

7. REGULATIONS AND ADVISORIES

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

ATSDR has derived a chronic-duration oral MRL of 0.0002 mg/kg/day based on renal effects in humans (Nogawa et al. 1989).

The EPA classifies cadmium as a probable human carcinogen (Group B1) and has established a reference dose (RfD) of 5×10^{-4} mg/kg/day in water and 1×10^{-3} mg/kg/day in food (IRIS 1995). The reference concentration (RfC) is undergoing review by an EPA Workgroup.

Cadmium compounds are included on the list of 189 chemicals listed as hazardous air pollutants under Section 112 of the Clean Air Act as amended (U.S. Congress 1990). Cadmium also is on the list of chemicals appearing in the Emergency Planning and Community Right-To-Know Act of 1986 (EPA 1989b, 1990c). Under Title III of this statute, owners and operators of facilities that manufacture, import, process, or otherwise use the chemicals on this list of report annually their release of those chemicals to any environmental media.

OSHA requires employers of workers who are occupationally exposed to cadmium 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 $5 \mu\text{g}/\text{m}^3$ (OSHA 1992). Respirators must be provided and used during the time period necessary to install or implement feasible engineering and work practice controls. The National Institute for Occupational Safety and Health recommends that exposure not exceed the lowest feasible level (NIOSH 1992).

Cadmium acetate, cadmium bromide, and cadmium chloride also are designed as hazardous substances under Section 311 of the Federal Water Pollution Control Act; any discharge of these chemicals over a specified threshold level into navigable waters is subject to reporting requirements (EPA 1978a, 1986a). Cadmium also is included on the list of 65 toxic pollutants (EPA 1979a, 1986b) subject to general pretreatment regulations for existing and new sources of pollution. Effluent discharges of cadmium from industrial sources are subject to effluent guidelines and standards in 40 CFR Part 413, 415, 421, 433, 435, 440, 461, 469, and 471. The major industrial source categories discharging cadmium include: electroplating, inorganic chemical manufacturing, nonferrous metals manufacturing, battery manufacturing,

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and sewage treatment plants, among others. For these each point source categories, cadmium is generally subject to specific regulatory limits. The maximum contaminant level goal (MCLG) for cadmium in drinking water is 0.005 mg/L; the maximum contaminant level (MCL) is 0.005 mg/L (EPA 1995).

The EPA has issued one advisory for the State of New Jersey and five advisories for the State of New York restricting the consumption of cadmium-contaminated fish and shellfish (EPA 1998). The EPA has also issued an advisory restricting the consumption of moose' liver and kidneys in the State of Maine (EPA 1998). This information is current as of December 1997, based on the EPA Fish and Wildlife Advisory Database searched in October 1998 on the Internet at:

<http://www.epa.gov/OST/fishadvice/>

More detailed information can be obtained from the state Public Health Department or the state Department of Natural Resources. A fish or wildlife advisory will specify the bodies of water or hunting areas with restrictions. The advisory will indicate what species and size of fish or game are of concern. The advisory may completely ban consumption or recommend limiting meals of a certain fish or wildlife species to a particular frequency. For example, an advisory may recommend that a person eat a certain type of fish no more than once a month. The advisory may indicate that only certain parts of the fish or game should not be consumed and recommend preparation methods that minimize exposure. For example, the wildlife consumption advisory issued for the state of Maine is specific for moose liver and kidney (EPA 1998). Fish and wildlife advisories may also provide restrictions specifically targeting pregnant women, nursing mothers, and young children. To reduce their exposure to cadmium, state advisory recommendations for fish consumption limits (meals per week or meals per month) should be observed.

Cadmium is a hazardous waste under the Resource Conservation and Recovery Act (RCRA) under several circumstances. Regulatory limits are applicable when it is contained in sludge applied to land used for food production (EPA 1979c, 1980c). Groundwater monitoring is required at municipal solid waste landfills (EPA 1991c) and land treatment facilities (EPA 1982e). Cadmium emissions are subject to limitations for metals when burned in boilers and industrial furnaces (EPA 1991f, 1991g, 1991h, 1991i). Hazardous waste containing cadmium also must meet treatment standards prior to land disposal (EPA 1986c, 1986d, 1988c).

The FDA has promulgated an action level to regulate the amount of cadmium in pottery and hollowware (FDA 1993).

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Table 7-1. Regulations and Guidelines Applicable to Cadmium

Agency	Description	Information	References
INTERNATIONAL			
IARC	Carcinogenic classification	Group 2A	WHO 1996
WHO	Chemical of Health Significance Provisional tolerable weekly intake	0.003 mg/L	WHO 1996
		7 µg/kg	WHO 1996
NATIONAL			
Regulations:			
a. Air			
NRC	Standards for Protection Against Radiation: Appendix B - ALIs and DACs of Radionuclides for Occupational Exposure; and Effluent Concentration Cd - 104, 107, 109, 113m, 113, 115m, 115, 117m, 117 Oral ALI Inhalation ALI Inhalation DAC Effluent Concentration	Yes	10 CFR 20 NRC 1991
		2x10 ⁻¹ -2x10 ⁻⁴ µCi	
		2x10 ⁰ -1x10 ⁻⁵ µCi	
		1x10 ⁻⁹ -2x10 ⁻⁵	
		µCi/mL	
		5x10 ⁻¹² -2x10 ⁻⁷	
		µCi/mL	
EPA OAQPS	NESHAP - List of Pollutants and Applicability of Part 61 NSPS Sewage Treatment Plants - Test Methods and Procedures NESHAP - Demonstration of Early Reduction Constructed, Reconstructed, or Modified Major Sources: Short-term <i>de minimis</i> value Cadmium oxide (proposed) Aerospace Manufacturing and Rework: Primer and Topcoat Application Operations (Proposed) Secondary Lead Smelters (Proposed)	Yes	40 CFR 61.01 EPA 1985
		Yes	40 CFR 60.154 EPA 1989a
		Yes	40 CFR 63.74 EPA 1992a
			40 CFR 63.44 59 FR 15504 EPA 1994a
		6.37x10 ⁻³ lb/hr	
		Yes	40 CFR 63 59 FR 29216 EPA 1994b
Yes	40 CFR 63 59 FR 29750 EPA 1994c		
OSHA	PEL TWA All cadmium compounds	5 µg/m ³	29 CFR 1910.1027(c) OSHA 1992
b. Water:			
EPA ODW	MCL MCLG Hazardous Waste Injection Restrictions	0.005 mg/L	EPA 1995
		0.005 mg/L	EPA 1995
		≥100 mg/L	40 CFR 148.12 EPA 1988b
EPA OWRS	Hazardous substance Cadmium acetate Cadmium bromide Cadmium chloride Reportable quantity Cadmium acetate Cadmium bromide Cadmium chloride	Yes	40 CFR 116.4
		Yes	EPA 1978a
		Yes	
		10 pounds	
		10 pounds	40 CFR 117.3 EPA 1986c
	10 pounds		

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

Agency	Description	Information	References
NATIONAL (cont.)			
NRC	Standards for Protection Against Radiation: Appendix B - Effluent concentrations Cd-104, 107, 109, 113m, 113, 115m, 115, 117m, 117	4x10 ⁻⁷ -3x10 ⁻⁴ µCi/mL	10 CFR 20 NRC 1991
	Concentrations for Release to Sewers Cd- 104, 107,109, 113m, 113, 115m, 115, 117m, 117	5x10 ⁻⁸ -3x10 ⁻³ µCi/mL	
EPA OW	NPDES - Storm Water Discharges	Yes	40 CFR 122.26 EPA 1990a
	NPDES: Appendix D - Permit Application Testing Requirements	Yes	40 CFR 122 EPA 1983d
	Form 2C - Criteria and Standards for NPDES	Yes	40 CFR 125 EPA 1984b
	Toxics Criteria for Those States Not Complying with Clean Water Act Section 303(c)(2)(B)		40 CFR 131.36 EPA 1992b
	Freshwater - max. conc.	3.9 µg/L	
	Freshwater - continuous conc.	1.1 µg/L	
	Saltwater - max. conc.	43 µg/L	
	Saltwater - continuous conc.	9.3 µg/L	
	Identification of Test Procedures	Yes	40 CFR 136 EPA 1973
	Appendix C to Part 136 - Inductively Coupled Plasma - Atomic Emission spectrometric Method for Trace Element Analysis of Water and Wastes Method 200.7	Yes	40 CFR 136 EPA 1984c
Appendix D to Part 136 - Precision and Recovery Statements for Methods for Measuring Metals	Yes	40 CFR 136 EPA 1990b	
Criteria for Evaluation of Permit Applications for Ocean Dumping of Materials: Environmental Impact - Constituents Prohibited as Other Than Trace Contaminants	Yes	40 CFR 227.6 EPA 1977a	
Criteria for the Management of Disposal Sites for Ocean Dumping: Guidelines for Ocean Disposal Site Baseline or Trend Assessment Surveys Under Section 102 of the Act	Yes	40 CFR 228.13 EPA 1977b	
Effluent Guidelines and Standards Toxic Pollutants	Yes	40 CFR 401.15 EPA 1979b	
General Pretreatment Regulations Appendix B - 65 Toxic Pollutants	Yes	40 CFR 403 EPA 1986d	
Electroplating of Common Metals Pretreatment Standards for Existing Sources Maximum Avg. daily (4 consecutive monitoring days)		1.2 mg/L 0.7	40 CFR 413.14 EPA 1981a

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

Agency	Description	Information	References
<u>NATIONAL</u> (cont.)			
	Inorganic Chemicals		40 CFR 415.642-.645 EPA 1984d
	Cadmium Pigments and Salts Production		
	Pigments BPT - Max		
	- Avg. daily value (30 consecutive days)	0.078 kg/kkg of product 0.026 kk/kkg	
	Salts - BPT - Max.	4.87x10 ⁻⁵ kg/kkg	
	- Avg. daily value (30 consecutive days)	1.62x10 ⁻⁵ kg/kkg	
	Pigment and Salts - PSES - Max.	0.94 mg/L	
	-Avg. daily value (30 consecutive days)	0.28 mg/L	
	Nonferrous Metals Mfg.: Primary Electrolytic Copper Refining - Effluent Limits		40 CFR 421.52 EPA 1984e
	Max. (1 day)		
	Avg. daily value (30 consecutive days)	0.00006 k/kkg product 0.00003 k/kkg	
	Nonferrous Metals Mfg.: Primary Zinc		40 CFR 421.83-.86 EPA 1984f
	BAT Effluent Limits, NSPS, Pretreatment Std. (new and existing sources)		
	Max. (1 day)		
	Max. (monthly avg.)	0-1.234 mg/kg of product 0-0.494 mg/kg of product	
	Nonferrous Metals Mfg.: Metallurgical Acid Plants		40 CFR 421.92-.96 EPA 1985c
	BPT Effluent Limits		
	Max. (1 day)	0.180 mg/kg of 1007 sulfuric acid capacity	
	Max. (monthly avg.)	0.090 mg/kg	
	BAT Effluent Limits, NSPS, Pretreatment Standards (existing and new)		
	Max. (1 day)		
	Max. (monthly avg.)	0.511 mg/kg 0.204 mg/kg	
	Nonferrous Metals Mfg.: Secondary Indium		40 CFR 421.194-.196 EPA 1985h
	NSPS, Pretreatment Std. (new and existing)		
	Max. (1 day)		
	Max. (monthly avg.)	2.105-12.170 mg/kg of product 0.929-5.370 mg/kg	
	Steam Electric Power Generating: Appendix A - 126 Priority Pollutants	Yes	40 CFR 423 EPA 1982a
	Metal Finishing		40 CFR 433.13-.14 EPA 1983e
	BPT, BAT, PSES		
	Max. (1 day)	0.69 mg/L	
	Max. (monthly avg.)	0.26 mg/L	40 CFR 433.15 EPA 1985g
	NSPS, PSNS		40 CFR 433.16-.17 EPA 1983f
	Max. (1 day)	0.11 mg/L	
	Max. (monthly avg.)	0.07 mg/L	

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

Agency	Description	Information	References
<u>NATIONAL</u> (cont.)			
	Oil and Gas Extraction: Offshore - BAT and NSPS	3 mg/kg dry wt. - Max. stock barite	40 CFR 435.13 & .15 EPA 1993a 40 CFR 483.16-.17 EPA 1983f
	Ore Mining and Dressing: Platinum Ores - BAT - Max. (1 day) Avg. daily value 30 consecutive days)	0.10 mg/L 0.05 mg/L	40 CFR 440.113 EPA 1982c
	Ore Mining and Dressing: General Provisions	Yes	40 CFR 440.131 EPA 1982d
	Pesticide Chemicals: Metallo-Organic Pesticide Chemicals Applicability	Yes	40 CFR 455.30 EPA 1978b
	Battery Mfg.,: Cadmium BPT Effluent Limits Max. (1 day) max. (monthly avg.)	0.31-758.91 mg/kg 0.14-360.94 mg/kg	40 CFR 461.11-.12 & .14 EPA 1984g
	BAT Effluent Limits and PSES - Max. (1 day) Max. (monthly avg.)	0.05-68 mg/kg 0.02-30 mg/kg	
	NSPS and PSNS Max. (1 day) Max. (monthly avg.)	0.028-40 mg/kg 0.11-16 mg/kg	40 CFR 461.13 & .15 EPA 1984h
	Electrical and Electronic Components: Cathode Ray Tube - PSES, NSPS, and PSNS Max. (1 day) Max. (monthly avg.)	0.06 mg/L 0.03 mg/L	40 CFR 469.34 -.36 EPA 1983g
	Nonferrous Metals Forming and Metal Powders: Precious Metals BPT Max. (1 day) Max. (monthly avg.)	0.001-4.12 mg/off- kg 0.0005-1.82 mg/off-kg	40 CFR 471.41-.45 EPA 1985h
	BAT, NSPS, PSES, PSNS Max. (1 day) Max. (monthly avg.)	0.001-2.27 mg/off- kg 0.0005-1.0 mg/off- kg	
	Nonferrous Metals Forming and Metal Powders: Uranium Forming BPT Max. (1 day) Max. (monthly avg.)	0-0.646 mg/off-kg 0.0006-0.285 mg/off-kg	40 CFR 471.71-.73 & .75 EPA 1985i
	BPT (laundry) Max. (1 day) Max. (monthly avg.)	17.8 mg/employee- day 7.86 mg/employee day	

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Agency	Description	Information	References
<u>NATIONAL</u> (cont.)			
	BAT, NSPS, PSNS Max. (1 day) Max. (monthly avg.)	0.0007–0.068 mg/off-kg 0.0003–0.027 mg/off-kg	
	BAT, NSPS, PSNS (laundry) Max. (1 day) Max. (monthly avg.)	5.24 mg/employee- day 2.10 mg/employee- day	
	Standards for the Use or Disposal of Sewage Sludge: Land Application - Pollutant Limits	1.9–39 kg/ha	40 CFR 503.13 EPA 1993b
	Incineration - Pollutant Limits (Risk specific concentration)	0.057 µg/m ³	40 CFR 503.43 EPA 1993c
	Frequency of Monitoring Recordkeeping	Yes	40 CFR 503.46-.47 EPA 1993d
OW	Water Quality Guidance for the Great Lakes System: Proposed Guidance: Summary of Potential Concern	Yes	58 FR 20002 EPA 1993e
c. Food: FDA	Color additives exempt from certification Limit for cadmium (as Cd) in bronze powder, copper powder and zinc oxide	15 ppm	21 CFR 73.1646-.1647 FDA 1977b
	Permissible level in bottled water	0.01 mg/L	21 CFR 103.35 FDA 1977c
	Food Additives permitted for Direct Addition: Cadmium level permitted in zinc methionine sulfate tablets	0.05 ppm	21 CFR 172.399 FDA 1981
d. Other: EPA OPTS	Definitions	Yes	40 CFR 165.3 EPA 1974a
	Pesticides and Containers: Procedures not recommended	Yes	40 CFR 165.12 EPA 1974b
	Recommended Disposal Procedures	Yes	40 CFR 165.11 EPA 1974c
	Recommended Disposal Procedures for Pesticides Containers and Residues	Yes	40 CFR 165.14 EPA 1974d
	Nonrefillable Container Standards: Container Design and Residue Removal (Proposed)	Yes	59 FR 6712 EPA 1994d
	Refillable Container Standards: Container Design and Residue Removal (Proposed)	Yes	59 FR 6712 EPA 1994d
	Standards for Pesticide Containment Structures (Proposed)	Yes	59 FR 6712 EPA 1994d
EPA OERR	Reportable Quantity Cadmium Cadmium acetate Cadmium bromide Cadmium chloride	10 pounds 10 pounds 10 pounds 10 pounds	40 CFR 302.4 EPA 1989b

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

Agency	Description	Information	References
NATIONAL (cont.)			
	Toxic Chemical Release Reporting Rule Cadmium and Cadmium compounds	Yes	40 CFR 372.65 EPA 1990c
	Provisional Test Guidelines: Environmental Effects Guidelines	Yes	40 CFR 795.120 EPA 1987b
	Chemical Fate Testing Guidelines: Complex Formation Ability in Water	Yes	40 CFR 796.3480 EPA 1985j
	Environmental Effects Testing Guidelines: Fish Bioconcentration Test	Yes	40 CFR 797.1520 EPA 1985k
	Avian Acute Oval Toxicity Test	Yes	40 CFR 797.2175 EPA 1985l
	Criteria for Classification of Solid Waste and Disposal Facilities Practices - Appendix I - Maximum Contaminant Levels	Yes	40 CFR 257 EPA 1991a
	Application of Solid Waste to Land and Used For Production of Food Chain Crops (Interim Final)	0.5 kg/hectare, annually	40 CFR 257.3-5 EPA 1979c
EPA OSW	Criteria for Municipal Solid Waste Landfills - Design Criteria	Yes	40 CFR 258.40EPA 1991b
	Appendix I - Constituents for Detection Monitoring	Yes	40 CFR 258EPA 1991c
	Appendix II - List of Hazardous and Organic Constituents	Yes	40 CFR 258EPA 1991d
	Definition of Hazardous Waste:		40 CFR 261.3 EPA 1992c
	Toxicity Characteristic: Maximum Conc.	1.0 mg/L	40 CFR 261.24 EPA 1990d
	Appendix VII - Basis for Listing Hazardous Waste	Yes	40 CFR 261 EPA 1981c
	Appendix VIII - Hazardous Constituents Cadmium and compounds (not otherwise specified)	Yes	40 CFR 261 EPA 1988b
	Appendix IX - Wastes Excluded Under §§ 260.20 and 260.22	Yes	40 CFR 261 EPA 1984i
	Releases from SWMUs: Max. Conc. in Limits in Groundwater	0.01 mg/L	40 CFR 264.94 EPA 1982e
	Land Treatment: Food Chain Crops - Annual Application Rate	0.5 kg/ha	40 CFR 264.276(b)(1) EPA 1982f
	Appendix IX - Groundwater Monitoring List	Yes	40 CFR 264 EPA 1982g
	Land Treatment- Waste Analysis	Yes	40 CFR 265.273 EPA 1980b
	Land Treatment - Food Chain Crops - Annual Application Rate	Yes	40 CFR 265.276 EPA 1980c
	Appendix III - EPA Interim Primary Drinking Water Standards	0.01 µg/L	40 CFR 265 EPA 1980d

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

Agency	Description	Information	References
NATIONAL (cont.)			
	Permit Standards for Burners	Yes	40 CFR 266.102 EPA 1991e
	Interim Status Standards for Burners	Yes	40 CFR 266.103 EPA 1991f
	Standards to Control Metals Emissions	Yes	40 CFR 266.106 EPA 1991g
	Feed Rates and Emissions Screening Limits for Carcinogenic Metals	Yes	40 CFR 266 EPA 1991h
	Appendix VII - Health-Based Limits	1 mg/L	40 CFR 266 EPA 1991i
	Appendix IX - Very Volatile Metal	Yes	40 CFR 266 EPA 1991j
	LDR - Treatment Standards Expressed as Concentrations in Waste Extract	Yes	40 CFR 268.41 EPA 1986e
	D006	1.0 mg/L (nonww)	
	F006, F007, F008, F009, F011, F012, F039, K100	0.066 mg/L (nonww)	
	K061		
	K069	0.19 mg/L (nonww) 0.14 mg/L (nonww)	
	LDR - Treatment Standards Expressed as Specified Technologies	Yes	40 CFR 268.42 EPA 1986f
	LDR - Treatment Standards Expressed as Waste Concentrations		40 CFR 268.43 EPA 1988c
	D006	1.0 mg/L (ww)	
	F039	0.2 mg/L (ww)	
	K028	6.4 mg/L (ww)	
	K061	1.61 mg/L (ww)	
	K069, K100	1.6 mg/L (ww)	
	K101, K102	0.24 mg/L (ww)	
	LDR - Variances From a Treatment Standard	Yes	40 CFR 268.44 EPA 1986g
	LDR - Alternative Treatment Standards for Nonwaste Waters	Yes	40 CFR 268.46 EPA 1992d
	LDR - Newly Identified and Listed Hazardous Waste and Hazardous Soil: Proposed Rule - Universal Treatment Standards for Metals	Yes	59 FR 48092 EPA 1993f
	EPA Administered Permit Program Part B Information Requirements for Land Treatment	Yes	40 CFR 270.20 EPA 1983h
	Permits For Boilers and Industrial Furnaces Burning Hazardous Waste	Yes	40 CFR 270.66 EPA 1991j
	Standards for Management of Used Oil: Used Oil Specifications	2 ppm max.	40 CFR 279.11 EPA 1992e
EPA OSWER	National Contingency Plan: Data Requirements	Yes	40 CFR 300.915 EPA 1990e
	Appendix C - Revised Standard Dispersant Effectiveness and Toxicity Tests	Yes	40 CFR 300 EPA 1984j

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

Agency	Description	Information	References
<u>NATIONAL</u> (cont.)			
	Notification Requirements	Yes	40 CFR 302.6 EPA 1985m
Guidelines:			
a. Air:			
ACGIH	TWA Cadmium and compounds (as Cd) Total dust Respirable fraction	0.01 mg/m ³ 0.002 mg/m ³	ACGIH 1996
NIOSH	IDLH (as cadmium) Recommended Exposure Limit Cadmium Dust and Fumes	9 mg/m ³ Lowest feasible limit (0.01 mg/m ³ LOQ)	NIOSH 1994 NIOSH 1992
b. Water:			
ACGIH	BEI - in urine - in blood	5 µg/g creatinine 5 µg/L	ACGIH 1996
EPA OWRS	Ambient Water Quality Criteria Ingesting Water and Organisms	10 µg/L	EPA 1985m 50 FR 30784
NAS	SNARL 7 day chronic	0.08 mg/L 0.005 mg/L	NRC 1980
c. Other:			
ACGIH	Cancer Class	A2	ACGIH 1996
EPA	RfD (oral) Water Food	5x10 ⁴ mg/kg/day 1x10 ³ mg/kg/day	IRIS 1996
FDA	Action Levels (in leaching solution) Flatware Small Holloware Large Holloware	0.5 µg/mL 0.5 µg/mL 0.25 µg/mL	CPG 7117.06 FDA 1993
NIOSH	Carcinogenic (dust and fume)	Ca	NIOSH 1992, 1994
<u>STATE</u>			
Regulations and Guidelines:			
a. Air:			
AZ	Acceptable ambient air concentrations 1 hour 24 hours	1.7x10 ⁻¹ µg/m ³ 1.1x10 ⁻¹ µg/m ³	NATICH 1992
CT	Annual 8 hours	2.9x10 ⁻⁴ µg/m ³ 4.0x10 ⁻¹ µg/m ³	
FL-FTLDLE	8 hours	1x10 ⁻⁴ µg/m ³	
FL-PINELLA	8 hours 24 hours Annual	5x10 ⁻¹ µg/m ³ 1.2x10 ⁻¹ µg/m ³ 5.6x10 ⁻⁴ µg/m ³	
KS	Annual	5.56x10 ⁻⁴ µg/m ³	
LA	Annual	6.0x10 ⁻² µg/m ³	
MA	24 hours Annual	3x10 ⁻³ µg/m ³ 1.0x10 ⁻³ µg/m ³	
MI	Annual	5.6x10 ⁻⁴ µg/m ³	

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

Agency	Description	Information	References
<u>STATE (cont.)</u>			
MT	Annual 24 hours	$7.0 \times 10^{-2} \mu\text{g}/\text{m}^3$ $3.9 \times 10^{-1} \mu\text{g}/\text{m}^3$	
NC	Annual	$5.5 \times 10^{-1} \mu\text{g}/\text{m}^3$	
NV	8 hours	$1.0 \times 10^{-3} \mu\text{g}/\text{m}^3$	
NY	Annual	$1.67 \times 10^{-1} \mu\text{g}/\text{m}^3$	
OK	24 hours	$5.0 \times 10^{-1} \mu\text{g}/\text{m}^3$	
PA (Phil)	Annual	$1.2 \times 10^{-1} \mu\text{g}/\text{m}^3$	
RI	Annual	$6.0 \times 10^{-4} \mu\text{g}/\text{m}^3$	
SC	24 hours	$2.5 \times 10^{-1} \mu\text{g}/\text{m}^3$	
SD	8 hours	$4.0 \times 10^{-1} \mu\text{g}/\text{m}^3$	
TX	Annual	$1 \times 10^{-2} \mu\text{g}/\text{m}^3$	
VT	Annual	$5.7 \times 10^{-4} \mu\text{g}/\text{m}^3$	
VA	24 hours	$8.0 \times 10^{-1} \mu\text{g}/\text{m}^3$	
WA-SWEST	Annual	$5.6 \times 10^{-4} \mu\text{g}/\text{m}^3$	
Cadmium acetate NC	Annual	$5.5 \times 10^{-6} \text{mg}/\text{m}^3$	
Cadmium bromide NC	Annual	$5.5 \times 10^{-6} \text{mg}/\text{m}^3$	
Cadmium chloride FL (Tampa) FL-FTLDLE NY	8 hours 8 hours Annual	$5.0 \times 10^{-4} \text{mg}/\text{m}^3$ $5.0 \times 10^{-4} \mu\text{g}/\text{m}^3$ $1.67 \times 10^{-1} \mu\text{g}/\text{m}^3$	
b. Water:	<u>Drinking water quality standards</u>		
AL		10 $\mu\text{g}/\text{L}$	FSTRAC 1990
AZ	(guideline) (standard)	5 $\mu\text{g}/\text{L}$ 10 $\mu\text{g}/\text{L}$	
CT	8 hours	$4.0 \times 10^{-1} \mu\text{g}/\text{m}^3$	
FL-FTLDLE	8 hours	$5.0 \times 10^{-4} \text{mg}/\text{m}^3$	
FL-PINELLA	8 hours 24 hours	$5.0 \times 10^{-1} \mu\text{g}/\text{m}^3$ $1.2 \times 10^{-1} \mu\text{g}/\text{m}^3$	
FL-TAMPA	8 hours	$5.0 \times 10^{-4} \text{mg}/\text{m}^3$	
KS	(guideline)	5 $\mu\text{g}/\text{L}$	
MA	(standard)	10 $\mu\text{g}/\text{L}$	
ME	(guideline)	5 $\mu\text{g}/\text{L}$	
MN	(guideline) (standard)	5 $\mu\text{g}/\text{L}$ 10 $\mu\text{g}/\text{L}$	
ND	1 hour	$5.0 \times 10^{-4} \text{mg}/\text{m}^3$	
NV	8 hours	$1.0 \times 10^{-3} \text{mg}/\text{m}^3$	
NY	Annual	$1.67 \times 10^{-1} \mu\text{g}/\text{m}^3$	

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

Agency	Description	Information	References
<u>STATE (cont.)</u>			
RI	(guideline) (standard)	5 µg/L 10 µg/L	
SC	24 hours	2.5x10 ⁻¹ µg/m ³	
VA	24 hours	4.2x10 ⁻¹ µg/m ³	
VT	(standard)	5 µg/L	
<u>Water Quality Criteria: Human Health</u>			
AK	Maximum Contaminant Level (MCL) for Inorganic Chemicals	0.01 ng	CELDs 1994
AZ	MCL for Inorganic Chemicals-Community & Non-Trans. and Non-Community	0.01 mg/L	
	MCL for Inorganic Chem-Transient Non-Comm., Private Agricultural and Semi-Private Water	0.020 mg/L	
AL	ADEM Primary Drinking Water Standards Maximum Contaminated Level for Inorganic Chem. (MCC)	0.01 mg/L	
	Human Health Criteria - Consumption of Water & Fish	10 µg/L	
	Human Health Criteria - Fish Consumption Only	Equation for calc in Resp. T (total recovery)	
AZ	Numeric Water Quality Criteria - Domestic Water Source	5 µg/L	
	Numeric Water Quality Criteria - Fish Consumption	83 µg/L T (total recoverable)	
	Numeric Water Quality Criteria - Full Body Contact	70 µg/L T (total recoverable)	
	Numeric Water Quality Criteria - Partial Body Contact	70 µg/L T (total recoverable)	
CO	Maximum Contaminant Levels for Inorganic Chem.	.010 mg/L	
CA	Maximum Contaminant Levels for Inorganic Chem.	0.10 mg/L	
	Persistent & Bioaccumulative Toxic Substances and Their Threshold Limit Conc. Values	10,000 mg/kg as Cd	
CT	Degree of Treatment - Disinfection and Chemical Treatment	0.01 mg/L	
	Degree of Treatment - Complete Treatment	0.01 mg/L	
	Maximum Permissible Level - Limits for Inorganic Chemicals	0.01 mg/L	
DE	Primary Maximum Contaminant Levels - MCL Conc. in mg/L	0.01 mg/L	
DC	Numeric Standards of Water Quality - Cd - total recoverables	0.01 mg/L	

7. REGULATIONS AND ADVISORIES

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

Agency	Description	Information	References
<u>STATE</u> (cont.)			
	Primary Contact Recreation & Secondary Contact Recreation - Numeric Standard $\mu\text{g/L}$	0.8545 in hardness - 1.465	
FL	Maximum Contaminant Level (mg/L) Cadmium - Shall not exceed 0.8 $\mu\text{g/L}$ where water hardness is 150 $\mu\text{g/L}$ or less and shall not exceed 1.10 mg/L in harder waters	0.005 mg/L	
	Criteria for Class II Waters - Maximum Levels	5.0 $\mu\text{g/L}$	
GA	Maximum Contaminant Level (mg/L)	0.01 mg/L	
HI	Maximum Levels of Inorganic Chemicals	0.01 mg/L NS (no std. developed)	
IA	MCL in Class B and Class C Waters Class B Class C	0.01 mg/L 0.01 mg/L	
	MCL for Inorganic Chemicals	0.01 mg/L	
ID	Domestic Water Supplies - Maximum Allowable Conc. - Inorganic	0.01 mg/L	
IL	Chemical Constituent Level - Conc. MCL for Inorganic Chemicals	0.01 mg/L 0.01 mg/L	EPA 1988d
	General Use Waters - Upper Value	0.05 mg/L	
	secondary Contam. - Upper Value	0.15 mg/L	
IN	Continuous Criterion Conc. (4-day avg.) - Point of Water Intake - Drinking Water Standards	0.01 mg/L	CELDs 1994
	MCL for Inorganic Chemicals	0.01 mg/L	
KS	MCL for Inorganic Chemicals	0.01 mg/L	
KY	MCL for Inorganic Chemicals	0.01 mg/L	
	Maximum Conc. Level - Substances Not Linked to Ca	0.01 mg/L	
	MCL for Underground Drinking Water Sources	0.01 mg/L	
	Interim Primary Drinking Water Standards	0.01 mg/L	
MA	MCL for Inorganic Chemicals	0.01 mg/L	
MD	MCL for Inorganic Chemicals	0.01 mg/L	
	Toxic Sub-Criteria for Ambient Surface Water - Drinking Water	10 $\mu\text{g/L}$	
ME	MCL for Inorganic Chemicals	0.01 mg/L	
MN	Standards for Classes A and B Standards for Class D MCL for Inorganic Chemicals	0.01 mg/L 0.01 mg/L 0.01 mg/L	

7. REGULATIONS AND ADVISORIES

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

Agency	Description	Information	References
<u>STATE</u> (cont.)			
MO	MCL for Inorganic Chemicals	0.01 mg/L	
MS	Numeric Criteria - Human Health Organisms Only	168 µg/L	
	Numeric Criteria - Human - Water & Organisms	10 µg/L	
MT	Groundwater	10 µg/L	EPA 1988d
NC	MCL for Inorganic Chemicals	0.01 mg/L	CELDs 1994
ND	MCL for Inorganic Chemicals	0.01 mg/L	
	Standards of Water Quality for Class I	one hour total cannot exceed in µg/L the numerical value given by $e(1.128 [n \text{ hardness as mg/L}] - 3.828)$ more than once every 3 years on avg.	
NE	MCL for Inorganic Chemicals	0.01 mg/L	
	Public Drinking Water Supply Numerical Criteria	0.01 mg/L	
NH	Contaminant Levels for Inorganic Chemicals & Fluoride	0.01 mg/L	
NM	MCL for Inorganic Chemicals	0.01 mg/L	
NV	All Classes - Upper Values	0.0004 mg/L	EPA 1988d
NY	For Water Classes A, A-S, AA, AA-S - Water Quality Standards - Surface & Ground (health)	10 µg/L	CELDs 1994
OH	MCL for Inorganic Chemicals	0.01 mg/L	
	Criteria for Use Designations - Human Health (30-day avg.)	10 µg/L	
OK	Maximum Allowable Levels for Inorganic Chemicals	0.005 mg/L	
	Public and Private - Upper Value	0.01 mg/L	EPA 1988d
OR	MCL for Inorganic Chemicals	0.01 mg/L	CELDs 1994
PR	Specific Stds for Toxic Sub. Coastal Estuarine Waters Surface Waters	5.0 µg/L Conc. In µg/L - must not exceed numerical value by 3.490 to power of (0.7852 [in hardness])	
RI	MCL's for Inorganic Chemicals	0.01 mg/L	
SC	MCL's for Inorganic Chemicals	0.01 mg/L	

7. REGULATIONS AND ADVISORIES

Table 7-1: Regulations and Guidelines Applicable to Cadmium (continued)

Agency	Description	Information	References	
<u>STATE (cont.)</u>				
SD	MCL's for Inorganic Chemicals	0.01 mg/L		
TN	Maximum Contaminant Level	0.01 mg/L		
	National Primary Drinking Std. - MCL	0.005 mg/L		
TX	MCL's for Inorganic Chemicals	0.01 mg/L		
UT	MCL for Inorganic Chemicals	0.005 mg/L		
	Domestic Purposes-Class IA-Upper Value	0.01 mg/L	EPA 1988	
	Domestic Purposes-Class IB-Upper Value	0.01 mg/L		
	Domestic Purposes-Class IC-Upper Value	0.01 mg/L		
VA	Primary Maximum Contaminant Levels	0.01 mg/L	CELDs 1994	
	Surface Water Stds for Surface Public Water Supplies	0.01 mg/L		
VT	MCL's for Inorganic Chemicals	0.01 mg/L		
	Class A and B Water - Water Quality Criteria	10 mg/L		
WA	Primary Inorganic Chemical & Physical Contaminants	0.01 mg/L		
WI	Human Threshold Criteria Public Water			
	Warm water sport fish	0.01 mg/L		
	Cold water comm.	0.01 mg/L		
	Great Lakes	0.01 mg/L		
	Human Threshold for Non-Public Water			
	Warm water sport fish	0.01 mg/L		
	Cold water comm.	0.01 mg/L		
	Great Lakes	0.01 mg/L		
	MCLGs Equal to MCLs or Action Levels	0.005 mg/L		
	Maximum Inorganic Contaminant Levels	0.005 mg/L		
WV	Public Water Surface-Category A -Upper Value	Narr. (10 mg/L)	EPA 1988d	
	Criteria for Cadmium - Hardness mg/L as CaCO ₃		CELDs 1994	
	0 - 35	soluble cadmium 1 µg/L		
	36 -75	2 µg/L		
	76 -150	5 µg/L		
	>150	10 µg/L		
	<u>Water Quality Criteria: Aquatic Life</u>			
	AL	Aquatic Life		CELDs 1994
		Marine acute	43.0 µg/L	
		Marine chronic	9.3 µg/L	
	Freshwater (acute/chronic)	See text of Regs. for Equation		
AZ	Acute & Chronic Criteria for Aquatic & Wildlife		Equation for Calculation is in Regulations - Dissolved Cadmium	
	Cold water fishery, warm water fishery			
	Effluent dominated water Ephemeral			
FL	Shall Not Exceed 5.0 µg/L in Marine Waters			

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

Agency	Description	Information	References
<u>STATE (cont.)</u>			
	Maximum Conc. Levels for Mixing Zone Pollutants	100 µg/L	
IA	Class B Waters - Upper Value	0.01 mg/L	EPA 1988d
	Class B Waters - 2o Upper Limit	0.0012 mg/L	
	Class C Waters - Upper Value	0.01 mg/L	
HI	Numeric Standards for Toxic Pollutants Applicable to All Waters		
	Freshwater Acute	3+ µg/L	
	Freshwater Chronic	3+ µg/L	
	Saltwater Acute	43 µg/L	
	Saltwater Chronic	9.3 µg/L	
	Fish Consumption	NS (no std developed)	
IN	Acute and Chronic Criteria for Certain Metals (Metals conc. in µg/L)		CELDS 1994
	<u>Hazardous Values:</u>	<u>Acute</u> <u>Chronic</u>	
	50	2 0.7	
	100	4 1.1	
	150	6 1.6	
	200	9 2.0	
	250	11 2.3	
	300	14 2.7	
	350	16 3.0	
	400	19 3.4	
	450	21 3.7	
	500	24 4.0	
KY	Warmwater Aquat. - Upper Value	4.0 µg/L	EPA 1988d
	Warmwater Aquat. - 2 ^o Upper Limit	12.0 µg/L	
	Chronic Criteria conc. (µg/L)	e(0.7852[in hard-	
	Acute Criteria Conc. (µg/L)	3.490]) e(1.128[in hard-	
		3.838])	
LA	Numerical Criteria for Substances - Acute Criteria for Aquatic Life		
	Fresh water	0.66, 1.13, 2.0 µg/L	CELDS 1994
	Marine water	10.00 µg/L	
MD	Toxic Sub. Criteria for Ambient Surface Waters - Aquatic Life		
	Fresh water acute	3.9 µg/L	
	Fresh water chronic	1.1 µg/L	
	Salt water acute	43 µg/L	
	Salt water chronic	9.3 µg/L	
MO	Protection of Warmwater Aquatic Life	12 µg/L	EPA 1988d
	Cold Water Sport - Upper Value	1.2 µg/L	
MS	Numeric Criteria for All Waters		
	Freshwater acute	1.8 µg/L	
	Freshwater chronic	0.66 µg/L	
	Saltwater acute	43 µg/L	
	Saltwater chronic	9.3 µg/L	

7. REGULATIONS AND ADVISORIES

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

Agency	Description	Information	References	
STATE (cont.)				
MT	Aquatic Life - <u>Hardness</u> (µg/L)	125- 200	CELDs 1994	
	Chronic cold water fisheries	<125 1.2		1.5
	Chronic lakes	10		10
	General warm-water fishery	10		13
	Limited warm-water fisher	13		18
	Class III	10 µg/L		
	Aquatic Life - Acute CWF	3.9		6.2
	Acute lakes & GWWF	33		52
	Acute LWWF	46		72
	NC	Fresh Surface Water (WS-I) - Upper Value		0.4 µg/L
- 2° Upper Limit		2.0 µg/L		
Fresh Surface Water (WS-II) - Upper Value		0.4 µg/L		
- 2° Upper Limit		2.0 µg/L		
Fresh Surface Water (WS-III) - Upper Value		0.4 µg/L		
- 2° Upper Limit		2.0 µg/L		
Fresh Surface Water Class B - Upper Value		0.4 µg/L		
- 2° Upper Limit		2.0 µg/L		
Fresh Surface Water Class C - Upper Value		0.4 µg/L		
- 2° Upper Limit		2.0 µg/L		
ND	Tidal Salt Water - Class SA - Upper Value	5.0 µg/L	EPA 1988d	
	Tidal Salt Water - Class SB - Upper Value	5.0 µg/L		
	Tidal Salt Water - Class SC - Upper Value	5.0 µg/L		
	Class I Streams - Upper Value	0.01 mg/L		
	Class IA Streams - Upper Value	0.01 mg/L		
NJ	Class II Streams - Upper Value	0.01 mg/L	EPA 1988d	
	Class III Streams - Upper Value	0.01 mg/L		
	Fresh Waters (FW2) - Upper Value	10 µg/L		
	For Water Class GA (health)	10 µg/L		
	For Water Classes A, A-S, AA, AA-S, B, C (aquatic)	exp.(0.7852(in[ppm hardness]))3.490		
NY	For Water Class D (aquatic)	exp.(1.128(in[ppm hardness]))3.828	EPA 1988d	
	For Water Classes SA, SB, SC, I (aquatic)	7.7 µg/L		
	For Water Class SD (aquatic)	21 µg/L		
	Water Quality Standards for Aquatic Use	<(1.05 [in hardness]))3.73		
	Water Quality Standards for Aquatic use - 24 hr. average	<(1.05[in hardness]))8.53		
NV	Water Quality Standards for Aquatic Use	<(1.05 [in hardness]))3.73	EPA 1988d	
	Water Quality Standards for Aquatic use - 24 hr. average	<(1.05[in hardness]))8.53		
	Warm Water Habitat - Upper Value	Narr.		
	Limited Warm Water - Upper Value	Narr.		
	Exceptional - Upper Value	Narr.		
OH	Seasonal Salmon - Upper Value	Narr.	EPA 1988d	
	Cold Water - Upper Value	Narr.		

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

Agency	Description	Information	References
STATE (cont.)			
OK	Numerical Criteria for Toxic Substances (µg/L)		
	Acute	e(1.128[in hardness])–1.6774	
	Chronic	e(0.7852[in hardness])–3.828	
	Cadmium Limit for Trout Streams		
	Acute	e(1.128[in hardness])–3828	
	Chronic	e(.7852[in hardness])–3.490	
RI	Fresh Water - Class B - 2° Upper Limit	Narr. µg/L	EPA 1988d
	Fresh Water - Class C - 2° Upper Limit	Narr. µg/L	
	Fresh Water - Class D - 2° Upper Limit	Narr. µg/L	
	Sea Water - Class SA - Upper Value	59 µg/L	
	Sea Water Class SA - 2° Upper Value	4.5 µg/L	
	Sea Water Class SB - Upper Value	59 µg/L	
	Sea Water Class SB - 2° Upper Value	4.5 µg/L	
	Sea Water Class SC - Upper Value	59 µg/L	
Sea Water Class SC - 2° Upper Value	4.5 µg/L		
Trust Territories	Coastal Water - Class AA - Upper Value	5 µg/L	
	Coastal Water - Class A - Upper Value	5 µg/L	
	Coastal Water - Class B - Upper Value	5 µg/L	
	Fresh Water - Class 1 - Upper Value	0.66 µg/L	
	Fresh Water - Class 2 - Upper Value	0.66 µg/L	
UT	Aquatic Class 3A - Upper Value	0.0004 mg/L	
	Aquatic - Class 3B - Upper Value	0.004 mg/L	
	Aquatic - Class 3C - Upper Value	Narr.	
	Aquatic - Class 3D - Upper Value	Narr.	
VA	Chronic Criteria for Protection of Aquatic Life Freshwater		CELDs 1994
	Salt water total recoverable	e[0.7852(in hardness)]–3.490	
		9.3 µg/L	
VT	Water Quality Criteria for Protection - Aquatic Biota		
	Acute criteria	exp (1.128[in hardness])– 3.828	
	Chronic criteria	exp(0.7852[in hardness])–3.49	
WI	Acute Toxicity Criteria for Sub with Toxicity Related Water Quality at Various Hardness Levels		
	50 ppm	1.79 µg/L	
	100 ppm	3.92 µg/L	
	200 ppm	8.57 µg/L	
WV	Specific Water Quality Criteria		
	Warm water fish/small non-fishable stream	2 µg/L	EPA 1988d
	Trout waters	3 µg/L	
	Water contact recreation	2 µg/L	

7. REGULATIONS AND ADVISORIES

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

Agency	Description	Information	References
<u>STATE (cont.)</u>			
WY	Water Quality Standards for Fish & Aquatic Life for Special A Waters	0.0004–0.015 mg/L	CELDs 1994
	<u>Agricultural Standards</u>		
KS	Agricultural - Upper Value	0.05 mg/L	EPA 1988d
	Agricultural - Upper Value	0.01 mg/L	
MO	Irrigation - Upper Value	10 µg/L	
NV	Agricultural Uses - Irrigation	0.01 mg/L	
	Agricultural Uses - Watering of Livestock	0.05 mg/L	
	Propagation of Wildlife (only)	<0.05 mg/L	
OH	Agricultural - Upper Value	50 µg/L	
UT	Agricultural Uses - Class 4 - Upper Value	0.01 mg/L	
	<u>Recreational Standards</u>		
DC	Primary Contact Recreation & Secondary Contact Recreation - Numeric Standards, µg/L	0.8545(In hardness)–1.465	
			CELDs 1994
UT	Recreation and Class 2A - Upper Value	Narr.	
	Recreation and Class 2B - Upper Value	Narr.	
	<u>Groundwater Quality Standards</u>		
AL	Maximum Conc. of Constituents for Groundwater Protection	0.01 mg/L	
CO	Agricultural Standards	0.01 mg/L	
	Maximum Conc. of Constituents for Groundwater	0.01 mg/L	
	Maximum Conc. of Constituents for Groundwater Protection	0.01 mg/L	
DE	Maximum Conc. of Constituents for Groundwater Protection	0.01 mg/L	
IL	Maximum Conc. of Constituents for Groundwater Protection	0.01 mg/L	
MA	Maximum Criteria for Class I and Class II Groundwaters	0.01 mg/L	
	Primary Effluent Limitation for Class I and Class II Groundwaters	0.01 mg/L	
	Groundwater Protection - Max. Conc.	0.01 mg/L	
MD	Maximum Conc. of Constituents for Groundwater Protection	0.02 mg/L	
MN	Maximum Conc. of Constituents for Groundwater Protection	0.01 mg/L	
MT	Groundwater	10 µg/L	

7. REGULATIONS AND ADVISORIES

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

Agency	Description	Information	References
<u>STATE (cont.)</u>			
NC	Water Quality Standards for Class GS Waters	0.005 mg/L	
NE	Maximum Contaminant Levels for Groundwater	0.01 mg/L	
NJ	Groundwater Quality Criteria for Class GW	Natural background	
	Groundwater Quality Criteria for Class GW2 & GW3	0.01 mg/L	
	Maximum Conc. of Constituents for Groundwater Protection	0.01 mg/L	
NM	Groundwater Standards - Human Health Standards	0.01 mg/L	
NY	Groundwater Effluent Standards - Class GA	20 µg/L	
	Groundwater Monitoring for Intern - Drinking Water Standards - Hazardous Waste Facilities	0.01 mg/L	
OR	Numerical Groundwater Quality Ref. Levels	0.01 mg/L	
SC	Max. Conc. of Constituents for Groundwater Protection	0.01 mg/L	
	Interim Primary Drinking Water Standards - Groundwater Quality	0.01 mg/L	
TN	EPA Interim Primary Drinking Water Standards - Groundwater	0.01 mg/L	
	Max. Conc. of Constituents for Groundwater Protection	0.01 mg/L	
TX	Max. Conc. of Constituents for Groundwater Protection	0.01 mg/L	
	Groundwater Standards	0.0004 mg/L	
UT	Groundwater Protection	0.01 mg/L	
VA	Max. Conc. of Constituents for Groundwater Protection	0.01 mg/L	
WI	Public Health Groundwater Quality Standards		
	Enforcement Standards Preventive Activation	0.5 mg/L 0.5 mg/L	
WY	Max. Contaminant Levels for Groundwaters - Underground Water		
	Domestic Class I	0.01 mg/L	
	Agricultural Class II	0.01 mg/L	
	Livestock Class III	0.01 mg/L	
<u>Groundwater Quality Monitoring Parameters</u>			
AL	Suggested Methods		
		6010, 7130, 7131	
CA	Groundwater Monitoring	6010, 7130	

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

Agency	Description	Information	References
<u>STATE (cont.)</u>			
CO	Monitoring Data EPA Intern Primary Drinking Water Standards	0.01 mg/L	
	Groundwater Monitoring	6010, 7130	
IL	Groundwater Monitoring List	6010, 7130	
LA	Groundwater Monitoring List	6010, 7130	
MO	Groundwater Evaluation Parameters	µg/L	
NY	Groundwater Evaluation Parameters	6010, 7130	
OH	Groundwater Evaluation Parameters	6010, 7130	
SC	Groundwater Evaluation Parameters	6010, 7130	
VA	Groundwater Evaluation Parameters	6010, 7130	
WI	Groundwater Evaluation Parameters	6010, 7130	
c. Other			
<u>Hazardous Waste Constituents</u>			
AK	In landfill, must ensure cadmium application does not exceed 0.5 lbs./acre/year, or 4.5 lbs./acre/total accumulated on the life of the facility.		
AL	Maximum Concentration of Contaminants for the Tox. Characteristics	1.0 mg/L	
	For growth of food-chain crops: If cadmium contained in waste applied → pH of waste ≥ 6.5		
AL	Annual application of cadmium must not exceed - 0.5 kg/hq		
	Cumulative application of cadmium must not exceed - 5 kg/hq		
	If waste in soil has pH>6.5 the cumulative application of cadmium from waste must not exceed 5 kg/ha if soil cation exchange capacity (CEC) is <5 meq/100g, 10kg/ha if soil (CED) is 5-15 meq/100g, and 20 kg/ha if soil (CEC is >15 meq/100g		
	Or animal feed must be the only food chain produced, the pH of the waste and soil must be 6.5		
	Specification levels for used oil subject to regulation when burned for energy recovery	2 ppm max.	

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

Agency	Description	Information	References
<u>STATE (cont.)</u>			
AZ	Must be disposed of in sanitary landfill on site approved		
	Wastewater Sludge - Annual application of cadmium must not exceed 0.5 kg/ha or 0.45 lbs/acre		
CA	Liquid Hazardous Waste Conc. - Restricted from Land Disposal	100 mg/L	
	Cannot be land disposed of if exceeds:		
	Metal containing solid waste	1.0 mg/L	
	Non RCRA waste cat., fish ash, bottom ash	1.0 mg/L	
	Non-RCRA waste, baghouse waste for foundries	1.0 mg/L	
	Cannot be land disposed of if exceeds:		
	Auto shredder waste	1.0 mg/L	
	Hazardous waste foundry sand.	1.0 mg/L	
CO	Maximum Conc. of Contaminants for Toxicity Characteristics	1.0 mg/L	
	Food chain crops cannot be grown unless:		
	Cadmium does not exceed	0.5 kg/ha	
	Cumulative application does not exceed	5 kg/ha	
	Cumulative Cadmium Appl. - <5 meq/100q - Soil Cation Exchange - Max. Cum. Appliatia	5 kg/ha	
	Cumulative Cadmium Appl. - 5-15 meq/100q - or - Soil Cation Exchange - Max. Cum. Appliatia	10 kg/ha	
	Cumulative Cadmium Appl. - >15 neq.1000q Soil Cation Exchange - max. Cum. Appliatia	20 kg/ha	
DE	Hazardous Waste Constituent		
	Cumulative App. of Cadmium from Waste If waste and soil mix has pH of 6.5 or > cum application of cadmium from waste shall not exceed - if soil cation exchange capacity is		
	<5-15 meq./100g	5 kg/ha	
	5-15 meq/100g	10 kg/ha	
	>15 meq/100g	20 kg/ha	
	Allowable Levels of Constituents in Used Oil Burned for Energy Rec. - Allowable Levels	2 ppm max.	
FL	Compost from Solid Waste Other Than Yard Waste Must Include Cadmium mg/kg Dry Weight		
IA	Maximum Contaminant Level	15 mg/kg	
IN	Application of Waste or Sludge Containing Cadmium Must Not Exceed	0.45 lbs./acre	
	Max. Metal Addition in lb./acre When Soil Cation Exchange Capacity (meq/100g)		
	<5 meq/100g	4.5 mg/kg (5)	
	5-15 meq/100g	9 mg/kg (10)	
	>15 meq/100g	18 mg/kg (20)	

7. REGULATIONS AND ADVISORIES

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

Agency	Description	Information	References
<u>STATE (cont.)</u>			
	Allowable Conc. for Parameters Using EP Toxicity Test		
	Type IV	0.01 mg/L	
	Type III	0.1 mg/L	
	Type II	0.23 mg/L	
	Type I	1.0 mg/L	
IL	Generic Exclusion Levels - Max. for Any Single Composite Sample	0.032 mg/L	
	Max. Conc. of Contaminants for the Toxicity Characteristics	1.0 mg/L	
KY	Maximum Concentration of Contaminants for Toxic Characteristics	1.0 mg/L	
	Maximum Concentration of Waste Permitted By Rule	30 mg/kg dry wt.	
KY	Formula for Determining the Maximum Number of Tons/Acre Tons waste/acre Pounds of allowable cadmium per/acre (mg of cadmium per kg in sample) x0.002		
	Max. Metal Cumulative Conc. Soil Exchange Capacity (meq/100g)		
	0-5	4.46 mg/kg	
	5-15	8.92 mg/kg	
	5+	17.84 mg/kg	
LA	Max. Allowable Metal Loading (lb./acre) Soil Cation Exchange Capacity		
	<5 meq/100g	5 lb/acre	
	<5-15 meq/100g	10 lb/acre	
	>15 meq/100g	20 lb/acre	
	Maximum Conc. of Contaminants for Toxicity Characteristics	1.0 mg/L	
	Liquid Hazardous Waste - containing the following metals or cpds. of these metals at conc. greater than or equal to - cadmium		
	pH of waste and soil mixture is 6.5 or > at time of each waste application except for waste containing cadmium at conc. of 2 mg/kg dry wt or less.		
MA	Sludge Conc. - Max. Allowable Conc, in ppm Dry Wt. (Type 1 Sludge)	2 ppm	
	Sludge or Septag Shall be Classified at Type II if Containing Substance, not exceeding	22 ppm dry wt.	
	Max. Allowable Conc. shall Not Exceed - Below Limitations Where Type II or Type III sludge or septage is land applied excluding soil background level - 7 than 5	4.5 lbs/acre	
	5 or more	4.5 lbs/acre	
	Max. Conc. of Contaminants of the Toxicity Characteristics	1.0 mg/L	

7. REGULATIONS AND ADVISORIES

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

Agency	Description	Information	References
<u>STATE</u> (cont.)			
	Liquid Hazardous Waste Containing Cadmium at Conc. Greater		
ME	Max. Permissible Conc. of Heavy Metals - for Application of Residuals and Sludges Onland	10 mg/kg dry wt.	
	Max. Loading Limits - (kg/ha) Based on Cation Exchange		
	<5 meq/100g	2.5 kg/ha	
	5-15 meq/100g	5kg/ha	
	>15 meq/100g	5 kg/ha	
	Max. Conc. of Contaminants of Toxicity Characteristics	1.0 mg/L	
MD	Max. Conc. of Contaminants of Toxicity Characteristics	1.0 mg/L	
MN	Max. Conc. of Contaminants of Toxicity Characteristics	1.0 mg/L	
MS	Max. Cum. Heavy Metal Loading Rate		
	kg/ha(CELL 5)	5 kg/ha	
	lb/acre (CELL 5)	4.4 lbs/acre	
	CEC 5-15	10 kg/ha	
	5-15	8.9 lb/acre	
	CEC >15	20 kg/ha	
	>15	17.8 lbs/acre	
MT	Max. Conc. of Contaminants of Toxicity Characteristics	1.0 mg/L	
ND	Max. Allowable Conc. of Contaminants for Characteristics of EPTOX.	1.0 mg/L	
	Max. Conc. of Constituents for Groundwater Protection	0.01 mg/L	
NE	Max. Allowable Conc. of Contaminants for Characteristics of EPTOX.	1.0 mg/L	
NH	Max. Allowable Conc. of Contaminants for Characteristics of EPTOX.	1.0 mg/L	
NJ	Maximum Conc. of Contaminants for the Toxicity Characteristics	1.0 mg/L	
NY	Max. Conc. of Contaminant for the Characteristics of EP toxicity	1.01 mg/L	
	Max. Conc. of Constituent for Groundwater Protection	0.01 mg/L	
OH	Max. Conc. of Contaminant for the Toxicity Characteristics	1.0 mg/L	
	Max. Conc. of Constituents for Groundwater Protection	0.02 mg/L	
PA	Max. Conc. of Contaminant for the Toxicity Characteristics	1.0 mg/L	
SC	Max. Conc. of Contaminant for the Toxicity Characteristics	1.0 mg/L	

7. REGULATIONS AND ADVISORIES

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

Agency	Description	Information	References
<u>STATE (cont.)</u>			
TX	Allowable Conc. of Contaminant for the Toxicity Characteristics		
	Inland Waters of Contaminant for the Toxicity Characteristics		
	Average	0.05 mg/L	
	Composite	0.1 mg/L	
	Grab sample	0.2 mg/L	
TX	Allowable Conc. of the Metals for Discharge of Tidal Waters		
	Average	0.01 mg/L	
	Composite	0.2 mg/L	
	Grab sample	0.3 mg/L	
	Sludge Constituents Do Not Exceed	50 mg/kg	
TX	If Sludge if Stored on Site Under Semi-dry Conditions for 6 mos., sludge constituents do not exceed	25 mg/kg	
VA	Max. Conc. of Contaminant of Toxicity Characteristics	1.0 mg/L	
VT	Total Metals Conc. Standards for Waste	25 mg/kg dry wt.	
	Max. Conc. of Contaminant of Toxicity Characteristics	1.0 mg/L	
WA	EP Toxicity List - EHW Max. Conc. Extract	>100 mg/L	
	EP Toxicity List - DH Max. Conc. In Extract	>100-10,000 mg/L	
	Max. Conc. Solid Waste Management	0.01 mg/L	
WI	Max. Conc. of Contaminant for the Tox. Characteristics	1.0 mg/L	
	EPA Interim Drinking Water Standards	0.01 mg/L	
WV	Max. Conc. of Contaminant for the Toxicity Characteristics	1.0 mg/L	
WY	Max. Conc. of Contaminant for the Toxicity Characteristics	1.0 mg/L	
	<u>Maximum Leachable Concentration</u>		
AL	Maximum Concentration Level	0.01 mg/L	CELDs 1994
CA	Leachable Monitoring - List of Required Constituents	--	
LA	Max. Conc. of Constituents for Groundwater Protection	0.01 mg/L	
SC	MCLs	0.01 mg/L	
TX	Constituents of Concern and Max. Leachable Conc.	0.5 mg/L	
	<u>Restricted Pesticides</u>		
CA	Restricted-Economic Poison Containing Cadmium		CELDs 1994
CT	Registered & Prohibited	Cadmium products	

7. REGULATIONS AND ADVISORIES

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

Agency	Description	Information	References
<u>STATE</u> (cont.)			
HI	Restricted Use Pesticides	Any conc.	
ME	Restricted Use Pesticides		
NH	Restricted Pesticides	Any conc.	
NJ	Restricted Pesticides	Any conc.	
OR	Restricted Pesticides	Any form	
PA	Restricted Pesticides		
WI	Limited Use Pesticides	Prohibited	
	<u>Fish and Wildlife Consumption Advisories</u>	Number of Advisories Issued for 1997	EPA 1998
		Fish Wildlife	
ME	Statewide		1
NJ	Statewide: coastal waters	1	
NY	Statewide: marine and freshwater	5	

^aStandard applies to any operation or sectors for which cadmium's standard 1910.1027 is stayed or otherwise not in effect.

Group 2A = probably carcinogenic to humans
 Ca = potential occupational carcinogen
 A2 = Suspected Human Carcinogen

ACGIH = American Conference of Governmental Industrial Hygienists; ALI = Annual Limits on Intake; BAT = Best Available Technology; BEI = Biological Exposure Indicator; BPT = Best Practicable Technology; DAC = Derived Air Concentrations; EPA = Environmental Protection Agency; FDA = Food and Drug Administration; IARC = International Agency for Research on Cancer; IDLH = Immediately Dangerous to Life or Health Level; LDR = Land Disposal Restrictions; MCL = Maximum Contaminant Level; MCLG = Maximum Contaminant Level Goal; NAS = National Academy of Science; NIOSH = National Institute for Occupational Safety and Health; NPDES = National Pollutant Discharge Elimination System; NRC = National Research Council; NSPS = New Source Performance Standard; OAQPS = Office of Air Quality Planning and Standards; ODW = Office of Drinking Water; OERR = Office of Emergency and Remedial Response; OPP = Office of Pesticide Products; OSHA = Occupational Safety and Health Administration; OSW = Office of Solid Waste; OTS = Office of Toxic Substances; OWRS = Office of Water Regulations and Standards; PEL = Permissible Exposure Limit; PQL = Practical Quantitation Limit; PSES = Pretreatment Standards for Existing Sources; PSNS = Pretreatment Standard for New Sources; RfD = Reference Dose; SNARL = Suggested No Adverse Reaction Level; SWMUs = Solid Waste Management Units; TLV = Threshold Limit Value; TWA = Time-Weighted Average; WHO = World Health Organization