

ARCHIVED ADVISORY LEVELS FOR DRINKING WATER

Division of Drinking Water State Water Resources Control Board

In 1982 and 1983, the Drinking Water Program of the California Department of Health Services (DHS), now the Division of Drinking Water in the State Water Resources Control Board, provided advisory levels (then called “action levels” and now called “notification levels”) for a number of chemicals to the Central Valley Regional Water Quality Control Board. Many were pesticides that had not been detected in drinking water but which were nonetheless of concern because of their association with a particular site.

Some of those chemicals now have enforceable drinking water standards. The remaining chemicals are archived here, along with several others with advisory levels established in 1990-91. A number of them have been updated (see Table 1).

If a chemical is detected above its archived advisory level (AAL), the requirements and recommendations are the same as for chemicals detected above their notification levels and response levels (the latter for recommending removing a source from service—see Table 2).

More information on the derivation of the levels presented below is available at http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/NotificationLevels.shtml.

Table 1. Archived Advisory Levels

Notes (which follow the Tables) include toxicological endpoint references, history, and other information, and are presented on the next page of this document. AAL updates due to more recent risk assessments are discussed in the Notes.

Notes	Chemical	Archived Advisory Level (mg/L)	Year Established/ Last Updated
1	Aldicarb	0.007	1983/2000
2	Aldrin	0.000002	1982/2000
3	Baygon	0.03	1982/2000
4	a-Benzene Hexachloride	0.000015	1982/2000
5	b-Benzene Hexachloride	0.000025	1982/2000
6	Captan	0.015	1982/2000
7	Carbaryl	0.7	1986/2000
8	Chloropicrin	0.05	1986
9	Chlorpropham (CIPC)	1.2	1982/2000

10	1,3-Dichlorobenzene	0.6	1983/2000
11	Dieldrin	0.000002	1983/2000
12	Dimethoate	0.001	1983/2000
13	2,4-Dimethylphenol	0.1	1983/2000
14	Diphenamid	0.2	1983/2000
15	Ethion	0.004	1982/2000
16	Malathion	0.16 0.009	1982/2017
17	N-Methyl dithiocarbamate (Metam sodium)	0.00019	1991/2010
18	Methylisothiocyanate	0.19	1991/2010
19	Methyl parathion	0.002	1982/2000
20	Parathion	0.04	1983/2000
21	Pentachloronitrobenzene	0.02	1982/2000
22	Phenol	4.2 0.6	1983/2017
23	2,3,5,6-Tetrachloroterephthalate	3.5	1990
24	Trithion	0.007	1983

Table 2. Recommendations for removing a drinking water source from service

Chemical	Toxicological Endpoint	Source Removal Level (multiples of Archived Action Level)
aldrin, a-BHC, b-BHC, captan, dieldrin, <u>malathion</u> , metam sodium	Cancer risk	100 times the AAL
All others	Noncancer effects	10 times the AAL

Notes on Chemicals with Archived Advisory Levels

1. Aldicarb: ENDPOINT: Noncancer—acetylcholinesterase inhibition in people. REFERENCE: [US EPA Integrated Risk Information System \(IRIS\)](#), 1993-2002 [Date is latest in revision history]. Aldicarb. The last revision for the oral reference dose (RfD) was November 1, 1993. HISTORY: DHS established an action level (AL) of 10 micrograms per liter (µg/L) in 1983, and revised it to the current level in 2000.
2. Aldrin: ENDPOINT: Cancer. REFERENCE: Title 27 California Code of Regulations (27 CCR) §12705. HISTORY: DHS established a 1-µg/L AL in 1982. In 1983, DHS changed it to 0.05 µg/L, the limit of quantitation, and in 2000, to the current level.

3. Baygon: ENDPOINT: Noncancer—mild cholinergic symptoms and red blood cell cholinesterase inhibition in people. REFERENCE: IRIS, 1992-2003. Baygon. The last revision for the oral RfD was July 1, 1992. HISTORY: DHS first established a 0.09-mg/L AL in 1982, and revised it the current level in 2000.
4. a-Benzene Hexachloride: ENDPOINT: Cancer. REFERENCE: 27 CCR §12705. HISTORY: AL for alpha-BHC was first established in 1982 as 0.7 µg/L, and revised to current level in 2000.
5. b-Benzene Hexachloride: ENDPOINT: Cancer. REFERENCE: 27 CCR §12705. HISTORY: AL for beta-BHC was first established in 1982 as 0.3 µg/L, and revised to current level in 2000.
6. Captan: ENDPOINT: Cancer. REFERENCE: 27 CCR §12705. HISTORY: AL for Captan was first established in 1982 as 350 µg/L, and revised to current level in 2000.
7. Carbaryl: ENDPOINT: Noncancer—kidney and liver toxicity in rats. REFERENCE: IRIS, 1998-2002. The last revision for the oral RfD was January 31, 1987. HISTORY: AL for carbaryl was included on a June 1986 list of ALs as 60 µg/L, and revised to current level in 2000.
8. Chloropicrin: ENDPOINT: Noncancer. HISTORY: AL for chloropicrin was included on a March 1986 list of ALs at the current level. In 1985 DHS drinking water staff referred to a National Cancer Institute bioassay (NCI-CG-TR-65, 1978) in which rats exposed to chloropicrin experienced too much lethality to enable an evaluation of chloropicrin's carcinogenicity. A taste and odor-based level of 37 µg/L was also established in 1986.
9. Chlorpropham (CIPC): ENDPOINT: Noncancer—kidney, spleen, liver, and bone marrow toxicity in rats. REFERENCE: IRIS, 1988-2003 (Archived July 2016). The last revision for the oral RfD was June 30, 1988. HISTORY: AL for CIPC was first established in 1982 as 350 µg/L, and revised to current level in 2000.
10. 1,3-Dichlorobenzene: ENDPOINT: Noncancer—liver toxicity, organ and body weight changes in rats. AL uses 1,2-dichlorobenzene's MCL (and public health goal) as a surrogate. HISTORY: AL was first established in 1983 as 130 µg/L (20 µg/L for taste and odor threshold), and revised to current level in 2000.
11. Dieldrin: ENDPOINT: Cancer. REFERENCE: 27 CCR §12705. HISTORY: AL was first established in 1983 as 0.05 µg/L, the limit of quantification, and revised to current level in 2000.
12. Dimethoate: ENDPOINT: Noncancer—brain cholinesterase inhibition in rats. REFERENCE: IRIS, 1990-2003 (Archived July 2016). Dimethoate. The last

revision for the oral RfD was ~~September 1, 1990~~ August 22, 1988. HISTORY: AL was first established in 1982 as 140 µg/L, and revised to current level in 2000.

13. 2,4-Dimethylphenol: ENDPOINT: Noncancer—clinical signs and blood changes in mice. REFERENCE: IRIS, ~~1990-2002~~. 2,4-Dimethylphenol. The last revision for the oral RfD was November 1, 1990. HISTORY: AL was first established in 1983 as 400 µg/L for chlorinated systems (taste and odor threshold), and revised to current level in 2000.
14. ~~Diphenamide~~Diphenamid: ENDPOINT: Noncancer—liver toxicity in dogs. REFERENCE: IRIS, ~~1991-2002~~. ~~Diphenamide~~Diphenamid. The last revision for the oral RfD was March 1, 1991–September 30, 1987. HISTORY: AL was first established in 1983 as 40 µg/L, and revised to current level in 2000.
15. Ethion: ENDPOINT: Noncancer—plasma cholinesterase inhibition in people. REFERENCE: IRIS, 1989, Ethion. The last revision for the oral RfD was September 1, 1989. HISTORY: AL was first established in 1982 as 35 µg/L, and revised to current level in 2000.
16. Malathion: ~~ENDPOINT: Noncancer—red blood cell cholinesterase inhibition in people. REFERENCE: IRIS, 1992. Malation.~~ The last revision for the oral RfD was January 1, 1992. Cancer. REFERENCE: 27 CCR §12705. HISTORY: AL was first established in 1982 as ~~160 µg/L, and revised to current level in 2000 for non-cancer endpoint (see IRIS oral RfD, September 30, 1987), and, following its May 2016 listing as a carcinogen for purposes of the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65), revised to from 160 µg/L to the current level in 2017.~~
17. Metam sodium: ENDPOINT: Cancer—angiosarcomas in mice exposed orally. REFERENCES: DPR, 2004. AL uses standard risk assessment methods and these assumptions: BW = 70 kg, DWC = 2 L/day, and Slope Factor (q_1^*) of 1.85×10^{-1} (mg/kg-day)⁻¹. HISTORY: AL was first established as 0.02 mg/L in 1991 for noncancer endpoint (OEHHA, 1991) and, based on updated carcinogenicity data, revised to current level in 2010.
18. Methylisothiocyanate: ENDPOINT: Noncancer—decreased body weight, reduced water consumption in mice. REFERENCES: DPR, 2003. AL uses standard risk assessment methods and these assumptions: adult: BW = 70 kg, DWC = 2 L/day, and RSC = 0.2, NOAEL = 2.74 mg/kg/day. HISTORY: AL established as 0.05 mg/L in 1991 (OEHHA, 1991), ~~Memorandum from A. Fan, OEHHA, to D. Spath, DHS, “Cantara Incident: Interim Action Levels—N-Methyl dithiocarbamate (Metam Sodium); Methylisothiocyanate (MITC),” July 19, 1991,~~ and updated to current level in 2010, based on more recent chronic animal study data.
19. Methyl parathion: ENDPOINT: Noncancer—red blood cell cholinesterase inhibition, blood changes in rats. REFERENCE: IRIS, ~~1987~~1991. Methyl parathion. The last

revision for the oral RfD was March 31, 1987 ~~1, 1991~~. HISTORY: AL was first established in 1982 as 30 µg/L, and revised to current level in 2000.

20. Parathion (ethyl): ENDPOINT: Noncancer. REFERENCE: HEAST, 1997. Health Effects Advisory Summary Tables (HEAST), FY 1997 Update, US Environmental Protection Agency (US EPA), Solid Waste and Emergency Response, 9200.6-303 (97-1), EPA-540-R-97-036, July 1997. HISTORY: AL was first established in 1983 for parathion (ethyl) as 40 µg/L, and revised to current level in 2000.
21. Pentachloronitrobenzene: ENDPOINT: Noncancer—liver toxicity in dogs. REFERENCE: IRIS, ~~1992~~2003. Pentachloronitrobenzene. The last revision for the oral RfD was ~~September 30, 1987~~ January 1, 1992. HISTORY: AL was first established in 1982 as 0.9 µg/L, and revised to current level in 2000.
22. Phenol: ENDPOINT: Noncancer—reduced fetal body maternal weight gain in rats. REFERENCE: IRIS, ~~1990~~2003. Phenol. The last revision for the oral RfD was ~~January 1, 1992~~ September 30, 2002. HISTORY: AL was first established in 1983 as 1 µg/L for chlorinated systems (taste and odor threshold), revised to 4200 µg/L in 2000, based on reduced fetal body weight gain in rats, and to current level in 2017.
23. 2,3,5,6-Tetrachloroterephthalate: ENDPOINT: Noncancer. REFERENCE: DHS, 1990. Memorandum from J. Brown, Pesticide and Environmental Toxicology Section, DHS, to A. Milea, Office of Drinking Water, DHS, "TPA Interim Action Level," December 10, 1990. HISTORY: AL established in 1990.
24. Trithion: ENDPOINT: Noncancer. REFERENCE: See DHS, 1983. HISTORY: AL established in 1983.

Additional References

DHS, 1982. Memorandum from J. Gaston, DHS, to S. Green, Central Valley Regional Water Quality Control Board (RWQCB), Recommended Acceptable Limits - T-H Agriculture & Nutrition Company, September 24, 1982.

DHS, 1983. Memorandum from D. Spath, DHS, to T. Souther, Central Valley RWQCB, Toxicology Report - THAN, T.H. Agriculture and Nutrition Company, August 2, 1983.

OEHHA, 1991. Memorandum from A. Fan, OEHHA, to D. Spath, DHS, "Cantara Incident: Interim Action Levels - N-Methyl dithiocarbamate (Metam Sodium); Methylisothiocyanate (MITC)," July 19, 1991.

DPR, 2003. Methyl Isothiocyanate (MITC) Risk Characterization Document. Medical Toxicology Branch, California Department of Pesticide Regulation, California Environmental Protection Agency, July 25, 2003.

DPR, 2004. Metam Sodium (Sodium N-Methyldithiocarbamate) Risk Characterization Document. Medical Toxicology Branch, California Department of Pesticide Regulation, California Environmental Protection Agency, July 21, 2004.