

7. REGULATIONS AND ADVISORIES

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

ATSDR has derived a Minimal Risk Level (MRL) of 0.002 mg/kg/day for oral exposure to ethion over the acute and intermediate durations based on a NOAEL of 0.06 mg/kg/day for inhibition of brain acetylcholinesterase in Beagle dogs (Bailey 1988). This same study was used to derive a chronic-duration MRL of 0.0004 mg/kg/day.

The Environmental Protection Agency (EPA) has not established a reference concentration (RfC) for ethion. The reference dose (RfD) for ethion is 0.0005 mg/kg/day. This RfD is based on a study in humans conducted by Palazzolo (1970) for the FMC Corporation (IRIS 1999).

Ethion has not been classified for carcinogenicity by the Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC), or the EPA. The National Toxicology Programs (NTP) Management Status Report does not list ethion as a candidate for general toxicology studies (NTP 1998).

Between June 27, 1974 and January 18, 1989, the Occupational Safety and Health Administration (OSHA) had promulgated protective, permissible exposure limits (PELs) for approximately 264 toxic substances (OSHA 1993). The OSHA PELs were established to protect workers against adverse health effects resulting from exposure to hazardous substances. An employer must ensure that an employee's exposure to a toxic substance in any 8-hour work shift of a 40-hour week does not exceed the 8-hour time-weighted average (TWA) established for the substance (OSHA 1993). On January 18, 1989, OSHA promulgated more protective PELs for approximately 376 toxic substances. Ethion was included among 164 toxic substances not previously regulated (OSHA 1989). The newly established PEL for ethion was set at 0.4 mg/m³ (OSHA 1989). OSHA also provided a "skin designation" for ethion. The skin designation would indicate a potential for dermal absorption and the need for employers to implement the use of good work practices including providing workers with gloves, coveralls, goggles, and other appropriate equipment in order to prevent skin exposures (NIOSH 1997). Because the 1989 promulgation was rescinded by the 11th Circuit Court Appeals in July 1992, only those PELs in place prior to the 1989 rule are currently enforced by OSHA. On June 30, 1993, OSHA published in the

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Federal Register a final rule announcing the revocation of the 1989 exposure limits, including the newly established limits for ethion (OSHA 1993). Currently, there is no OSHA PEL for ethion. However, the National Institute for Occupational Safety and Health (NIOSH) and approximately twenty-five states have adopted the 0.4 mg/m³ exposure limit for ethion that was initially promulgated by OSHA (NIOSH 1992, 1997; OSHA 1993). The American Conference of Governmental Industrial Hygienists (ACGIH) also adopted the 0.4 mg/m³ exposure limit for ethion (ACGIH 1998).

Ethion has been designated as a hazardous substance pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (EPA 1995a, 1996a). The statutory source for this designation is section 311(b)(4) of the Clean Water Act (CWA) (EPA 1995a). The owner and operator of any facility that produces, uses, or stores a CERCLA hazardous substance in an amount exceeding the “threshold planning quantity” are required to immediately report any release to any environmental media, if the amount released is equal to or exceeds the specified “reportable quantity” assigned to the substance. The threshold planning quantity for ethion is 1,000 pounds, and the reportable quantity is 10 pounds (4.54 kg) (EPA 1999c).

Under the authority of the CWA ethion is regulated as a wastewater pollutant in discharges from new and existing facilities that formulate, package, and repack pesticide products. Facilities of this type make up two subcategories of the Pesticide Chemicals Point Source Category—Subcategory C: Pesticide Formulating, Packaging and Repackaging which includes facilities that also manufacture pesticide active ingredients (PAIs) and Subcategory E: Repackaging of Agricultural Pesticides Performed at Refilling Establishments (EPA 1996c). As of January 6, 1997, the regulatory limit for Subcategory C facilities on the discharge of wastewater pollutants into navigable waters and into publicly owned treatment works (POTWs) is a choice between zero discharge or compliance with the pollution prevention alternative provided in Table 8 of 40 CFR 455 (EPA 1996c). Subcategory E facilities are required to achieve the “zero” criterium for discharge of wastewater pollutants (EPA 1996c). Some of the PAIs to which these effluent guidelines and standards do not apply are sanitizers, including pool chemicals; microorganisms, such as *Bacillus thuringiensis*; and certain liquid chemical sterilants that are used on critical or semi-critical medical devices (EPA 1996c). Complete listings of PAIs that are not required to meet the Subcategory C and E guidelines and standards can be found in 40 CFR 455.40 and 40 CFR 455.60, respectively. As a pesticide, ethion is regulated under the section 408 of the Federal Food, Drug, and

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Cosmetics Act as amended by the Food Quality Protection Act (EPA 1998a). The EPA has set tolerance limits for the amount of ethion residue that can be found raw agricultural products and animal feeds (EPA 1997a, 1998a).

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Table 7-1. Regulations and Guidelines Applicable to Ethion

Agency	Description	Information	Reference
<u>International Guidelines:</u>			
IARC	Cancer classification	None	IARC 1997
<u>National Regulations and Guidelines:</u>			
a. Air			
ACGIH	Threshold limit value (TLV)	0.4 mg/m ³	ACGIH 1999
NIOSH	Exposure limit (TWA)—skin	0.4 mg/m ³	NIOSH 1999
OSHA	Permissible exposure limit (PEL) 8-hour time weighted average (TWA)	None 0.4 mg/m ³ was the vacated 1989 PEL	OSHA 1989 ^a NIOSH 1997 ^a
b. Water			
	No available data		
c. Food			
EPA	Pesticide classification for ethion	Cholinesterase inhibiting pesticide	40 CFR 180.3 EPA 1999a
	Tolerances for ethion residues in or on raw agricultural commodities	0.2-10 ppm	40 CFR 180.173 EPA 1999b
d. Other			
ACGIH	Biological exposure indices (BEI) organophosphorus cholinesterase inhibitors	70% of individual's baseline	ACGIH 1999
EPA	RfD Cancer classification	5x10 ⁻⁴ mg/kg/day Not determined	IRIS 1999
	Reportable quantities of hazardous substances Ethion—designated CERCLA hazardous substance under sections 311(b)(4) Clean Water Act	10 lbs.	40 CFR 302.4 EPA 1999c
	Statutory source for designation as a CERCLA hazardous substance	Yes	Clean Water Act U.S. Congress 1977

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

Agency	Description	Information	Reference
EPA (cont.)	Designated hazardous substance in accordance with section 311(b)(2)(a) of the act	Yes	40 CFR 116.4 EPA 1998a
	Included in the list of organic pesticide active ingredients	Yes	40 CFR 455 Sub E EPA 1998b
<u>STATE</u>			
Regulations and Guidelines:			
a. Air			
Colorado	5 CCR1001-5 Regulation No. 3-Air contaminant emissions notices for HAP	Yes	BNA 1998
Connecticut	8-hour 30-minute	8 µg/m ³ 40 µg/m ³	
Idaho	Screening emissions level	0.4 mg/m ³	Idaho Department of Health and Welfare 1999
	Emissions in pounds per hour	0.0267	
	Acceptable concentration	0.02 mg/m ³	
	Occupational exposure level	0.4 mg/m ³	
Maryland	Toxic air pollutants for existing sources	Yes	BNA 1998
New Mexico	Screening emissions levels	0.4 mg/m ³	
	Emissions in pounds per hour	0.0267	
Washington	Toxic air pollutants and acceptable source impact levels	1.3 µg/m ³	
Wisconsin	Air contaminant emission inventory reporting requirements	147 pounds/year	Wisconsin Department of Natural Resources 1997
	Acceptable emission levels		
	<25 feet 25 feet	3.4x10 ⁻² lbs/hour 0.14 lbs/hour	
b. Water			
Arizona	Human health based guidance levels (HBGLS) for ingestion of contaminants in drinking water— Oral HBGL	3.5 µg/L	Arizona Department of Health Services 1999
c. Other			
Hawaii	Restricted use pesticide	Yes	BNA 1998

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

Agency	Description	Information	Reference
Indiana	Restricted use pesticide	All products 80% or greater	
Vermont	Restricted use pesticide	All products	
Washington	Pesticide regulations	Not for distribution to home and garden users	

^aPrior to setting a protective PEL of 0.4 mg/m³ for ethion in 1989, OSHA had not established a protective level for this substance. In July 1992, the 11th Circuit Court Appeals rescinded the 1989 PELs promulgated by OSHA for 212 substances, including ethion. Only PELs in place prior to the 1989 rule are currently allowed.

ACGIH = American Conference of Governmental Industrial Hygienists; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980; CFR = Code of Federal Regulations; EPA = Environmental Protection Agency; IARC = International Agency for Research On Cancer; NIOSH = National Institute for Occupational Safety and Health; NPDES = National Pollutant Discharge Elimination System; ODW = Office of Drinking Water; OERR = Office of Emergency and Remedial Response; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit; RfD = Reference Dose; TLV = Threshold Limit Value; TWA = Time-Weighted Average; USDA = United States Department of Agriculture; WHO = World Health Organization