California Environmental Protection Agency
Office of Environmental Health Hazard Assessment

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Summary of Changes Between the First and Second Public Review Drafts of the Proposed Public Health Goals for Trihalomethanes in Drinking Water

On November 8, 2019, OEHHA released for public comment the second public review draft of the proposed Public Health Goals (PHGs) for trihalomethanes in drinking water. The comment period ends on December 9. The first public review draft was released in October 2018.

There were a number of changes between the first and second public review drafts to add clarity to the document. This summary is not a comprehensive list of all changes, but does identify the primary substantive changes in the second review draft compared to the first. These substantive changes were:

- A list of abbreviations was added.
- The health-protective concentrations were rounded to two significant figures.
- The tables of results of the genotoxicity studies in each THM profile were re-organized for greater accuracy, and a few of the results that had been inadvertently left out previously were added.
- The total number of disinfection byproducts identified was updated from 250 to 600 on page 2.
- The following statement on page 31 was deleted:

  > "Based on these in vitro studies, the reductive pathway seems to be less relevant at low environmental exposures, since it is active at high substrate concentrations."

- The following statement on page 34 was added:

  > "As noted above, the initial, rate-limiting reaction of oxidative metabolism is insertion of oxygen at the C–H bond of THMs to produce a trihalomethanol (CX 3 OH), which spontaneously decomposes to yield a reactive dihalocarbonyl (CX 2 O), a structural analogue of phosgene. The dihalocarbonyl may form adducts with various cellular nucleophiles, hydrolyze to yield carbon dioxide, or undergo a glutathione-dependent reduction to yield carbon monoxide."

- The following text was deleted from page 42:

"Unlike other CYPs that are mainly regulated at the transcriptional level, CYP2E1 activity appears to be primarily influenced at the post-transcriptional and post-translational levels, specifically by substrate binding and stabilization of the mRNA or protein (Bolt et al., 2003)."

- “856 pregnancies” was changed to “86 pregnancies” on page 68.
- A footnote was added to define pesticide-quality chloroform on page 86.
- A discussion about Chu et al. (1982b) on page 102 was deleted.
- The text around the results of DeAngelo et al. (2002) was clarified in Toxicological Profile: Bromoform, Subchronic Toxicity, page 104.
- The following statement on page 134 was deleted:

  "A comparison of these results to those obtained by Condie et al. (1983) in male CD-1 mice suggest possible strain-specific differences in sensitivity to BDCM."

- “AOM620” was changed to “AOM” on page 140.
- A Cochran-Armitage test for trend was conducted on data from the Ruddick et al. (1983) developmental toxicity study of BDCM to determine whether there was statistical significance for increased sternebral aberrations, and a sentence was added to the text in Toxicological Profile: Bromodichloromethane, Developmental and Reproductive Toxicity, page 150.
- A trend test was conducted on the data for hepatic lesions in the Chu et al. (1982b) subchronic toxicity study of DBCM in male and female SD rats, and results of the trend test were described in Toxicological Profile: Dibromochloromethane, Subchronic Toxicity, page 184.
- The results of Foureman et al. (1994) and Sekihashi et al. (2002) were added to Table 8.5 in Toxicological Profile: Dibromochloromethane on page 190.
- A new paragraph was added on the potential role of epigenetic alterations induced by THMs and their involvement in THM-induced carcinogenesis in Mechanisms of Carcinogenicity, page 204.
- Clarification was added that the best fit model for the noncancer bromoform data was the Hill model, not the Polynomial model, in Dose-Response Assessment, page 242.
- Appendix F, Determination of Multi-route Exposures was added, which provides the equations and values for parameters used in the CalTOX model to determine multi-route exposures.
- A number of new references were added, including:

- Richardson *et al*. (2007) in Introduction, page 6.
- Prah *et al*. 2002 in Production, Use and Environmental Occurrence, page 19.
- Leavens *et al*. (2007) in Pharmacokinetics, page 24.
- Jayaweera *et al*. (2016) in Toxicological Profile: Chloroform, Acute Effects page 45.
- Kang *et al*. (2014) in Toxicological Profile: Chloroform, Subchronic Toxicity, Effects in Humans, page 51.
- Khaleff *et al*. (2018) in Toxicological Profile: Chloroform, Genetic Toxicity, In Vitro Assays page 62 and Toxicological Profile: Bromoform, Genetic Toxicity, In Vitro Assays, page 109.
- Lodhi *et al*. (2017) in Toxicological Profile: Bromoform, Hematotoxicity, page 117.
- Belmeier *et al*. (2007) in Toxicological Profile: Bromodichloromethane, Developmental and Reproductive Toxicity, page 154.
- Villanueva *et al*. (2018) in Toxicological Profile: Bromodichloromethane, Neurotoxicity, page 160.
- Moser *et al*. (2007) in in Toxicological Profile: Bromodichloromethane, Neurotoxicity, page 162.
- Narotski *et al*. (2011) in Toxicological Profile: Dibromochloromethane, Developmental and Reproductive Toxicity, page 195.
- Salas *et al*. (2014) in Mechanisms of Carcinogenicity, page 204.
- Salas *et al*. (2015) in Mechanisms of Carcinogenicity, page 204.
- Kuppasamy *et al*. (2015) in Mechanisms of Carcinogenicity, page 204.