

Project Summary

A pilot scale remedial event was conducted in Durham, NC at a former dry cleaner site to exhibit the efficacy of a proposed remedial design. The site was identified as having impacted soils and groundwater due to the historical use of tetrachloroethylene (PCE) (fig.1). In April 2011, an 18' self-contained mobile injection trailer was used to deliver the remedial materials via permanent injection wells. Open rock wells were utilized to deliver materials from 30' to 40' and create a pilot scale permeable reactive barrier.

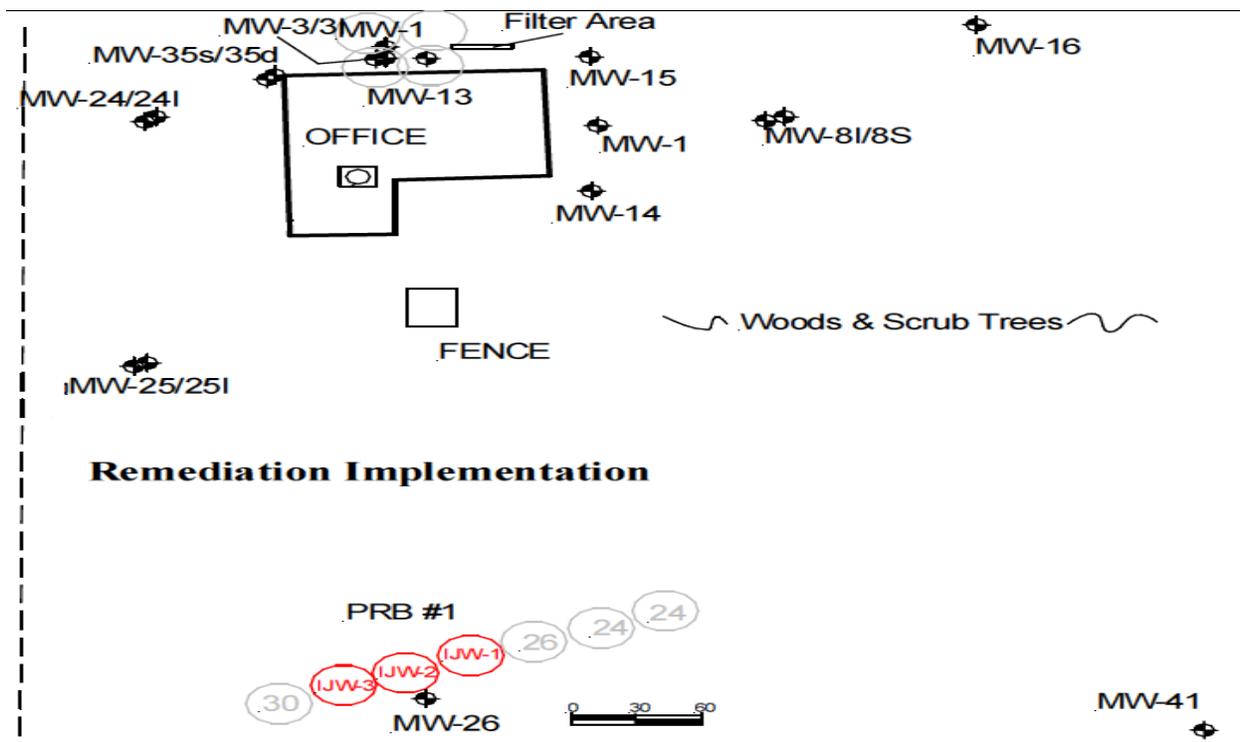


Figure 1: Sitemap showing three injection points (IJW-1,2&3), permeable reactive barrier and MW-26.

Remediation Plan

The injection program at the site consisted of three injection wells utilized to inject a mixture of remedial materials containing blue green algae, sodium sulfite, calcium propionate, zero valent iron, and soluble kelp. A single inflatable TMA 350 packer system was used to inject the materials below 25' bgs. The remedial mixture was designed to be a pilot scale remedial action at the site to restrict plume migration while also reducing CVOC concentrations locally via enhanced reductive dechlorination. The pilot scale program was to act as a proof of concept and promote anaerobic conditions in the groundwater, thereby enhancing bacterial populations within the anoxic groundwater.

Results

Monitoring well MW-26 is located within the pilot scale remedial treatment area, immediately down-gradient of the three injection points and is screened between 27-37.5 feet bgs. Sampling results from January 2012 show MW-26 was strongly affected by the remedial action and that both the geochemistry and groundwater contamination concentrations changed. Nine months after the injection event, total CVOC concentrations were reduced from 2,540 $\mu\text{g/L}$ to 71.2 $\mu\text{g/L}$, a 97.2% reduction (fig.2). Tetrachloroethene (PCE) also saw a significant decrease of 99.74% nine months after the initial injection, down from 2,400 $\mu\text{g/L}$ to 6.2 $\mu\text{g/L}$. Anaerobic daughter products of PCE, trichloroethylene (TCE) and cis-1,2-DCE were also reduced by 24.42% and 55.4% respectively. Vinyl chloride (VC) increased from below the laboratory detection limit to 20 $\mu\text{g/L}$ in January. It is normal to have an initial increase in vinyl chloride because it is a byproduct of cis-1,2-DCE, which explains its slight increase in concentration. Continued reductive dechlorination is expected in the pilot area.

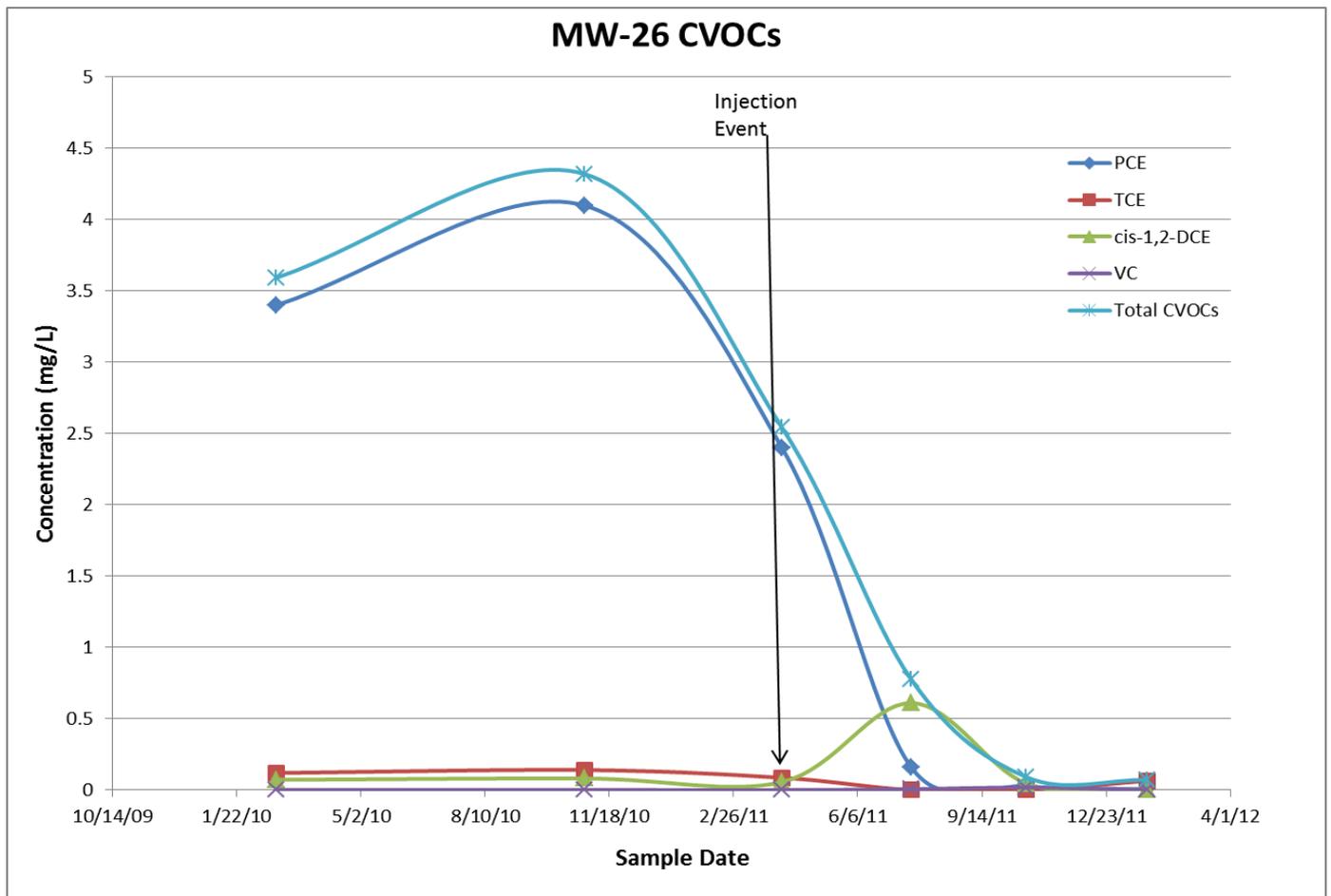


Figure 2: Concentrations (mg/L) in Groundwater vs. Time at MW-26 before and after in-situ injection event.