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The Use of Seismic Stratigraphy for Waste Site Characterization

High resolution seismic reflection data were gathered over two waste sites in the South Carolina Coastal plain. The data were originally collected as part of a project to determine the feasibility of using seismic data to directly detect DNAPL. However, during the course of interpreting the data it was noted that the seismic data could be a valuable tool in understanding the depositional environment as well as determining any preferential pathways for contaminant migration off site.

The data were interpreted to provide stratigraphic information about the waste sites that would aid in determining the distribution of contaminants and provide information that could be used to map explain migration pathways off the waste unit.

At SRS M-area Seepage Basin, the channel provided a pathway through the point bars into the underlying aquifer system. Typical characterization methods did not adequately explain how the contaminants were migrating through the aquifer systems at the site. With the introduction of the stratigraphic data provided by seismic, a better understanding of how the contaminants were migrating through the aquifer was obtained.

At the Charleston Naval Weapons Station, Charleston, SC contaminant flow was controlled by the presence of a high permeability channel. The flow direction was in a different direction than was predicted by the potentiometric surface for the aquifer. Standard cross section interpretation did not detect the presence of a channel. Seismic stratigraphic methods readily identified the channel and correlated well to hydraulic conductivity data derived from slug tests.