Site Characterization and Visualization: Reducing Costs by Designing More Efficient ISTR Systems

Robert M. D'Anjou, Kerry Stonestreet, and Michael Dodson
(Cascade Technical Services, Seattle, WA, USA)

Background/Objectives. Traditionally, in situ thermal remediation (ISTR) has not been known for its finesse. It is perceived as a heavy hammer best applied for removing contaminant mass from as small of a treatment volume as possible. While low-temperature thermal applications and advances in heat enhanced bioaugmentation are beginning to change that stereotype, ISTR is still most commonly applied as a source area treatment. Designing an effective ISTR system that maximizes contaminant mass removal while minimizing overall project cost relies solely on constructing an accurate conceptual site model (CSM). Typically, the vast majority of contaminant mass at a site is contained within 5% to 10% of the total plume volume. These concentered contaminant sources are often difficult to accurately delineate, and a poorly defined source volume is the largest cause for failure to reach, or exceed, all site remedial goals following a thermal project. In this presentation, we will look at the different data sets and visualization tools needed to generate a CSM that will engender surgically focused ISTR designs to maximize project cost effectiveness while ensuring the desired outcome.

Approach/Activities. This presentation will review the different types of data that should be collected in order to appropriately design an optimal application of ISTR at a given site. A discussion of the importance of each data set are presented alongside examples of how those data sets can be combined using advanced data management and visualization tools to pinpoint contaminant plume sources, and design systems that effectively treat the source volume. Specifically we will look at the importance of Contaminant Mass Distribution and Estimate models, and ways that 3-D EVS models of MIP or soil sampling data can improve the accuracy of these models and overall ISTR system designs.

Results/Lessons Learned. Conventional site characterization approaches very often lead to underperforming remedies. Integrating advanced site characterization and visualization capabilities with all three major ISTR remedial technologies ensures that, once the CSM is tested, it is possible to select and design an optimal remedy with confidence.