

CASE STUDY

ISTD remediation below building

Taastrup, Denmark

KRÜGER



Key facts

| | |
|--------------------------|----------------------|
| Contaminant: | PCE |
| Recovered mass of PCE: | 50 kg |
| Treatment area: | 275 m ² |
| Treatment volume: | 1,730 m ³ |
| Depth of treatment zone: | 8 m |
| Geology: | Clay till |
| Location: | Industrial laundry |

Challenge

Below a functioning industrial laundry, significant pollution with free phase PCE and other chlorinated solvents was discovered. The chlorinated solvents had migrated through a clay till layer to a secondary sandy aquifer at 8 meters below ground.

The challenge was to remediate the clay till to a level of maximum 1 mg/kg chlorinated solvents below existing buildings.

Solution

40 ISTD heater vacuum wells were installed over the 275 m² target treatment area. Heaters were installed to a depth of approximately 9.5 meters below ground into the sandy aquifer below the clay.

The building floor was insulated with Rockwool floor batts and a temporary wooden floor was installed to make the treatment area accessible during operation. Cable trenches in the building were also insulated to keep the laundry buildings functional during operation of the ISTD facility.

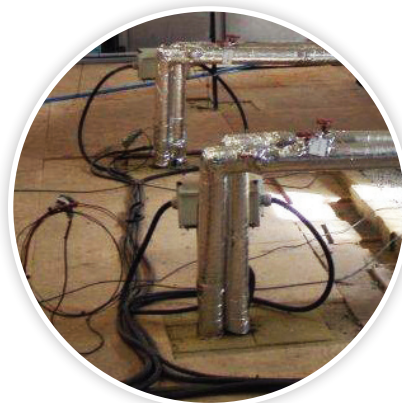
Observation wells were installed in the secondary sandy aquifer outside the treatment area to monitor possible movement of steam generated in the aquifer. No steam zone outside the treatment area was found to exist.

Wells, extraction system and treatment plant were installed from December 2011 to March 2012 and operation of the facility was maintained from March to June 2012.

To ensure structural stability of the buildings level measurements were performed during and after operation.



ISTD
remediation,
industrial
laundry



For further information:

Krüger A/S

Gladsaxevej 363
DK-2860 Søborg
Tel: +45 39 69 02 22
E-mail: kruger@kruger.dk

www.kruger.dk

 **VEOLIA**
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Results

After a treatment period of 106 days, 45 soil samples were taken at different depths in 5 borings within the treatment area.

The results were:

- 40 samples were below detection limit
- Average concentration: 0.01 mg/kg
- Maximum concentration: 0.27 mg/kg

Key facts

Number of heater wells: 40

Target temperature: 100 °C

Remediation target: 1 mg/kg

Heating period: 106 days

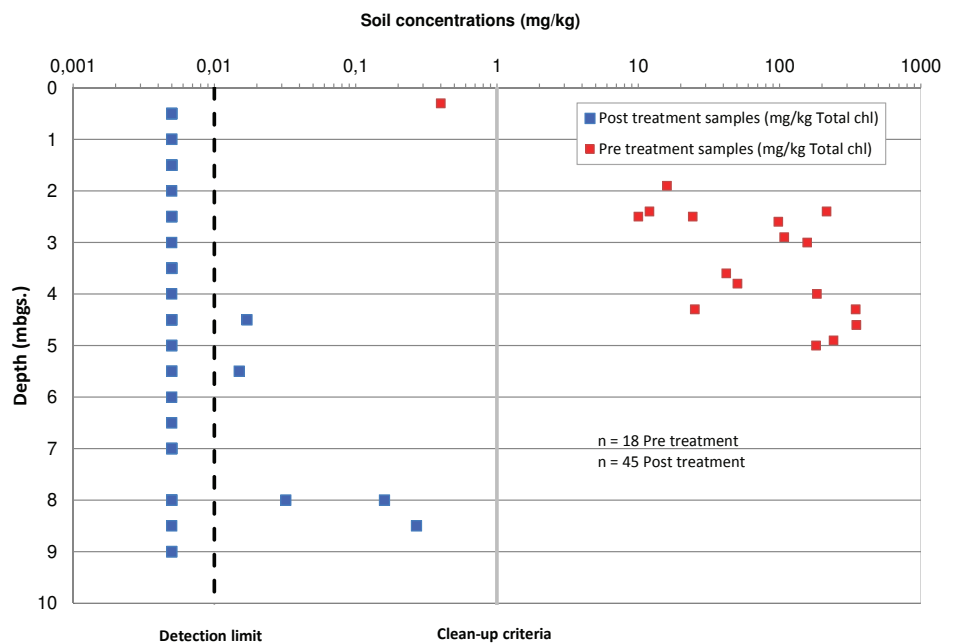
Avg. end concentration: 0.01 mg/kg PCE

Client: Capital Region of Denmark

Consultant: Grontmij

Contractor (ISTD): Krüger A/S

Consultant to contractor: NIRAS



| Energy balance | |
|--------------------------------|------------------------|
| Volume, total | 1,700 m ³ |
| Power input | 350-400 kW |
| Total energy | 800,000 kWh |
| Total energy/m ³ | 470 kWh/m ³ |
| Energy extracted | 300,000 kWh |
| Average temperature within TTZ | 100 °C |

For further information:

Krüger A/S
 Gladsaxevej 363
 DK-2860 Søborg
 Tel: +45 39 69 02 22
 E-mail: kruger@kruger.dk
www.kruger.dk



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