Leveraging PRISMTM to Refine High-Resolution Site Characterization (HRSC) Techniques at a Complex Geologic Site, Washington, DC

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High-resolution, 3-D visualization tools are commonly used for characterizing the shape and extent of contamination at complex remedial sites. However, without a proper understanding of the subsurface geology, these tools are likely to inaccurately interpolate between data points, leading to the erroneous determination of contamination flow-paths and the development of ineffective remedial strategies. In this study, by incorporating PRISM™ (PRedictive Integrated Stratigraphic Modeling), a holistic approach that leverages sequence stratigraphy, facies analysis, and subsurface geophysics to accurately characterize the geology, we refine an EVS model for a large dilute plume in Washington, DC. This updated model is then used to predict contaminant flow pathways at the site.

In this presentation, HRSC tools, including membrane interface probe/hydraulic profiling tool (MIP/HPT) borings and the analysis of grab and monitoring well groundwater data are used to characterize a stable contamination plume in the aquifer. HRSC methods and EVS software are used to build a dynamic CSM, refine mass flux/discharge estimates, and evaluate contaminant discharge zones through a focused remedial approach, while PRISM™ is used to refine the stratigraphy and accurately predict contaminant migration pathways at the site.

The 3-D CSM representation of the site depicts key contaminant migration channels, mass flux estimates and contaminant mass discharge into the Potomac River. PRISM's stratigraphic study incorporated in the model reveals that the Site represents a Horst and Graben system that induced the development of structurally controlled incised valleys that constrain the migration of the plume, which was previously undetected. Thus, the integration of stratigraphic correlation with the EVS model provides multiple advantages for improved site characterization and remedial investigation.