

High-Resolution Site Characterization for Multisite Management

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Background/Objectives. The use of high-resolution site characterization (HRSC) offers the advantages of reducing investigative uncertainty and providing a clear and concise conceptual site model in support of streamlined remedial action decision making. The site of interest for this presentation is located at Kennedy Space Center, which is a relatively flat coastal area with a shallow groundwater table. The Fluid Servicing Road Area (FSRA) is a collective area of four RCRA sites that were investigated in parallel due to close geographic proximity and common chlorinated contaminants. FSRA is located adjacent to the Crawlerway and was a staging support area for space shuttle missions. The site grouping streamlined the investigation and delineation of the horizontal and vertical extent of contamination, allowing for prioritization of remedial action decisions. The primary contaminants of concern are the chlorinated volatile organic compounds TCE, cDCE, and vinyl chloride. The site characterization approach implemented at FSRA will be discussed, and the characterization methods and resulting benefits will be detailed.

Approach/Activities. In the process of preparing a Step 1 Engineering Evaluation (equivalent to a RCRA Facility Investigation) to verify that the site was fully delineated, an HRSC process for FSRA was developed for field application. The HRSC process involves close integration of field activities, 2D and 3D visualization, and data screening to Florida Department of Environmental Protection Groundwater Cleanup Target Levels (GCTLs) and Natural Attenuation Default Criteria (NADCs, generally 10 times the GCTL). The horizontal site delineation consisted of using the following three guidelines for DPT sample location spacing to ensure complete delineation of the site: 100-foot grid spacing for the low-concentration plume (VOCs greater than GCTLs); 50-foot grid spacing for the high-concentration plume (VOCs greater than NADCs); and 25-foot grid spacing for hot spots (VOCs more than 10 times NADCs). Vertical delineation was also completed at each location using 10-foot vertical sampling intervals. The systematic sampling density promoted high-resolution spatial data distribution and subsequently resulted in more accurate delineation. Monitoring wells were then installed throughout the site based on high-resolution characterization results and site monitoring requirements.

Results/Lessons Learned. Based on the results of the characterization, risk, receptors, and areas of impact were prioritized for subsequent remedial action. For example, effective site delineation of FSRA plumes resulted in prompt advancement of remedial phases and remedy selection for the most sensitive areas of concern, and remedy screening and design were completed to prevent contamination of surface water discharging to adjacent Outstanding Florida Water. Overall, HRSC delineation efforts have identified the following plume footprints: 50 acres, 15 acres, and 2.5 acres for the low-concentration plumes, high-concentration plumes, and hot spots, respectively. With the HRSC process in place,

future site investigations will be accomplished in a focused and expedited manner resulting in well-developed conceptual site models and accelerated transition to other remedial action phases. The process continues to be implemented and optimized at other Kennedy Space Center sites.