ISCO Treatment Program: #2 Fuel Oil Related COCs

Site

- Residential Property; Southern New Jersey.

Contaminants of Concern

- VOCs - 1,169 ppb (GW)
- SVOCs – 2,460 ppb (GW)
- VOC TICs - 611 ppb (GW)
- SVOC TICs – 50,100 ppb (GW)
- TPH – 32,000 ppm (Soil)
- LNAPL sheen has been observed in the GW.

Geology/ Hydrology

- Targeted portion of the aquifer is composed of fine, medium and coarse sands to approximately 24 ft bgs.
- Depth to water is approximately 17-18 feet bgs.
- GW flow is to the north-northwest.

ISCO Treatment Program

- Modified Fenton's Reagent (MFR).
- 1,330 sq. ft area from 17-24 ft bgs.
- Two, 4-day events & two, 2-day events.
- Direct-push point technology utilized for outdoor locations (80 locations) and up to 7 permanent injection wells utilized in the basement of the property.

Results

- MW-1 showed reduction in VOC TICs (95%), SVOCs (100%) and SVOC TICs (92%).
- GW-1 showed reduction in VOCs (98%), VOC TICs (60%), SVOCs (90%) and SVOC TICs (96%).
- GW-2 showed reduction in VOCs (93%), VOC TICs (90%), SVOCs (94%) and SVOC TICs (72%).
- GW-3 showed reduction in VOC TICs (41%), SVOCs (88%) and SVOC TICs (86%).

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ISOTEC Case Study No. 57

ISCO Treatment Program: #2 Fuel Oil Related Organic Compounds

Residential Property
Southern New Jersey

INTRODUCTION

ISOTEC was retained to conduct a bench-scale treatability study and a field treatment program at the occupied residential property site in southern New Jersey to address soil and groundwater contamination related to an accidental heating oil release. The target contaminants of concern (COC) included volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) in groundwater, and total petroleum hydrocarbons (TPH) as gasoline range organics (GRO) and diesel range organics (DRO) in soil.

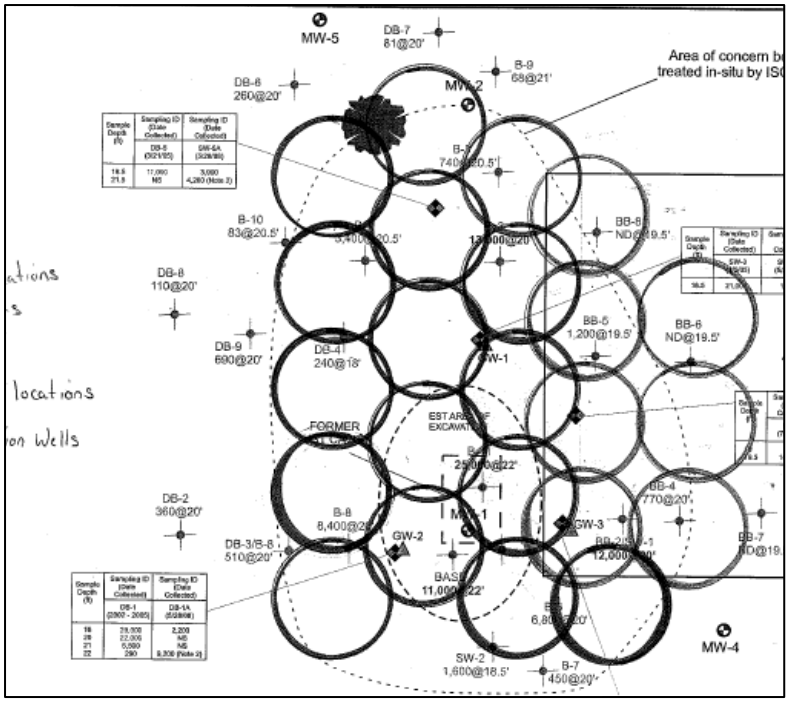
SITE BACKGROUND

Accidental discharges of #2 fuel oil related compounds resulted in soil and GW contamination at the residential property. Levels of VOCs within the GW have exceeded 1,100 µg/L; total VOC tentatively identified compounds (TICs) in GW have exceeded 600 µg/L; SVOCs within the GW have exceeded 2,400 µg/L; Total SVOC TICs in GW have exceeded 50,000 µg/L; and levels of TPH within the soils have exceeded 32,000 mg/kg. The area of concern was an approximately 1,330 sq. ft area targeting the 17-24 ft below ground surface (bgs) aquifer interval. Permitting for the injection activities

was governed by the New Jersey Department of Environmental Protection (NJDEP) regulations.

ISCO TREATMENT PROGRAM AND IMPLEMEMENTATION

The ISCO treatment program consisted of two, 4-day field injection events and two, 2-day field injection events. Approximately eighty (80) direct-push (DP) injection points were installed during the treatment program targeting the 17-24 ft bgs aquifer interval during Events I & II, and the 17-22 ft bgs aquifer interval during Events III & IV. The area of concern (AOC) targeted during the treatment program was approximately 1,330 sq. ft with majority of contamination located to the west of the residence; and a smaller portion of the plume existing underneath the basement of the residence. Between 7,300-7,900 gallons of ISOTEC's modified Fenton's reagent (MFR) were injected during Events I & II, and between 4,800-5,100 gallons of MFR were injected during Events III & IV. Injection point locations were laterally off-set from previous locations with each subsequent injection event.



RESULTS

Results of the treatment program indicated significant decreases in groundwater VOC TICs (95%), SVOCs (100%) and SVOC TICs (92%) in MW-1 following Event IV with other wells showing very low to non-detect (ND) values. Following Event II, three additional groundwater sampling locations (GW-1, GW-2 & GW-3) were installed within the treatment area to further delineate site conditions and gauge treatment effectiveness. Post-Event IV samples collected from these locations indicated significant decreases in groundwater COCs compared to post-Event II (baseline) concentrations. GW-1 showed reductions in VOCs (98%), VOC TICs (60%), SVOCs (90%) and SVOC TICs (96%) following Event IV; GW-2 showed reductions in VOCs (93%), VOC TICs (90%), SVOCs (94%) and SVOC TICs (72%) following Event IV; and GW-3 showed reductions in VOC TICs (41%), SVOCs (88%) and SVOC TICs (86%) following Event IV.

CURRENT PROJECT STATUS

Although the targeted VOCs and SVOCs have been treated to below the applicable NJDEP criteria, concentrations of TICs in two monitoring wells (GW-1 and GW-3) remain above NJDEP criteria. In an effort to bring all monitoring wells at the site to be in compliance with NJDEP standards, additional limited injections targeting the residual contamination at the site has been proposed with treatment expected in the near future.