinogen	CA ^b	Sittig 1994
b. Water: EPA	q ₁ * Cancer Slope Factor (oral exposure)	1.22x10 ⁻¹ per mg (kg/day)	60 FR 50338 EPA 1995b
c. Other EPA	Cancer Classification	B2 ^c	60 FR 50338 EPA 1995b
	Reference Dose (RfD)	5x10 ⁻⁴ mg/kg/day	IRIS 1996
	Reference Concentration (RfC)	5x10 ⁻⁴ mg/m ³	IRIS 1996
NTP	Cancer Classification		
	Male rat, gavage	SE ^d	NTP 1995
	Female rat, gavage	EE ^e	
	Male mouse, gavage	SE	
	Female mouse, gavage	CE ^f	
<u>STATE</u>			
Regulations or Guidelines:			
a. Air	Acceptable Ambient Air Concentration Guidelines or Standards		
CT	8 hr. avg. time	20 µg/m ³ (2.21x10 ⁻³ ppm)	Sittig 1994
M	8 hr. avg. time	10 µg/m ³ (1.11x10 ⁻³ ppm)	
	24 hr. avg. time	2.4 µg/m ³ (2.66x10 ⁻³ ppm)	
ND	8 hr. avg. time	9 µg/m ³ (9.96x10 ⁻⁴ ppm)	
OK	24 hr. avg. time	10 µg/m ³ (1.11x10 ⁻³ ppm)	
TX	0.5 hr. avg. time	9 µg/m ³ (9.96x10 ⁻⁴ ppm)	
	Annual	0.9 µg/m ³ (1.0x10 ⁻⁴ ppm)	
VA	24 hr. avg. time	15 µg/m ³ (1.66x10 ⁻³ ppm)	

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

Agency	Description	Information	References
<u>State (cont.)</u>			
WA	24 hr. avg. time	3.3 $\mu\text{g}/\text{m}^3$ (3.65×10^{-4} ppm)	
b. Water:			
OH	Aquatic Life Habitat - Cold Water Outside Mixing Zone, 30-day average	0.001 $\mu\text{g}/\text{L}$	
MI	Domestic/Drinking Water	0.12 $\mu\text{g}/\text{L}$	Sittig 1994
	Hazardous Waste Constituents		CELDS 1994
ME		Yes	
NJ		Yes	
SD		Yes	
	Restricted Use Pesticides		CELDS 1994
ME		Yes (above 25%)	
NH		Yes (Above 25%)	
NM		Yes	

- a Possible carcinogenic to humans
b CA =Potential occupational carcinogen
c Possible human carcinogen
d Some evidence
e Equivocal evidence
f Clear evidence

ACGIH = American Conference of Governmental Industrial Hygienists; CELDs = Computer-assisted Environmental Legislative Data System; CFR = Code of Federal Regulations; DOT = Department of Transportation; EPA = Environmental Protection Agency; IARC = International Agency for Research on Cancer; IRIS = Integrated Risk Information System; NIOSH = National Institute of Occupational Safety and Health; OSHA = Occupational Safety and Health Administration; STEL = Short-term Exposure Limit; TLV = Threshold Limit Value; TWA = Time Weighted Average