REDOX TECH, LLC

"Providing Innovative In Situ Soil and Groundwater Treatment"

A CASE STUDY FOR THE APPLICATION OF ABC® TO STIMULATE ANAEROBIC BIODEGRADATION OF TRICHLOROETHANE (TCA)

In May 2005, ABC® was applied into the overburden and upper weathered bedrock zones at an industrial complex in Stoughton, MA where elevated concentrations of trichloroethane (TCA) have been reported in groundwater. The original source of contamination appears to be associated with past handling practices of TCA. Elevated concentrations of PCE, TCE, cis-DCE and daughter products of TCA, specifically DCA and DCE, have also been reported. Currently, a pump and treat system is in place that recovers and treats groundwater from within the deeper bedrock zone. Anaerobic BioChem (ABC®) was applied at the site to enhance the anaerobic decay of the target contaminants. The area of treatment encompasses approximately 4,000 square feet and targets a saturated thickness of approximately 10 feet within a glacial till overburden and the top of bedrock.

Approximately 650 and 1,300 pounds of ABC® were injected into each injection well location targeting the overburden soils, and the upper weathered bedrock zone, respectively. Figure 1 illustrates the injection locations with respect to the current monitoring well network. Injection of ABC® was performed through ¾-inch diameter PVC wells, constructed with 5-ft long screens. Eleven (11) injection wells were installed in the overburden using a Geoprobe® direct push drill rig, and four (4) injection wells were installed in the upper bedrock zone using an auger drill rig.

ABC® solution was mixed with water into a fifteen percent by weight solution to increase dispersion during injection. At injection locations screened within the upper weathered bedrock, a denser solution of ABC® was prepared so that it would fall under gravity into the bedrock. The recovery wells that are part of the pump and treat system were allowed to operate to enhance the downward migration of the solution. Due to its chemical makeup and high solubility in water, no adverse impacts to the pump and treat system would occur if the ABC® solution were recovered by the system.

Groundwater samples from monitoring wells were collected approximately five and a half (5.5) months following the application of ABC®. Results from monitoring wells MW-02, MW-45I, and MW-46I are presented in Figure 2. An order of magnitude decrease in concentrations of TCA, PCE, and TCE are evident in samples from monitoring wells MW-2 and MW-46I, with nearly a 50% reduction in MW-45I. In fact, TCA concentrations in monitoring well MW-2 decreased from 24,500ppb prior to injections, to 980ppb post ABC® treatment. Increases in DCA concentrations, a daughter product of TCA, were reported in samples from all three monitoring wells providing evidence that reductive dechlorination of TCA is occurring. In addition, the decreasing concentrations of TCE, and the subsequent increases in cis-1,2-DCE concentrations, a daughter product of TCE, is evident in monitoring wells MW-02, MW-45I, and MW-46I providing further evidence of reductive dechlorination.

Another line of evidence suggesting that ABC® has enhanced the reductive dechlorination of TCA and subsequent daughter products is the reported concentrations of chloroethene in wells RW-100 and RW-102 at 152 ppb and 81 ppb, respectively. Chloroethene is a daughter product of DCA and has never been reported in samples collected from within the target area (since 1998). The operation of these recovery wells subsequent to the ABC® application has likely drawn those compounds downward from the treatment areas through the bedrock. Full-scale application will be completed at the site in Spring 2006.

REDOX TECH, LLC

"Providing Innovative In Situ Soil and Groundwater Treatment"

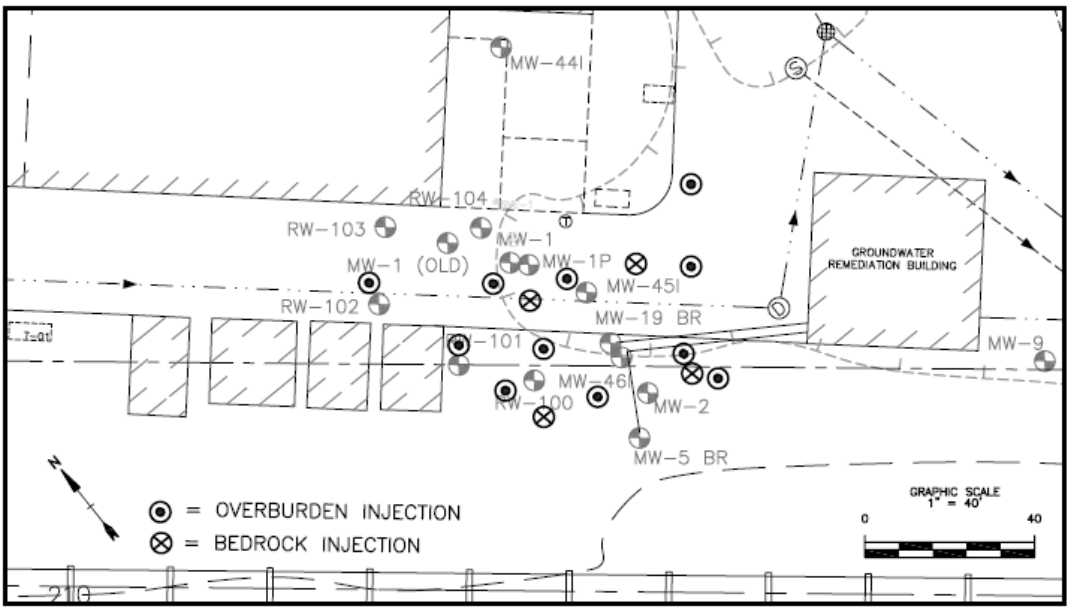

Figure 1. Injection Points and Monitoring Well Locations

CONTACT INFORMATION:

Steve Markesic
markesic@redox-tech.com
Phone: 630-705-0390

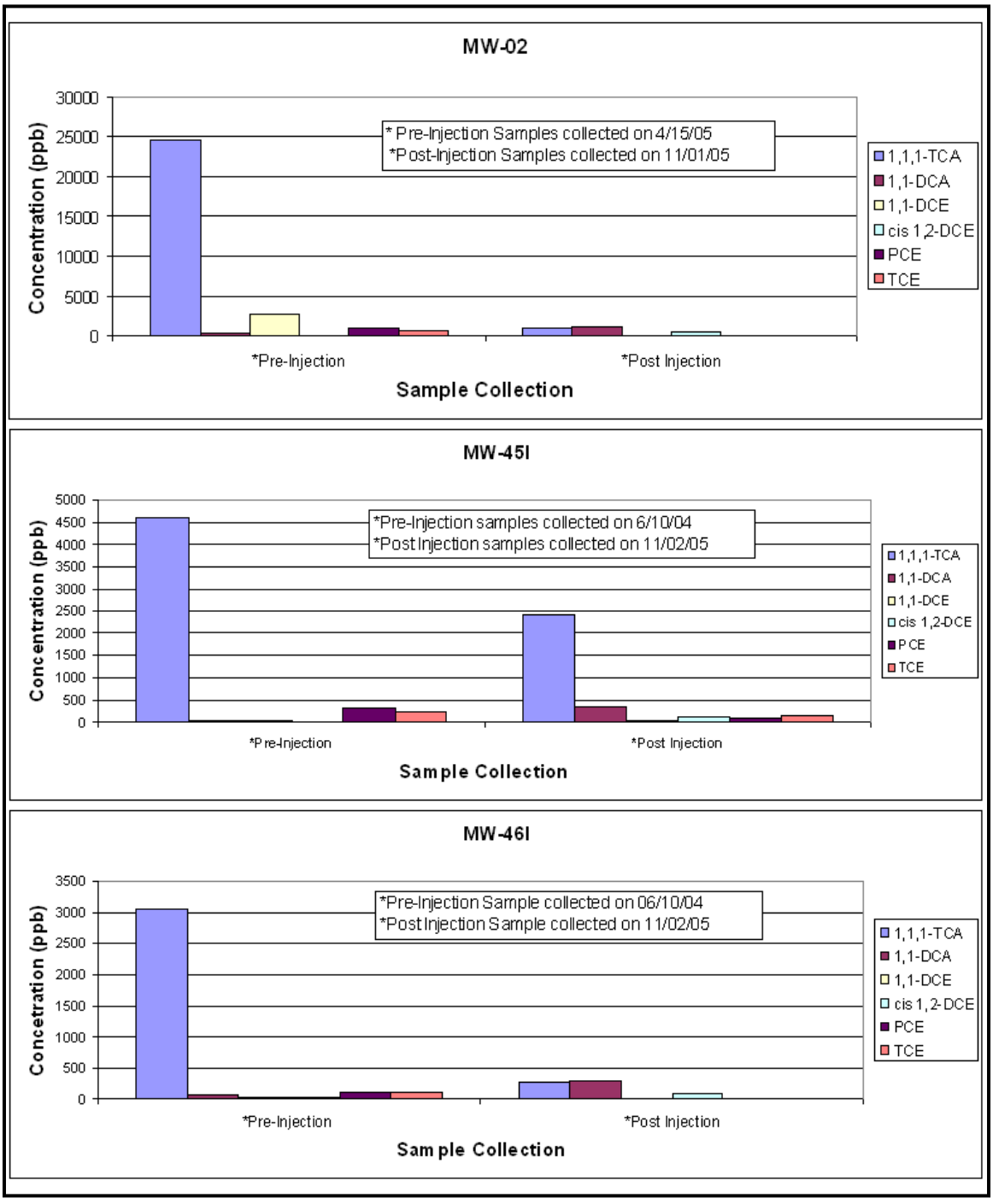

Figure 2. Monitoring Data