

# Air Force Civil Engineer Center

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## Federal Opportunities for Technology Developers AFCEC

October 2022



# AFCEC Goal in Advancing Innovative Technology



Promote technology solutions that (1) Improve efficiency and effectiveness of cleanup  
(2) Shorten time scales for meeting site remedial objectives

## Investment Plan

- Identify needs for innovation
- Research and development (R&D): SERDP-ESTCP
- Field scale validation of emerging technology: Broad Agency Announcements (BAA)
- Support commercialization: Optimize and upscale
- Technology transfer: Deploy innovation throughout the AFCEC enterprise





# Current Remediation Technology Needs

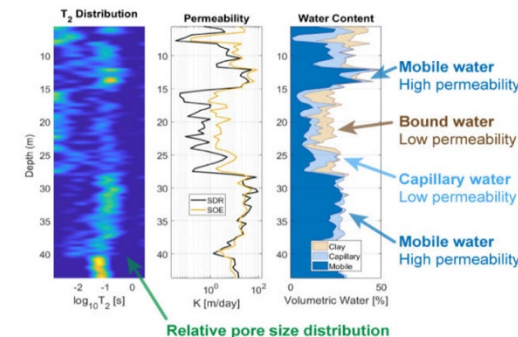


- Destructive and/or *in situ* treatment technology
  - PFAS-impacted media (soil, groundwater, surface water)
  - Legacy contaminants at complex sites (back diffusion, contaminant mixtures)
  - PFAS-legacy mixtures
- Characterization technology
  - High resolution tools/methods supporting remedy design/optimization and PFAS characterization
  - Characterization of PFAS distribution, fate and transport
- PFAS fate and transport modeling
- Sustainable-resilient approaches to cleanup

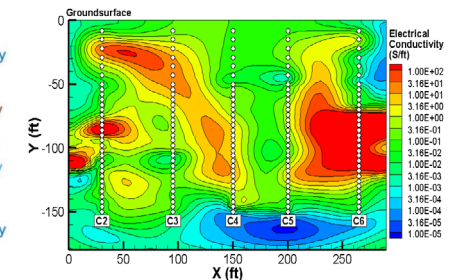
## FY21-22 New Project Starts

Challenge	Technical Focus	Awards
PFAS	Treatment	14
	Characterization	3
	Modeling	4
Complex Sites	High resolution characterization	1
	Advanced analytics/ modeling	2

### Nuclear Magnetic Resonance



### Electrical Resistivity Tomography



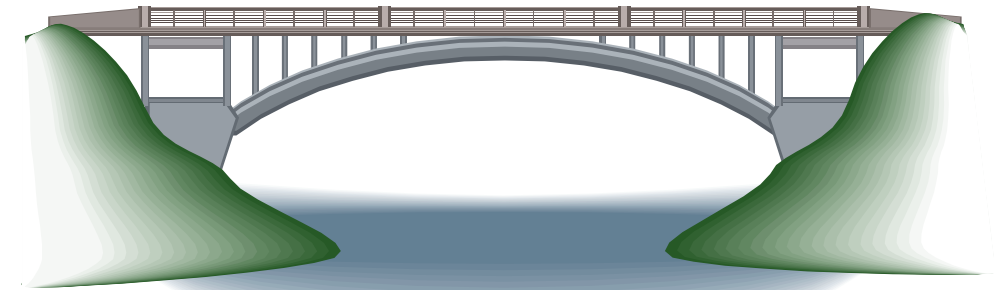


# AFCEC BAA Restoration Technology Projects



- Evaluate, upscale and optimize promising technologies that emerge from R&D
- Address complex remediation challenges for priority sites and emerging contaminants such as PFAS
- Emphasize field-scale validation of innovative technologies
- Promote upscaling and technology transfer for full-scale application
- Must provide direct and measureable benefits to site-specific cleanup objectives at DERP funded sites

## ***Bridge from R&D to AFCEC enterprise***



### **BAA Funded Projects**

- ✓ *Pre FY21 – 0 to 3 awards per year (< \$3M)*
- ✓ *FY21 – 8 awards (\$5M)*
- ✓ *FY 21-22 straddles – 3 awards (\$3.5M)*
- ✓ *FY 22 – 13 awards (\$12M)*



# Status of PFAS Treatment Technologies at Air Force Sites



Full Scale Potential	Technology	AFCEC Field Test Locations
Available	<b>Off the shelf</b> – carbon filtration, ion exchange, membrane separation, foam fractionation	Many sites
High  Need Full-Scale Evaluation	<b>Sequestration</b> – Fluoro-Sorb, RemBind, PlumeStop	Cape Canaveral, Ellsworth, Peterson, Tinker
	<b>Soil washing</b>	Eielson, Peterson
	<b>Electrochemical oxidation</b> – DeFluoro, OxbyEI, others	Wright-Patterson, Davis-Monthan Travis, Tyndall, Goodfellow
Moderate	<b>Supercritical water oxidation</b> – Annihilator	Hill, Peterson
	<b>Ultrasound mineralization</b>	TBD
Need Pilot-Scale Optimization	<b>Electrical discharge plasma reactor</b>	Wright-Patterson, Hill, Tyndall
	<b>UV photochemical treatment</b>	Peterson





# Deploying Innovative PFAS Treatment Technology



## ■ Challenges

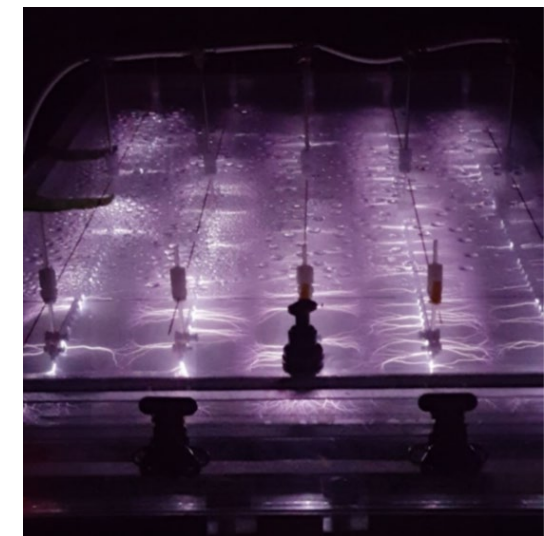
- Perform onsite destruction of parent PFAS and short-chain PFAS byproducts
- Destroy or neutralize byproducts to avoid incineration or landfilling (e.g., HF)
- Replicating bench efficiency at large scale
- Demonstrate cost-benefit relative to off-the-shelf technologies

## ■ Barriers

- Limited technology demonstration-verification opportunities
- Inability to match existing dem-val conditions to site conditions
- Scaling from lab to large field system can be time consuming
- Reluctance to test/adopt new technologies (regulatory and time commitments)



*Pixie Dust – Bottled*



**Plasma Technology for PFAS Destruction**



# FY21 Awards



Award	Offeror	BAA ID	Title	Installation
FY21	OXbyEL	2102	Continuous Flow Field Pilot to Completely Mineralize PFAS in Groundwater	Davis Monthan
FY21	Battelle	2104	Field Demonstration of PFAS Destruction Using Supercritical Water Oxidation (SCWO)	Peterson
FY21	Arcadis	2105	Continuing to Evaluate the Mitigation of PFAS Leaching using Soil Stabilization via Novel Characterization Techniques	Cape Canaveral
FY21	CDM Smith	2108	Mass Flux as a Tool to Assess the Need for PFAS Remediation	Charleston
FY21	OTIE	2115	Comprehensive EVO/ERD-Focused Data Assessment Combined with Tailored HRSC and Data Interpretation Techniques	Vandenberg
FY21	SDSMT	2117	A pilot-scale, portable water treatment train for remediation of PFAS contamination	Offutt*
FY21	U of Utah	2123	PFAS Elimination from Waters and Soils	Hill
FY21	AECOM	2128	Cyclodextrin Sorbent and Electrochemical Oxidation Treatment Train for PFAS Separation and Destruction of PFAS in Groundwater	Travis
FY22 Straddle	GSI	2101	Integrated Analysis of Existing Data to Maximize High-Resolution Site Characterization Knowledge	Edwards
FY22 Straddle	CDM Smith	2112	Advanced Data Analytics and Forensics Framework and Demonstration: High-Resolution Site Characterization	Dover
FY22 Straddle	TetraTech	2103	Ultrasound Technology for the Mineralization of PFAS	TBD

\* tentative



# FY22 Awards Modeling and Characterization



Award	Offeror	BAA ID	Title	Installation
FY22	Arcadis	2213	Tempe cell method for PFAS leaching	Multiple
FY22	Arcadis	2215	“Osorb Passive Samplers for PFAS in Groundwater and Surface Water”	Multiple
FY22	Arclight	2217	“Field Validation of a Modified HYDRUS Model for Simulating PFAS Leaching in the Vadose Zone”	F E Warren
FY22	GSI	2234	“Can the REMChlor-MD Model be Used to Evaluate Passive and Active PFAS Remediation Alternatives?”	Multiple
FY22	GSI	2237	Applicability Comparison of Two Common Used Modeling Systems for Simulating PFAS Fate and Transport	TBD
FY22	Rutgers	2246	Rapid field-scale characterization of PFAS source zones with electrical geophysics	Multiple





# FY22 Awards PFAS Treatment



Award*	Offeror	BAA ID	Title	Installation (tentative)
FY22	Allonnia	2203	On-Site Removal And Destruction Of Per- And Polyfluoroalkyl Substances (PFAS) Using Surface Active Foam Fractionation (SAFF) And De-Fluoro Technologies	Hanscom
FY22	CDM Smith	2224	"In Situ Treatment of PFAS-Impacted Stormwater Emanating from AFFF Source Areas"	TBD
FY22	Haley & Aldrich, Inc.	2242	"Demonstration of a Treatment Train with Foam Fractionation and Hydrated Electron for Cost-Effective Removal and Destruction of PFAS"	March
FY22	Geosyntec	2247	Treatment of PFAS in Mixed Media	TBD
FY22	South Dakota Mines	2249	"Retrofitting Stormwater Pond Outlets for Surface Water PFAS Remediation"	Offutt
FY22	Wood PLC	2276	Supercritical Water Oxidation Destruction of PFAS Concentrated Spent Media	TBD
FY22	Wood PLC	2277	PFAS Treatment Gates for Surface Water Management in Drainage Systems	Seymour Johnson



# ***BAA FY2023 Acquisition Process and Schedule***



- **Development of statement of needs – Current**
- **BAA Acquisition Plan – Jan 2023**
- **Two phase acquisition process**
  - **Technology concept papers (phase 1)**
  - **Site-specific proposals of high-quality phase 1 offers (phase 2)**
- **Phase 1 proposals:**
  - **Request for proposals released Feb 2023**
  - **Phase 1 proposals received Apr 2023**
- **Phase 2 proposals RFP: May 2023**
- **Negotiations and Awards by 772ESS – Aug 2023**



# Discussion and Questions



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AFCEC Restoration Technology  
Webinar  
Monthly, 2<sup>nd</sup> Wed @ 1pm (Central  
Time)

<https://www.afit.edu/CE/index.cfm>