



ISCO Full-Scale: TPH-G and Benzene

Site Background

- Gasoline Station Release; Homer, Louisiana.

Contaminants of Concern

- Total Petroleum Hydrocarbons and Benzene in saturated soils and groundwater.
- Maximum Benzene concentration in soil was reported at 350 mg/kg.
- Maximum Benzene concentrations in groundwater were reported at 1,435 (µg/L).

Geology/Hydrogeology

- Sandy clays.
- Depth to water at 12 feet bgs.

ISCO Full-scale Remediation Program

- Modified Fenton's Reagent (MFR).
- 2,000 sq. ft area from 15-21 ft bgs.
- ISOTEC conducted a single event full-scale program utilizing direct-push injection screens to treat the saturation zone from 15 to 21 feet bgs.

Results

- Benzene concentrations were reduced by 85% and 90% in monitoring wells MW-3 and MW-5 respectively.

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ISOTEC Case Study No. 49

ISCO Full-Scale Source Reduction of Total Petroleum Hydrocarbons, most notably Benzene

Gasoline Station Release
Homer, Louisiana

INTRODUCTION

ISOTEC was retained to conduct an in-situ chemical oxidation (ISCO) full-scale remediation program using stabilized 12% hydrogen peroxide and ISOTEC's patented neutral pH catalyst at a gasoline station where petroleum hydrocarbons, most notably benzene were released into the subsurface. Maximum benzene concentrations in groundwater were reported at 1,435 micrograms per liter (µg/L) in monitoring well MW-3.

GEOLOGY/HYDROGEOLOGY

The subsurface is comprised of sandy clays. The depth of water at the site is approximately 12 feet below ground surface (bgs). The target treatment interval for the ISCO Full-scale event was from 15 to 21 feet bgs.

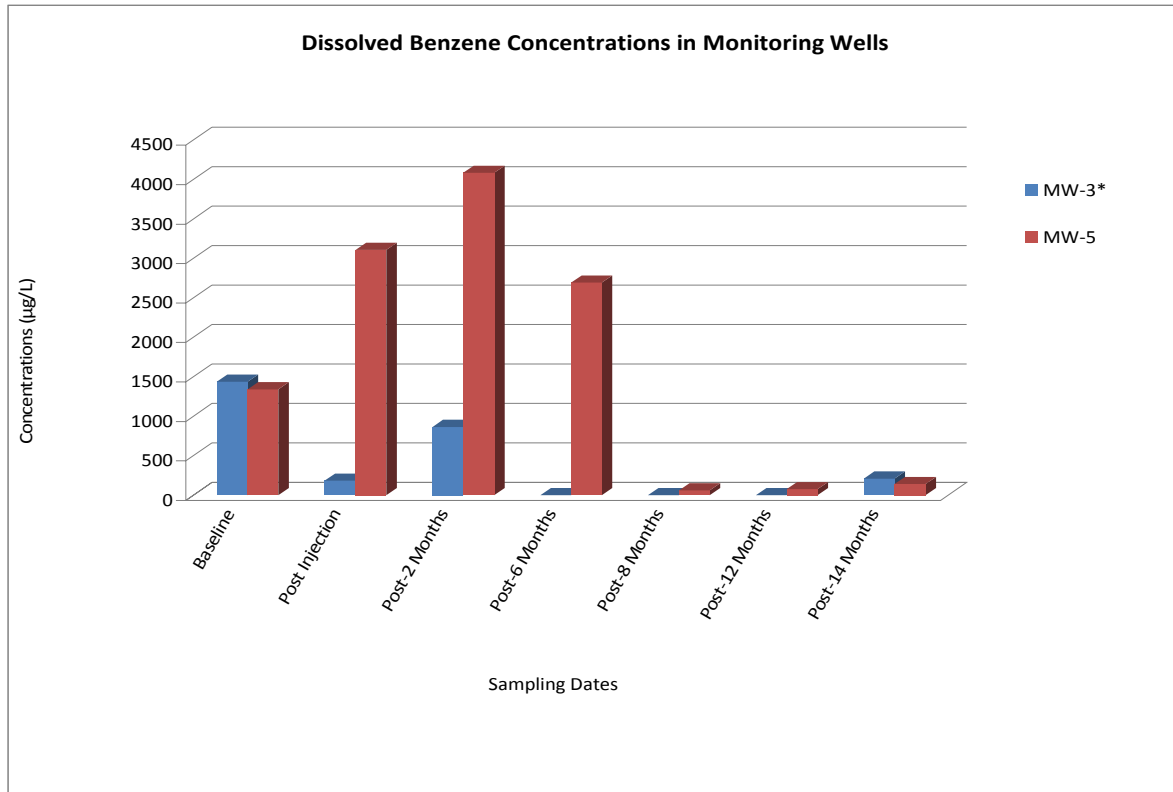
ISCO REMEDIATION PROGRAM DESIGN

The full-scale remediation program consisted of one injection events over a two day period using direct push technology (DPT) by a drilling company. A total of 1,307 gallons of ISOTEC reagents were injected through 9 temporary injection locations, located within the 2,000 square foot treatment area. One screen was deployed from approximately 15 to 18 feet bgs and the second screen was deployed from approximately 18 to 21 feet bgs to target the treatment interval.

RESULTS

The effectiveness of the ISOTEC process was evaluated by comparing baseline soil samples to post injection soil samples. Additionally baseline groundwater samples and four quarters of groundwater samples were also analyzed. Confirmation soil samples collected from a depth of 16 to 18 feet bgs in the area of former boring G-4 indicated that benzene concentrations had reduced from a baseline concentration of 350 mg/kg to 0.013 mg/kg, which was below the soil cleanup level. Four quarters of groundwater samples were also collected and analyzed following the field injection event. The groundwater sample from MW-5 indicated a dissolved-phase concentration increase from the pre-injection concentration of 1,341 µg/L to 4,083 µg/L two months

after the injection event. However, after four quarters of sampling, the benzene concentration in MW-5 decreased to 140 µg/L, a 90% reduction from the pre-injection concentration. A significant reduction was also observed in MW-3, which decreased from a pre-injection concentration of 1,435 µg/L to 210 µg/L four quarters after the injection, an 85% reduction.



*MW-3 was not sampled during the Post-6, 8 and 12 month sampling events.

CONCLUSION

The full-scale ISCO remediation program reduced the TPH-G mass by approximately 2,500 pounds (from 2,800 pounds to 300 pounds). Based on contaminant concentration reductions at the site, a No Further Action (NFA) determination was made by the Louisiana Department of Environmental Quality (LDEQ).