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KB-1®

Case Study

Client:
COWI A/S

Site Location:
Svendborg, Denmark

Project Duration:
2004-2007

Services Provided:
- KB-1® Bioaugmentation
- Gene-Trac® *Dehalococcoides* Testing

"Within three years, TCE, and vinyl chloride concentrations in groundwater were reduced to levels below risk based cleanup criteria across the site..."

Regulatory Closure at TCE/Hexavalent Chromium Site

Project Highlights

- Hexavalent chromium (co-treated with TCE) to below detection limits within 1 year
- Regulatory closure achieved within 3 years of bioaugmentation

Problem Definition

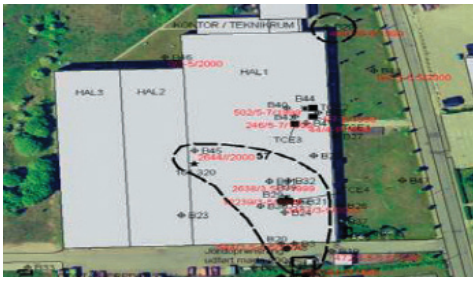
In 2004, the site was an active manufacturing facility with groundwater plume trichloroethene (TCE) concentrations ranging from 1 to 20 milligrams per liter (mg/L), and hexavalent chromium (Cr[VI]) ranging from 0.5 to 7 mg/L. Intermediate degradation products of TCE were present in only trace concentrations in this primarily aerobic aquifer. The site source area was excavated in March 2004 to remove 800 tons of TCE-contaminated soil. Enhanced *in-situ* bioremediation (EISB) was implemented to remediate the remaining plume.

Solution

EISB for treatment of the TCE and Cr(VI)-impacted groundwater was implemented via a forced-gradient flow field to distribute lactate (electron donor) throughout the plume. After a two month conditioning period, strongly reducing conditions were established and 12 wells located throughout the plume were bioaugmented with approximately 3 liters each of the KB-1® culture to introduce *Dehalococcoides (Dhc)* bacteria.

Notable Results

Within five months of KB-1® bioaugmentation, significant enhanced reductive dechlorination was evident, resulting in accumulation of the non-toxic dechlorination product ethene. Gene-Trac® *Dhc* testing indicated high concentrations (10^7 *Dhc* per liter of groundwater) post bioaugmentation. Within one year, Cr(VI) was reduced to concentrations below detection limits. Within three years, TCE, and vinyl chloride concentrations in groundwater were reduced to levels below risk based cleanup criteria across the site and the Danish regulatory authority approved a no further remedial action designation for the site.



The bioremediation remedy allowed manufacturing operations to continue uninterrupted.