Sent via ELECTRONIC MAIL to lauren.zeise@oehha.ca.gov

April 25, 2023

The Honorable Lauren Zeise, PhD
Director
Office of Environmental Health Hazard Assessment
1001 I Street
Sacramento, CA 95814

RE: Announcement of Second Data Call-In For The Hexavalent Chromium Public Health Goal Update

Dear Director Zeise,

The Association of California Water Agencies (ACWA), California Water Association (CWA), and California Municipal Utilities Association (CMUA) appreciate the opportunity to provide input on the Office of Environmental Health Hazard Assessment (OEHHA) Announcement of Second Data Call-In For The Hexavalent Chromium Public Health Goal Update (Second Data Call-In). ACWA represents over 460 local public water agencies that collectively supply approximately ninety percent of the water distributed for domestic, agricultural, and business uses in California. CWA is the statewide association representing the interests of 94 drinking water utilities subject to the jurisdiction of the California Public Utilities Commission (CPUC). CWA represents members that provide safe, reliable, high-quality drinking water to approximately 6 million Californians. CMUA represents over 50 water agencies that deliver water to nearly 75 percent of Californians.

We view the Second Data Call-In as an appropriate step in completing the full review of the hexavalent chromium public health goal (Cr(VI) PHG). We support updating the PHG to reflect the latest science on the public health effects of Cr(VI) to estimate the level of Cr(VI) in drinking water that is not anticipated to cause or contribute to adverse health effects, or that does not pose any significant risk to health.[1] We offer the following comments in response to the Second Data Call-in.

[1] California Health and Safety Code Section 116365 requires OEHHA to update PHGs using latest science.

Comment 1- OEHHA should consider all relevant Cr(VI) studies published since the previous data call-in in 2016 as part of the Second Data Call-In for the Cr(VI) PHG.

We encourage OEHHA to consider the latest Cr(VI) studies published since the previous Data Call-In that occurred in 2016.[2] We have compiled a list of Cr(VI) studies (Appendix A) that have been published since 2016 for OEHHA to review as part of the Second Data Call-In. Use of the studies listed in Appendix A is essential to update the Cr(VI) PHG because many of these more recent studies were not available when OEHHA finished the 2011 Cr(VI) PHG and support a threshold mode of action for Cr(VI) carcinogenicity that should inform the Cr(VI) PHG update moving forward.

Comment 2- OEHHA should include and consider ACWA's previous comment letters submitted to update the Cr(VI) PHG as part of the Second Data Call-In.

OEHHA should review and consider previous ACWA comment letters[3][4][5] submitted to inform the Cr(VI) PHG update as part of public record for the Second Data Call-In. Since 2016, ACWA has submitted three comment letters to OEHHA to inform the Cr(VI) PHG update by identifying latest Cr(VI) studies, and referencing updated chromium standards used[6][7] since the previous Cr(VI) PHG was finalized in 2011.

Conclusion

We encourage OEHHA to incorporate the above comments regarding inclusion of latest Cr(VI) studies into the Cr(VI) PHG Update as part of the Second Data Call-In. We appreciate OEHHA's consideration of these comments. If you would like to discuss or have any questions regarding these comments, please contact us at nickb@acwa.com or (916) 441-4545, jcapitolo@calwaterassn.com or (916) 402-1155, and aabergel@cmua.org or (916) 841-4060.

[2] OEHHA Announcement of Process to Update Public Health Goals for Chemicals in Drinking Water, dated October 28, 2016.
[3] Letter from ACWA, to Dr. Lauren Zeise, Director, OEHHA, dated December 13, 2016.
[4] Letter from Adam Quiñonez, State Legislative Director, ACWA, to Dr. Lauren Zeise, Director, OEHHA, dated March 31, 2020.
[5] Letter from Nicholas Blair, State Relations Advocate, ACWA, to Dr. Lauren Zeise, Director, OEHHA, dated February 16, 2023.
[6] Health Canada published a maximum acceptable concentration (MAC; analogous to an MCL) for total chromium in drinking water of 50 parts per billion (ppb) in August 2018.
[7] World Health Organization (WHO) issued a draft document that recommends retaining the current WHO guideline value for total chromium (50 ppb) in September 2019.

Sincerely,

Nick Blair
State Relations Advocate II
Association of California Water Agencies

Jennifer M. Capitolo
Executive Director
California Water Association

Andrea Abergel
Manager of Water Policy
California Municipal Utilities Association

cc:

The Honorable Yana Garcia, Secretary for Environmental Protection, California Environmental Protection Agency (CalEPA)
The Honorable Joaquin E. Esquivel, Chair, State Water Resources Control Board
Ms. Christine Hironaka, Deputy Cabinet Secretary, Governor's Office
Ms. Clare Mendelsohn, Deputy Secretary for Public Policy, CalEPA
Ms. Anna Naimark, Deputy Secretary and Special Counsel for Water Policy, CalEPA
Mr. Jonathan Bishop, Chief Deputy Director, State Water Resources Control Board
Dr. David Edwards, Ph.D., Chief Deputy Director, Office of Environmental Health Hazard Assessment
Dr. Vincent Cogliano, Ph.D., Deputy Director, Division of Scientific Programs, Office of Environmental Health Hazard Assessment
Mr. Darrin Polhemus, Deputy Director, Division of Drinking Water, State Water Resources Control Board,
Mr. Dave Eggerton, Executive Director, ACWA
Ms. Cindy Tuck, Deputy Executive Director, ACWA

Appendix A

1) Rager, J.E., C.L. Ring, R.C. Fry, M. Suh, D.M. Proctor, L.C. Haws, M.A. Harris, and C.M. Thompson. 2017. High-throughput screening data interpretation in the context of in vivo transcriptomic responses to oral Cr(VI) exposure. *Toxicological Sciences.* 158(1): 199-212. https://academic.oup.com/toxsci/article-lookup/doi/10.1093/toxsci/kfx085

2) Kirman, C.R., M. Suh, D.M. Proctor, and S. Hays. 2017. Improved physiologically based pharmacokinetic model for oral exposures to chromium in mice, rats, and humans to address temporal variation and sensitive populations. *Toxicology and Applied Pharmacology.* 325: 9-17. http://www.sciencedirect.com/science/article/pii/S0041008X17301370?via%3Dihub

3) Thompson, C.M., M. Suh, D.M. Proctor, L.C. Haws, and M.A. Harris. 2017. Ten factors for considering the mode of action of Cr(VI)-induced gastrointestinal tumors in rodents. *Mutation Research.* 823: 45-57. https://www.sciencedirect.com/science/article/pii/S1383571817301365

4) Thompson, C.M., J. Wolf, A. McCoy, M. Suh, D.M. Proctor, C. Kirman, L.C. Haws, and M.A. Harris. 2017. Comparison of toxicity and recovery in the duodenum of B6C3F1 mice following treatment with intestinal carcinogens captan, folpet, and hexavalent chromium. *Toxicologic Pathology.* 45(8): 1091-1101. http://journals.sagepub.com/doi/10.1177/0192623317742324

5) Thompson, C.M., R.R. Young, H. Dinesdurage, M. Suh, M.A. Harris, A.C. Rohr, and D.M. Proctor. 2017. Assessment of the mutagenic potential of hexavalent chromium in the duodenum of Big Blue® rats. *Toxicology and Applied Pharmacology* 330: 48-52. http://www.sciencedirect.com/science/article/pii/S0041008X1730282X

6) Thompson, C.M., C.R. Kirman, S. Hays, M. Suh, S. Harvey, J.E. Rager, L.C. Haws, and M.A. Harris. 2018. Integration of mechanistic and pharmacokinetic information to derive oral reference dose and margin-of-exposure values for hexavalent chromium. *Journal of Applied Toxicology* 38: 351-365. https://onlinelibrary.wiley.com/doi/full/10.1002/jat.3545

7) Thompson, C.M., M. Suh, D.M. Proctor, and M.A. Harris. 2018. Letter to the Editor Regarding Banu et al. (2018). Chromium Accumulation on Human Placental Oxidative Stress and Apoptosis. *Toxicological Sciences.* 165(2): 269-271. https://academic.oup.com/toxsci/article/165/2/269/5032764

8) Moffat, I., N. Martinova, C. Seidel, and C.M. Thompson. 2018. Hexavalent chromium in drinking water. *Journal AWWA*. 110(5): E22-E35. https://awwa.onlinelibrary.wiley.com/doi/10.1002/awwa.1044

9) Chappell G, Rager J, Wolf J, Babic M, Leblanc, Ring C, Harris MA, Thompson CM**.** 2019. Comparison of gene expression responses in the small intestine of mice following exposure to three carcinogens using the S1500+ gene set informs a potential common adverse outcome pathway. Toxicol Pathol 47(7):851–864, https://doi.org/10.1177/0192623319873882.

10) Rager, J.E., M. Suh, G.A. Chappell, C.M. Thompson, and D.M. Proctor. 2019. Review of transcriptomic responses to hexavalent chromium exposure in T lung cells supports a role of

epigenetic mediators in carcinogenesis. *Toxicology Letters.* 305: 40-50. https://www.sciencedirect.com/science/article/pii/S0378427419300128?via%3Dihub

11) Suh, M., D. Wikoff, L. Lipworth, M. Goodman, S. Fitch, L. Mittal, C. Ring, and D. Proctor. 2019. Hexavalent chromium and stomach cancer: A systematic review and meta-analysis. *Critical Reviews in Toxicology* 49(2):140-159. https://www.tandfonline.com/doi/abs/10.1080/10408444.2019.1578730?journalCode=itxc20

12) Aoki, Y, Matsumoto, M, Matsumoto, M, Masumura, K, Nohmi, T. 2019. Mutant frequency is not increased in mice orally exposed to sodium dichromate. Food Safety (Tokyo) March 13; 7(1): 2-10. https://pubmed.ncbi.nlm.nih.gov/31998582/.

13) Thompson CM, Donahue DA, Hobbs C, Costecalde Y, Franzen A, Suh M, Proctor DM, Harris MA. 2020. Exposure to environmentally-relevant concentrations of hexavalent chromium does not induce ovarian toxicity in mice. Regul Toxicol Pharmacol 116, open access: https://doi.org/10.1016/j.yrtph.2020.104729.

14) Bhat VS, Cohen SM, Gordon EB, Wood CE, Cullen JM, Harris MA, Proctor DM, Thompson CM. 2020. An adverse outcome pathway for small intestinal tumors in mice involving chronic cytotoxicity and regenerative hyperplasia: A case study with hexavalent chromium, captan, and folpet. Crit Rev Toxicol (open access), https://doi.org/10.1080/10408444.2020.1823934.

15) Chappell GA, Wikoff DS, Thompson CM. 2021. Assessment of mechanistic data for hexavalent chromium-induced rodent intestinal cancer using the key characteristics of carcinogens. Toxicol Sci 180(1):38-50, https://doi.org/10.1093/toxsci/kfaa187.

16) Thompson CM, Aardema MJ, Heintz MM, MacGregor JT, Young RR. 2021. A review of mammalian in vivo genotoxicity of hexavalent chromium: Implications for oral carcinogenicity risk assessment. *Critical Reviews in Toxicology* 51:820-849. https://pubmed.ncbi.nlm.nih.gov/35060824/

17) Proctor DM, Bhat V, Suh M, Reichert H, Jiang X, Thompson CV. 2021. Inhalation cancer risk assessment for environmental exposure to hexavalent chromium: Comparison of margin-of-exposure and linear extrapolation approaches. *Regulatory Toxicology and Pharmacology*, https://sci-hub.se/10.1016/j.yrtph.2021.104969.

18) Chappell G, Wolf JC, Thompson CM (2022) Crypt and villus transcriptomic responses in mouse small intestine following oral exposure to hexavalent chromium. *Toxicological Sciences* 186:43-57. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8883354/