CASE STUDY: E-REDOX® FOR IN SITU REDUCTION OF TETRACHLOROETHENE (PCE) IN GROUNDWATER AT A BROWNFIELDS SITE

Location: Former dry cleaner in Wheat Ridge, Colorado, USA
Contaminated Matrix: Groundwater and saturated soil
Primary Contaminants of Concern: Tetrachloroethene (PCE)
Project Objective: *In situ* reductive degradation of PCE using the E-Redox® technology

Case Study Description & Results: The E-Redox® technology was implemented at a site in Wheat Ridge, CO where a dry cleaner facility was once located. The primary persistent r contaminant in the matrix is tetrachloroethene (PCE), and the matrix formation is clayey with highly limited permeability. Five E-Redox® systems, each consisted of multiple electrodes, were installed at the site and powered by residential power source (~50 W/unit). Figure 1 shows the installation of the E-Redox® units at the site.

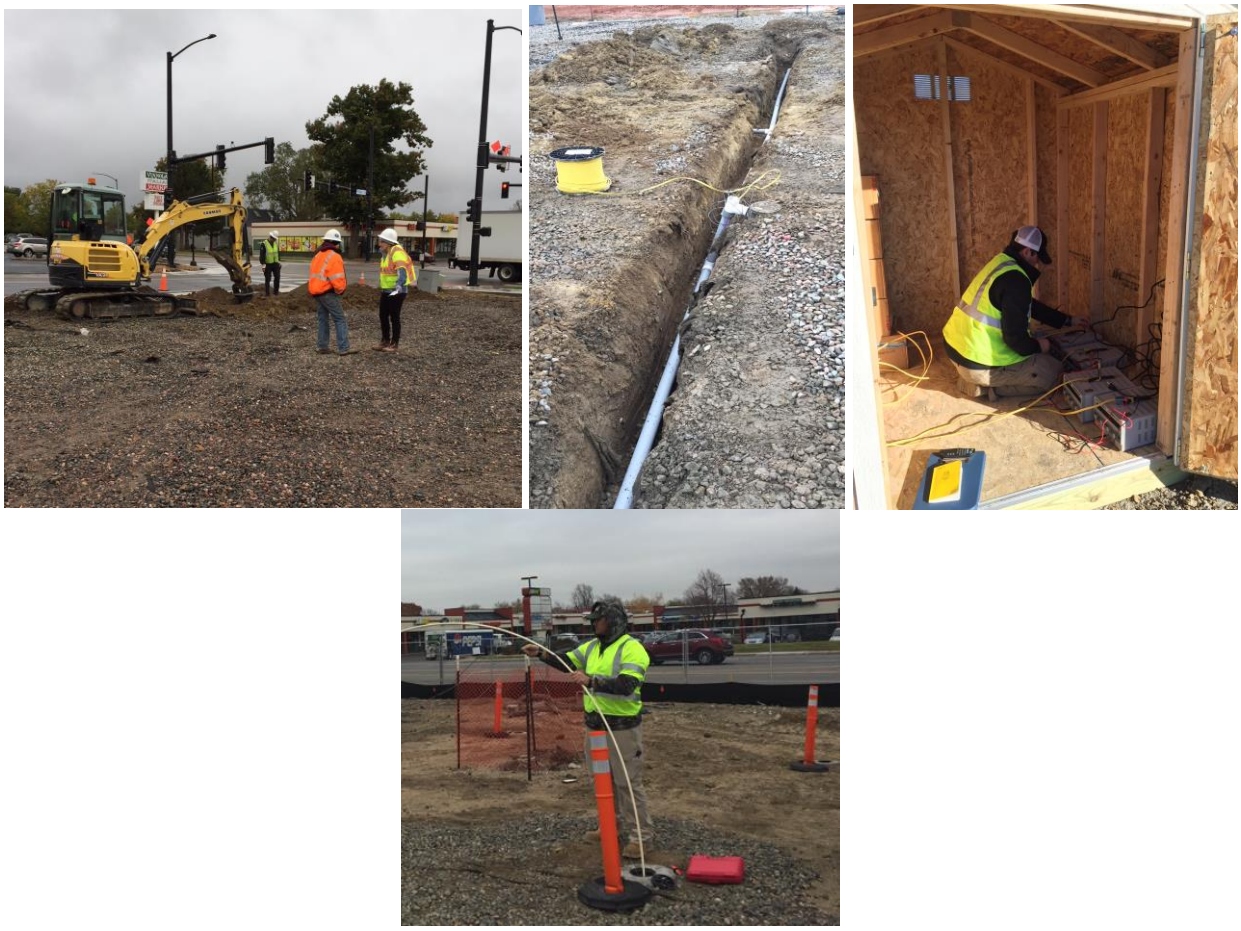

Figure 1. (Clockwise from top left) Trenching for protecting connecting wires; conduit inside a trench; electrode installation in a well; power source preparation inside shelter

Figure 2 shows PCE concentration changes in one of the primary monitoring wells. Approximately 62% of the PCE was degraded without rebound. Substantial reduction in PCE concentration has been achieved during the five months of operation without any

rebound. Ethane is the final product of complete PCE reduction, where increases in ethane concentrations were coinciding with the decrease in PCE concentrations. The increases in ethane production indicated that more PCE was being degraded than the direct groundwater water PCE measurements indicated, where the average total site-wide PCE reduction rates were determined to be 31 μg/L/day (maximum 50 μg/L/day) based on the measured ethane concentrations. This indicates that undissolved PCE and PCE adsorbed to the groundwater sediments were being reduced within the radius of influence of the E-Redox® system.

The E-Redox® treatment achieved a "no further action" determination from the State of Colorado, and the site has been successfully closed.

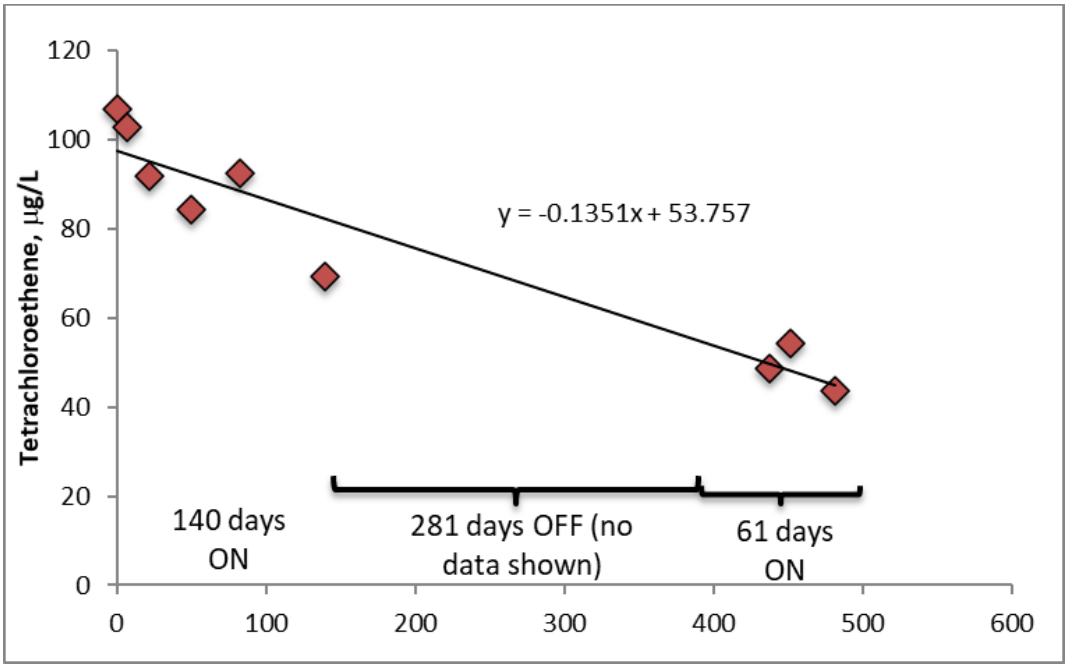

Figure 2. PCE concentration in groundwater in the index well onsite