TABLE 5
RELATIVE SOURCE CONTRIBUTION VALUES FOR SYSTEMIC TOXIC POLLUTANTS *

Chemical	EPA Recommended Relative Source Contribution Value	ADEM Adopted Relative Source Contribution Value
1,1,1-Trichloroethane 71556	0.20	
1,1,2,2-Tetrachloroethane 79345		
1,1,2-Trichloroethane 79005		
1,1-Dichloroethylene 75354	0.20	0.20
1,2,4-Trichlorobenzene 120821		
1,2-Dichlorobenzene 95501	0.20	0.20
1,2-Dichloroethane 107062		
1,2-Dichloropropane 78875		
1,2-Diphenylhydrazine 122667		
1,3-Dichlorobenzene 541731	0.20	ND
1,3-Dichloropropene 542756		
1,4-Dichlorobenzene 106467	0.20	0.20
2,3,7,8-TCDD (Dioxin) 1746016		
2,4,6-Trichlorophenol 88062		

Chemical	EPA Recommended Relative Source Contribution Value	ADEM Adopted Relative Source Contribution Value
2,4-Dichlorophenol 120832	0.20	1.0
2,4-Dimethylphenol 105679	0.20	1.0
2,4-Dinitrophenol 51285	0.20	1.0
2,4-Dinitrotoluene 121142		
2-Chloronaphthalene 91587	0.80	1.0
2-Chlorophenol 95578	0.20	1.0
2-Methyl-4,6-Dinitrophenol 534521	0.20	1.0
3,3'-Dichlorobenzidine 91941		
3-Methyl-4-Chlorophenol 59507	0.20	
Acenaphthene 83329	0.20	1.0
Acrolein 107028	0.20	1.0
Acrylonitrile 107131		
Aldrin 309002		
alpha-Hexachlorocyclohexane (HCH) 319846		
alpha-Endosulfan 959988	0.20	1.0

Table 5 - Alabama (page 2 of 9)

Chemical	EPA Recommended Relative Source Contribution Value	ADEM Adopted Relative Source Contribution Value
Anthracene 120127	0.20	1.0
Antimony 7440360	0.40	0.40
Arsenic 7440382		
Asbestos 1332214		
Benzene 71432		
Benzidine 92875		
Benzo(a)anthracene 56553		
Benzo(a)pyrene 50328		
Benzo(b)fluoranthene 205992		
Benzo(k)fluoranthene 207089		
beta-Hexachlorocyclohexane (HCH) 319857		
beta-Endosulfan 33213659	0.20	1.0
Bis(2-Chloro-1-methylethyl) Ether 108601	0.20	1.0
Bis(2-Chloroethyl) Ether 111444		
Bis(2-Ethylhexyl) Phthalate 117817		

Table 5 - Alabama (page 3 of 9)

Chemical	EPA Recommended Relative Source Contribution Value	ADEM Adopted Relative Source Contribution Value
Bromoform 75252		
Butylbenzyl Phthalate 85687		
Carbon Tetrachloride 56235		
Chlordane 57749		
Chlorobenzene 108907	0.20	0.20
Chlorodibromomethane 124481		
Chloroform 67663	0.20	ND
Chrysene 218019		
Copper 7440508		
Cyanide 57125	0.20	0.20
Dibenzo(a,h)anthracene 53703		
Dichlorobromomethane 75274		
Dieldrin 60571		
Diethyl Phthalate 84662	0.20	1.0
Dimethyl Phthalate 131113	0.20	1.0

Table 5 - Alabama (page 4 of 9)

Chemical	EPA Recommended Relative Source Contribution Value	ADEM Adopted Relative Source Contribution Value
Di-n-Butyl Phthalate 84742	0.20	1.0
Endosulfan Sulfate 1031078	0.20	1.0
Endrin 72208	0.80	0.20
Endrin Aldehyde 7421934	0.80	1.0
Ethylbenzene 100414	0.20	0.20
Fluoranthene 206440	0.20	1.0
Fluorene 86737	0.20	1.0
gamma-Hexachlorocyclohexane (HCH) [Lindane] 58899	0.50	0.20
Heptachlor 76448		
Heptahlor Epoxide 1024573		
Hexachlorobenzene 118741		
Hexachlorobutadiene 87683		
Hexachlorocyclopentadiene 77474	0.20	0.20
Hexachloroethane 67721		
Indeno(1,2,3-cd)pyrene 193395		

Table 5 - Alabama (page 5 of 9)

Chemical	EPA Recommended Relative Source Contribution Value	ADEM Adopted Relative Source Contribution Value
Isophorone 78591		
Methylmercury 22967926	0.73	
Methyl Bromide 74839	0.20	1.0
Methylene Chloride 75092		
Nickel 744000	ND	1.0
Nitrobenzene 98953	0.20	1.0
N-Nitrosodimethylamine 62759		
N-Nitrosodi-n-Propylamine 621647		
N-Nitrosodiphenylamine 86306		
Pentachlorophenol 87865		
Phenol 108952	0.20	1.0
p,p'-Dichlorodiphenyldichloroethane (DDD) 72548		
p,p -Dichlorodiphenyldichloroethylene (DDE) 72559		

Chemical	EPA Recommended Relative Source Contribution Value	ADEM Adopted Relative Source Contribution Value
p,p'-Dichlorodiphenyltrichloroethane (DDT) 50293		
Polychlorinated Biphenyls (PCBs) 1336363		
Pyrene 129000	0.20	1.0
Selenium 7782492	ND	1.0
Tetrachloroethylene 127184		
Thallium 7440280	0.20	0.20
Toluene 108883	0.20	0.20
Toxaphene 8001352		
trans-1,2-Dichloroethylene 156605	0.20	0.20
Trichloroethylene 79016		
Vinyl Chloride 75014		
Zinc 7440666	ND	1.0

*** Summary:**

Table 5 identifies the Relative Source Contributions (RSCs) used to calculate EPA's national recommended water quality criteria for 37 toxic pollutants to protect against systemic health effects in humans and the Relative Source Contributions (RSCs) used to calculate ADEM's adopted water quality criteria for 33 of 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, Appendix A.

ADEM has adopted RSCs for 33 toxic pollutants with systemic toxicity endpoints. Of these 33 toxic pollutants, ADEM's adopted RSCs for 22 are less stringent than the EPA-recommended RSCs (highlighted in yellow). ADEM has not adopted any RSCs for another 5 toxic pollutants. ADEM's less stringent and omitted RSCs underestimate the exposure of humans to toxic pollutants having systemic (non-cancer) health effects.

Comments:

In *Water Quality Standards Handbook* (EPA 823-B-17-001 2017), Chap. 3, at § 3.3.2, EPA explained relative source contribution:

> For non-carcinogens and non-linear carcinogens, the EPA includes a relative source contribution (RSC) component in human health water quality criteria calculations. The RSC represents the appropriate portion of the RfD to be attributed to ambient water and freshwater and estuarine fish consumption. This is usually expressed as a percentage of the RfD but can also be expressed as an absolute value after subtracting an allowance to reflect exposures that may come from sources not considered in the criterion derivation. The rationale for this approach is that, for pollutants exhibiting threshold effects (i.e., pollutants which exhibit toxicity above a certain level of that pollutant), the objective of the human health criterion is to ensure that an individual's total exposure from all sources does not exceed a threshold level. These sources include, but are not limited to, exposure to a particular pollutant from ocean fish consumption (not included in the fish consumption rate), non-fish food consumption (fruits, vegetables, grains, meats, poultry), dermal exposure, and respiratory exposure.
>
> The EPA recommends following the Exposure Decision Tree in Figure 4-1 of the 2000 Human Health Methodology to determine the appropriate RSC. A default RSC of 20 percent is recommended and used by the EPA in deriving Section 304(a) recommended criteria for non-carcinogens and non-linear carcinogens where data are insufficient to characterize the likelihood of exposure to relevant

sources. The 20 percent default RSC should only be replaced where sufficient data are available to develop a scientifically defensible alternative value. For example, in the 2015 updated criteria recommendations for the protection of human health, the EPA defined a RSC of 0.5 or 0.8 for several pollutants based on currently available data regarding human exposure to these pollutants.

See *Human Health Ambient Water Quality Criteria: 2015 Update* (EPA 820-F-15-001 June 2015).

An RSC of 1.0 assumes that 100% of the RfD for a toxic pollutant is attributable to the presence of that toxic pollutant in water and fish and shellfish and 0% of the RfD for the toxic pollutant is attributable to other sources. Similarly, an RSC of 0.20 assumes that 20% of the RfD for a toxic pollutant is attributable to the presence of that toxic pollutant in water and fish and shellfish and 80% of the RfD for the toxic pollutant is attributable to other sources. A lower RSC value results in more stringent criteria and less human exposure to toxic pollutants.

Where EPA has recommended an RSC of 0.20 and ADEM has adopted an RSC of 1.0, ADEM's adopted RSC is less stringent than EPA's recommended RSC. The absence of an ADEM-adopted RSC has the same effect on the criteria calculation as an RSC equal to 1.0. ADEM's less stringent RSCs underestimate the exposure of humans to toxic pollutants having systemic (non-cancer) health effects.

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