Targeted Characterization Expedites Integrated Design/Construction for DNAPL Response Actions

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Background/Objectives. The Former Aerovox Site is a roughly 10-acre former mill property located in an urban mixed industrial/residential area of New Bedford, Massachusetts along the banks of the Acushnet River. Comprehensive site assessment activities under the Massachusetts Contingency Plan (MCP) privatized waste site cleanup program confirmed the presence of dense non-aqueous phase liquid (DNAPL) in an area adjacent to the river, triggering a State/regulatory requirement to undertake Immediate Response Actions (IRA). Primary DNAPL components were identified as polychlorinated biphenyls (PCBs) and chlorinated volatile organic compounds (CVOCs). A compressed IRA schedule was required by MassDEP, including one month for submittal of a work plan, and just three months from plan approval to complete design and competitive procurement and initiate construction. An integrative assessment, design and flexible bid/construction approach was needed to expedite design, procurement, permitting and completion. The focus of this paper will be the considerations and challenges associated with this integrated project delivery approach and the benefits of high resolution and targeted characterization techniques used to support it.

Approach/Activities. High resolution site characterization results, including two membrane interface - hydraulic profiling tool (MiHpt) programs, a site customized Ultra Violet Optical Screening Tool (UVOST®) effort, and a mise-a la-masse geophysical analysis, were used to narrow the focus of the IRA. Two shallow soil DNAPL hot spot areas were targeted for excavation and disposal, and a third area was defined for installation of a free product recovery system to remove DNAPL from shallow and deep overburden and shallow groundwater. Subsequently, two days of direct push soil screening provided sufficient additional detail to complete the initial design. This initial working design supported permitting efforts and provided a base for engaging with prospective remedial contractors. Development of the Issued for Construction design was combined with constructability reviews at a fast pace while still providing opportunity for vetting creative alternative approaches with cost and schedule savings potential. Pre-characterization defined the limits of excavation and supported containment design performance requirements, avoiding excavation scope expansion and eliminating soil stockpiling. The integrated delivery approach facilitated going from work plan approval to competitive request for proposal (RFP) in just 8 weeks, and from RFP to project mobilization in just 4 weeks. During construction, integrating the design and construction team allowed for on the fly decisions and an adaptive construction process. For example, reconfiguration to combine two excavation areas allowed the team to reduce time and expense for excavation sheet piling. Mid-construction engineering provided supporting technical information to defer installation of an active recovery system in deference to a less costly passive recovery approach.

Results/Lessons Learned. In less than six months, the project team was able to design procure and construct a remedy that resulted in the removal of approximately 6 tons of PCB mass, primarily as DNAPL saturated soil, from the vulnerable Acushnet River waterfront. A free product recovery system was installed and tested, and passive recovery initiated. Nimble and effective change management was achieved in the face of changed conditions, including severe weather and a King tide. In addition to the time savings and risk mitigation, the integrated delivery resulted in a cost savings to the owner of approximately $150,000 on a $1.5 million project despite additional efforts to address the changed conditions.