

Subaqueous Sediment Capping from Field Investigation to Design with a Focus on Chemical Isolation

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Background/Objectives. Numerous advances in subaqueous cap design, following the publication of guidance documents in the late 1990s, have refined and improved the efficiency and process through which data for cap design can be confidently collected and incorporated into the design framework using improved modeling tools and general principles for design strategy. From progressive field investigation techniques and new technologies, to improvements in batch, column, and other methods of laboratory testing, and perhaps a better understanding of which sites or conditions warrant, the effort of small or large-scale pilot testing, experience gained, and shared on these projects has moved the science forward. On the design side, models have advanced from a relatively simple advection and dispersion equations to advanced numerical models that include exceptional functionality. Models now include default values available and referenced, script for additional sensitivity analysis through Monte Carlo or optional process function definition, all complete with user-friendly interfaces.

Approach/Activities. This presentation will outline a framework for practitioners executing a sediment cap design and will include discussions on focusing data collection efforts and modeling evaluations to tailor the results to the specific goals and objectives of the project. Key concepts from capping guidance and technical literature will be highlighted from an experienced practitioner perspective. Project examples, field and design experience, and lessons learned will be provided.

In 1998, two capping guidance documents were published *Guidance for Subaqueous Dredged Material Capping and Assessment and Remediation of Contaminated Sediments Program* and *Guidance for In Situ Subaqueous Capping of Contaminated Sediments*. Additional knowledge and project experience was been incorporated into the U.S. Environmental Protection Agency 2005 document *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* and more recently the Interstate Technology & Regulatory Council guidance document on *Contaminated Sediments Remediation Remedy Selection for Contaminated Sediments*. Combined, these four documents supplemented by numerous technical papers, design reports and presentations provide an ample database to draw from when initiating a cap design.

Results/Lessons Learned. Recent advances in chemical isolation layer modeling, supporting field investigation techniques, and overall design strategy are not explicitly discussed in main stream guidance documents. This presentation will discuss a general strategy for approaching a cap design. The presentation will discuss examples of key pre-design investigation data, how to collect that data and tailor collection to different site conditions and objectives. A framework for focusing the modeling approach, identifying tools for screening large areas, and conducting more detailed modeling evaluations where appropriate considering site objectives will be provided.