

Large scale *in-situ* bioremediation of BTEX, TMB

Problems:

- Underground tank farm
- 0.5 m floating phase
- 50 000 µg BTEX/litre (BTEX: benzene, toluene, ethylbenzene, xylenes)
- 10 000 µg TMB /litre (TMB: Trimethylbenzene)
- Hot spot area 32 400 tons of soil affected in the saturated zone, 16 200 tons in the unsaturated zone
- Very permeable gravel and sand
- Contamination at boundary
- Sensitive targets at boundary such as private housing

Our Responses:

- Bioremediation feasibility study undertaken proving that the diffuse BTEX/TMB 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 removed leaving underground services in place
- Existing concrete slab repaired to achieve capping
- Floating phase material removed with groundwater slurping
- Volatile sources reduced to non-toxic levels by soil vapour extraction
- Bioremediation feasibility study undertaken
- Aerobic biodegradation implemented using biosparging / water infiltration / soil vapour extraction / biofiltration / on-line monitoring

Location: Area TF1 N, Germany

Initial cost estimates using standard technologies: 13 700 – 19 100 k US\$

Actual costs using *in-situ* bioremediation: 3 420 k US\$

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