

Thermal Soil Remediation

Remediation in a small residential area | Case Study

Customer

The Capital Region of Denmark

Location: Skuldelev, DK

Technology

Thermal Conduction (TCH)

Keyfacts

Treatment area: 250 m²

Depth of treatment zone: 7.5 m

Treatment volume: 1.180 m³

Geology: Clay, sand and peat

Contaminant: PCE

Target temperature: 100 °C

Remediation target: 5-10 mg/kg TS

Heating period: 73 days

The client's needs

A massive contamination of Tetra-chloroethylene (PCE) was found in a sandy aquifer. Before treatment 1.2 m³ of free phase PCE was removed directly from the aquifer by simple pumping.

The contaminated aquifer was based on top of a low permeable clay layer. And a considerably risk occurred that pools of PCE were left there and that contamination was absorbed in the clay. According to this the situation required that both the high-permeable aquifer and the low permeable clay layer were treated. Earlier tests had shown that effective groundwater control was needed to prevent cooling of the area if heated by ISTD.

Part of the hotspot area was placed beneath a small pond and very close to both residential houses and to a transformer producing company.

Our solution

Based on results from an ISTD pilot test in the hot spot area a decision was made regarding groundwater control. To be sure to prevent problems with incoming water a sheet pile were driven 8 m below ground surface around the whole treatment area.

53 heater wells were installed to 7-9 meters depth. By creating a hot floor in the clay layer complete removal of DNAPL was ensured. A vapor cap of high-porous concrete covered the whole treatment area. The vapor cap was constructed in three levels to compensate for the considerable topographic differences in the area.

Having the treatment area enclosed by pile sheets the aquifer was emptied by pumping.



The power was turned on in September 2008 with an estimated treatment period of 112 days and a target temperature of 100 °C.

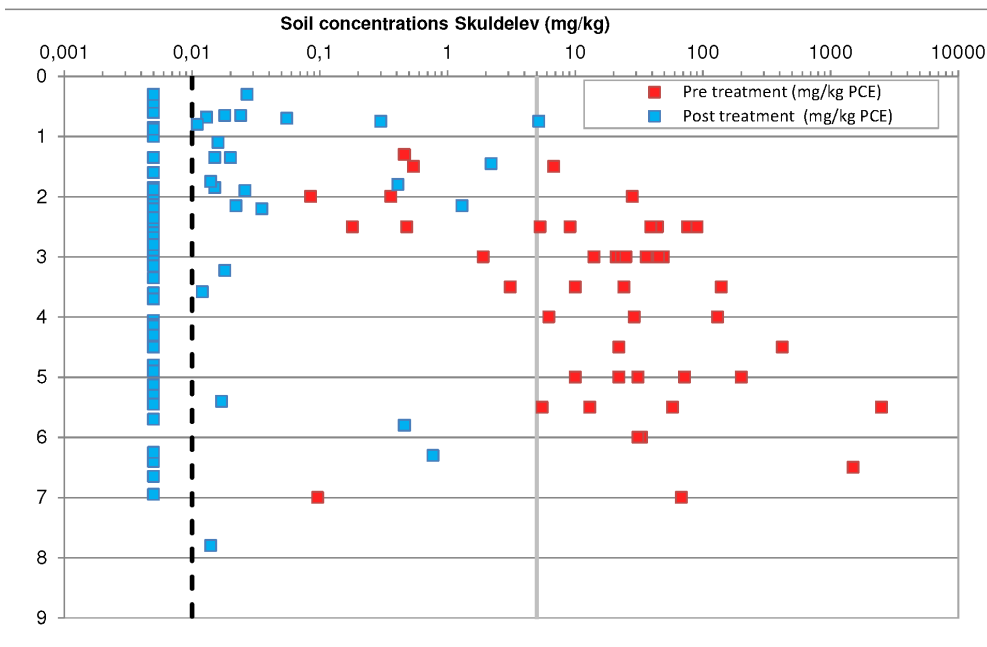
Results

After a treatment period of 73 days 40 soil samples were taken. The samples were taken in different depths from 8 borings within the treatment area.

All the soil samples showed concentrations well below the remediation target of 5 mg/kg.

- 30 soil samples were below the detection limit
- Average post-treatment concentration: 0.02 mg/kg PCE
- Maximum post-treatment concentration: 0.077 mg/kg

The treatment was finished before the end of 2008.



**For further information,
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