Fact Sheet

AIR STRIPPING BY SIEVE-TRAY AERATION

PROBLEM

Diesel and volatile organic compounds were present in 8000 gallons of water that was used for ice-drilling experiments at CRREL. This water was held underground in a 200-ft-deep steel-encased pit and needed to be disposed.

SOLUTION

A method of on-site treatment and disposal was demonstrated using a compact, low-profile sieve-tray aerator provided through a Cooperative Research and Development Agreement (CRADA) with North East Environmental Products, Inc., West Lebanon, New Hampshire. The stainless-steel air-stripping unit consisted of a series of trays that were perforated with 0.5-cm holes. Ambient air was forced through these holes to create a 10- to 15-cm-high froth as contaminated water flowed across the trays. The frothing and turbulent mixing produced large interfacial areas to enhance the mass transfer.

The unit was first evaluated for removal of trichloroethylene (TCE) from groundwater at the site. The experimental wastewater was then treated in 1660-L batches heated to temperatures ranging from 25 to 38 °C. A recycle mode was established between the aerator and the holding tank at flow rates ranging from 20 to 70 L/min.

RESULTS

The unit was operated continuously from 16 March through 10 May 1993 with semi-daily sampling to evaluate efficiency of TCE removal from groundwater. Greater than 99% removal was observed in all of the samples collected.

Removal of TCE from the wastewater also was observed to be greater than 99% in all cases. Removal efficiency of diesel-range organics (DRO) was observed to be dependent on water temperature, but relatively independent of flow rate. A unit change in water temperature was about 15 times as effective as a unit change in flow rate with respect to removal efficiency. Nearly 80% of DRO was removed at 35 °C. The volatile components, including naphthalene, methylnaphthalene, and the BTEX (benzene, toluene, ethylbenzene, and xylene) compounds were removed to levels below detection. The 8000 gallons of wastewater was treated and discharged to a municipal treatment facility.

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