Value-Driven Engineering for Design and Construction Management of a Time Critical Removal Action with PCB-Impacted Soil/Sediment Including a Water Control Structure Dam Removal

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Background/Objectives. A time critical removal action (TCRA) for sediment and bank remediation for PCBs was performed at a Superfund site in Michigan within a 1.7 mile river reach. The objectives were to remediate the near shore banks (10-20 feet upland of the river), remove impacted in-channel sediments, stabilize the channel and install appropriate bank treatments to minimize future bank erosion. Based on the time constraints of a TCRA, the approach to design, work plan development, procurement and construction management must be flexible, as well as adaptive and value driven, to achieve the various technical and legal requirements. For a TCRA involving sediment and bank soil removal and stabilization integral with a dam removal, multiple design and implementation factors were managed simultaneously to achieve a successful project that met regulatory or other requirements/expectations of the EPA, Michigan DNR (primary land owner), and other stakeholders. One of the primary team challenges was the limited availability of design data prior to the start of the project (FS stage) including PCB concentrations/location, topographical and bathymetry surveys, geotechnical data and general site physical characteristics.

Approach/Activities. To meet the schedule requirements, the project was broken down into nine segments called Bank Stabilization and Restoration Areas (BRSA) which allowed the work to start before the entire design was completed. The BRSAs were generally defined by a geomorphic change in the river (steep slope, meander, etc.). In order to define the extent of the remediation excavations, a predesign investigation was completed along the 1.7 mile reach, which included sediment cores and bank soil samples. Concurrently with the predesign investigation, bathymetric, geotechnical and topographic surveys were conducted to provide critical information for the various 1-D/2-D hydrodynamic models and 3-D visualization tools required for development of the sediment, bank removal, bank stabilization, and restoration design. While the 30% design was completed for BRSA 1, a short list of qualified contractors was defined and a bidding package was created with a mix defined and performance-based bid items to balance the cost risk of bidding with a limited design. Real-time design, procurement and proposed work sequencing information was presented at routine stakeholder/regulatory meetings to maintain collaborative, effective, and efficient review of the design and implementation of the work in the field. This process of information sharing and decision making was effectively managed by EPA's On-Scene Coordinator (OSC) and was critical to progression of the project.

Results/Lessons Learned. Early predesign sampling and collection of field data were critical to development of the modeling and visualization tools, which were essential for development of the final design for each BRSA. Effective presentation of the design information as it progressed was critical for the buy-in of the stakeholders and regulatory agencies. Early procurement of the contractor promoted a collaborative design/construction environment where constructability was incorporated into the design of each BRSA. The design and construction work will be completed in summer 2018.