Usage of HRSC Tools to Create More Accurate CSMs at Two Large Manufacturing Facilities

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Background/Objectives. Our client ceased production at two large manufacturing facilities and requested thorough subsurface investigations prior to sale of the properties. High-resolution site characterization (HRSC) tools provided a detailed understanding of the conceptual site models (CSMs). The accurate CSMs ultimately allowed for efficient feasibility studies and selection of appropriate remedies. The two sites provide completely different approaches to HRSC due to contaminants of concern (COCs) and drastically different hydrogeology. Additionally, HRSC tools were utilized to obtain real-time data during remediation, ultimately making the remedy more efficient and saving the client money.

Approach/Activities. Site 1 consisted of a large dilute plume of trichloroethene (TCE) that was present in the intermediate interval of an approximately 30-foot-thick sandy aquifer. The primary tools utilized to characterize the site consisted of membrane interface probe (MIP) and hydraulic profiling tool (HPT). Based on the extensive size of the site and the thin plumes of TCE present, MIP and HPT technologies were utilized to rapidly identify and delineate the vertical and horizontal extent of TCE impacts. Over 300 MIP/HPT locations were completed, typically in north/south transects oriented perpendicular to groundwater flow direction.

Site 2 contained several COCs including chlorinated VOCs, petroleum hydrocarbons, 1,4-dioxane, light nonaqueous phase liquid (LNAPL), and dense nonaqueous phase liquid (DNAPL). The site geology consisted of permeable sandy fill material beneath and around the manufacturing building underlain by native clay with thin discontinuous sand seams. Approximately 160 laser induced fluorescence (LIF) borings were completed inside the inactive manufacturing building to locate LNAPL and petroleum hydrocarbon source areas. Following LIF investigations, approximately 280 MIP/HPT borings were completed to characterize chlorinated VOC impacts and identify potential DNAPL areas. The LIF and MIP/HPT borings were completed in a grid pattern within the manufacturing building and select areas of concern throughout the property.

Results/Lessons Learned. At Site 1, the MIP investigation identified chlorinated VOC impacted zones typically less than 4 ft thick and greater than or equal to 10 ft below the water table. Three primary source areas/plumes were identified along with several smaller, less significant areas of impacts. Two of the plumes were over ½ mile long. The CSM was utilized to select the most feasible remedies and successfully implement interim remedial measures. HRSC tools were used during the startup of the injection program to refine the program design. The detailed CSM and interim measures allowed for sale and redevelopment of the property.

At Site 2, the LIF investigation identified one large LNAPL plume of approximately 23.5 acres beneath the building and a second smaller plume of approximately 1.5 acres in a storage area. The LNAPL was present between 6 and 12 ft below grade. The MIP/HPT investigation identified 10 additional source areas of chlorinated VOCs and assisted with the identification of a DNAPL area. The chlorinated VOCs were present throughout shallow, intermediate, and deep sand units. The CSM was utilized to select and successfully implement remedial measures. The detailed CSM and corrective actions allowed for regulatory approval and our client was able to sell the property.