

Remediation of a Chlorinated VOC Contamination of a Former Production Site

On a former production site of Continental Teves brake systems were produced for more than 20 years. Similar to all working companies at that time, solvents (chlorinated Volatile Organic Compounds, like Per and Tri) were used for degreasing processing. This was state-of-the art technique during that time. The use of this substances was generally approved and caused contamination of sub surface soil and groundwater which can be found 3 m below the ground surface.

After the site was abandoned Continental Teves implemented a program to investigate potential contamination of the site as well as to plan remediation measures. The planning of remediation measures was conducted in close cooperation with the pertinent environmental authorities.

During the investigation and the planning of remediation more than 100 soil bores were conducted. In order to investigate groundwater contamination, 22 wells were installed the base of the calcareous aquifer at a depth of 8 m below ground surface. Follow-up measures included comprehensive studies and modelling of the vertical and horizontal conditions and the extension of the contamination plume.

Since 2000 a comprehensive remediation concept to remediate soil and groundwater exists which is approved by the authorities. The concept includes clean-up of 2 contamination areas by soil venting. The remediation of the ground water is conducted by conventional pump and treat measures.

Due to the actual use of the site all necessary installations of the remediation (30 wells, 800 m power lines, and piping) had to be installed below ground surface in order to avoid any disturbances for the actual use.

For the soil venting, volatile contaminants were removed by extracting soil gas from soil gas wells.

In the center of the contamination hot vapor (160°C) is injected into the ground water by use of 4 injection wells. The temperature increases the water solubility and vapor pressure of the chlorinated VOCs. This effect the amount of contaminants can be removed is sharply increased.

The combined soil and groundwater remediation started in 2002. Today more than 2500 kilogram of solvents were removed and recycled. Two years after the remediation started the unsaturated zone was almost cleaned-up. During the time the concentration of the groundwater decreased by 15% as compared to the initial concentration.

The remediation system is operated and monitored by use of a remote controlled SPS system. The status of the remediation system and real time data can be transmitted by telecommunication in order to monitor the system.

The remediation target set by authorities requires that the remediation has to be continued for 3 to 5 years.