

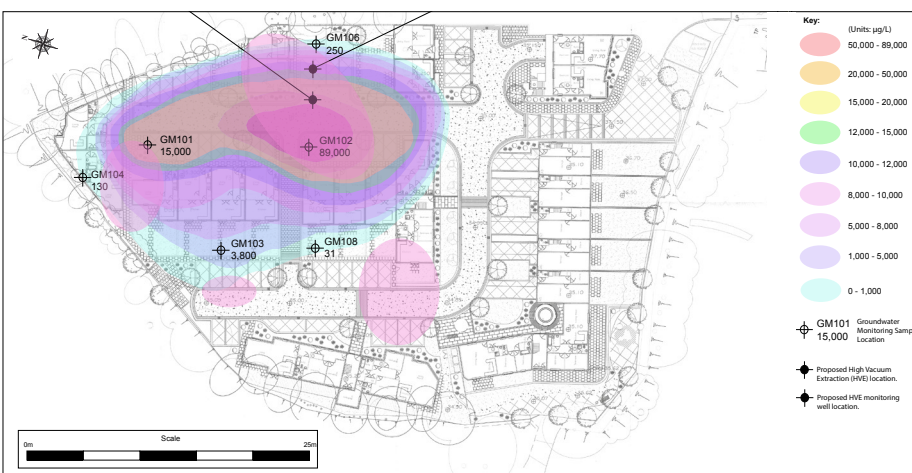
# Remediation of DNAPL in a Sandstone Aquifer at a Former Bleaching Mill, UK

## In situ treatment of bedrock under active construction site



### Summary

Historically, this site had been used as a bleaching mill and the use of chlorinated solvents (PCE and TCE) there had resulted in contamination of the sandstone aquifer beneath. Concentrations of chlorinated solvents at the site suggested that DNAPL could be present. After a DPVE pilot trial proved unsuccessful, REGENESIS was approached to provide an alternative solution. By this time, the site was already under residential development and so REGENESIS had to provide an in situ solution that could be applied without disrupting the ongoing construction works. After evaluating the data, REGENESIS recommended 3-D Microemulsion® (3DMe) be applied across the site in a series of barriers.



### Design and Application

REGENESIS designed a series of barrier injections, accommodating the existing footing of the houses under construction. Treatment was feasible using this array, due to the ability of 3-D Microemulsion to self-distribute in the subsurface following application. This allows for very wide injection point spacing, minimising costs, disturbance and time on site, without compromising treatment integrity. Reducing the number of wells is particularly important on deep, bedrock sites such as this one, in order to minimise the drilling costs, which may otherwise be economically prohibitive.

### Remediation Details

#### Site Type:

Residential construction site

#### Project Driver:

Redevelopment

#### Remediation Approach:

Bedrock injection on installed boreholes

#### Technologies:

3-D Microemulsion® (3DMe)

### Geology

X	Bedrock
	Gravel
	Sand
	Silt
	Clay

### Medium

X	Groundwater
	Saturated Soil
	Vadose Zone

### COC

	Petro HCs
	Petro LNAPL
X	Chlorinated VOCs
	Metals

#### COC Concentration Levels:

15,000 µg/L PCE  
89,000 µg/L TCE  
23,000 µg/L cis-DCE

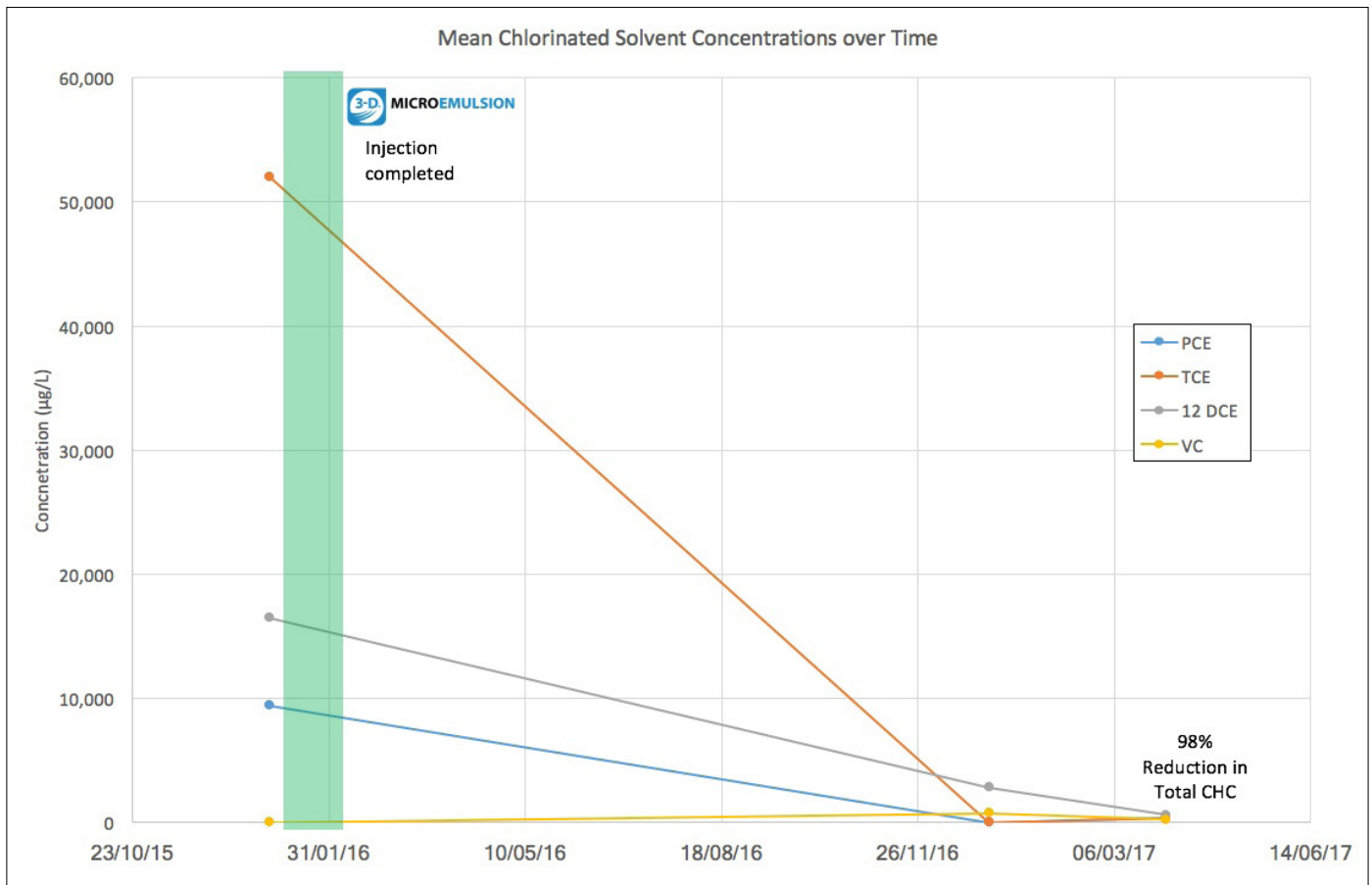
**Treatment Level:** 5 – 15m BGL

**Injection Grid:** Series of barriers

**Injection Points:** 19

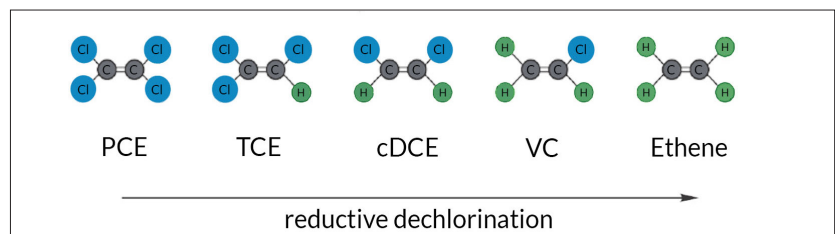
**Remediation Cost:** £80k

REGENESIS worked closely with the Environmental Consultant, who oversaw the installation of the injection wells across the site. This was done to minimise the cost to the Developer and to take advantage of the knowledge gained by the Environmental Consultant during the site investigation. The injection works were completed by REGENESIS in 10 days, applying 73,000 L of 3-D Microemulsion across 19 injection wells.



## Results

After 15 months, the monitoring shows a reduction in the total chlorinated solvent mass of over 98%. Full sequential reductive dechlorination (as depicted below) has been achieved and is continuing to occur. The parent compounds PCE and TCE have been entirely degraded (to below detection limits) within 12 months. DCE concentrations have been significantly reduced and continue to decrease. VC showed a minor increase at very low concentrations and is now degrading as the DCE mass has been degraded.



## Conclusion

- A successful treatment of DNAPL in a bedrock;
- The application was completed on a site already under construction;
- The number of wells was minimised through the use of 3-D Microemulsion with its ability to self-distribute in the subsurface;
- REGENESIS worked closely with the Environmental Consultant to realise the treatment onsite.
- Results 1 year on show dechlorination is taking place with both PCE and TCE reduced to detection limits.

**For more information or to discuss your project, contact:**

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