Regulations and California’s Tightening Drinking Water Standards: Where Do We Draw the Line?

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Friday, October 14, 2015
9:00 – 10:00 a.m.
The Department is mandated by State law to set a Chrome-6 MCL.

On July 1, 2014 the Hexavalent Chromium MCL became effective.

Website has been updated with a memo from Dave Mazzeria and our drinking water-related regulation book has been updated and posted.

MCL = 0.010 mg/l or 10 ug/l (notice the significant figures for rounding purposes)
CHROMIUM VI

- Applies to Community and NTNC systems only.
- PWS have 6 months to take an initial Chromium VI sample, by January 1, 2015.
- Grandfathering data for groundwater sources only that is less than 2 years old is allowed if monitored by an ELAP certified lab using proper laboratory analysis.
- Analytical methods – 218.6 or 218.7.
Chromium 6 Background

- Chromium is an inorganic chemical used in industrial manufacturing and cooling tower treatment for corrosion control.

- Chromium can enter drinking water sources through discharges from industrial, leaching from hazardous waste sites, and erosion of natural deposits.

- Chromium 6 is known to cause cancer in humans when inhaled. There is limited evidence on cancer and chromium 6 through ingestion
Chromium 6 Regulatory Activities

- Chromium is currently regulated in drinking water as total chromium which assumes a mixture of chromium 3 (approx. 93%) and chromium 6 (approx. 7%).

- State Senate Bill 351 requires the California Dept. Health Services to adopt a Chromium 6 standard by January 1, 2004 and OEHHA to adopt Chromium 6 PHG in early 2003.
Chromium (Cr) Background

- Chromic oxide – 9th most abundant compound in earth’s crust
- Chromium-3 (Cr3) or chromium-6 (Cr6) in water
  - Mostly Cr6 in groundwater
  - Need Cr3 to produce insulin
- Cr6 Sources in Water
  - Erosion of natural sediments
  - Isolated industrial sources
- Cr6 Health Concerns
  - Carcinogen when inhaled at work
  - Listed as possible carcinogen when ingested (rodent studies)
Coachella Valley Cr6 Occurrence

- Natural in groundwater
  - Ultra-mafic sediments
- Levels from <1 to 22 parts per billion (ppb)
- Above 10 ppb in about 100 domestic wells valley-wide
- 30 of CVWD’s 100 wells (150 square mile service area)
- Cr6 below reportable levels in Colorado River water used for aquifer replenishment
California’s Path to Regulate Cr6

1999 Cr PHG 2.5 ppb

1999 Cr PHG

Widespread Natural Occurrence

April 15, 2014 Court Order Cr6 MCL is set at 0.010 mg/L (10 ppb)

2010 Cr6 PHG 0.020 ppb

NRDC The Earth’s Best Defense

V.

CALIFORNIA REPUBLIC
Early “Cr6 Treatment” Work

Cr6 Reduction

• Proved reduction of Cr6 to Cr3 was possible
• More cost effective than removing Cr
• Critical limiting factor
  – Drinking water is chlorinated to meet bacteria standards
  – Chlorine oxidizes Cr3 to Cr6
  – Can provide residual Cl₂ or reduced Cr, not both
CHROMIUM REMOVAL
BEST AVAILABLE TECHNOLOGIES (BAT)

Weak-Base Anion Exchange (WBA)

Reduction Coagulation Filtration (RCF or RCMF)

Strong-Base Anion Exchange with Residuals Treatment (SBA)

Reverse Osmosis (RO)
CVWD’s Cr6 Treatment Work

• 2001 – Cr6 added to pilot Arsenic removal tests
• 2006 – Two Ion Exchange treatment plants begin removing Arsenic and Cr6 ($13 million)
• 2011 – Collaborative Water Research Foundation Cr6 pilot study (IX & RCF)
• 2012 – CVWD absorption media pilot test for Cr6
• 2013 – Second Cr6 Water Research Foundation study (RCMF & Brine)
• 2013 – Begin Source Study (draft MCL)
• 2014 – Multiple ion-exchange and brine pilot test programs (Hazen)
• 2015 – Follow-up pilot tests to finalize Facilities Basis of Design
Cr6 Removal By Ion Exchange

Ion Exchange
Ions of Cr6 attach to specially coated resin beads

- Cr6 in water
- Chloride on resin
+ Resin bead
Additional Control Measure

• Must achieve “no unreasonable risk”
• Install Point Of Use Treatment – too costly and not quick enough
  – Exceeds BAT cost
• Provide bottled water – quick but too costly
  – $1.60 gallon delivered
  – $0.84/person/day = $92 million/year
• What about Cr6 reduction at the tap?
Hexavalent Chromium (Cr-6)

- Total chromium regulated in 1991 at 100 ppb
- “Erin Brockovich” increased interest in Cr-6
- Draft risk assessment now in late 2013
  - Final risk assessment thereafter
    - EPA will have to then decide if regulation needs to be revised to address Cr-6 (a likely outcome)
      - Not sure if this would be part of SY3 or an “out-of-cycle” regulatory determination
- Total and Cr-6 included in UCMR3 monitoring
  - Relationship between the two can vary quite a bit
- Treatment is challenging and expensive
  - Total treatment costs for a potential Cr-6 regulation could be higher than all SDWA regulations to date
Economic Impact of Proposed State Chromium MCL in Watsonville

City of Watsonville Water Expenses

- Annual Capital Improvements: $500,000
- New Cr6+ Initial Treatment: $26,000,000
- Annual Operations of New Cr6+ Treatment: $1,700,000
Cost to City Residents

• **Cost of Compliance:**
  – **78% rate increase**
  – Currently, nearly 1000 water connections in jeopardy of shut off each year due to delinquency
    • This number would dramatically increase with a 78% rate increase

• **Cost of Non-compliance:**
  – Loss of public confidence in our drinking water system
  – Enforcement penalties unknown at this time
Watsonville is an Economically Disadvantaged Community

Per Capita Income

- Watsonville
- California
- United States