

Furthering Hydrologic Characterization by Visual Mapping of Injection Data

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Background/Objectives. Among remediation practitioners it is a known truth: there is not sufficient understanding of the hydrology before implementing a remediation project. However, there is a largely unexplored yet abundant data mine collected *during* in situ remediation projects that can greatly enhance the understanding of hydraulic conditions. When used properly in conjunction with an adaptive remediation approach, a successful remedy and a more rapid site closure can be assured.

Approach/Activities. One of the most common methods employed for the injection of remediation fluids is pumping through drilling rods advanced by a direct push rig. When done correctly, flow rates, pressure responses and applied volumes are recorded for a given vertical interval as fluids are injected. Through the relationship between an applied pumping (i.e., flow) rate and the formation pressure response, a relative permeability can be derived for a given volume or unit of treatment. These permeability units can then be plotted, and visual enhancement applied to create a cross-sectional picture of the subsurface hydrological architecture. When viewed in real-time during injection, these pictures are a useful aid in properly directing remedial fluids to the target contaminant flux zones. Once completed, they can often greatly enhance the hydraulic understanding at a project site due to the density of data that is often collected during injection.

Results/Lessons Learned. A case study will be presented to demonstrate how this approach was used to overcome a challenging heterogeneous environment during installation of a permeable reactive barrier utilizing a liquid activated carbon substrate to cut off migration of chlorinated solvents from an industrial facility into a residential area. This led to a more optimal directing of remedial fluids, a better understanding of the more discrete nature of the permeable channels and a successful remedy implementation. The site is in the performance monitoring stage and is currently on track for closure.