



LAND RESEARCH PROGRAM

PREVENTING THE SPREAD OF CONTAMINATED SEDIMENTS WITH INNOVATIVE TECHNOLOGY

Issue

Capping is a common strategy for managing the risk associated with contaminated sediments in rivers, lakes and other waterways. Traditionally, caps are constructed with sand and are designed to isolate contaminated sediments from bottom-dwelling organisms and other aquatic organisms and prevent the transport of contaminated sediments in the water body.

Scientific questions remain concerning the short and long-term effectiveness of traditional capping. Short-term questions include the fate and transport of contaminants during cap construction. Long-term questions include the physical stability of a cap and the fate and transport of contaminants over a long period of time.

To address some of the questions with traditional sand caps,

innovative capping materials and cap designs have been proposed. While these innovations hold promise, they require scientific investigation to determine their effectiveness.

Scientific Objective

The Land Research Program in EPA's Office of Research and Development is leading efforts at EPA to assess the effectiveness of traditional sand capping and to investigate several new and innovative capping materials. The research is designed to provide solutions to the problem of contaminated sediments in waterways.

Capping research goals:

- Evaluate the short-term effectiveness of capping
- Evaluate the extent to which the performance of a capping technology is affected by gas generation below the cap

- Evaluate the degree to which benthic and other aquatic biota affect cap performance
- Investigate how the presence of a cap affects the population and diversity of fauna in a contaminated area
- Evaluate the long-term effectiveness of capping

Research is ongoing to develop improved methods for collecting, measuring, and monitoring gas generation from contaminated sediments.

Anacostia River Study

A study at the Anacostia River in Washington, D.C. is being conducted to evaluate various capping materials, placement techniques, and long-term performance. Researchers are evaluating how effectively an innovative capping material, AquaBlok, manages contaminated sediments. The demonstration project includes an

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evaluation of the physical stability of the cap, the effect of the cap on the groundwater and sediment interface, and the impacts of the cap on aquatic organisms.

Results of the study are available in the report entitled *Demonstration of the AquaBlok Sediment Capping Technology*. Identification of innovative cap materials and collection of performance measures will continue to be a focus of the sediments research.

Eagle Harbor Superfund Study

Researchers are collaborating with the U.S. Department of Defense's Strategic Environmental Research and Development Program (SERDP) and the U.S. Army Corps of Engineers to improve cap designs and their cost effectiveness. Researchers are studying how contaminants can be transported through sediment caps and the contributions of bioturbation, pore water advection, and sorption.

The research is being conducted with the support of EPA's Region 10 Office at the Eagle Harbor Superfund site located in Washington. Engineering tools developed by the Land Research Program are being used in the research.

In another SERDP effort, EPA is evaluating in the laboratory an innovative bauxite cap for containing mercury contaminated sediments.

Applications and Impacts

Innovative capping technology research is addressing many of the scientific challenges to reduce the risk of contaminated sediments at Superfund sites and other properties. The research is providing new information and tools that are being used directly by EPA's Office of Superfund Remediation and Technology Innovation and EPA's regional remedial project managers to select the most effective and environmentally prudent remediation techniques at contaminated sediment sites.

Research has:

- Increased awareness of the need to minimize resuspension during cap construction
- Provided a successful study of AquaBlok capping technology
- Demonstrated the effectiveness of bauxite as a sorbent for mercury with bench-scale testing references

REFERENCES

Evaluation of Sediment Agitation and Mixing into the Surrounding Water Column from Capping Activities at the Wyckoff/Eagle Harbor Superfund Site, EPA/540/R-05/013, July 2006.
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