November 3, 2025

Pesticide and Environmental Toxicology Branch
Office of Environmental Health Hazard Assessment
California Environmental Protection Agency
1001 I Street P.O. Box 4010, MS-12B
Sacramento, California 95812-4010

Attention: PHG Program

**Public Comments on the California Office of Environmental Health Hazard Assessment's Request for Information on the Development of Public Health Goals for Perfluorohexane Sulfonic Acid (PFHxS) in Drinking Water**

Our organizations submit these comments to the California Office of Environmental Health Hazard Assessment (OEHHA) in support of developing a health-protective public health goal (PHG) for PFHxS in drinking water.

State monitoring data shows that millions of Californians are affected by PFHxS contamination of their public water systems, which puts them at higher risk of PFHxS associated health effects, such as immunotoxicity and endocrine disruption. In 2022 OEHHA recommended the State Water Resources Control Board (SWRCB) set a notification level for PFHxS at 0.002 µg/L (2 parts per trillion, ppt).[1] The SWRCB subsequently set a notification level for PFHxS at 0.003 µg/L (3 ppt) due to the minimum reporting level of the analytical method used to detect PFHxS in water.

To date, the state of California has developed PHGs for PFOA and PFOS, notification levels for PFHxS and PFBS, and is in the process of setting notification levels for PFHxA and PFHpA, but no maximum contaminant levels (MCLs) have been set for any PFAS individually or the class of PFAS combined. Although the development of a PHG and MCL for PFHxS is important, especially considering its potential to cause health harm at such low levels of exposure, we also recommend OEHHA to begin the process of addressing PFAS as a class because that is what is ultimately needed to protect Californians from PFAS contaminated drinking water.

We urge OEHHA to quickly develop and finalize this PHG so that the SWRCB can establish a health-protective MCL for PFHxS, in addition to PFOA and PFOS, as soon as possible. This task can be efficiently accomplished by referring to EPA's 2025 IRIS toxicological review of PFHxS to build on OEHHA's 2022 analysis.

**IRIS' Toxicological Review of PFHxS supports a strict PHG**

U.S. EPA finalized the IRIS Toxicological Review of PFHxS in January 2025. When finalized, the review included a full search of the literature through April 2022. Relevant studies that were

[1] OEHHA, *Notification Level Recommendation: Perfluorohexane Sulfonic Acid in Drinking Water* (2022), https://oehha.ca.gov/water/report/notification-level-recommendation-perfluorohexane-sulfonic-acid-pfhxs-drinking-water.

published between April 2022 and April 2023 were fully included in the review only if they would have a "material impact on the assessment conclusions."[2] Given the strength, reliability, and transparency of the methods used for conducting the toxicological review, we recommend that the OEHHA take advantage of the analysis recently completed by the U.S EPA's IRIS Program and supplement their analysis by reviewing literature published since April 2022. U.S. EPA's IRIS found that the evidence indicates that PFHxS impacts the immune and thyroid systems and ultimately chose the immune endpoints as the critical endpoint. Specifically, the U.S. EPA calculated lifetime and subchronic oral reference doses (RfDs) based on decreased serum anti-tetanus antibody concentrations in children (male and female)[3] and calculated the oral RfD of $4 \times 10^{-10}$ mg/kg-day.

This lifetime oral RfD is lower than the oral noncancer RfD the U.S. EPA calculated for PFOA and PFOS in 2024. In the 2024 Human Health Toxicity Assessments, the U.S. EPA calculated an oral RfD of $3 \times 10^{-8}$ mg/kg-day for PFOA and $1 \times 10^{-7}$ mg/kg-day for PFOS.[4] Using the same logic and assumptions as the U.S. EPA used in deriving interim lifetime health advisories for PFOA and PFOS (assumed a drinking water intake based on children aged 0 to < 5 years and a relative source contribution of 20%), one can calculate what a drinking water PHG should be for PFHxS based on U.S. EPA's analysis:

PHG=(RfD/DWI-BW)*RSC
PHG=((0.0000000004 mg/kg/day) / (0.0701 L/kg bw/day)) *0.2
PHG=0.000000001 mg/L
PHG=0.001 ng/L or 0.001 ppt

This level is below the currently achievable reporting limits for measuring PFHxS in drinking water using EPA validated methods (537.1 or 533). Thus, the MCL should be set as low as technologically feasible once OEHHA has finalized the PHG.

**PFAS should be evaluated as a class, and California should consider establishing a class based public health goal.**

While the development of a PHG for PFHxS is important, this only represents a small step toward protecting public health from PFAS. Consequently, our organizations urge the SWRCB and OEHHA to review PFAS beyond the long chain compounds and to address PFAS in drinking water more comprehensively.

---

[2] US EPA, *IRIS Toxicological Review of Perfluorohexanesulfonic Acid (PFHxS, CASRN 335-46-4) and Related Salts*, Final EPA/635/R-25/012Fa (2025), https://iris.epa.gov/document/&deid=363894.
[3] Philippe Grandjean et al., "Serum Vaccine Antibody Concentrations in Children Exposed to Perfluorinated Compounds," *JAMA* 307, no. 4 (2012): 391–97, https://doi.org/10.1001/jama.2011.2034 Esben Budtz-Jørgensen and Philippe Grandjean, "Application of Benchmark Analysis for Mixed Contaminant Exposures: Mutual Adjustment of Perfluoroalkylate Substances Associated with Immunotoxicity," *PLOS ONE* 13, no. 10 (2018): e0205388, https://doi.org/10.1371/journal.pone.0205388.
[4] US EPA, *Human Health Toxicity Assessment for Perfluorooctanoic Acid (PFOA) and Related Salts*, Final no. 815R24006 (2024), https://www.epa.gov/system/files/documents/2024-05/final-human-health-toxicity-assessment-pfoa.pdf; US EPA, *FINAL Human Health Toxicity Assessment for Perfluorooctane Sulfonic Acid (PFOS) and Related Salts*, no. 815R24007 (2024), https://www.epa.gov/system/files/documents/2024-05/final-human-health-toxicity-assessment-pfos.pdf.

California's Environmental Contaminant Biomonitoring Program lists the entire class of PFAS as priority chemicals[5] for measuring in the blood and urine of Californians and has added to its designated chemicals list[6] other carbon-fluorine bond containing substances as well. This is in part due to the persistence conferred to chemicals containing carbon-fluorine bonds and that it is a resource efficient approach, facilitating the use of non-targeted laboratory screening methods for measuring organofluorine content. The Department of Toxic Substances Control also applies the class approach to prioritizing chemicals within the Safer Consumer Products program and supports extending this approach to other regulatory agencies to focus on this entire class of chemicals with similar hazard traits.[7] This framework is necessary to avoid regrettable substitutions and manage a persistent, structurally similar class that includes thousands of chemicals.[8] Further, other PFAS that have been studied, beyond PFOA, PFOS, and PFHxS,[9] such as the replacement chemical GenX,[10] have shown evidence of carcinogenicity in two-year animal studies. While GenX is thankfully not a major contaminant of California's drinking water now, its continued production, similar persistence and even greater mobility in the environment threaten to eventually change this.

In 2024, US EPA took the first steps towards a class-based approach for addressing PFAS in drinking water by finalizing MCLs for PFOA and PFOS as well as a Hazard Index for 4 additional PFAS (PFBS, GenX, PFNA, and PFHxS).[11] However, these national drinking water standards are in danger of being repealed and delayed.[12] Additionally, while we are pleased with the acknowledgment that exposure to multiple PFAS can have an additive effect, we urge OEHHA and the SCRWB to address PFAS in drinking water more comprehensively. Such

---

[5] Biomonitoring California, Priority Chemicals, March 2024 https://biomonitoring.ca.gov/sites/default/files/downloads/PriorityChemicalsList_March2024.pdf

[6] Biomonitoring California, Designated Chemicals, March 2024 https://biomonitoring.ca.gov/sites/default/files/downloads/DesignatedChemicalsList_March2024.pdf

[7] Bălan, Simona Andreea, Vivek Chander Mathrani, Dennis Fengmao Guo, and André Maurice Algazi. "Regulating PFAS as a Chemical Class under the California Safer Consumer Products Program." *Environmental Health Perspectives* 129, no. 2 (February 2021): 025001. https://doi.org/10.1289/EHP7431.

[8] Kwiatkowski, Carol F., David Q. Andrews, Linda S. Birnbaum, Thomas A. Bruton, Jamie C. DeWitt, Detlef R. U. Knappe, Maricel V. Maffini, et al. "Scientific Basis for Managing PFAS as a Chemical Class." *Environmental Science & Technology Letters* 7, no. 8 (August 11, 2020): 532–43. https://doi.org/10.1021/acs.estlett.0c00255.

[9] Pelch, Katherine E., Anna Reade, Carol F. Kwiatkowski, Francheska M. Merced-Nieves, Haleigh Cavalier, Kim Schultz, Taylor Wolffe, and Julia Varshavsky. "The PFAS-Tox Database: A Systematic Evidence Map of Health Studies on 29 per- and Polyfluoroalkyl Substances." *Environment International* 167 (September 1, 2022): 107408. https://doi.org/10.1016/j.envint.2022.107408.

[10] Caverly Rae, J.M., Lisa Craig, Theodore W. Slone, Steven R. Frame, L.William Buxton, and Gerald L. Kennedy. "Evaluation of Chronic Toxicity and Carcinogenicity of Ammonium 2,3,3,3-Tetrafluoro-2-(Heptafluoropropoxy)-Propanoate in Sprague–Dawley Rats." *Toxicology Reports* 2 (2015): 939–49. https://doi.org/10.1016/j.toxrep.2015.06.001.

[11] US EPA, "PFAS National Primary Drinking Water Regulation," *Federal Register* 89, no. 82 (2024), https://www.federalregister.gov/documents/2024/04/26/2024-07773/pfas-national-primary-drinking-water-regulation.

[12] NRDC, "EPA Seeks to Roll Back PFAS Drinking Water Rules, Keeping Millions Exposed to Toxic Forever Chemicals in Tap Water," September 12, 2025, https://www.nrdc.org/press-releases/epa-seeks-roll-back-pfas-drinking-water-rules-keeping-millions-exposed-toxic-forever..

actions are necessary because of the large fraction of unknown PFAS in drinking water sources, which will continue to be an issue as long as PFAS are produced and used with so little restrictions.[13]

Taking a more comprehensive approach to PFAS contamination of drinking water will help to future proof the safety of California's drinking water from the chemical industry's never-ending cycle of regrettable substitutions. It will also help avoid investment in water treatments that could end up being insufficient to address newer generation PFAS and could thus need to be replaced – a comprehensive approach would be a better long term economic investment for addressing PFAS contamination for the state, ratepayers and the healthcare system.

Sincerely,

Anna Reade, PhD
Director PFAS Advocacy
and
Katie Pelch, PhD
Senior Scientist
Natural Resources Defense Council

Andria Ventura
Legislative and Policy Director
Clean Water Action

Thomas R. Fox
Senior Legislative Counsel
Center for Environmental Health

Teresa Mcgrath
Chief Research Officer
Healthy Building Network

[13] SWRCB, "Broad-Spectrum Per- and Polyfluoroalkyl Substances (PFAS) Method Comparison Study Results and Selection of Broad-Spectrum Methods to Support Statewide Monitoring for the Class of PFAS" April 24, 2024, https://www.waterboards.ca.gov/pfas/docs/broad-spectrum-pfas-method-comparison-study-summary-combined.pdf