

## **Field Demonstration of Active Caps: Innovative Capping and In-Situ Treatment Technologies**

**Hazardous Substance Research Center/South & Southwest  
Louisiana State University, Baton Rouge, LA 70803**

**Project Status Report for the 12 month period 2/1/06 through 1/31/07 to:**

**Government of the District of Columbia, Department of Health, Environmental Health  
Administration, 51 N Street NE, Suite 6039, Wash., DC 20002**

**Introduction:** The Hazardous Substance Research Center/South and Southwest (HSRC), Louisiana State University, is conducting comparative validation of innovative “active capping” technologies. The goal of “active capping” is to ensure contaminants migrating through the cap are sorbed, chemically bound, or degraded and not released into the overlying water. The project seeks to provide site-specific preliminary design information on the application of innovative technologies to the Anacostia River where historically industrial, municipal, and military activities have resulted in potentially high hazardous levels of polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), metals, and other contaminants. The project will also demonstrate, on a field scale, the ability to design and construct caps that will provide treatment of sediment contaminants while simultaneously providing containment. Two sites in the Anacostia River were selected for the field demonstration, which are designated as Area 1 and Area 2. The sites are located to the east and west of the Navy Yard. Area 1, west of the Navy Yard, is currently the site of interest and activity.

This report provides an annual report on status for the project for the twelve-month period of February 1, 2007 through January 31, 2007. During the current reporting period activity was focused on completing the 6-month and 18-month sampling event reports (*attached on CD*), planning for and executing the 30-month sampling event. A draft report from Matrix describing seepage tests at the 30 month event is also included on the CD.

**Communication:** Copies of presentations, reports and other documents are available in the HSRC web site at the direct link of [www.hsrc-ssw.org/ana-index.html](http://www.hsrc-ssw.org/ana-index.html). The web site is being continuously updated with status reports, presentations, photos, reports and plans, etc. The following materials were published during 2006:

Reible, D.D., Y. Zhu and W.D. Constant, “The Anacostia River Active Capping Demonstration Project”, Seventh Coastal and Estuarine Shallow Water Science and Management Conference, Atlantic City, NJ, May 8-10, 2006, abstract published in proceedings.

“Anacostia River Advanced Capping Project History” DVD, 2006, produced by HSRC/SSW, copies distributed to parties of the project and interest groups. (*copy enclosed*)

Reible, D.D., “Anacostia River Demonstration finds Active Caps Effectively Contain Sediment Contaminants”, US EPA, News and Trends, Issue 25, July 2006, pp. 6-8.

Lampert, D., D.D. Reible, W.D. Constant and Y. Zhu, "Monitoring of the Active Capping Demonstration Project in the Anacostia River, DC", presented with abstract published in proceedings of the SETAC North America 27<sup>th</sup> Annual Meeting, Montreal, Canada, November 5-9, 2006, p. 154.

Reible, D.D., D. Lampert, W.D. Constant, R. Mutch & Y. Zhu, "Active Capping Demonstration in the Anacostia River, Washington DC", Remediation, The Journal of Environmental Cleanup Costs, Technologies, and Techniques, Vol. 17, No. 1, pp. 39-53, Winter 2006.

**Status of Contracting/Subs:** Horne Engineering, as prime subcontractor, is responsible for subcontracting fieldwork and providing expertise in the site characterization work, design and placement of the caps and analysis of the placement and effectiveness of the technology. Their efforts during this period included completion of 6-month report and preparation of 18-month report, completion of Aquablok inclinometer data collection with HydroQual, and coordination with Battelle/EPA for the 30-month monitoring event. Horne Engineering assisted with the benthic survey and diffuser installation. Then they removed SPMD's, supported sampling, processing and shipping of samples.

During the 30 Month monitoring event, Horne assisted Battelle with geophysical and SPI surveys, conducted diver-assisted coke breeze mat sampling and shipping of same to the University of Texas. Battelle and Horne also conducted the sediment cap coring activity on the other three cells and collected 16 cores from Aquablok, apatite and sand caps plus two from control cell. Two cores from each were shipped to UT for study. Horne processed balance of cores for contaminant migration study.

**Permitting and Approval Activity:** Horne Engineering contacted agencies as needed for the 30 month sampling and survey activities. Earth Conservation Corps personnel were also involved with facility and boat use in diffuser installation. No additional permit or approval activity was performed during this reporting period.

**Construction/Design Activity:** Horne Engineering completed construction of the series of reactive caps (AquaBlok™, coke breeze, and apatite) in the Anacostia River in March and April 2004. The project was permitted under the River and Harbor Act, which is administrated by the U.S. Army Corps of Engineers (USACE). A Water Quality Certificate (WQC), in accordance with Section 401 of the Clean Water Act, was obtained from the Department of Health (DOH), District of Columbia.

After the cap construction, Horne, along with Battelle, EPA SITE and subcontractors conducted the Month 1, Month 6, Month 18 and Month 30 post-cap monitoring to verify the integrity and performance of the caps and to evaluate the potential long-term biological impact of the cap by monitoring biological recruitment of the cap surface within the capping area.

**Summary Observations:** The Month 1 monitoring findings documented successful placement of the cap described in Horne's Cap Placement Report. The Cap Placement Report and the Month 1 Post-Cap Report have been finalized, reported and posted on the project website. The

Month 6 report is also complete and results were reported elsewhere. Below are summary results from the 18 Month report:

- Bathymetric monitoring verified the physical stability and integrity of the cap.
- Coring results documented net accretion on the cap surface from regional sediment deposition.
- Overall, the cap thickness documented during the Month 18 monitoring event is consistent with objectives set forth in the design for this project.
- Chemical concentrations in the caps indicate contaminants of interests are not migrating into the cap layers. Further, monitoring indicates that all of the cap materials, including sand, are effectively containing contaminants. Data indicate that the coke mat effectively contains PAHs near the surface, particularly due to movement of new contaminated material onto the surface of the cap
- A number of worms were observed in the caps, but do not pose any threat to the integrity of the caps.
- AquaBlok was observed to reduce seepage from 1-5 cm/day to significantly less than 1 cm/day. The low permeability also led to accumulation and release of gas from the cap, although this did not appear to increase contaminant migration or decrease cap performance.

The Month 18 monitoring data document the continued success of the placement of caps. Physical, chemical, and biological monitoring at the demonstration area in the Anacostia River was continued during Month 30 (September-October 2006) to evaluate the long-term effectiveness of the reactive caps. These results are being compiled and evaluated at this time. The preliminary results from month 30 seepage tests continues to show reduced seepage from Aquablok and similar seepage rates from the control area and sand cap area. Additional monitoring will be continued for at least one more year in order to better quantify the cap performance and help identify performance benefits of active caps over conventional sand caps.

**Current Activities:** Current activities are directed toward:

- Completion of the final 18-month report
- Submission of the draft 30-month report
- Assessment of data generated from samples of 18 and 30 month events
- Assessment and planning of future monitoring events