NETTS PROJECT/DEMONSTRATION SUMMARY

NCBC-15-97

Title: Biocell Pilot Testing of PAHs Contaminated Soil

Lead PI/Affiliation: WES
Co-PI's/Affiliations:

Date/Duration:
Initiated - 02/97
Completed - 09/97

Abstract:

The ability of biocell technology to reduce the concentration of petroleum constituents in excavated soils through the use of aerobic biodegradation has been successfully demonstrated. The Army's Waterways Experiment Station (WES) developed a 10-yd^3 biocell. Biocells use naturally occurring microbes to degrade polyaromatic hydrocarbons (PAHs) in fuels and oils into carbon dioxide and water. Under optimum nutrient, moisture, oxygen, and temperature conditions, native bacteria in the contaminated soil use the PAHs as a food source.

The biocell system consists of commercial 10 yd^3 roll-off dumpsters or containers converted into fully contained bioremediation units. Biocell containers have an impermeable liner to reduce the potential migration of leachate to the subsurface environment. A leachate collection system is installed at the bottom of the container to capture excessive moisture in the system. Perforated pipes, installed under the contaminated soil, are connected to a blower to facilitate aeration of the soil. The blower pulls air through the soil and granulated activated carbon (GAC) canisters. The container is covered with an impermeable liner to prevent the release of contaminants and/or contaminated soil to the environment, and to protect the soil from wind and precipitation.

Results/Conclusions:

After biocell test period, the total recoverable petroleum hydrocarbons (TRPH) concentrations in the soil decreased from 4,769 ppm to below 1,000 ppm.

The unit cost per cubic yard, amortized over five years, with three operations per year, is \$40.83/yd^3 for one biocell.

Publications:

1) Burchell II, M., et al., "Biocell Pilot Testing of TPH Contaminated Soil", Draft USAE-WES Report 1997.
2) Trotsky, J. and D. Pal, "Biocell Application Guidance", NFESC, Technical Report TR-2092-ENV, July 1998.