

## CASE STUDY: ACTIVATED SODIUM PERSULFATE ISCO TREATMENT OF A BENZENE PLUME, LA MIRADA, CA

JAG Consulting Group completed a successful ISCO treatment on a benzene plume using activated sodium persulfate. Two activation techniques were used for the sodium persulfate; use of catalyzed hydrogen peroxide and ferrous iron activation. The ISCO treatment was performed under a General WDR permit issued by the Los Angeles RWQCB.

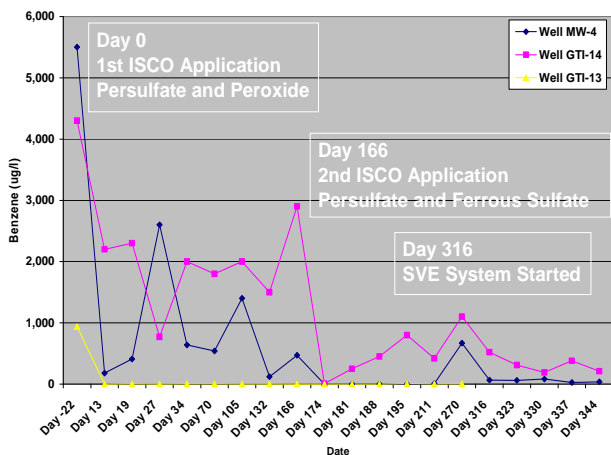
### SITE BACKGROUND

Benzene leaking from an underground storage tank caused extensive groundwater contamination at an industrial site in La Mirada, CA. Pump and treat was performed for over 10 years and was successful in controlling the off-site migration of contamination and in reducing the Benzene levels from over 90,000 µg/l to 5,000 µg/l over the 10 years of operation. To expedite the groundwater cleanup, ISCO treatment using activated sodium persulfate was selected to treat the remaining Benzene plume.

The Benzene plume measured 80 feet long and 50 feet wide at the time of the ISCO treatment. A total of six dedicated injection wells were installed and utilized for the ISCO treatment.

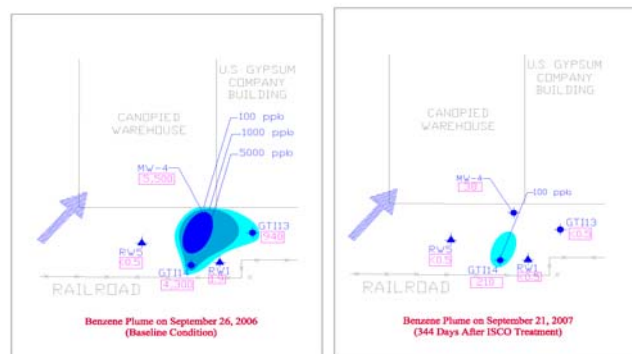
### INJECTION AND DESIGN CONSIDERATIONS

An initial ISCO treatment was performed in September 2006 using catalyzed hydrogen peroxide to activate the sodium persulfate. As shown in the graph below, benzene levels showed immediate reductions of 90%, but rebounded in two wells after three months.



A second ISCO injection was performed on Day 166 using ferrous sulfate as the activator of sodium persulfate. As before, significant reductions in Benzene were achieved within the first 90 days. The benzene rebounded again, however, this time much lower in concentration. The rebound was determined to be caused by a rising water table and remaining benzene contamination in the vadose zone. On Day 316, operation of the soil vapor extraction system was started to remove the deep soil contamination between 50 feet and 80 feet. This action allowed the Benzene levels in the groundwater to stabilize and gradually decline to levels below 100 µg/l.

After one year of monitoring, the Benzene plume has been reduced by over 85% in size. The map below illustrates the size of the Benzene plume before and after treatment.



### SITE CLOSURE

Based on the success of the ISCO treatment, a meeting with the Los Angeles RWQCB has been scheduled to discuss closure of the site.

### CONTACT INFORMATION

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