



PROJECT ID:
594

Demonstration and Application of Amendments Targeting Comingled Organics and Metals in Sediments



AquaGate+ amendments being deployed at a Navy site.

(Photo Credit: Courtesy of ESTCP project no. ER-201131)

OBJECTIVE

The objective of this work is to demonstrate and validate performance and stability following placement of reactive amendments for in situ treatment of comingled organic and metal-contaminated sediments at Navy facilities.

PROBLEM STATEMENT

Contaminated sediment remediation represents a \$2 billion liability for

the Navy. Though activated carbon has proven effective as an in situ amendment for addressing sediments with organic contaminants, a remedy that addresses comingled organics and metals contamination is needed.

DESCRIPTION

Several amendments for addressing metal-contaminated sediments are emerging, including various metal oxides and clays.



AquaGate+ reactive amendment media.
(Photo Credit: Scott Collins)

Metal oxide-modified activated carbon is a promising treatment for addressing sediments contaminated with comingled metals and organics. However, none of these remedies have been field tested in real-world environments similar to Navy sites.

The proposed technology will combine reactive amendments to address both organics and metals. Various reactive elements will be laboratory tested for their potential to treat common Navy contaminants of concern. Likely substances include metal oxides, ion-exchange materials and other commercially available materials. Sediments chosen from several targeted sites will be used for this testing.

Amendments that show promising treatment for addressing comingled metals and organics will be carried forward for incorporation into a two-component particle that will include activated carbon for the organic phase, and a metal-specific amendment for metals. Targeted contaminants will bind to

the particles, minimizing their availability to sediment organisms and their ability to migrate through the water column. The composite particle will be manufactured by commercial vendor AquaBlok. The company has proven success with its AquaGate+ amendments in use at numerous Navy sites.

At the conclusion of laboratory testing, the three most promising amendment combinations will be field tested at one of the contaminated sites previously identified.

RETURN ON INVESTMENT

Contaminated sediments remediation represents a \$2 billion liability for the Navy. If sediment amendments can be easily delivered as composite particles and be demonstrated to perform effectively to reduce environmental exposure of problematic contaminants such as polychlorinated biphenyls (PCB), while also addressing metal contamination, the potential savings in cleanup costs could be substantial.

Although highly site-specific, it is anticipated that the concurrent treatment of organic and metal contaminants using an in situ reactive amendment could reduce costs associated with sediment remediation (i.e. design, construction and monitoring) by 50 percent or more in comparison to current alternatives such as isolation capping or dredging,

which would be realized within the first year.

In addition to cost savings, there is significant added benefit potential due to the unintended heightened environmental and human health risks associated with resuspension of contaminants following dredging operations.

NAVY BENEFITS

A remedy that addresses comingled organics and metals contamination represents significant cost savings by avoidance of more expensive dredging operations as well as reduced impacts to the delicate ecosystems characterizing many Navy sediment sites. In situ technologies such as this are less energy intensive and thus result in lower carbon emissions than conventional techniques such as dredging or dewatering disposal remedies. Sustainability is also far greater since valuable landfill space is not being utilized by materials that may be safely treated in place. Finally, this technology has the demonstrated ability to treat difficult-to-access areas such as underneath piers.

TRANSITION DESCRIPTION

Personnel from the Naval Information Warfare Center Pacific will transition the technology by teaming with the private sector (AquaBlok), which has a proven track record to provide in situ amendments for Navy benefit, in addition



to participation in workgroups, seminars and publications. Results will be conveyed and transitioned to academia and industry through venues such as the Battelle Contaminated Sediments Conference and

North American Society of Environmental Toxicology and Chemistry Conference. Regulatory acceptance will be sought by working with the U.S. Environmental Protection Agency's Contaminated Sediments Advisory Group.

CONTACT

For more specific information about this project, contact the Principal Investigator at 619-553-0886.



ABOUT THE NESDI PROGRAM

The Navy Environmental Sustainability Development to Integration (NESDI) program is the Navy's environmental research and development, demonstration and validation (6.4) program, sponsored by the Chief of Naval Operations, Energy and Environmental Readiness Division (OPNAV N45) and managed by the Naval Facilities Engineering Systems Command (NAVFAC) out of the Engineering and Expeditionary Warfare Center (EXWC) in Port Hueneme, CA.

The mission of the program is to provide solutions by demonstrating, validating and integrating innovative technologies, processes, materials, and filling knowledge gaps to minimize operational environmental risks, constraints and costs while ensuring Fleet readiness and lethality. The program accomplishes this mission through the evaluation of cost-effective technologies, processes, materials and knowledge that enhance environmental readiness of naval shore activities and ensure they can be integrated into weapons system acquisition programs.

The program is the Navy's complement to the Department of Defense's Environmental Security Technology Certification Program which conducts demonstration and validation of technologies important to the tri-Services, U.S. Environmental Protection Agency and Department of Energy.

For more information, visit the NESDI program web site at www.navfac.navy.mil/nesdi or contact Ken Kaempffe, the NESDI Program Manager at 805-982-4893, DSN: 551-4893 or ken.kaempffe@navy.mil.

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