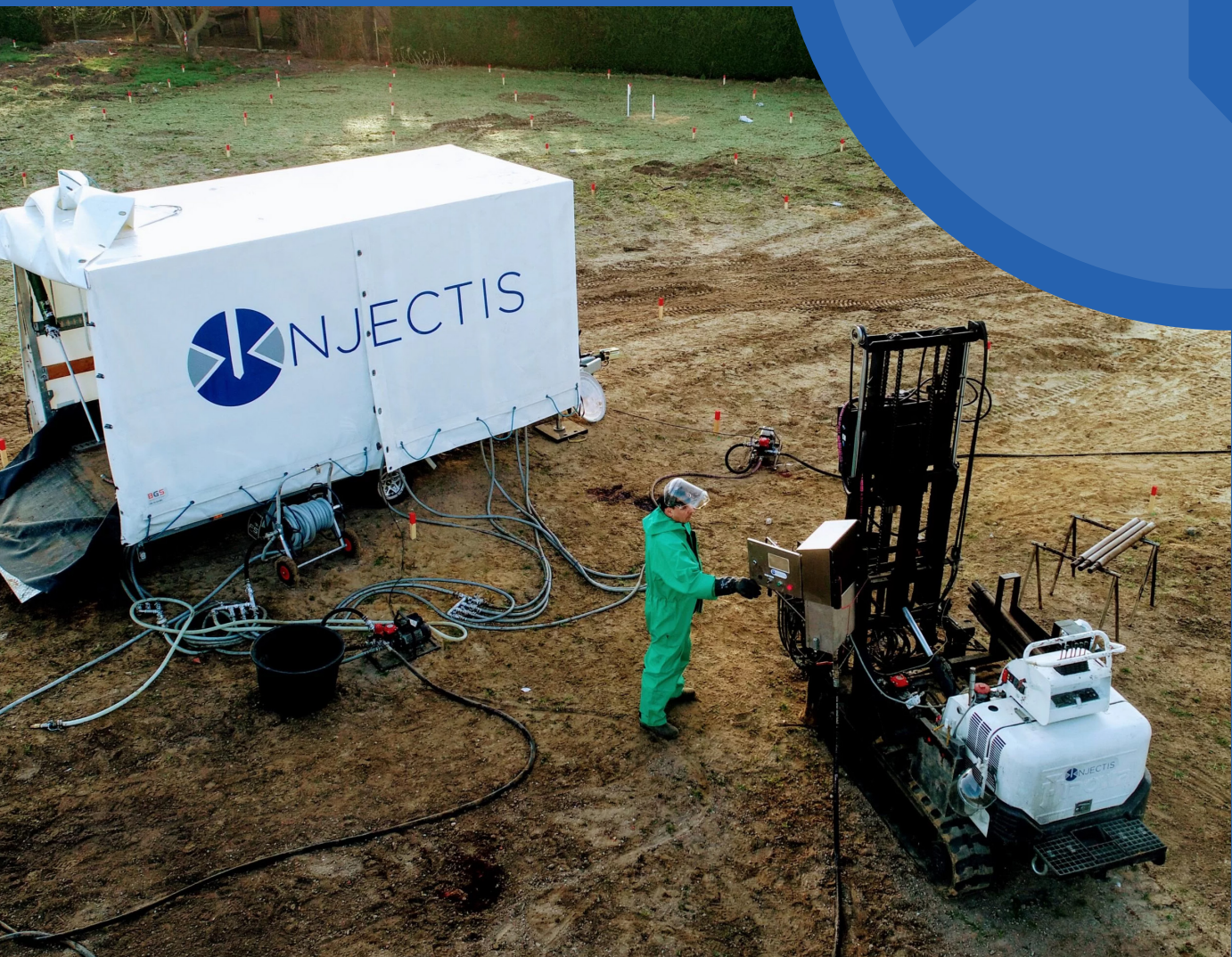


**A strong HCOV
characterisation
by EniSSA MIP for
a very precise and
cost safer ISCO**



Context

In order to reconvert an area that had housed a former metal processing plant into a residential area with a real estate project of several apartments, Injectis has been called to provide his in situ technics to rehabilitate the affected area.

The characterization studies revealed several pollutions in the soil and groundwater, mainly in chlorinated solvents (PCE).

The unsaturated area was treated after excavation. Concerning the saturated zone, the physicochemical conditions were not favorable to a biological degradation (no observation of natural biological degradation, and aerobic conditions). It was decided to carry out an ISCO (chemical oxidation reaction).

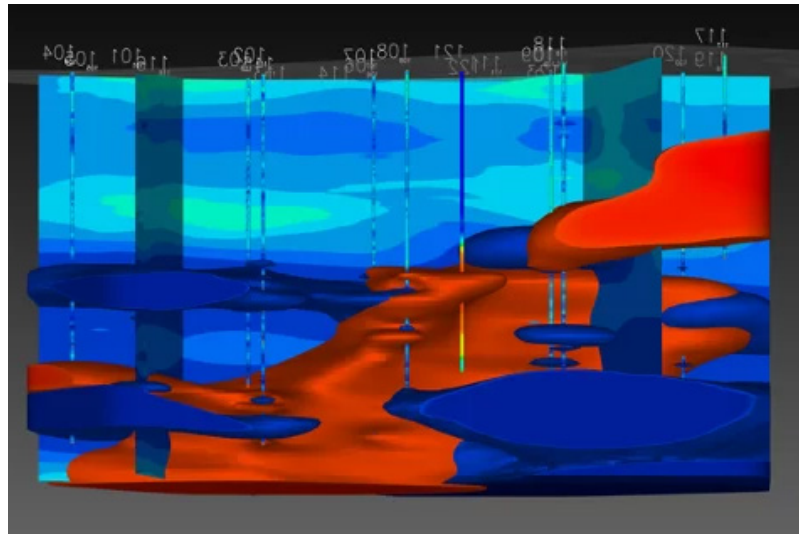
Particularity

The particularity of this project results in the realization of a thorough characterization of the pollution in chlorinated solvents in water in order to reduce the costs of depollution and to characterize various spots of pollution.

For this, the realization of 23 MIP-drillings carried out with the collaboration of **EnISSA** made it possible to 3D-model with precision the pollutions of the basement. The soil oxidant demand (SOD) has been determined in the Injectis's lab.

Moreover, the sub-zones of pollution were identified with different concentrations of oxidants according to the highlighted spots.

Finally, the SPIN® Technology allowed to target these zones with precision by dosing the reagents for each injection point thanks to programmed automatic mixers.





Reaction

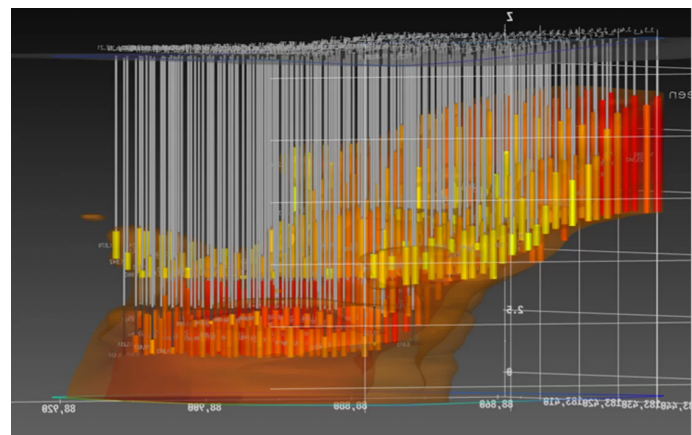
As the environmental conditions did not indicate any possible biological degradation (no natural degradation observed in aerobic conditions), the pathway was oriented towards chemical oxidation (ISCO). In particular, an ISCO requires direct and optimal contact between pollutants and reagents to obtain the best degradation results. It is therefore particularly interesting to know the precise distribution of the pollutants in the groundwater and their concentrations. In this case, INJECTIS has the only machines of injection able to detect the different permeabilities crossed (cm by cm) and at the same time able to inject adapting each of the injections.

Reagents

The sodium permanganate (NaMnO_4 ; 40%) has been selected based on a laboratory test carried out by INJECTIS. The 3D modelling of Enissa allowed to define different injection concentrations according to the different sub-zones and depths detected: 4 different dosages were established between 3.2-7.2 m-bgl (0.57 L/m³); 7.2-9.2 m (1.15/m³); 10.4-12 m (1.72 L/m³); 13.2-14.8 m (8.6 L/m³).

Result

The realisation of a high resolution characterisation (MIP) as well as the combination of high precision SPIN[®] injections made it possible to save 150.000€, i.e. almost 30% of the total cost of the remediation initially planned.





Location:	Flanders, BE
Geology:	Alternance of sand, silt and sandy silt
Pollutant(s):	HCOV (PCE) with GW up to 260 mg/L
Reaction:	ISCO
Reagent(s):	Sodium Permanganate (40%)
Application type:	Grid application
Surface/length:	3000 m ²
Number of points:	248
Depth interval:	1,5 – 14,8 m-bgl
Dosage:	average 208 l/m (4 different dosis)

Injectis, your specialist partner for in situ soil remediation

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

