August 13, 2014

Hon. Gina McCarthy, Administrator
United States Environmental Protection Agency
William Jefferson Clinton Building
Environmental Protection Agency
1200 Pennsylvania Avenue, N.W., MC1101A
Washington, DC 20460

Via email to: ow-docket@epa.gov

Re: Updated National Recommended Water Quality Criteria For the Protection of Human Health; Docket ID No. EPA–HQ–OW–2014–0135

Dear Administrator McCarthy:

The Association of Clean Water Administrators (ACWA) is pleased to provide the U.S. Environmental Protection Agency (EPA) with comments on the notice of availability on Draft *Updated National Recommended Water Quality Criteria for the Protection of Human Health* (hereinafter "Draft Updated HHC") (79 Fed. Reg. 27303, May 13, 2014). ACWA is the independent, nonpartisan, national organization of state and interstate (hereinafter "states") water program directors, responsible for the daily implementation of the Clean Water Act's (CWA) water quality programs, including the water quality standards programs responsible for the development and implementation of state water quality criteria.

ACWA recognizes that it is good practice, as well as a requirement of CWA § 304(a), for EPA to periodically review previously issued water quality criteria recommendations to ensure that those guidelines reflect the latest data and scientific information available on the public health risks associated with the many chemical stressors which impact our nation's waters. The Association applauds EPA for its effort to update recommended HHC for the ninety-four chemicals represented in the Draft Updated HHC. ACWA wishes to express appreciation for EPA's Office of Water, Office of Science & Technology's participation on a June 18, 2014 conference call with state water quality standards program professionals to brief their state co-regulators on the Draft Updated HHC. ACWA also appreciates that EPA accommodated the requests received for an extension of the comment period; granting an additional 30 days.

The following comments provide input on aspects of the Draft Updated HHC that would benefit from additional details and clarification. In

1221 Connecticut Avenue, NW, 2nd Floor, Washington, DC 20036
TEL: 202-756-0600, FAX: 202-756-0605

WWW.ACWA-US.ORG Twitter @cleanwaterACWA

some cases, the desired background may in fact be included within the supporting materials to the Draft. However, states could not readily locate that information and would like further direction on whether it is available, and, if so, where it can be accessed. ACWA would also like to note that the feedback and comments below are not necessarily shared by every state surface water program, and we strongly encourage EPA to carefully consider any individual state comments.

I. More information is needed on information sources and models used to derive the updated criteria.

EPA's process for deriving the Draft Updated HHC involved the use of modeling tools and sources of information that are new to many states. In order to more fully evaluate their applicability and limitations, states request additional background on the following tools and information sources identified in the Draft Updated HHC:

a. Estimation Program Interface Suite (EPI Suite)

EPA relied on a peer-reviewed model called EPI Suite to develop bioaccumulation factors (BAFs) for each trophic level of fish. For many states, EPI Suite is a new tool that they need time to review and assess, and as such, its proposed use for criteria development raises a number of questions. States would like EPA to provide more information on the drivers for using this modeling tool rather than using lab-derived bioconcentration factors (BCFs) or field-derived BAFs. States are also interested in more background on the public and scientific review associated with EPI Suite, and whether there are any examples where states used EPI Suite in developing their state criteria.

During the aforementioned June 18 call, state participants expressed a desire for additional background on EPI Suite and the determining factors that led EPA to utilize this particular model in its Draft Updated HHC. Subsequently, EPA posted an EPI Suite User Guide to its HHC website. While the User Guide does assist states wishing to test the tool, it does not provide more information on EPA's basis for selecting EPI Suite modeling over other methods. ACWA recommends EPA share additional information in the final Updated HHC on its rationale for choosing EPI Suite, and the pros and cons of using this model over other methods, such as lab-derived BCFs.

b. Information sources for health risk factors

In its Draft Updated HHC, EPA provides updated health risk factors using what it describes as the "most current toxicity information."[1] Many states are well-acquainted with EPA's Integrated Risk Information System (IRIS) as a source of information for cancer slope factors (CSFs) and reference dose factors (RfDs). Although IRIS remains the primary source of information for CSFs and RfDs values for many of the chemicals represented in the Draft Updated HHC, for some of the chemicals EPA relied on sources other than IRIS, which are

[1] *See* "Human Health Ambient Water Quality Criteria: Draft 2014 Update" Fact Sheet (EPA-820-F-14-003) *available at* http://water.epa.gov/scitech/swguidance/standards/criteria/current/upload/Human-Health-Ambient-Water-Quality-Criteria-Draft-2014-Update-Factsheet.pdf.

less familiar to states (*see* Appendix A.1).[2] States are interested in information on the public and scientific review process used to derive these non-IRIS values. ACWA recommends that EPA include more background on these less established information sources for health risk factors in its final Updated HHC materials.

II. Bioaccumulation Factors (BAFs) & EPI Suite

EPA derived the Draft Updated HHC using BAFs rather than BCFs used in the current criteria. As prescribed in EPA's 2000 Human Health Criteria Methodology, EPA established BAFs for three trophic levels of fish to account for variation in bioaccumulation due to trophic position. EPA used EPI Suite to develop BAFs for each of the trophic levels.

Many states' state-specific fish consumption rate (FCR) data will not support the multi-trophic level allocation prescribed. If a state should want to use state-specific FCR data and chooses to use EPI Suite BAFs, but the state does not have the requisite resolution on ingested species and trophic level for application of the three trophic level BAFs, how should EPI Suite BAFs be applied? EPA should address how states should proceed with EPI Suite modeling given such FCR data limitations in the final Updated HHC.

States are also concerned that EPI Suite may not be an appropriate tool for modeling in every state given variable geographic and ecological conditions. The EPI Suite User Guide available via EPA's website[3] indicated that the model is not recommended for use when modeling arctic, sub-tropical or tropical conditions. EPI Suite was calibrated to Great Lakes food webs and is based on a limited number of species.[4] Likewise, key model constants[5] may not be representative of the conditions and fish species variation from state-to-state. Given these potential limitations, ACWA recommends that EPA address whether EPI Suite modeling can be tailored to, and calibrated for, the specific site-specific conditions in a particular state.

III. BCFs vs. BAFs

States recognize that both the older BCFs and the proposed BAFs in the Draft Updated HHC have uncertainties associated with them. However, the current Draft Updated HHC lacks discussion on the pros and cons of using BAFs over BCFs. States would like EPA to consider whether model-derived BAFs may be appropriate for some pollutants, but not others, and whether BCFs could still be a reliable approach for those pollutants that may be less suited for model-derived BAFs. ACWA recommends that EPA include more discussion of the benefits and limitations of both BCFs and BAFs in the final Updated HHC.

[2] *See* Appendix A.1 to this comment letter for some examples of Draft Updated HHC derived using non-IRIS values.
[3] *See* U.S. EPA "Exposure Assessment Tools and Models" webpage *available at* http://www.epa.gov/oppt/exposure/pubs/episuite.htm.
[4] EPI Suite's biotransformation constant (km) was calibrated based on seventy-nine percent carp and rainbow trout, and included no invertebrates; biomagnification constant (β) was calibrated to Great Lakes data.
[5] e.g., temperature, carbon content, and fish weight.

IV. Relative Source Contribution (RSC)

As EPA states in the Federal Register notice, "the draft update is based on EPA's current methodology for deriving human health criteria as described in 'Methodology for Deriving Ambient Water Quality Criteria for the protection of Human Health (2000)' [hereinafter "2000 Methodology"]."[6] The 2000 Methodology provides a decision tree approach for selecting RSC factors to account for exposures other than through drinking water and consumption of freshwater aquatic organisms. Using this approach, an RSC that is less stringent than the default RSC of 20% is used if supported by chemical-specific data. It is unclear whether EPA considered whether chemical-specific data are available to support RSC values that differ from the default 20% RSC value used for all non-carcinogenic criteria in the Draft Updated HHC. ACWA encourages EPA to evaluate whether there is a scientific basis for non-default RSC values for any of the HHC, or alternatively, EPA should include further discussion of the evidence to support the selection of the 20% RSC value.

V. Risk Level Options

In discussions on the Draft updated HHC, EPA has indicated that the draft is presented at a risk level of 1 in 1,000,000 (10^{-6}). EPA has also expressed that states would still have the option of adopting criteria at risk levels of 1 in 10,000 (10^{-4}), 1 in 100,000 (10^{-5}), or 1 in 1,000,000 (10^{-6}). However, the Draft Updated HHC itself does not expressly address the use of risk levels other than 1 in 1,000,000 (10^{-6}), nor the alternative risk level options that are permissible under the proposed updates. ACWA requests that EPA provide more clarity on these options in the final Updated HHC.

VI. Updated Exposure Assumptions for Drinking Water Consumption and Body Weight

In developing the Draft Updated HHC, EPA has updated the default drinking water intake assumption from 2 L/day to 3 L/day and the default body weight assumption from 70 kg to 80 kg. During the June 18 conference call discussion with states about the Draft, EPA indicated that it does not currently plan to revise these exposure assumptions to develop drinking water maximum contaminant levels (MCLs) and Health Advisories. The rationale for potentially using different drinking water intake and body weight assumptions for developing Human Health Criteria versus drinking water MCLs and Health Advisories is unclear, and it is recommended that the EPA provide an explanation as to the reason for using different assumptions.

VII. Role of Risk Management and Policy in Criteria Development

The 2000 Methodology more clearly acknowledges that criteria are not solely science-based, and that risk management and policy play a role in criteria development. Under the CWA, states have authority to make site-specific decisions based on all of those factors. ACWA recommends that EPA include a clear statement on the role of policy and risk management in the final

[6] 79 Fed. Reg. 27303.

Updated HHC, as well as language that expressly acknowledges states' flexibility to accommodate site-specific needs and conditions in their state's waterbodies.

VIII. Human Health Criteria Matrix Document and Comparison Table

In addition to the recommendations above on the aspects of the Draft that would benefit from further details, ACWA recommends that EPA consider presenting some of the Draft's information in the formats described below to improve the overall clarity and understanding of changes to the existing criteria.

a. Update of 2002 HHC Calculation Matrix Document

Many states have cited the "Human Health Criteria Calculation Matrix document for the 2002 National Recommended HHC"[7] as a helpful resource that provides useful background for the 2002 criteria. States would be interested in having the Draft updated HHC information in a similar matrix format. ACWA recommends that EPA include such a matrix in the final Updated HHC and/or final supporting materials to improve overall understanding of the updates and provide value to states as a useful reference tool going forward.

b. Comparison Table

ACWA recognizes that a side-by-side comparison table of the current and Draft Updated HHC is included in the supporting materials available on EPA's website.[8] ACWA recommends that EPA expand the information included in the final HHC materials that provide a more detailed side-by-side comparison of the existing HHC with the updated criteria values. The example below and in the attached Appendix A.2 provides examples suggested to ACWA by states as a template for a final comparison table that would provide pertinent information on the changes in a concise reference document.

Pollutant name	CAS	BCF for current NRWQC	TL2 BAF for proposed NRWQC	TL3 BAF for proposed NRWQC	TL4 BAF for proposed NRWQC	RfD or CSF for current NRW QC	Source (IRIS, internal EPA review document, etc..) of RfD or CSF for current NRWQC	RfD or CSF for proposed NRWQC	Source (IRIS, internal EPA review document, etc..) of RfD or CSF for proposed NRWQC

[7] "National Recommended Water Quality Criteria: Human Health Criteria Calculation Matrix (2002)," *available at* http://water.epa.gov/scitech/swguidance/standards/upload/2002_12_30_criteria_wqctable_hh_calc_matrix.pdf.
[8] "Side-by-Side Comparison of Draft 2014 Updates and Current EPA Recommended Ambient Water Quality Criteria for the Protection of Human Health" *available at* http://water.epa.gov/scitech/swguidance/standards/criteria/current/upload/comparisontable.pdf.

We thank EPA for the opportunity to comment on the Draft Updated HHC and appreciate the Agency's consideration of our recommendations, as well as the separate comments that will be filed individually by states. We encourage EPA to continue dialogue with its state co-regulators on the proposed updates, and we remain ready to answer questions regarding these comments. Please contact ACWA's Executive Director Julia Anastasio at 202-756-0600 ext. 1 or janastasio@acwa-us.org with any such questions or to plan further discussion.

Sincerely,

Shellie Chard-McClary
ACWA President
Water Quality Division Director
Oklahoma Department of Environmental Quality

Cc: Dr. Elizabeth Southerland, Director, Office of Science and Technology, Office of Water

Appendix A.1

Examples of Draft Updated HHC derived using non-IRIS values

Pollutant	***Factor***	***Source of Toxicity Factor***	***Citation***
gamma-BHC (Lindane)	RfD = 0.0047	Reregistration Eligibility Decision (RED)	USEPA (U.S. Environmental Protection Agency). 2001. Memorandum: Lindane (009001) Reregistarion Case No. 0315. Revised Anticipated Residues, Acute and Chronic Dietary Exposure and Risk Analyses for the HED Human Health Risk Assessment. DP Barcode D279260. 13 December 2001. USEPA (U.S. Environmental Protection Agency). 2002b. Reregistration Eligibility Decision (RED) for Lindane. Office of Prevention, Pesticides and Toxic Substances. Washington,DC. Federal Register 67: 59500-59502.
Dichlorobromomethane	CSF = 0.035	EPA's Office of Water	USEPA (U.S. Environmental Protection Agency). 2005. Drinking Water Criteria Document For Brominated Trihalomethanes. Office of Water. Washington, DC. EPA-822-R-05-011.
Chrysene	CSF = 0.029	OEHHA (CalEPA)	OEHHA (Office of Environmental Health Hazard Assessment). 2010. Public Health Goals for Chemicals in Drinking Water-Benzo(a)pyrene. California Environmental Protection Agency.

Appendix A.2: Example of a Comparison Table of Basis for Current Recommended EPA Human Health Ambient Water Quality Criteria and 2014 Draft Values

Disclaimer: provided for purpose of an example with no assurances as to its accuracy

Chemical	CAS Number	Criteria Document	Water + Organism (ug/L)	Organism Only (ug/L)	Carcinogen (C) or Non-Carcinogen (NC) [Carcinogen Group, if applicable]	Reference Dose (RfD) (mg/kg x d)	Cancer Slope Factor (CSF) $(mg/kg\text{-}day)^{-1}$	Source of Toxicity Information (NS = not specified)	Relative Source Contribution (RSC) (NA = not applied; ND = not derived)	BCF (Existing EPA) / BAF (Draft 2014) ((L/KG)	Average of trophic levels (T2, T3, & T4) BAFs	(BCF (L/kg)*0.017.5 (kg/day)) / (BAF (L/kg)*0.008,0.009, 0.005 kg/day)
Acenapththene	83-32-9	Current EPA recommended (2002)	670	990	NC	0.06	---	IRIS (1994)	NA	242		4.235
		Proposed EPA (2014)	200	400	NC	0.06	---	IRIS (1994)	0.2	123.1, 116.4, 94.95	111.4833333	2.50715
Acrolein	107-02-8	Current EPA recommended (2009)	6	9	NC	0.0005	---	IRIS (2003)	NA	215		3.7625
		Proposed EPA (2014)	3	400	NC	0.0005	---	IRIS (2003)	0.2	0.992, 0.9891, 0.9705	0.983866667	0.0216904
Acrylonitrile	107-13-1	Current EPA recommended (2002)	0.051	0.25	C [B1]	---	0.54	IRIS (1991)	NA	30		0.525
		Proposed EPA (2014)	0.049	6.5	C [B1]	---	0.54	IRIS (1991)	NA	1.034, 1.036, 1.033	1.034333333	0.022761
Aldrin	309-00-2	Current EPA recommended (2002)	0.000049	0.00005	C [B2]	---	17	IRIS (1993)	NA	4670		81.725
		Proposed EPA (2014)	0.000001	0.000001	C [B2]	---	17	IRIS (1993)	NA	222600, 207700, 184000	204766.6667	4570.1
alpha-BHC (alpha-HCH)	319-84-6	Current EPA recommended (2002)	0.0026	0.0049	C [B2]	---	6.3	IRIS (1993)	NA	130		2.275
		Proposed EPA (2014)	0.00042	0.00047	C [B2]	---	6.3	IRIS (1993)	NA	934.9, 1118, 1935	1329.3	27.2162
alpha-Endosulfan (EPA: adopted isomer-specific [i.e., alpha] criteria)	959-98-8 (mixture: 115-29-7)	Current EPA recommended (2002)	62	89	NC	0.006	---	IRIS (1994)	NA	270		4.725
		Proposed EPA (2014)	8	10	NC	0.006	---	IRIS (1994)	0.2	375.6, 409.7, 544.4	443.2333333	9.4141
Anthracene	120-12-7	Current EPA recommended (2002)	8300	40000	NC	0.3	---	IRIS (1993)	NA	30		0.525
		Proposed EPA (2014)	200	200	NC	0.3	---	IRIS (1993)	0.2	1212, 1169, 1151	1177.333333	25.972
Benzene	71-43-2	Current EPA recommended (2002)	0.61–2.2	14–51	C [A]	---	0.015–0.055	IRIS (2000)	NA	5.2		0.091
		Proposed EPA (2014)	0.45–1.6	6.2–23	C [A]	---	0.015–0.055	USEPA (1999) IRIS (2000)	NA	8.9, 10.01, 14.79	11.23333333	0.23524
Benzidine	92-87-5	Current EPA recommended (2002)	0.000086	0.0002	C [A]	---	230	IRIS (1993)	NA	87.5		1.53125
		Proposed EPA (2014)	0.00011	0.0065	C [A]	---	230	IRIS (1993)	NA	2.195, 2.354, 2.992	2.513666667	0.053706
Benzo(a) Anthracene	56-55-3	Current EPA recommended (2002)	0.0038	0.018	C [B2]	---	7.3	IRIS (1994) for CASN 205992	NA	30		0.525
		Proposed EPA (2014)	0.011	0.013	C [B2]	---	0.29	OEHHA (2005, 2010) CA Air Resources Board and OEHHA (1994)	NA	1577, 748.7, 405.5	910.4	21.3818
Benzo(a) Pyrene	50-32-8	Current EPA recommended (2002)	0.0038	0.018	C [B2]	---	7.3	IRIS (1994)	NA	30		0.525
		Proposed EPA (2014)	0.00077	0.00084	C [B2]	---	2.9	OEHHA (2010)	NA	2736, 983.7, 395.6	1371.766667	32.7193
Benzo(b) Fluoranthene	205-99-2	Current EPA recommended (2002)	0.0038	0.018	C [B2]	---	7.3	IRIS (1994) for CASN 205992	NA	30		0.525
		Proposed EPA (2014)	0.0037	0.0038	C [B2]	---	0.29	OEHHA (2005, 2010) CA Air Resources Board and OEHHA (1994)	NA	5325, 2643, 1165	3044.333333	72.212
Benzo(k) Fluoranthene	207-08-9	Current EPA recommended (2002)	0.0038	0.018	C [B2]	---	7.3	IRIS (1994) for CASN 205992	NA	30		0.525
		Proposed EPA (2014)	0.011	0.012	C [B2]	---	0.29	OEHHA (2005, 2010) CA Air Resources Board and OEHHA (1994)	NA	1883, 675.5, 300.5	953	22.646
beta-BHC (beta-HCH)	319-85-7	Current EPA recommended (2002)	0.0091	0.017	C [C]	---	1.8	IRIS (1993)	NA	130		2.275
		Proposed EPA (2014)	0.0015	0.0016	C [C]	---	1.8	IRIS (1993)	NA	934.9, 1118, 1935	1329.3	27.2162
beta-Endosulfan (EPA: adopted isomer-specific [i.e., beta] criteria)	33213-65-9	Current EPA recommended (2002)	62	89	NC	0.006	---	IRIS (1994), endosulfan CASN 115-29-7 used	NA	270		4.725
		Proposed EPA (2014)	10	20	NC	0.006	---	IRIS (1994), endosulfan CASN 115-29-7 used	0.2	178.9, 199.2, 281.1	219.7333333	4.6295

Bis(Chloromethyl) Ether	542-88-1	Current EPA recommended (2002)	0.0001	0.00029	C [A]	---	220	IRIS (1991)	NA	63		1.1025
		Proposed EPA (2014)	0.00012	0.014	C [A]	---	220	IRIS (1991)	NA	1.149, 1.166, 1.225	1.18	0.025811
Bis(2-Chloroethyl) Ether	111-44-4	Current EPA recommended (2002)	0.03	0.53	C [B2]	---	1.1	IRIS (1994)	NA	6.9		0.12075
		Proposed EPA (2014)	0.024	1.5	C [B2]	---	1.1	IRIS (1994)	NA	2.028, 2.156, 2.639	2.274333333	0.048823
Bis(2-Chloro-1-Methylethyl) Ether (previously Bis(2-Chloroisopropyl) Ether)	108-60-1	Current EPA recommended (2002)	1400	65000	NC	0.04	---	IRIS (1990)	NA	2.47		0.043225
		Proposed EPA (2014)	200	2000	NC	0.04	---	IRIS (1990)	0.2	13.48, 14.23, 15.63	14.44666667	0.31406
Bis(2-Ethylhexyl) Phthalate	117-81-7	Current EPA recommended (2002)	1.2	2.2	C [B2]	---	0.014	IRIS (1993)	NA	130		2.275
		Proposed EPA (2014)	0.028	0.029	C [B2]	---	0.014	IRIS (1993)	NA	17370, 6120, 1040	6136.666667	199.24
Bromoform	75-25-2	Current EPA recommended (2002)	4.3	140	C [B2]	---	0.0079	IRIS (1991)	NA	3.75		0.065625
		Proposed EPA (2014)	5.2	50	C [likely to be carcinogenic to humans]	---	0.0046	USEPA (2005)	NA	13.85, 15.18, 19.49	16.17333333	0.34487
Butylbenzyl Phthalate	85-68-7	Current EPA recommended (2002)	1500	1900	NC	0.2	---	IRIS (1993)	NA	414		7.245
		Proposed EPA (2014)	800	3000	NC	0.2	---	IRIS (1993)	0.2	62.46, 54.54, 40.08	52.36	1.19094
Carbon Tetrachloride	56-23-5	Current EPA recommended (2002)	0.223	1.6	C [B2]	---	0.13	IRIS (1991)	NA	18.75		0.328125
		Proposed EPA (2014)	0.3	3	C [likely to be carcinogenic to humans]	---	0.07	IRIS (2010)	NA	20.02, 20.11, 18.82	19.65	0.43525
Chlordane	57-74-9	Current EPA recommended (2002)	0.0008	0.00081	C [B2]	---	0.35	IRIS (1998)	NA	14100		246.75
		Proposed EPA (2014)	0.0000068	0.0000068	C [B2]	---	0.35	IRIS (1998)	NA	688200, 1318000, 3205000	1737066.667	33392.6
Chlorobenzene	108-90-7	Current EPA recommended (2003)	130	1600	NC	0.02	---	IRIS (1993)	0.2	10.3		0.18025
		Proposed EPA (2014)	90	600	NC	0.02	---	IRIS (1993)	0.2	24.41, 25.05, 25	24.82	0.54573
Chlorodibromomethane	124-48-1	Current EPA recommended (2002)	0.4	13	C [C]	---	0.084	IRIS (1992)	NA	3.75		0.065625
		Proposed EPA (2014)	0.58	8.4	C [suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential]	---	0.043	USEPA OW (2005)	NA	8.723, 9.616, 12.78	10.373	0.220228
Chloroform	67-66-3	Current EPA recommended (2002)	5.7	470	C [B2]	---	0.0061	IRIS (1991)	NA	3.75		0.065625
		Proposed EPA (2014)	50	1000	Non-linear carcinogen	POD/UF = 0.01	---	IRIS (2001)	0.2	6.003, 6.591, 8.706	7.1	0.150873
Chlorophenoxy Herbicide (2,4-D)	94-75-7	Current EPA recommended (1986)	100	ND	NC	0.01	---	Gold Book (1986)	0.2	ND		ND
		Proposed EPA (2014)	200	800	NC	0.05	---	USEPA OCSPP (2012)	0.2	39.49, 44.92, 68.75	51.05333333	1.06395
Chlorophenoxy Herbicide (2,4,5-TP)	93-72-1	Current EPA recommended (1986)	10	ND	NC	0.008	---	Gold Book (1986)	0.2	ND		ND
		Proposed EPA (2014)	10	10	NC	0.008	---	IRIS (1988)	0.2	389.7, 441.9, 662.9	498.1666667	10.4092
Chrysene	218-01-9	Current EPA recommended (2002)	0.0038	0.018	C [B2]	---	7.3	IRIS (1994) for CASN 205992	NA	30		0.525
		Proposed EPA (2014)	0.022	0.022	C [B2]	---	0.029	OEHHA (2005, 2010) CA Air Resources Board and OEHHA (1994)	NA	8997, 4739, 1993	5243	124.592
Cyanide	57-12-5	Current EPA recommended (2003)	140	140	NC	0.02	---	IRIS (1993)	0.2	1		0.0175
		Proposed EPA (2014)	3	400	NC	0.0006	---	IRIS (2010)	0.2	0.9634, 0.9561, 0.9202	0.946566667	0.0209131
Dibenzo(a,h) Anthracene	53-70-3	Current EPA recommended (2002)	0.0038	0.018	C [B2]	---	7.3	IRIS (1994) for CASN 205992 was used	NA	30		0.525
		Proposed EPA (2014)	0.000063	0.000063	C [B2]	---	4.1	OEHHA (2005)	NA	24690, 10700, 2863	12751	308.135
Dichlorobromomethane	75-27-4	Current EPA recommended (2002)	0.55	17	C [B2]	---	0.062	IRIS (1993)	NA	3.75		0.065625
		Proposed EPA (2014)	0.72	14	C [likely to be carcinogenic to humans]	---	0.035	USEPA OW (2005)	NA	6.562, 7.269, 10.01	7.947	0.167967
Dieldrin	60-57-1	Current EPA recommended (2002)	0.000052	0.000054	C [B2]	---	16	IRIS (1993)	NA	4670		81.725
		Proposed EPA (2014)	0.00001	0.00001	C [B2]	---	16	IRIS (1993)	NA	17280, 20740, 30820	22946.66667	479
Diethyl Phthalate	84-66-2	Current EPA recommended (2002)	17000	44000	NC	0.8	---	IRIS (1993)	NA	73		1.2775
		Proposed EPA (2014)	4000	90000	NC	0.8	---	IRIS (1993)	0.2	6.747, 6.636, 5.889	6.424	0.143145
Dimethyl Phthalate	131-11-3	Current EPA recommended (2002)	270000	1100000	NC	ADI = 10	---	USEPA OW (1980)	NA	93.8		1.6415
		Proposed EPA (2014)	50000	4000000	NC	10	---	USEPA OW (1980)	0.2	2.066, 2.065, 1.953	2.028	0.044878
Di-n-Butyl Phthalate	84-74-2	Current EPA recommended (2002)	2000	4500	NC	0.1	---	IRIS (1990)	NA	89		1.5575
		Proposed EPA (2014)	200	400	NC	0.1	---	IRIS (1990)	0.2	236.2, 209.4, 159.4	201.6666667	4.5712

Dinitrophenols (EPA adopted criterion based on 2,4-dinitrophenol (51-28-5))	25550-58-7	Current EPA recommended (2002)	69	5300	NC	0.002	---	USEPA OW (1980)	NA	1.5		0.02625
		Proposed EPA (2014)	10	800	NC	0.002	---	IRIS (1991)	0.2	1.808, 1.835, 1.833	1.825333333	0.040144
Endosulfan Sulfate	1031-07-8	Current EPA recommended (2002)	62	89	NC	0.006	---	IRIS (1994), endosulfan CASN 115-29-7 used	NA	270		4.725
		Proposed EPA (2014)	10	10	NC	0.006	---	IRIS (1994)	0.2	255, 281, 383	306.3333333	6.484
Endrin	72-20-8	Current EPA recommended (2003)	0.059	0.06	NC	0.0003	---	IRIS (1991)	0.2	3970		69.475
		Proposed EPA (2014)	0.01	0.01	NC	0.0003	---	IRIS (1991)	0.2	17280, 20740, 30820	22946.66667	479
Endrin Aldehyde	7421-93-4	Current EPA recommended (2002)	0.29	0.3	NC	0.0003	---	IRIS (1991) for CASN 72-20-8 was used	NA	3970		69.475
		Proposed EPA (2014)	0.03	0.03	NC	0.0003	---	IRIS (1991)	0.2	5409, 6428, 10070	7302.333333	151.474
Ethylbenzene	100-41-4	Current EPA recommended (2003)	530	2100	NC	0.1	---	IRIS (1991)	0.2	37.5		0.65625
		Proposed EPA (2014)	400	1000	NC	0.1	---	IRIS (1991)	0.2	61.51, 65.33, 73.56	66.8	1.44785
Fluoranthene	206-44-0	Current EPA recommended (2002)	130	140	NC	0.04	---	IRIS (1993)	NA	1150		20.125
		Proposed EPA (2014)	40	50	NC	0.04	---	IRIS (1993)	0.2	790.1, 563.4, 388.4	580.6333333	13.3334
Fluorene	86-73-7	Current EPA recommended (2002)	1100	5300	NC	0.04	---	IRIS (1990)	NA	30		0.525
		Proposed EPA (2014)	30	40	NC	0.04	---	IRIS (1990)	0.2	763, 789.7, 909.2	820.6333333	17.7573
gamma-BHC (Lindane)	58-89-9	Current EPA recommended (2003)	0.98	1.8	NC	0.0003	---	IRIS (1988)	0.2	130		2.275
		Proposed EPA (2014)	2.5	2.8	NC	0.0047	---	USEPA OPPTS (2002)	0.2	934.9, 1118, 1935	1329.3	27.2162
Heptachlor	76-44-8	Current EPA recommended (2002)	0.000079	0.000079	C [B2]	---	4.5	IRIS (1993)	NA	11200		196
		Proposed EPA (2014)	0.000023	0.000024	C [B2]	---	4.5	IRIS (1993)	NA	31680, 33940, 39160	34926.66667	754.7
Heptachlor Epoxide	1024-57-3	Current EPA recommended (2002)	0.000039	0.000039	C [B2]	---	9.1	IRIS (1993)	NA	11200		196
		Proposed EPA (2014)	0.000016	0.000016	C [B2]	---	9.1	IRIS (1993)	NA	11850, 19230, 55830	28970	547.02
Hexachlorobenzene	118-74-1	Current EPA recommended (2002)	0.00028	0.00029	C [B2]	---	1.6	IRIS (1996)	NA	8690		152.075
		Proposed EPA (2014)	0.0000064	0.0000064	C [B2]	---	1.6	IRIS (1996)	NA	157300, 294000, 791100	414133.3333	7859.9
Hexachlorobutadiene	87-68-3	Current EPA recommended (2002)	0.44	18	C [C]	---	0.078	IRIS (1991)	NA	2.78		0.04865
		Proposed EPA (2014)	0.008	0.008	C [C]	---	0.04	USEPA OW (2003)	NA	6044, 8953, 23410	12802.33333	245.979
Hexachlorocyclohexane - Technical	608-73-1	Current EPA recommended (1980)	0.0123	0.0414	C	---	2.0	USEPA OW (1980)	NA	130		2.275
		Proposed EPA (2014)	0.0011	0.0012	C [B2]	---	1.8	IRIS (1993)	NA	1270, 1534, 2705	1836.333333	37.491
Hexachlorocyclopentadiene	77-47-4	Current EPA recommended (2003)	40	1100	NC	0.006	---	IRIS (2001)	0.2	4.34		0.07595
		Proposed EPA (2014)	0.6	0.6	NC	0.006	---	IRIS (2001)	0.2	7310, 6930, 6502	6914	153.36
Hexachloroethane	67-72-1	Current EPA recommended (2002)	1.4	3.3	C [C]	---	0.014	IRIS (1994)	NA	86.9		1.52075
		Proposed EPA (2014)	0.1	0.1	C [likely to be carcinogenic to humans]	---	0.04	IRIS (2011)	NA	727.1, 762.8, 912.6	800.8333333	17.245
Indeno(1,2,3-cd) Pyrene	193-39-5	Current EPA recommended (2002)	0.0038	0.018	C [B2]	---	7.3	IRIS (1994) for CASN 205992 was used	NA	30		0.525
		Proposed EPA (2014)	0.0045	0.0048	C [B2]	---	0.29	OEHHA (2005, 2010) CA Air Resources Board and OEHHA (1994)	NA	5370, 1465, 316.6	2383.866667	57.728
Isophorone	78-59-1	Current EPA recommended (2002)	35	960	C [C]	---	0.00095	IRIS (1992)	NA	4.38		0.07665
		Proposed EPA (2014)	27	1100	C [C]	---	0.00095	IRIS (1992)	NA	3.301, 3.493, 3.992	3.595333333	0.077805
Methoxychlor	72-43-5	Current EPA recommended (1986)	100	ND	NC	2	---	Gold Book (1986)	NA	ND		ND
		Proposed EPA (2014)	0.4	0.4	NC	0.005	---	IRIS (1991)	0.2	8963, 8860, 9001	8941.333333	196.449
Methyl Bromide	74-83-9	Current EPA recommended (2002)	47	1500	NC	0.0014	---	IRIS (1991)	NA	3.75		0.065625
		Proposed EPA (2014)	100	8000	NC	0.02	---	USEPA OPPTS (2006)	0.2	1.795, 1.891, 2.243	1.976333333	0.042594
Methylene Chloride	75-09-2	Current EPA recommended (2002)	4.6	590	C [B2]	---	0.0075	IRIS (1995)	NA	0.91		0.015925
		Proposed EPA (2014)	8.0	510	C [likely to be carcinogenic to humans]	---	0.0033	IRIS (2011)	NA	1.968, 2.098, 2.63	2.232	0.047776
Nitrobenzene	98-95-3	Current EPA recommended (2002)	17	690	NC	0.0005	---	IRIS (1991)	NA	2.89		0.050575
		Proposed EPA (2014)	10	300	NC	0.002	---	IRIS (2009)	0.2	4.669, 5.072, 6.433	5.391333333	0.115165

Pentachlorobenzene	608-93-5	Current EPA recommended (2002)	1.4	1.5	NC	0.0008	---	IRIS (1988)	NA	2.125		0.0371875
		Proposed EPA (2014)	0.02	0.02	NC	0.0008	---	IRIS (1988)	0.2	19630, 28470, 61860	36653.33333	722.57
Pentachlorophenol	87-86-5	Current EPA recommended (2002)	0.27	3.0	C [B2]	---	0.12	IRIS (1993)	NA	11		0.1925
		Proposed EPA (2014)	0.02	0.02	C [likely to be carcinogenic to humans]	---	0.4	IRIS (2010)	NA	486.1, 360.9, 254.7	367.2333333	8.4104
Phenol	108-95-2	Current EPA recommended (2009)	10000	860000	NC	0.3	---	IRIS (2002)	NA	1.4		0.0245
		Proposed EPA (2014)	2000	100000	NC	0.3	---	IRIS (2002)	0.2	2.193, 2.27, 2.419	2.294	0.050069
Pyrene	129-00-00	Current EPA recommended (2002)	830	4000	NC	0.03	---	IRIS (1993)	NA	30		0.525
		Proposed EPA (2014)	20	20	NC	0.03	---	IRIS (1993)	0.2	1322, 1058, 784.9	1054.966667	24.0225
Tetrachloroethylene	127-18-4	Current EPA recommended (2002)	0.69	3.3	C	---	0.0398	USEPA OW (1980)	NA	30.6		0.5355
		Proposed EPA (2014)	10	40	C [likely to be carcinogenic to humans]	---	0.002	IRIS (2012)	NA	54.22, 52.97, 46.04	51.07666667	1.14069
Toluene	108-88-3	Current EPA recommended (2003)	1300	15000	NC	0.2	---	IRIS (1994)	0.2	10.7		0.18725
		Proposed EPA (2014)	300	2000	NC	0.08	---	IRIS (2005)	0.2	27.6, 30.14, 37.79	31.84333333	0.68101
Toxaphene	8001-35-2	Current EPA recommended (2002)	0.00028	0.00028	C [B2]	---	1.1	IRIS (1991)	NA	13100		229.25
		Proposed EPA (2014)	0.000019	0.000019	C [B2]	---	1.1	IRIS (1991)	NA	117800, 163300, 278100	119733.3333	3802.6
Trichloroethylene	79-01-6	Current EPA recommended (2002)	2.5	30	C	---	0.0126	USEPA OW (1980)	NA	10.6		0.1855
		Proposed EPA (2014)	0.5	4	C [carcinogenic to humans]	---	0.05	IRIS (2011)	NA	15.43, 17.18, 23.7	18.77	0.39656
Vinyl Chloride	75-01-4	Current EPA recommended (2003)	0.025	2.4	C	---	1.4	IRIS (2000)	NA	1.17		0.020475
		Proposed EPA (2014)	0.018	0.68	C [known human carcinogen]	---	1.4	IRIS (2000)	NA	3.343, 3.652, 4.892	3.962333333	0.084072
1,1,1-Trichloroethane	71-55-6	Current EPA recommended (2002)	ND	ND	ND	ND	ND	ND	ND	5.6		0.098
		Proposed EPA (2014)	10000	100000	NC	2	---	IRIS (2007)	0.2	10.55, 10.7, 10.32	10.52333333	0.2323
1,1,2,2-Tetrachloroethane	79-34-5	Current EPA recommended (2002)	0.17	4.0	C	---	0.2	IRIS (1994)	NA	5		0.0875
		Proposed EPA (2014)	0.1	1	C [likely to be carcinogenic to humans]	---	0.2	IRIS (2010)	NA	13.72, 15.08, 19.6	16.13333333	0.34348
1,1,2-Trichloroethane	79-00-5	Current EPA recommended (2002)	0.59	16	C [C]	---	0.057	IRIS (1994)	NA	4.5		0.07875
		Proposed EPA (2014)	0.45	12	C [C]	---	0.057	IRIS (1994)	NA	19.6, 5.312, 6.585	10.499	0.237533
1,1-Dichloroethylene	75-35-4	Current EPA recommended (2003)	330	7100	NC	0.05	---	IRIS (2002)	0.2	5.61		0.098175
		Proposed EPA (2014)	200	4000	NC	0.05	---	IRIS (2002)	0.2	8.186, 9.012, 11.93	9.709333333	0.206246
1,2,4-Trichlorobenzene	120-82-1	Current EPA recommended (2003)	35	70	NC	0.01	---	IRIS (1996)	0.2	114		1.995
		Proposed EPA (2014)	8	10	NC	0.01	---	IRIS (1996)	0.2	642.8, 714.7, 1010	789.1666667	16.6247
1,2,4,5-Tetrachlorobenzene	95-94-3	Current EPA recommended (2002)	0.97	1.1	NC	0.0003	---	IRIS (1991)	NA	1125		19.6875
		Proposed EPA (2014)	0.04	0.04	NC	0.0003	---	IRIS (1991)	0.2	3696, 4798, 9639	6044.333333	120.945
1,2-Dichlorobenzene	95-50-1	Current EPA recommended (2003)	420	1300	NC	0.09	---	IRIS (1991)	0.2	55.6		0.973
		Proposed EPA (2014)	700	1000	NC	0.3	---	ATSDR (2006)	0.2	151.5, 168.6, 235.6	185.2333333	3.9074
1,2-Dichloroethane	107-06-2	Current EPA recommended (2002)	0.38	37	C [B2]	---	0.091	IRIS (1991)	NA	1.2		0.021
		Proposed EPA (2014)	0.29	13	C [B2]	---	0.091	IRIS (1991)	NA	2.67, 2.89, 3.777	3.112333333	0.066255
1,2-Dichloropropane	78-87-5	Current EPA recommended (2002)	0.5	15	C	---	0.067	DW reg. 56 FR 3526 (1/30/91)	NA	4.1		0.07175
		Proposed EPA (2014)	0.71	16	C [B2]	---	0.036	CalEPA (1999)	NA	5.664, 6.106, 7.414	6.394666667	0.137336
1,2-Diphenylhydrazine	122-66-7	Current EPA recommended (2002)	0.036	0.20	C [B2]	---	0.8	IRIS (1991)	NA	24.9		0.43575
		Proposed EPA (2014)	0.02	0.10	C [B2]	---	0.8	IRIS (1991)	NA	41.47, 44.73, 53.3	46.5	1.00083
1,2-Trans-Dichloroethylene	156-60-5	Current EPA recommended (2003)	140	10000	NC	0.02	---	IRIS (1989)	0.2	1.58		0.02765
		Proposed EPA (2014)	100	2000	NC	0.02	---	IRIS (2010)	0.2	6.731, 7.507, 10.71	8.316	0.172081
1,3-Dichlorobenzene Note: ADI for 1,2-Dichlorobenzene used for	541-73-1	Current EPA recommended (2002)	320	960	NC	ADI = 0.0134	---	USEPA OW (1980)	NA	41.2		0.721
		Proposed EPA (2014)	5	10	NC	0.002	---	ATSDR (2006)	0.2	134.3, 140.1, 149.5	141.3	3.0828
		Current EPA recommended (2003)	0.34	21	C [B2]	---	0.1	IRIS (2000)	NA	1.9		0.03325

1,3-Dichloropropene	542-75-6	Proposed EPA (2014)	0.2	4	C [likely to be a human carcinogen]	---	0.1	IRIS (2000)	NA	7.137, 7.965, 11.38	8.827333333	0.185681
1,4-Dichlorobenzene	106-46-7	Current EPA recommended (2003)	63	190	NC	ADI = 0.0134	---	USEAP OW (1980)	0.2	37.5		0.65625
Note: ADI for 1,2-Dichlorobenzene used for		Proposed EPA (2014)	200	200	NC	0.07	---	ATSDR (2006)	0.2	165.7, 187.5, 281.3	211.5	4.4196
2,4,5-Trichlorophenol	95-95-4	Current EPA recommended (2002)	1800	3600	NC	0.1	---	IRIS (1988)	NA	110		1.925
		Proposed EPA (2014)	200	400	NC	0.1	---	IRIS (1988)	0.2	190.4, 195, 198.5	194.6333333	4.2707
2,4,6-Trichlorophenol	88-06-2	Current EPA recommended (2002)	1.4	2.4	C [B2]	---	0.011	IRIS (1994)	NA	150		2.625
		Proposed EPA (2014)	1.4	3.2	C [B2]	---	0.011	IRIS (1994)	NA	109.6, 106.9, 93.59	103.3633333	2.30685
2,4-Dichlorophenol	120-83-2	Current EPA recommended (2002)	77	290	NC	0.003	---	IRIS (1988)	NA	40.7		0.71225
		Proposed EPA (2014)	10	60	NC	0.003	---	IRIS (1988)	0.2	35.28, 35.65, 33.95	34.96	0.77284
2,4-Dimethylphenol	105-67-9	Current EPA recommended (2002)	380	850	NC	0.02	---	IRIS (1990)	NA	93.8		1.6415
		Proposed EPA (2014)	100	1000	NC	0.02	---	IRIS (1990)	0.2	9.984, 10.67, 12.33	10.99466667	0.237552
2,4-Dinitrophenol	51-28-5	Current EPA recommended (2002)	69	5300	NC	0.002	---	IRIS (1991)	NA	1.5		0.02625
		Proposed EPA (2014)	10	500	NC	0.002	---	IRIS (1991)	0.2	2.697, 2.765, 2.814	2.758666667	0.060531
2,4-Dinitrotoluene	121-14-2	Current EPA recommended (2002)	0.11	3.4	C	---	0.311	USEPA OW (1980)	NA	3.8		0.0665
		Proposed EPA (2014)	0.0378	0.711	C [B2]	---	0.667	USEPA OW (2008)	NA	6.485, 7.232, 10.33	8.015666667	0.168618
2-Chloronaphthalene	91-58-7	Current EPA recommended (2002)	1000	1600	NC	0.08	---	IRIS (1990)	NA	202		3.535
		Proposed EPA (2014)	90	100	NC	0.08	---	IRIS (1990)	0.2	440.4, 477.8, 626.2	514.8	10.9544
2-Chlorophenol	95-57-8	Current EPA recommended (2002)	81	150	NC	0.005	---	IRIS (1993)	NA	134		2.345
		Proposed EPA (2014)	20	300	NC	0.005	---	IRIS (1993)	0.2	8.957, 9.989, 14.07	11.00533333	0.231907
2-Methyl-4,6-Dinitrophenol	534-52-1	Current EPA recommended (2002)	13	280	NC	0.00039	---	USEPA OW (1980)	NA	5.5		0.09625
		Proposed EPA (2014)	2	60	NC	0.0004	---	HHS (1995)	0.2	4.757, 4.771, 4.485	4.671	0.10342
3,3'-Dichlorobenzidine	91-94-1	Current EPA recommended (2002)	0.021	0.028	C [B2]	---	0.45	IRIS (1993)	NA	312		5.46
		Proposed EPA (2014)	0.028	0.055	C [B2]	---	0.45	IRIS (1993)	NA	138.1, 145.6, 162.1	148.6	3.2257
3-Methyl-4-Chlorophenol	59-50-7	Current EPA recommended (2002)	ND	ND	ND	ND	ND	ND	ND	ND		ND
Note: USEPA OW organoleptic criterion		Proposed EPA (2014)	500	3000	NC	0.1	---	NSF (2002)	0.2	23.02, 22.24, 18.76	21.34	0.47812
4,4'-DDD	72-54-8	Current EPA recommended (2002)	0.00031	0.00031	C [B2]	---	0.24	IRIS (1988)	NA	53600		938
		Proposed EPA (2014)	0.000019	0.000019	C [B2]	---	0.24	IRIS (1988)	NA	370200, 678800, 1636000	561666.6667	17250.8
4,4'-DDE	72-55-9	Current EPA recommended (2002)	0.00022	0.00022	C [B2]	---	0.34	IRIS (1988)	NA	53600		938
		Proposed EPA (2014)	0.0000376	0.0000376	C [B2]	---	0.167	USEPA CCL2 (2008)	NA	463100, 573300, 775200	603866.6667	12740.5
4,4'-DDT	50-29-3	Current EPA recommended (2002)	0.00022	0.00022	C [B2]	---	0.34	IRIS (1991)	NA	53600		938
		Proposed EPA (2014)	0.0000072	0.0000072	C [B2]	---	0.34	IRIS (1991)	NA	1022000, 1446000, 2315000	1594333.333	32765