

CASE STUDY

GASOLINE



Background

CLIENT: Environmental Consulting Firm, on behalf of a Petroleum Company

DURATION: 18 months

LOCATION: Cobourg, Ontario, Canada

PROJECT VALUE: \$272,000 CDN

The decommissioning of a gas bar, situated in the parking lot of a shopping mall, required remediation to prepare the site for new development. The busy location necessitated a discrete approach, on a small site based between two operating stores, with no disruption to local businesses.

GEOLOGY: Overburden and fractured shale.

PLUME SIZE: 3,000 m²

Approach

The petroleum company hired a local environmental consulting firm to characterize the site, complete preliminary sampling, and monitoring; the consultant recommended an integrated approach.

Integrated Remediation:

- 1 A contractor was hired to demolish the gas bar infrastructure and remove as much of the impacts as possible from the area directly in and around the Underground Storage Tanks (USTs) through a standard dig and dump excavation.
- 2 IRSL was contracted to develop and execute on a green in-situ remediation plan to mitigate the remaining impacts, including those under the plaza parking lot.

To mitigate the gasoline without disrupting surrounding businesses, IRSL combined chemical oxidation and aerobic bioremediation, which required little infrastructure and ensured a very small ecological footprint.



APPLIED TECHNOLOGIES

IRSL used infiltration galleries to treat any residual Non-Aqueous Phase Liquids (NAPLs) in the source zone where the tanks had been situated and Direct Push Technology (DPT) to address the plume.

Nine injections were completed, each one requiring 4-2 days (decreasing as the plume shrunk in size).

1 Chemical oxidation:

Activated persulphate was injected to chemically oxidize any residual petroleum hydrocarbons (existing as NAPL, sorbed, and dissolved phases) within the source and plume zones.

Upon activation, persulphate ions produce very powerful sulphate and other free radicals, which enhance the oxidative destruction of petroleum hydrocarbons in the subsurface.

2 Aerobic bioremediation:

Oxygen-releasing materials were then injected to stimulate the native bacteria to degrade the remaining hydrocarbons following chemical oxidation.

Challenges

Several characteristics made this site exceptionally challenging:

1. Presence of NAPLs required an integrated approach.
2. Existing utilities buried on-site required limiting the treatment choices in those areas to non-corrosive compounds. The high permeability of the gravel surrounding the utility pipes altered the plume and injection configuration.
3. The relatively low hydraulic conductivity of the fractured shale made accessing the hydrocarbons within the shale, as well as attaining good distribution, difficult.

Results

- Despite the unique challenges with this site, the project was completed on time and on budget.
- The result met the Ministry of Environment's Table 3 Standards for commercial sites.
- Post-injection samplings have confirmed the site has remained within Ministry standards for over a year.



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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.

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