TABLE 4
RECOMMENDED AND ADOPTED CANCER RISK
LEVELS FOR CARCINOGENIC TOXIC POLLUTANTS *

Chemical	EPA Recommended Cancer Risk Level	ADEM Adopted Cancer Risk Level
1,1,1-Trichloroethane 71556		
1,1,2,2-Tetrachloroethane 79345	1×10^{-6}	1×10^{-6}
1,1,2-Trichloroethane 79005	1×10^{-6}	1×10^{-6}
1,1-Dichloroethylene 75354		
1,2,4-Trichlorobenzene 120821	1×10^{-6}	1×10^{-6}
1,2-Dichlorobenzene 95501		
1,2-Dichloroethane 107062	1×10^{-6}	1×10^{-6}
1,2-Dichloropropane 78875	1×10^{-6}	1×10^{-6}
1,2-Diphenylhydrazine 122667	1×10^{-6}	1×10^{-6}
1,3-Dichlorobenzene 541731		
1,3-Dichloropropene 542756	1×10^{-6}	1×10^{-6}
1,4-Dichlorobenzene 106467		
2,3,7,8-TCDD (Dioxin) 1746016	1×10^{-6}	1×10^{-6}

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Chemical	EPA Recommended Cancer Risk Level	ADEM Adopted Cancer Risk Level
2,4,6-Trichlorophenol 88062	1×10^{-6}	1×10^{-6}
2,4-Dichlorophenol 120832		
2,4-Dimethylphenol 105679		
2,4-Dinitrophenol 51285		
2,4-Dinitrotoluene 121142	1×10^{-6}	1×10^{-6}
2-Chloronaphthalene 91587		
2-Chlorophenol 95578		
2-Methyl-4,6-Dinitrophenol 534521		
3,3'-Dichlorobenzidine 91941	1×10^{-6}	1×10^{-6}
3-Methyl-4-Chlorophenol 59507		
Acenaphthene 83329		
Acrolein 107028		
Acrylonitrile 107131	1×10^{-6}	1×10^{-6}
Aldrin 309002	1×10^{-6}	1×10^{-6}
alpha-Hexachlorocyclohexane (HCH) 319846	1×10^{-6}	1×10^{-6}

Chemical	EPA Recommended Cancer Risk Level	ADEM Adopted Cancer Risk Level
alpha-Endosulfan 959988		
Anthracene 120127		
Antimony 7440360		
Arsenic 7440382	1×10^{-6}	1×10^{-5}
Asbestos 1332214		
Benzene 71432	1×10^{-6}	1×10^{-6}
Benzidine 92875	1×10^{-6}	
Benzo(a)anthracene 56553	1×10^{-6}	1×10^{-6}
Benzo(a)pyrene 50328	1×10^{-6}	1×10^{-6}
Benzo(b)fluoranthene 205992	1×10^{-6}	1×10^{-6}
Benzo(k)fluoranthene 207089	1×10^{-6}	1×10^{-6}
beta-Hexachlorocyclohexane (HCH) 319857	1×10^{-6}	1×10^{-6}
beta-Endosulfan 33213659		
Bis(2-Chloro-1-Methylethyl) Ether 108601		
Bis(2-Chloroethyl) Ether 111444	1×10^{-6}	1×10^{-6}

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Chemical	EPA Recommended Cancer Risk Level	ADEM Adopted Cancer Risk Level
Bis(2-Ethylhexyl) Phthalate 117817	1×10^{-6}	1×10^{-6}
Bromoform 75252	1×10^{-6}	1×10^{-6}
Butylbenzyl Phthalate 85687	1×10^{-6}	1×10^{-6}
Carbon Tetrachloride 56235	1×10^{-6}	1×10^{-6}
Chlordane 57749	1×10^{-6}	1×10^{-6}
Chlorobenzene 108907		
Chlorodibromomethane 124481	1×10^{-6}	1×10^{-6}
Chloroform 67663		
Chrysene 218019	1×10^{-6}	1×10^{-6}
Copper 7440508		
Cyanide 57125		
Dibenzo(a,h)anthracene 53703	1×10^{-6}	1×10^{-6}
Dichlorobromomethane 75274	1×10^{-6}	1×10^{-6}
Dieldrin 60571	1×10^{-6}	1×10^{-6}
Diethyl Phthalate 84742		

Chemical	EPA Recommended Cancer Risk Level	ADEM Adopted Cancer Risk Level
Dimethyl Phthalate 131113		
Di-n-Butyl Phthalate 84742		
Endosulfan Sulfate 1031078		
Endrin 72208		
Endrin Aldehyde 7421934		
Ethylbenzene 100414		
Fluoranthene 206440		
Fluorene 86737		
gamma-Hexachlorocyclohexane (HCH) [Lindane] 58899		
Heptachlor 76448	1×10^{-6}	1×10^{-6}
Heptahlor Epoxide 1024573	1×10^{-6}	1×10^{-6}
Hexachloroenzene 118741	1×10^{-6}	1×10^{-6}
Hexachlorobutadiene 87683	1×10^{-6}	1×10^{-6}
Hexachlorocyclopentadiene 77474		

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Chemical	EPA Recommended Cancer Risk Level	ADEM Adopted Cancer Risk Level
Hexachloroethane 67721	1×10^{-6}	1×10^{-6}
Indeno(1,2,3-cd)pyrene 193395	1×10^{-6}	1×10^{-6}
Isophorone 78591	1×10^{-6}	1×10^{-6}
Methylmercury 22967926		
Methyl Bromide 74839		
Methylene Chloride 75092	1×10^{-6}	1×10^{-6}
Nickel 744000		
Nitrobenzene 98953		
N-Nitrosodimethylamine 62759	1×10^{-6}	1×10^{-6}
N-Nitrosodiphenylamine 86306	1×10^{-6}	1×10^{-6}
N-Nitrosodi-n-Propylamine 621647	1×10^{-6}	1×10^{-6}
Pentachlorophenol 87865	1×10^{-6}	1×10^{-6}
Phenol 108952		
p,p'-Dichlorodiphenyldichloroethane (DDD) 72548	1×10^{-6}	1×10^{-6}

Chemical	EPA Recommended Cancer Risk Level	ADEM Adopted Cancer Risk Level
p,p -Dichlorodiphenyldichloroethylene (DDE) 72559	1×10^{-6}	1×10^{-6}
p,p'-Dichlorodiphenyltrichloroethane (DDT) 50293	1×10^{-6}	1×10^{-6}
Polychlorinated Biphenyls (PCBs) 1336363	1×10^{-6}	1×10^{-6}
Pyrene 129000		
Selenium 7782492		
Tetrachloroethylene 127184	1×10^{-6}	1×10^{-6}
Thallium 7440280		
Toluene 108883		
Toxaphene 8001352	1×10^{-6}	1×10^{-6}
trans-1,2-Dichloroethylene 156605		
Trichloroethylene 79016	1×10^{-6}	1×10^{-6}
Vinyl Chloride 75014	1×10^{-6}	1×10^{-6}
Zinc 7440666	1×10^{-6}	1×10^{-6}

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*** Summary:**

Table 4 identifies the cancer risk levels used to calculate EPA's national recommended water quality criteria for 54 toxic pollutants to protect against cancer in humans and the cancer risk levels used to calculate ADEM's adopted water quality criteria for those toxic pollutants. The former are based on individual water quality criteria documents for toxic pollutants hyperlinked in *National Recommended Water Quality Criteria - Human Health Criteria Table*, https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table (accessed Dec. 31, 2021). The latter are based on ADEM Admin. Code r. 335-6-10-.07(1)(d).

EPA has used the 10^{-6} cancer risk level for calculating national recommended water quality criteria for 54 toxic pollutants with carcinogenic endpoints. ADEM has used the 10^{-6} cancer risk level for calculating water quality criteria for 53 toxic pollutants with carcinogenic endpoints. ADEM has used the 10^{-5} cancer risk level for calculating water quality criteria for 1 toxic pollutant with a carcinogenic endpoint – Arsenic. ADEM's decision to exempt Arsenic from its otherwise applicable 10^{-6} risk management policy is concerning.

Comments:

In *Water Quality Standards Handbook* (EPA 823-B-17-001 2017), Chap. 3, at § 3.3.2, EPA explained the selection of the cancer risk level as follows:

> For deriving human health 304(a) criteria recommendations based on the 2000 Human Health Methodology, the EPA uses the 10^{-6} (i.e., 1 chance in 1,000,000) risk level. However, when states and authorized tribes develop their criteria, 10^{-5} (i.e., 1 chance in 100,000) may be acceptable for the general target population depending on the particular circumstances. It is important to note that the incremental cancer risk levels are relative, meaning that any given criterion associated with a particular cancer risk level is also associated with specific exposure parameter assumptions (i.e., fish consumption rate, drinking water intake, body weight). Selection of a cancer risk level to derive human health criteria should involve careful consideration of the associated exposure parameter assumptions, and whether the resulting criteria would expose the target population consuming fish at unsuppressed rates to no more than a 10^{-5}

cancer risk (or sensitive subpopulations consuming fish at unsuppressed rates to no more than a 10^{-4} cancer risk).

See Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (EPA-822-B-00-004, Oct. 2000), at 2-6.

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