

Case Study – BOS200® Pilot Test LNAPL clean-up on active Retail Gas Station in Copenhagen

Project facts

Pilot test area:	100 m ²
Budget:	1 million DKK
Product amount:	
BOS:	3300 kg
Suppl. Gypsum:	1030 kg
T&T microorganisms:	15 L
Injection points:	15
Vertical treatment zone:	7.5-12.6 mbgl

Ejlskov A/S

- Founded in 1998.
- Number of Employees +20
- Master Installer of BOS 100® and BOS 200®
- Is one of the leading innovative environmental engineering companies in Scandinavia

Intro

In Marts/April 2012, the BOS 200® technology was tested to treat source area and LNAPL impacted groundwater on a retail gas station in Copenhagen.

Light NAPL had migrated downward through the unsaturated soil and apparently remains trapped in preferential pathways within the unsaturated and saturated till.

LNAPL was also believed to have entered the limestone formation below the till.

LNAPL was observed as a distinct layer (free product) floating on the groundwater in 5 monitoring wells. Up to 60 cm of free phase had been observed.

The LNAPL was previously monitored and removed by manual pumping with a bi-weekly frequency from February to June 2011 which decreased the amount of free phase to between 5 and 10 cm.

The other wells in the test area constantly showed a film or up to 1 cm of LNAPL. The bulk of the contaminant mass was considered to be present within depth range of 6 to 12 mbgl.

Objectives

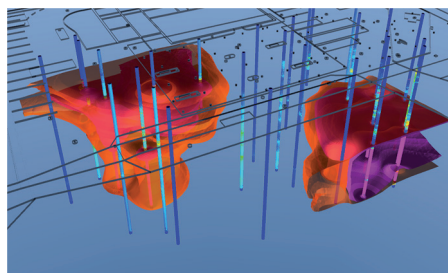
The pilot test had several objectives:

- To test the efficiency of the BOS 200® for remediating both the LNAPL in the groundwater and soil matrix to a significant level.
- To test if the remediation could be done in a limited time frame.
- To test if BOS 200® would be a more cost effective solution than the present “Pump and Treat” methodology.
- Determine if full scale remediation could be performed without major disturbance of the sales activities on the gas station – a major parameter for the site owner!

Detailed Dynamic Site Characterization

Preliminary site characterization using Dynamic Approach MIP-screening combined with 3D-modeling was conducted. The result was a very detailed delineation of two separate plumes. The contaminant mass was afterwards estimated based on high density soil sampling in the contaminated zones.

The Pilot test partly targets one of the plumes.



Detailed 3D-model of the contamination

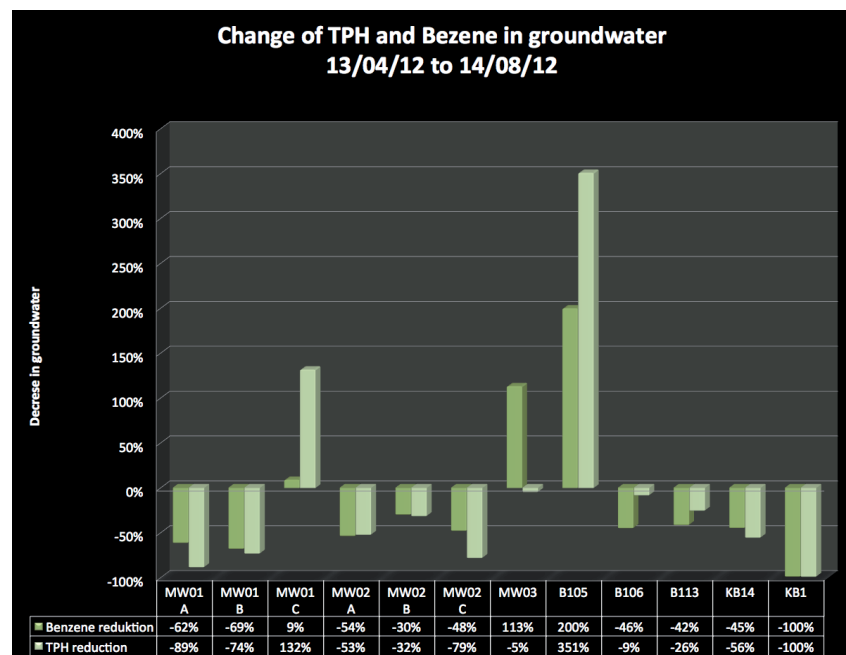
The method – “Trap & Treat®”

The carbon-based injectate BOS 200® is well suited for remediation of gasoline, as it has been designed to degrade petroleum products. BOS 200® accelerates biodegradation processes by concentrating microbes, electron acceptors, electron donors, and nutrients together in an activated carbon matrix, and immediately reduces the concentration of hydrocarbons in the subsurface. Rates of degradation within the carbon matrix are significantly faster than rates commonly observed using conventional in-situ bioremediation technology due to this concentration effect.

The method utilizes the Trap&Treat® methodology – contaminants are by contact fixated to the activated carbon matrix and afterwards degraded by the microbes added along with the activated carbon and nutrients.

Results

After completion of the injection program, monitoring activated has indicated a fast reduction of the TPH (Total Petroleum Hydrocarbons) in the treatment zone. The increase seen in some wells is due to zones where the product distribution is not so effective. However, these small local areas are all surrounded by areas with much more effective distribution which will secure the overall success for the site in the long term.



Ejlskov A/S offers a wide range of environmental services concerning:

- Advanced Site characterization
- In-situ remediation
- Building and Construction
- Geoprobe Drilling
- Environmental Due Diligence
- Environmental Assets Management (EAM)
- Industry and Good Environmental Practice

Further Information

For further information about in-situ remediation or our other services please contact:

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