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Jared Blumenfeld, Secretary for Environmental Protection
Lauren Zeise, Ph.D., Director

MEMORANDUM

TO: Darrin Polhemus
Deputy Director
State Water Resources Control Board

FROM: Vincent Cogliano, Ph.D.
Deputy Director

DATE: July 6, 2022

SUBJECT: HEXAVALENT CHROMIUM FIVE-YEAR REVIEW

This memo is in response to inquiries regarding the public health goal (PHG) development and five-year reassessment for hexavalent chromium, or Cr(VI), and the reason the Cr(VI) PHG was not given a full review recently.

A PHG is the level of a drinking water contaminant that does not pose a significant risk to health. PHGs are non-regulatory in nature and are used as the health basis to support California's primary drinking water standards ([Maximum Contaminant Levels, or MCLs](#)) established by the State Water Resources Control Board ("Water Board"). In 2011, OEHHA developed a PHG of 0.02 parts per billion (ppb) for Cr(VI). Each PHG is to be reviewed once every five years unless there has not been a detection of the corresponding contaminant in the preceding five years, although due to resource constraints such reviews have not been accomplished within that timeframe. OEHHA initiates a PHG review with a data call-in for information that could assist in updating the risk assessment.

In 2016, OEHHA announced a data call-in for Cr(VI). Many of the submitted studies were already reviewed by OEHHA in conjunction with meetings and discussions with industry consultants following adoption of the PHG in 2011. In addition to the information submitted by interested stakeholders, reviews by authoritative groups were also available:

- The 2018 European Chemicals Agency's Committees for Risk Assessment and Socio-economic Analysis opinion document,¹ which applied linear extrapolation in its dose-response analysis for cancer endpoints;

¹ <https://www.hse.gov.uk/reach/applications-for-authorisation/ra-aala-0037.pdf>

- The 2017 review by the European Commission's Scientific Committee on Occupational Exposure Limits,² which concluded that Cr(VI) compounds are carcinogens with no threshold;
- The 2016 review by the Dutch Expert Committee on Occupational Safety,³ which noted in its report that all Cr(VI) compounds are carcinogens with underlying processes that include a genotoxic mechanism;
- The 2014 European Food Safety Authority review,⁴ which considered Cr(VI) both genotoxic and carcinogenic;
- The 2013 European Chemicals Agency report⁵ that used an approach similar to OEHHA's for evaluating cancer risks from oral exposure;
- The 2012 review by the US Department of Health and Human Services' Agency for Toxic Substances and Disease Registry⁶ that highlighted genotoxicity and carcinogenicity as effects of Cr(VI) exposure;
- The 2012 International Agency for Research on Cancer review⁷ that indicated Cr(VI) to be carcinogenic to humans, involving several mechanisms related to genotoxicity.

OEHHA is also aware of publications in the peer-reviewed literature that speak to underlying mechanisms of carcinogenicity that are consistent with a non-threshold mode of action. Based on the review of the information from the data call-in and authoritative groups, there was not enough evidence to warrant a change in OEHHA's approach of determining the cancer potency of Cr(VI) (i.e., to rely on the threshold cytotoxic mode of action instead of a non-threshold genotoxic mode of action).

Because of this, an updated PHG value for Cr(VI) would not likely vary significantly from the 2011 value. Furthermore, current PHG priorities are for chemicals with widespread exposures via drinking water that do not have an existing PHG value and have been identified as priorities for PHG development by the Water Board.

² <https://www.certifico.com/component/attachments/download/6104>

³ <https://www.healthcouncil.nl/binaries/healthcouncil/documenten/advisory-reports/2016/09/30/hexavalent-chromium-compounds/advisory-report-hexavalent-chromium-compounds.pdf>

⁴ <https://efsa.onlinelibrary.wiley.com/doi/pdfdirect/10.2903/j.efsa.2014.3595?download=true>

⁵ https://echa.europa.eu/documents/10162/17233/carcinogenicity_dose_response_cr_vi_report_en.pdf/7158ab67-0801-4307-bf5b-30c75c15518e?t=1395235087502

⁶ <https://www.atsdr.cdc.gov/toxprofiles/tp7.pdf>

⁷ <https://monographs.iarc.who.int/wp-content/uploads/2018/06/mono100C-9.pdf>