



PROJECT ID:
615

Ex-situ Concentration and Destruction of PFAS from Aqueous Wastes



Two firemen clean the bilge aboard USS Oak Hill (LSD 51). Bilge water impacted by PFAS is one of the potential waste streams that this project is addressing. (U.S. Navy photo by Mass Communication Specialist 3rd Class Jessica L. Dowell)

OBJECTIVE

This project will leverage past knowledge and cutting-edge approaches to destroy per- and polyfluoroalkyl substances in low-concentration wastewater sources of special interest to the Navy.

PROBLEM STATEMENT

Per- and polyfluoroalkyl substances (PFAS) are widely distributed, chemicals of interest with potential human and ecological health risks. They are difficult to treat in many matrices, proposed regulatory limits are exceptionally low, and other wastewater constituents (e.g., salts, oils) can impact the efficacy of some treatment methods. At this time, many Navy sites simply containerize and store PFAS-impacted wastewater indefinitely, without workable and cost-effective methods to treat these wastes. There is need to validate various promising pre-concentration methods to identify pathways to treat PFAS-impacted waters at Navy sites.

DESCRIPTION

Both PFAS concentration and destruction technologies have been developed and demonstrated at a range of scales under the Strategic Environmental Research and Development Program (SERDP) and the Environmental Security Technology Certification Program (ESTCP). These technologies are typically for very large systems intended to remediate large volumes of water such as a groundwater plume. The focus of this project will be developing a paired treatment approach or set of approaches that can be rapidly implemented at Navy sites to preconcentrate and destroy PFAS in compliance-relevant, low-volume and complex waste streams where large-scale systems (such as a pump-and-treat) are not appropriate (i.e., bilgewater, tank wash water, etc.).

Building on prior work funded by NESDI, SERDP, ESTCP and Naval Information



Warfare Center (NIWC) Pacific, the team will evaluate preconcentration approaches for different waste streams, focusing on developing (if needed) and demonstrating a field-deployable system for treating relatively small volumes of PFAS-impacted water. Waste streams impacted by PFAS of significant concern for Navy compliance include bilgewater, oily wastewater, firefighting water, investigation-derived waste (IDW), wash water associated with military construction projects, etc. These wastewater streams represent relatively small volumes of water but are large enough that shipping them elsewhere for treatment would be costly and logistically challenging.

In Year 1 and 2, the team will evaluate individual and combination pretreatment options, aqueous concentration methods (e.g., reverse osmosis filtration, foam fractionation), and solid concentration (e.g., sorbents) for a range of different PFAS-impacted waters. The goals of this effort will be to understand how much water can be treated and at what cost and timeframe, and to understand the

volume of resulting aqueous and solid waste and their PFAS concentrations, which is critical to determining how the resulting concentrates can be further treated with various potential PFAS destruction methods.

In year 2, the team will select which destruction technologies are contenders to destroy the PFAS in the preconcentration waste produced in Year 1 and 2, and in Year 3, we will send high-concentrate waste products to selected vendors and/or collaborators for destruction. This project will result in better understanding of which types of preconcentration and destruction methods are best and cost-effective for different wastewater streams.

RETURN ON INVESTMENT

By pairing concentration with destruction technologies, Navy costs associated with using pump and treat technology followed by landfilling sorbents (a typical current approach), for all PFAS treatment needs, will be greatly reduced.

NAVY BENEFITS

By first concentrating PFAS into high-concentration, low-volume waste

streams, the Navy will see significant cost savings for PFAS destruction—and sites that now simply containerize and store PFAS-impacted wastewater will finally have a workable solution.

TRANSITION DESCRIPTION

The focus of the transition effort will be for Navy site managers and remedial program managers who are under increasing pressure to clean up their sites, and are currently required to expend significant costs to dispose of large volumes of PFAS-impacted wastewaters. The project team will produce guidelines for treating (via preconcentration followed by destruction) each type of studied wastewater stream considering costs and logistics. The deliverables of this project will aid in the implementation of onsite pretreatment technologies at Navy sites followed by destruction, resulting in significant cost savings compared to current practices.

CONTACT

For more specific information about this project, contact the Principal Investigator at 619-553-2781.



ABOUT THE NESDI PROGRAM

The Navy Environmental Sustainability Development to Integration (NESDI) program is the Navy's environmental research and development demonstration and validation program, sponsored by OPNAV N4I Installations Division and managed by the Naval Facilities Engineering Systems Command from the Engineering and Expeditionary Warfare Center in Port Hueneme, CA. The mission of the program is to provide solutions by demonstrating, validating and integrating innovative technologies, processes and materials and by filling knowledge gaps to minimize operational environmental risks, constraints and costs while ensuring Navy readiness and lethality.

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

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