

Large scale *in-situ* bioremediation of BTEX / CHC

Problems:

- Underground and above-ground tanks
- 1 m floating phase, mainly BTEX (BTEX: benzene, toluene, ethylbenzene, xylenes)
- 60 000 µg BTEX/litre
- 30 000 µg Chlorinated hydrocarbons/litre (perchloroethylene, trichloroethylene, *cis*-1,2-dichloroethene, vinyl chloride)
- Hot spot area 27 000 tons of soil affected in the saturated zone, 13 500 tons in the unsaturated zone
- Sand, clay lenses, groundwater at 6 m depth

Our Responses:

- Bioremediation feasibility study undertaken proving that the diffuse BTEX/CHC contamination can be degraded within the boundaries of the site after removing hot-spots with high ecotoxicity.
- Containment wells installed to prevent off-site groundwater migration
- Underground tanks with underground services removed
- Surface sealed with flexible foil
- Floating phase material removed with groundwater slurping
- Volatile sources reduced by soil vapour extraction to non-toxic concentrations.
- Aerobic biodegradation implemented using biosparging / bioventing / soil vapour extraction / biofiltration / on-line monitoring

Location: TF45, Germany

Initial cost estimates using standard technologies: 16 700 – 19 100 k US\$

Actual costs using *in-situ* bioremediation: 3 900 k US\$

Time for active *in-situ* remediation : 2,5 years