



National Defense Center for  
Energy and Environment



**DoD Lead Agent**  
Deputy Assistant  
Secretary of the  
Army (Environment,  
Safety and Occupational  
Health)



**Program Manager**  
United States Army  
Environmental  
Command



**Autonomous Robotic & Remote Refueling  
Point – Autonomous Grounding System**

# National Defense Center for Energy and Environment Program Introduction

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# NDCEE Basics

- National Defense Center for Energy and Environment (NDCEE) program demonstrates, validates, advances, and transitions technologies, and processes that address high - priority and emerging DoD environmental, safety, occupational health, energy and climate change challenges
- 3 focus areas
  - **Environment:** maximizing natural resources, enhancing water reutilization, and conservation practices
  - **Energy:** enhance energy efficiency, improve service flexibility, increase safety, and advance current capabilities
  - **Safety/Occupational Health:** increase safety, with a particular focus on reducing Warfighter exposure and risk of loss of life in remote areas and extreme environments





# NDCEE Basics

The NDCEE PMO does not restrict proposals to a set list of user needs or requirements. Instead, the process allows flexibility and dynamic responsiveness to the changing needs of DoD.

## Areas of Interest:

- Mature technologies that no longer require lab testing;
- Commercial off -the -shelf options, ensuring funding goes straight to demonstration/validation

## Project Eligibility Requirements:

### **BA4**

Budget Activity 4 eligible

### **TRL 6**

Technology Readiness Level 5-6 at entry / 8-9 at exit

### **Valid Multi-Service Need**

Must be needed by 2 or more Services

### **Technology Transition Partner**

One Service must sign policy-compliant agreement

### **Two-Year Duration**

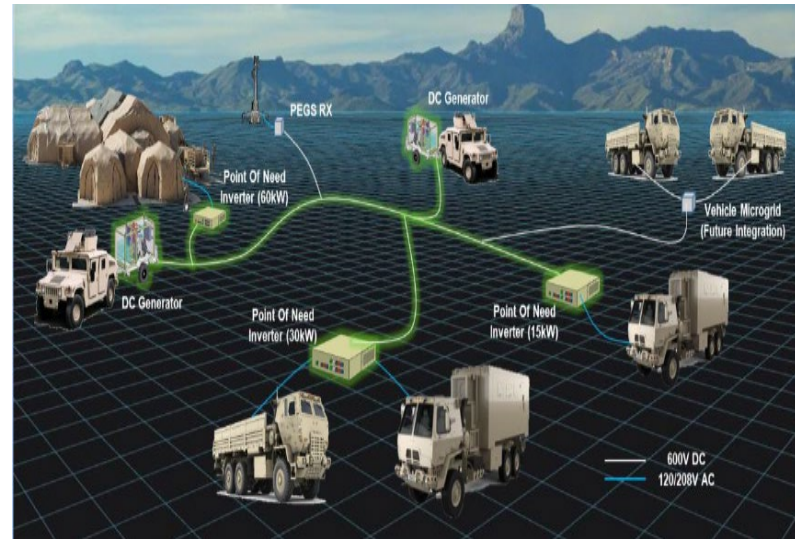
Project must be complete within two years

# Project(s) Selected in Fiscal Year 2023 (Energy)



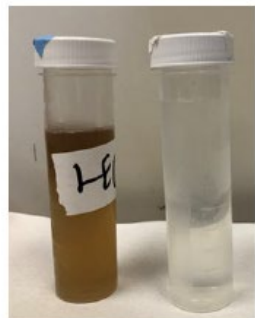
**Advanced Refrigerated Container System (ARCS)**

**Large Capacity Hybrid Power Systems**



**DC Ground Microgrid Architecture**

# Project(s) Selected in Fiscal Year 2023 (Environmental)



AFFF stockpiles stored at DoD installations  
3 to 6 wt% PFAS (30-60,000 ppm)

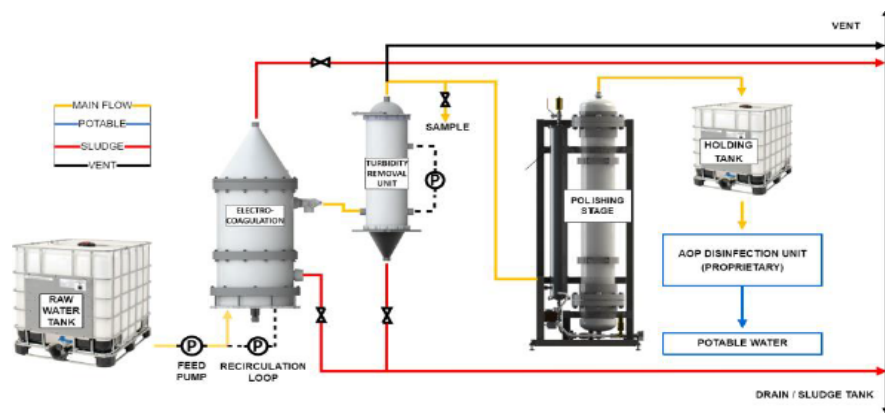
Hydrothermal Alkaline Treatment  
~99.99% destruction of all PFAS compounds  
(3-6 ppb discharge)

PFAS Effluent Treatment System (PETS)  
Removal of residual PFAS < 70 ppt PFAS discharge

## Super Critical Water Oxidation (SCWO) of PFAS on Spent Sorbents and Ion Exchange Resins

## On-Site Disposal of Aqueous Film-Forming Foam (AFFF) using Hydrothermal Destruction + PFAS Effluent Treatment System (PETS)

## Deployable Potable Water Production from Contaminated Surface and Ground Waters



Tamaqua Process Diagram



# Project(s) Selected in Fiscal Year 2023 (Safety/Occupational Health)

**Demonstration and Validation of Robotic Pulsed Water Jet De-Painting of Aircraft Confined Spaces**

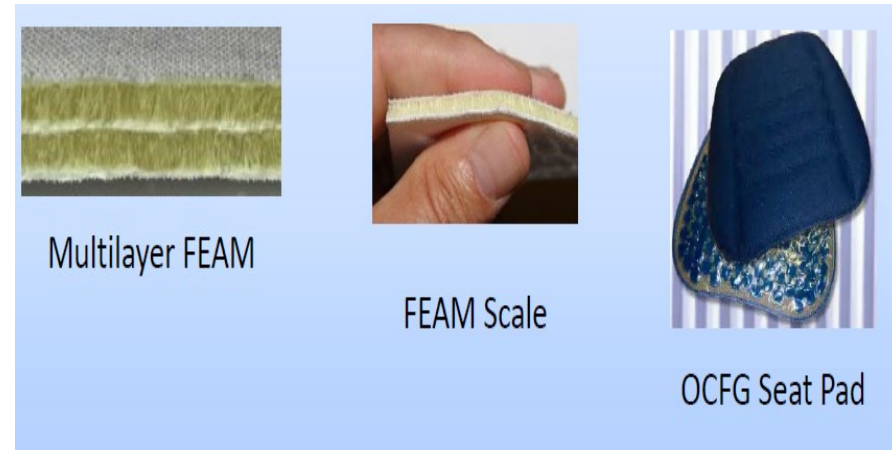


Robotic Arm



Artisan in blast suit

Current De-Painting



Multilayer FEAM

FEAM Scale

OCFG Seat Pad

**Evaluating Anti-Vibration Seat Pads to Improve Health and Safety of DoD Operators**

# NDCEE Remediation Projects

**FY16: Gray Water Treatment and Reuse System (G-WTRS)**

**FY17: Foam Filtration using Renewable Natural Fibers**

**FY19: Novel Bioaugmented Sorption Treatment Technology for CVOCs and 1,4 Dioxane**

**FY19: PFAS Effluent Treatment System (PETS)**

**FY20: An Innovative Plasma Technology for Treatment of PFAS -Impacted Waters**

**FY20: Wastewater Evaporators as AFFF Mitigation Strategy at Firefighting Training Facilities**

**FY20: The Destruction of PFAS using Supercritical Water Oxidation**

**FY20: Mobile PFAS Removal System To Support Warfighter Aircraft And Carriers**

**FY20: Energy Efficient Expeditionary Small Unit Water Purifier**

# NDCEE Remediation Projects

**FY21: Graywater Recycle Pretreatment Module for the Lightweight Water Purifier**

**FY22: ENVIROPETS for PFAS Contaminated Water**

**FY22: Zero Water Footprint Strategy for Agile Bases**

**FY23: Super Critical Water Oxidation of PFAS on Spent Sorbents and Ion Exchange Resins**

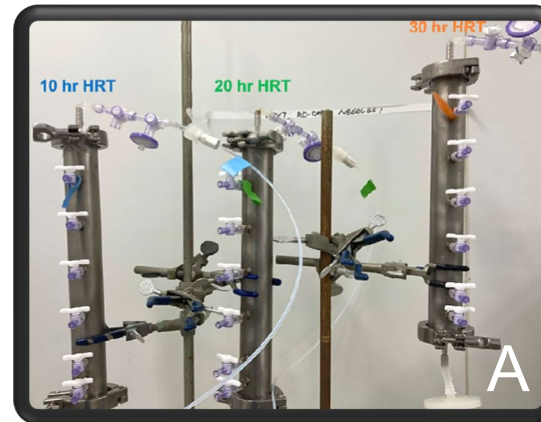
**FY23: Deployable Potable Water Production from Contaminated Surface and Ground Waters**

**FY23: On -Site Disposal of Aqueous Film -Forming Foam (AFFF) using Hydrothermal Destruction + PFAS Effluent Treatment System (PETS)**



# FY19: Novel Bioaugmented Sorption Treatment Technology for CVOCs and 1,4 Dioxane

- Principle Investigators: – NAVFAC EXWC and UCLA
- Technology Focus: demonstrate an ex-situ adsorption/biodegradation treatment train to irreversibly remove CVOCs and 1,4-dioxane from waters at a DoD site using bioaugmented adsorbents.
- Project Results:
  - Enhanced 1,4-dioxane degradation capacity to nearly 90 -100% during steady state operation.
  - Bioaugmented reactors performed 5 times better than abiotic reactors while utilizing 3% GAC to 97% sand showing significant cost savings for clean-up sites with multiple contaminants in groundwater including PFAS.
  - This is the first instance where direct metabolic treatment of comingled 1,4-dioxane and CVOCs was applied in hybrid field-scale bioreactors.



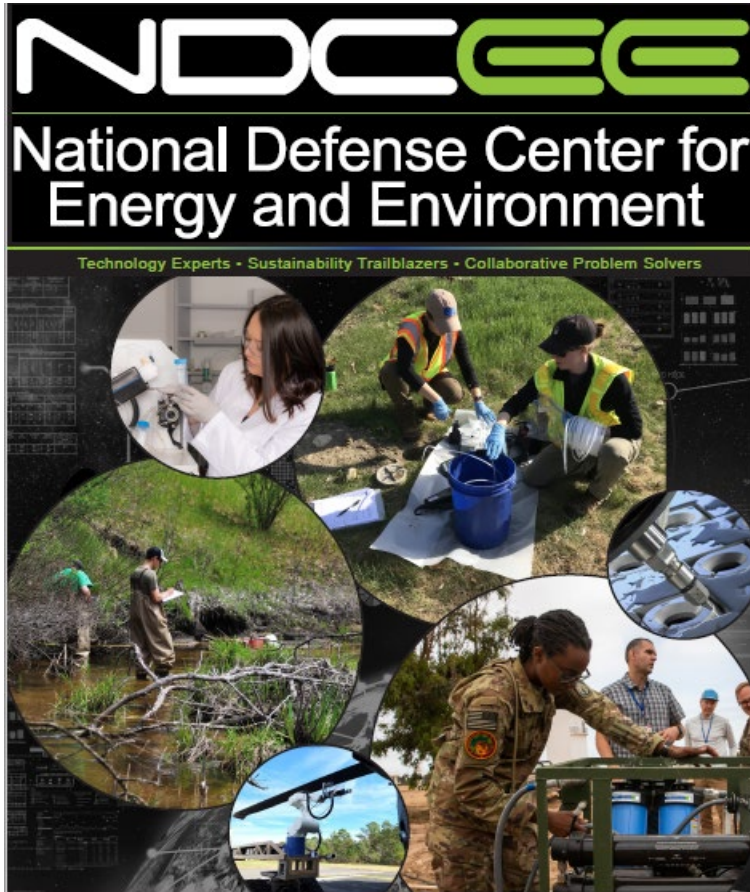
# FY20: Wastewater Evaporation as AFFF Mitigation Strategy at Firefighting Training Facilities

- Principle Investigator: AFCEC/CXAE
- Technology Focus: Examining and demonstrating thermal wastewater evaporation for AFFF-waste streams.
- Project Results:
  - Using solid-phase adsorptive media to pretreat the feedstock and then thermal evaporation, PFAS was concentrated on the media and in the evaporator brine.
  - More than 1.3 M gallons of wastewater were processed, reducing hazardous waste to <2% of original volume.
  - The operating costs-fuel, consumables, and waste disposal were \$0.36 per gallon, compared to disposal costs of dilute aqueous wastes of \$2.75 per gallon.
  - The system provides a modular platform, amenable to ready installation and start-up. The final technical report will refine the transition (and scaling) of technology application to other DoD and civilian sites.





# NDCEE recently celebrated its 30<sup>th</sup> Anniversary



NDCEE's 5-year review –December 2022

Celebrating over...

# 30

Years of  
**Technology Transition**  
for the DoD

**Our Mission ~**

As a critical component of the DoD's environmental quality investment strategy, the NDCEE investigates, demonstrates and helps field viable, mission-driven solutions that reduce total ownership costs and fulfill DoD environmental, energy, health, safety, and sustainability requirements.

Through DoD-wide participation in NDCEE program development and application of the NDCEE process, the following benefits are achieved:

1. Addressing DoD Priorities/Challenges - Proactively identify and focus on current and emerging issues; develop Service-wide programs for joint initiatives
2. Leveraging Resources - Share information and successes, synergize RDT&E execution, and enhance coordination among the Services while minimizing duplication of effort
3. Transfer of Tools and Technologies - Apply and propagate solutions in support of warfighter / mission requirements
4. Providing Value-Added / Measurable Benefits - Assess the business case to optimize return on investment; reduce life-cycle costs while enhancing readiness and sustainability.

Since its inception by Congress in 1991, the NDCEE has successfully executed hundreds of tasks to improve operations, reduce risks and costs, and enhance energy, environmental, and safety stewardship.






# FY24 Call for Proposals: 1 March – 1 April



Role	Name	Contact
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*For any questions or a request for additional information, go to <https://denix.osd.mil/ndcee/> or send an email to the program manager*