7. REGULATIONS AND ADVISORIES

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

An MRL of 0.1 ppm has been derived for acute-duration inhalation exposure to chloroform. The MRL is based on a NOAEL of 3 ppm for hepatic effects in mice (Larson et al. 1994~).

An MRL of 0.05 ppm has been derived for intermediate-duration inhalation exposure to chloroform. The MRL is based on a LOAEL of 14 ppm for toxic hepatitis in workers exposed to up to 400 ppm for less than 6 months (Phoon et al. 1983).

An MRL of 0.02 ppm has been derived for chronic-duration inhalation exposure to chloroform. The MRL was based on a LOAEL of 2 ppm for hepatic effects in workers exposed to concentrations of chloroform ranging from 2 to 205 ppm for l-4 years (Bomski et al. 1967).

An MRL of 0.3 mg/kg/day has been derived for acute-duration oral exposure to chloroform. The MRL is based on a NOAEL of 26.4 mg/kg/day for hepatic effects in mice (Larson et al. 1994b).

An MRL of 0.1 mg/kg/day has been derived for intermediate-duration oral exposure to chloroform. The MRL is based on a NOAEL of 15 mg/kg/day for liver effects (increased SGPT) in dogs exposed to chloroform in toothpaste for 26 weeks (Heywood et al. 1979).

An MRL of 0.01 mg/kg/day has been derived for chronic-duration oral exposure to chloroform based on a LOAEL for liver effects (increased SGPT) in dogs administered 15 mg/kg/day chloroform in toothpaste in capsules for 7.5 years (Heywood et al. 1979).

The chronic-duration oral reference dose (RfD) for chloroform is also 0.01 mg/kg/day, based on the LOAEL for liver effects in dogs administered 15 mg/kg/day chloroform (Heywood et al. 1979; IRIS 1996).

No reference concentration (RfC) exists for the compound.

7. REGULATIONS AND ADVISORIES

The EPA has determined that chloroform is a probable human carcinogen; corresponding group B2 (IRIS 1996). Gavage studies conducted by the NTP were positive for carcinogenicity in female mice and male mice and rats, but negative for female rats (NTP 1995).

The International Agency for Research on Cancer (IARC) has determined that chloroform is possibly carcinogenic to humans; Group 2B classification (IARC 1987).

Chloroform is regulated by the Clean Water Act Effluent Guidelines for the following industrial point sources: electroplating; organic chemicals; steam electric, asbestos, and timber products processing; paving and roofing; paint and formulating; formulating; gum, wood and carbon black; metal molding, casting, and finishing; coil coating; copper forming; and electrical and electronic components (EPA 1981a).

Agency	Description	Information	References
INTERNATIONAL			
Guidelines:			
IARC	Carcinogenic classification	Group 2B ^a	IARC 1987
WHO	Drinking water guidelines	30 μg/L	WHO 1984
NATIONAL			
Regulations:			
a. Air: EPA OAQPS	Intent to list under Section 112 of Clean Air Act	Yes	40 CFR 61.01 EPA 1985d
	New Source Performance Standards		
	Chemicals Produced at SOCMI Facilities	Yes	40 CFR 60.489 EPA 1983b
	Chemical Affected by Standards for SOCMI Distillation Operations	Yes	40 CFR 60.667 EPA 1990e
	National Emission Standards for Hazardous Air Pollutants		
	Hazardous Air Pollutants	Yes	40 CFR 61.01 EPA 1985d
	Proposed Rule: Identification of "More Hazardous" Emission Decreases	Yes	59 FR 15504 40 CFR 63.48 EPA 1994a
	Proposed Rule: National Emission Standards for Halogenated Solvent Clearing-Applicability	Yes	58 FR 62566 40 CFR 63.460 EPA 1993a
OSHA	PEL-TWA	50 ppm	29 CFR 1910 OSHA 1974
	Permissible Exposure Limit (Ceiling)	240 mg/m ³	OSHA 1974
	Occupational Exposure to Hazardous Chemicals in Laboratories	Yes	OSHA 1974
b. Water:			
EPA	PQL	0.5 μg/L	40 CFR 264 and 270 EPA 1987a
	Effluent Guidelines and Standards		
	List of Toxic Pollutants	Yes	40 CFR 401.15 EPA 1979b
	List of Toxic Pollutants Subject to Pretreatment Standards	Yes	40 CFR 403, App. B EPA 1981a
	Definition of Total Toxic Organics (TTO) for Electroplating Point Source Category	Yes	40 CFR 413.02 EPA 1981b
	Bulk Organic Chemicals in Wastewater from Sources of Organic Chemicals, Plastics and Synthetic Fibers	Yes	40 CFR 414.70 EPA 1987e

Agency	Description	Information		References
NATIONAL (cont.)	Organic Chemicals, Plastics, and Synthetic Fibers - Effluent Limitations for Direct Discharge Point Sources Using End-of-Pipe Biological Treatment One-day maximum Maximum for monthly average	46 μg/L 21 μg/L		40 CFR 414.91 EPA 1987e
	Organic Chemicals, Plastics, and Synthetic Fibers - Effluent Limitations for Direct Discharge Point Sources That Do Not Use End-of-Pipe Biological Treatment One-day maximum Maximum for monthly average	325 μg/L 111 μg/L		40 CFR 414.101 EPA 1987e
	Priority Pollutants, Associated With Steam Electric Power Generating Sources	Yes		40 CFR 423, App. A EPA 1982b
	Proposed Rule: Effluent Limitations for Pupl, Paper, and Paperboard - Dissolving Kraft (bleach plant effluent)			58 FR 66078 40 CFR 430 EPA 1993d
		1-Day Max.	Monthly Avg.	
	Existing BAT New Source Pretreatment	10.1 g/kkg 10.1 g/kkg	7.06 g/kkg 7.07 g/kkg	
	Bleached paper grade kraft and soda (bleach plant effluent - existing BAT and pretreatment for existing	5.06 g/kkg	2.01 g/kkg	
	Dissolving sulfite - pretreatment for new sources	23.2 g/kkg	74.4 g/kkg	
	Proposed Rule: Monitoring Requirements for Pulp, Paper, and Paperboard Category	Yes		59 FR 12567 40 CFR 430.02 EPA 1994c
	Definition of TTO for Metal Finishing Sources	Yes		40 CFR 433.11 EPA 1983d
	Definition of TTO for Metal Molding and Casting Sources	Yes		40 CFR 464.21 EPA 1985e
	Definition of TTO for Ferrous Casting Sources			40 CFR 464.31 EPA 1985e
	Definition of TTO for Coil Coating Sources	Yes		40 CFR 465.02 EPA 1982c
EPA ODW	National Primary Drinking Water Regulations			
	Definition of Trihalomethanes (THM)	Yes		40 CFR 141.2 EPA 1975
	Maximum Contaminant Levels for THM	0.10 mg/L		40 CFR 141.12 EPA 1991f
	Method of Analysis for THM	Yes		40 CFR 141, App. C EPA 1979a

Agency	Description	Information	References
NATIONAL (cont.)	Monitoring for Inorganic and Organic Chemicals	Yes	40 CFR 141.40 EPA 1987d
	Proposed Rule: Total Trihalomethane Sampling and Analysis	Yes	58 FR 65622 40 CFR 141.30 EPA 1993c
	Proposed Rule: Maximum Contaminant Levels for Total THM	Yes	59 FR 38668 40 CFR 141.12 EPA 1994b
	Proposed Rule: Total THM Sampling, Analytical and Other Requirements	Yes	59 FR 38668 40 CFR 141.30 EPA 1994b
	Proposed Rule: Best Available Technology for Achieving Compliance with MCLs for Total THM	Yes	59 FR 38668 40 CFR 141.64 EPA 1994b
	Proposed Rule: Disinfection By-Product Compliance Monitoring for Total THM	Yes	59 FR 38668 40 CFR 141.133 EPA 1994b
EPA OW	Designation of Hazardous Substances	Yes	40 CFR 116.4 EPA 1978
	Reportable Quantities for Hazardous Substances	10 pounds	40 CFR 117.3 EPA 1986e
	National Pollutants Charge Elimination System: Permit Application Testing Requirements	Yes	40 CFR 122, App. D EPA 1983c
	Proposed Rule: Application of Part 132 Requirements to Great Lake States and Tribes - Pollutants of Initial Focus	Yes	58 FR 20802 40 CFR 132.6 EPA 1993b
	Test Procedures for the Analysis of Pollutants	Yes	40 CFR 136.3 EPA 1973
	Methods of Analysis of Municipal and Industrial Wastewater	Yes	40 CFR 136, App. A EPA 1973
c. Food:			
FDA	Substances used only as components of adhesives	Yes	21 CFR 175.105 FDA 1977
d. Other:			
EPA OERR	RQ (Ruled)	10 pounds	54 FR 155 EPA 1989c
	Threshold planning quantity	10,000 pounds	EPA 1987b
	Constituents for Solid Waste Detection Monitoring	Yes	40 CFR 258, App. I EPA 1991g
	Hazardous Constituents Subject to Regulatory Requirements	Yes	40 CFR 258, App. II EPA 1991g
	Maximum Concentration Contaminants for the Toxicity Characteristic	Yes	40 CFR 261.24 EPA 1990d

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Agency	Description	Information		References
NATIONAL (cont.)	Discarded commercial chemical products, off- specification species, container residues, and spill residues	Yes		40 CFR 261.33 EPA 1990d
	Basis for Listing Hazardous Waste	Yes		40 CFR 261, App. VII EPA 1981c
	Proposed Rule: Basis Listing Hazardous Waste	Yes		59 FR 9808 40 CFR 261, App. VII EPA 1994d
	Hazardous Constituents	Yes		40 CFR 261, App. VII EPA 1988j
	Groundwater Monitoring List for Hazardous Waste TSDF	Yes		40 CFR 264, App. IX EPA 1991d
	Health Based Limits for Exclusion of Waste- Derived Residues	6x10 ⁻²		40 CFR 266, App. VII EPA 1991d
	Potential PICs For Determination of Exclusion of Waste-Derived Residues	Yes		40 CFR 266, App. VII EPA 1991d
EPA	Land Disposal Restrictions			
	Identification of Waste to Be Evaluated by August 8, 1988	Yes		40 CFR 268.10 EPA 1986f
	Constituent Concentrations Which May Not be Exceeded for Land Disposal			40 CFR 268.43 EPA 1988k
	Waste Code:	Waste water	Non- waste water	
	F025	0.046 mg/L	6.2 mg/kg	
	F039, K117, U044	0.046 mg/L	5.6 mg/kg	
	Halogenated organic compounds regulated under 40 CFR 268.32	Yes		40 CFR 268, App. III EPA 1987g
	Proposed Rule: Treatment Standards for Land Disposed Waste			58 FR 48092 40 CFR 268.40 & 268.48 EPA 1993e
	Waste Code:	Waste water	Non- waste water	
	D022, K019, K029, K150, K151, universal treatment standard	0.046 mg/L	6/9 mg/kg	
	F025, K073	0.046 mg/L	6.2 mg/kg	
	F038, K117, K118, K136, U044	0.046 mg/L	5.6 mg/kg	
	K009, K010	0.1 mg/L	6.0 mg/kg	

Agency	Description	Information	References
NATIONAL (cont.)	List of Hazardous Substances and Reportable Quantities	10 pounds	40 CFR 302.4 EPA 1989d
	Proposed Rule: Reportable Quantity Adjustments - Designation of Hazardous Waste	Yes	58 FR 54836 40 CFR 302.4 EPA 1993f
	Extremely Hazardous Substances and Threshold Planning Quantities	10,000 pounds	40 CFR 355, App. A EPA 1987h
	Chemicals Subject to Toxic Chemical Release Reporting: Community Right-to-Know	Yes	40 CFR 372.65 EPA 1988I
	Chemicals Subject to the Health and Safety Data Reporting Requirements Under TSCA	Yes	40 CFR 716.120 EPA 1988m
Guidelines:			
a. Air: ACGIH	TLV-TWA	10 ppm (49 mg/m ³)	ACG1H 1992
	Threshold Limit Value for Occupational Exposure	49 mg/m ³	ACGIH 1994
NIOSH	STEL (60 minutes)	2 ppm (9.78 mg/m ³)	NIOSH 1990
	Recommended Exposure Limit for Occupational Exposure (STEL-60 min)	9.78 mg/m ³	NIOSH 1992
	Immediately Dangerous to Life & Health	1,000 ppm	NIOSH 1990
b. Water: EPA	1-d Health Advisory	4 mg/L (child)	EPA 1994e
	10-d Health Advisory (child & adult)	4 mg/L (child)	EPA 1994e
	Longer-term Health Advisory (child & adult)	0.1 mg/L (child 0.4 mg/L (adult)	EPA 1994e
	Maximum Contaminant Level Chloroform	0.1 mg/L	EPA 1994e
	Total THM (community and non-transcient, non-community water systems) Total THM (serve more than 10,000	0.080 mg/L	59 FR 38668
	people)	0.040 mg/L	40 CFR 141.64 EPA 1994b
	Maximum Contaminant Level Goal	zəro	59 FR 38668 40 CFR 141.53 EPA 1994b
	q ¹ * cancer slope factor (oral exposure)	6.1x10 ⁻³ per mg/(kg/day)	IRIS 1996
	RfD (oral)	1.10 ⁻² mg/kg/day) (UF 1,000)	
EPA ODW	Individual lifetime cancer risk 10 ⁻⁵	60 μg/L	
NAS	Suggested No-Adverse-Response Level 24-hour 7-day	22 mg/L 3.2 mg/L	NAS 1980

7. REGULATIONS AND ADVISORIES

Agency	Description Information		References	
NATIONAL (cont.)				
c. Non-specific				
media EPA	q ₁ * (oral) q ₁ * (inhalation)	6.1x10 ⁻³ (mg/kg/day) ⁻¹ 8.1x10 ⁻² (mg/kg/day) ⁻¹ [2.3x10 ⁻⁵ (μg/m ³) ⁻¹]	IRIS 1996	
	RfD (chronic oral) Cancer classification	0.01 mg/kg/day B2 ^b		
d. Other				
EPA	Cancer classification	B2		
NIOSH	Cancer classification	Yes	NIOSH 1990 NIOSH 1992	
Regulations and Guidelines:				
a. Air: AZ	Acceptable ambient air concentrations 1 hour 24 hours 1 year	60 μg/m ³ 16 μg/m ³ 0.043 μg/m ³	NATICH 1992	
ст	8 hours	250 μ g/m ³		
FL (Ft. Lauderdale)	8 hours	0.5 mg/m ³		
FL (Pinellas Co.)	8 hours 24 hours 1 year	97.8 μg/m ³ 23.5 μg/m ³ 0.043 μg/m ³		
IN	8 hours Annual	48.9 μg/m ³ 0.043 μg/m ³		
IN (Innap)	8 hours	1200 $\mu { m g/m}^{ m 3}$		
KS	1 year	0.0435 μ g/m ³		
KS-KC	Annual	0.0435 μ g/m ³	State of Kentucky 198	
LA	Annual	4.3 μg/m ³	NATICH 1992	
МА	24 hours 1 year	133 μg/m ³ 0.04 μg/m ³		
ME	1 year	0.043 μ g/m 3		
MI	1 year	0.40 μ g/m ³		
NC	1 year	0.0043 mg/m ³		
NC	1 year	0.0043 mg/m ³		
ND		BACT		
NV	8 hours	1.19 mg/m ³		
NY	1 year	167 μ g/m 3		
ОК	24 hours	97 μ g/m ³		

Agency	Description	Information	References
STATE (cont.)		# 1 m m	
PA (Phil.)	1 year	120 <i>µ</i> g/m ³	
RI	1 year	0.04 μ g/m ³	
SC	24 hours	250 μg/m ³	
тх	30 minutes 1 year	98 μ g/m 3 10 μ g/m 3	
VA	24 hours	490 μg/m ³	
VT	1 year	0.043 μg/m ³	
WA/SWEST	1 year	0.043 <i>µ</i> g/m ³	,
. Water:			
	Water Quality: Human Health		FSTRAC 1990
AZ	Drinking water quality standards Domestic/ Drinking	0.49 μg/L 5.7μg/L	Sittig 1994
FL	Domestic/ Drinking	100 µg/L	
IL		1 µg/L	CELDs 1994
MA		5 µg/L	
М	Domestic/ Drinking	5.6 µg/L	Sittig 1994
MN		57 μg/L	CELDS 1994
NJ	Domestic/ Drinking	6 µg/L	Sittig 1994
NY	Domestic/ Drinking	0.2-100µg/L	
OR	Domestic /Drinking	10 μg/L	
RI	Drinking water standard	6-100 μg/L	CELDS 1994
TN	Domestic/ Drinking	100 µg/L	Sittig 1994
ТХ	Domestic/ Drinking	100 µg/L	
VT	Domestic/ Drinking	6µg/L	
	Water Quality: Human Health		CELDs 1994
AZ	Domestic Water Source (DWS) Fish Consumption (FC) Full Body Contact (FBC) Partial Body Contact (PBC)	TTHM 590 μg/L 230 μg/L 1400 μg/L	
со	MCL	0.10 mg/L	
СТ	MCL	2.0 μg/L	
DC	Water Quality Criteria C D	3,000 mg/L 0.2 mg/L	
FL	MCL	0.10 mg/L	

CHLOROFORM

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

gency	Description	Information		References
TATE (cont.)				
н	Maximum organic contaminant level: Total trihalomethane (TTHM) (TTHM = the sum of the concentration of bromodichloromethane, dibromochloromethane and chloroform) Fresh water Salt water Fish consumption	<u>Acute</u> 9,600 μg/L ns 5.1	<u>Chronic</u> ns ns	
IN	Outside of mixing zone Point of water intake MCL (TTHM)	157 μg/L 1.9 μg/L 0.10 mg/L		
KY	Consumption of fish MCL	15.7 μg/L 0.19 μg/L		
KS	MCL (TTHM)	0.10 mg/L		
LA	Drinking water Non-drinking water	5.30 μ g/L 70.00 μg/L		
ME	Maximum level (TTHM)	0.10 mg/L		
NH	MCL (TTHM)	0.10 mg/L		
NM	Groundwater levels	0.1 mg/L		
NY	Groundwater effluent standard (max.)	7 μ g/L		
ND	MCL (TTHM)	0.10 mg/L		
NC	MCL (TTHM) Water quality standard for class GS Groundwater	0.10 mg/L 0.00019 mg/L		
OG	Groundwater quality reference level (TTHM) MCL (TTHM)	0.100 mg/L 0.10 mg/L		
ОК	Groundwater water quailty criteria MCL (TTHM)	10.0 (no units 0.10 mg/L	s specified)	
он	MCL (TTHM)	0.10 mg/L		
SC	MCL (TTHM)	0.10 mg/L		
VT	Class A or B waters Class C water	0.19 mg/L 15.7 mg/L		
WV	MCL (TTHM)	0.10 mg/L		
WI	Human cancer criteria: Public Water Supplier Warm water sport fish communities Cold water communities Great Lakes communities Non-Public Water Supplies Warm water sport fish communities Cold water communities Warm water forage and limited fish communities and limited aquatic life	1.9 mg/L 1.8 mg/L 1.8 mg/L 87 mg/L 31 mg/L 380 mg/L		
	Groundwater Enforcement standard Prevention action limit	6 μg/L		

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Agency	Description	Information		References
STATE (cont.)				
WV	All water use categories, maximum criteria B1, B2, B3 waters A	15.7 μg/L 0.19 μg/L		
	Water Quality: Aquatic Life			CELDs 1994
AZ	Acute Criteria for Aquatic and Wildlife Uses Cold water fishery (A/W) Warm water fishery (A/W) Effluent dominated water (A/W) Ephemeral (A/W)	<u>Acute</u> 14,000 μg/L 14,000 μg/L 14,000 μg/L NNS	<u>Chronic</u> 900 μg/L 900 μg/L 900 μg/L NNS	
со	Aquatic Life Segments Acute Chronic	28,900 μg/L 1,240 μg/L		
FL	MCL for mixing zone pollutants	1.57 mg/L		
LA	Acute Criteria Freshwater Marine water	2,890 μg/L-ac 1,445 μg/L-ch 8,150 μg/L-ac	ronic ute	
он	Outside mixing zone: maximum Inside mixing zone: maximum Cold water mixing zone: 30-day average	4,075 μg/L-ch 1,800 μg/L 3,600 μg/L 79 μg/L	ronic	
	Groundwater Monitoring			CELDs
AL		Yes		
CA		Yes		
со		Yes		
IL		Yes		
KY		Yes		
LA		Yes		
MN		Yes		
MT		Yes		
NY		Yes		
ОН		Yes		
SC		Yes		
TN		Yes		
VA		Yes		
WI		Yes		
WV		Yes		

CHLOROFORM

lgency	Description	Information	References
STATE (cont.)			
	Hazardous Constituents		CELDs
AL	Maxixmum Concentration of Contaminants for the Toxicity Characteristics	60 mg/L	
CA	Concentration in waste; non-RCRA solvent waste Maximum concentration for the toxicity	2.0 mg/kg 6.0 mg/L	
	Maximum concentration for the toxicity characteristics	0.0 mg/L	
CO	Maximum concentration for the toxicity characteristics	6.0 mg/L	
IL	Maximum concentration for the toxicity characteristics	6.0 mg/L	
KY	Maximum concentration for the toxicity characteristics	6.0 mg/L	
LA	Maximum concentration for the toxicity characteristics	6.0 mg/L	
MA	Maximum concentration for the toxicity characteristics	6.0 mg/L	
MD	Maximum concentration for the toxicity characteristics	6.0 mg/L	
ME	Maximum concentration for the toxicity characteristics	Yes	
MN	Maximum concentration for the toxicity characteristics	6.0 mg/L	
MT	Maximum concentration for the toxicity characteristics	6.0 mg/L	
ND	Maximum concentration for the toxicity characteristics	6.0 mg/L	
NH	Maximum concentration for the toxicity characteristics	Yes	
NJ	Maximum concentration for the toxicity characteristics	6.0 mg/L	
NY	Maximum concentration for the toxicity characteristics	Yes	
PA	Maximum concentration for the toxicity characteristics	6.0 mg/L	
ОН	Maximum concentration for the toxicity characteristics	6.0 mg/L	
SC	Maximum concentration for the toxicity characteristics	6.0 mg/L	
тх	Maximum leachable concentration	6.0 mg/L	
VA	Maximum concentration for the toxicity characteristics	6.0 mg/L	

Agency	Description	Information	References
STATE (cont.)			
VT	Maximum concentration for the toxicity characteristics	6.0 mg/L	
WI	Maximum concentration for the toxicity characteristics	6.0 mg/L	
WV	Maximum concentration for the toxicity characteristics	Yes	
WY	Maximum concentration for the toxicity characteristics	6.0 mg/L	

^aGroup 2B: Possible human carcinogen

^bGroup B2: Probable human carcinogen

ACGIH = American Conference of Governmental Industrial Hygienists; AW = Aquatic and Wildlife; BAT = Best Available Technology Economically Achievable; CELDs = Computer-aided Environmental Legislative Database; CFR = Code of Federal Regulations; EPA = Environmental Protection Agency; FR = Federal Register; FSTRAC = Federal State Toxicology and Regulatory Alliance Committee; IARC = International Agency for Research on Cancer; NATICH = National Air Toxics Information Clearinghouse; NIOSH = National Institute for Occupational Safety and Health; ns = No Standard Has Been Developed; NNS = No Numerical Standard; OAQPS = Office of Air Quality Planning and Standards; ODW = Office of Drinking Water; OERR = Office of Emergency and Remedial Response; OSHA = Occupational Safety and Health Administration; OW = Office of Water; PEL = Permissible Exposure Limit; PICs = Product of Incomplete Combustion; PQL = Permissible Quantity Limit; RfD = Reference Dose; RQ = Reportable Quantity; SOCMI = Synthetic Organic Chemical Manufacturing Industry; STEL = Short-Term Exposure Limit; THM = Trihalomethanes; TLV = Threshold Limit Value; TSCA = Toxic Substance Control Act; TSDF = Treatment, Storage and Disposal Facility; TTO = Total Toxic Organics; TWA = Time-Weighted Average for 8-hour exposure; WHO=World Health Organization

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