Great Lakes Human Health Cancer Criteria Calculations

Human Health Cancer Equation Components and Calculations

TOTAL FISH CONSUMPTION = 142.4 g/d

	IRIS Slope Factors (q1*)	Risk Level (1 in 100,000)	*mg/kg/d* Risk assoc. dose (RAD)	*kg* Human weight (BW)	*L/d* Water consum (WCd)	*L/d* Water consum (WCr)	*kg/d* Fish consump. (FCtl3)	*kg/d* Fish consump. (FCTL4)	*L/kg* BAF (tl3)	*L/kg* BAF (tl4)	DW Criteria (mg/l)	**DW Criteria (ug/l)**	NDW Criteria (mg/l)	**NDW Criteria (ug/l)**
Benzene	0.029	0.00001	3.448E-04	70	2	0.01	0.034176	0.108224	3	5	9.1E-03	9.1E+00	3.7E-02	3.7E+01
*Chlordane	0.35	0.00001	2.857E-05	70	2	0.01	0.034176	0.108224	116600	154200	9.7E-08	9.7E-05	9.7E-08	9.7E-05
Chlorobenzene	Not carcinog.			70	2	0.01	0.034176	0.108224	15	24				
Cyanides	Not carcinog.			70	2	0.01	0.034176	0.108224	1	1				
DDT	0.34	0.00001	2.941E-05	70	2	0.01	0.034176	0.108224	376400	1114000	1.5E-08	1.5E-05	1.5E-08	1.5E-05
Dieldrin	16	0.00001	6.250E-07	70	2	0.01	0.034176	0.108224	72610	571000	6.8E-10	6.8E-07	6.8E-10	6.8E-07
2,4-Dimethylphenol	Not carcinog.			70	2	0.01	0.034176	0.108224	5	7				
2,4-Dinitrophenol	Not carcinog.			70	2	0.01	0.034176	0.108224	2	2				
Hexachlorobenzene	1.6	0.00001	6.250E-06	70	2	0.01	0.034176	0.108224	43690	71080	4.8E-08	4.8E-05	4.8E-08	4.8E-05
Hexachloroethane	0.014	0.00001	7.143E-04	70	2	0.01	0.034176	0.108224	371	532	6.9E-04	0.7	7.1E-04	0.7
Lindane	Under review			70	2	0.01	0.034176	0.108224	1926	2636				
Mercury	Not carcinog.			70	2	0.01	0.034176	0.108224	27900	140000				
Methylene chloride	0.0073	0.00001	1.370E-03	70	2	0.01	0.034176	0.108224	1	2	4.3E-02	4.3E+01	3.7E-01	3.7E+02
**PCBs (class)	2	0.00001	5.000E-06	70	2	0.01	0.034176	0.108224	321000	1086000	2.7E-09	2.7E-06	2.7E-09	2.7E-06
2,3,7,8-TCDD	75000	0.00001	1.333E-10	70	2	0.01	0.034176	0.108224	48490	79420	9.1E-13	9.1E-10	9.1E-13	9.1E-10
Toluene	Not carcinog.			70	2	0.01	0.034176	0.108224	11	17				
Toxaphene	1.1	0.00001	9.091E-06	70	2	0.01	0.034176	0.108224	498100	665600	7.1E-09	7.1E-06	7.1E-09	7.1E-06
Trichloroethylene	0.011	0.00001	9.091E-04	70	2	0.01	0.034176	0.108224	7	12	1.8E-02	1.8E+01	4.1E-02	4.1E+01

**q1* revised in IRIS*
*** BAFs and q1* revised*

EPA's Total Fish Consumption =		15 g/day
	0.0036	0.0114

Great Lakes Human Health Non-Cancer Criteria Calculations

	NOAEL	UF	ADE (NOAEL/UF)	RSC	Human weight (BW)	ADE*RSC*BW	Water consum (WCd)	Water consum (WCr)	Fish consump. (FCtl3)	Fish consump. (FCTL4)	BAF (tl3)	BAF (tl4)	DW Criteria (mg/l)	DW Criteria (ug/l)	NDW Criteria (mg/l)	NDW Criteria (ug/l)
Benzene	0.71	1000	0.000710	0.8	70	3.976E-02	2	0.01	0.034176	0.108224	3	5	1.5E-02	1.5E+01	6.1E-02	6.1E+01
Chlordane	0.055	1000	0.000055	0.8	70	3.080E-03	2	0.01	0.034176	0.108224	116600	154200	1.5E-07	1.5E-04	1.5E-07	1.5E-04
*Chlorobenzene	19.46	1000	0.019460	0.2	70	2.724E-01	2	0.01	0.034176	0.108224	15	24	5.3E-02	5.3E+01	8.7E-02	8.7E+01
*Cyanides	10.8	500	0.021600	0.2	70	3.024E-01	2	0.01	0.034176	0.108224	1	1	1.4E-01	1.4E+02	2.0E+00	2.0E+03
DDT	0.05	100	0.000500	0.8	70	2.800E-02	2	0.01	0.034176	0.108224	376400	1114000	2.1E-07	2.1E-04	2.1E-07	2.1E-04
Dieldrin	0.005	100	0.000050	0.8	70	2.800E-03	2	0.01	0.034176	0.108224	72610	571000	4.4E-08	4.4E-05	4.4E-08	4.4E-05
2,4-Dimethylphenol	50	3000	0.016667	0.8	70	9.333E-01	2	0.01	0.034176	0.108224	5	7	3.2E-01	3.19E+02	9.9E-01	9.9E+02
2,4-Dinitrophenol	2	1000	0.002000	0.8	70	1.120E-01	2	0.01	0.034176	0.108224	2	2	4.9E-02	4.9E+01	3.8E-01	3.8E+02
Hexachlorobenzene	0.08	100	0.000800	0.8	70	4.480E-02	2	0.01	0.034176	0.108224	43690	71080	4.9E-06	4.9E-03	4.9E-06	4.9E-03
Hexachloroethane	1	1000	0.001000	0.8	70	5.600E-02	2	0.01	0.034176	0.108224	371	532	7.8E-04	7.8E-01	8.0E-04	8.0E-01
Lindane	0.33	1000	0.000330	0.8	70	1.848E-02	2	0.01	0.034176	0.108224	1926	2636	5.2E-05	5.2E-02	5.3E-05	5.3E-02
Mercury	0.003	50	0.000060	0.8	65	3.120E-03	2	0.01	0.034176	0.108224	27900	140000	1.9E-07	1.9E-04	1.9E-07	1.9E-04
Methylene chloride	5.85	100	0.058500	0.8	70	3.276E+00	2	0.01	0.034176	0.108224	1	2	1.5E+00	1.5E+03	1.3E+01	1.3E+04
2,3,7,8-TCDD	0.00000013	100	0.000000	0.8	70	7.280E-08	2	0.01	0.034176	0.108224	48490	79420	7.1E-12	7.1E-09	7.1E-12	7.1E-09
*Toluene	223	1000	0.223000	0.2	70	3.122E+00	2	0.01	0.034176	0.108224	11	17	7.4E-01	7.4E+02	1.4E+00	1.4E+03

**RSC revised*

	142.4 g/day Cancer		60 g/day Cancer			
	kg/d	*kg/d*	*kg/d*	*kg/d*	*from 142.4 criteria to 60 criteria*	
	DW Criteria (ug/l)	**NDW Criteria (ug/l)**	**DW Criteria (ug/l)**	**NDW Criteria (ug/l)**	**Percent increase DW**	**Percent increase NDW**
Benzene	9.13054	36.928	10.6278	85.83902	16.4	132.4495021
*Chlordane	0.00010	0.000	0.00023	0.00023	137.3	137.3331757
Chlorobenzene					#DIV/0!	#DIV/0!
Cyanides					#DIV/0!	#DIV/0!
DDT	0.00002	0.000	0.0000	0.00004	137.3	137.3333089
Dieldrin	0.00000	0.000	0.0000	0.00000	137.3	137.3332826
2,4-Dimethylphenol					#DIV/0!	#DIV/0!
2,4-Dinitrophenol					#DIV/0!	#DIV/0!
Hexachlorobenzene	0.00005	0.000	0.0001	0.00011	137.3	137.3329785
Hexachloroethane	0.69200	0.712	1.5822	1.68853	128.6	137.2869551
Lindane					#DIV/0!	#DIV/0!
Mercury					#DIV/0!	#DIV/0!
Methylene chloride	42.60614	367.926	45.5407	829.50182	6.9	125.4532872
**PCBs (class)	0.0000027	0.000	0.0000	0.00001	137.3	137.333308
2,3,7,8-TCDD	0.00000	0.000	0.0000	0.00000	137.3	137.3330154
Toluene					#DIV/0!	#DIV/0!
Toxaphene	0.00001	0.000	0.0000	0.00002	137.3	137.3332967
Trichloroethylene	17.98694	41.111	24.0319	96.71180	33.6	135.2462006

	142.4 g/day Non-Cancer		60 g/day Non-Cancer			
					from 142.4 criteria to 60 criteria	
	DW Criteria (ug/l)	**NDW Criteria (ug/l)**	**DW Criteria (ug/l)**	**NDW Criteria (ug/l)**	**Percent increase DW**	**Percent increase NDW**
Benzene	15.03982	60.82785	17.50616	141.39403	16.4	132.4495021
Chlordane	0.00015	0.00015	0.00035	0.00035	137.3	137.3331757
*Chlorobenzene	53.31490	87.32007	82.29821	206.33141	54.4	136.2932445
*Cyanides	141.15011	1984.25197	146.79612	4320.00000	4.0	117.7142857
DDT	0.00021	0.00021	0.00050	0.00050	137.3	137.3333089
Dieldrin	0.00004	0.00004	0.00010	0.00010	137.3	137.3332826
2,4-Dimethylphenol	318.71262	994.54987	390.32006	2326.35427	22.5	133.9102692
2,4-Dinitrophenol	49.01961	379.91859	52.83019	861.53846	7.8	126.7692308
Hexachlorobenzene	0.00488	0.00488	0.01157	0.01158	137.3	137.3329785
Hexachloroethane	0.77504	0.79699	1.77206	1.89115	128.6	137.2869551
Lindane	0.05234	0.05263	0.12325	0.12491	135.5	137.3240507
Mercury	0.00019	0.00019	0.00046	0.00046	137.3	137.3331309
Methylene chloride	1455.59631	12569.83240	1555.85106	28339.10035	6.9	125.4532872
2,3,7,8-TCDD	0.00000001	0.00000001	0.00000002	0.00000002	137.3	137.3330154
*Toluene	740.55730	1402.67704	1064.22143	3308.60534	43.7	135.8779144
					#DIV/0!	#DIV/0!
					#DIV/0!	#DIV/0!
					#DIV/0!	#DIV/0!

Human Health Criteria, cancer values (µg/L)		
	HCV - Drinking	HCV - Nondrinking
Benzene	9.1E+00	3.7E+01
Chlordane	9.7E-05	9.7E-05
DDT	1.5E-05	1.5E-05
Dieldrin	6.8E-07	6.8E-07
Hexachlorobenzene	4.8E-05	4.8E-05
Hexachloroethane	6.9E-01	7.1E-01
Methylene chloride	4.3E+01	3.7E+02
PCBs (class)	2.7E-06	2.7E-06
2,3,7,8-TCDD	9.1E-10	9.1E-10
Toxaphene	7.1E-06	7.1E-06
Trichloroethylene	1.8E+01	4.1E+01

Human Health Criteria, noncancer values (µg/L)		
	HNV - Drinking	HNV - Nondrinking
Benzene	1.50E+01	6.08E+01
Chlordane	1.49E-04	1.49E-04
Chlorobenzene	5.33E+01	8.73E+01
Cyanides	1.41E+02	1.98E+03
DDT	2.10E-04	2.10E-04
Dieldrin	4.36E-05	4.36E-05
2,4-Dimethylphenol	3.19E+02	9.95E+02
2,4-Dinitrophenol	4.90E+01	3.80E+02
Hexachlorobenzene	4.88E-03	4.88E-03
Hexachloroethane	7.75E-01	7.97E-01
Lindane	5.23E-02	5.26E-02
Mercury	1.94E-04	1.94E-04
Methylene chloride	1.46E+03	1.26E+04
2,3,7,8-TCDD	7.10E-09	7.10E-09
Toluene	7.41E+02	1.40E+03