



ISCR Treatment Program: Cr (VI) Reduction

Site

- Confidential Site.

Contaminants of Concern

- Cr (VI) levels between 240-1,770 mg/kg in site soils.
- Average Cr (VI) concentration in soils was estimated to be 100 mg/kg for the design of the ISCR treatment program.

Geology/ Hydrology

- Site geology consists of fill material to a depth of approximately 5-12 feet bgs consisting mostly of silty sands underlain by a 0.5-3.0 feet thick organic peat layer encountered between 6-12 feet bgs referred to as meadow mat.
- Depth to water is approximately 4 feet bgs.
- GW flow is to the west.

ISCR Treatment Program

- Calcium Polysulfide Solution (CAPS).
- Both 9-10% and 14-14.5% concentrations were utilized.
- 28,000 sq. ft area from 3-12 ft bgs.
- Two work cycles over consecutive weekends.
- Direct-push point technology utilized to install 65 injection point locations over the two work cycles.
- Approximately 33,042 gallons of CAPS was injected during the two work cycles.

Results

- Post-treatment samples are scheduled to be collected by the client approximately three years after the ISCR injection event.

ISOTEC Case Study No. 60

ISCR TREATMENT PROGRAM: IN-SITU HEAVY METAL TREATMENT (HEXAVALENT CHROMIUM)

Confidential Site

INTRODUCTION

ISOTEC was retained to implement a calcium polysulfide (CAPS) treatment program at a confidential site in northern New Jersey to address heavy metal impacted soils. The target contaminant of concern (COC) was hexavalent chromium [Cr (VI)]. Concentrations of Cr (VI) in soils varied from less than 240 milligrams per kilogram (mg/kg) to as high as 1,770 mg/kg. Average Cr (VI) concentration of 100 mg/kg was assumed in the design of the *in-situ* chemical reduction (ISCR) treatment program.

SITE BACKGROUND/GEOLOGY

Past business operations at the site have resulted in soil impacts with Cr (VI). The site is currently occupied by a retail business. The area of concern (AOC) was an approximately 28,000 square feet (ft²) area targeting the 3-ft to 12-ft below ground surface (bgs) aquifer interval.

Site geology noted fill material to a depth of approximately 5-ft to 12-ft bgs consisting of mostly silty sands with brick fragments, coal, cinders, concrete, glass, gravel, wood fragments, etc. This layer was underlain by a 0.5-ft to 3.0-ft thick organic peat layer encountered at 6-ft to 12-ft bgs (referred to as Meadow Mat). Depth to groundwater is approximately 4-ft bgs and generally flows to the west.

ISCO TREATMENT PROGRAM AND IMPLEMENTATION

The ISCR treatment program was limited to two 36-hour work cycles, implemented over two consecutive weekends so that operations at the existing business were not interrupted. Approximately sixty-five (65) direct-push (DP) injection points were installed during the ISCR treatment program targeting the 3-ft to 12-ft bgs (down to the Meadow Mat) aquifer interval during work cycles I & II. The AOC targeted during the treatment program was split into 2 different sections with each section being treated over a different work cycle so as to minimize existing business operations (See Figure). Work cycle #1 consisted of injecting approximately 20,229 gallons of CAPS solution into 38 DP locations and work cycle #2 consisted of injecting approximately 12,813 gallons of CAPS solution into 27 DP locations. The concentration of CAPS utilized during the ISCR treatment program varied between 9% to 10% and

14% to 14.5% depending on varying site constraints and injection flow rates encountered during implementation. Injection point spacing was approximately 20-ft apart with an anticipated radius of influence (ROI) of 10-ft.

CURRENT PROJECT STATUS

The objective of the ISCR treatment program was to inject CAPS into the shallow subsurface in an effort to reduce Cr (VI) concentrations in soils within the historic fill areas to below the current soil cleanup criteria of 20 mg/kg. The ISCR injection event was successfully implemented and completed within the proposed two work cycle time frame and no further CAPS applications are currently planned for the site. Post-treatment sampling and performance evaluations will be conducted in approximately three years.

Site Map

