

***Summary of Reasons Supporting Proposed Revisions
to rule 335-6-10, Water Quality Criteria***

335-6-10-.07 Appendix A

The Alabama Department of Environmental Management (ADEM) proposes to amend rule 335-6-10-.07 Appendix A to revise the reference doses for acrolein and phenol to be consistent with the values in the United States Environmental Protection Agency's Integrated Risk Information System (IRIS). On April 18, 2008 the Alabama Environmental Management Commission directed the Department to propose this change.

335-6-10-.07 Toxic Pollutant Criteria Applicable to State Waters.

(1) The U. S. Environmental Protection Agency has listed the chemical constituents given in Table 1 as toxic pollutants pursuant to Section 307(a)(1) of the Federal Water Pollution Control Act (FWPCA). Concentrations of these toxic pollutants in State waters shall not exceed the criteria indicated in Table 1 to the extent commensurate with the designated usage of such waters.

(a) The freshwater and marine aquatic life criteria for certain of the pollutants are dependent on hardness or pH. For these pollutants, the criteria are given by the following equations. In the hardness-dependent equations for metals, a conversion factor converts the total recoverable value to a criterion expressed as the dissolved fraction in the water column. All numeric values listed for metals in Table 1 at the end of this chapter are expressed as dissolved metals unless otherwise noted.

1. Cadmium

(i) freshwater acute aquatic life:

$$\text{conc. } (\mu\text{g/l}) = (e^{(1.0166[\ln(\text{hardness in mg/l as CaCO}_3)]-3.924)})(\text{CF}); \quad \text{(Eq. 1)}$$

$$\text{conversion factor (CF)} = 1.136672 - [\ln(\text{hardness})(0.041838)]$$

(ii) freshwater chronic aquatic life:

$$\text{conc. } (\mu\text{g/l}) = (e^{(0.7409[\ln(\text{hardness in mg/l as CaCO}_3)]-4.719)})(\text{CF}); \quad \text{(Eq. 2)}$$

$$\text{conversion factor (CF)} = 1.101672 - [\ln(\text{hardness})(0.041838)]$$

2. Chromium (trivalent)

(i) freshwater acute aquatic life:

$$\text{conc. } (\mu\text{g/l}) = (e^{(0.8190[\ln(\text{hardness in mg/l as CaCO}_3)]+3.7256)})(\text{CF}); \quad \text{(Eq. 3)}$$

$$\text{conversion factor (CF)} = 0.316$$

(ii) freshwater chronic aquatic life:

$$\text{conc. } (\mu\text{g/l}) = (e^{(0.8190[\ln(\text{hardness in mg/l as CaCO}_3)]+0.6848)})(\text{CF}); \quad \text{(Eq. 4)}$$

$$\text{conversion factor (CF)} = 0.860$$

3. Copper

(i) freshwater acute aquatic life:

$$\text{conc. } (\mu\text{g/l}) = (e^{(0.9422[\ln(\text{hardness in mg/l as CaCO}_3)]-1.700)})(\text{CF}); \quad \text{(Eq. 5)}$$

$$\text{conversion factor (CF)} = 0.960$$

(ii) freshwater chronic aquatic life:

$$\text{conc. } (\mu\text{g/l}) = (e^{(0.8545[\ln(\text{hardness in mg/l as CaCO}_3)]-1.702)})(\text{CF}); \quad \textbf{(Eq. 6)}$$

$$\text{conversion factor (CF)} = 0.960$$

4. Lead

(i) freshwater acute aquatic life:

$$\text{conc. } (\mu\text{g/l}) = (e^{(1.273[\ln(\text{hardness in mg/l as CaCO}_3)]-1.460)})(\text{CF}); \quad \textbf{(Eq. 7)}$$

$$\text{conversion factor (CF)} = 1.46203 - [\ln(\text{hardness})(0.145712)]$$

(ii) freshwater chronic aquatic life:

$$\text{conc. } (\mu\text{g/l}) = (e^{(1.273[\ln(\text{hardness in mg/l as CaCO}_3)]-4.705)})(\text{CF}); \quad \textbf{(Eq. 8)}$$

$$\text{conversion factor (CF)} = 1.46203 - [\ln(\text{hardness})(0.145712)]$$

5. Nickel

(i) freshwater acute aquatic life:

$$\text{conc. } (\mu\text{g/l}) = (e^{(0.8460[\ln(\text{hardness in mg/l as CaCO}_3)]+2.255)})(\text{CF}); \quad \textbf{(Eq. 9)}$$

$$\text{conversion factor (CF)} = 0.998$$

(ii) freshwater chronic aquatic life:

$$\text{conc. } (\mu\text{g/l}) = (e^{(0.8460[\ln(\text{hardness in mg/l as CaCO}_3)]+0.0584)})(\text{CF}); \quad \textbf{(Eq. 10)}$$

$$\text{conversion factor (CF)} = 0.997$$

6. Pentachlorophenol

(i) freshwater acute aquatic life:

$$\text{conc. } (\mu\text{g/l}) = e^{[1.005(\text{pH})-4.869]} \quad \textbf{(Eq. 11)}$$

(ii) freshwater chronic aquatic life:

$$\text{conc. } (\mu\text{g/l}) = e^{[1.005(\text{pH})-5.134]} \quad \textbf{(Eq. 12)}$$

7. Silver

(i) freshwater acute aquatic life:

$$\text{conc. } (\mu\text{g/l}) = (e^{(1.72[\ln(\text{hardness in mg/l as CaCO}_3)]-6.59)})(\text{CF}); \quad \textbf{(Eq. 13)}$$

$$\text{conversion factor (CF)} = 0.85$$

8. Zinc

(i) freshwater acute aquatic life:

$$\text{conc. } (\mu\text{g/l}) = (e^{(0.8473[\ln(\text{hardness in mg/l as CaCO}_3)]+0.884)})(\text{CF}); \quad \text{(Eq. 14)}$$

$$\text{conversion factor (CF)} = 0.978$$

(ii) freshwater chronic aquatic life:

$$\text{conc. } (\mu\text{g/l}) = (e^{(0.8473[\ln(\text{hardness in mg/l as CaCO}_3)]+0.884)})(\text{CF}); \quad \text{(Eq. 15)}$$

$$\text{conversion factor (CF)} = 0.986$$

(b) The marine aquatic life criteria apply only to interstate and coastal waters of the Mobile River - Mobile Bay Basin and interstate and coastal waters of the Perdido River Basin, as identified in rule 335-6-11-.02 of the Department's regulations. The acute aquatic life criteria apply to all waters of the State. The chronic aquatic life criteria apply only to waters classified Outstanding Alabama Water, Public Water Supply, Swimming and Other Whole Body Water-Contact Sports, Shellfish Harvesting, Fish and Wildlife, and Limited Warmwater Fishery, as identified in rule 335-6-11-.02 of the Department's regulations.

(c) For the purpose of establishing effluent limitations pursuant to chapter 335-6-6 of the Department's regulations, the minimum 7-day low flow that occurs once in 10 years ($7Q_{10}$) shall be the basis for applying the chronic aquatic life criteria, except as noted in rule 335-6-10-.09(6), and the minimum 1-day low flow that occurs once in 10 years ($1Q_{10}$) shall be the basis for applying the acute aquatic life criteria, except as noted in rule 335-6-10-.09(7)(c)(5). Where a permit specifies a minimum flow greater than $7Q_{10}$, the specified minimum flow may be used as the basis for applying the acute and chronic aquatic life criteria for that permit.

(d) Except as noted in Table 1, two human health criteria are provided for each pollutant--a criterion for consumption of water and fish, and a criterion for consumption of fish only. For certain pollutants, the human health criterion for consumption of water and fish may represent a maximum contaminant level (MCL) developed under the Safe Drinking Water Act.

1. For pollutants classified by the U.S. Environmental Protection Agency as non-carcinogens, the criteria shall be given by the following equations, except where numeric values are given in Table 1.

(i) Consumption of water and fish:

$$\text{conc. (mg/l)} = (\text{HBW} \times \text{RfD} \times \text{RSC}) / [(\text{FCR} \times \text{BCF}) + \text{WCR}] \quad \text{(Eq. 16)}$$

(ii) Consumption of fish only:

$$\text{conc. (mg/l)} = (\text{HBW} \times \text{RfD} \times \text{RSC}) / (\text{FCR} \times \text{BCF}) \quad \text{(Eq. 17)}$$

where (in Equations 16 and 17):

HBW = human body weight, set at 70 kg

RfD = reference dose, in mg/(kg-day)

RSC = relative source contribution

FCR = fish consumption rate, set at 0.030 kg/day

BCF = bioconcentration factor, in 1/kg

WCR = water consumption rate, set at 2 l/day

(iii) The values used for the reference dose (RfD) shall be values available through the U.S. Environmental Protection Agency's Integrated Risk Information System (IRIS), and values used for the bioconcentration factor (BCF) and relative source contribution (RSC) shall be values contained in ambient water quality criteria documents published by the U.S. Environmental Protection Agency, except where other values are established pursuant to subparagraph (1)(g). The RfD, RSC, and BCF values for specific pollutants are provided in Appendix A.

2. For pollutants classified by the U.S. Environmental Protection Agency as carcinogens, the criteria shall be given by the following equations, except where numeric values are given in Table 1.

(i) Consumption of water and fish:

$$\text{conc. (mg/l)} = (\text{HBW} \times \text{RL}) / (\text{CPF} \times [(\text{FCR} \times \text{BCF}) + \text{WCR}]) \quad \text{(Eq. 18)}$$

(ii) Consumption of fish only:

$$\text{conc. (mg/l)} = (\text{HBW} \times \text{RL}) / (\text{CPF} \times \text{FCR} \times \text{BCF}) \quad \text{(Eq. 19)}$$

where (in Equations 18 and 19):

HBW = human body weight, set at 70 kg

RL = risk level, set at 1×10^{-6} (except for arsenic which is set at 1×10^{-5})

CPF = cancer potency factor, in (kg-day)/mg

FCR = fish consumption rate, set at 0.030 kg/day

BCF = bioconcentration factor, in 1/kg

WCR = water consumption rate, set at 2 l/day

(iii) The values used for the cancer potency factor (CPF) shall be values available through the U.S. Environmental Protection Agency's Integrated Risk Information System (IRIS), and values used for the bioconcentration factor (BCF) shall be values contained in ambient water quality criteria documents published by the U.S. Environmental Protection Agency, except where other values are established pursuant to subparagraph (1)(g). The CPF and BCF values for specific pollutants are provided in Appendix A.

(e) The criteria given in Table 1 for consumption of water and fish, or computed from equation 16 or equation 18 for consumption of water and fish, shall apply only to those waters of the State classified Public Water Supply, as identified in rule 335-6-11-.02 of the Department's regulations. The criteria given in Table 1 for consumption of fish only, or computed from equation 17 or equation 19 for consumption of fish only, shall apply to all waters of the State.

(f) For the purposes of establishing effluent limitations pursuant to chapter 335-6-6 of the Department's regulations, the minimum 7-day low flow that occurs once in 10 years ($7Q_{10}$) shall be the basis for applying the human health criteria for pollutants classified as non-carcinogens, and the mean annual flow shall be the basis for applying the human health criteria for pollutants classified as carcinogens; except that where a permit specifies a minimum flow greater than $7Q_{10}$, the specified minimum flow may be used as the basis for applying the human health criteria for pollutants classified as non-carcinogens for that permit.

(g) Numeric criteria may be computed by the Department from equations 16, 17, 18, and 19 using values for the reference dose (RfD), relative source contribution (RSC), cancer potency factor (CPF), and bioconcentration factor (BCF) determined by the Department in consultation with the State Department of Public Health after review of information available from sources other than the U.S. Environmental Protection Agency's Integrated Risk Information System (IRIS) or ambient water quality criteria documents. Such criteria, or the RfD, RSC, CPF, and BCF values used to compute criteria, shall not be effective until adopted following established rulemaking procedures.

Author: James E. McIndoe.

Statutory Authority: Code of Alabama 1975, §§ 22-22-9, 22-22A-5, 22-22A-6, 22-22A-8.

History: March 2, 1990. **Amended:** April 3, 1991; May 28, 1992; August 29, 1994; May 30, 1997; September 7, 2000; January 12, 2001; January 14, 2005; September 21, 2005; May 29, 2007; May 27, 2008; [XXXXXX, 2008](#).

TABLE 1
TOXIC POLLUTANT CRITERIA

Pollutant	Aquatic Life Criteria (in µg/l unless otherwise noted)				Human Health Criteria (in µg/l unless otherwise noted)	
	Freshwater Acute	Freshwater Chronic	Marine Acute	Marine Chronic	Consumption of Water and Fish	Consumption of Fish Only
Acenaphthene					Eq. 16	Eq. 17
Acrolein					Eq. 16	Eq. 17
Acrylonitrile ¹					Eq. 18	Eq. 19
Aldrin ¹	3.0		1.3		Eq. 18	Eq. 19
Anthracene					Eq. 16	Eq. 17
Antimony					Eq. 16	Eq. 17
Arsenic ¹ (Risk level = 1 x 10 ⁻⁵)	340 (tri)	150 (tri)	69 (tri)	36 (tri)	Eq. 18	Eq. 19
Asbestos					7,000,000 fibers/l (MCL)	
Benzene ¹					Eq. 18	Eq. 19
Benzidine ¹					Eq. 18	Eq. 19
Benzo(a)anthracene ¹					Eq. 18	Eq. 19
Benzo(a)pyrene ¹					Eq. 18	Eq. 19
Benzo(b)fluoranthene ¹					Eq. 18	Eq. 19
Benzo(k)fluoranthene ¹					Eq. 18	Eq. 19
Bis(2-chloroethyl)ether ¹					Eq. 18	Eq. 19
Bis(2-chloroisopropyl)ether					Eq. 16	Eq. 17
Bis(2-ethylhexyl)phthalate ¹					Eq. 18	Eq. 19
Bromoform ¹					Eq. 18	Eq. 19
Butylbenzyl phthalate					Eq. 16	Eq. 17

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Pollutant	Aquatic Life Criteria (in µg/l unless otherwise noted)				Human Health Criteria (in µg/l unless otherwise noted)	
	Freshwater Acute	Freshwater Chronic	Marine Acute	Marine Chronic	Consumption of Water and Fish	Consumption of Fish Only
Cadmium	Eq. 1	Eq. 2	40	8.8		
Carbon tetrachloride ¹					Eq. 18	Eq. 19
Chlordane ¹	2.4	0.0043	0.09	0.004	Eq. 18	Eq. 19
Chlorobenzene					Eq. 16	Eq. 17
Chlorodibromomethane ¹					Eq. 18	Eq. 19
Chloroform ¹					Eq. 18	Eq. 19
2-Chloronaphthalene					Eq. 16	Eq. 17
2-Chlorophenol					Eq. 16	Eq. 17
Chromium (trivalent)	Eq. 3	Eq. 4				
Chromium (hexavalent)	16	11	1100	50		
Chrysene ¹					Eq. 18	Eq. 19
Copper	Eq. 5	Eq. 6	4.8	3.1	1300 (MCL)	
Cyanide (free)	22	5.2	1.0	1.0	Eq. 16	Eq. 17
4,4'-DDD ¹					Eq. 18	Eq. 19
4,4'-DDE ¹					Eq. 18	Eq. 19
4,4'-DDT ¹	1.1	0.001	0.13	0.001	Eq. 18	Eq. 19
Dibenzo(a,h)anthracene ¹					Eq. 18	Eq. 19
1,2-Dichlorobenzene					Eq. 16	Eq. 17
1,3-Dichlorobenzene					Eq. 16	Eq. 17
1,4-Dichlorobenzene					Eq. 16	Eq. 17

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Pollutant	Aquatic Life Criteria (in µg/l unless otherwise noted)				Human Health Criteria (in µg/l unless otherwise noted)	
	Freshwater Acute	Freshwater Chronic	Marine Acute	Marine Chronic	Consumption of Water and Fish	Consumption of Fish Only
3,3'-Dichlorobenzidine ¹					Eq. 18	Eq. 19
Dichlorobromomethane ¹					Eq. 18	Eq. 19
1,2-Dichloroethane ¹					Eq. 18	Eq. 19
1,1-Dichloroethylene					Eq. 16	Eq. 17
2,4-Dichlorophenol					Eq. 16	Eq. 17
1,2 Dichloropropane ¹					Eq. 18	Eq. 19
1,3 Dichloropropylene ¹					Eq. 18	Eq. 19
Dieldrin ¹	0.24	0.056	0.71	0.0019	Eq. 18	Eq. 19
2,4-Dimethylphenol					Eq. 16	Eq. 17
Diethyl phthalate					Eq. 16	Eq. 17
Dimethyl phthalate					Eq. 16	Eq. 17
Di-n-butyl phthalate					Eq. 16	Eq. 17
4,6-Dinitro-2-methylphenol					Eq. 16	Eq. 17
2,4 Dinitrotoluene ¹					Eq. 18	Eq. 19
2,4-Dinitrophenol					Eq. 16	Eq. 17
Dioxin (2,3,7,8-TCDD) ¹					Eq. 18	Eq. 19
1,2-Diphenylhydrazine ¹					Eq. 18	Eq. 19
Endosulfan (alpha)	0.22	0.056	0.034	0.0087	Eq. 16	Eq. 17
Endosulfan (beta)	0.22	0.056	0.034	0.0087	Eq. 16	Eq. 17

TABLE 1
TOXIC POLLUTANT CRITERIA

Pollutant	Aquatic Life Criteria (in µg/l unless otherwise noted)				Human Health Criteria (in µg/l unless otherwise noted)	
	Freshwater Acute	Freshwater Chronic	Marine Acute	Marine Chronic	Consumption of Water and Fish	Consumption of Fish Only
Endosulfan sulfate					Eq. 16	Eq. 17
Endrin	0.086	0.036	0.037	0.0023	Eq. 16	Eq. 17
Endrin aldehyde					Eq. 16	Eq. 17
Ethylbenzene					Eq. 16	Eq. 17
Fluoranthene					Eq. 16	Eq. 17
Fluorene					Eq. 16	Eq. 17
Heptachlor ¹	0.52	0.0038	0.053	0.0036	Eq. 18	Eq. 19
Heptachlor epoxide ¹	0.52	0.0038	0.053	0.0036	Eq. 18	Eq. 19
Hexachlorobenzene ¹					Eq. 18	Eq. 19
Hexachlorobutadiene ¹					Eq. 18	Eq. 19
Hexachlorocyclohexane (alpha) ¹					Eq. 18	Eq. 19
Hexachlorocyclohexane (beta) ¹					Eq. 18	Eq. 19
Hexachlorocyclohexane (gamma)	0.95		0.16		Eq. 16	Eq. 17
Hexachlorocyclopentadiene					Eq. 16	Eq. 17
Hexachloroethane ¹					Eq. 18	Eq. 19
Indeno (1,2,3-cd) pyrene ¹					Eq. 18	Eq. 19
Isophorone ¹					Eq. 18	Eq. 19
Lead	Eq. 7	Eq. 8	210	8.1		
Mercury (total recoverable)	2.4	0.012	2.1	0.025	Eq. 16	Eq. 17

TABLE 1
TOXIC POLLUTANT CRITERIA

Pollutant	Aquatic Life Criteria (in µg/l unless otherwise noted)				Human Health Criteria (in µg/l unless otherwise noted)	
	Freshwater Acute	Freshwater Chronic	Marine Acute	Marine Chronic	Consumption of Water and Fish	Consumption of Fish Only
Methyl bromide					Eq. 16	Eq. 17
Methylene chloride ¹					Eq. 18	Eq. 19
Nickel	Eq. 9	Eq. 10	74	8.2	Eq. 16	Eq. 17
Nitrobenzene					Eq. 16	Eq. 17
N-Nitrosodimethylamine ¹					Eq. 18	Eq. 19
N-Nitrosodi-n-propylamine ¹					Eq. 18	Eq. 19
N-Nitrosodiphenylamine ¹					Eq. 18	Eq. 19
PCB-1016 ^{1,2}		0.014		0.03	Eq. 18	Eq. 19
PCB-1221 ^{1,2}		0.014		0.03	Eq. 18	Eq. 19
PCB-1232 ^{1,2}		0.014		0.03	Eq. 18	Eq. 19
PCB-1242 ^{1,2}		0.014		0.03	Eq. 18	Eq. 19
PCB-1248 ^{1,2}		0.014		0.03	Eq. 18	Eq. 19
PCB-1254 ^{1,2}		0.014		0.03	Eq. 18	Eq. 19
PCB-1260 ^{1,2}		0.014		0.03	Eq. 18	Eq. 19
Pentachlorophenol ¹	Eq. 11	Eq. 12	13	7.9	Eq. 18	Eq. 19
Phenol					Eq. 16	Eq. 17
Pyrene					Eq. 16	Eq. 17
Selenium ³	20	5.0	290	71	Eq. 16	Eq. 17
Silver	Eq. 13		1.9			
1,1,2,2-Tetrachloroethane ¹					Eq. 18	Eq. 19

TABLE 1
TOXIC POLLUTANT CRITERIA

Pollutant	Aquatic Life Criteria (in µg/l unless otherwise noted)				Human Health Criteria (in µg/l unless otherwise noted)	
	Freshwater Acute	Freshwater Chronic	Marine Acute	Marine Chronic	Consumption of Water and Fish	Consumption of Fish Only
Tetrachloroethylene ¹					Eq. 18	Eq. 19
Thallium					Eq. 16	Eq. 17
Toluene					Eq. 16	Eq. 17
Toxaphene ¹	0.73	0.0002	0.21	0.0002	Eq. 18	Eq. 19
1,2-Trans-dichloroethylene					Eq. 16	Eq. 17
Tributyltin (TBT)	0.46	0.072	0.42	0.0074		
1,2,4-Trichlorobenzene					Eq. 16	Eq. 17
1,1,2-Trichloroethane ¹					Eq. 18	Eq. 19
Trichloroethylene ¹					Eq. 18	Eq. 19
2,4,6-Trichlorophenol ¹					Eq. 18	Eq. 19
Vinyl chloride ¹					Eq. 18	Eq. 19
Zinc	Eq. 14	Eq. 15	90	81	Eq. 16	Eq. 17

¹ Pollutants considered by EPA to be carcinogenic.

² The criteria for Polychlorinated Biphenyls (PCBs) apply to total PCBs, which is defined as the sum of the seven particular Aroclors (1016, 1221, 1232, 1242, 1248, 1254, and 1260) listed in this table.

³ The freshwater aquatic life criteria for selenium are expressed in terms of total recoverable metal in the water column.

APPENDIX A

POLLUTANT	CAS Registry Number	REFERENCE DOSE mg/(kg-day)	CANCER POTENCY FACTOR (kg-day)/mg	BIO- CONCENTRATION FACTOR 1/kg	RELATIVE SOURCE CONTRIBUTION
Acenaphthene	83329	0.06		242	1.0
Acrolein	107028	0.0156 <u>0.0005</u>		215	1.0
Acrylonitrile	107131		0.54	30	
Aldrin	309002		17	4670	
Anthracene	120127	0.3		30	1.0
Antimony	7440360	0.0004		1	0.4
Arsenic	7440382		1.75	44	
Benzene	71432		0.029	5.2	
Benzidine	92875		230	87.5	
Benzo(a)anthracene	56553		7.3	30	
Benzo(a)pyrene	50328		7.3	30	
Benzo(b)fluoranthene	205992		7.3	30	
Benzo(k)fluoranthene	207089		7.3	30	
Bis(2-chloroethyl)ether	111444		1.1	6.9	
Bis(2-chloroisopropyl)ether	108601	0.04		2.47	1.0
Bis(2-ethylhexyl)phthalate	117817		0.014	130	
Bromoform	75252		0.0079	3.75	
Butylbenzyl phthalate	85687	0.2		414	1.0
Carbon tetrachloride	56235		0.13	18.75	
Chlordane	57749		0.35	14100	
Chlorobenzene	108907	0.02		10.3	0.2
Chlorodibromomethane	124481		0.084	3.75	
Chloroform	67663		0.0061	3.75	

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POLLUTANT	CAS Registry Number	REFERENCE DOSE mg/(kg-day)	CANCER POTENCY FACTOR (kg-day)/mg	BIO- CONCENTRATION FACTOR 1/kg	RELATIVE SOURCE CONTRIBUTION
2-Chloronaphthalene	91587	0.08		202	1.0
2-Chlorophenol	95578	0.005		134	1.0
Chrysene	218019		7.3	30	
Cyanide	57125	0.02		1	0.2
4,4'-DDD	72548		0.24	53600	
4,4'-DDE	72559		0.34	53600	
4,4'-DDT	50293		0.34	53600	
Dibenzo(a,h)anthracene	53703		7.3	30	
1,2-Dichlorobenzene	95501	0.09		55.6	0.2
1,3-Dichlorobenzene	541731	0.0134		55.6	1.0
1,4-Dichlorobenzene	106467	0.0134		55.6	0.2
3,3'-Dichlorobenzidine	91941		0.45	312	
Dichlorobromomethane	75274		0.062	3.75	
1,2-Dichloroethane	107062		0.091	1.2	
1,1-Dichloroethylene	75354	0.05		5.6	0.2
2,4-Dichlorophenol	120832	0.003		40.7	1.0
1,2-Dichloropropane	78875		0.067	4.1	
1,3-Dichloropropylene	542756		0.1	1.9	
Dieldrin	60571		16	4670	
Diethyl phthalate	84662	0.8		73	1.0
2,4 Dimethylphenol	105679	0.02		93.8	1.0
Dimethyl phthalate	131113	10		36	1.0
Di-n-butyl phthalate	84742	0.1		89	1.0
4,6-Dinitro-2-methylphenol	534521	0.00039		5.5	1.0

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POLLUTANT	CAS Registry Number	REFERENCE DOSE mg/(kg-day)	CANCER POTENCY FACTOR (kg-day)/mg	BIO- CONCENTRATION FACTOR 1/kg	RELATIVE SOURCE CONTRIBUTION
2,4-Dinitrophenol	51285	0.002		1.5	1.0
2,4 Dinitrotoluene	121142		0.31	3.8	
Dioxin (2,3,7,8-TCDD)	1746016		17500	5000	
1,2-Diphenylhydrazine	122667		0.8	24.9	
Endosulfan (alpha)	959988	0.006		270	1.0
Endosulfan (beta)	33213659	0.006		270	1.0
Endosulfan sulfate	1031078	0.006		270	1.0
Endrin	72208	0.0003		3970	0.2
Endrin aldehyde	7421934	0.0003		3970	1.0
Ethylbenzene	100414	0.1		37.5	0.2
Fluoranthene	206440	0.04		1150	1.0
Fluorene	86737	0.04		30	1.0
Heptachlor	76448		4.5	11200	
Heptachlor epoxide	1024573		9.1	11200	
Hexachlorobenzene	118741		1.6	8690	
Hexachlorobutadiene	87683		0.078	2.78	
Hexachlorocyclohexane (alpha)	319846		6.3	130	
Hexachlorocyclohexane (beta)	319857		1.8	130	
Hexachlorocyclohexane (gamma)	58899	0.0003		130	0.2
Hexachlorocyclopentadiene	77474	0.006		4.34	0.2
Hexachloroethane	67721		0.014	86.9	
Indeno (1,2,3-cd) pyrene	193395		7.3	30	
Isophorone	78591		0.00095	4.38	
Mercury	7439976	0.0001		5500	1.0

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POLLUTANT	CAS Registry Number	REFERENCE DOSE mg/(kg-day)	CANCER POTENCY FACTOR (kg-day)/mg	BIO- CONCENTRATION FACTOR 1/kg	RELATIVE SOURCE CONTRIBUTION
Methyl bromide	74839	0.0014		3.75	1.0
Methylene chloride	75092		0.0075	0.9	
Nickel	7440020	0.02		47	1.0
Nitrobenzene	98953	0.0005		2.89	1.0
N-Nitrosodimethylamine	62759		51	0.026	
N-Nitrosodi-n-propylamine	621647		7	1.13	
N-Nitrosodiphenylamine	86306		0.0049	136	
PCB-1016 ¹	12674112		2.0	31200	
PCB-1221 ¹	11104282		2.0	31200	
PCB-1232 ¹	11141165		2.0	31200	
PCB-1242 ¹	53469219		2.0	31200	
PCB-1248 ¹	12672296		2.0	31200	
PCB-1254 ¹	11097691		2.0	31200	
PCB-1260 ¹	11096825		2.0	31200	
Pentachlorophenol	87865		0.12	11	
Phenol	108952	0.6 <u>0.3</u>		1.4	1.0
Pyrene	129000	0.03		30	1.0
Selenium	7782492	0.005		4.8	1.0
1,1,2,2-Tetrachloroethane	79345		0.2	5	
Tetrachloroethylene	127184		0.039776	30.6	
Thallium	7440280	0.000068		116	0.2
Toluene	108883	0.2		10.7	0.2
Toxaphene	8001352		1.1	13100	
1,2-Trans-dichloroethylene	156605	0.02		1.58	0.2

APPENDIX A

POLLUTANT	CAS Registry Number	REFERENCE DOSE mg/(kg-day)	CANCER POTENCY FACTOR (kg-day)/mg	BIO- CONCENTRATION FACTOR 1/kg	RELATIVE SOURCE CONTRIBUTION
1,2,4-Trichlorobenzene	120821	0.01		114	0.2
1,1,2-Trichloroethane	79005		0.057	4.5	
Trichloroethylene	79016		0.0126	10.6	
2,4,6-Trichlorophenol	88062		0.011	150	
Vinyl chloride	75014		1.4	1.17	
Zinc	7440666	0.3		47	1.0

¹ The criteria for Polychlorinated Biphenyls (PCBs) apply to total PCBs, which is defined as the sum of the seven particular Aroclors (1016, 1221, 1232, 1242, 1248, 1254, and 1260) listed in this table.