

CASE STUDY: Remediation, Combined Approach of Dual Phase Vacuum Extraction with Insitu Chemical Oxidation



Client: Local Housebuilder

Site: Former Petrol Filling Station and Maintenance Garage



When redevelopment of an old Petrol Filling Station was proposed in the sensitive environment of the Yorkshire Dales, the discovery of a significant hydrocarbon impact threatened to derail the programme.

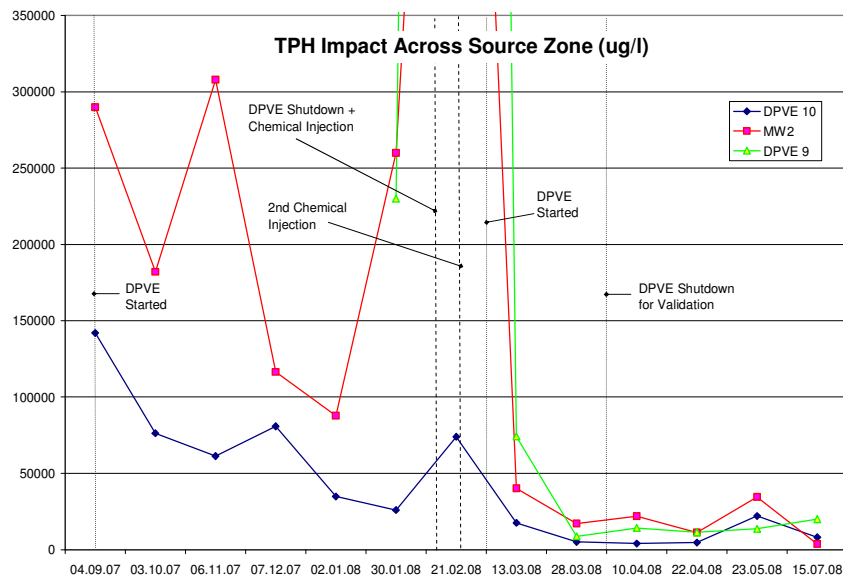
Geo² were contacted to remediate the impact and ensure safe redevelopment of the site for a luxury residential end use, whilst ensuring no impact to local protected controlled waters.

Working to a tight development timescale, around, and even within, the ongoing construction of residential properties, Geo² installed a Dual Phase Vacuum Extraction System (DPVE), designed to rapidly remove phase separated product, identified on the surface of the groundwater. Thicknesses of product up to 100mm, identified around the former tank farm were removed

within two months of commencing treatment. Using a series of abstraction lances, a vacuum gradient was generated across the impacted area. That enabled product removal across the surface of the groundwater, whilst minimising any smearing, and therefore rebound, across the vadose zone.

Pronounced reductions were noted in the concentrations of dissolved phase contamination across the site. However, in order to satisfy the Environment Agency, it was necessary that remedial activity ongoing beneath newly constructed properties was augmented with the addition of chemical oxidant followed by mass removal (pioneered by Geo²).

Geo² applied In-Situ Chemical Oxidation, directly injecting a powerful contact oxidant (Regenesi's RegenOx) into the subsurface around the dissolved phase impact. A very large mobilisation of soil sorbed impact into the dissolved phase was noted (as expected), which, with the restart of the DPVE system allowed for huge reduction in the mass of hydrocarbon contamination at the site.



As the oxidant is active for up to three weeks, the injections were undertaken one week apart to maximise the effect. Concentrations of TPH in the most significantly impacted areas show reductions from 300mg/l, following product removal, to a maximum of 20mg/l at the end of the validation period.

This combination of techniques, can optimise the remedial potential of both methodologies, producing greater gains than would typically be achieved by implementing either approach solely. This combination of techniques achieved regulatory sign off within four months of the chemical injections and before the newly developed homes could reach the marketplace.