



CASE STUDY

Anaerobic Bioremediation for Chlorinated Ethene Impacts in Complex Aquifer Guarulhos, Sao Paulo

Background

DURATION:	14 months
LOCATION:	Guarulhos, Sao Paulo
CLIENT:	Industrial Facility
PROJECT VALUE:	2,250,000 reals

At an active industrial facility in Guarulhos, historical spills of the chlorinated ethene trichloroethene (TCE) resulted in impacts to the underlying shallow silty sand unconfined aquifer. Dechlorination of the TCE lead to additional impacts to the aquifer from , cis 1,2 dichloroethene, and vinyl chloride. Historical pump & treat operations were unsuccessful at remediating the plume thus the client was looking for alternative treatment methods. ASR in conjunction with the client's consultant developed a remedial work plan that used anaerobic bioremediation to address the dissolved phased chlorinated ethenes. ASR's remedial plan used direct push technology to effectively deliver the reagents to the impacted aquifer.

Approach

The owners of the industrial facility along with the owner's consultants worked with ASR to develop a remedial work plan that included additional high-resolution characterization of the impacted aquifer that led to significant cost savings for the remedial program. The program included membrane interface probing, compound specific isotopes and DNA analyses of the aquifer system. Based on the updated conceptual site model (CSM) ASR was able to work with the consultant and client to develop a remedial plan that used anaerobic bioremediation to reduce the contaminant mass within the aquifer to below the regulatory limits and eliminate risks to humans and the environment as well as limit liability associated with off site migration. The remedial plan was based on injecting a mixture of organic donors including fast and slow-release organic carbon along with micro and nano zero-valent iron to address any potential back and matrix diffusion issues.

InSitu Remediation Services Ltd. (IRSL) is one of Canada's most experienced remediation companies. Our team has designed, implemented, and optimized, soil and groundwater remediation programs in diverse geological environments in North, Central, and South America, Asia, Europe, and the Middle East.

We confidently implement innovative solutions, based on sound knowledge, using seasoned field staff. Our pragmatic, flexible approach reduces effort, cost to our clients, and environmental risk.



Challenges

Several conditions at the site made this project challenging including:

- Large variation in aquifer variability
- Active site
- Back and matrix diffusion concerns

Results

The results of the chemical oxidation program included:

- Over 688,000 kg of remedial solution being injected over a 10-week period at low pressure
- Reduction of TCE concentrations of greater than 99.99 percent for a three-year period
- Reduction of 1,2 DCE concentrations greater than 99.99 percent for a three-year period
- Reduction of vinyl chloride concentrations greater than 99.99 percent for a three-year period

