

Parameter Estimation of Aqueous Contaminant Transport and Storage in Heterogeneous, Alluvial Aquifers

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Abstract.

The process of back diffusion is emerging as a major factor constraining restoration of sites impacted by recalcitrant compounds. Back diffusion maintains plumes downgradient of sources of contaminants even after the source has been depleted. Ability to predict outcomes of site cleanup is important to managing the current legacy of anthropogenic releases. There are transport models available that include diffusion. These models could be used to make *a priori* predictions of benefits achieved by upgradient source depletion – if there were a way to obtain the input parameters needed.

Single well injection-withdrawal (SWIW) tracer tests are a promising area of research that may provide the needed parameters to predict cleanup benefits *a priori*. Bench-scale research is underway at Colorado State University's Center for Contaminant Hydrology to determine the necessary methodology of SWIW tests. Two short-duration, dual-tracer SWIW tests were done: one in homogeneous media obtained from the Borden aquifer in Canada and the other in a heterogeneous architecture with media obtained from F. E. Warren Air Force Base in Wyoming. Fluorescein and bromide were used as tracers. The tank tests were instructive in resolving better implementation techniques.

Determination of good SWIW methodology will be a step toward the goal of reliable *a priori* predictions of benefits achieved by upgradient contaminant flux depletion. Thus, better tools will be available for decision-making and management of expectations related to site cleanup.

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