Essais de traçage pour l'analyse du transport d'un panache d'éther de méthyle et de *tert*-butyle (MtBE) : Natural Gradient Tracer Test to Support Transport Analysis of a Detached MtBE Plume

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In February 2007 a large scale, multi-constituent natural gradient tracer test was commenced at a site in Yaphank, NY. The tracer study was undertaken to assist in confirming a source of environmental contamination, and gain additional insight into aquifer properties appropriate for fate and transport modeling of the contaminants. The three tracer compounds selected for inclusion in the tracer test were potassium bromide, rhodamine WT and sulfur hexafluoride (SF6) gas. These tracer compounds were primarily selected on the basis of their solubility limits, dynamic range of detection capabilities, ease of monitoring and cost of analysis, and their non-toxicity within the range of applied concentrations. The tracer compounds were introduced to the aquifer up-gradient of the suspected contaminant source. A mixed potassium bromide/rhodamine WT solution was introduced into four wells over a 24 hour period, followed by 197 days of continuous injection of rhodamine WT and SF6 gas. The injection rate was designed to minimize disturbance to the natural flow field. Bromide and rhodamine WT injection concentrations were designed to avoid density-induced tracer sinking while still providing the maximum range of detection. Migration of the tracer compounds was documented by frequent sampling within a high resolution three dimensional (3D) monitoring well network. The 3D monitoring data enabled the plotting of breakthrough curves for the tracer compounds at distances of about 200 feet, 400 feet and 800 feet down-gradient of the point of introduction. Continuous water levels recorded using data logging pressure transducers were supplemented by regular manual water level readings. In addition, the study has provided a comparison of three different tracers released under the same hydraulic conditions. Results from the tracer study have shown that bromide was the most reliable conservative tracer of the three injected. Rhodamine WT breakthrough at all sampling locations was retarded compared to bromide and SF6. We present a range of aquifer and transport properties, including site specific estimates of groundwater velocity and dispersivity for this medium sand Upper Glacial outwash aquifer. **Note: traduction française fournie en contactant l'auteur (dsorel@sspa.com)**