

Optimized Cleanup Outcomes Through Proactive Combined Remediation

Paul M. Dombrowski, P.E. (pdombrowski@isotec-inc.com) (ISOTEC Remedial Technologies, Lawrenceville, NJ)

At many projects Feasibility Studies underestimate remediation time and cost, often due to limitations of the single selected remedy. Combined remedy treatment programs are being applied at many contaminated sites where more than one remediation technology is implemented to treat and/or remove contamination in efforts to achieve site-specific objectives. More often multiple technologies are performed reactively where additional technologies are used when one remediation technology was no longer effective or was not adequate to achieve site criteria, and then another remediation process is proposed. In contrast, a proactive combined remedy approach incorporates multiple treatment processes/technologies into the remedial design. Proactively utilizing a combined technology remediation approach can improve treatment performance, increase efficiency, and reduce clean-up time and cost. A proactive combined remedy plan will harness the advantages of each individual technology, determine the most optimal remediation schedule, and better predict overall cost and cash flow requirements. Such proactive remediation planning is especially appropriate for projects with aggressive timelines.

This presentation will detail projects where combined remediation approaches were proactively planned to identify synergies in treatment and limit inhibitory effects. Consideration will be presented on regulatory considerations, reaction byproducts, contaminant mobilization, and spatial and sequential combined remediation application. In addition, the presentation will discuss combined remedy remediation projects where additional technologies were applied reactively. Example combinations that were designed proactively and implemented that will be detailed for planning and lessons learned will include in-situ chemical oxidation (ISCO) with bioremediation via enhanced reductive dechlorination (ERD), ISCO applying two different oxidants, and incorporation of surfactants to enhance in-situ remediation.