

CASE STUDY

ISTD remediation Vadsbyvej

Denmark

KRÜGER



Key facts

Contaminant: Chlorinated solvents

Recovered mass: 150 kg

Treatment area: 120 m²

Treatment volume: 1140 m³

Depth of treatment zone: 11 m

Geology: Clay till

Location: Former reloading station for chemicals

Challenge

At a site that housed a reloading station for chemicals in the 1970'ies, heavy pollution with PCE, TCE and 1,1,1 TCE in a clay till layer was discovered. At this site thermal remediation was to be used for remediation of two hotspots at the site and the heat distributed to the surrounding areas from the thermal remediation was to facilitate stimulated reductive dechlorination in the remaining less contaminated areas at the site.

At this site, the remediation target was formulated as an off gas concentration of maximum 300 mg/m³ of total chlorinated solvents. This target was formulated on the grounds of equilibrium calculations made between soil and pore gas concentrations. These calculations were performed by the consultant.

The treatment zone was made of two separate areas of 75 and 45 m², respectively

Solution

A total of 24 heater elements were installed in the depth interval 3,5-13 mbgs. A rubber liner was installed at ground surface to minimize infiltration of rainwater. Ventilation was performed using filters placed alongside the heaters in the clay till.

Towards the end of the remediation period, heaters were boosted at the bottom part of the treatment zone. This boosting of the heaters was obtained by inserting longer sections of coldpins on the heater elements in the depth sections that were estimated to be treated adequately. Insertion of low resistivity material increases the current through the heater elements thereby increasing the current and the energy transmitted in the section still containing original heater element material. This adjustment of the heaters was performed relatively simple for 6 heater elements in the setup.

Also, at the end of the remediation period hot sampling was performed at all ventilation wells. The extracted steam was allowed to cool off and the headspace above the condensed steam in the extracted samples was analyzed using an on-site GCMS. This was done to assess where the remediation was completed.



PCE, TCE
remediation
in clay till.
Hedehusene

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Results

After a treatment period of 107 days, the largest treatment area was shut down following performance of hot sampling of steam/gas from each ventilation well in the large treatment area (15 wells total).

After a treatment period of 121 days, soil samples were taken in the smaller treatment area and heating was stopped after 137 days of heating.

Soil sampling inside the treatment area showed a maximum concentration of chlorinated solvents of 1,3 mg/kg and an average concentration of 0,6 mg/kg.

SERVICE

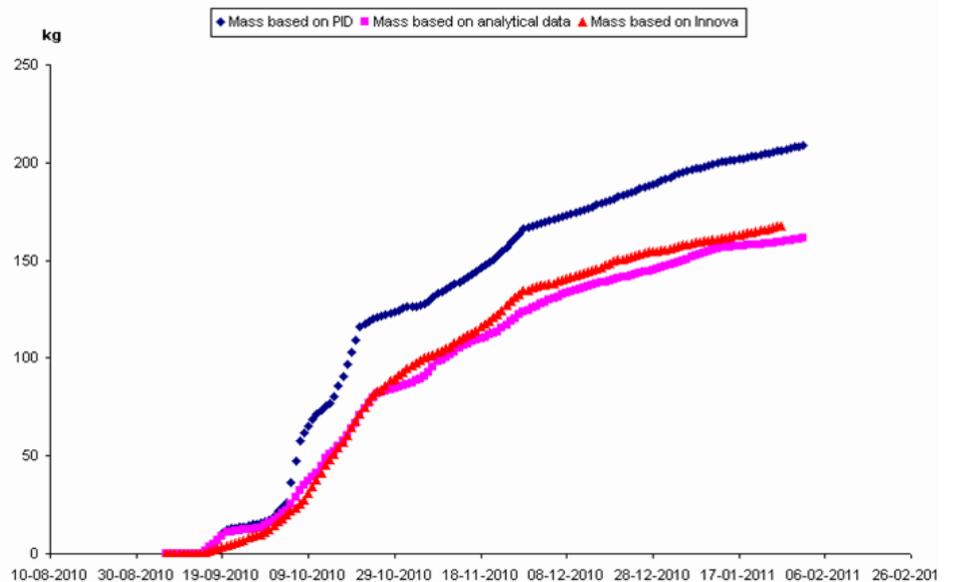
- > ISTD - Quick remediation with the ability to reach stringent clean-up levels

VALUE

- > ISTD - Can be completed with minimal disruption to ongoing operations

RESPONSIBILITY

- > Thermal remediation restores soil and groundwater resources for the future
- > We have focus on safe work environment and our personnel is experienced



Energy balance

Volume total	1.140 m ³
Power input	250 kW
Total energy	700.000 kWh
Total energy/m ³	610 kWh/m ³

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