

USING MULTIPLE REMEDIAL STRATEGIES TO ATTAIN NFA AT A BROWNFIELD



David Bushong (Environmental Operations, Inc.), St. Louis, Missouri, USA (daveb@environmentalops.com)
 Tim Hippensteel (Environmental Operations, Inc.), St. Louis, Missouri, USA



SITE BACKGROUND

The former Wagner Electric facility located in Wellston, St. Louis County, Missouri, was impacted with soil and groundwater contamination (Figure 1) from a variety of contaminants. At approximately 15 acres, the site supported a century of industrial use.

Source contamination in the soil was addressed using conventional remedial solutions. However, to achieve final, site-wide, clean certification from the state, trichloroethylene (TCE) in groundwater needed to be addressed using a relatively fast and non-conventional technology. In addition, this project was tied to brownfield re-development funds and tax credits.

Enhanced anaerobic bioremediation (reductive dechlorination) through the direct injection of Hydrogen Release Compound (HRC[®]) (Figures 2 and 3) was selected as the remedial option of choice for the groundwater. All work was overseen by the Missouri Department of Natural Resources' (MDNR) Voluntary Cleanup Program (VCP) and the Missouri Department of Economic Development's Brownfield Program for remediation tax credits.



Figure 1. Site Contamination



Figure 3. HRC, a viscous, injectable product from Regenesis



Figure 2. HRC Injection

RESULTS

The monitoring data provides strong evidence that reductive dechlorination is occurring due to the HRC mediated maintenance of anaerobic conditions in most of the groundwater monitoring wells.

The very high initial concentrations of TCE found in the heart of the contaminant plume were quickly and effectively reduced immediately following the injection of HRC. Dramatic decreases in TCE concentrations were observed in monitoring wells MW-11, MW-12, and MW-13 over the twelve month post injection monitoring period.

The most significant reduction in TCE concentration occurred in MW-12 with a decrease of over 99% between the first and the most recent groundwater sampling events (155,000 µg/L to less than 5 µg/L).

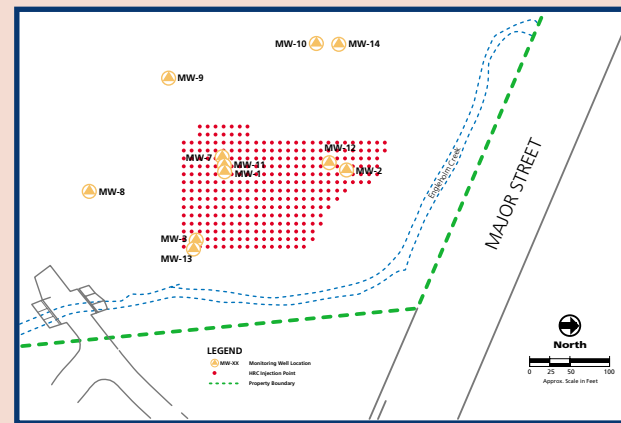


Figure 4. Site Map

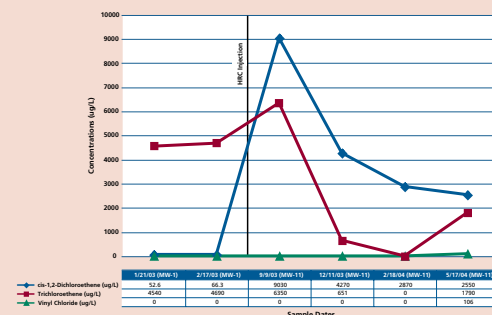


Figure 5. Concentrations at MW-1 and MW-11*

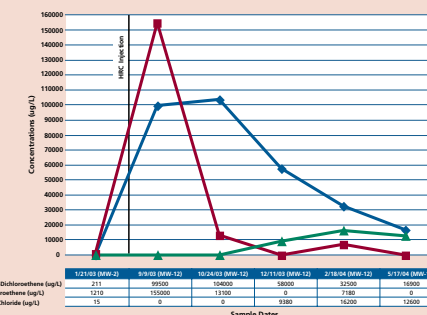


Figure 6. Concentrations at MW-2 and MW-12*

* MW-1 and MW-2 were abandoned prior to HRC injection due to site development. MW-11 and MW-12 were installed after HRC injection in the vicinity of the previous wells.

CONCLUSIONS

The primary objective for enhancing naturally occurring biodegradation was to attempt to expedite the receipt of site-wide "no further action" from the MDNR VCP, thereby releasing all remaining tax credits and driving the redevelopment of the property.

The data indicates that the treatment of groundwater with HRC[®] has accelerated TCE degradation to a level at which the state can comfortably certify completion of groundwater remediation based on "decreasing trends" of this chlorinated compound.



Figure 7. One of the Former Wagner Electric Buildings



Figure 8. The Renovated Cornerstone Building