

CASE STUDY: Remediation, Enhanced Anaerobic Bioremediation of Chlorinated Solvents



Client: Nationwide Consultants

Site: Former Industrial Site



When redevelopment of an area of disused industrial land was proposed in an already heavily developed area, the discovery of a significant chlorinated hydrocarbon impact threatened to impact the development.

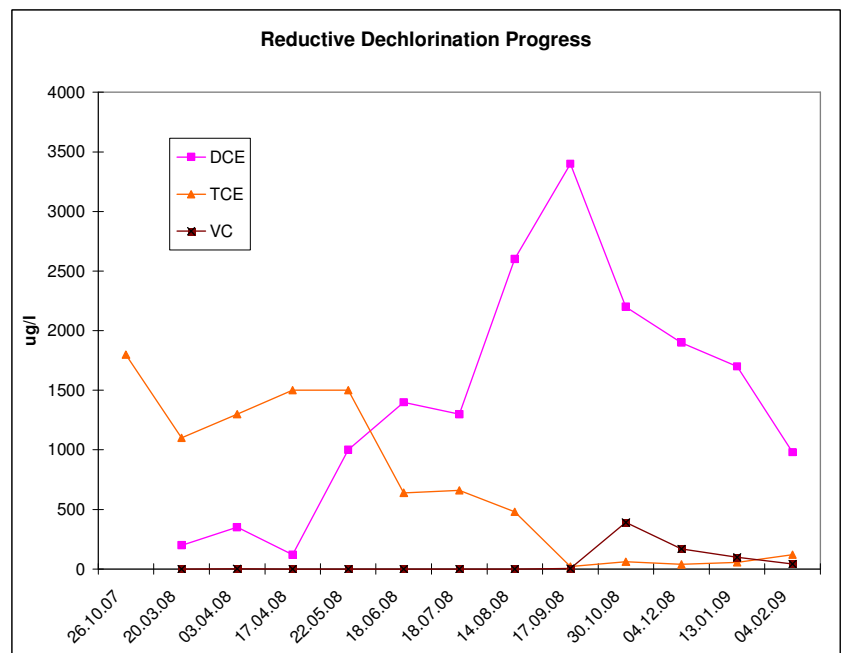
Geo² were contacted to remediate the impact and ensure safe redevelopment of the site for a large scale industrial end use, whilst ensuring no liability to the future landlords.

Working to a tight development timescale, around, and during, the ongoing construction of the industrial development, Geo² proposed a series of direct push injections of Hydrogen Release Compound (HRC), designed to accelerate the mechanism by which chlorinated hydrocarbons are biologically degraded

under anaerobic conditions. HRC is noted for its ability to break down Trichloroethylene (TCE) and its various daughter products. By injecting HRC in a grid configuration over the target area, saturation of the area was rapidly achieved. This enabled enhanced insitu bioremediation of the site to take place, without delaying the construction works on site.

Pronounced reductions were noted in the concentrations of dissolved phase TCE across the site. However, the breakdown products of this reaction, dichloroethylene (DCE) and Vinyl Chloride (VC) are considered to be equally as toxic, and therefore, remediation of these daughter products was also required. Due to the long lasting and slow release nature of the HRC which was applied, breakdown of all these contaminants is predicted over the lifecycle of the HRC, therefore, Geo2 have undertaken a monitoring programme at the site in accordance with EA recommendations.

By using a specially adapted direct push drilling rig, injections could introduce the HRC compound at different levels throughout the water column. This allows for gradual hydrogen release throughout the area of contamination, therefore optimizing the process of reductive dechlorination at the site.



As the compound is active for up to three to five years, depending on the ground conditions, monthly monitoring trips were undertaken which showed over 90% reductions in TCE, at the most contaminated location, within 12 months of injection, in addition, the breakdown products of this reaction, DCE and VC, have showed reductions of over 65% and 85%, respectively, from peak concentrations.

By using this technique of application, the remedial potential of the HRC compound can be maximised, producing greater gains than would typically be achieved by implementing alternative methods. This technique enabled for accelerated insitu bioremediation of the site to take place, whilst allowing redevelopment to continue, unhindered by on site remedial activities.