In Situ Technologies for the Remediation of Contaminated Sediments

Kelly Madalinski, US EPA, Office of Superfund Remediation and Technology Innovation, Washington, DC (503-326-6831; madalinski.kelly@epa.gov)

Remedial options to address contaminated sediments are currently limited practically to: dredging/excavation, capping, and monitored natural recovery. Each of these options present scientific and technical limitations, including ability to achieve desired risk reduction goals, implement in a cost-effective manner, or adequately address site-specific issues (e.g., presence of nonaqueous phase liquids (NAPL)). Development and improvement of in situ technologies aim to address some of these limitations as well as expand the current remedial options available.

Specifically, in situ treatment is gaining renewed interest as a potential remedial option. In situ treatment technologies have traditionally maintained an area of high interest among sediment practitioners and researchers. This level of interest stems from the tremendous potential advantages, including permanent risk reduction and lower cost to implement. However, in situ treatment technologies present significant technical challenges to deliver and keep treatment amendments in the sediments under an aquatic environment. Recent field demonstrations and ongoing research on in situ treatment are beginning to show promise in addressing these challenges.

"Active" or "reactive" capping is another in situ technology receiving significant interest and activity among sediment practitioners and researchers. Reactive capping enhances traditional capping approaches by using reactive (treatment) material within the cap to further control contaminant migration. Reactive caps may potentially address site-specific issues, including the presence of NAPL in the sediments or concerns over consolidation effects. In addition, innovative installation techniques (e.g., geotextile mats) allow for placement of the reactive material in a controlled manner. There are a growing number of full- and demonstration-scale sediment projects implementing reactive caps, including several Superfund sites.

This presentation will provide a brief overview on the current state of the art for in situ treatment and reactive caps, including recent site-specific applications.