



Consulting Group, Inc.

ISCO CASE STUDY: ACTIVATED SODIUM PERSULFATE TREATMENT OF THREE GROUNDWATER SITES, ALAMEDA NAVAL STATION, CA

INTRODUCTION

In June 2010, JAG Consulting Group completed an activated sodium persulfate treatment of three groundwater sites at the former Alameda Naval Air Station, Operable Unit-1. The Site is located in the East Bay area of San Francisco Bay. JAG Consulting Group's services included performing chemical injections at 255 direct push boring locations, including several locations inside an aircraft hangar building.



Each well was estimated to have a radius of influence of approximately 10 feet each. Over the course of this project, a total of 75,000 pounds of sodium persulfate and 15,000 pounds of ferrous sulfate were mixed into solution and injected into the groundwater. The injections were completed over a period of 41 days in the field.

The Record of Decision for this site requires that the COCs be treated to below drinking water standards (MCLs).

PROJECT BACKGROUND

The ISCO injections were performed at three treatment areas; Site 6, Site 16 South, and Site 16 North. The primary constituents of concern included TCE, PCE, cis-1,2-DCE, 1,4-DCB, and vinyl Chloride. The soils at the Site consisted primarily of silts and sands to a depth of 15 feet. The depth to groundwater at the Site was approximately 3 feet below ground surface (bgs).

ISCO DESIGN

Due to the presence of shallow groundwater (3 feet bgs) and continuing problems with direct push injection causing chemical daylighting, JAG Consulting came up with a solution to the problem by construction of a temporary small diameter (3/4 inch) injection well in each direct push borehole. This allowed for injection of chemicals at lower pressures, which eliminated chemical daylighting.

During the injections, JAG Consulting also provided water quality measurements of pH, dissolved oxygen, ORP, conductivity, temperature, ferrous iron concentration, and persulfate concentration in nearby monitoring wells, which helped to verify that oxidizing conditions were achieved throughout the treatment zone.

ISCO EFFECTIVENESS

Following the ISCO injections, quarterly sampling of 26 monitoring wells was performed to track the progress of VOC cleanup. Overall, a significant declining trend was measured in the wells. Concentrations of PCE were less than the MCL of 5 µg/L in all monitoring wells at Site 6 and Site 16N, with only one well exceeding the MCL at Site 16S. TCE levels were below the MCL level at Site 16N and 16S, with only three wells above the MCL level at Site 6. Levels of 1,2-DCE were below the MCL for Site 16S and exceeded the MCL in five wells at Site 6. Levels of 1,4-DCB exceeded the MCL in five wells at Site 16N. Vinyl chloride did not exceed the MCL at Site 16S, but did exceed the MCL at Site 6.

Although the ISCO injections were effective in reducing COC concentrations, some isolated areas may require further treatment to reach MCLs. Use of anaerobic in-situ bioremediation is being considered for final polishing of the COCs.

CONTACT INFORMATION

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