



CASE STUDY

PCE

Background

CLIENT: Large Commercial Retailer

DURATION: Ongoing

LOCATION: Wallaceburg, Chatham-Kent,
Ontario, Canada

PROJECT VALUE: \$75,000 CDN

As part of a commercial redevelopment project in Wallaceburg, Ontario, a property formerly occupied by a drycleaner and then a gas station required remediation to mitigate tetrachloroethene (PCE) impacts, an artefact of the dry-cleaning operation.

The vacant lot, in a mixed commercial, industrial, and residential neighbourhood, necessitated a green approach requiring minimal infrastructure and disruption, and leaving a very small ecological footprint.

Approach

The landowner, a large commercial retailer, contracted an international environmental consulting firm to complete the site characterization and performance monitoring. On behalf of their client, the consultant tendered the project for bid to three companies, who submitted recommendations and approaches for remediation.

IRSL earned the project based on their superior approach, which also cost significantly less than other techniques submitted for consideration.

Abiotic and Biotic Dechlorination:

To mitigate the PCE and its related daughter products with minimal disruption to the surrounding neighbourhood, IRSL planned and executed an in-situ remediation program combining abiotic and biotic dechlorination.



GEOLOGY: Silty clay

PLUME SIZE: Approx. 45 m²

APPLIED TECHNOLOGIES

IRLS used Direct Push Technology (DPT) to inject the compound EHC™ at multiple vertical intervals on a grid system.

This technique combined abiotic dechlorination, via zero-valent iron, and biotic dechlorination, using organic carbon. PCE is susceptible to reductive dechlorination by both microorganisms as well as abiotically using compounds such as zero-valent iron. The EHC acted as a cost-effective, slow-release electron donor to generate reactive minerals via microbial iron and sulphate reduction while the organic carbon stimulated microbial activity.

Two additional injections were required to mitigate a hotspot approximately 10 m².

Injection 1 :

- Completed in 4 days.

Injection 2 —Hotspot:

- Completed in 1 day.

Injection 3 —Hotspot:

- Completed in 1 day.

Challenges

Although the first injection was successful in eliminating the PCE and reducing the plume size by greater than 85%, a second injection was required. This injection further reduced the plume, however, the rate of reductions were not as great as expected. IRSL recommended Gene-Trac® testing to the consultant in order to quantify and characterize the key dechlorinating bacteria in the subsurface. The testing confirmed that the native bacterial population was insufficient to complete remediation. To successfully solve the issue, IRSL bio-augmented the final injection with KB-1 culture.

In addition, the silty clay on this site had a low hydraulic conductivity that required specialized injection equipment.

Results

- Proactively recommending bacterial testing minimized increases to the original budget and remedial time frame.
- To date, over 92% of the plume has been remediated to within the Ministry of Environment's Table 3 Standards for industrial sites for PCE and its daughter products.



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

**For more information,
contact:**

InSitu Remediation Services Limited
St. George, Ontario, Canada

T: 289.208.8832
E: info@irsl.ca

IRSL.CA