

CASE STUDY

PHC REMEDIATION WITH A PERMEABLE REACTIVE BARRIER USING PLUMESTOP™

BACKGROUND

CLIENT: INTERNATIONAL RETAILER

DURATION: 2 MONTHS

LOCATION: CALGARY, ALBERTA

In Calgary, Alberta, a former retail gas outlet belonging to a large international retailer had released petroleum hydrocarbons (PHCs) into the subsurface resulting in a plume that had migrated underneath a residential neighbourhood. Remediation using a Dual Phase Vacuum Extraction (DPVE) system failed to reduce the dissolved phase concentrations to acceptable levels, therefore a new solution was required to stop the further flow of contamination underneath the residential neighbourhood.

APPROACH

The retailer hired an environmental consulting firm to assess the extent and flow of contamination on the site and in the adjacent neighbourhood. The consulting firm concluded that a Permeable Reactive Barrier (PRB) was the most appropriate response to mitigate the transport of PHCs underneath the neighbourhood.

GEOLOGY: Clayey Silt, Sandy Silt and Silty Sand

PLUME SIZE: Approximately 175 m wide

Design

IRSL worked alongside Regenesi to design an effective PRB for the site. Regenesi is the manufacturer of PlumeStop™, a proprietary form of colloidal activated carbon (CAC), and ORC™, which were utilized to form a PRB to mitigate the migration of the PHCs. The combination of these reagents allowed for a flexible treatment approach to the PHCs, using adsorption and aerobic biodegradation to treat the PHCs.

Construction

Direct Push Technology (DPT) was utilized to create a PRB that was approximately 175 meters long and ranging from 6.5 to 19 meters below ground surface. Approximately 60 temporary injection points were utilized to create a PRB over a six-week period. The use of DPT allowed for the injection of PlumeStop™ and ORC™ at several vertical intervals, ensuring both vertical and lateral dispersion of the reagents. In total, nearly 30,000 kilograms of PlumeStop™ and over 8,000 kilograms of ORC™ were used in the implementation of the PRB.



Challenges

- The large scale, the largest implementation of PlumeStop™ in Canada thus far, of this project required the development of an efficient procedure and system for injecting large volumes daily.
- The depth and vertical heterogeneity of the geology and plume required detailed characterization by the consultant in order for a cost and technically effective design to be developed and implemented.
- The public location of the injection, as well as harsh winter weather conditions for the duration of the project, necessitated detailed logistical planning regarding for the storage, movement, mixing, and injection of the reagents.

Results

- The reagents were injected effectively throughout the PRB target zone on budget and under the time estimated. Preliminary results indicate that the PRB is performing as designed.



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.

**For more information,
contact:**

InSitu Remediation Services Limited
St. George, Ontario, Canada

T: 289.208.8832
E: info@irsl.ca

IRSL.CA