Electro-Reclamation®

(In-Situ) Soil & groundwater remediation based on direct current (DC)

Remediation of inorganic pollutants (heavy metals or polar components) in sand, clay, peat or loamy soil. Cleaning the environment by active and specialized technology with electrictricity and in situ purification.

The patented electro-reclamation technique is used to mobilize pollutants towards anodes and cathodes, where they are absorbed by electrolyte and removed through the electrolyte conditioning and purification system.

The direct current causes:

- Electrolysis or movement of ions and ion complexes (ion migration);
- Electro-osmosis or movement of water from anode to cathode (hydro migration);
- Electrophoresis or movement of charged particles.

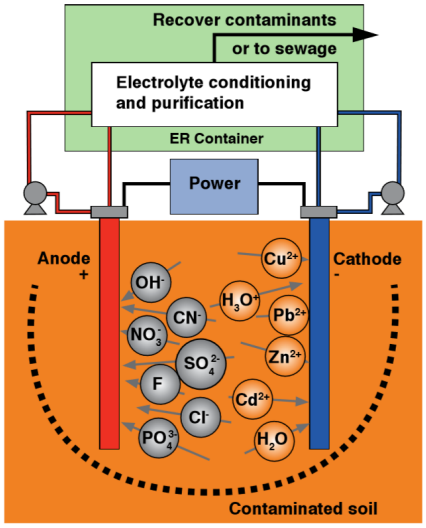
In soil and groundwater, displacement occurs of ions and water-soluble contaminations through disturbance of the existing electro-chemical iquilibrium between the solid phases (metal salts, clay and other organic soil particles) and the liquid phases (ground and pore water). The generating of H+ ions at the anode and OH- ions at the cathode is a further effect. It is necessary to manage the pH around the anode.

System:

Electric current is induced into the soil through rows of alternating anodes and cathodes. The distance between electrodes of both equal and opposite charges depends on site-specific conditions, but generally spans 1,5 to 2 meters. Both anodes and cathodes are integrated into separate closed loop pump systems. Electrolytes are circulated into these systems. With these electrolytes pH is controlled at a pre-determined level, and the contaminations, desorbed and mobilized under the influence of the applied potential, are collected. Conditioning of the electrolytes as well as periodical removal of the contaminants from the electrolytes, is effectuated in a special installation together with the energy supply. If necessary, electricity cables and extraction ducts and pipes can be installed subsurface.

Site characteristic's:

Technology is applicable for diffusely dispersed contaminations, both in the unsaturated and saturated zone and in clay, sandy, and peaty soils. Minimal moisture content about 15-20%. In situ remediation possible up to relatively great depths and under buildings. No disturbance to the groundwater flow and no destruction of microbiological life. In designing a pilot or full-scale performance, we often execute tests in our laboratory ('turbo test') to examine the electrical flows into the soil in combination with the contaminations.



Scope & duration:

About 2000 m3 of contaminated soil can be treated with the installations at present. The duration can vary from a few months to a few years.

Reference:

Soil remediation of a mercury contaminated industrial area, Porto Marghera, Italy.

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