

SUSTAINABLE MANAGEMENT OF OPERATIONAL WASTE STREAMS

PROJECT OVERVIEW

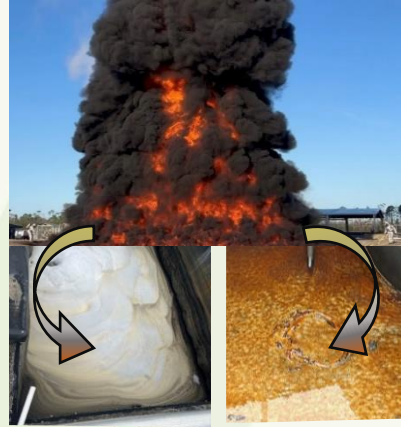
Design, fabricate, and demonstrate modular treatment systems that combine physiochemical sorption, microbial degradation, and phytoremediation to remove contaminants. The approach makes use of a novel adsorptive media, matting made from reclaimed animal and human hair (Matter of Trust Inc. 501(c)(3), San Francisco, CA). The material acts as bulk filtration matrix, scaffolding for the microbial community, and plant rooting media for hydroponic systems. The demonstrations will evaluate the treatment of representative DoD process effluent streams and other contaminated waters.

BENEFITS

- Concept broadly applicable to DoD and civilian waste management issues
- Reduces environmental risks by degrading and sequestering contaminants
- Platform design can operate as carbon negative process – promotes environmental stewardship
- Significant advance for firefighter training site water management
 - Treatments clarify holding pond waters, allowing re-use for training and test fires at operational sites
 - Provide an effective step in PFAS “treatment train” to promote downstream processes

PATH FORWARD

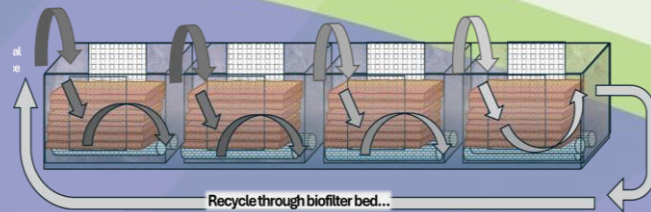
- A series of demonstrations are planned at Tyndall AFB that will evaluate approach with a range of representative waste streams and operational scales. The results will provide basis for design of containerized platforms that may be installed at users' sites.
- First target is the management of DoD firefighter training sites – particularly valuable as operations shift from propane simulators back to liquid-fuel training fires – promote water reuse – 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 and PFAS sequestration monitored.



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 process effectiveness. The reduced contaminant load and clarification facilitate downstream processing steps such as adsorption to activated carbon and ion-exchange resins.

DoD Executive Agent

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

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FOR FURTHER INFORMATION

National Defense Center for Energy and Environment
<http://www.denix.osd.mil/ndcee/>

Air Force Civil Engineer Center
<https://www.afcec.af.mil/>

Battelle Memorial Institute
<https://www.battelle.org/>