Geo-Cleanse® INTERNATIONAL, INC.

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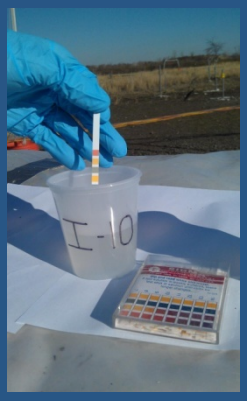
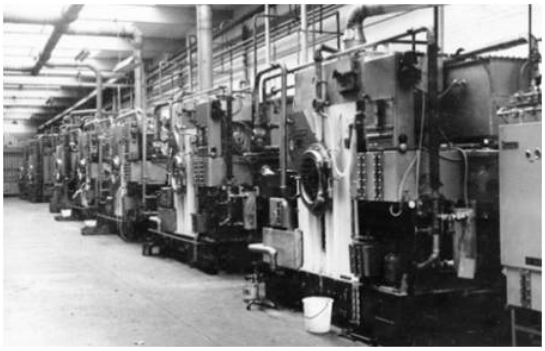


DNAPL Destruction in Belgium

Investigation activities at a former industrial dry cleaning facility located in Flanders, Belgium, which included advancing Membrane Interface Probes (MIPs) and soil cores, revealed chlorinated volatile organic compounds (CVOCs), including tetrachloroethylene dense non-aqueous phase liquid (PCE DNAPL), below and adjacent to the existing abandoned building. Following an evaluation of in-situ technologies and remediation contactors, Geo-Cleanse, in collaboration with our European partner European Remediation Technologies (ERT) was selected to design and implement a pilot-scale in-situ chemical remediation treatment program to determine if the DNAPL could be efficiently remediated. Several site challenges existed such as restricted access, an existing concrete cap, limited remedial budget, and two contaminated vertical zones (approximately 15 ft-bgs & 45 ft-bgs). Based on the site conditions and treatment program goals, Geo-Cleanse determined that an application of catalyzed hydrogen peroxide (CHP) through permanent injection wells would be the most effective approach.



Former Industrial Dry Cleaners in Flanders, Belgium

The primary goals of the pilot program were to evaluate the overall effectiveness of the CHP application and to assess engineering assumptions relevant for full-scale project design and implementation. Only the shallow treatment interval was addressed during the pilot. A total of nine permanent injection wells were installed within the building to a total depth of approximately 15 ft-bgs and approximately 12,600 gallons of CHP were injected over 13 days. Eight vent wells were installed to ensure that off-gases did not build within the subsurface and compromise nearby structures. Vent wells also provide additional groundwater and off-gas process monitoring points. Process monitoring

includes analyses of groundwater (pH, peroxide concentration, iron concentration, etc.) and off-gas (CO_2, O_2 and PID headspace) collected within and adjacent to the treatment area during the injection event. These data allow us to make real-time treatment modifications during the injection process to ensure that subsurface conditions within an active injection area are optimal for an effective and efficient CHP treatment. The data are evaluated daily to assess the treatment progress and to optimize the injection. After the completion of the pilot, CVOC concentrations were significantly reduced (95-99%) in the groundwater and soil, and PCE DNAPL was eliminated in the target monitoring well (see picture below).

Following the success of the pilot, full-scale design and implementation occurred, which consisted of targeting a 63,000 ft^2 DNAPL impacted area. A total of 51 shallow and 97 deep injection wells were installed at 10-ft lateral intervals in a grid-like pattern. Our design also included the installation of 128 vent wells. Pre-injection sampling of the injection and vent wells indicated that 63 well locations yielded the presence of DNAPL, with levels as high as approximately 2 ft.

To most efficiently utilize the CHP, Geo-Cleanse targeted well locations near and/or impacted with DNAPL. We were able to target these areas by evaluating pre-injection investigation activities like DNAPL measurements and MIP data in combination with our process monitoring results. Based on our evaluation, the deep injection intervals received more volume than the shallow intervals, and some individual injection wells received more volume than others. The deep injection wells received approximately 260,000 gallons of 5% peroxide and the shallow injection wells received approximately 25,000 gallons of 5% peroxide.

At the end of the primary injection event, DNAPL concentrations were eliminated or significantly reduced in these target areas. Only three of the 63 baseline locations showed evidence of DNAPL. Of these three locations with DNAPL still present, two were near areas of limited access. Geo-Cleanse and ERT are currently awaiting approval for a polish treatment program to target these areas.

Want to Learn More About ISCO and ISCR?

Just ask the premiere remediation experts at Geo-Cleanse. We can organize webinars or meet in person to share our experiences with you and your team. To learn more about ISCO or ISCR, please contact Stephanie Turkot at our office.

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