Appendix A:Water Quality Criteria for Toxic Substances

As new criteria documents for toxic substances are published by EPA, these will become incorporated into and made a part of Subsection O, TOXIC SUBSTANCES and the associated tables A1: "Fresh Water Aquatic Criteria" and A2: "Human Health Criteria," during triennial review, and the numeric criteria established by EPA shall equally apply. Numeric criteria for carcinogens will reflect a risk level of one in a million.

For specific **segments** where the criteria in Tables A1 and A2 may need to be recalculated using appropriate species or water quality factors, the Pueblo of Santa Ana may, after public participation and EPA approval, adopt site-specific criterion modifications. Since pesticides and PCB's can accumulate in bottom sediments and tissues of aquatic organisms, sediment and tissue analysis shall routinely be used to complement water analysis. Fish tissue levels in excess of **FDA Action Limits** shall require investigation.

Table A1: Fresh Water Aquatic Criteria

Substance[b]	CASRN	Chronic Toxicity[c] (µg/l)	Acute Toxicity[c] (µg/l)
Acrolein	107-02-8	3.0	3.0
Aldrin	309-00-2	--	3.0
Aluminum[a]	7429-90-5	750	750
Ammonia[d]	7664-41-7[e]	0.21[f,g]	0.81[f]
Arsenic[a]	7440-38-2	150	340
Beryllium[a]	7440-41-7	5.3	130
Cadmium[a]	7440-43-9	e(0.79770.7409[ln(hd)]-3.90944.719)(CF)	e(0.97891.0166[ln(hd)]-3.8663.924)(CF)
Carbaryl	63-25-2	2.1	2.1
Chlordane	57-74-9	0.0043	2.4
Chlorine residual	7782-50-5	11	19
Chlorpyrifos	2921-88-2	0.041	0.083
Chromium (III)[a]	16065-83-1	e(0.8190[ln(hd)]+0.68480.534)(0.860)	e(0.8190[ln(hd)]+3.72562.5736)(0.316)
Chromium (VI)[a]	18540-29-9	10.58	15.71
Copper[a]	7440-50-8	e(0.8545[ln(hd)]-1.7021.7428)(0.960)	e(0.9422[ln(hd)]-1.7001.7408)(0.960)
Cyanide	57-12-5	5.2	22
4,4'-DDT	50-29-3	0.001	1.1
Demeton	8065-48-3	0.1	--
Diazinon	333-41-5	0.17	0.17
Dieldrin	60-57-1	0.056	0.24
Endosulfan, alpha	959-98-8	0.056	0.22
Endosulfan, beta	33213-65-9	0.056	0.22

Table A1: Fresh Water Aquatic Criteria (Continued)

Substance[b]	CASRN	Chronic Toxicity[c] (µg/l)	Acute Toxicity[c] (µg/l)
Endrin	72-20-8	0.036	0.086
Guthion	86-50-0	0.01	--
Heptachlor	76-44-8	0.0038	0.52
Heptachlor epoxide	1024-57-3	0.0038	0.52
gamma-BHC (Lindane)	58-89-9	--	0.95
Iron [a]	7439-89-6	1000	--
Lead[a]	7439-92-1	e(1.273[ln(hd)]-4.705) (CF)	e(1.273[ln(hd)]-1.460) (CF)
Malathion	121-75-5	0.1	--
Mercury	7439-97-6	0.012	2.4
Methoxychlor	72-43-5	0.03	--
Mirex	2385-85-5	0.001	--
Nickel[a]	7440-02-0	e(0.8460[ln(hd)]+0.0584~~0.0554~~)(0.997)	e(0.8460[ln(hd)]+2.255~~2.253~~)(0.998)
Nonylphenol	25154-52-3	6.6	28
Parathion	56-38-2	0.013	0.065
Polychlorinated Biphenyls	xx-xx-x	0.014	--
Pentachlorophenol[h]	87-86-5	e(1.005(pH)-5.134)[h]	e(1.005 (pH)-4.869)[h]
Selenium	7782-49-2	2	20
Silver[a]	7440-22-4	--	e(1.72[ln(hd)]-6.59~~6.7525~~)(0.85)
Sulfide-Hydrogen Sulfide	7783-06-4	2	--
Toxaphene	8001-35-2	0.0002	0.73
Tributyltin (TBT)	-	0.072	0.46
Zinc[a]	7440-66-6	e(0.8473[ln(hd)]+0.884~~0.8699~~)(0.986)	e(0.8473[ln(hd)]+0.884~~0.8618~~)(0.978)

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-- = no criterion exists
hd = hardness
ln = natural log of number
CF = Conversion Factor (for hardness dependent metals)
For Cadmium: Acute CF is 1.136672-[ln(hd)(0.041838)]
Chronic CF is 1.101672-[ln(hd)(0.041838)]
For Lead: Acute CF is 1.46203-[ln(hd)(0.145712)]
Chronic CF is 1.46203-[ln(hd)(0.145712)]
a = Value based on using a dissolved method.
b = Total recoverable portion, unless indicated

c = Chronic and acute toxicity averaging periods and exceedances are as specified by the U.S. Environmental Protection Agency in *Quality Criteria for Water*, 1986 (EPA 440/5-86-001).

d = Ammonia criteria are based on *Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater 2013*, 2013 (EPA 822-R-13-001). Values listed in this table are for pH 8.6 at 25ºC. Specific values for other pH and temperature conditions are listed in Appendix B (Table B1 for CMC and Table B2 for CCC). These ammonia criteria are not to be exceeded more than once in three years on average.

e = The CAS number given is for ammonia. Ammonia reacts in water to form ammonium hydroxide. This reaction is temperature and pH dependent and both ammonia and ammonium hydroxide are typically present in equilibrium in aqueous solutions of ammonia. Therefore aqueous ammonia is given a different CAS number, 1336-21-6.

f = Units for ammonia criteria are mg Total Ammonia Nitrogen (TAN)/L.

g = The chronic criterion is expressed as a Criterion Continuous Concentration (CCC). The ammonia concentration is not to exceed 2.5 times the CCC as a 4-day average within 30-days, i.e., 0.53 mg TAN/L at pH 8.6 and 25ºC, more than once in three years on average.

h = Pentachlorophenol criteria are based on pH. For the allowable pH range (6.0 to 9.0), the pentachlorophenol criteria for chronic toxicity range from 2.4 to 50 and for acute toxicity range from 3.2 to 65.

mg/l = milligrams/liter

µg/l = micrograms/liter

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Appendix A: Water Quality Criteria for Toxic Substances

Table A2: Human Health Criteria*

Substance[b]	CASRN	Fish Consumption and Other[c] (Not to Exceed) (µg/l)	Water Consumption(µg/l)
Acenaphthene	83-32-9	20[i]	--
Acrolein	107-02-8	4009	--
Acrylonitrile	107-13-1	70.25	--
Aldrin	309-00-2	0.00000077~~0.00005~~	--
Antimony[a]	7440-36-0	--	6[e]
Arsenic[a]	7440-38-2	3.6[h]	10[e, h]
Barium [a]	7440-39-3	--	2000[e]
Benzene	71-43-2	16--	5[e]
Benzidine	92-87-5	0.011~~0.0002~~	--
Beryllium[a]	7440-41-7	--	4[e]
Butyl Benzyl Phthalate	85-68-7	0.10~~1900~~	--
Cadmium[a]	7440-43-9	--	5[e]
Carbon Tetrachloride	56-23-5	5~~1.6~~	--
Chlordane	57-74-9	0.00032~~0.00081~~	--
Chlorobenzene	108-90-7	20[i]	--
2-Chloronapthalene	91-58-7	1000~~1600~~	--
Bis(2-Chloroethyl) Ether	111-44-4	2.2~~0.53~~	--
Bis(2-Chloroisopropyl) Ether	108-60-1	~~65000~~4000	--
Bis(Chloromethyl) Ether	542-88-1	~~0.00029~~0.017	--
2-Chlorophenol	95-57-8	0.10[i]	--
3-Chlorophenol	108-43-0	0.10[i]	--
4-Chlorophenol	106-48-9	0.10[i]	--
2-Methyl-4-Chlorophenol	1570-64-5	1800[i]	--
3-Methyl-4-Chlorophenol	59-50-7	2000~~3000~~[i]	--
3-Methyl-6-Chlorophenol	615-74-7	20[i]	--
Chromium (III)[a]	16065-83-1	--	100[e]
Chromium (VI)[a]	18540-29-9	--	100[e]
Copper[a]	7440-50-8	1000[i]	--
Cyanide	57-12-5	400~~140~~	--
4,4'-DDT	50-29-3	0.00003~~0.00022~~	--

Table A2: Human Health Criteria* (Continued)

Substance[b]	CASRN	Fish Consumption and Other[c] (Not to Exceed) (µg/l)	Water Consumption(µg/l)
4,4'-DDE	72-55-9	0.000220.000018	--
4,4'-DDD	72-54-8	0.000120.00031	--
Di-n-Butyl Phthalate	84-74-2	304500	--
1,2-Dichlorobenzene	95-50-1	3000--	600[e]
1,3-Dichlorobenzene	541-73-1	10960	--
1,4-Dichlorobenzene	106-46-7	900--	75[e]
3,3'-Dichlorobenzedine	91-94-1	0.150.028	--
1,2'-Dichloroethane	107-06-2	650--	5[e]
1,1-Dichloroethylene	75-35-4	20000--	7[e]
1,2-Trans-Dichloroethylene	156-60-5	4000--	100[e]
2,3-Dichlorophenol	576-24-9	0.04[i]	--
2,4-Dichlorophenol	120-83-2	0.3[i]	--
2,5-Dichlorophenol	583-78-8	0.5[i]	--
2,6-Dichlorophenol	87-65-0	0.2[i]	--
3,4-Dichlorophenol	95-77-2	0.3[i]	--
2,4-Dichlorophenoxy-acetic acid (2,4-D)	94-75-7	12000--	70[e]
1,2-Dichloropropane	78-87-5	31--	5[e]
1,3-Dichloropropene	542-75-6	1221	--
Dieldrin	60-57-1	0.0000012 0.000054	--
Diethyl phthalate	84-66-2	60044000	--
2,4 Dimethyl phenol	105-67-9	400[i]	--
Dimethyl phthalate	131-11-3	2000 1100000	--
2,4-Dinitrotoluene	121-14-2	1.73.4	--
Dinitrophenols	25550-58-7	1000	--
2,4-Dinitrophenol	51-28-5	3005300	--
2-Methyl-4,6-Dinitrophenol	534-52-1	30280	--
Dioxin (2,3,7,8-TCDD)	1746-01-6	0.0000000051	--
1,2-Diphenylhydrazine	122-66-7	0.20	--
Bis 2-Ethylhexylphthalate	117-81-7	2.20.37	--
Endosulfan, alpha	959-98-8	3089	--
Endosulfan, beta	33213-65-9	4089	--

Table A2: Human Health Criteria* (Continued)

Substance[b]	CASRN	Fish Consumption and Other[c] (Not to Exceed) (µg/l)	Water Consumption(µg/l)
Endosulfan Sulfate	1031-07-8	4089	--
Endrin	72-20-8	0.030.06	--
Endrin Aldehyde	7421-93-4	0.301	--
Ethylbenzene	100-41-4	130--	700[e]
Fluoranthene	206-44-0	20140	--
Fluoride	16984-48-8	--	4000[e]
Heptachlor	76-44-8	0.000005900.000079	--
Heptachlor epoxide	1024-57-3	0.00003200.000039	--
Hexachloroethane	67-72-1	0.13.3	--
Hexachlorobenzene	118-74-1	0.00007900.00029	--
Hexachlorobutadiene	87-68-3	0.0118	--
Hexachlorocyclohexane (HCH) -Technical	608-73-1	0.010	
alpha-BHC	319-84-6	0.0003900.0049	--
beta-BHC	319-85-7	0.01400.017	--
gamma-BHC (Lindane)	58-89-9	4.41.8	--
Hexachlorocyclopentadiene	77-47-4	1[i]	--
Isophorone	78-59-1	1800960	--
Lead[a]	7439-92-1	d	--
Manganese[a]	7439-96-5	100	--
Methylmercury	22967-92-6	0.3 mg/kg in fish tissue[f]	--
Methyl Bromide	74-83-9	100001500	--
Methylene Chloride	75-09-2	1000590	--
Methoxychlor	72-43-5	--0.02	40[e]
Napthalene	91-20-3	d	--
Nickel[a]	7440-02-0	4600	--
Nitrate	14797-55-8	--	10000[e]
Nitrobenzene	98-95-3	30[i]	--
Nitrosamines		1.24	--
Nitrosodibutylamine N	924 -16-3	0.22	--
Nitrosodiethylamine N	55-18-5	1.24	--
N-Nitrosodimethylamine	62-75-9	3.0	--

Table A2: Human Health Criteria* (Continued)

Substance[b]	CASRN	Fish Consumption and Other[c] (Not to Exceed) (µg/l)	Water Consumption(µg/l)
N-Nitrosodi-n- Propylamine	621-64 -7	0.51	--
N-Nitrosodiphenylamine	86-30-6	6.0	--
N-Nitrosopyrrolidine	930-55-2	34	--
Polychlorinated Biphenyls	1336-36-3	0.000064	--
Pentachlorobenzene	608-93-5	0.11~~.5~~	--
Pentachlorophenol	87-86-5	~~30[i]~~0.04	1[e]
Phenol	108-95-2	300[i]	--
Polynuclear Aromatic Hydrocarbons (PAH's)		--	--
Anthracene	120-12-7	400~~00~~	--
Benzo(a)Anthracene	56-55-3	0.0013~~0.018~~	--
Benzo(a)Pyrene	50-32-8	0.00013~~0.018~~	--
Benzo(b)Fluoranthene	205-99-2	0.0013~~0.018~~	--
Benzo(ghi)Perylene	191-24-2	d	--
Benzo(k)Fluoranthene	207-08-9	0.013~~0.018~~	--
4-Bromophenyl Phenyl Ether	101-55-3	d --	--
Chysene	218-01-9	0.13~~0.018~~	--
Dibenzo(a,h)Anthracene	53-70-3	0.00013~~0.018~~	--
Fluorene	86-73-7	70~~5300~~	--
Indeno 1,2,3-cd Pyrene	193-39-5	0.0013~~0.018~~	--
Phenanthrene	85-01-8	d	--
Pyrene	129-00-0	30~~4000~~	--
Selenium	7782-49-2	4200	--
Tetrachlorobenzene 1,2,4,5	95-94-3	0.03~~1.1~~	--
1,1,2,2-Tetrachloroethane	79-34-5	3~~4.0~~	--
Tetrachloroethylene	127-18-4	29~~3.3~~	--
2,3,4,6-Tetrachlorophenol	58-90-2	1.0[i]	--
Thallium [a]	7440-28-0	0.47	--
Toluene	108-88-3	520~~--~~	1000[e]
Toxaphene	8001-35-2	0.00071~~0.00028~~	--
1,2,4 Trichlorobenzene	120-82-1	0.076~~70~~	--
1,1,1-Trichloroethane	71-55-6	200000~~--~~	200[e]
1,1,2-Trichloroethane	79-00-5	8.9~~--~~	5[e]
Trichloroethylene	79-01-6	7~~--~~	5[e]

Table A2: Human Health Criteria* (Continued)

Substance[b]	CASRN	Fish Consumption and Other[c] (Not to Exceed) (µg/l)	Water Consumption(µg/l)
2,4,5-Trichlorophenol	95-95-4	1.0[i]	--
2,4,6-Trichlorophenol	88-06-2	2.0[i]	--
2-(2,4,5-Trichlorophenoxy) Propionic acid (Silvex)	93-72-1	400~~--~~	50[e]
TTHM (Sum of total Trihalomethanes)			80[e, g]
Dichlorobromomethane	75-27-4	27~~17~~	--
Bromoform	75-25-2	120~~140~~	--
Chloroform	67-66-3	2000~~470~~	--
Chlorodibromomethane	124-48-1	21~~13~~	--
Vinyl Chloride	75-01-4	1.6~~--~~	2[e]
Zinc[a]	7440-66-6	5000[i]	--

* The values stated as Human Health Criteria for these substances are based on the assumption that fish from the surface waters covered by the Pueblo of Santa Ana Water Quality Standards are consumed, but water from these surface waters is not regularly ingested. A risk 10^{-6} is assumed for carcinogens. Where no criterion exists based on fish consumption, MCLs and background conditions are used as the basis of the water quality standard of protection.

-- = no criterion exists

a = Value based on using a dissolved method.

b = Total recoverable portion, unless indicated

c = unless otherwise noted, the value based on current national recommended water quality criteria with respect to human health for the consumption of fish and other aquatic organisms. These values can be found on http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm.

d = EPA has not calculated human health criterion for this contaminant. However, permit authorities should address this contaminant in NPDES permit actions using the Pueblo of Santa Ana's narrative criteria for toxics.

e = Based on Safe Drinking Water Act Maximum Contaminant Levels (MCLs).

f = Concentrations of mercury from all sources shall not result in methylmercury concentrations in fish tissue that exceed 0.3 mg/kg. This criterion is based on a fish consumption rate of 17.5 g/day.

g = This value cannot be exceeded by itself, or as part of Total Trihalomethanes that include:
Bromodichloromethane (CASN 75-27-4)
Dibromochloromethane(CASN 124-48-1)
Tribromomethane [Bromoform (CASN 75-25-2)]
Trichloromethane [Chloroform (CASN 67-66-3)]

h = Based on background conditions of the Rio Grande the Fish Consumption and Other limit for Arsenic is 3.6 µg/L. Levels in the Rio Jemez commonly exceed this value and background is estimated to be 160 µg/L. The criterion for water consumption of 10 µg/L will be applied to discharges into the waters of the Rio Jemez watershed.

i = Value based on organoleptic effects criteria (e.g., taste and odor) in the current national recommended water quality criteria (see http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm).
mg/l= milligrams/liter
µg/l = micrograms/liter