

Geochemical Fixation of Hexavalent Chromium Site Resulting in Expedited Remediation and Significant Reduction in Liability and Cost Savings

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Background/Objectives. In September 2011, a Record of Decision (ROD) was issued to remediate soil source areas impacted by hexavalent chromium at a site in New Jersey. The ROD included Feasibility Study (FS) estimates over \$22,000,000 to complete remediation of approximately 130,000 tons of impacted, unsaturated source soil, not including previously incurred remedial costs for groundwater remediation. For small manufacturing companies, costs of that magnitude represent a serious concern to corporate financial health and survival. Panther Technologies (Panther) was contacted by the Board of Directors to evaluate the ROD remedy and validate the FS costing of remedial implementation. Because of Panther's review and experience, a design/build approach was developed that not only satisfied the USEPA's ROD components in an expedited timeframe but also projected completion by half the costs in the FS.

Approach/Activities. The ROD remedy included geochemical fixation of hexavalent chromium in soil in excess of the most stringent soil standards. The FS cost evaluation were based on investigations performed by CDM on behalf of USEPA that included conservatism with respect to implementation of the geochemical fixation remedial alternatives. As such, Panther prepared an aggressive and innovative remedial design/remedial action (RD/RA) approach to fast track the project schedule and significantly reduce the overall costs that included pre-design investigation activities with support from a national environmental consultant as a member of our team.

In late 2013, Panther completed the expedited RD phase that pre-delineated the site using post-excavation equivalency soil sampling; compared a suite of chemical reductants during treatability study testing for chemistry optimization; developed a site-specific impact to groundwater soil cleanup criteria per NJDEP requirements; and detailed an aggressive ex-situ soil mixing program. Numerous site constraints were considered during the RD that would impact future remedial activities during construction including onsite buildings containing asbestos requiring abatement/demolition, proximity of deep excavations adjacent to an existing, operating asphalt paving plant, proximity of residences to the area of excavation and treatment activities (<100 feet) along with construction impacts of excavation to 40-foot bgs while treating all soil onsite.

In late 2014, Panther mobilized to complete the RA phase which included demolition, site setup and soil treatment plant assembly involving on-site soil screening, mixing of over a million pounds of calcium polysulfide, and subsequent stabilization prior to backfill. In February 2015, excavation, ex-situ soil treatment, post-treatment soil sampling and analysis, and backfill activities were initiated and completed in 13 months. Off-site soils near the asphalt plant were addressed using precise excavation using trench boxes and sheet piling and installation of helical piles to support the silo of the plant prior to micro-tunneling under the silo to remove a discrete, impacted bog iron layer. Panther's aggressive remedial program fully complied with the ROD, where we completed the remedial program two years ahead of schedule, eliminated the hexavalent chromium source of groundwater contamination in the soil by removing and treating over 107,500 tons of impacted soils, while also reducing remedial costs by 40% over

the ROD estimates.

Results/Lessons Learned. This presentation will focus on the expedited nature of the project by implementing an adaptive site management approach in conjunction with the USEPA and USACOE to achieve success in reducing the liability associated with the site using a design-build approach to Superfund cleanup where the project coordinating firm also served as the approved field contractor for the project.