Fact Sheet

EX-SITU BIOVENTING PILOT STUDY
EARECKSON AIR FORCE STATION, SHEMYA, ALASKA

PROBLEM

This site had a history of several diesel fuel spills from underground storage tanks. The contaminated soil was excavated and stored in dikes on an asphalt-paved runway.

SOLUTION

We investigated the efficacy of ex-situ bioventing in a subarctic climate to meet the target cleanup levels for the remediation of petroleum products. The contaminated soil was cleaned using a bioventing technique that includes simple and enhanced bioventing. This technique uses a combination of biodegra-dation and vapor extraction, and consists of aeration and moisture replacement. Also, inorganic macro-nutrients were added to enhance microbial remediation in one of the soil pits. Year-round operation for the remediation of contaminated soil was established. Two treatment pits— 8 feet wide at the base, 16 feet wide at the surface, 4 feet deep, and 60 feet long—were constructed. Each pit contained 100 cubic yards of contaminated soil. The advantages of the modified year-round operation are as follows:

- It minimizes the wind hazard.
- It prevents dilution by rain.
- It maintains the temperature above freezing in winter.
- It protects spread of contaminants during remediation.

Also, pits can be reused for the remediation of additional quantities of contaminated soil.

RESULTS

Nutrient additions to petroleum-contaminated soil resulted in more rapid remediation and consistently higher soil temperatures than a control pile that received no nutrient additions, suggesting greater production of microbial heat in the amended soil-pile system. Soil temperatures in nutrient-amended biopiles increased relative to control soil, and initial degradation was more rapid. Inherent spatial variability of contamination in soils and cost of sample analysis make traditional interpretation techniques difficult. A video on this project is available from CRREL.

CONTACT

Dr. Mike Reynolds
603-646-4394
reynolds@crrel.usace.army.mil

Paul M. Currier, P.E.
603-646-4563
pcurrier@crrel.usace.army.mil

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Cold Regions Research & Engineering Laboratory

CRREL, 72 Lyme Road, Hanover, NH 03755-1290