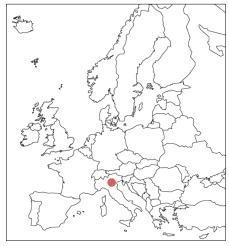


# Redevelopment of Former Manufacturing Facility, Northern Italy Low concentration chlorinated solvent treatment via ERD





## Summary

Industrial activities at a former industrial site undergoing redevelopment in Northern Italy resulted in chlorinated solvent groundwater contamination requiring remediation. Contamination consisted of chlorinated constituents 1,2-Dichloropropane at 9  $\mu$ g/L and 1,1-Dichloroethene at 1  $\mu$ g/L.

However, the aquifer also showed a marked concentration of a competitor electron acceptor (approx. 1,000  $\mu$ g/L sulphate). Due to very low target contaminant concentrations and difficult geology, physical and chemical remediation methods were rejected, and in-situ anaerobic bioremediation using Regenesis' 3-D Microemulsion was deemed the most cost effective approach.

## **Treatment**

A total of 17,000 L 3-D Microemulsion was applied by Direct-Push into 26 No. injection points in a grid configuration with 3m by 3m spacing. Target treatment depth was 2m to 6m BGL within a saturated soil matrix with clay lenses formation.

## Overcoming Challenges of Low Concentrations in Low Permeability

The challenge of treating very low contaminant concentrations within a low permeability formation was overcome by enhanced anaerobic bioremediation. Additionally, a mix of contaminants and competing electron acceptors did not hinder the performance of 3-D Microemulsion. Remedial works were completed in 2012 and long-term monitoring is ongoing.

#### Remediation Details

## Site Type:

Former industrial facility

#### **Remediation Driver:**

Site redevelopment

## **Remediation Approach:**

Anaerobic Bioremediation / Enhanced Reductive Dechlorination (ERD)

#### Technologies:

3-D Microemulsion®

| Geology |         |
|---------|---------|
|         | Bedrock |
|         | Gravel  |
| Χ       | Sand    |
|         | Silt    |
|         | Clav    |

| Medium |                |
|--------|----------------|
| Χ      | Groundwater    |
|        | Saturated Soil |
|        | Vadose Zone    |

| coc |                  |
|-----|------------------|
|     | Petro HCs        |
|     | Petro LNAPL      |
| Χ   | Chlorinated VOCs |
|     | Metals           |

## **COC Concentration Levels:**

Dichloropropane - 9 μg/L Dichloroethene - 1 μg/L

## **Treatment Depth:**

2m to 6m BGL

## **Remediation Cost:**

€30.000