

## ISTD – a sustainable choice for hot spot removal

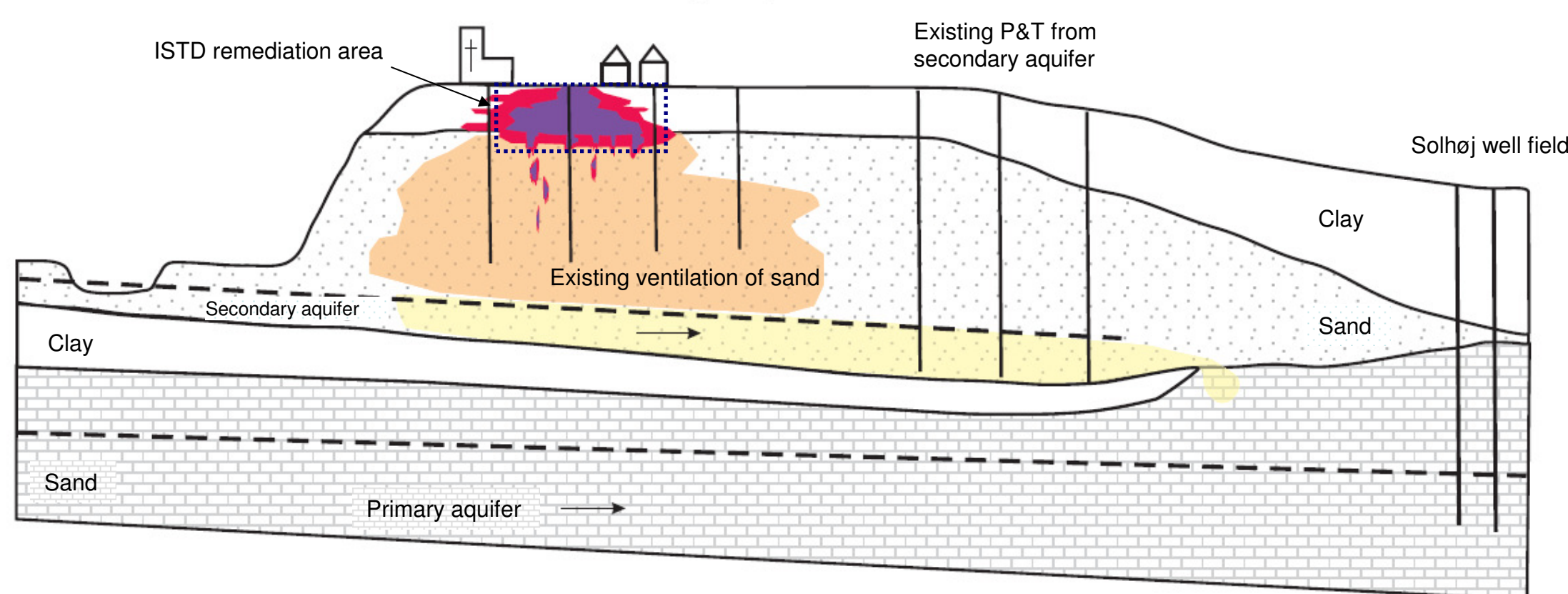
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ISTD is a robust, proven and patented technology for heating the subsurface to remediate soil and groundwater. ISTD is based on conductive heating, which means that ISTD is not limited by soil type or heterogeneity unlike techniques based on fluid conductivity. The conductive heating ensures a uniform heating with a sweep efficiency of nearly 100 % even in tight clays.

In Reerslev, ISTD is being applied to remediate a hotspot of about 2-3 tons of chlorinated solvents in a low permeability clay layer. An independent evaluation process showed that hotspot remediation by ISTD was not only the most cost-effective solution but also the most sustainable solution for the site.

### The site

A PCE contamination in an impermeable clay layer has been seeping to an underlying sandy aquifer and is threatening the nearby Solhøj well field, which is one of the largest well fields in Denmark



### The setup

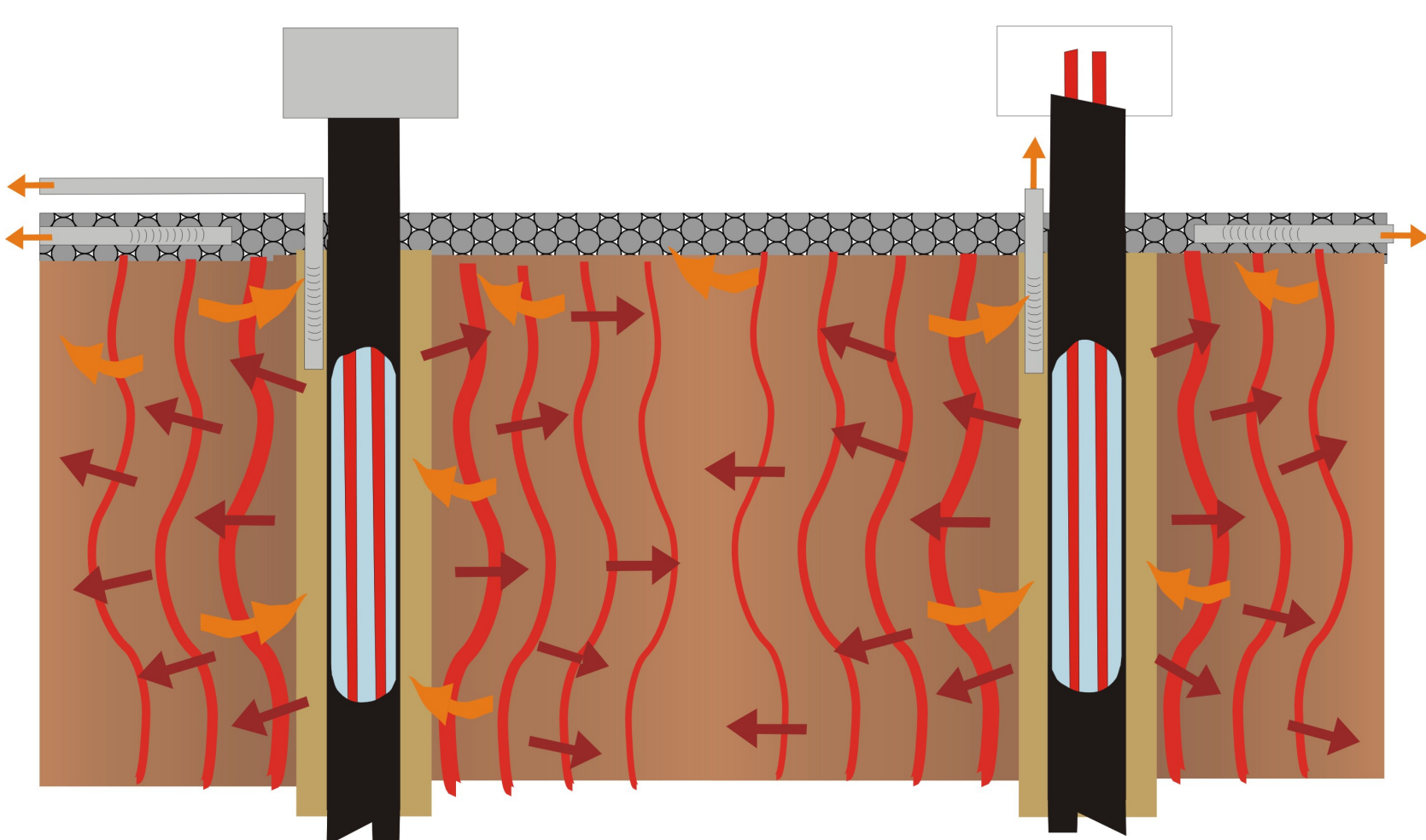
The 1300 m<sup>2</sup> area is remediated by use of:

- 147 heaters to average 10 meters depth
- 25 ventilation wells screened in the unsaturated sand below the clay
- 15 horizontal ventilation drains below the vapor cap
- 30 temperature monitoring wells
- Light concrete vapor cap to insulate and promote pneumatic control

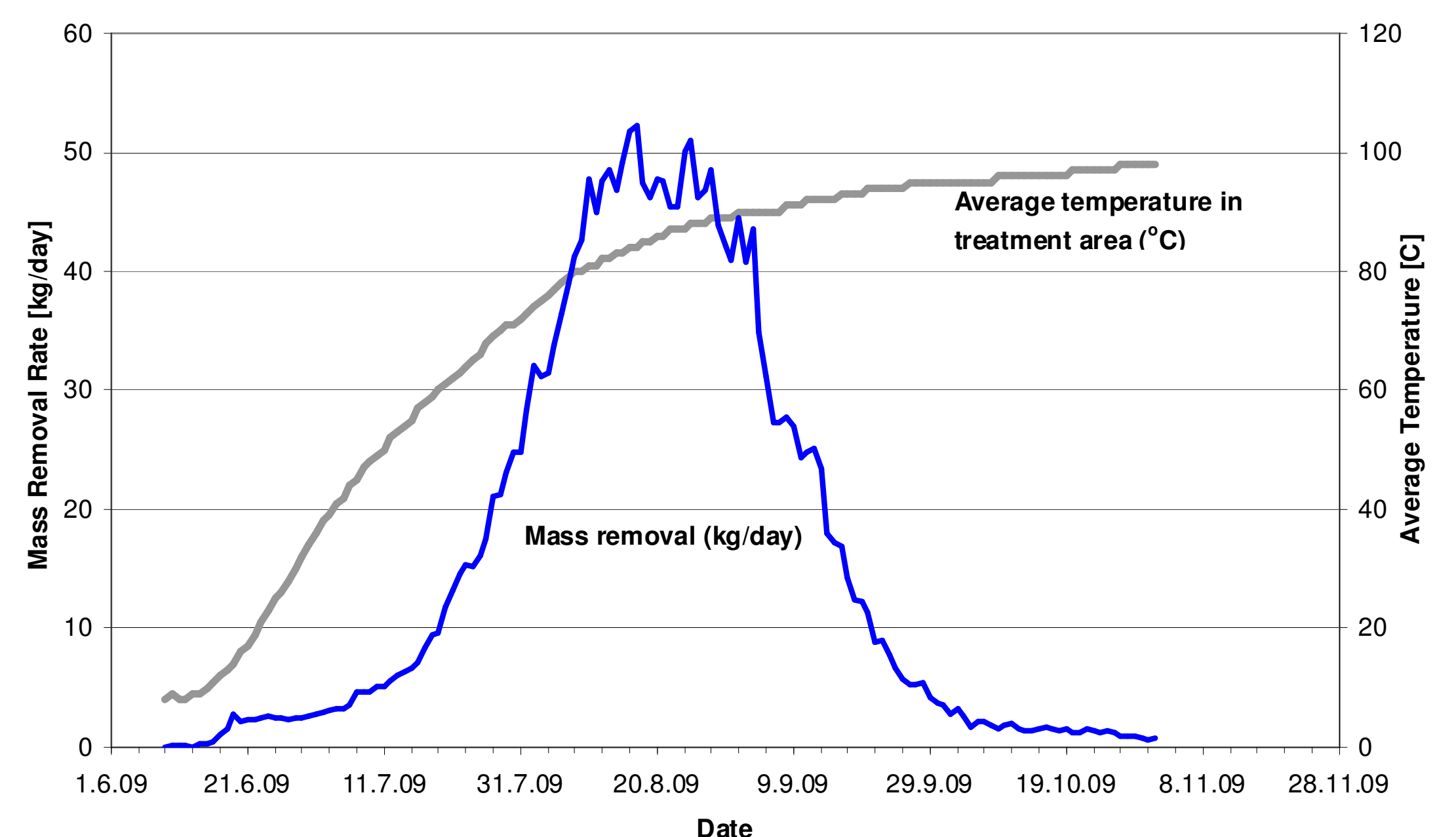


### The technology

Heater elements deliver the energy to the soil and heat is distributed by the thermal conductivity of the soil. Increasing temperatures drives the pollution towards gaseous form and produced steam and polluted gas is extracted through ventilation wells.



### Mass removal



### Evaluation of methods

Evaluation of cost-effectiveness and LCA on ISTD and alternatives long term SVE and excavation was performed. The conclusions were:

- ISTD and excavation had comparable impacts on the environment.
- Long-term SVE has the most adverse effect on the environment
- ISTD was the most cost-effective method for hot spot removal