

REDUCTIVE DECHLORINATION OF TCE AND TCA USING HRC® DURING A BROWNFIELD REDEVELOPMENT



Tim Hippensteel (Environmental Operations, Inc., St. Louis, MO)

Michael J. McGuire (Environmental Operations, Inc., St. Louis, MO) • **Michael R. Sieczkowski** (Regenesis, Lenexa, KS)



ABSTRACT

A former manufacturing facility in west suburban St. Louis was the subject of a potential Brownfield redevelopment when chlorinated solvents, presumably from prior operations, were found in the soil and groundwater under and around the building. A number of remedial options were researched—classical mechanical options such as air sparging, soil vapor extraction, and groundwater removal and treatment were dismissed as ineffective, costly, and intrusive, as the facility was to be renovated to house new office space. Enhanced bioremediation using HRC, in conjunction with excavation was selected as the remedial option of choice to remove both the soil contaminant source and groundwater contamination so that renovation could occur on schedule. All work has been conducted under the Missouri Department of Natural Resource's Voluntary Cleanup Program and the Missouri Department of Economic Development's Brownfield Program for remediation tax credits.



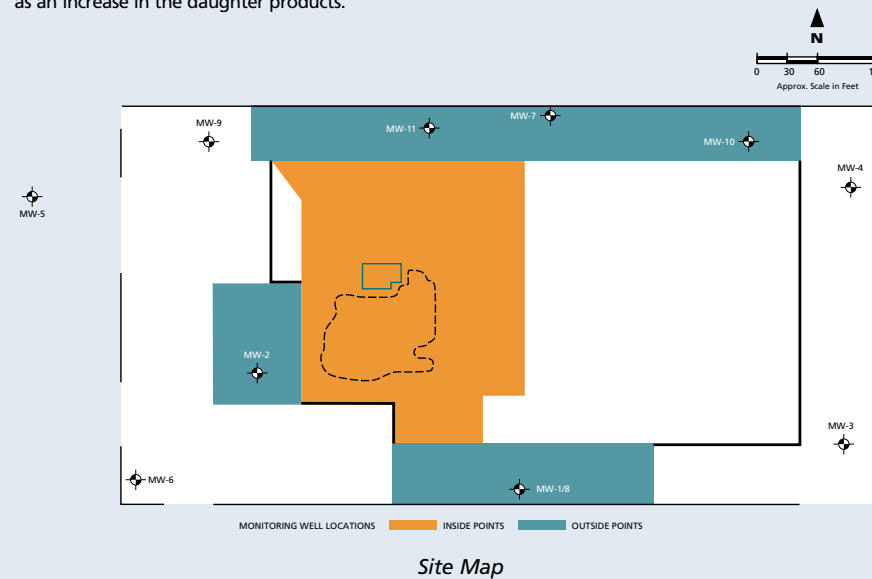
Site before cleanup and development



Site after cleanup and development

RESULTS

The application of HRC quickly attained and maintained anaerobic conditions in two of three critical areas of the aquifer for a period of more than 10 months while providing organic carbon for reductive dechlorination. This is supported by strong evidence of reductive dechlorination in the areas around MW-7 and MW-10. Despite the inconsistency in MW-11 data, there is evidence that reductive dechlorination may be occurring in this well. Evidence of reductive dechlorination is shown by a dramatic decrease of TCE and 1,1,1 TCA, as well as an increase in the daughter products.

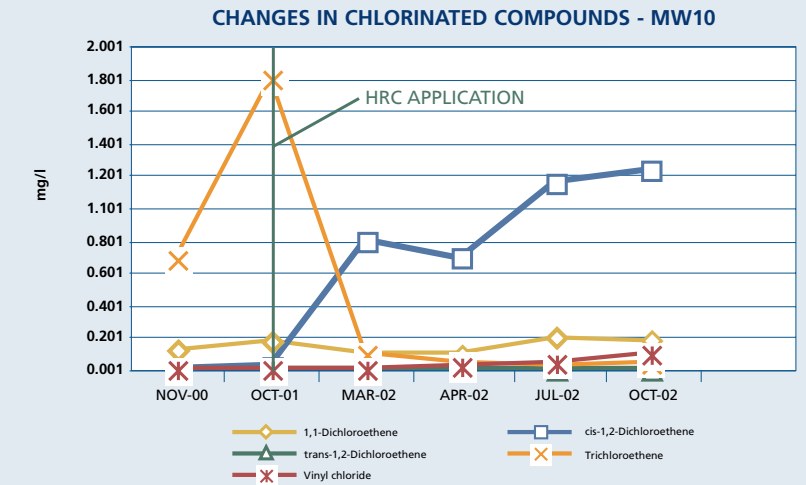


Excavation

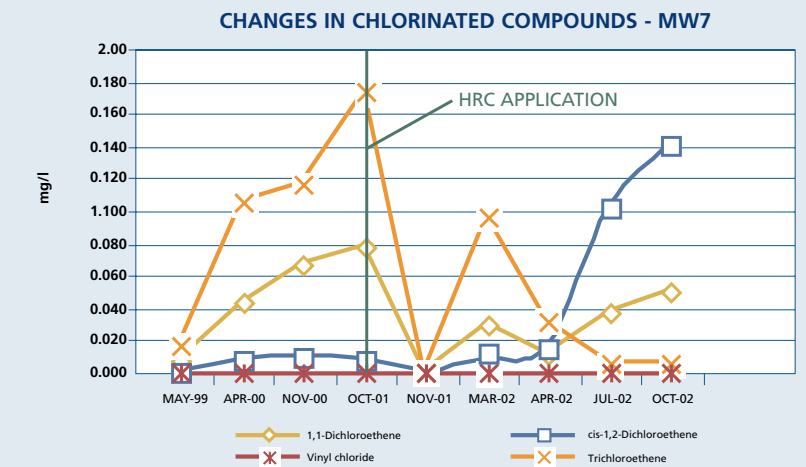


HRC Application

MW – 10 CAH CONCENTRATIONS



MW – 7 CAH CONCENTRATIONS



CONCLUSIONS

The goal of the project was to reduce the concentrations of contaminants of concern to a point where no further action could be requested. Additionally, this had to be done cost effectively, with minimal site disruption, and within the renovation schedule. The project was completed within the schedule and the budget, and results show that the contaminants of concern have been reduced to less than 30 ug/L (a 95% reduction for TCE and a 40% reduction for 1,1,1-TCA) in two of the three areas of concern after 10 months. The final area of concern has responded more slowly, but data shows a trend towards conditions more conducive to reductive dechlorination.