

In-Field Innovation Drives a Home Run

Thermal Remediation Services (TRS) provided Electrical Resistance Heating (ERH) design, construction, operations and specialty equipment for the remediation of perchloroethene (PCE) and trichloroethene (TCE) in soil at a confidential client site in Chicago.

Unique aspects of this project included using a sheet pile wall as one continuous electrode (see **Figure 1**) and using single sheet pile electrodes (see **Figure 2**) and co-located horizontal vapor and steam recovery wells. In addition, this site was selected by TRS for a screening level study to evaluate the effects of heat on the in-situ biodegradation of PCE and TCE during ERH.



Figure 1

Site Information

The treatment area was approximately 4,300 square feet. The remediation depth extended from five to 20.3 feet below ground surface (bgs). The resulting target remediation volume was approximately 2,400 cubic yards. The site lithology in the remediation area consisted of fine silty sand overlying glacial-lake clay approximately 20 feet bgs.

The remediation is being conducted in two phases: 1) the offsite plume and 2) the onsite plume, with the two areas separated by a sheet pile wall. Onsite treatment will involve razing the factory to access the treatment area. This remediation focused on ERH treatment of the offsite plume and plan to continue the ERH remediation of the onsite PCE and TCE plume located under the building in 2008.

The ERH system included 18 sheet pile electrodes with co-located vapor recovery (VR) wells, as well as a long sheet pile on the western edge of the site acting both as an electrode and an isolation barrier (separating the offsite treatment area from the future onsite treatment area). The sheet pile wall acts as a barrier to contaminant plume migration from under the building into the offsite treatment area.

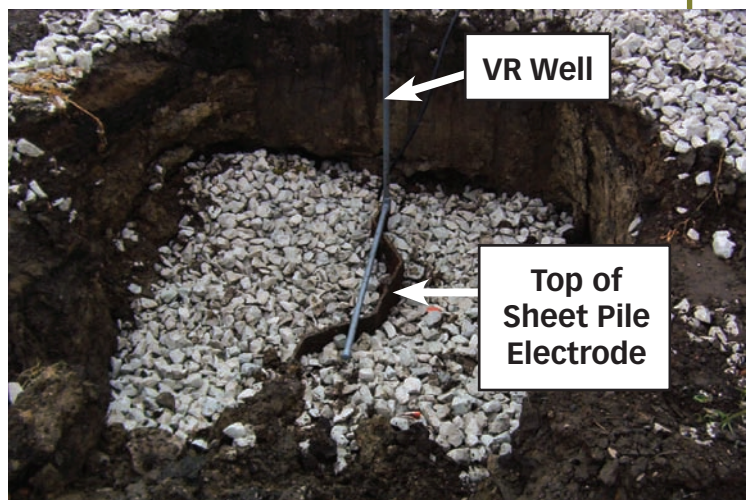


Figure 2

Remedial Goals and Results

ERH operations began on August 29, 2006 and were completed on December 7, 2006, representing 100 days of treatment. Subsurface temperatures were monitored from six locations and averaged 80°C after the initial 30 days of heating.

The beginning maximum concentrations of PCE and TCE in soil were 1,310 mg/kg and 4,990 mg/kg, respectively. The remedial goals were removal of TCE and PCE DNAPL, which according to Illinois regulations require reduction of PCE below 240 mg/kg (82% reduction), all measured in soil concentrations. This requirement for a Tier 3 closure was surpassed in all samples. Tier 3 closures are allowed in Illinois where groundwater is not considered a resource through either site-specific conditions, usually protected by local ordinance, and there is no potential for exposure to the chemicals by site workers or the general public.

PCE and TCE concentrations in soil, following the ERH remediation, were 170 mg/kg and 1,000 mg/kg, respectively. These values represent reductions of 87 and 80 percent in PCE and TCE in soil, respectively, when compared to the beginning concentrations.

The Figure summarizes the baseline, interim and final concentrations of PCE and TCE before, during and following ERH.

The proper application of ERH technology cleaned a difficult site quickly and cost effectively without interrupting operations.

Full case study can be viewed on the TRS website, www.thermalrs.com. Contact David Fleming, (425) 396-4266 or dfleming@thermalrs.com for more information.

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