

The logo for SEA (Seattle-Tacoma International Airport) is displayed in a bright green, sans-serif font. The letters 'SEA' are large and bold, with a stylized green line underneath the 'A'.

Seattle-Tacoma  
International  
Airport

# FLUORINE-FREE FOAM PURCHASING

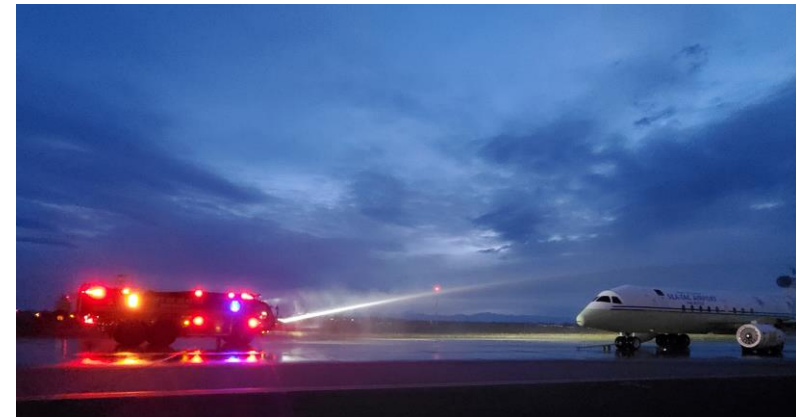
JUNE 2023



# Critical Product and Partnership

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1. Life-Saving Purchase
2. Outfitting the First Commercial Airport ARFF in the Nation

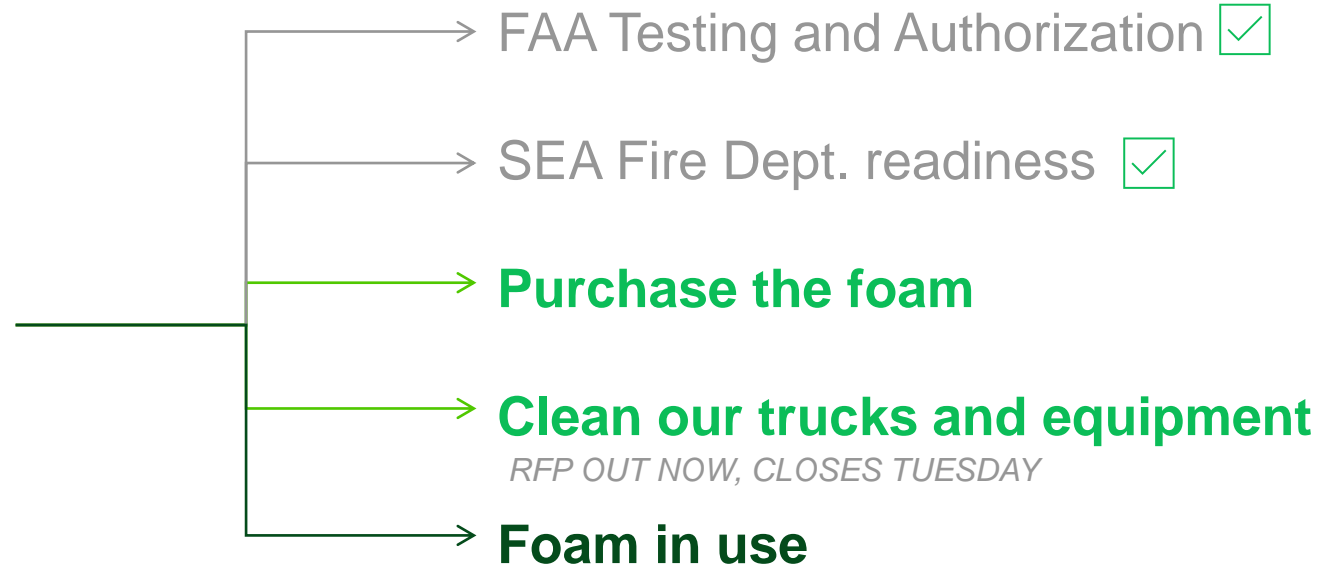


# Where We Are Today

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## National leader in AFFF transition

- Mandated by WA state law
- Vital for better environment and human health
- Position to support regional transitions and expand impact



# What We Need

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- Product Confidence
- Training Support
- Product Storage/Use Support
- Equipment Modification Guidance
- Reliable Supply and Company



# Background



- Continuously assessed options and conducted outreach since 2018
- One supplier has shown continuous engagement and support
- Only one USA-produced supplier
- Risk of increased demand as more airports and Department of Defense transition; further pressure on international suppliers
- Current product used in trainings

# What's At Risk

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- MILSPEC and environmental requirements are a must
- Products are not interchangeable, what we choose is what we use
- We are an early adopter which makes it difficult to:
  - quantify support pieces
  - ensure company and product longevity
  - confirm supply chain and product availability will not be an issue
- Nearest large ARFFs (PDX, SFO) we rely on for emergency backup supply replenishment are purchasing a specific product
- Product quality and partnership fit are the most important aspects



THANK YOU

# Next Steps

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Need CPO's help and partnership to ensure we can secure the right (and only) fit.



The logo for Seattle-Tacoma International Airport, featuring the letters 'SEA' in a bold, green, sans-serif font. The letter 'A' has a stylized, curved top. The background of the entire slide is a photograph of an airport tarmac with several red fire trucks. Two fire trucks in the foreground are spraying high-pressure jets of water into the sky. In the background, there are airport buildings and a clear blue sky with some light clouds. A thick, bright green diagonal line runs from the bottom left towards the top right, partially overlapping the text and the fire trucks.

**SEA**

Seattle-Tacoma  
International  
Airport

# AFFF TRANSITION OPPORTUNITY

JANUARY 2023



# Today's Objective: Secure Support for 2023 Action Plan

# Agenda

- Regulatory Updates
- Opportunity for SEA
- 2023 Proposed Action Plan

# The Latest

## State and Federal Regulations

**Q1** MILSPEC revision published  
FAA CertAlert issued  
Product submissions for testing underway

**Q2** First fluorine-free products added to qualified list (April/May)

**Q4** Expected DOD transition begins

July 31, 2018

Mr. Daniel K. Flwell  
Acting Administrator  
Federal Aviation Administration  
800 Independence Avenue SW  
Washington, DC 20591

Re: Requested Action | Alternatives to Aqueous Film Forming Foams

Dear Mr. Flwell:

I am writing on behalf of Seattle-Tacoma International Airport (STIA) to (1) Administration (FAA) move quickly to evaluate and adopt alternatives to forming foams (AFFF) with the goal of replacing them with non-fluorinated an immediate suspension of the requirement to calibrate aircraft rescue annually by spraying AFFF on the ground to demonstrate application rates

As I am sure you are aware, there is growing concern over AFFF used for a in the United States. A class of chemicals known as per and poly fluorinated key to the effectiveness of AFFF. Federal Aviation Administration (FAA) Pa the use of AFFF that meets military specification Mil-F 24385. Section 3.2 that concentrates "shall consist of fluorocarbon surfactants," a type of PF recognized as environmental contaminants of emerging concern through of other products and are the subject of increasing regulation throughout

AFFF containing PFAS can be released to the environment in multiple ways: events, system discharge or false activation, firefighter training, and system

# Our Opportunity

**M.V. Airport advances PFAS mitigation pilot**

**Fear of PFAS Disposal Costs Looms Over Firefighting Foam Switch** Forever chemicals threaten communities near Okla.

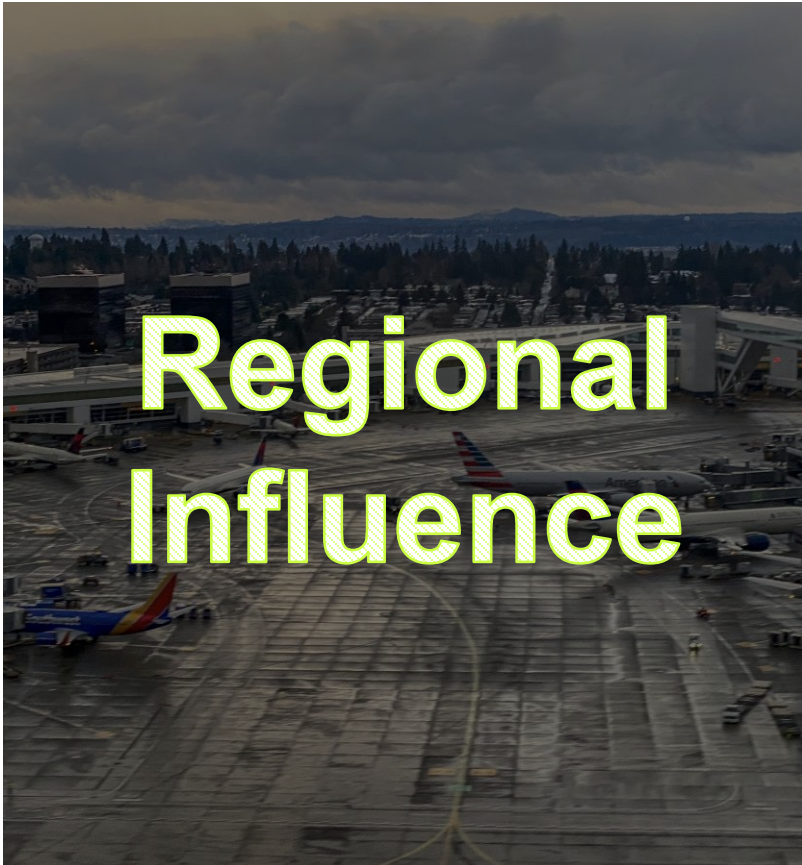
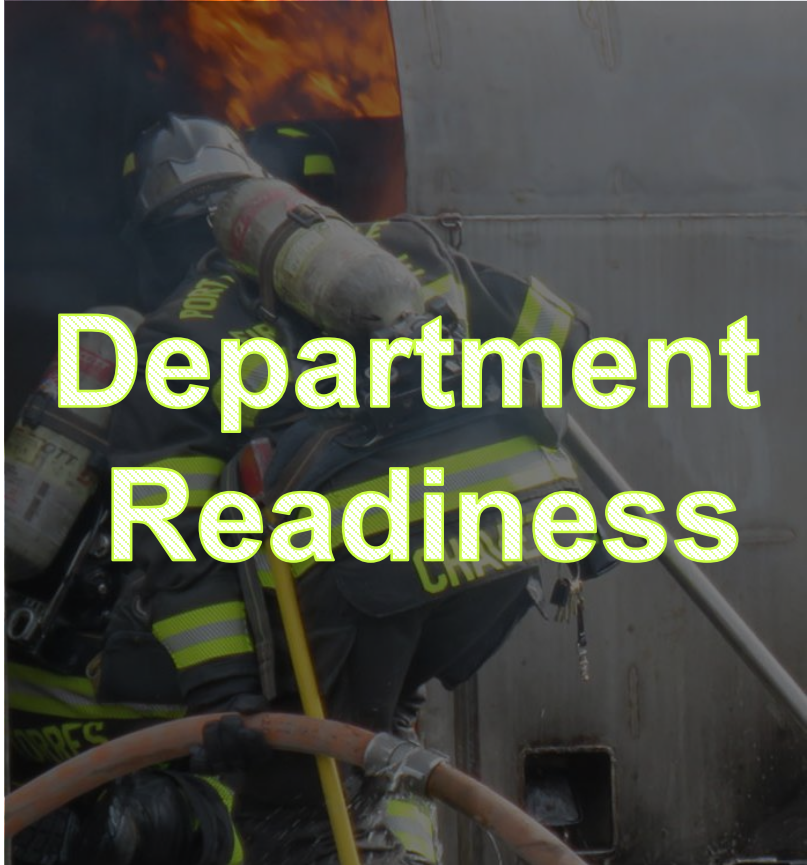
**Residents frustrated by continued delays County airport PFAS cleanup**

**Guilford County stops PFAS classes bill** spread of toxic PFAS at homes near PTI Airport

**Fairbanks International Airport Named Recipient of ACI-NA 2023 Environmental Achievement Award**

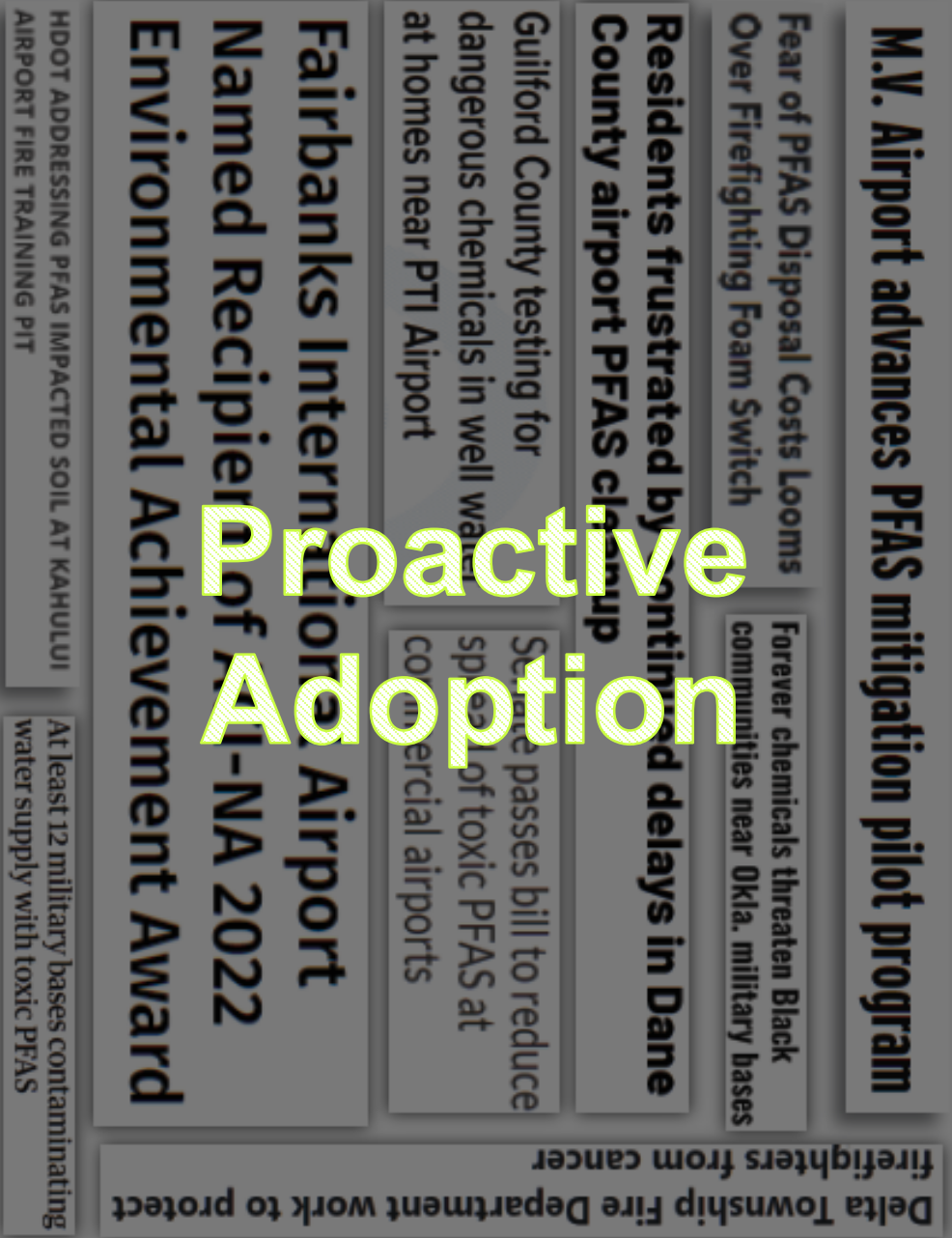
**HDOT ADDRESSING PFAS IMPACTED SOIL AT KAHULUI AIRPORT FIRE TRAINING PIT** At least 12 military water supply wells

**Proactive Adoption**



# Proactive Adoption

- Opportunity to be the first commercial airport in the US to use fluorine-free foam for ARFF
- Transition is inevitable and starting now gives us additional time to secure resources and combat anticipated hurdles
- SEA can become the region lead in transition and support other airports and fire departments





# Department Readiness

- Fire Department leadership and capacity
- Prepared to act: 100% already trained
- Identified preferred products and confirmed availability
- Identified truck cleaning technologies and confirmed availability
- ENV prepared to identify preferred waste handling and discharge processes



# Regional Influence

- SEA FD hosted an initial workshop with fire chiefs from PDX, BFI, and PAE, and National Foam and TRS Inc representatives in Jan 2023
- All noted interest in conducting a coordinated transition period and shared support
- SEA is the only department with hands-on experience using fluorine-free foam
- Utilize our experience, advanced planning, and size to support our smaller regional neighbors



# 2023 Action Plan



REGULATORY

Jan 12: MILSPEC revision published  
 Jan 12: FAA Issued CertAlert  
 Product Submission for Testing

Products Added to Qualified  
 Products List (April/May)

WINDOW OF OPPORTUNITY

Expected DOD  
 nationwide transition  
 begins

SEA AIRPORT

**Prepare agreements (Legal)**  
**Begin procurement processes (CPO)**  
**Funding approval (Finance)**  
**Waste handling exploration (ENV)**

**Execute contracts and  
 agreements (April – June)**  
**Purchase foam**  
**Schedule SEA FD cleaning**

**Complete cleaning and foam  
 transition**  
**Begin use (ARFF)**  
**Potential regional partner  
 transition at SEA**

# Mitigating Perceived Risks

- **Product Performance**
- **Transition Learnings**
- **FAA Transition Plan**
- **Regulatory Waste Handling Requirements**



# Next Steps

## **Prepare Agreements (Legal)**

- Consider retainers to secure vendors
- Evaluate options for regional partner agreements

## **Begin Procurement Processes (CPO)**

- RFI or sole source justification

## **Secure Funding (Mid-year request) (Finance)**

- Truck cleaning (approx. \$300,000)
- Fluorine-free foam purchase (approx. \$200,000)
- Waste disposal

## **Waste Handling Exploration (ENV)**

- Wash water disposal coordination with King County
- PFAS disposal coordination with Ecology
- Opportunities for PFAS destruction piloting on-site



THANK YOU



# FOAM TRANSITION @ SEA

Randy Krause

Fire Chief

# OVERVIEW

- SEA Journey to completion
- Partnerships
  - Environmental
  - Legal
  - Public/Government Affairs
  - Executive Leadership
  - Risk Management
  - King County Airport/Bellingham Airport
- Cleaning
  - Mechanic
  - Flow paths
- Disposal
- Hub Concept
- What would we do differently?

# FULLY TRANSITIONED

- Bill and Hillary Clinton National Airport/LIT
- Central Wisconsin/CWA
- Charlottesville-Albemarle/CHO
- Columbus/CSG
- Groton-New London/GON
- Jackson Hole/JAC
- Mammoth Yosemite/MMH
- McNary Fld/SLE
- Naples Muni/APF
- Ogden-Hinckley/OGD
- Portland Intl/PDX
- Eastern Iowa/CID
- Sea-Tac International/SEA
- Cedar City Regional
- King County Airport/Boeing Field



**STEP 1:** Rinse and empty PFAS foam concentrate from the vehicle into holding tanks



Holding tanks

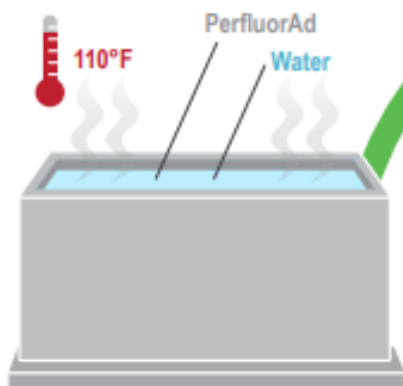


**STEP 3:** Flush solution through the vehicle followed by a clean water rinse and empty into a sediment tank



Spill protection and containment

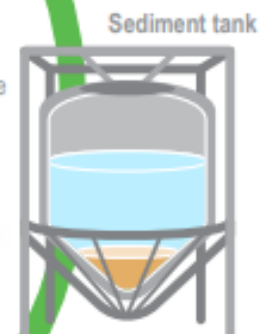
**STEP 2:** Mix new PFAS-free solution (PerfluorAd) with water and heat to 110-120 degrees Fahrenheit



110°F

PerfluorAd  
Water

**STEP 4:** Mix PerfluorAd and flocculant aid into the sediment tank and allow everything to settle



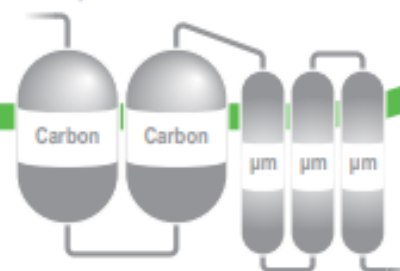
Sediment tank

**STEP 5:** Collect PFAS sludge that forms after settling through bag filters and store for proper offsite disposal



PFAS sludge

**STEP 6:** Purify remaining reinstate liquid



**STEP 8:** Discharge cleaned water to the sanitary sewer after multiple cycles



Spill protection and containment

**STEP 7:** Store clean water and reuse for additional cleaning cycles

\*Test PFAS levels throughout the process  
\*\*Repeat Steps 2-7 at least 3-5 times per vehicle before discharging clean water

# FLOC DEMONSTRATION







Truck

Truck







FIRE / RESCUE 3



PORT OF SEATTLE

3

FIRE/RESCUE

SPX









SPYR

CAUTION

NEW

POWER









RESCUE













SEA TAG

*In Loving Memory of  
Gilbert "Gib" Smith*



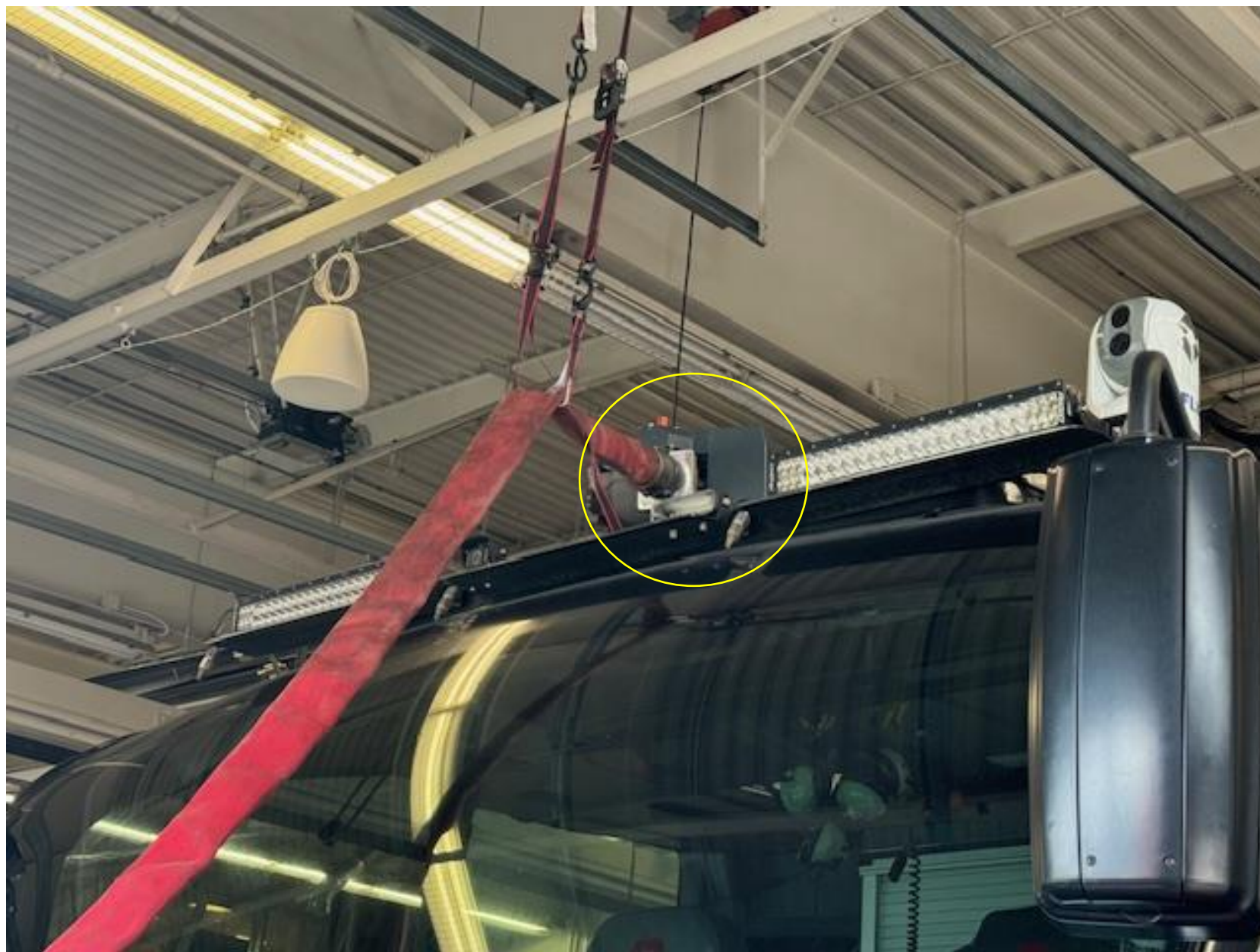


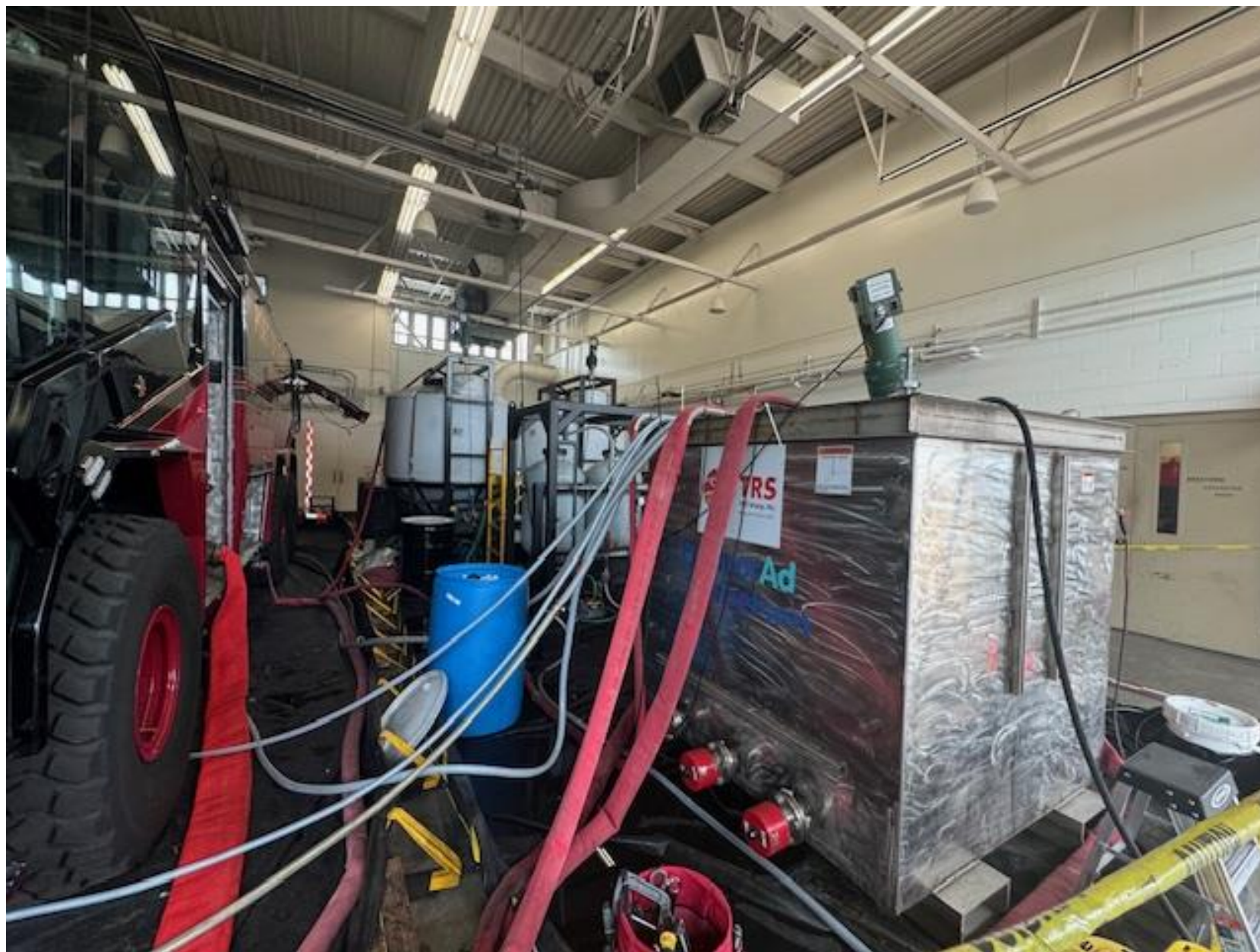












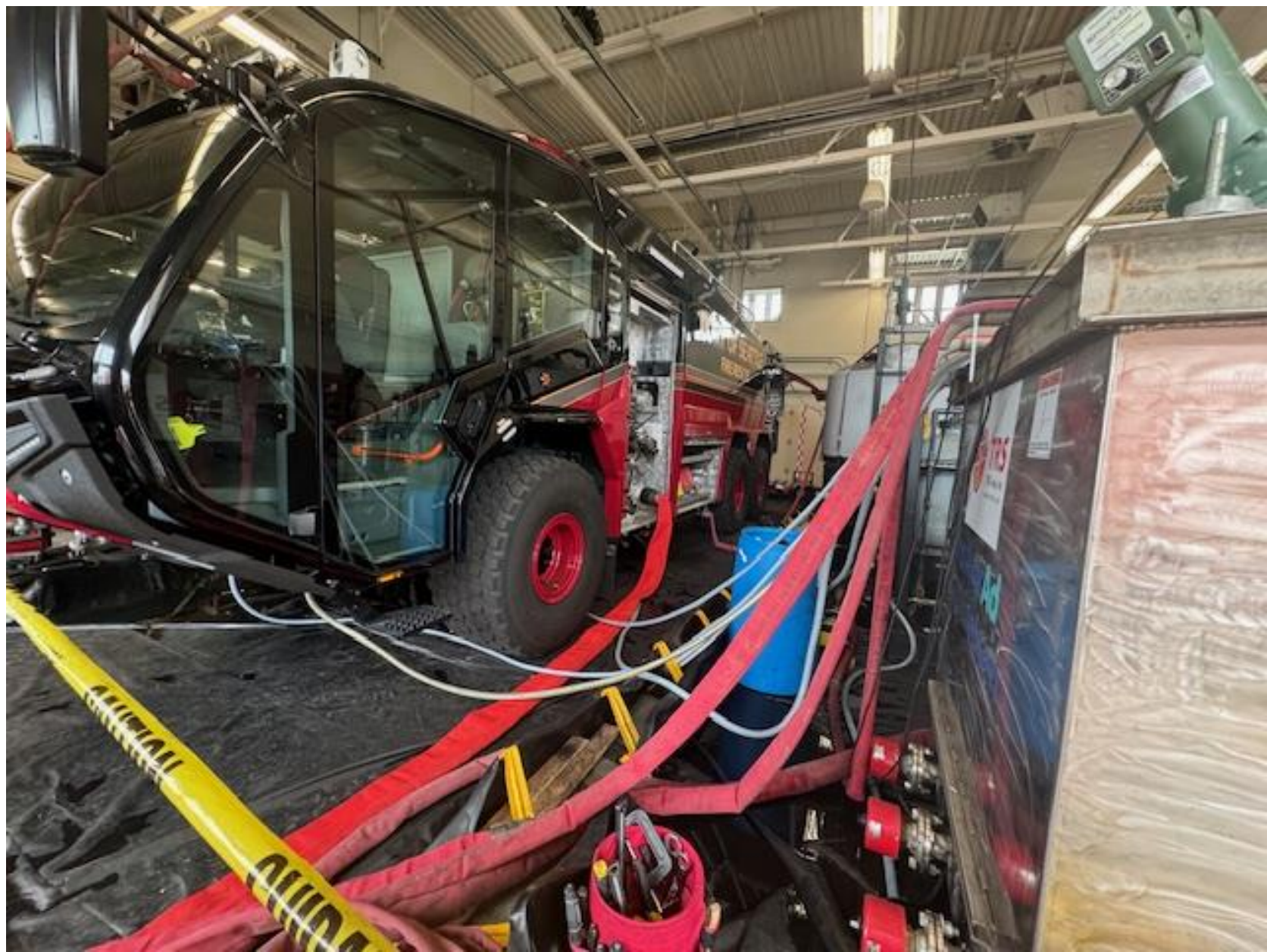
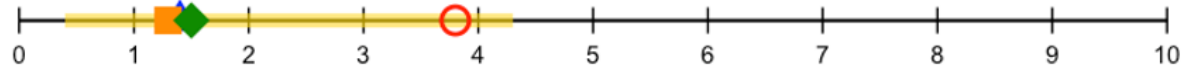




Figure 1. n-PFOA (ug/L)



\*Below our ability  
to measure

Figure 2. Sb-PFOA (ug/L)

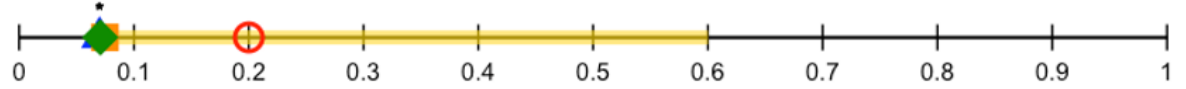


Figure 3. n-PFOS (ug/L)

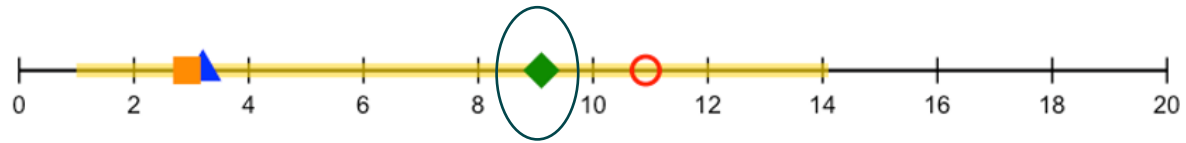


Figure 4. Sm-PFOS (ug/L)

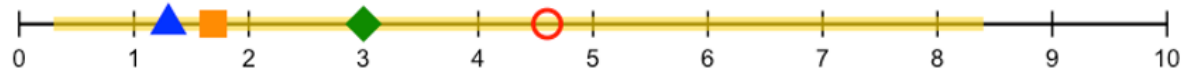
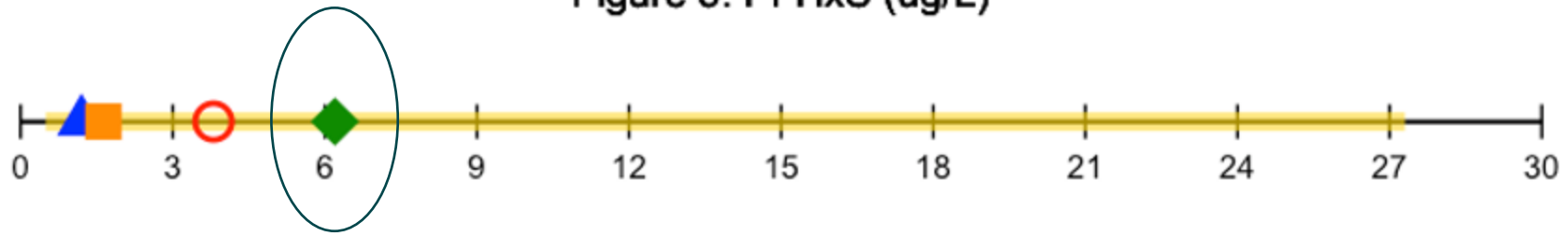


Figure 5. PFHxS (ug/L)



\*Below our ability to measure

Figure 6. PFDeA (ug/L)

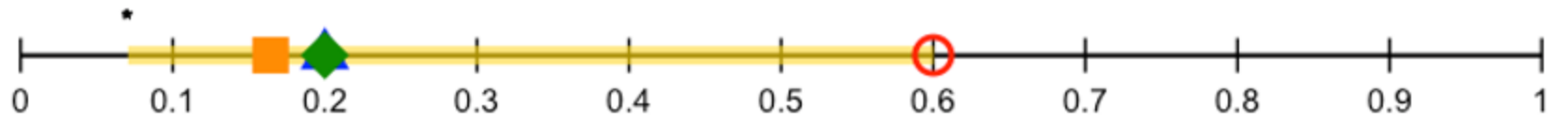
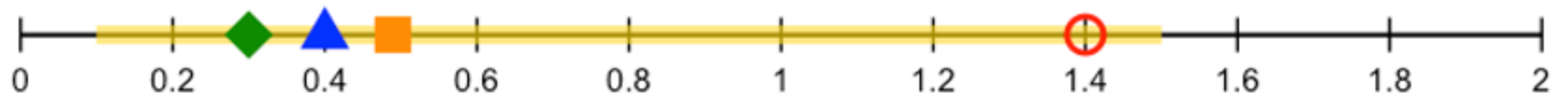


Figure 7. PFNA (ug/L)



## Test Results

	Rosen 5 Initial	Rosen 5 Final		% Difference
PFBA	6,000	10	U	99.833%
PFHxA	34,000	280		99.176%
PFOA	46,000	74		99.839%
PFBS	5,600	3	U	99.955%
PFHxS	48,000	3	U	99.995%
PFOS	280,000	11		99.996%
PFNA	900,000	35		99.996%
6:2 FTS	440,000	410		99.907%
8:2 FTS	270,000	69		99.974%

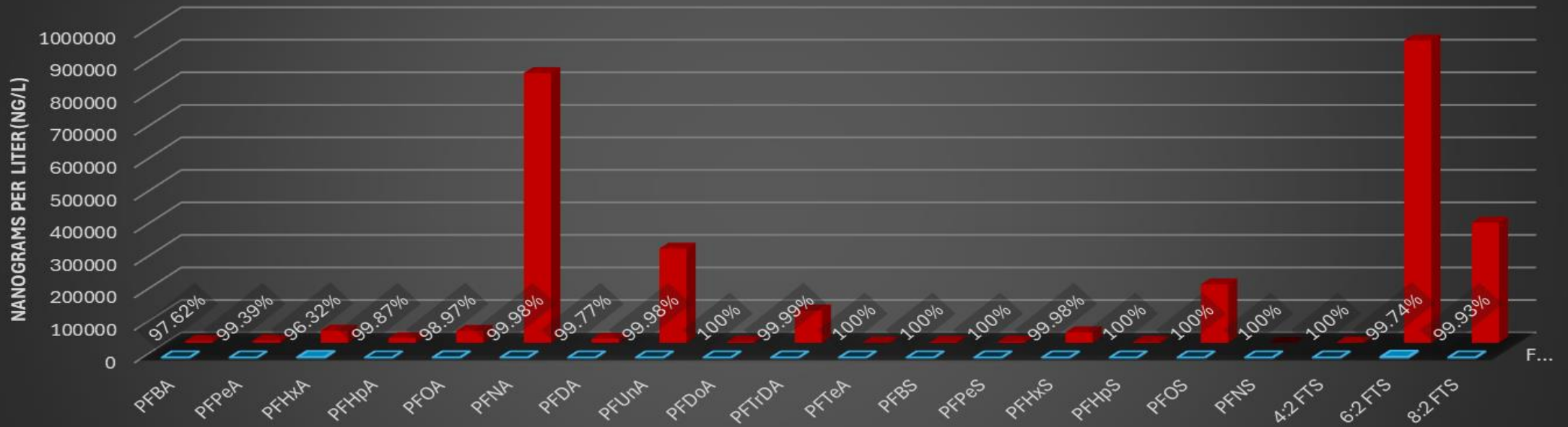
	Oshkosh 2 Initial	Oshkosh 2 Final		% Difference
PFBA	6,200	51		99.177%
PFHxA	21,000	980		95.333%
PFOA	21,000	240		98.857%
PFBS	1,800	3	U	99.861%
PFHxS	14,000	35		99.750%
PFOS	91,000	250		99.725%
PFNA	340,000	130		99.962%
6:2 FTS	300,000	8,800		97.067%
8:2 FTS	120,000	260		99.783%

	Oshkosh 4 Initial	Oshkosh 4 Final		% Difference
PFBA	6,300	150		97.619%
PFHxA	38,000	1,400		96.316%
PFOA	37,000	380		98.973%
PFBS	3,100	3	U	99.919%
PFHxS	33,000	8		99.976%
PFOS	180,000	30		99.983%
PFNA	690,000	150		99.978%
6:2 FTS	910,000	2,400		99.736%
8:2 FTS	370,000	260		99.930%



# All PFAS Before & After

Final Baseline



## Hub Concept



Bellingham Airport moving into position today.

# DISPOSAL

Options:

- Washington State Department of Ecology Take Back Program
- Hire a 3<sup>rd</sup> Party to take raw ARFF and waste away

# What would we have done differently?

- Would have reframed the MOU's for others cleaning at our site
- Not necessary to require the reuse of water
  - Advantage of the technology we used as the rinse water is non-detect

NOTE: Regardless of cleaning method must have trained ARFF mechanics on site to assist.

**RANDY KRAUSE**

Fire Chief

PORT OF SEATTLE  
FIRE DEPARTMENT

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