

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 $2 \times 10^{-4} \text{ mg/ m}^3$ 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 $9 \times 10^{-5} \text{ mg/kg/day}$ 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 $6 \times 10^{-5} \text{ mg/kg/day}$ 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 $4 \times 10^{-5} \text{ mg/kg/day}$ (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 $6 \times 10^{-5} \text{ mg/kg/day}$, and the EPA chronic oral RfD is $4 \times 10^{-5} \text{ mg/kg/day}$ (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

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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 Right-to-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).

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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), spinach, 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/kg ^a | |
| | Monthly average shall not exceed | 3.79×10^{-3} kg/kg | |
| | Priority pollutant effluent limitation for NSPS and PSNS | | |
| | Maximum for any 1 day | 5.28×10^{-3} kg/kg | |
| | Monthly average shall not exceed | 2.72×10^{-3} kg/kg | |
| 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 |

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

| Agency | Description | Information | References |
|-------------------------|--|--|----------------------------|
| <u>NATIONAL</u> (cont.) | | | |
| EPA OSW | LDR for Newly Identified and Listed Hazardous Wastes and Hazardous Soil | Yes | 58 FR 48092 EPA 1993 |
| | 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 |

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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 µg/m ³ | |
| FL- Pinella | 8 hr avg. time | 1 µg/m ³ | |
| FL-Pinella ^b | 24 hr avg. time | 2.40x10 ⁻¹ µg/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 µg/m ³ | |
| TX | Annual avg. time | 1x10 ⁻¹ µg/m ³ | |
| VA | 24 hr avg. time | 1.7 µg/m ³ | |
| WA-SWEST | 24 hr avg. time | 3x10 ⁻¹ µg/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 | |

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

| Agency | Description | Information | References |
|----------------------|------------------------------|-------------|------------|
| <u>STATE (Cont.)</u> | | | |
| 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 | |

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

| Agency | Description | Information | References |
|----------------------|---------------------------------|-------------------------|------------|
| <u>STATE (Cont.)</u> | | | |
| | 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 | |

^aEPA 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

