Hexavalent Chromium Treatment Studies in Glendale, CA

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Project Background

Public concern about Cr(VI) in drinking water supplies prompted the City of Glendale, in partnership with other local cities, to investigate the feasibility and cost-effectiveness of treatment technologies for Cr(VI) removal. The studies involve four phases, including:

Phase I – Bench Study
Technology screening in the laboratory

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Phase II – Pilot Study
Test of 6 treatment technologies at Glendale

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Phase III – Demonstration Study
- Bridge project of WBA resin
- Optimization studies of RCF
- WBA and RCF wellhead treatment

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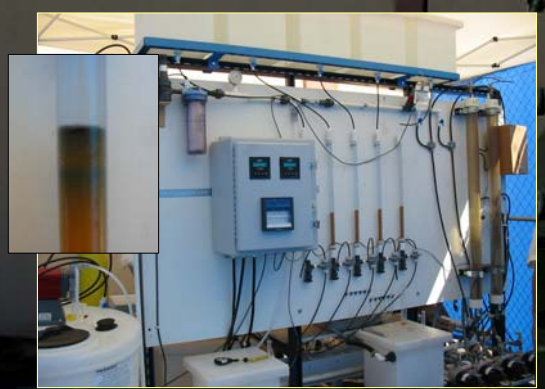
Phase IV – Full-Scale Treatment
Treatment of all 8 GOU wells



WBA Bridge Project – Conversion of Cr(VI) to Cr(III)

Bench and Pilot-Scale Testing Revealed Two Leading Treatment Technologies for Glendale:

Weak Base Anion (WBA) Exchange

Process Description – Removal of Cr(VI) using WBA resin at an acidic pH (6.0). Cr(VI) is reduced to Cr(IIII) on the resin. Key highlights:

- Very high capacity (~100,000 bed volumes to 50% breakthrough) makes this resin feasible for use as a disposable media
- No brine waste (compared to regenerable strong base anion exchange)

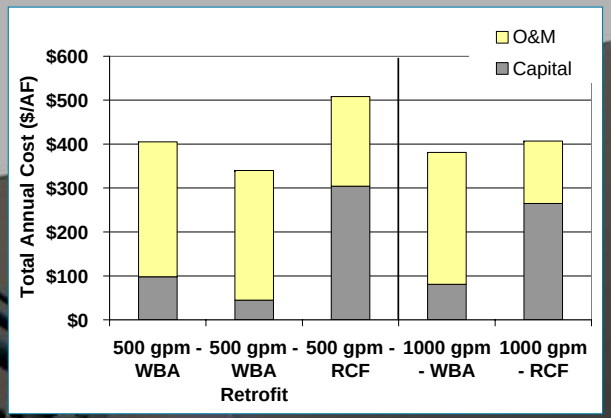
Reduction/Coagulation/Filtration (RCF)

Process Description - Reduction with ferrous sulfate, coagulation, aeration, and filtration using dual-media granular filters. Key highlights:

- Excellent Cr(VI) reduction and total Cr removal
- High capital costs due to long detention times in reduction and aeration processes

RCF Pilot Study Components

Cost estimates for the WBA and RCF technologies are shown below:



WBA and RCF technologies were similar on an annualized basis for 1,000 gpm, although WBA had higher O&M costs due to resin replacements and RCF had higher capital costs. A retrofit of existing (unused) GAC vessels offers a lower-cost option for a demonstration-scale WBA system at the GS-3 well.

Expert Panel Recommendations

An expert panel reviewed the technical and cost information developed in Phases I and II, and concluded that RCF should be tested at demonstration-scale and the mechanism of WBA Cr(VI) removal should be determined. The WBA Bridge Project completed the WBA mechanism investigation and provided further assurances of the WBA technology's applicability in treating Glendale's groundwater.

Next Steps

Detailed design and construction of:

- 425 gpm WBA treatment system at GS-3
- Between a 100 and 1,134 gpm RCF treatment system for part or all of the flow from GN-2 and GN-3, depending on funding availability