

Drinking Water Notification Levels and Response Levels: An Overview

which the recommendation occurs is called the “Response Level.” The specific recommendation depends on the toxicological endpoint that provided the basis for the notification level.

DDW recommends source removal when the chemical's concentration is:

- 10 times the notification level, if it is based on non-cancer endpoints. A level greater than 10 times the notification level reduces the margin of safety provided.
- 100 times the notification level, if it is based on cancer risk and established at the 10^{-6} risk level. A level 100 times the notification level corresponds to a theoretical lifetime risk of up to one excess case of cancer in 10,000 people, the upper value of the 10^{-6} to 10^{-4} risk range typically allowed by regulatory agencies.
- If the notification level is established at a risk greater than 10^{-6} , as it is for 1,4-dioxane, NDEA, NDMA and NDPA, the response level for this recommendation is adjusted downward accordingly, so that it corresponds to the 10^{-4} risk level, as discussed in the second bullet.
- For PFOS and PFOA, the response level has been adjusted to 10-ppt for PFOA and 40-ppt for PFOS for these chemicals.

Additional Notification When Water Is Served above the Response Level:

When a drinking water system does not take a source out of service despite the presence of a contaminant in drinking water at a level confirmed to be greater than the response level, DDW recommends the following:

- Notification of the local governing body (i.e., city council or board of supervisors, or both) that indicates water is being provided that exceeds the chemical's response level, and the reason for the continued use of the source.
- Notification of the water system's customers and other water consumers that the contaminant is present in their drinking water at a concentration greater than its response level, the level at which source removal is recommended, and the reason for the continued use of the source.
- Whenever such a public "right-to-know" notice occurs, it should be provided to customers and to the water-consuming population in the affected area that would not directly receive such information, including renters, workers and students.
- Notification should be provided directly to consumers, for example by posted notices, hand-delivered notices, and water bill inserts.

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- A press release from the water system should also be issued to the local media.

Thereafter, DDW recommends the following:

- Monthly sampling and analysis of the drinking water supply for as long as the contaminant exceeds its response level, and quarterly sampling for 12 months, should the concentration drop below the response level.
- Quarterly notification of the water system's customers and other water consumers for as long as the contaminant is present at a concentration greater than its response level, using the methods described above.

Should the water system refuse to provide additional consumer notification, DDW may provide that notification.

Notes for Chemicals with Notification Levels

1. Boron: ENDPOINT: Noncancer—decreased fetal weight (developmental) in rats. REFERENCE: US EPA Integrated Risk Information System (IRIS), 2004. [Date refers to latest date in revision history.] Boron and Compounds. The last revision for the oral RfD was August 5, 2004. HISTORY: Notification level first established at 1 mg/L at an uncertain date but thought to be early to mid-1990s. ADDITIONAL INFORMATION: The relatively large number of sources with boron detections reflects its natural occurrence.
2. n-Butylbenzene: ENDPOINT: Noncancer—increased kidney weight in rats, using cumene (isopropylbenzene) as a surrogate. REFERENCES: (1) National Center for Environmental Assessment (NCEA), 1997, Risk Assessment Issue Paper for: Derivation of Provisional Chronic RfDs for n-Butylbenzene, sec-Butylbenzene, tert-Butylbenzene, and n-Propylbenzene. NCEA, US EPA (97-009/6-5-97) and (2) Memorandum from R. Howd, Office of Environmental Health Hazard Assessment (OEHHA), to D. Spath, CDHS, "Proposed Action Level for n-Propylbenzene," October 27, 2000. HISTORY: Notification level was first established as 0.045 mg/L (date uncertain), and revised to 0.07 mg/L in 2000, and to current level in 2003.
3. sec-Butylbenzene: ENDPOINT: Noncancer—increased kidney weight in rats, using cumene (isopropylbenzene) as a surrogate. REFERENCE: OEHHA, 2000. Memorandum from R. Howd, OEHHA, to D. Spath, CDHS, "Proposed Action Levels for sec-Butylbenzene and tert-Butylbenzene," October 27, 2000.
4. tert-Butylbenzene: ENDPOINT: Noncancer—increased kidney weight in rats, using cumene (isopropylbenzene) as a surrogate. REFERENCE: OEHHA, 2000. Memorandum from R. Howd, OEHHA, to D. Spath, CDHS, "Proposed Action Levels for sec-Butylbenzene and tert-Butylbenzene," October 27, 2000.

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5. Carbon disulfide: ENDPOINT: Noncancer—decreased motor conduction velocity in people. REFERENCE: OEHHA, 2001. Memorandum from R. Howd, OEHHA, to D. Spath, CDHS, "Proposed Action Level for Carbon Disulfide," July 5, 2001.
6. Chlorate: ENDPOINT: Noncancer—pituitary gland vacuolization & thyroid gland depletion in rats. REFERENCE: OEHHA, 2002. Memorandum from R. Howd, OEHHA, to D. Spath, CDHS, "Proposed Action Level for Chlorate," January 7, 2002. HISTORY: Notification level was established in 2002. ADDITIONAL INFORMATION: Notification level is derived from standard risk assessment methods with RSC = 0.8.
7. 2-Chlorotoluene: ENDPOINT: Noncancer—decrease in body weight gain in rats. REFERENCE: IRIS, 2003. 2-Chlorotoluene. The last revision for oral RfD was February 1, 1990. OEHHA concurred with the notification level via a June 7, 2000 memorandum.
8. 4-Chlorotoluene: See notification level for 2-chlorotoluene, which is used as a surrogate.
9. Diazinon: ENDPOINT: Noncancer—neurotoxicity. REFERENCE: ATSDR toxicological profile update (ATSDR, 2008) and 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: NL for was first established in 1982 as 14 µg/L, revised to 0.006 mg/L in 2000, and updated to current level in 2010. NL uses standard risk assessment methods and these assumptions: adult: Body Weight (BW) = 70 kg, Drinking Water Consumption (DWC) = 2 L/day, Relative Source Contribution (RSC) = 0.2, Uncertainty Factor (UF) = 1,000, No Observable Adverse Effect Level (NOAEL) = 0.6 mg/kg/day.
10. Dichlorodifluoromethane: ENDPOINT: Noncancer—reduced body weight in rats. REFERENCE: IRIS, 2005. Dichlorodifluoromethane. The last revision for the oral RfD was January 31, 1987. HISTORY: Notification level was initially established at 1 mg/L (exact date uncertain, but likely mid-1990s).
11. 1,4-Dioxane: ENDPOINT: Cancer in laboratory rodents. REFERENCE: IRIS, 2013. The 10⁻⁶ cancer risk level is 0.00035 mg/L. The last revision for oral slope factor for cancer risk was September 20, 2013. HISTORY: Notification level first established in 1998 at a 0.003-mg/L concentration, based on 1990 IRIS documentation, and revised to the current level on November 22, 2010. ADDITIONAL INFORMATION: The notification level's cancer risk is 3 x 10⁻⁶, rather than the usual 1 x 10⁻⁶, because it is difficult to detect 1,4-dioxane at very low levels. Source removal is recommended at (response level=) 0.035 mg/L. [More about 1,4-dioxane.](#)

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12. Ethylene glycol: ENDPOINT: Noncancer—kidney toxicity in rats. REFERENCE: IRIS, 2003, Ethylene glycol. The last revision for the oral RfD was September 30, 1987. HISTORY: Notification level was first established in May 2002.
13. Formaldehyde: ENDPOINT: Noncancer by ingestion—reduced weight gain, histopathology in rats. REFERENCE: IRIS, 1990. Formaldehyde. The last revision for the oral RfD was September 1, 1990. HISTORY: Notification level first established in 1983 as 30 µg/L, and revised to current level in 2000. ADDITIONAL INFORMATION: Notification level is derived from standard risk assessment methods, with MF = 10 (because of formaldehyde's cancer risk associated with inhalation exposures, as shown in a variety of animals studies). Though rarely detected in drinking water sources, formaldehyde is of interest because of its possible production as a disinfection byproduct from the use of ozone and/or hydrogen peroxide.
14. HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine): ENDPOINT: Noncancer—liver lesions in rats. REFERENCE: IRIS, 2003. The last revision for the oral RfD was September 26, 1988. HISTORY: Notification level was first established September 30, 2005.
15. Isopropylbenzene: ENDPOINT: Noncancer—increased kidney weight in rats. REFERENCE: IRIS, 1997. Cumene (also known as Isopropylbenzene). The last revision for the oral RfD was August 1, 1997. OEHHA concurred with the notification level via a November 1, 2000 memorandum. HISTORY: Notification level was first established in 2000.
16. Manganese: ENDPOINT: Noncancer—neurotoxicity, based on human data. REFERENCE: IRIS, 2002. Manganese. The last revision for the oral RfD was November 1, 1995. HISTORY: AL was established on March 20, 2003. ADDITIONAL INFORMATION: Notification level is derived from standard risk assessment methods with RSC = 0.3. Manganese has an enforceable secondary MCL of 0.05 mg/L that is based upon aesthetics. Secondary MCLs apply only to community water systems. The relatively large number of sources with manganese detections reflects its natural occurrence. [More about manganese.](#)
17. MIBK: ENDPOINT: Noncancer—increased kidney and liver weight, kidney pathology in rats. REFERENCE: OEHHA, 1999. Memorandum from G. Alexeeff, OEHHA, to D. Spath, CDHS, "Proposed Action Level for Methyl Isobutyl Ketone," December 29, 1999. HISTORY: Notification level established in 2000.
18. Naphthalene: ENDPOINT: Noncancer—decreased body weight in rats. REFERENCE: IRIS, 1998. Naphthalene. The last revision for the oral RfD was September 17, 1998. OEHHA concurred with the notification level via an April 20, 2000 memorandum. HISTORY: Notification level was first established in 2000 at a concentration of 0.17 mg/L, and revised to current level in April 2005. ADDITIONAL INFORMATION: Subsequent to the establishment of the notification level,

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naphthalene was identified by OEHHA in 2002 as a chemical known to the state to cause cancer for purposes of Proposition 65, and was identified by OEHHA in 2004 as a toxic air contaminant and potential carcinogen when inhaled. Notification level is derived from standard risk assessment methods, with MF = 10 (because of naphthalene's cancer risk associated with inhalation exposures, as shown in animal studies).

19. N-Nitrosodiethylamine (NDEA): ENDPOINT: Cancer in a variety of laboratory animals. REFERENCE: the 10^{-6} cancer risk level is 0.000001 mg/L, derived from the 10^{-5} lifetime cancer risk level in 27 CCR §12705. HISTORY: Notification level first established September 2004. ADDITIONAL INFORMATION: The notification level's cancer risk is 1×10^{-5} , rather than the usual 1×10^{-6} , because it is difficult to detect NDEA at very low levels, and because it may be produced in drinking water treatment. Source removal is recommended at (response level=) 0.0001 mg/L. [More about NDEA.](#)
20. N-Nitrosodimethylamine (NDMA): ENDPOINT: Cancer in a variety of laboratory animals. REFERENCE: the 10^{-6} cancer risk level is 0.000003 mg/L, according to OEHHA's public health goal for NDMA. HISTORY: Notification level first established in 1998, and revised to current level in 2002. ADDITIONAL INFORMATION: The notification level's cancer risk is 3.3×10^{-6} , rather than the usual 1×10^{-6} , because it is difficult to detect NDMA at very low levels, and because it may be produced in drinking water treatment. Source removal is recommended at (response level=) 0.0003 mg/L. [More about NDMA.](#)
21. N-Nitrosodi-n-propylamine (NDPA): ENDPOINT: Cancer in a variety of laboratory animals. REFERENCE: the 10^{-6} cancer risk level is 0.000005 mg/L, derived from the 10^{-5} lifetime cancer risk level in 27 CCR §12705. HISTORY: Notification level first established in May 2005. ADDITIONAL INFORMATION: The notification level's cancer risk is 2×10^{-6} , rather than the usual 1×10^{-6} , because it is difficult to detect NDPA at very low levels, and because it may be produced in drinking water treatment. Source removal is recommended at (response level=) 0.0005 mg/L. [More about NDPA.](#)
22. Perfluorooctanoic acid (PFOA): ENDPOINT: Cancer, based on pancreatic and liver tumors in male rats, and non-cancer effects, based on liver toxicity in female mice. REFERENCE: Notification Level Recommendations for Perfluorooctanoic Acid and Perfluorooctane Sulfonate, OEHHA, August 2019, and Memorandum from L. Zeise, OEHHA, to D. Polhemus, DDW, dated August 22, 2019. HISTORY: Initial notification level of 14 ng/L was established in 2018. ADDITIONAL INFORMATION: OEHHA's August 2019 recommendations included a *de minimis* cancer risk level for PFOA of 0.1 ng/L, and a non-cancer health-based level of 2 ng/L. OEHHA noted that non-cancer liver and immunotoxicity effects have been observed in studies of humans exposed to PFOA and PFOS, underscoring the importance of these

