

DESIGNING OF A MONITORING SYSTEM FOR REMEDIATION OF A BROWNFIELD AREA

Konstantinos Tsakirmpaloglou; Thierry Martin; Aude DEVALCKENEER; Marie-Eve DUPREZ; Amandine Liénard; Gilles Colinet; Jean-Marie Collet; Pascal GODERNIAUX; Anne-Lise Hantson; Olivier Kaufmann

In the scope of the MEMORIS research project aiming at brownfield remediation by bio-stimulation, an ERT and IP monitoring experiment is conducted. This geophysical monitoring complements more classical soil and water sampling techniques in order to follow the site evolution during the remediation.

The brownfield lies outside Charleroi city in Belgium in an old industrial area and used to be a cokery. One area on the site was selected to carry on a remediation experiment. In this location, both soil and groundwater are heavily contaminated down to 6 meters deep, especially with hydrocarbons such as BTEX and PAH.

The remediation process aims at enhancing the ability of some indigenous bacteria and or fungi to degrade the hydrocarbons by in situ heating.

Several geophysical techniques such as EM, SP, 2D and 3D ERT and IP were conducted before designing and implementing a first remediation and monitoring prototype in the field. These preliminary surveys allowed better imaging the underground conditions and help in the interpretation of soil and water sample analysis taken on site.

From the first investigations, some important points were identified. Firstly, the site shows a high spatial heterogeneity both in the subsoil nature and in contamination. This heterogeneity is linked to the presence of old foundation substructures. Secondly, strong electromagnetic noise is present in the area that might interfere with geophysical measurements and might thus be limiting the imaging possibilities.

Results from the first data acquisitions also helped in the design of the first ERT and IP monitoring system and layout. This system is now being installed, it consists of thirteen boreholes, arranged in a triangular grid. Along seven of these boreholes a heating system was added. Each borehole is equipped as a piezometer and six stainless steel electrodes. Extra unpolarizable electrodes may be used within the piezometers.