



Omaha Post Meeting

AGENDA:

- Pledge of Allegiance
- New Member/ Guest Introductions
- Announcements
- Awards
- Program
- Split Kitty

Pledge of Allegiance



I pledge allegiance to the Flag of the United States of America, and to the Republic for which it stands, one Nation under God, indivisible, with liberty and justice for all.

Announcements

Introductions

- New Members
- Guests

Upcoming Meetings:

- March General Membership Meeting
 - ▶ Thursday, March 9, 2023 @ Field Club of Omaha
 - ▶ Topic: TBD
- April General Membership Meeting
 - ▶ Thursday, April 13, 2023 @ Field Club of Omaha
 - ▶ Topic: Midwest Roadside Safety Facility

Announcements

Upcoming Meetings:

- Omaha Industry Day and Golf Outing 2023
 - ▶ Wednesday, May 31 - Friday, June 2
 - ▶ CHI Convention Center in Omaha, Nebraska
 - ▶ Walking Tour/Sneak Peak of the new Riverfront Parks
 - ▶ Sponsorships and Registration Open Friday, February 17, 2023



Announcements

2023 Engineering & Construction Camps Application Now Open

Application Deadline: March 15, 2023

U.S. Army	U.S. Navy	U.S. Air Force	U.S. Air Force Academy	U.S. Marine Corps
<p>Engineering & Construction Camp</p> <p>U.S. Army Corps of Engineers Vicksburg, MS</p> <p>June 11 – 17, 2023 Fee: \$100.00</p> <p>Grades: Rising Junior or Senior as of Fall 2022</p>	<p>Engineering & Construction Camp</p> <p>Naval Construction Battalion Center, Port Hueneme, CA</p> <p>July 16 – 22, 2023 Fee: \$800.00</p> <p>Grades: Rising Sophomore, Junior, Senior as of fall 2022</p>	<p>Engineering & Construction Camp</p> <p>Scott Air Force Base Scott AFB, IL</p> <p>July 16 – 22, 2023 Fee: \$800.00</p> <p>Grades: Rising Sophomore, Junior, Senior as of fall 2022</p>	<p>Engineering & Construction Camp</p> <p>U.S. Air Force Academy Colorado Springs, CO</p> <p>July 6 – 12, 2023 Fee: \$800.00</p> <p>Grades: Rising Sophomore, Junior, or Senior as of fall 2022</p>	<p>Engineering & Construction Camp</p> <p>Camp Lejeune Jacksonville, NC</p> <p>June 17 – 24, 2023 Fee: \$800</p> <p>Grades: Rising Sophomore, Junior, or Senior as of Fall 2022</p>



Member Spotlight

olsson®

olsson®



About Us

- Founded in 1956
- 30 Offices
- 1800 employees
- Employee-owned engineering
- In 9 States
- 645 Engineers

We exist to leave the world better than we found it.

SERVICES

Engineering

- Civil Engineering
- Electrical Engineering
- Mechanical Engineering
- Structural Engineering

Environmental

- Air Quality
- Environmental Planning & Permitting
- Hydrogeology
- Remediation



Technology

- Geographic Information Systems
- Intelligent Transportation Systems
- Systems Engineering
- Traffic Management Systems
- Utility & Industrial Automation
- Project Visualization

Planning & Design

- Community Planning
- Landscape Architecture
- Master Planning
- Program Management
- Site Design
- Transportation Planning



Field Services

- Geotechnical
- Materials Testing
- Special Inspections
- Drilling
- Nondestructive Testing
- Surveying
- Construction Management





MARKETS



Energy

- Oil & Gas
- Power
- Renewable Energy
- Thermal Energy

Government

- Federal
- State
- Local

Transportation

- Aviation
- Bridges
- Highways & Streets
- Mass Transit
- Rail

Water

- Dams & Levees
- Drinking Water
- Groundwater
- Stormwater
- Wastewater

Land & Facilities

- Commercial
- Data Centers
- Education
- Healthcare
- Industrial
- Residential
- Sports & Recreation

Telecomm.

- Outside Plant
- Inside Plant
- Network Planning
- Wireless

Federal Program

- Civil
 - NWK Civil Work AE IDC
 - SWT Hydrologic & Hydraulic Engineering and Design IDIQ
- Military
 - NWK Design-Build MATOC
 - NWO Road & Rail MATOC
- Environmental
 - OK Military Department Environmental IDIQ (National Guard)
 - National Parks Service



Notable Projects

Offutt Air Force Base Security Campus

Site Civil	Geotech
Survey	Landscape
Testing/Inspection	Commissioning

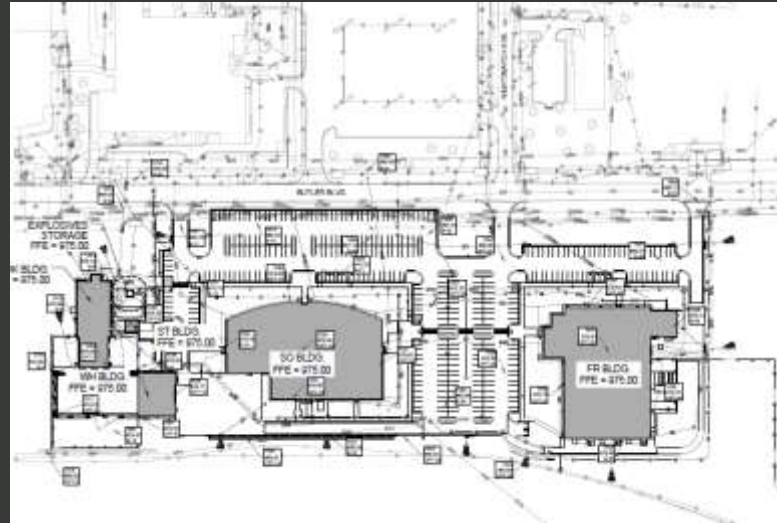
\$74 M 14 Acres Site

Design Start 8/22

Design Complete 2/23

Con Start 3/23

Cons Complete 11/24



Notable Projects

Fort Leonard Wood Hospital

Site Civil	Surveying
\$300 M	40 Acre Site
Design Start	1/2020
Design Complete	11/2020
Const Start	11/2020
Const Complete	12/2023



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Presentation

Surface Active Foam Fractionation® (SAFF®) Technology Now Capable of Removing Short Chain Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)



Robert Sinkler

VP of Government Programs



Zach Pierce

Environmental Engineer

The image features a dark blue background with a repeating pattern of colorful, stylized circular shapes in shades of purple, blue, and green. These shapes are arranged in a grid-like pattern, with some overlapping. The shapes resemble a combination of the letters 'C' and 'S' or similar abstract forms.

allonnia™

Surface Active Foam Fractionation® (SAFF®) Technology

*Now Capable of Removing Short Chain Perfluoroalkyl and
Polyfluoroalkyl Substances (PFAS)*

Solving PFAS Contamination



Analyzing and evaluating waste streams to detect trace amounts of PFAS and inform solutions like remediation.

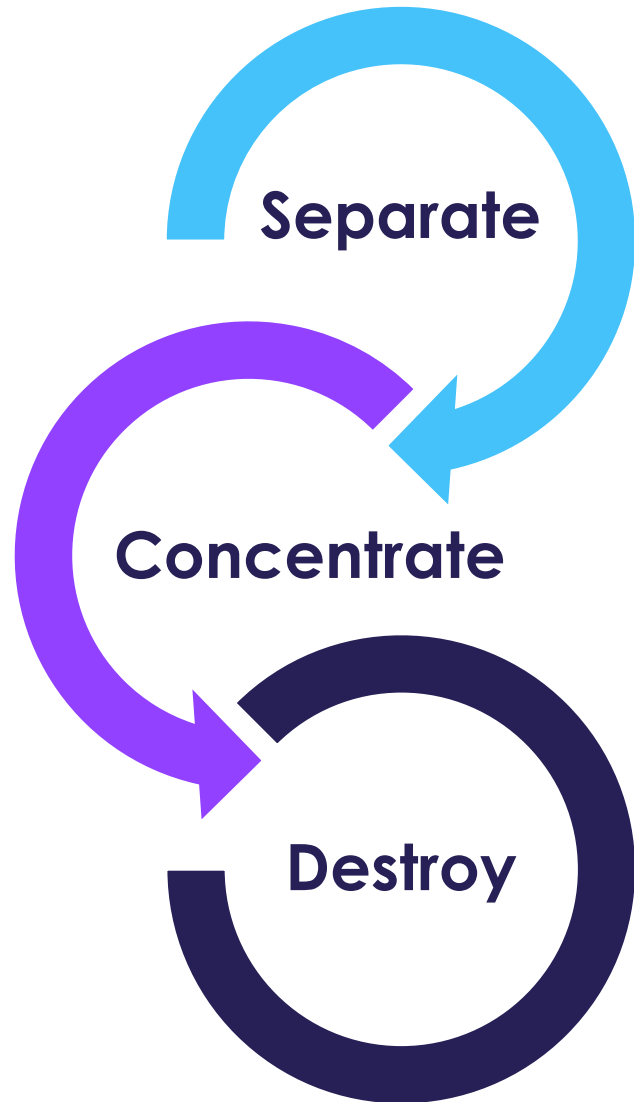


Separating and concentrating PFAS from contaminated water.



Destroying the removed PFAS by enzymatically breaking the C-F bond.

Comprehensive PFAS Treatment Solution



Treatment Goals

Example Treatments

- Protect human health and the environment
- Meet safe drinking water and discharge requirements

- GAC, AIX
- RO
- Foam Fractionation

- Reduce waste stream volume

- Regenerable media → regenerant waste
- Foam fractionation → foam concentrate

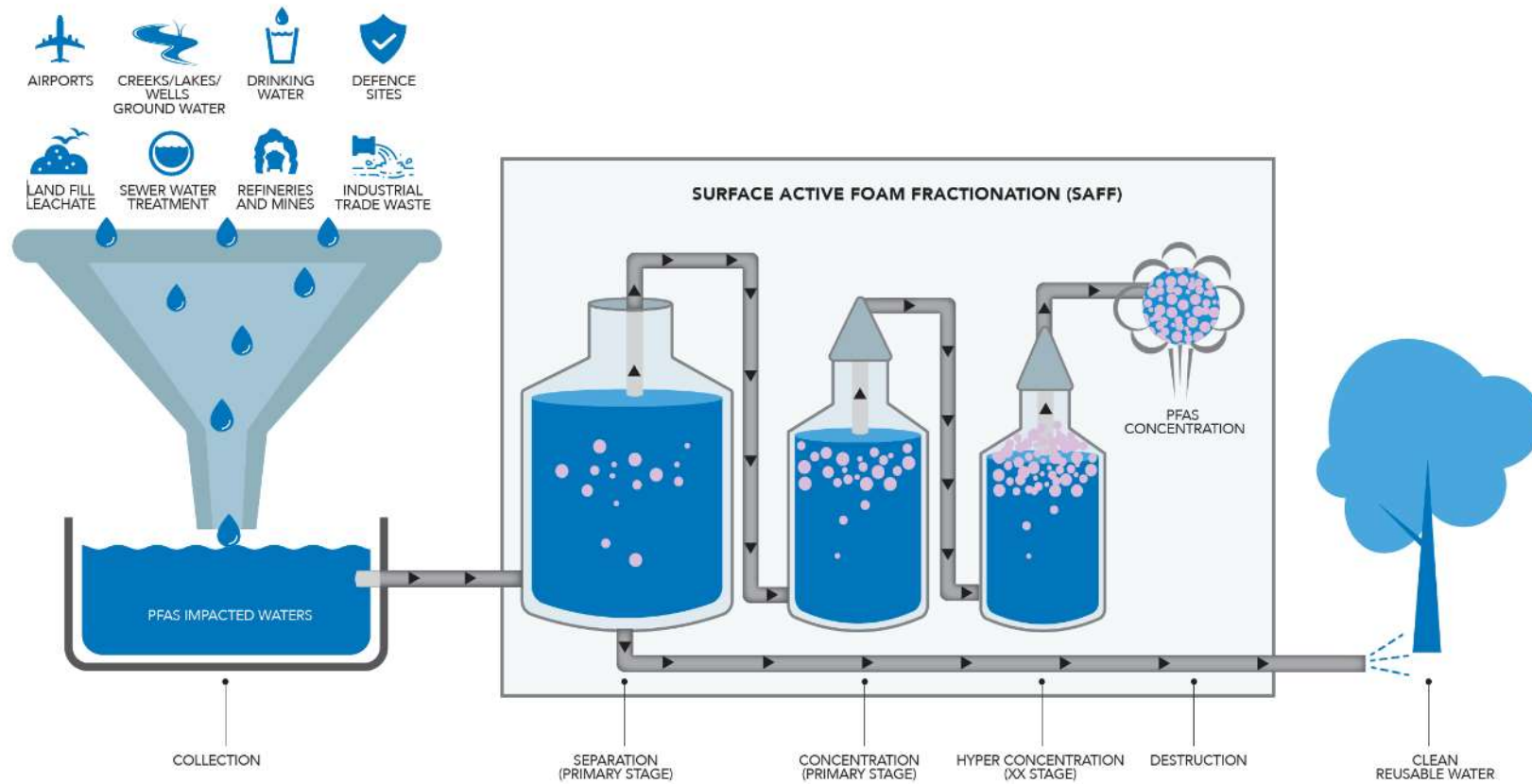
- Zero PFAS waste discharge

- Several pilot scale technologies for concentrate destruction coming to market: SCWO, EO, HALT, Plasma, UV Sulfite



SAFF Process

SAFF: The Basic Concept of Foam Fractionation



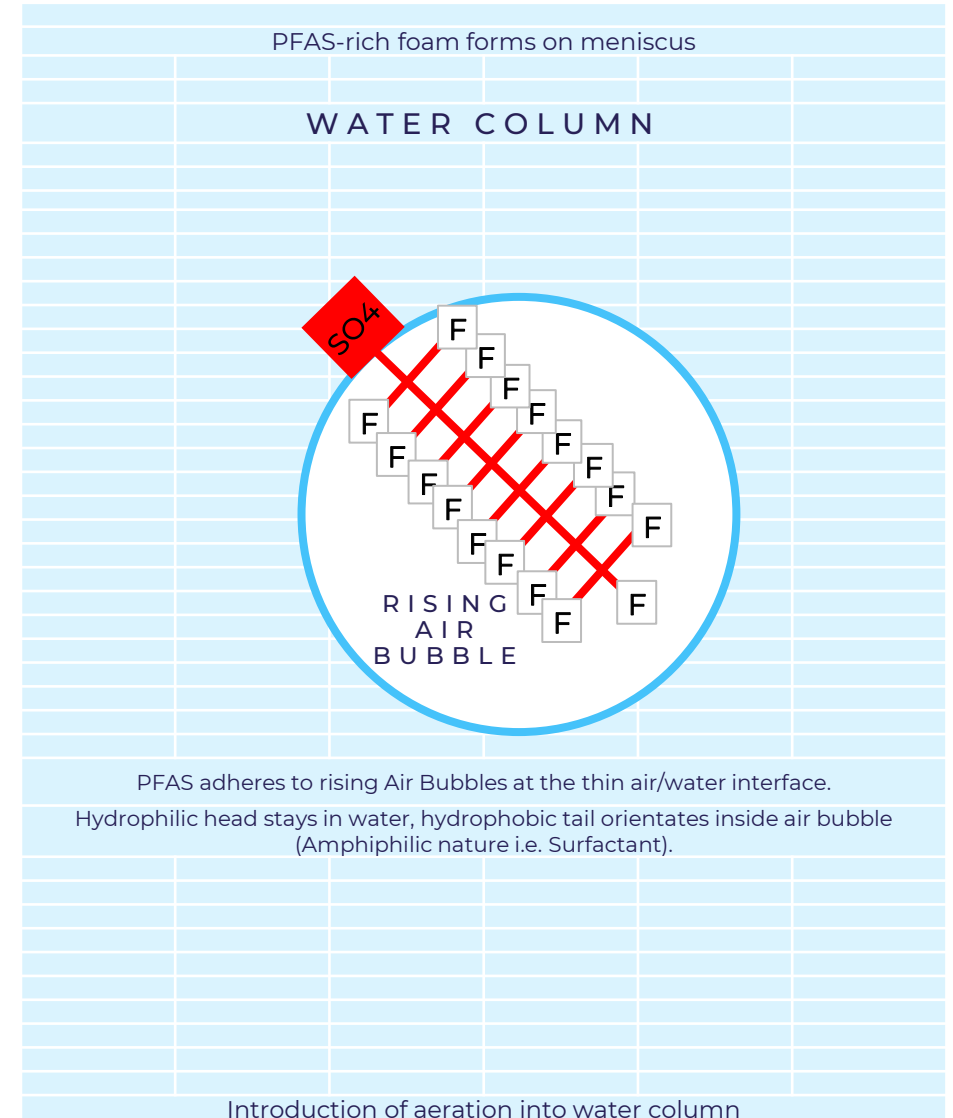


SAFF™ Separation Mechanism

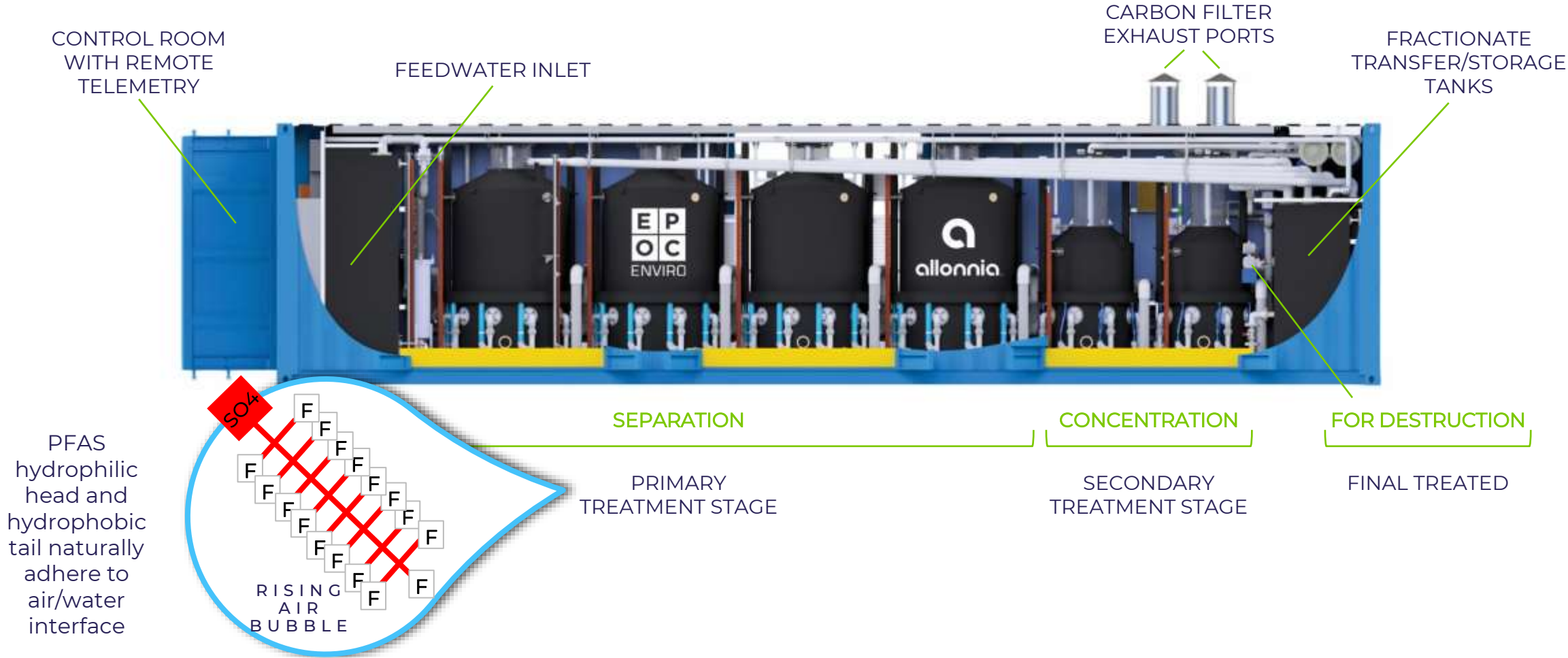
RISING AIR BUBBLES

Separates PFAS to surface

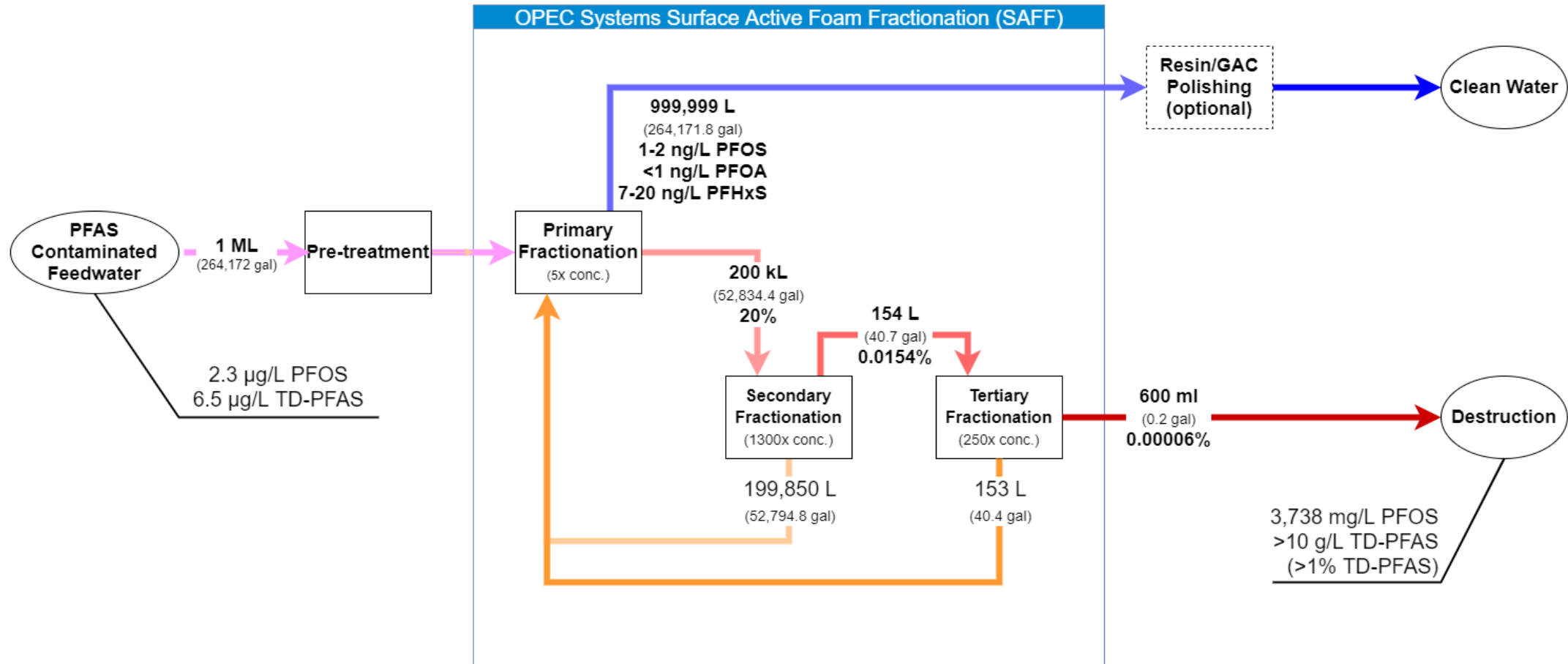
- Hydrophilic Head: Orientates in water
- Hydrophobic Tail: Orientates in air-bubble



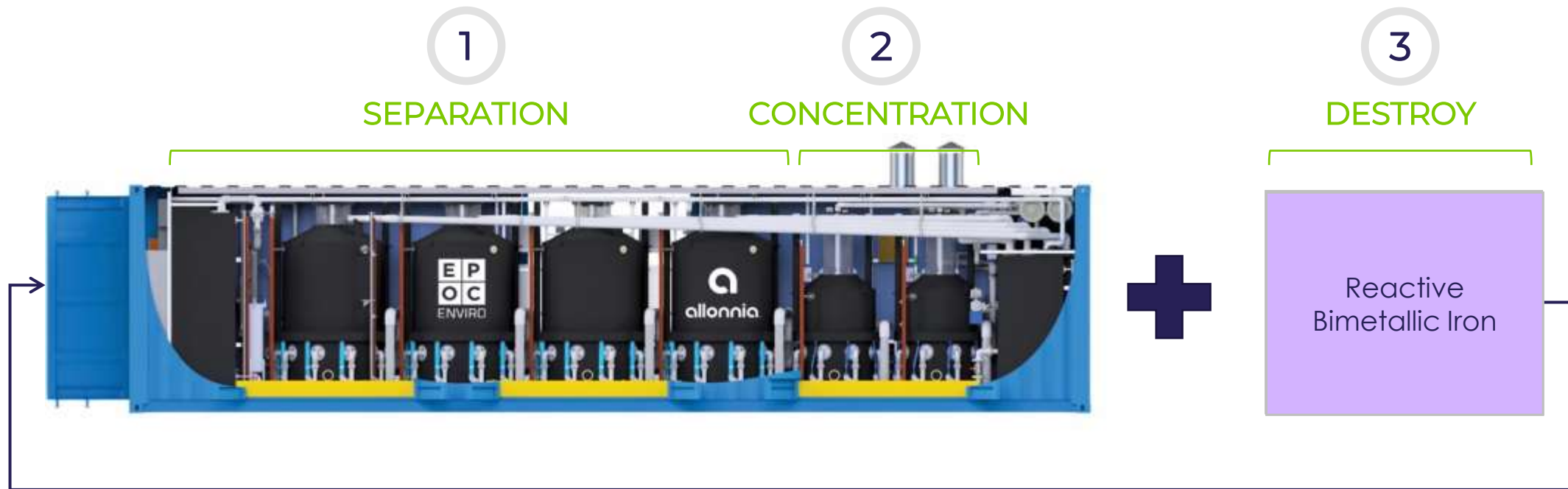
Concept of Foam Fractionation



SAFF™ Concentration Process



Generate a Closed-Loop Solution



SAFF in Action





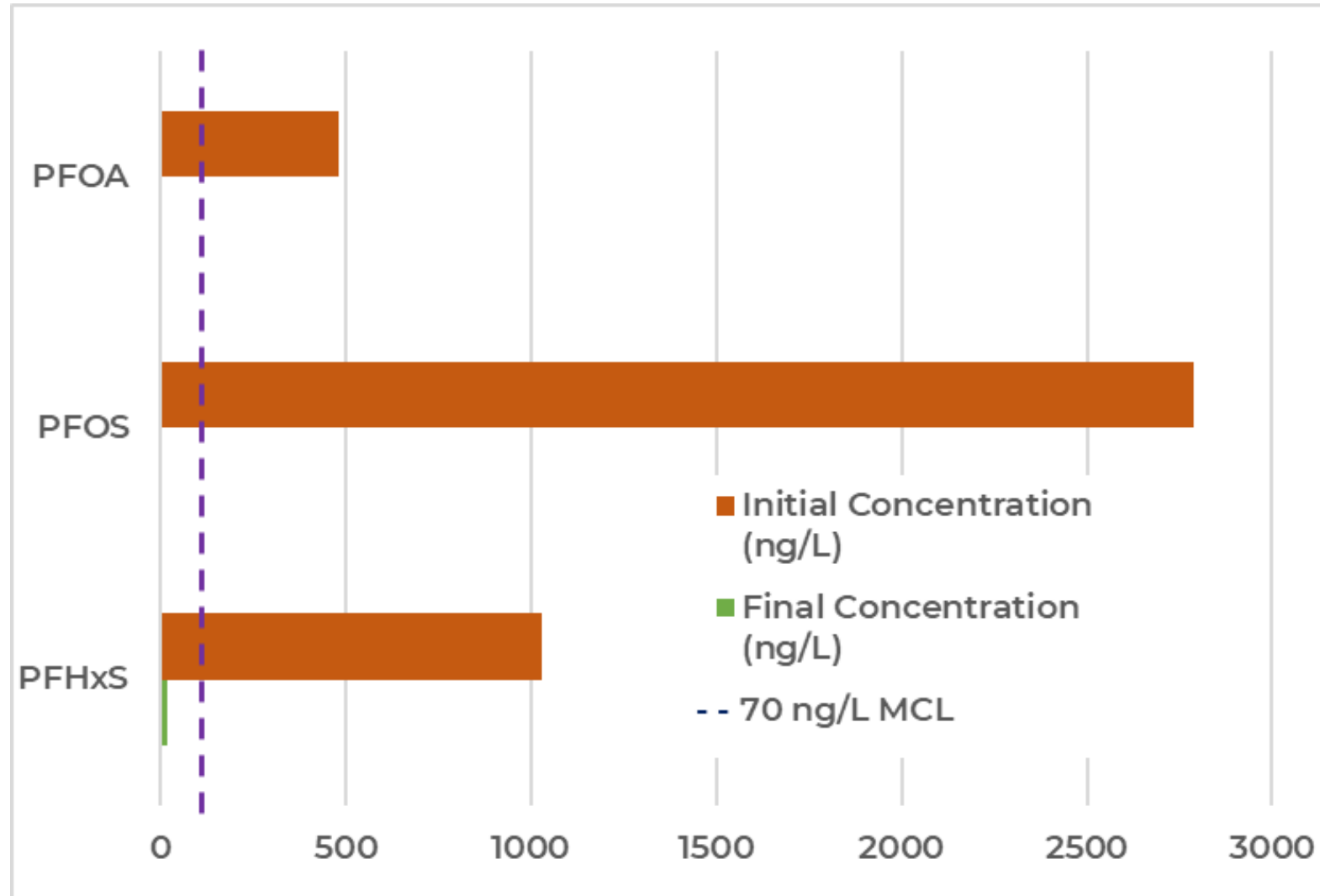
Case Studies



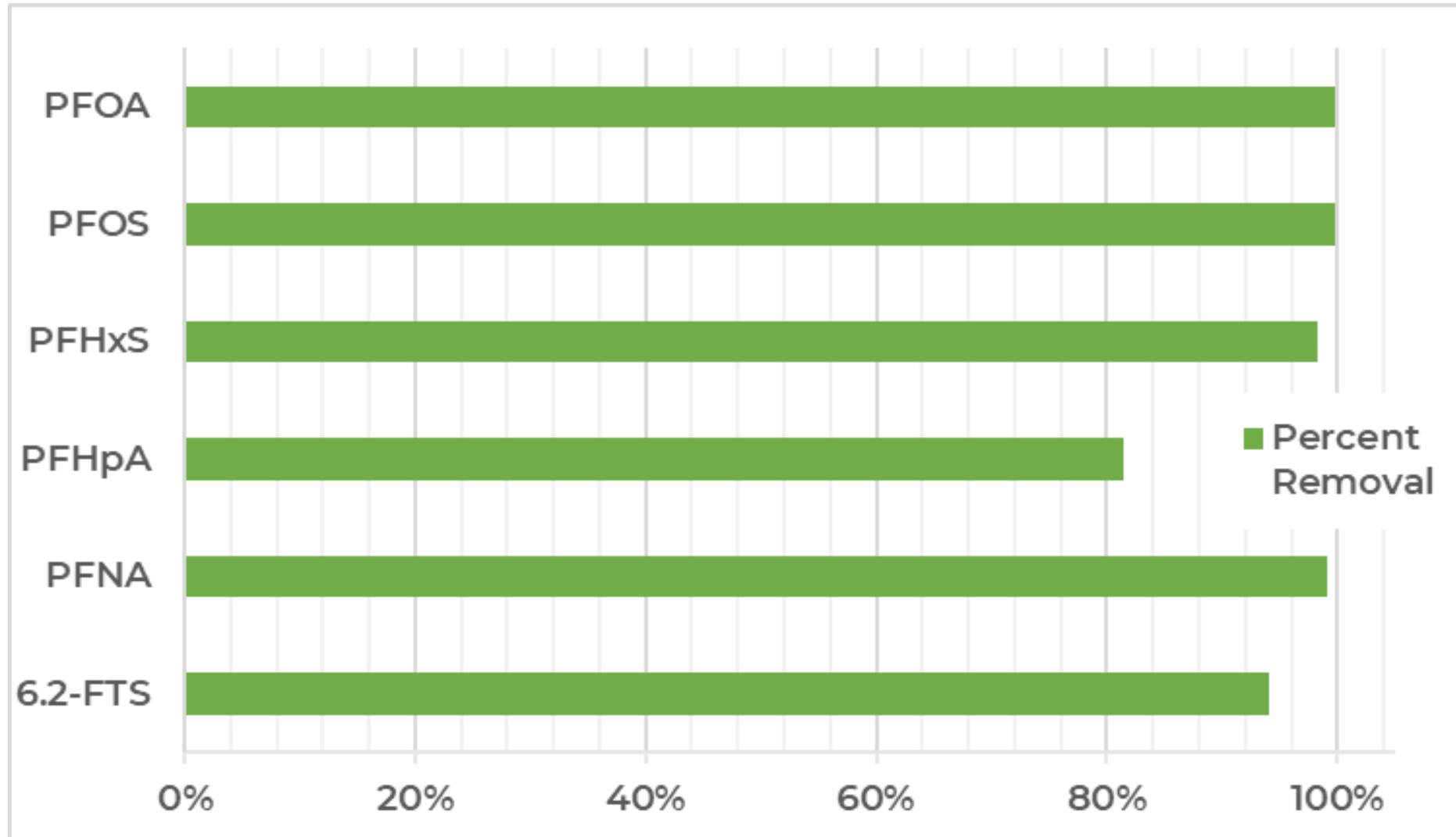
First Groundwater Application

- Treat PFAS contamination caused by historical fire-fighting training at Australian DoD site (Oakey)
- Gallons treated: 65,000 m³ (16M Gal)
- Concentration Factor: >1,000,000x
- 8.7 m³ (2,200 Gal) of secondary fractionate
- 7 gallons of tertiary fractionate
- Length of Operation: Since December 2018 (nearly 4 years)
- No exceedances of criteria compounds (PFOA, PFOS and PFHxS)

Australia (Oakey) – Influent/Effluent



Australia (Oakey) – Influent/Effluent

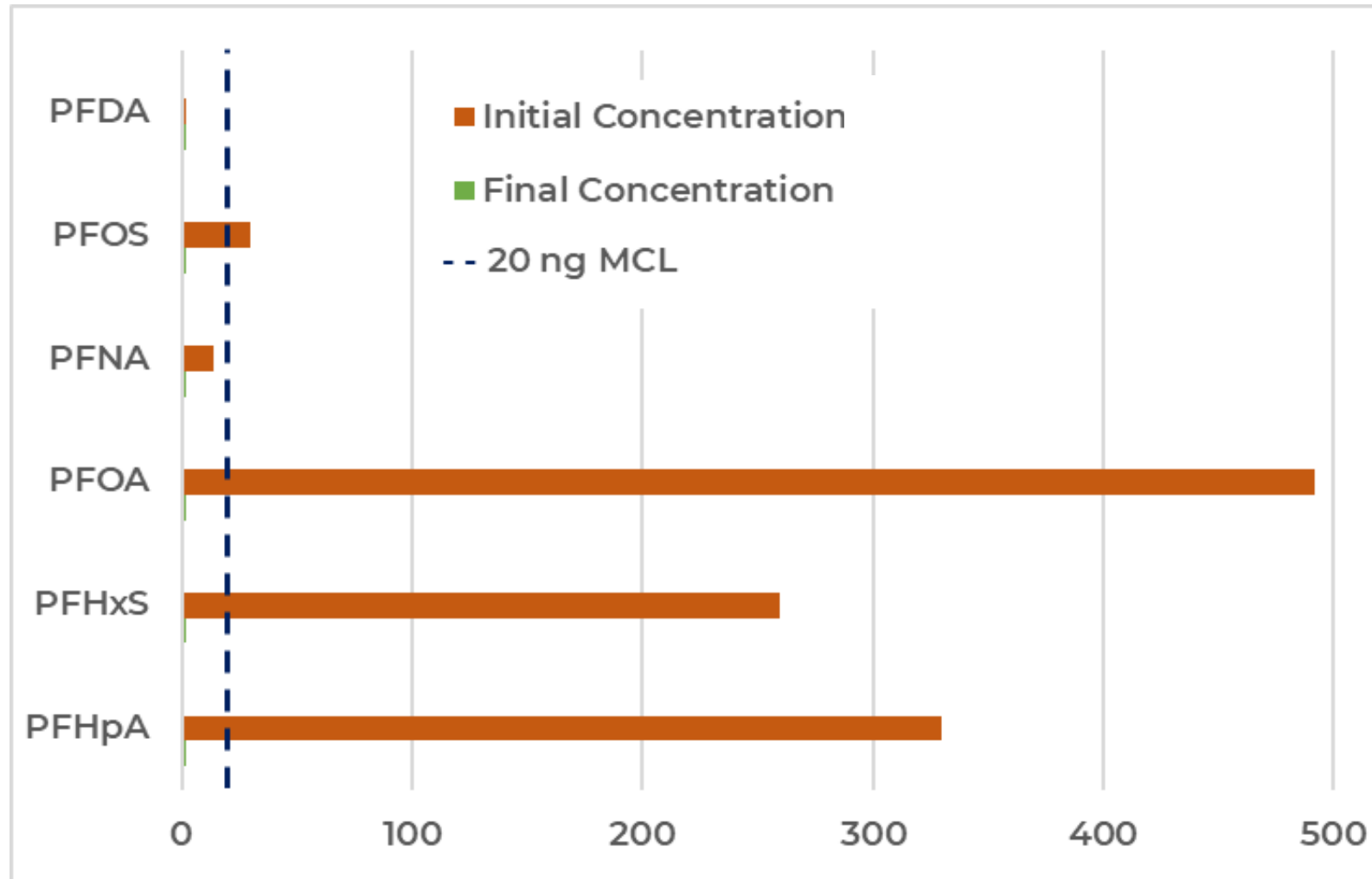


First US SAFF® Landfill Leachate Application

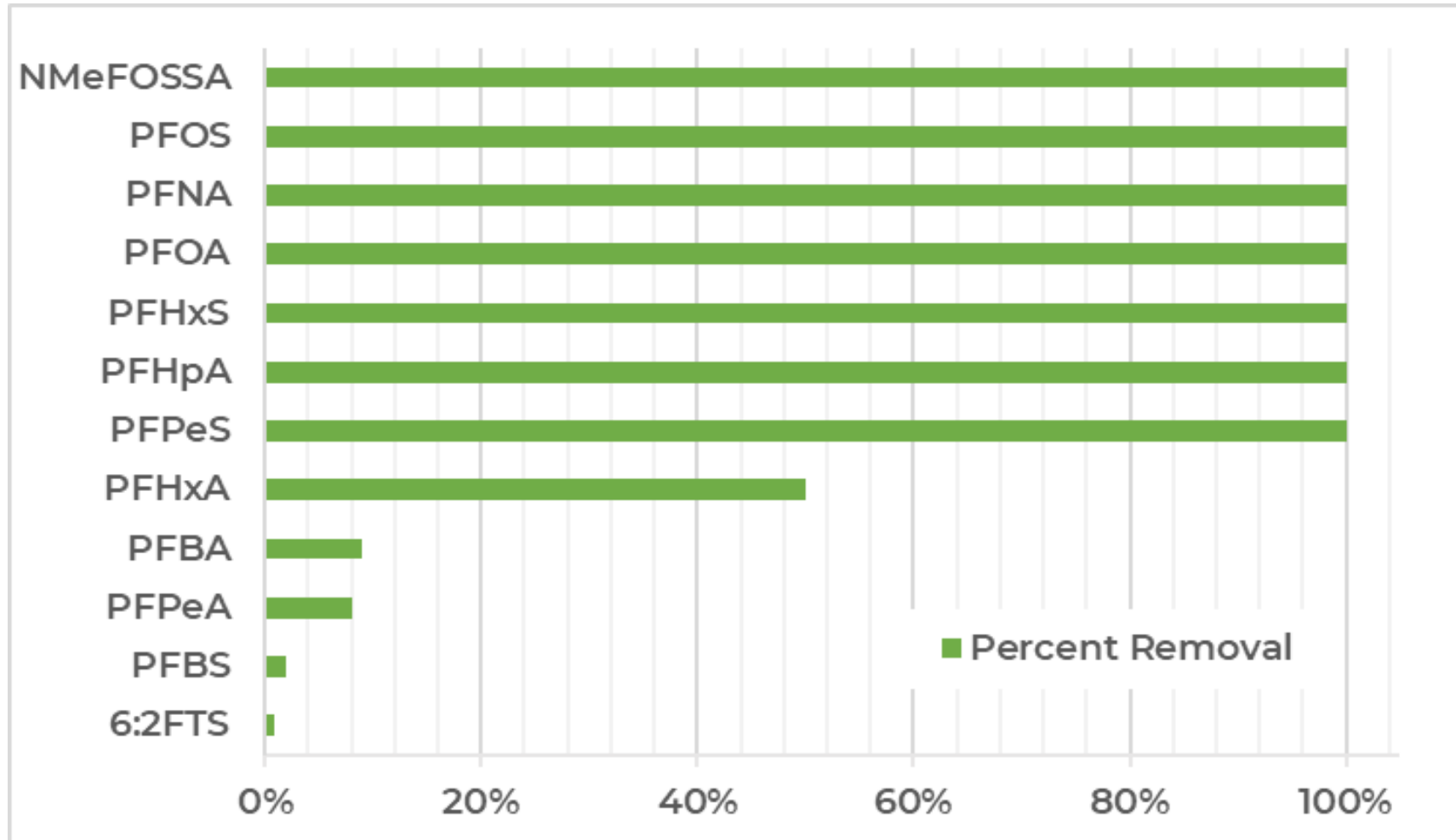
- July 2022 in New England with Civil and Environmental Consultants (CEC) and EPOC Enviro
- SAFF 20® with ~43,000 gpd capacity; 360,000 gallons treated during this study
- Treated leachate successfully with and without pretreatment
- Concentration factor: >700x
- Planned 8-week pilot completed in 5 weeks due to highly successful performance



Northeast US – Influent/Effluent



Northeast US – PFAS Removal Percentages

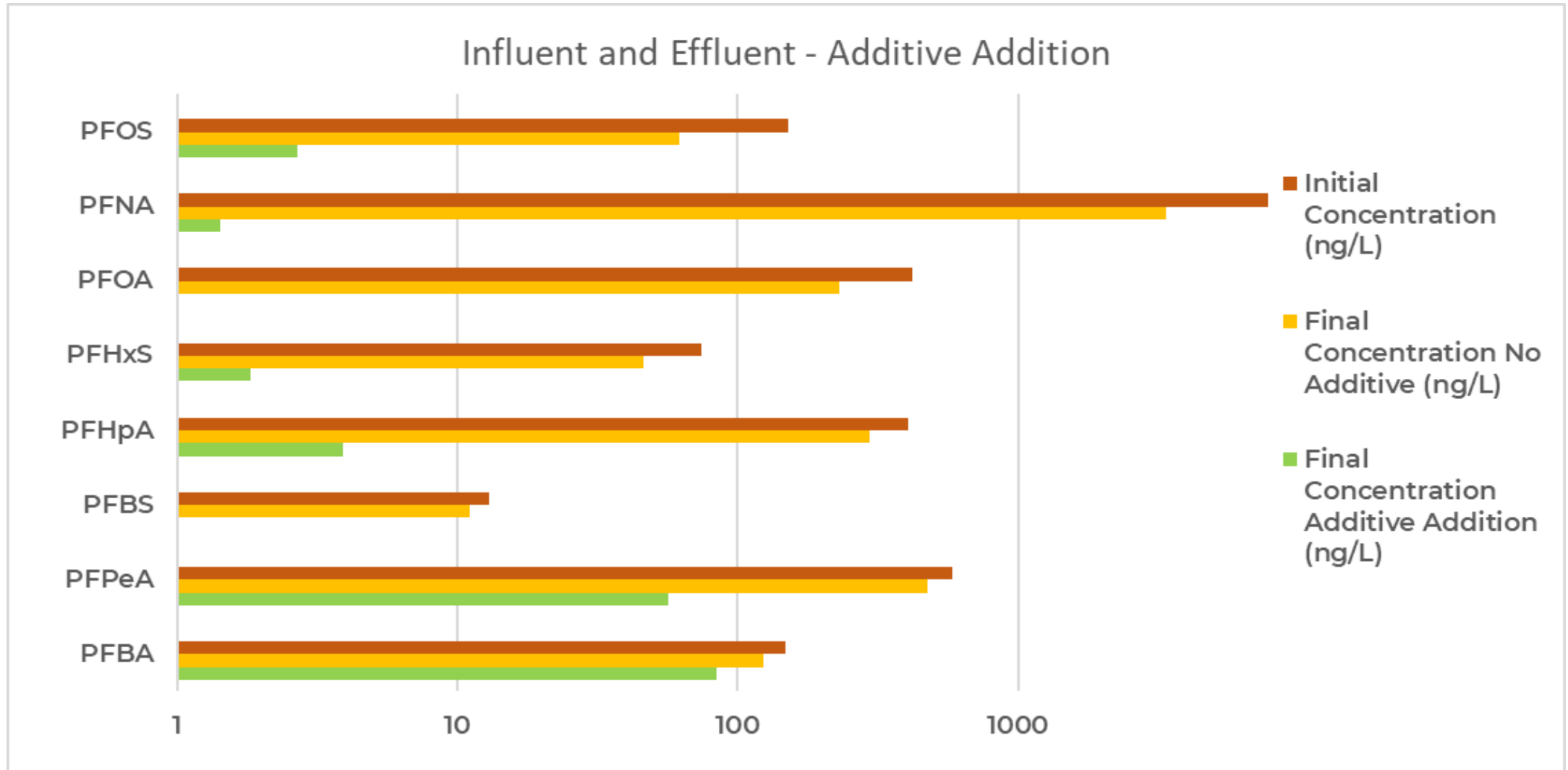


US SAFF® Groundwater Treatment Using Additive for Enhanced Stripping

- Summer 2022 in the Northeast US with CDM Smith and EPOC Enviro
- Full scale demonstration additive removed to 10 ug/L
- Water did not foam, moderate treatment demonstrated without additive, great treatment demonstrated with additive
- Concentration factor: 90,000x



US SAFF® Groundwater Treatment Using Additive for Enhanced Stripping





The Closed Loop PFAS Solution

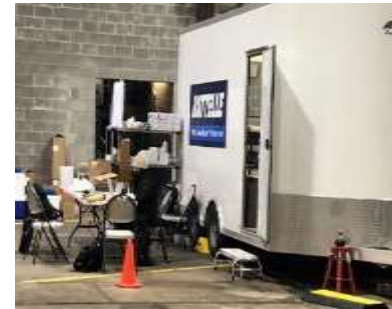
Combining SAFF® and PFAS Annihilator™

<https://www.crystal-clean.com/renewable-solution/pfas-solution-4never/>



Field Deployments of 4never Technology

- Revive Environmental’s Annihilator on-site destruction solution powered by supercritical water oxidation (SCWO)
 - Primary unit processes 350 to 500 gallons per day.
- Recent Field Demonstration (February/March 2022)
 - PFAS in at mg/L scale -> PFAS out <10 ng/L.
 - Part per million concentrations of VOCs and SVOCs also destroyed to non-detect levels.
- Hands-off, turnkey solution with a hub and spoke model
 - “hub” located in Grand Rapids MI, with shipping network set up to transport SAFF concentrate to Annihilator for disposal, all labor provided



Landfill Leachate

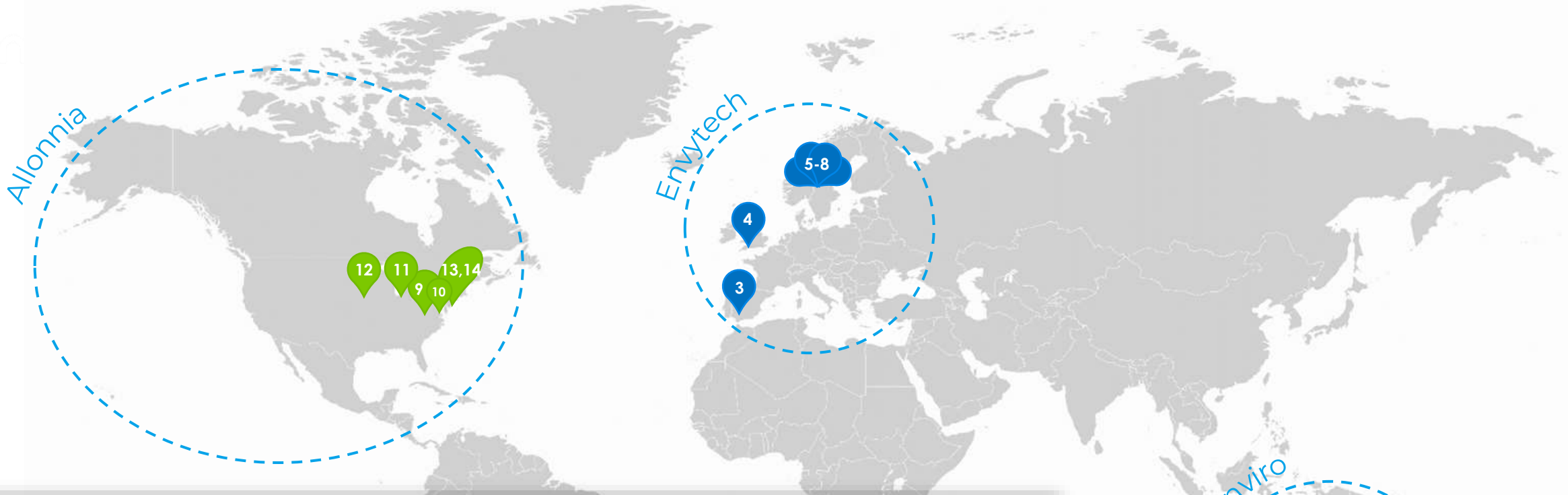
Annihilator™-treated Landfill Leachate



Industrial Wastewater

Annihilator™ treated Wastewater





- 1. Queensland, Australia
- 2. New South Wales, Australia
- 3. Confidential Site, Spain
- 4. Confidential Site, UK
- 5. Helsingborg, Sweden
- 6. Brotby, Sweden
- 7. Stockholm, Sweden
- 8. Stockholm, Sweden
- 9. Confidential Site, East Coast USA
- 10. Massachusetts, USA
- 11. Michigan, East Coast USA
- 12. Minnesota, USA
- 13. Vermont, USA
- 14. Maine, USA

UPCOMING DoD Funded Projects at

- Beale AFB, CA (SAFF + HALT Destruction)
- March ARB, CA (SAFF + UX Destruction)
- Hanscom AFB, MA (SAFF + DE-FLUORO)
- Wurtsmith AFB (SAFF + Annihilator)
- Confidential DoD Site (SAFF + Biosensor)



Thank you

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Meeting Close

- Questions
- Split Kitty Drawing
- PDHs available from the Omaha Post Website





SAFF40 Delivery to Sweden Landfill Site

JAN 2021: WINTER

OPEX Costs for Removing PFAS from Telge Landfill Leachate

FIRST 5 MONTHS OPEX DATA

- 1 Labor
USD \$0.05/m³ (treated)
- 2 Consumables
Zero
- 3 Energy
USD \$0.05/m³ (treated)
- 4 Waste
USD \$0.02/m³ (treated)



SAFF40[®] Swedish Landfill Leachate

COMMISSIONED JAN 2021

SWEDISH
SLV-11 PFAS
SUITE (3)

REMOVAL PERCENTAGES
(% R)

TREATMENT RESULTS
(Field Trial Data, 3-Month Average, Sampled Weekly)

	Predictive Desktop Audit ⁽¹⁾	40L Bench-Scale Testing ^(1,4)	Full-Scale Field Trial Removal Results ⁽⁴⁾	Feedwater Conc. ⁽²⁾ (ng/l)	Criteria (ng/l)	Treated Water Results (ng/l)
Σ_{PFAS} (SLV-11)	50-60%	68% ⁽⁴⁾	55.6% ⁽⁴⁾	2,470	90	1,098
PFOS	98%	100% ⁽⁴⁾	99.0% ⁽⁴⁾	182	50	1.8
PFDA	100%	100% ⁽⁴⁾	67.8% ⁽⁴⁾	4.5	-	1.9
PFNA	100%	100% ⁽⁴⁾	98.3% ⁽⁴⁾	66	-	1.2
6.2-FTS	100%	100% ⁽⁴⁾	97.5% ⁽⁴⁾	39	-	1.0
PFOA	98%	100% ⁽⁴⁾	99.5% ⁽⁴⁾	403	-	2.0
PFHpA	85%	67% ⁽⁴⁾	98.3% ⁽⁴⁾	196	-	3.2
PFHxS	98%	97% ⁽⁴⁾	98.5% ⁽⁴⁾	65	-	1.0
PFHxA	50%	20% ⁽⁴⁾	53.7% ⁽⁴⁾	560	-	259
PFPeA	<20%	24% ⁽⁴⁾	15.9% ⁽⁴⁾	518	-	436
PFBS	<5%	22% ⁽⁴⁾	26.7% ⁽⁴⁾	117	-	86

Future Application for SAFF:

Most Efficient Applications:

1. High PFAS Concentrations (>1000 ppt for target compounds)
2. High Solids/Co-contaminants

For Example:

- Reverse Osmosis Reject Water
- DoD PFAS Wastewater Sources
 - Bilge Water
 - Evaporation Pond Water
 - Base Drinking and Wastewater
- Soil Washing Process Water
- IDW Water