

Reactive barrier for the anaerobic biodegradation of HVOC



Context

The project was carried out in an industrial metallurgical site specialized in electrical and electronic equipment systems, active since the 1960s. For their activities, the use of solvents for the cleaning and maintenance of machines and materials for many years has caused soil pollution resulting in groundwater pollution by leaching of solvents. The studies have revealed a significant risk of dispersion which had to be stopped as soon as possible. Therefore, it was decided to create a reactive barrier downstream from the site to limit the risks of dispersion.

Reaction

For this project, the environmental conditions showed a natural biological degradation of the pollution in anaerobic conditions, it was therefore naturally decided to promote these conditions by stimulating anaerobic biodegradation (ERD: Enhanced Reductive Dechlorination). The reducing conditions allow the biological chain degradation of the chlorinated solvents from perchloroethylene (PCE) down to the smallest molecule, ethene, and then ethane, which is a non-toxic molecule for human health and the environment.

Reagents

The reagents allow the stimulation of the reductive biodegradation of solvents in anaerobic conditions. By its constitution, it allows an immediate and medium term treatment but also a long term one: 3 stages of degradation: lactic acid is directly available for fermentation, in the medium term, polylactates are released to continue the fermentation conditions and to stimulate the anaerobic conditions ; finally, fatty acids (acids and esters) are the last sources of electron donors to maintain the biodegradation up to 4 years after injections.

Particularity

For this project, it has been decided to realize a barrier application with different concentrations depending of the depth.

Out of a total of 269 injections, the different dosages were performed to inject 230 points from 5 to 8m-bgl at 500L/m, 30 injections from 2 to 8m-bgl at 250 to 400L/m and 9 injections from 13 to 18m-bgl at 400-600 L/m.



Location:	Orléans, France
Geology:	Heterogeneous silt
Pollutant(s):	HCOV
Reaction:	Enhanced Reductive Dechlorination (ERD)
Reagent(s):	3DMe (carbon source)
Application type:	Permeable Reactive Barrier (PRB)
Surface/length:	152 m ²
Number of points:	269
Depth interval:	2,0 – 8,0 m-bgl
Dosage:	250 – 600 L/m (average 500 L/m)

Injectis, your specialist partner for in situ soil remediation

Innovative techniques for cleaning and restoring contaminated soil in its original location.

