

Combined Remedies Approach (Dual Phase Extraction, ISCO and ERD) Lead to Rapid Results on a Guaranteed Cost to Closure Project in Indiana

3- D Microemulsion, BDI Plus and RegenOx reduce cVOC concentrations

Project Highlights

- Guaranteed cost to closure project.
- ISCO coupled with dual-phase extraction was successful in reducing cVOC concentrations within the core source area.
- Plume-wide ERD injection resulted in meeting remedial goals within 18-20 months.
- Combined remedy approach (ISCO & ERD) accelerated the time to closure allowing project to be completed within budget.

Project Summary

A plating plant in Batesville, Indiana was contaminated with chlorinated VOCs. A subsequent investigation identified a plume of TCE extending from the building approximately 250 feet down gradient (off-site and onto private property across a street).

Site Type: Manufacturing Site

Contaminant of Concern: Chlorinated Ethenes (PCE, TCE, c-DCE, VC)

Remediation Approach: Enhanced Reductive Dechlorination, In Situ Chemical Oxidation

Soil Type: Sand lens in predominantly silty clay matrix

Technology Used: 3-D Microemulsion, BDI Plus, RegenOx

Remediation Approach

The initial remedial approach involved installation and operation of a dual-phase extraction (DPE) system throughout most of the plume area (26 extraction wells), which operated for approximately 1 ½ years. Approximately one year after the DPE system installation, a core area in situ chemical oxidation (ISCO) injection of RegenOx[®] was performed by KERAMIDA and RegenesiS Remediation Services (RRS). ISCO combined with further operation of the DPE system was effective in additional reductions of cVOC concentrations in the groundwater. Upon conclusion of these efforts, the DPE system was shut down to allow for enhanced reductive dechlorination process to take place.

A successful enhanced reductive dechlorination (ERD) pilot test with 3-D Microemulsion[®] and BDI[®] Plus was performed around two off-site wells at the leading edge of the plume. Based on the success of this test, an ERD injection was performed in a newly-identified source area with outstanding results in the first six months. Consequently, the DPE system remained shut down and a full-scale ERD injection was performed in the core area of the plume.

Approximately 9 months after the full scale injections, a very small supplemental injection was performed in the off-site area where the pilot study was done and another in an area where no injection was performed. One year after the full-scale ERD injection, cVOC concentrations are below the target cleanup levels in all wells with the exception of two slightly elevated VC concentrations, which are expected to decrease shortly.

Technology Description

3-D Microemulsion is an engineered electron donor material that offers a novel 3-stage electron donor release profile, pH neutral chemistry and is delivered on-site as a factory-emulsified product.

RegenOx is an advanced chemical oxidation technology that destroys contaminants through powerful, yet controlled chemical reactions and not through biological means. This product maximizes in situ performance while using a solid alkaline oxidant that employs a sodium percarbonate complex with a multi-part catalytic formula.

Bio-Dechlor INOCULUM Plus is an enriched natural microbial consortium containing species of Dehalococcoides sp. (DHC). This microbial consortium has since been enriched to increase its ability to rapidly dechlorinate contaminants during in situ bioremediation processes.