

**REMEDICATION OF TCE CONTAMINATED GROUND WATER USING METHANE
INJECTION TO ENHANCE COMETABOLISM DEMONSTRATION PROJECT
AT THE HASTINGS FORMER NAVAL AMMUNITION DEPOT**

Arbor D. Drinkwine (United States Army Corps of Engineers, Kansas City, MO, USA)

The gaseous nutrient injection system developed and employed at the Savannah River Site has been adapted to the air sparging/soil vapor extraction system previously installed at the former Hastings Naval Ammunition Depot (NAD) as a pilot study to treat a Trichloroethene (TCE) ground water plume. The 200-foot horizontal sparging well is oriented perpendicular to groundwater flow and sparged the plume at a nominal rate 300 scfm for three years. After 2.5 years of operation, methane was applied at a concentration of 4 percent by volume to increase the methanotroph population and degrade the residual unsparged TCE by cometabolism. Triethylphosphate was also amended at a concentration of 0.01 percent by volume to supplement low levels of phosphorous present in the aquifer. Initially, air-methane injection occurred for periods of 3.5 days followed by 3.5 days when the sparging is turned off. At the termination of the project, after nearly 4 years of operation, air-methane was injected for 2 days out of 14.

Monitoring primarily included ground water sampling of an extensive network of 28 wells placed around the horizontal well. Data indicates significant reductions of TCE occurred although water level measurements indicate the distribution of air along the length of the horizontal well was not uniform. A significant area around the injection point went anaerobic (dissolved oxygen < 0.5 mg/L). Increases of both dissolved carbon dioxide concentrations and methanotroph densities have also been observed and give further evidence the TCE reduction is due to cometabolism by an increased population methanotrophs.