



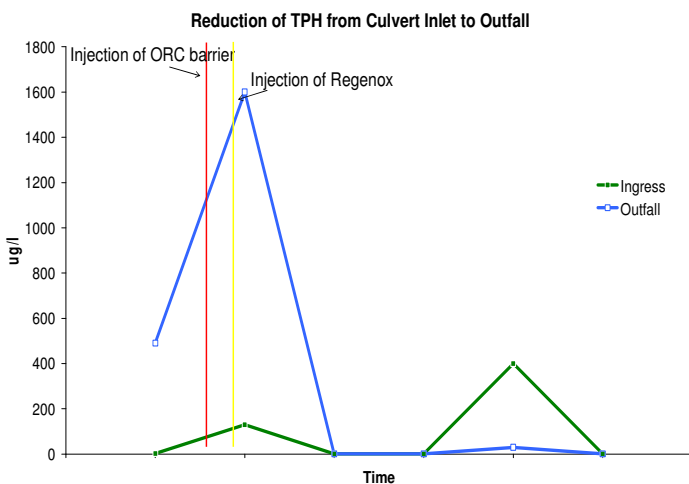
CASE STUDY: Remediation: Application of Chemical Oxidation and Oxygen Reducing Compound

Client: Regional Supermarket Chain

Site: Operational Petrol Filling Station, Cheshire

As part of a petrol filling station forecourt redevelopment, a significant hydrocarbon impact of soil and groundwater was identified associated with ageing fuel storage infrastructure. The tanks were considered to represent an ongoing source and a high risk to local receptors, including a culverted watercourse that was found to be impacted as it ran through the site.

Remediation of the contaminated area comprised of three phases. During phase one, GEO² applied an Oxygen Release Compound via a custom drilling rig to form a permeable barrier, targeting hydrocarbon migration. ORC achieved this by promoting biodegradation of dissolved phase hydrocarbons, ensuring no residual impact could migrate down gradient to the culverted watercourse. Phase two consisted of source elimination; removing the ageing petrol storage and distribution facilities in preparation for site redevelopment and continued operation. Finally a series of in-situ chemical oxidation injections were undertaken directly into the highly contaminated sandy clays and groundwater in the source area. The oxidant, Regenox, rapidly breaks the hydrocarbon bonds producing harmless by-products; mainly CO₂, H₂O and O₂.

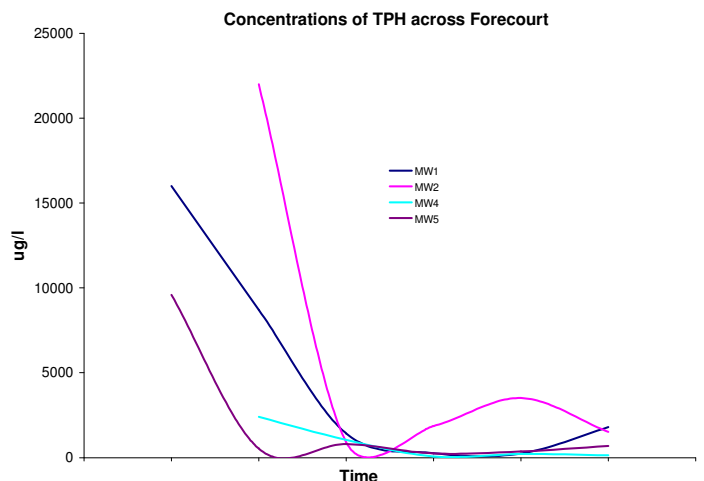


The application of the permeable ORC barrier had a further two fold benefit. Primarily, due to the longevity of the ORC, the oxygenated barrier will remain in the soils for up to twelve months and will continue to promote natural degradation and prevent contamination rebound. Secondly, the migration of the barrier maximised the treatment area by generating a plume of oxygenated groundwater beneath the areas of limited access such as below the shop buildings.

The effectiveness of the ORC barrier was proven to be successful because the Total Petroleum Hydrocarbons present in the culvert outfall from the site were reduced to concentrations equal to or lower than that of concentrations of TPH at the culvert ingress entering the

site (above). A rapid reduction of TPH was also achieved in the source zone under the forecourt (below). The chemical oxidation programme's success was greatly assisted by GEO²'s considerable experience with the product and on-going development of application techniques. Optimal efficiency was achieved at this site with three pressurised injections of Regenox, two weeks apart, providing a high radius of influence impact area per injection point. Subsequent monitoring of the site confirmed rapid reductions of TPH across the forecourt. Following further validation monitoring, regulatory sign off was achieved.

The combined use of ORC, which provided both a vertical and horizontal barrier, and chemical oxidation in source areas has proved to be a highly effective remediation strategy. Furthermore, this treatment method does not pose any significant changes to the geology into which it is injected. The rapid nature of the treatment reduces impact on receptors and redevelopment programmes. GEO² have a comprehensive profile of chemical oxidation programmes which, when combined with other remediation technologies, have been successfully tailored to meet site specific requirements.



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