

## **USE OF CHEMICAL OXIDATION TO EXPEDITE CLEANUP OF A 10-YEAR PUMP AND TREAT SITE**

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Pump and treat systems have been commonly implemented for the past 25 years to cleanup groundwater contaminant plumes. While pump and treat systems are often effective in controlling the migration and reducing the size of the plume, they have one common drawback in that contaminant levels usually reach a low asymptotic level after several years of pumping and most times they do not attain regulatory cleanup levels.

At the U.S. Gypsum Company site in La Mirada, CA, a pump and treat system has operated for over ten years (1996 to 2006). The pump and treat system has been successful in reducing the size of two large co-mingled contaminant plumes; one containing benzene and one with TCE. During this time period, groundwater was pumped from nine recovery wells, resulting in the treatment of over 45 million gallons of groundwater and the removal of over 408 pounds of dissolved VOCs. After 10 years of operation, asymptotic levels of benzene (3,000 µg/l range) and TCE (500 µg/l range) were still present at two locations at the site.

As a means of expediting groundwater cleanup, two in-situ chemical oxidation (ISCO) technologies were implemented. For treatment of the benzene plume, catalyzed hydrogen peroxide and activated sodium persulfate were injected into six injection wells in October 2006 and again in March 2007. Peroxide and persulfate were selected because they are highly effective on benzene. Laboratory results indicate benzene concentrations have been reduced from a pre-ISCO maximum of 5,500 µg/l to 51 µg/l (99% reduction) in well MW-4. Other monitoring wells have shown similar benzene reductions from 96% to 100%.

For the TCE plume, a full scale treatment using potassium permanganate was performed in April 2008 because of its effectiveness on TCE, its persistence in the environment, and its large radius of treatment. Six injection wells, including two wells in the street, were used for the treatment. TCE reductions ranging from 85% to 100% were observed in the monitoring wells at the site. Based on these highly successful ISCO results, closure of both groundwater plumes is expected to be obtained from the Los Angeles Regional Water Quality Control Board by mid 2009.

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Biography

Mr. Gary Cronk is the President of JAG Consulting Group, Inc., in Santa Ana, CA, that specializes in providing services for the design and implementation of in-situ chemical oxidation (ISCO). Mr. Cronk has experience in the design and implementation of over 30 ISCO projects in California and other states. Overall, Mr. Cronk has over 34 years experience in hazardous waste site investigations, design of environmental remediation systems, and expert witness consulting. Mr. Cronk is a California Registered Professional Engineer, a California Certified Hazardous Substances Removal and Remedial Actions Contractor (A-HAZ), a Class A General Engineering Contractor, and a Certified Hazardous Materials Manager (CHMM). He holds a Masters degree in Biological Sciences from Cal State Fullerton. He is a frequent speaker at conferences and seminars on the benefits of in-situ chemical oxidation.