

## **Add Chapter 50. Corrective Action**

Article 1. Toxicity Criteria for Human Health Risk Assessments and Health-Based Decision-Making

### **68400.5. Toxicity Criteria for Human Health Risk Assessments and Health-Based Decision-Making**

For any release of hazardous waste or hazardous constituents, the human health risk assessment calculations, including, but not limited to, all cancer risk and non-cancer hazard screening levels and corrective action objectives, shall comply with and use the toxicity criteria specified in California Code of Regulations, title 22, sections 69020-69022.

Authority cited: sections 25150, 25159, 25159.5, 58004, and 58012, Health and Safety Code. Reference: sections 25150, 25159, 25159.7, 25187, and 116365, Health and Safety Code; section 71110, Public Resources Code.

## **Add Chapter 51. Site Remediation**

Article 2. Toxicity Criteria for Human Health Risk Assessments and Health-Based Decision-Making

### **69020. Background, Purpose and Applicability**

(a) This Chapter applies to the cleanup (e.g., response or corrective action) of releases of hazardous waste or hazardous waste constituents, hazardous materials, and hazardous substances (collectively, hazardous substances) to the environment, that are subject to the provisions of Health and Safety Code, Division 20, Chapters 6.5, 6.8, and 6.82. Section 69021 specifies the required toxicity criteria for use in setting all human health risk-based screening levels and human health risk-based remediation goals, and in all human health risk assessments for those sites.

(b) This Chapter adopts toxicity criteria for all human health risk assessments, human health risk-based screening levels, and human health risk-based remediation goals statewide, where those levels are memorialized in documents approved after the effective date of this Chapter. The California Office of Environmental Health Hazard Assessment (OEHHA) develops toxicity criteria using modeling parameters consistent with and inclusive of California's diverse demographic as authorized under state and federal law, including, but not limited to, Public Resources Code, section 71110 and the with the California Children's Environmental Health Protection Act (Senate Bill No. 25, Escutia, chaptered 1999, 1998-99 Reg. Sess.). These toxicity criteria are substantive standards of control that provide health-based protection for the entirety of California's diverse population, including its most sensitive receptors, from harmful exposures to hazardous substance(s) released to the environment. This Chapter clarifies, without changing, the Department's existing practices for human health risk assessment, and for deriving both human health risk-based screening levels and human health risk-based remediation goals. This Chapter does not replace applicable Maximum Contaminant Levels (MCLs) established under

Health and Safety Code section 116365 or Title 42 United States Code section 300g as remediation goals.

(c) Terms used in this Chapter shall have the following meanings:

(1) “Contaminant of Potential Concern” (COPC) is a chemical or contaminant at or from the Site that is identified as a potential threat to human health or the environment, and whose site-specific data are of sufficient quality for use in any risk assessment.

(2) “Department” means the California Department of Toxic Substances Control.

(3) “IRIS” means the United States Environmental Protection Agency’s (U.S. EPA) Integrated Risk Information System. This Chapter incorporates by this reference the unit risk factor, oral slope factor, reference dose, and reference concentration values in this U.S. EPA IRIS database, available online at <https://www.epa.gov/iris>, as of September 30, 2017.

(4) “OEHHA” means the California Environmental Protection Agency’s (CalEPA’s) Office of Environmental Health Hazard Assessment.

(5) “Remediation Goal” is a contaminant concentration that is: (i) media-specific (e.g., for the air, groundwater, surface water, or soil affected by a release); (ii) site-specific; (iii) protective of human health and the environment; and (iv) serves as a final cleanup goal for the response or corrective action.

(6) “Screening Level” (SL) is a generic risk-based concentration derived from standardized risk assessment equations combining exposure information assumptions with applicable toxicity criteria. SLs are contaminant concentrations considered to be protective for humans (including sensitive groups) over a lifetime. SLs calculated using the toxicity criteria under this Chapter do not address non-human health endpoints such as ecological impacts.

(7) “Site” has the same meaning as the term “facility” as defined by Health and Safety Code section 25323.9 and also includes “hazardous waste facilities” and “sites” as those terms are defined in 22 CCR 66260.10.

(8) “Total Petroleum Hydrocarbons” (TPH) is a term to describe a large family of several hundred chemical compounds derived from crude oil.

(d) Any other terms not defined above shall have the meanings specified in the following:

(1) Health and Safety Code section 25100 et seq., and its implementing regulations.

(2) Health and Safety Code section 25300 et seq.

Authority cited: sections 25150, 25159, 25159.5, 25351.5, 25395.64, 25395.71, 25395.92, 58004, and 58012, Health and Safety Code. Reference: sections 25150, 25159, 25159.7, 25187, 25355.8,

25356.1, 25356.1.5, 25395.92, 25395.94 and 116365, Health and Safety Code; section 71110, Public Resources Code; and section 300.430 of Title 40 of the Code of Federal Regulations; sections 300g and 9621 of Title 42 of the United States Code.

### **69021. Applicable Toxicity Criteria**

All human health risk assessments, human health risk-based screening levels, and human health risk-based remediation goals used for the cleanup of sites described under section 69020, subdivision(b), shall use the cancer and non-cancer toxicity criteria for each contaminant of potential concern (COPC) from the following sources in the order listed below:

(a) OEHHA's peer reviewed unit risk factors, oral slope factors, reference exposure levels (RELs), and reference dose(s) (RfDs), as listed in Appendix I to this Chapter, shall be used for the COPCs which are listed in this Appendix. If Appendix I does not list toxicity criteria for a specific COPC then the toxicity criteria listed under section 69021, subdivision (b) shall be used.

(b) The peer reviewed unit risk factors, oral slope factors, reference doses (RfDs), and reference concentrations (RfCs), identified in U.S. EPA's Integrated Risk Information System (IRIS) shall be used where section 69021, subdivision (a) above does not specify toxicity criteria for a particular COPC. If IRIS does not list toxicity criteria for a specific COPC then the toxicity criteria listed under section 69021, subdivision (c) shall be used.

(c) Toxicity criteria from another source, that applies the best available science and is health-based, may be used in human health risk assessments upon approval by the Supervising Toxicologist, of the Department's Human and Ecological Risk Office, or his or her designee, when neither subdivision (a) nor subdivision (b) above specifies toxicity criteria for the particular COPC. Other sources include, but are not limited to: OEHHA toxicity criteria that are not listed in Appendix I (e.g., those toxicity criteria used in U.S. EPA's Regional Screening Levels), U.S. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs) (excluding TPH PPRTVs), Agency for Toxic Substances and Disease Registry Minimal Risk Levels, PPRTV Appendix Screening Toxicity Values, and U.S. EPA Superfund Health Effects Assessment Summary Table values. Any selected toxicity criteria or value used under this subdivision shall be consistent with Health and Safety Code section 25356.1.5, subdivision (c).

Authority cited: sections 25150, 25159, 25159.5, 25351.5, 25395.64, 25395.71, 25395.92, 58004, and 58012, Health and Safety Code. Reference: sections 25150, 25159, 25159.7, 25187, 25355.8, 25356.1, 25356.1.5, 25395.92 and 25395.94, Health and Safety Code; section 71110, Public Resources Code; and section 300.430 of Title 40 of the Code of Federal Regulations.

### **69022. Screening Levels and Remediation Goals**

(a) Consistent with the purpose of this Chapter, all human health risk assessments, human health risk-based screening levels, and human health risk-based remediation goals shall use the toxicity criteria specified in section 69021 above.

(b) When based on human health risk or non-cancer hazard, screening levels for individual COPCs shall be set to:

- (1) An incremental excess lifetime cancer risk to an individual of  $1 \times 10^{-6}$ , and
- (2) A hazard quotient of 1.

(c) All human health risk-based remediation goals for response actions conducted under Health and Safety Code, Division 20, Chapter 6.8, shall comply with Health and Safety Code section 25356.1.5(a)(1).

Authority cited: sections 25150, 25159, 25159.5, 25351.5, 25395.64, 25395.71, 25395.92, 58004, and 58012, Health and Safety Code. Reference: sections 25150, 25159, 25159.7, 25187, 25355.8, 25356.1, 25356.1.5, 25395.92 and 25395.94, Health and Safety Code; section 71110, Public Resources Code; and section 300.430 of Title 40 of the Code of Federal Regulations.

DRAFT Appendix I. California OEHHA-based Toxicity Criteria

Line #	Analyte	CAS Registry Number	Cancer Potency Values				Non-cancer Health-Hazard Values			
			Oral Slope Factor (CSF <sub>o</sub> )		Inhalation Unit Risk (IUR)		Oral Reference Dose (RfD <sub>o</sub> )		Reference Exposure Level (REL) or Reference Concentration (RfC)	
			CSF <sub>o</sub> (mg/kg-d) <sup>-1</sup>	Reference	IUR (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference	RfD <sub>o</sub> (mg/kg-d)	Reference	REL or RfC (µg/m <sup>3</sup> )	Reference
1	Acetaldehyde	75-07-0	--	--	2.70E-06	OEHHA	--	--	--	--
2	Ammonia	7664-41-7	--	--	--	--	--	--	2.00E+02	OEHHA
3	Arsenic	7440-38-2	9.50E+00	OEHHA PHG	3.30E-03	OEHHA	3.50E-06	OEHHA	1.50E-02	OEHHA
4	Arsine	7784-42-1	--	--	--	--	3.50E-06	OEHHA	1.50E-02	OEHHA
5	Benzene	71-43-2	1.00E-01	OEHHA	2.90E-05	OEHHA	--	--	3.00E+00	OEHHA
6	Benzo[a]anthracene	92-87-5	5.00E+02	OEHHA	1.40E-01	OEHHA	--	--	--	--
7	Benzo[a]pyrene	56-55-3	--	--	1.10E-04	OEHHA	--	--	--	--
8	Benzo[b]fluoranthene	50-32-8	--	--	1.10E-03	OEHHA	--	--	--	--
9	Benzo[b]fluoranthene	205-99-2	--	--	1.10E-04	OEHHA	--	--	--	--
10	Benzo[k]fluoranthene	207-08-9	--	--	1.10E-04	OEHHA	--	--	--	--
11	Beryllium	7440-41-7	--	--	--	--	2.00E-04	OEHHA PHG	7.00E-03	OEHHA
12	Beryllium oxide	1304-56-9	--	--	--	--	2.00E-04	OEHHA PHG	7.00E-03	OEHHA
13	Beryllium sulfate	13510-49-1	--	--	--	--	2.00E-04	OEHHA PHG	7.00E-03	OEHHA
14	Boron Trifluoride	7637-07-2	--	--	--	--	4.00E-02	OEHHA (Fluorides)	--	--
15	Bromoform	75-25-2	1.10E-02	OEHHA	--	--	--	--	--	--
16	1,3-Butadiene	106-99-0	6.00E-01	OEHHA	1.70E-04	OEHHA	--	--	2.00E+00	OEHHA
17	2-Butoxyethanol	111-76-2	--	--	--	--	--	--	8.20E+01	OEHHA
18	Cadmium	7440-43-9	--	--	4.20E-03	OEHHA	--	--	--	--
19	Carbon tetrachloride	56-23-5	1.50E-01	OEHHA	4.20E-05	OEHHA	--	--	4.00E+01	OEHHA
20	Carbonyl sulfide	463-58-1	--	--	--	--	--	--	1.00E+01	OEHHA
21	Chlordane	57-74-9	1.30E+00	OEHHA	3.40E-04	OEHHA	--	--	--	--
22	Chromium (VI)	18540-29-9	5.00E-01	OEHHA PHG	1.50E-01	OEHHA	--	--	--	--
23	Chrysene	218-01-9	--	--	1.10E-05	OEHHA	--	--	--	--
24	Dibenz[a,h]anthracene	53-70-3	4.10E+00	OEHHA ECP	1.20E-03	OEHHA	--	--	--	--
25	3,3'-Dichlorobenzidine	91-94-1	1.20E+00	OEHHA	3.40E-04	OEHHA	--	--	--	--
26	1,1-Dichloroethene	75-35-4	--	--	--	--	--	--	7.00E+01	OEHHA
27	1,3-Dichloropropene	542-75-6	9.10E-02	OEHHA	1.60E-05	OEHHA	--	--	--	--
28	cis-1,3-Dichloropropene	10061-01-5	9.10E-02	OEHHA (1,3-Dichloropropene)	1.60E-05	OEHHA (1,3-Dichloropropene)	--	--	--	--
29	trans-1,3-Dichloropropene	10061-02-6	9.10E-02	OEHHA (1,3-Dichloropropene)	1.60E-05	OEHHA (1,3-Dichloropropene)	--	--	--	--
30	1,4-Dioxane	123-91-1	--	--	7.70E-06	OEHHA	--	--	--	--
31	Epichlorohydrin	106-89-8	8.00E-02	OEHHA	2.30E-05	OEHHA	--	--	3.00E+00	OEHHA
32	bis(2-Chloroethyl) ether	111-44-4	2.50E+00	OEHHA	7.10E-04	OEHHA	--	--	--	--
33	Ethylene dibromide	106-93-4	--	--	--	--	--	--	8.00E-01	OEHHA
34	Formaldehyde	50-00-0	--	--	--	--	--	--	9.00E+00	OEHHA
35	HCH (mixed isomers)	608-73-1	4.00E+00	OEHHA	1.10E-03	OEHHA	--	--	--	--
36	Hexachlorobenzene	118-74-1	1.80E+00	OEHHA	5.10E-04	OEHHA	--	--	--	--
37	Hexachlorodibenzo-p-dioxin Mixture (2:1 1,2,3,7,8,9- and 1,2,3,6,7,8-)	Hexachlorodibenzo-p-dioxin Mixture	--	--	3.80E+00	OEHHA (WHO-05 TEF)	--	--	--	--
38	Hydrochloric acid	7647-01-0	--	--	--	--	--	--	9.00E+00	OEHHA
39	Indeno[1,2,3-cd]pyrene	193-39-5	--	--	1.10E-04	OEHHA	--	--	--	--
40	Lead and compounds <sup>#</sup>	7439-92-1	--	--	--	--	1.0 µg/dL	OEHHA	--	--
41	Lead subacetate	1335-32-6	3.80E-02	OEHHA	1.10E-05	OEHHA	--	--	--	--
42	Manganese (non-diet)	7439-96-5 (non-diet)	--	--	--	--	--	--	9.00E-02	OEHHA

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Line #	Analyte	CAS Registry Number	Cancer Potency Values				Non-cancer Health-Hazard Values			
			Oral Slope Factor (CSF <sub>0</sub> )		Inhalation Unit Risk (IUR)		Oral Reference Dose (RfD <sub>0</sub> )		Reference Exposure Level (REL) or Reference Concentration (RfC)	
			CSF <sub>0</sub> (mg/kg-d) <sup>-1</sup>	Reference	IUR (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference	RfD <sub>0</sub> (mg/kg-d)	Reference	REL or RfC (µg/m <sup>3</sup> )	Reference
43	Mercuric Chloride	7487-94-7	--	--	--	--	1.60E-04	OEHHA REL	3.00E-02	OEHHA
44	Mercury	7439-97-6	--	--	--	--	1.60E-04	OEHHA REL	3.00E-02	OEHHA
45	Methylene Chloride	75-09-2			1.00E-06	OEHHA	--	--	4.00E+02	OEHHA
46	4,4'-Methylene-bis(2-chloroaniline)	101-14-4	1.50E+00	OEHHA	--	--	--	--	--	--
47	Methylene diphenyl diisocyanate	101-68-8	--	--	--	--	--	--	8.00E-02	OEHHA
	Polymeric methylenediphenyl diisocyanate	9016-87-9	--	--	--	--	--	--	8.00E-02	OEHHA
48	Mirex	2385-85-5	1.80E+01	OEHHA	5.10E-03	OEHHA	--	--	--	--
49	1-Naphthylamine	134-32-7	1.80E+00	OEHHA	--	--	--	--	--	--
50	Nickel	7440-02-0	--	--	2.60E-04	OEHHA	1.10E-02	OEHHA	1.40E-02	OEHHA
51	Nickel Hydroxide	12054-48-7	--	--	2.60E-04	OEHHA	1.10E-02	OEHHA	1.40E-02	OEHHA
52	Nickel Oxide	1313-99-1	--	--	2.60E-04	OEHHA	1.10E-02	OEHHA	2.00E-02	OEHHA
53	Nickel refinery dust	Nickel refinery dust	--	--	2.60E-04	OEHHA	1.10E-02	OEHHA	1.40E-02	OEHHA
54	Nickel subsulfide	12035-72-2	--	--	--	--	1.10E-02	OEHHA	1.40E-02	OEHHA
55	N-Nitroso-di-n-butylamine	924-16-3	1.10E+01	OEHHA	3.10E-03	OEHHA	--	--	--	--
56	Styrene	100-42-5	--	--	--	--	--	--	9.00E+02	OEHHA
57	Tetrachloroethene	127-18-4	5.40E-01	OEHHA PHG	6.10E-06	OEHHA	--	--	--	--
58	Toluene	108-88-3	--	--	--	--	--	--	3.00E+02	OEHHA
59	Toluene 2,4/2,6-Diisocyanates	26471-62-5	3.90E-02	OEHHA	--	--	--	--	8.00E-03	OEHHA
60	Toluene-2,4-diisocyanate	584-84-9	3.90E-02	OEHHA (toluene diisocyanates)	--	--	--	--	8.00E-03	OEHHA (toluene diisocyanates)
61	Toluene-2,6-diisocyanate	91-08-7	3.90E-02	OEHHA (toluene diisocyanates)	--	--	--	--	8.00E-03	OEHHA (toluene diisocyanates)
62	o-Toluidine	95-53-4	1.80E-01	OEHHA	--	--	--	--	--	--
63	Toxaphene	8001-35-2	1.20E+00	OEHHA	--	--	--	--	--	--
64	1,1,1-Trichloroethane	71-55-6	--	--	--	--	--	--	1.00E+03	OEHHA
65	2,4,6-Trichlorophenol	88-06-2	7.00E-02	OEHHA	2.00E-05	OEHHA	--	--	--	--
66	Vinyl chloride	75-01-4	2.70E-01	OEHHA	7.80E-05	OEHHA	--	--	--	--
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"--" = No OEHHA toxicity value.

(mg/kg-d)<sup>-1</sup> = per (milligram per kilogram--day)

(µg/m<sup>3</sup>)<sup>-1</sup> = per (microgram per cubic meter)

CAS = Chemical Abstracts Service

DTSC = California Department of Toxic Substances Control

IUR = inhalation unit-risk factor

OEHHA = California Office of Environmental Health Hazard Assessment

PHG = Public Health Goal toxicity factor

RfD = chronic oral reference dose

#The RfD for Lead is expressed as ug/dL (microgram per deciliter)

REL = chronic reference exposure level

CSF<sub>0</sub> = oral slope factor

SL = screening level

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Line #	Analyte	CAS Registry Number	Cancer Potency Values				Non-cancer Health-Hazard Values				
			Oral Slope Factor (CSF <sub>o</sub> )		Inhalation Unit Risk (IUR)		Oral Reference Dose (RfD <sub>o</sub> )		Reference Exposure Level (REL) or Reference Concentration (RfC)		
			CSF <sub>o</sub> (mg/kg-d) <sup>-1</sup>	Reference	IUR (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference	RfD <sub>o</sub> (mg/kg-d)	Reference	REL or RfC (µg/m <sup>3</sup> )	Reference	

WHO-05 TEF = 2005 World Health Organization, Toxicity Equivalency Factor