



National Drinking Water Program Agenda



**California Water Association
Sacramento, CA
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Current Regulatory Status of Chromium in Drinking Water

- Current MCLs for total chromium [Cr³ + Cr⁶] are based on Cr+6 toxicity
 - USEPA MCL = 100 ug/L
 - California MCL = 50 ug/L
- No federal or state standalone MCL specific for Cr+6
- CA proposed Cr+6 MCL of 10 ug/L in August 2013
- USEPA reconsidered total chromium MCL in last Six-Year Review
 - Lacked health/occurrence data that said “change”



The Evolution of Cr+6 Health Risk Assessments

- Trivalent chromium (Cr+3) is an essential nutrient
 - Blood sugar control
- Hexavalent chromium (Cr+6) is considered toxic
 - Airborne exposures can cause skin sensitization, rashes, respiratory cancers
 - Oral ingestion effects typically seen above palatability
- 1991 MCL based on non-cancer Reference Dose (RfD) with no stated “adverse endpoint”
- 1998 IRIS RfD set at 3 ug/kg/d (~100 ug/L water)
 - Similarly based on no adverse endpoint



Hexavalent Chromium As a Carcinogen

- USEPA reviewed carcinogenicity data (1998 IRIS)
 - Lung damage from Cr+6 plating mists, aerosols
 - Lung cancer in humans from inhalation
- “The oral carcinogenicity of Cr(VI) cannot be determined. No data were located in the available literature that suggested that Cr(VI) is carcinogenic by the oral route of exposure.”



Evolution of Cancer Risks

- National Toxicology Program studies, 2005-07
 - Tested oral exposure of Cr+6 in rats, mice
 - Found elevated mouth and intestinal epithelial neoplasms, starting around 20 mg/L in mice
 - Doses to 180 mg/L did not kill animals
- Rapid reduction of Cr+6 to Cr+3 occurs in stomach
 - DeFlora, et al (2008) suggested effects threshold when reduction (detoxification) capacity is exceeded
 - Range of reduction capacity in humans



Current Cr+6 Health Risk Thoughts

- CA OEHHA finalized PHG at 0.02 ppb on July 27, 2011
 - PHG set at “1 cancer per million” risk level
 - Did not consider detoxification as risk reduction
 - Used linear, no threshold extrapolation
- USEPA reconsidered oral carcinogenicity
 - 2010 draft risk assessment said CR+6 to be carcinogenic
- USEPA considering new data on Mode of Action of carcinogenicity
 - USEPA “withdrew” September 2010 draft risk assessment after peer review
 - Unclear when new draft will appear



USEPA IRIS Review of Cr+6

- IRIS = Integrated Risk Information System
 - USEPA's main risk assessment program
- USEPA will hold stakeholder meeting on Cr+6 (and arsenic) risk assessment issues on June 25-27, 2014
- Discussion topics
 - Inhalation carcinogenicity dose-response
 - Possible non-cancer health effects
 - Susceptibility of mice to gastrointestinal toxicity
 - Use of subchronic histopathological data
 - Reproductive and developmental toxicity database
 - Role of anemia in oral tumors in rats



Possible USEPA Regulatory Actions

- USEPA has two options: Revise the current total chromium MCL or establish a separate Cr+6 MCL
- USEPA will await occurrence data on total chromium and Cr+6 under UCMR3 (2013-2015)
- USEPA will need to complete its revised health risk assessment
- Bottomline: Any decision is not likely to be soon



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