

# **An Innovative Approach for Evaluating the Horizontal and Vertical Distribution of Chlorinated Ethenes in a Fractured Bedrock Aquifer**

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## **Biographical Sketches of Authors**

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## **Abstract**

During the completion of an RI/FS project in a complex geologic setting in north Florida, multiple techniques were utilized to develop a comprehensive Conceptual Site Model (CSM) for a bedrock aquifer. The CSM was developed upfront using a combination of: literature research; USGS topographic maps; bedrock topography maps; fracture trace analysis; geophysical borehole logging; review of private bedrock well logs; and review of publicly available ground water data. The CSM provided an initial understanding of the geology and hydrogeology of the bedrock aquifer.

Validation of the bedrock CSM consisted of the following field investigations: continuous lithologic logging of two boreholes located within the approximate chlorinated ethenes plume axis using Sonic drilling from 100 to 250-ft below land surface; collection of ground water samples at 10-ft depth intervals as boreholes were advanced using inflatable packers in conjunction with temporary 5-ft well screens; and the subsequent installation and sampling of four, 1.25-inch temporary vertical profiling wells (TVPWs) within each borehole.

Based on the results of the continuous packer and TVPW sampling, two horizontal flow zones representative of the upper 50-ft of affected aquifer were identified for multi-level piezometer (MLP) installations. The subsequent permanent monitoring well network consisted of 9 bedrock compliance wells to monitor the plume, which equates to about 1 well every 20 acres. By developing the comprehensive CSM upfront, and validating the model using TVPW and MLP screening methodology, the horizontal and vertical distribution of the plume was estimated, and the anticipated field investigation and long-term monitoring costs were reduced significantly.