

Project Summary

A pilot scale remedial event was conducted in Madison, IN 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 historic use of tetrachloroethene (PCE). The geology at the site consisted of a mixture of silt, clay and gravel. A total of seven direct push point injections were made in October 2011 utilizing a Geoprobe 6620 at a depth range of 7-22' bgs.

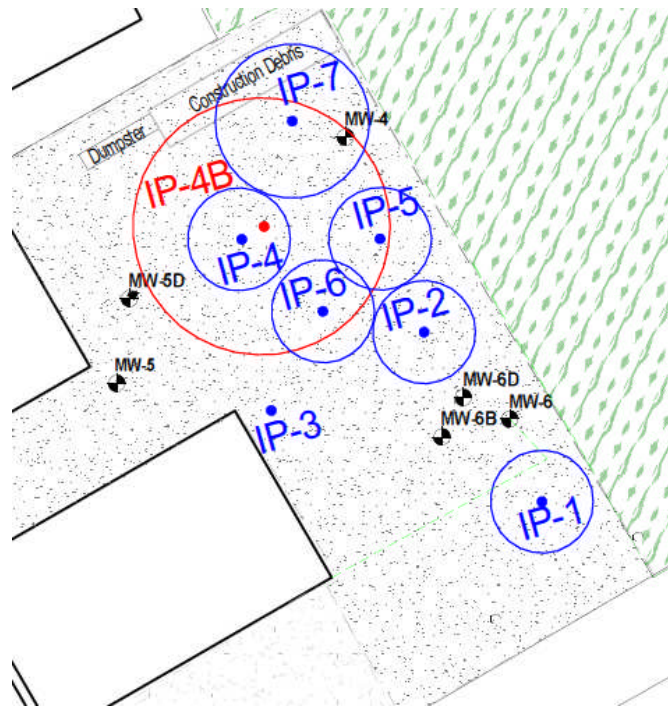


Figure 1: Site Map showing MW-4 & 5 inside treatment area with MW-6 on the perimeter.

Remediation Plan

The objective of the pilot scale remedial event was to promote in-situ conditions necessary for accelerated dechlorination via both abiotic and microbial processes. Further, through the introduction of a 1-3 micron zero valent iron colloidal suspension, reduction of the dissolved phase CVOCs occurred while initiating the production of hydrogen for microbial mineralization processes.

The injection program at the site consisted of a mixture of vitamins, nutrients, sodium sulfite, calcium propionate, zero valent iron, hydrolyzed kelp, and EHC®. The remedial mixture was designed to be a pilot scale remedial action at the site to reduce concentrations in the vicinity of MW-4, act as a proof of concept, and promote anaerobic conditions in the groundwater favorable to anaerobic bacteria that degrade CVOCs.



Results

Two sampling events were conducted at 60 and 90 days after the initial injection event. The data collected at these events indicate that reductive dechlorination was accelerated during the pilot scale event. The two monitoring wells (MW-4 & MW-5) located within the treatment area indicate that the proposed materials successfully remediated contamination present at the site. After 90 days total CVOC concentrations at the monitoring well closest to the injection event, MW-4, were reduced from 23,045 $\mu\text{g/L}$ to 17.1 $\mu\text{g/L}$. A 99.93% reduction in total CVOCs was observed with all compounds below both their residential (RDCL) and industrial default closer levels (IDCL) (fig. 2). Total CVOCs in monitoring well MW-5 located east/southeast of the injection event were reduced from 16,549 $\mu\text{g/L}$ to 221 $\mu\text{g/L}$. A total reduction of 98.66% was observed with only PCE and TCE above their RDCL and/or IDCLs.

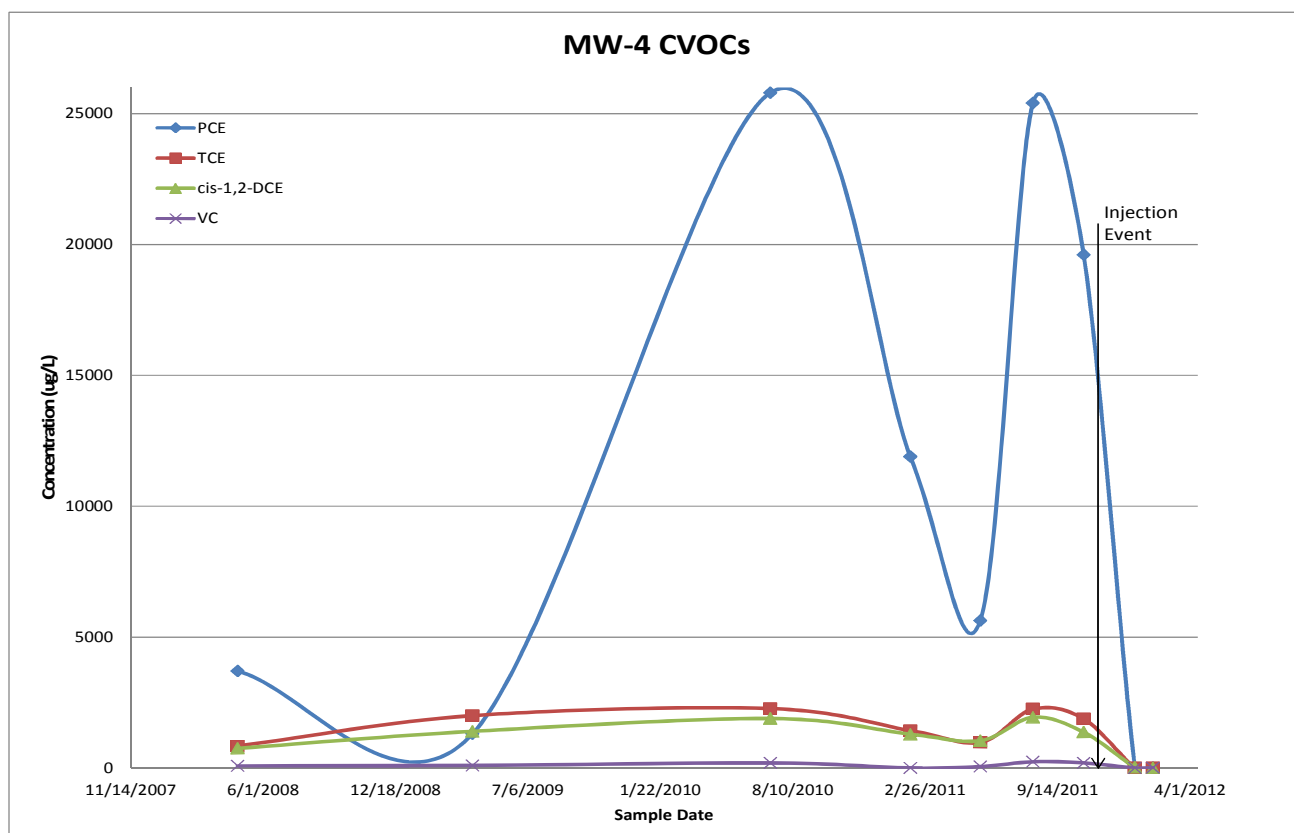


Figure 2: MW-4 CVOC Concentrations ($\mu\text{g/L}$) before and after October 2011 injection event.

Perimeter well, MW-6, down-gradient of the site was also tested and saw large decreases in PCE (97.58%) and TCE (63.73%) concentrations. Continued reductive dechlorination is expected in the pilot area.