

PROJECT:

Spill of AFFF Concentrate at Military Base

CHALLENGES

The situation required a quick emergency response and a solution able to treat rapidly over 4.5 million litres (1 million US gallons) of contaminated groundwater at a heliport on a Canadian military base.

BACKGROUND

In November 2001, a leak was detected in the underground piping system responsible for transferring an Aqueous Film-Forming Foam (AFFF) solution at a heliport located on a Canadian military base. This incident resulted in the loss of 14,550 liters (3,840 US gallons) of AFFF liquid, which seeped into the sandy soils and eventually reached the groundwater at a depth of 5.4 meters below ground surface (bgs). The AFFF solution consisted of traditional firefighting surfactants, primarily propylene glycol butyl ether, and also contained per- and polyfluoroalkyl substances (PFAS), particularly perfluorooctane sulfonate (PFOS).

Given the characteristics of the aquifer present, immediate action was necessary to address the situation. Defence Construction Canada, in collaboration with Environment Canada, implemented emergency measures to effectively respond to the incident. Remediation efforts were initiated in the months following the spill, aiming to mitigate the

The logo for SANEXEN, featuring the word "SANEXEN" in a bold, white, sans-serif font. The letter "X" is stylized with a green and blue gradient.

WATER TREATMENT

Project location: Canada

Quantity of water treated: 4.5M litres (1M US gallons)

Project date: 2001

Aqueous Film Forming Foam (AFFF) is a fire suppressant used to extinguish flammable liquid fires such as fuel fires

environmental impact and restore the affected area.

- Accidental loss of concentrated AFFF foam product, a solution designed to produce firefighting foam, from an underground reservoir on a military base

SOLUTION DEVELOPED

- Work performed on the basis of an emergency response with a fixed monetary amount.
- Hydraulic containment using upstream wells to slow down the dispersion of the plume in the aquifer
- Groundwater pumping and treatment using a foaming column followed by filter column
- Sequence including sand, Ultrasorption™ and activated carbon medias
- Controlled *in situ* soil washing of the vadose zone by re-injection treated water

PROJECT HIGHLIGHTS

- Over **15,000 litres** (3,960 US gallons) @ 10% of AFFF product lost
- **175 m³** of soil treated using *in situ* washing
- Water treatment at 50 litres per minute with over **4,500,000 litres** (1,190,000 US gallons) of water treated
- Overall water treatment efficiency at over 95%
- Approximately **377 kilograms** of concentrate product recovered and **30 m³** of waste disposed at authorized facility
- Reduction of AFFF concentrations in water below acute toxicity criteria for daphnia magna and rainbow trout.



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