CASE STUDY

PETROLEUM HYDROCARBON REMEDIATION IN PERMAFROST CONDITIONS

Background

LOCATION: Fort Simpson, Northwest Territories, Canada

CLIENT: Property Owner

DURATION: 1 week

In Canada's remote Northwest Territories, in the town of Fort Simpson, a historical fuel oil spill of unknown origin on the site of a demolished building required remediation to mitigate risk to the population, surrounding wildlife, and aquatic life in the nearby Mackenzie River. The remote location (an hour's flight from the closest city of Yellowknife), the very short summer season, and permafrost conditions, made remediation challenging.

Approach

An environmental consultant hired by the property owner characterized the site and determined that the soil at the site was contaminated with petroleum hydrocarbons with concentrations between 17,000 mg/kg – 32,000 mg/kg. The consultant sub-contracted IRSL to complete the project based on their reputation, preparedness, and experience in remote regions.

CHEMICAL OXIDATION WITH PERCARBONATE

To remediate the petroleum hydrocarbon within the silty sand, IRSL used soil mixing with percarbonate to chemically oxidize the petroleum hydrocarbons

For more information, contact:

InSitu Remediation Services Limited
St. George, Ontario, Canada

T: 289.208.8832
E: info@irsl.ca

GEOLOGY: Silty sand
PLUME SIZE: Approximately 120 m^3

TREATMENT

To break down the petroleum hydrocarbons in the silty sand, a general contractor excavated 120 m3 of contaminated soil and mixed it with sodium percarbonate under the supervision of IRSL. The cold climate necessitated a reagent that would work effectively at low temperatures. Percarbonate was chosen due to its stability, as well as its non-reactivity with utilities and below-ground infrastructure.

The percarbonate provided an easily transportable form of oxidant that was effective for the destruction of the contaminants. Through careful and vigorous mixing, direct contact with the soil caused this reagent to chemically oxidize the hydrocarbons, resulting in the production of harmless by-products.

Challenges

- The remote region required choosing a stable oxidant that could be shipped safely over long distances and be effective at a range of temperatures.
- Limited access to equipment and technical tools required a simple approach.
- The northern climate required completing the project in the very short summer season when road access was open and temperatures and weather permitted excavation.
- The permafrost conditions made mixing the soil difficult.

Results

- The remedial program was executed in one week.
- The petroleum hydrocarbons were treated to below the applicable regulatory standards.

INSITU | INNOVATIVE TECHNOLOGIES GROUNDED IN EXPERIENCE

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