

## CASE STUDY

# PHC AND HEAVY METAL REMEDIATION IN NORTHERN BRITISH COLUMBIA



## BACKGROUND

**CLIENT:** FEDERAL GOVERNMENT

**DURATION:** 10 WEEKS

**LOCATION:** NORTHERN BRITISH COLUMBIA

A former maintenance and refueling station for highway maintenance vehicles was found to have soil and groundwater impacted with petroleum hydrocarbons and heavy metals. This site was located in a remote area of Northern British Columbia, along the Alaskan Highway. The plume on this site was shown to be spread over a large area and was found down to 12.5 meters below ground surface.

## APPROACH

An environmental consulting firm characterized the site and recommended an integrated approach to remediating the soil and groundwater.

### Integrated Remediation

IRSL worked alongside a general contractor to implement an integrated remediation approach. This included an ex situ component, which involved excavation and removal of contaminated soil and an in situ component that utilized Direct Push Technology (DPT) injections to deliver hydrogen peroxide to the impacted groundwater and soil. IRSL completed the in situ component of the project.

**GEOLOGY:** Sand and Gravel

**PLUME SIZE:** 2900 m<sup>2</sup>

## Injection System Design

- The large scale of the plume necessitated the design of an injection system that could inject large volumes of solution while ensuring the reagents injected in each DPT point accurately reflected the remediation plan.
- A system was designed and then built on site that allowed for six direct push points to be injected simultaneously while allowing for the flow rate, injection pressure and total volume for each point to be controlled individually. With this system, IRSL was able to inject up to 110,000 litres of solution per day.

## Applied Technologies

- 4.7 million litres of a 17.5% hydrogen peroxide solution was injected into 568 points using DPT to oxidize petroleum hydrocarbons in the target area.
- A small amount of citric acid and potassium citrate were added to the solution in order to act as a stabilizer and enhance the effectiveness of the hydrogen peroxide.



## Challenges

- The remote location of the site posed several logistical challenges. Detailed planning was required as all necessary tools and equipment had to be shipped to the job site well in advance, with the nearest town located 3 hours away.
- The high concentration of hydrogen peroxide (59% by weight) being used on site required an acute focus on health and safety. The system was designed to avoid leaks and any other direct contact with the source hydrogen peroxide or the injection solution. A full suite of personal protective equipment (PPE) was utilized and an emergency shower was also constructed on site.

## Results

- There was an overall average reduction of 47% in F2 petroleum hydrocarbons in the soil being treated in situ.
- This complex remediation program was completed on time and on budget.



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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