7. REGULATIONS AND ADVISORIES

International, national, and state regulations and guidelines for disulfoton are listed in Table 7- 1.

An acute-duration inhalation MRL for disulfoton of 0.006 mg/ m^3 was derived. The MRL is based on a NOAEL of 0.5 mg/ m^3 for lethargy and decreased cholinesterase activity in rats exposed for 4 hours/day, 5 days/week (Thyssen 1978).

An intermediate-duration inhalation MRL for disulfoton of $2x10^{-4}$ mg/ m^3 was derived. The MRL is based on a NOAEL of 0.02 mg/ m^3 for decreased cholinesterase activity in rats exposed for 6 hours/day, 5 days/week for 3 weeks (Thyssen 1980).

An acute-duration oral MRL for disulfoton of 0.001 mg/kg/day was derived. The MRL is based on a NOAEL value of 0.1 mg/kg/day for decreased cholinesterase activity in rats treated by gavage on gestation days 6-15 (Lamb and Hixson 1983).

An intermediate-duration oral MRL for disulfoton of $9x10^{-5}$ mg/kg/day was derived. The MRL is based on a NOAEL value of 0.009 mg/kg/day for decreased cholinesterase activity in rat pups in a multigeneration feeding study in rats (Hixson and Hathaway 1986).

A chronic-duration oral MRL for disulfoton of 6 $x10^{-5}$ mg/kg/day was derived. The MRL is based on a LOAEL value of 0.06 mg/kg/day for decreased cholinesterase activity in female rats in a chronic feeding study (Hayes 1985).

EPA has verified a chronic oral reference dose (RfD) for disulfoton of 4 $x10^{-5}$ mg/kg/day (IRIS 1994). The RfD is based on the LOAEL of 0.04 mg/kg/day for cholinesterase inhibition in rats treated with disulfoton in the diet for 2 years (Hayes 1985).

The chronic-duration oral MRL for disulfoton is 6 $x10^{-5}$ mg/kg/day, and the EPA chronic oral RfD is 4 $x10^{-5}$ mg/kg/day (IRIS 1994). Both of these values are based on the same study (Hayes 1985) and the identical end point. Even though the MRL and the RfD are essentially the same, they have minor differences due to the manner in which the exposure doses were calculated. The LOAEL of 0.04 mg/kg/day used by EPA was calculated by multiplying the analytical dietary concentration of

0.8 ppm (nominal concentration of 1 ppm) by the reference rat food consumption factor of 0.05. However, Hayes (1985) provided an equivalent dose of 0.08 mg/kg/day for the nominal concentration of 1 ppm, based on actual food consumption and body weight data. The LOAEL of 0.06 mg/kg/day used in deriving the chronic oral MRL was obtained by multiplying the 0.08 mg/kg/day dose, corresponding to the nominal concentration of 1 ppm, by the analytical concentration of 0.8 ppm.

Disulfoton is on the list of chemicals appearing in "The Emergency Planning and Community Rightto-Know Act of 1986" (EPCRA) (EPA 1988d). 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.

An Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) for disulfoton does not exist. A U.S. Court of Appeals decision rescinded the 1989 PELs promulgated by OSHA (OSHA 1989), which included a PEL for disulfoton. Only PELs in place prior to the 1989 are now allowed. Disulfoton had no PEL prior to 1989; therefore, it currently has no PEL.

Disulfoton is regulated by the Clean Water Effluent Guidelines as state in Title 40, Sections 400-475, of the Code of Federal Regulations. The point source category for which disulfoton has a specific Regulatory Limitation is the organic pesticide chemicals industry (EPA 1978a).

Under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), disulfoton is classified for restrictive use (EPA 1978b).

Under the Resource Conservation and Recovery Act (RCRA), disulfoton is listed as a hazardous waste when it is a discarded commercial chemical product, off-specification species (e.g., a product that does not meet purity or property specifications), container residue, and spill residue (EPA 1980c).

Table 7-1. Regulations and Guidelines Applicable to Disulfoton

Agency	Description	Information	References
INTERNATIONAL			
WHO	ADI	0.002 mg/kg	WHO 1976
	Temporary ADI established at 0.001 mg/kg		
	Guidelines in specific foods:		
	Alfalfa (hay, clover (hay)	10 mg/kg	
	Forage crops (green)	5 mg/kg	
	Vegetables including beans, broccoli, brussel sprouts, cabbage, cauliflower, celery, lettuce, maize, potatoes, peanut shells, peas (including pods), rice (in husk), spinich, sugar beets (roots), tomatoes		
	Raw grain (except rice and maize)	0.5 mg/kg	
	Coffee beans, pecans, peanuts (kernels), pineapple, soybeans	0.2 mg/kg	
		0.1 mg/kg	
NATIONAL			
Regulations:			
a. Water			
EPA OWRS	Priority pollutants regulated in pesticide active ingredient manufacturing wastewater	Yes	40 CFR 455 EPA 1992a
	Priority pollutant effluent limitation for BAT and PSES	Yes	
	Maximum for any 1 day	7.33×10^{-3} kg/kkg[a]	
	Monthly average shall not exceed	3.79×10^{-3} kg/kkg	
	Priority pollutant effluent limitation for NSPS and PSNS		
	Maximum for any 1 day	5.28×10^{-3} kg/kkg	
	Monthly average shall not exceed	2.72×10^{-3} kg/kkg	
EPA OW	App. D - NPDES Permit Application Testing Requirement, Table V: Toxic and Hazardous Substances	Yes	40 CFR 122 EPA 1983
	Form 2D - NPDES Permits	Yes	40 CFR 122 EPA 1983
	Form 2C - Criteria and Standards for NPDES	Yes	40 CFR 125 EPA 1989e
	Guidelines for Testing Pollutants Under CWA	Yes	40 CFR 136.3 EPA 1973
	Substances Prohibited from Underground Injection Control	Yes	40 CFR 148 EPA 1989a
	Calculating Effluent Limits for Organic Pesticides	Yes	40 CFR 455.20 EPA 1978a
	Test Methods for Pesticides	Yes	40 CFR 455.50 EPA 1992b
b. Other:			
EPA OERR	Reportable Quantity	1 pound	40 CFR 117.3 EPA 1985
	App. B - Extremely Hazardous Substance TPQ	500 pounds	40 CFR 355 EPA 1987a
EPA OPP	Intent to Cancel or Restrict Registration of Pesticide Products Containing Disulfoton	No	
EPA OPTS	Pesticides Classified for Restrictive Use	Yes	40 CFR 152.175 EPA 1978b

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

Agency	Description	Information	References
NATIONAL (cont.)			
	LDR for Newly Identified and Listed Hazardous Wastes and Hazardous Soil	Yes	58 FR 48092 EPA 1993
EPA OSW	Designation of Hazardous Substance	Yes	40 CFR 116.4 EPA 1978c
	Listing as Hazardous Waste: Discarded commercial chemical products off-specification species, container residues, and spill residues thereof	Yes	40 CFR 261.33 EPA 1980b
	App. VIII - Listing as Hazardous Waste Constituent	Yes	40 CFR 261 EPA 1988a
	App. II - List of Hazardous and Organic Constituents	Yes	40 CFR 258 EPA 1991
	Hazardous Wastes from Specific Sources	Yes	40 CFR 261.32 EPA 1981c
	App. IX - Hazardous Wastes Excluded from Non-specific Sources	3.34 ppm	40 CFR 261 EPA 1984c
	App. IX - Groundwater Monitoring List	Yes	40 CFR 264 EPA 1987b
	LDR - Identification of Waste to be Evaluated by August 8, 1988	Yes	40 CFR 268.10 EPA 1986b
	LDR - Treatment Standards Expressed as Waste Concentrations	P039 = 0.017 mg/L (ww) P039 = 0.1 mg/kg (nonww) K037 = 0.025 mg/L (ww) K037 = 0.1 mg/kg (nonww)	40 CFR 268.43 EPA 1988b
	Reportable Quantity	1 lb.	40 CFR 302.4 EPA 1989d
Guidelines:			
a. Air			
ACGIH	TLV TWA	0.1 mg/m^3	ACGIH 1994
NIOSH	REL TWA	0. 1 mg/m^3 (skin)	NIOSH 1992
b. Water			
EPA ODW	One-day health advisory (10 kg child)	0.01 mg/L	EPA 1994
	10-day health advisory (10 kg child)	0.01 mg/L	
	Longer-term health advisory (10 kg child)	0.003 mg/L	
	Longer-term health advisory (adult)	0.009 mg/L	
	DWEL	0.001 mg/L	
	Lifetime health advisory (adult)	0.0003 mg/L	
c. Other			
EPA	RfD (oral)	$4x10^{-5}$ mg/kg/day	IRIS 1994

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

Agency	Description	Information	References
STATE			
Regulations and Guidelines:			
a. Air:			
	Acceptable ambient air concentrations		NATICH 1992
CT	8 hr avg. time	2 $\mu g/m^3$	
FL- Pinella	8 hr avg. time	1 $\mu g/m^3$	
FL-Pinella[b]	24 hr avg. time	$2.40x10^{-1}$ $\mu g/m^3$	
ND	8 hr avg. time	$1x10^{-3}$ mg/m^3	
NV	8 hr avg. time	$2x10^{-3}$ mg/m^3	
TX	30 min avg. time	1 $\mu g/m^3$	
TX	Annual avg. time	$1x10^{-1}$ $\mu g/m^3$	
VA	24 hr avg. time	1.7 $\mu g/m^3$	
WA-SWEST	24 hr avg. time	$3x10^{-1}$ $\mu g/m^3$	
	Air toxics emissions inventory data		
MO		1.45 mT/year (state-wide)	
b. Water:			
	Drinking Water Guidelines		FSTRAC 1990
AZ		0.3 µg/L	
ME		0.3 µg/L	
MN		0.3 µg/L	
RI		0.3 µg/L	
VT		0.3 µg/L	
	Water Quality Criteria: Human Health		CELDs 1994
NY		No detect	
	Groundwater Quality Standards		CELDs 1994
NY		No detect	
	Groundwater Quality Monitoring Parameters		CELDs 1994
AL		Yes	
CO		Yes	

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

Agency	Description	Information	References
STATE (Cont.)			
CA		Yes	
IL		Yes	
KY		Yes	
MN		Yes	
OH		Yes	
SC		Yes	
TN		Yes	
VA		Yes	
WV		Yes	
WI		Yes	
	Hazardous Waste Constituents		CELDs 1994
AL		Yes	
CA		Yes	
CO		Yes	
IL		Yes	
KY		Yes	
LA		Yes	
MD		Yes	
MN		Yes	
MT		Yes	
NE		Yes	
NH		Yes	
NJ		Yes	
NY		Yes	
ND		Yes	
OH		Yes	
SC		Yes	
SD		Yes	
VA		Yes	
VT		Yes	
WI		Yes	
WV		Yes	
WY		Yes	

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

Agency	Description	Information	References
STATE (Cont.)			
	Maximum Leachable Concentration		CELDs 1994
TX		0.1 mg/L	
	Restricted Pesticides		CELDs 1994
AL		Yes	
CA		Yes	
FL		Yes	
ME		Yes	
MI		Yes	
OR		All formulations >2%	
WA		Yes	

[a]EPA limits a facility's effluent to contain the designated kilograms of the sum of all organic pesticide active ingredients (listed in 40 CFR 455.20(b) which includes disulfoton) per 1000 kg of the sum of all active ingredients manufactured at a facility.

ACGIH = American Conference of Governmental and Industrial Hygienists; ADI = Acceptable Daily Intake; BAT = Available Technology; CELDs = Computer-aided Environmental Legislative Data System; DWEL = Drinking Water Exposure Level; EPA = Environmental Protection Agency; FSTRAC = Federal-State Toxicology and Regulatory Alliance Committee; mT = metric ton; NATICH = National Air Toxics Clearinghouse; NIOSH = National Institute of Occupational Safety and Health; NSPS = New Source Performance Standards; ODW = Office of Drinking Water; OERR = Office of Emergency and Remedial Response; OPP = Office of Pesticide Programs; OSHA = Occupational Safety and Health Administration; OSW = Office of Solid Waste; OWRS = Office of Water Regulations and Standards; PEL = Permissible Exposure Limit; PSNS = Pretreatment Standards for New Sources; REL = Recommended Exposure Level; RfD = Reference Dose; TLV = Threshold Limit Value; TPQ = Threshold Planning Quantity; TWA = Time- Weighted Average; WHO = World Health Organization