

CASE STUDY

FUEL OILS WITH PAHS & CHLORINATED ETHENES IN TORONTO, ONTARIO

Background

CLIENT: Municipal Government

DURATION: Ongoing

LOCATION: Toronto, Ontario, Canada

PROJECT VALUE: \$25,000 CDN per year

Along the shore of Lake Ontario, in Toronto's Portlands, an area over 2 km² and the former site of a petroleum hydrocarbon storage facility required remediation to mitigate contamination caused by historical spills and leaks. The expansive area required a robust, permanent system able to operate continuously year-round in all weather conditions.

The municipal government had originally hired another remediation contractor, who installed and operated the system. An analysis of the effectiveness of the system, including treatment train, capture zone analysis, and financial effectiveness, indicated that the system was not being utilized to its fullest potential.

Approach

When the initial contract for ongoing remediation efforts expired, the municipal government offered the project by competitive bid to three firms. IRSL earned the project renewal based on their ability to effectively analyse and optimize the existing system.

GROUNDWATER PUMP & TREAT SYSTEM

To most efficiently capture and treat the Fuel Oil, LNAPL, and groundwater impacted with Petroleum Hydrocarbons, PAHs (Polycyclic Aromatic Hydrocarbons) and Chlorinated Ethenes, IRSL analysed, refurbished, optimized, and continues to adjust and maintain the Pump & Treat Groundwater System.

GEOLOGY: Fill & Glacial Till

PLUME SIZE: ~2,000 m²

ANALYSIS & OPTIMIZATION

To confirm hydraulic containment, the IRSL team completed pumping tests, supplemented by numerical modeling. Based on the picture they attained from this modeling, they were able to optimize the approach.

TREATMENT SYSTEM

The Pump & Treat system consisted of 3 wells, from which water was pumped into one above-ground system that treated the groundwater to levels below the regulatory limits. Recovered water was disposed of into the sewer system, as per an agreement with the municipal government.

TREATMENT TRAIN

To remove the Fuel Oil, LNAPL, and groundwater impacted with Petroleum Hydrocarbons, PAHs (Polycyclic Aromatic Hydrocarbons) and Chlorinated Ethenes, IRSL used the following methodology:

- 1 Oil/Water Separator:** To isolate and remove any NAPL.
- 2 Greensand:** To remove particles and heavy metals, including iron and manganese.
- 3 Particle Filters:** To remove additional particles.
- 4 Organoclay:** To remove oil droplets.
- 5 Activated Carbon:** To remove any organic contaminants.



Challenges

- Detailed hydrogeologic analyses were required to ensure plume capture and confirm no adverse impacts to down-gradient human and ecological receptors.
- The system required year-round operation, necessitating winterization to protect the equipment and piping against freezing in sub-zero temperatures.

Results

- Hydrogeological and geochemical testing has confirmed plume capture.
- Successful reductions in the quantity of fluids being pumped have lowered operating costs by approximately 60%.
- Over the course of the project, operating and maintenance costs have decreased relative to inflation.



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.

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