

Project

Confidential Client/Consultant Site
Southern Arizona
Purpose: Stabilization of Chromium in Groundwater

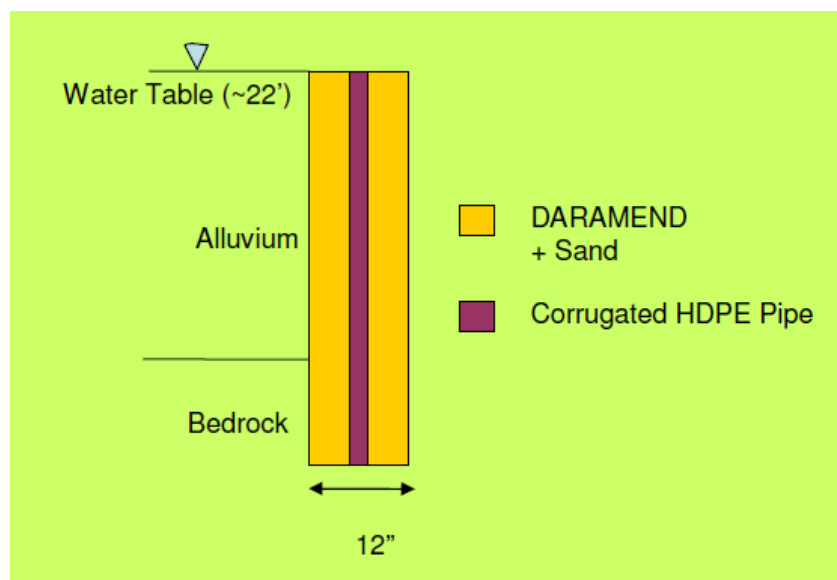
Summary

As a result of historical site operations by prior owners groundwater at this site was impacted by hexavalent chromium (Cr(VI)). Historical total chromium concentrations were as high as 0.68 mg/L, which exceeded the Arizona Aquifer Water Quality Standard (AWQS) of 0.1 mg/L. Following a review of available technologies, the Consultant selected a combination of Adventus' *in situ* chemical reduction (ISCR™) technologies for use in a pilot test at the site. The pilot utilized a relatively unique method of Adventus product installation to meet the challenges of site-specific geological constraints. Subsequent field monitoring has shown reduction in and stabilization of both total chromium and Cr(VI).

The Challenge

In addition to the presence of both total chromium and Cr(VI) in excess of AWQS, site geology confounded more traditional injection techniques that may otherwise have been used at this site. In particular, the presence of alluvium over conglomerate eliminated the traditional direct push injection techniques that may otherwise have been readily applicable to the site.

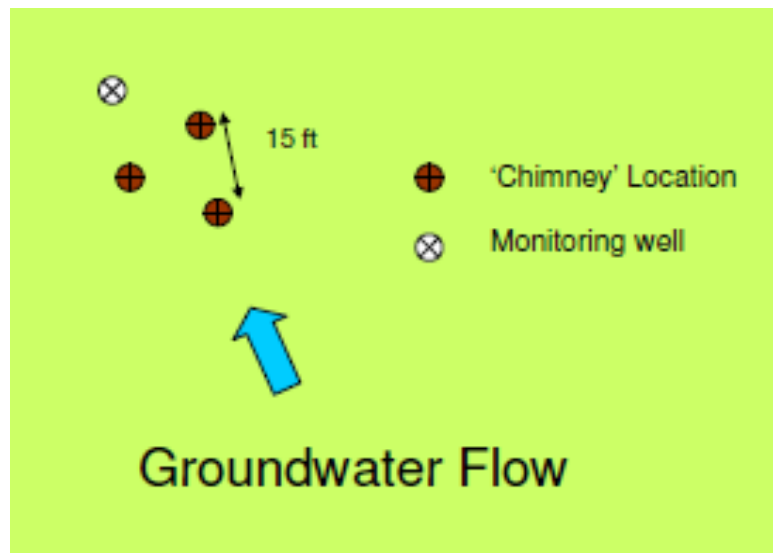
To effect treatment under these conditions, a suitable dosage of Adventus products was selected to



enable creation of *In-Situ* Chemical Reduction (ISCR) conditions favorable to chromium treatment. For the pilot, this amounted to a 0.15 wt % to soil mass dosage over a 25' x 30' by 13' thick saturated interval, or an equivalent EHC[®] dosage of 1,650 pounds. This was installed in a 'chimney' configuration using 12" diameter well bores using a mixture of DARAMEND[®] and EHC-A[®].

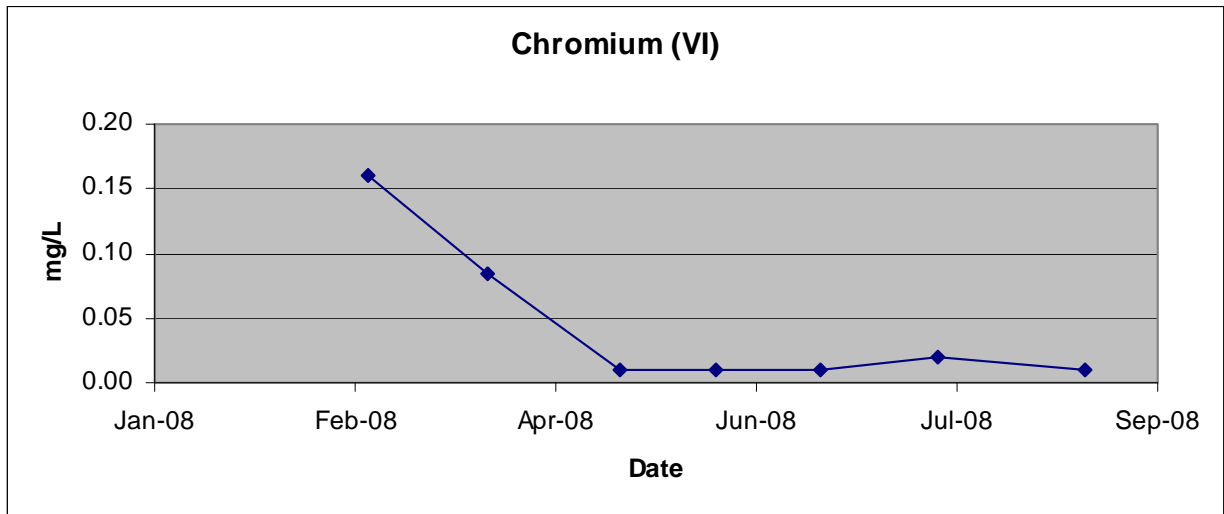
Field-Scale Pilot

By configuring three such 'chimney' borings just upgradient of the pilot test target well, a minimum of drilling to achieve product placement was accomplished. To provide adequate treatment permeability within the sand backfill, 20 wt % DARAMEND[®] was amended to the sand during 'chimney' construction. EHC-A[®] (a cold-water soluble formulation of EHC[®]) was subsequently flushed through the 'chimney' well pipe. Overall, 450 pounds of DARAMEND[®] and 1,200 pounds of EHC-A[®] were utilized to effect treatment.



The Results

Following installation of the 'chimneys' in February of 2008, concentrations of both total Cr and Cr(VI) quickly fell below AWQS. In addition, these concentrations have remained low in all subsequent monitoring events. Results in the Figure below after April 2008 are posted at laboratory detection limit values.



The Conclusion

The DARAMEND[®] 'chimney' approach was highly effective in the treatment of chromium in groundwater at this site. Overall product cost was less than \$3,000, and was coupled with a relatively unique product delivery and drilling approach. This approach enabled rapid, cost effective, and lasting treatment in a challenging geological environment.

To discuss the technology or request a free estimate, please contact Adventus.

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