Implementation Lessons Learned from a VOC-Contaminated Coastal Site in Monterey, California

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Background/Objectives. As the implementation of enhanced reductive dechlorination (ERD) for chlorinated volatile organic compounds (CVOCs) continues to evolve, greater efficiencies and performance are being achieved. These improvements are the result of leveraging well-developed conceptual site models, adhering to and implementing remediation hydraulics best practices, use of next-generation remedial reagents, and real-time field monitoring coupled with concurrent injection modifications. Data gathered from an ongoing ERD project in Monterey, California, demonstrated excellent performance after a single injection event.

Approach/Activities. While in situ chemical oxidation (ISCO) often is a primary technology choice for elevated CVOC concentrations, this project confirms the efficacy and efficiencies of ERD treatment for high concentration sites. Close integration of design engineers and experienced field injection crews allowed for critical reagent application adjustments. These modifications were based on real-time data related to a suspected non-aqueous-phase liquid and/or highly adsorbed mass area. Another notable technical challenge was the presence of the chlorinated contaminants in a very conductive, yet heterogeneous aquifer setting with a nearly flat potentiometric surface. Distributing the electron donor in this low/no advection environment required application of a higher injection volume to compensate for the low/no advection distribution of donor. The selection of a donor with an advantageous hydrophile/lipophile balance enhanced the distribution of the donor to achieve the required ROIs, which were confirmed via field piezometer sampling.

Results/Lessons Learned. By directly involving the remedial injection contractor throughout the remedial design program a lump-sum fixed price contract was arranged providing greater cost-control and cost-certainty. Post-injection monitoring results illustrate the need for a thorough understanding of pre- and post-injection site conditions for all remedial steps. A discussion of critical lessons learned will include in-the-field adaptive management approaches, the importance/value of near real-time field data collection efforts and the close coordination between injection design and implementation stages.