



PROJECT ID:
585

High Efficiency Media for Metals Removal in NPDES Discharges



The MetalZorb filtration media.
(Photo Credit: Brandon Swope)

OBJECTIVE

This project team is evaluating the performance of one specific filtration media for removing metals from various discharges and sources, including stormwater runoff and other shipyard activities, to help maintain regulatory permit compliance. The team also aims to expedite field deployment of the media during the first year of the effort.

PROBLEM STATEMENT

There is a longstanding issue at many Navy facilities with meeting National Pollutant Discharge Elimination System (NPDES) permit requirements for metals from various discharges and sources, including shipyard activities and stormwater. The need exists for technologies to remove metals from these discharge streams down to permit compliance levels.

DESCRIPTION

MetalZorb® is a high-capacity sponge filtration media that effectively absorbs and reduces dissolved heavy metals, including copper, zinc, lead and mercury found in stormwater and industrial process water discharges. This media has been previously identified (in a Naval Base San Diego project) and undergone initial bench scale testing (under NESDI project no. 576: In-Pipe Stormwater Treatment System). Results indicated that MetalZorb performs better than established media such as bone char, zeolite, etc., with good metals removal efficiency under short exposure/treatment durations.

This project team will build upon previous laboratory work and evaluate the metal removal capacity of the media over longer exposure durations (several minutes) and with larger volumes of water (greater than 50 gallons).

This project will target two primary field deployment settings. The first will be identifying best management practices (BMP) that currently use some type of media for a 1:1 replacement with MetalZorb. The second will be identifying novel BMP options to include MetalZorb as part of the treatment process.

The project will consider testing and evaluation across multiple geographic areas including regional Navy bases in San Diego, Puget Sound Naval Shipyard and Pearl Harbor Naval Shipyard.

Metals concentrations for this testing will be environmentally relevant and higher than permit compliance levels. The system will be evaluated on whether or not concentrations fall below the compliance benchmarks or regulatory limits.



RETURN ON INVESTMENT

Under NESDI project no. 576, MetalZorb was deployed in a stormwater conveyance system. Before and after measurements showed metals reduction of approximately 25 percent and 45 percent for copper and zinc, respectively. If this project is able to achieve similar results, shipyards could meet NPDES permit requirements and potentially avoid annual costs upwards of \$100,000 related to a Notices of Violation (NOV) or other permit mandated responses. The ability to achieve compliance with existing infrastructure, with only minor modifications, will also provide

huge cost savings as opposed to expensive military construction projects which have recently cost between \$500,000 to \$2,000,000 for pier related upgrades for stormwater compliance.

NAVY BENEFITS

The Navy will benefit in terms of regulatory and financial relief. The ability to reduce metals discharge concentrations below compliance levels will prevent potential future NOV's as well as additional litigation from outside organizations.

TRANSITION DESCRIPTION

Technology transition and integration are built into the

demonstration/validation portion of the project, as the team will select a location for testing that will ultimately benefit from implementation of the system. Additionally, if successful, they will engage other shipyard managers and regional environmental offices about the successful deployment of the technology and the implementation strategies that were developed as part of the project. There are ample Navy facilities with NPDES discharge permits that could benefit from this technology.

CONTACT

For more specific information about this project, contact the Principal Investigator at 619-553-2761.



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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