

Remediation of a Free Kerosene Phase using Bioslurping on a Refinery Area in Huelva, Spain



BAUERUmweltgruppe

| | |
|--|--|
| Client: | URS España S.L., Madrid, Spain |
| Engineering Design and Supervision: | URS España S.L., Madrid |
| Scope of Works: | Remediation of a Fuel Contamination at a Refinery Area Free Non Aqueous Phase Liquid Recovery and simultaneous In-Situ Bioremediation in the unsaturated Groundwater Zone |
| Contract Period: | December 2001 until 2004 |



Project

Due to a leakage in a tube a local spot of fuel contamination occurred at a refinery area in Huelva, Spain.

Remediation Site

Aim of the project was the recovery of free non aqueous phase liquids and the remediation of the capillary groundwater zone by using bioslurping as well as the remediation of the contamination in the water unsaturated groundwater zone by soil vapor extraction.



The FWS remediation plant basically consists of ATEX-conform vacuum pumps, bioslurping lances and vapour phase activated carbon filters.



The contaminated groundwater is collected in a separator and is then automatically pumped through and treated by a liquid phase activated carbon stage. The storage tank for the non aqueous phase is equipped with a level switch, thus the plant is automatically shut down in case of overflow.

Result

Eight soil vapour extraction wells have been installed to carry out the remediation. Each well was equipped with slurping lances with special slurping heads in a distance of 10 to 15 cm from the free phase. Partial vacuum is produced by special vacuum pumps. Free phase is then sucked through suction tubes to the surface. The groundwater which is produced to the surface due to the described process is separated from the free phase by a partial vacuum phase separator before the free phase is collected in a product tank. Soil vapour extraction is a positive side effect of the used technique that occurs due to the partial vacuum produced by the vacuum pumps. In case of the illustrated process at the remediation site in Spain a capacity of 250 m³ soil vapour per hour could be achieved and a comprehensive amount of volatile contaminants was removed from the unsaturated soil zone. Another side effect of the used remediation technique is the increase of oxygen concentration in the unsaturated zone due to air transfer into the soil body. Oxygen enhances microbiological degradation processes by autochthonous microorganisms.



Vacuum compressors and waste gas stream cleaners are ATEX-conform and installed in a certified climate conditioned container.

The FWS remediation plant consists of ATEX- conform vacuum pumps, bioslurping lances and vapour phase activated carbon filters. Contaminated groundwater which is collected in a separator is cleaned through aqueous phase activated carbon filters. The collection tank for free phase is equipped with a level switch to avoid any overflow events.

The treatment plant is operated successfully for four years now.