National Defense Center for Energy and Environment

SUSTAINABLE MANAGEMENT OF OPERATIONAL WASTE STREAMS

PROJECT OVERVIEW

Modular systems designed that combine physiochemical sorption, microbial degradation, and phytoremediation to remove contaminants from affected waters such as residential wastewater, process effluent, landfill leachate, and stormwater. The approach makes use of a novel adsorptive media (matting made from reclaimed animal and human hair) as a biofiltration support and matrix for microbial community scaffolding and plant rooting when system is set up as hydroponic platform. The demonstrations will assess the system's effect on clarification of representative DoD process effluent streams and other contaminated waters.

BENEFITS

- Concept broadly applicable to DoD and civilian waste management issues
- Reduces environmental risks through degradation and sequestration of contaminants
- Platform design can operate as carbon negative process – promotes environmental stewardship
- Significant advancement for firefighter training site water management; treatments clarify holding pond waters, allowing re-use for training and test fires at operational sites; and an effective step in PFAS "treatment train" to promote downstream processes

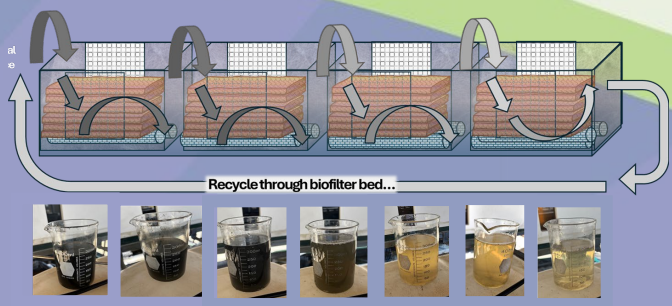
PATH FORWARD

A series of demonstrations are planned at Tyndall AFB that will evaluate processes with a range of representative waste streams and operational scales. The results will provide a basis for design of containerized platforms that may be installed at users' sites.

- Concept targeted first to management of DoD firefighter training sites, which is particularly valuable as operations shift from propane simulators back to liquid-fuel training fires; promote water reuse; and reduce site disposal costs

Firefighter tests and resulting effluent at Tyndall AFB. The complex waste stream can contain high concentrations of fire suppression agent and fuels.

Lizard's tail plants in hydroponic system circulating wastewater from firefighter test operations. The water quality is monitored regularly and PFAS sequestration determined at end of trial.



Day	0	1	3	7	14	21	28
Turbidity[a]	5527	1440	380	263	80	47	20
MBAS[b]	44.9	35.9	26.7	26.1	16.4	10.6	6.5
COD[c]	4353	nd	1023	916	720	nd	507

a- Nephelometric Units b- Methylene Blue Active Substance (mg/L)
c- Chemical Oxygen Demand (mg/L)nd- not done

Results of recent trial applying anaerobic field-scale trickle flow reactor as biofilter to clarify the dense effluent from operations site. Basic water quality assays demonstrate effectiveness and how the process facilitates downstream processing like activated carbon and other treatment approaches.

DoD Executive Agent
Office of the Assistant Secretary of the Army for Installations, Energy, and Environment

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FOR FURTHER INFORMATION

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