NORTH
TO THE FUTURE

March 13, 2025

House Transportation Committee

Introduction to Per- & Polyfluoroalkyl Substances (PFAS)

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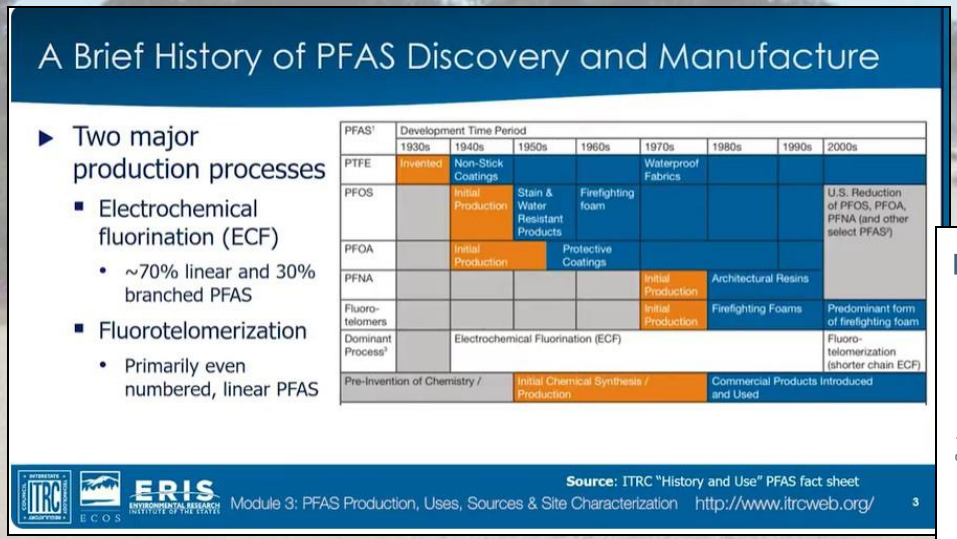
PER – AND POLY, WHAT?

What are Per- and Polyfluoroalkyl Substances (PFAS)?

- Utilized in consumer products since 1950s
- Over 12,000 chemicals
- Water, soil, and heat resistant
- Water soluble and extremely stable
- Some bioaccumulate
- PFOS (Perfluorooctane Sulfonic Acid) and PFOA (Perfluorooctanoic Acid) are the two most studied



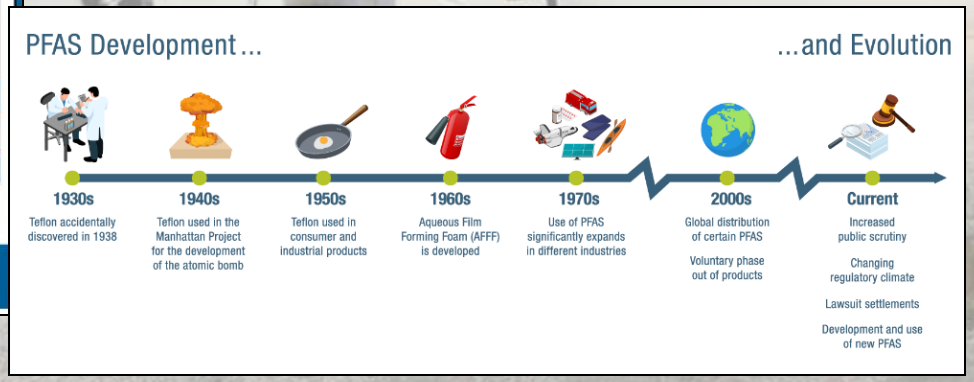
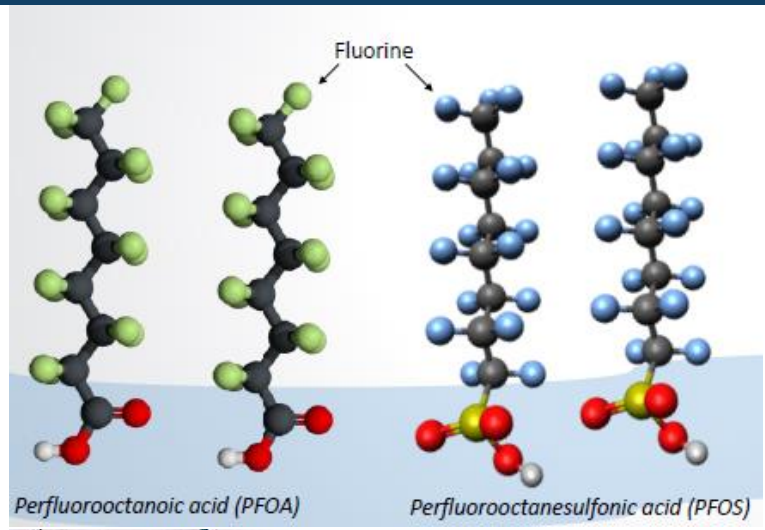


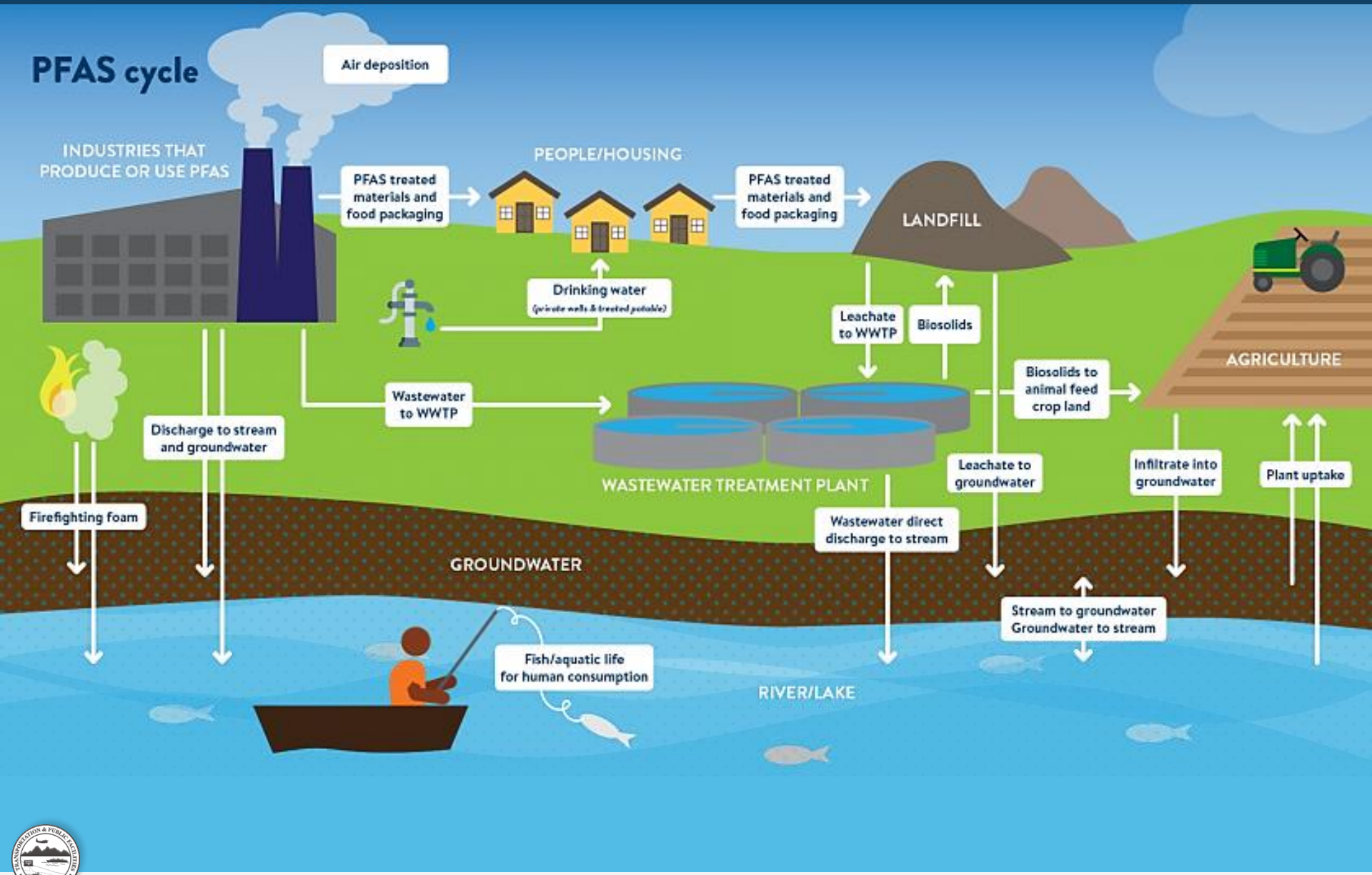
Image Source: https://www.kimley-horn.com/what-is-pfas/

PER – AND POLYFLUOROALKYL SUBSTANCES (PFAS)

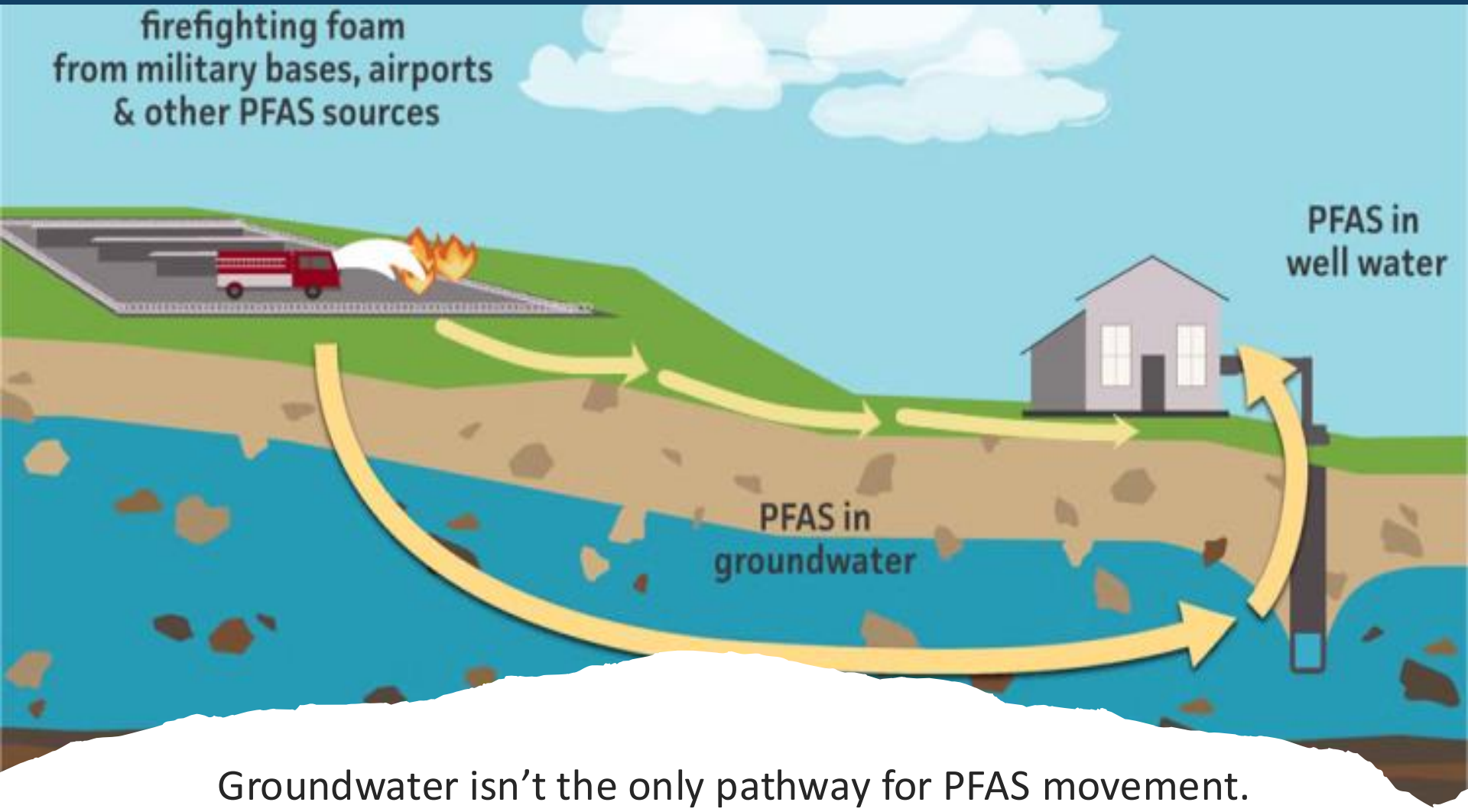
- **What are PFAS**
  - Family of over 6,000 chemicals
  - Do not break down easily
  - Builds up in humans and animals
  - Toxic at 70 ppt (parts per trillion) levels
- **Products, sources, and history**
  - Aqueous Film Forming Foam (AFFF)
  - Consumer Products: non-stick and stain-resistant products used in furniture, ski waxes, rain gear, cooking utensils, paints, plastics, adhesives, personal care products (such as dental floss) convenience food packaging, and some bottled water
- **Major Sources of Releases**
  - Manufacturing
  - Releases from fire suppression activities
  - Wastewater Treatment Plants
  - Landfills



ENVIRONMENTAL CONCERNS: PFAS PATHWAYS



PFAS PATHWAY AT PART 139 AIRPORTS



Groundwater isn't the only pathway for PFAS movement. Surface water, like ponds, ditches, and other bodies of water can easily transport contamination.

DRINKING WATER IMPACTS IN ALASKA

DOT&PF Airports across Alaska

- Current & Former Part 139 Airports
- Former DoD (Department of Defense) Sites

Over 130 known PFAS contaminated sites in Alaska.

Communities where treatment or alternative water solutions provided due to drinking water impacts:

DOT&PF Airports

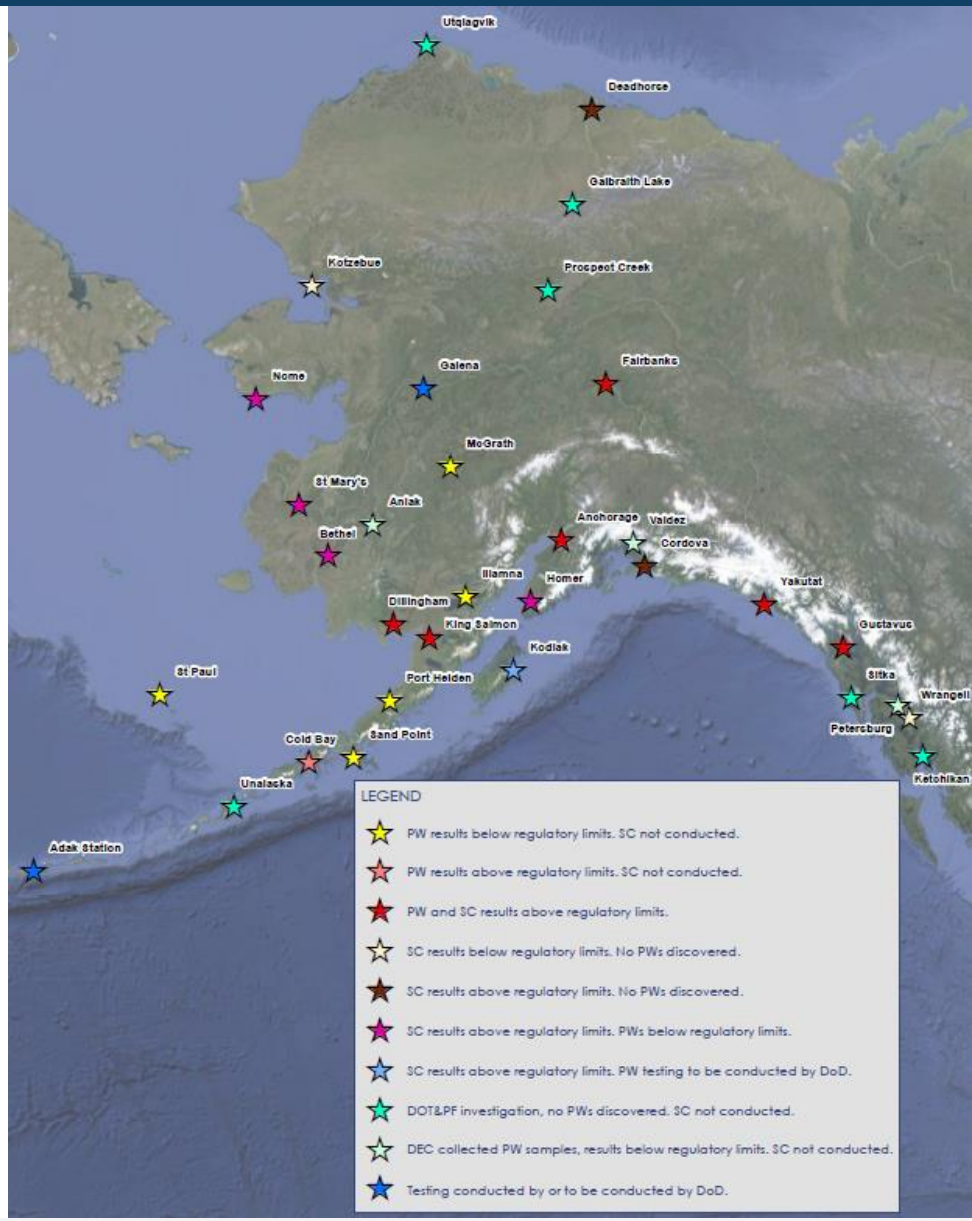
- Anchorage
- Cold Bay
- Dillingham
- Fairbanks
- Gustavus
- King Salmon
- Yakutat
- Utqiagvik

Other known sites in Alaska

- Eielson AFB / Moose Creek
- Fairbanks Municipal Fire Training Center

Additional Sites Upon Adoption of the EPA (Environmental Protection Agency) MCLs (Maximum Contaminant Levels)

- Bethel
- Iliamna
- McGrath
- Port Heiden
- Sand Point
- St Mary's



CONTAMINATED MEDIA HANDLING: CONSTRUCTION

Construction Soil/Materials Management Plan

- DEC (Department of Environmental Conservation) approved document, prior to construction activities
- Provides guidelines during design phase of project to determine if work is necessary on PFAS-contaminated sites, cost-saving opportunity
- Provides procedures during construction for contractors working with PFAS-contaminated media (soil, asphalt, concrete, and water)
- Key Points
  - Establishing methods allows construction projects in contaminated areas to move forward
  - Goal is to guide construction projects in contaminated areas, not to delineate or remediate
  - Construction projects in these areas may result in delays and additional costs if PFAS is not factored in during the project planning and funding phases

AIRPORT SITE CHARACTERIZATIONS

Airports which have had site characterization by DOT&PF:

- Anchorage
- Fairbanks
- Gustavus
- Dillingham
- King Salmon
- Homer
- Deadhorse
- Cold Bay
- Nome
- Kodiak

What is learned from Site Characterization

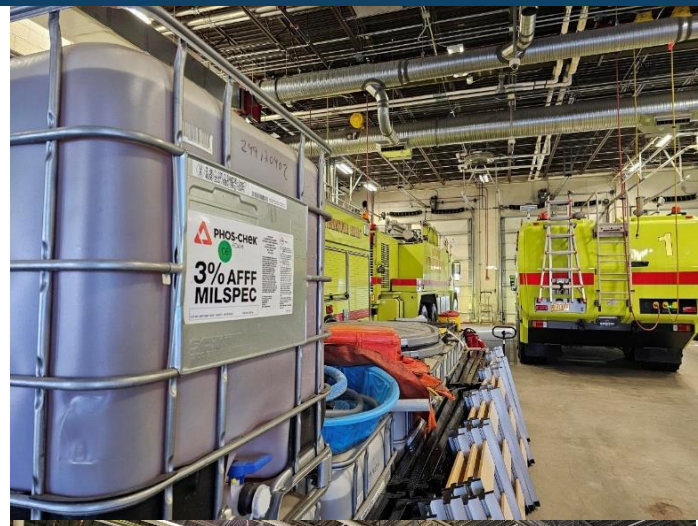
- Current and historical use of area
- Community institutional knowledge
- Geology and Geography
- Direction of groundwater flow
- Soil, water, sediment sampling
- Contamination source identification

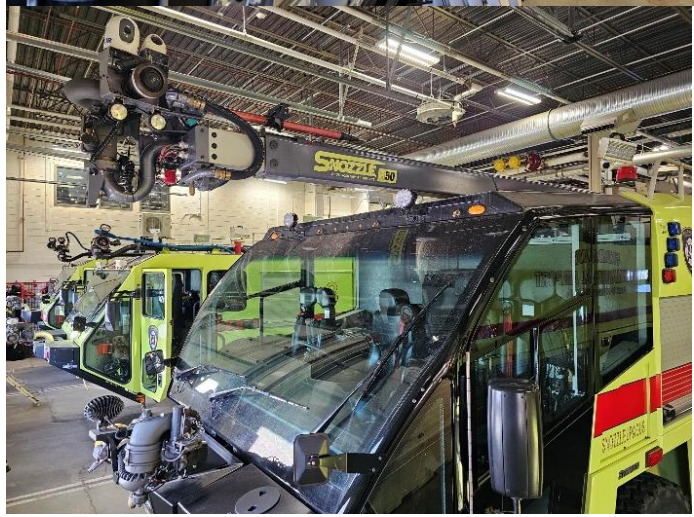
Site characterization leads to feasibility studies and ultimately long-term drinking water solutions and options for remediation and mitigation of contaminated areas to minimize PFAS migration.

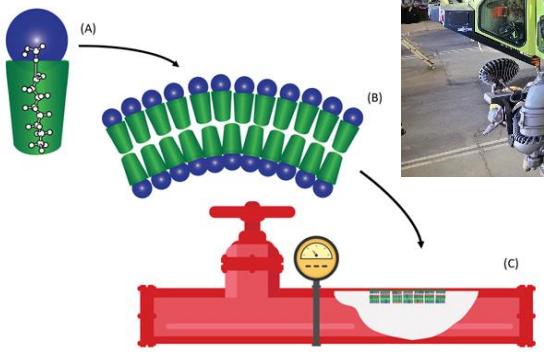
2025 EFFORTS ON PFAS

Aircraft Rescue and Fire Fighting (ARFF) Truck Cleaning & Transition to Flourine-Free Foam (F3)

- Spring 2025:
  - Request for Proposal and Contractor Selection
- Summer/Fall 2025, Phase 1:
  - Transition Fairbanks and Ted Stevens Anchorage International Airport from AFFF to F3
  - Evaluate Cleaning Method and Setting Standards/Procedures for Alaska and the Arctic
- As airports transition, dispose of AFFF and purchase F3







FAI PFAS MITIGATION PILOT STUDY: SOIL & WATER

2023/2024 Project Pilot Study

Goal

- Implement two PFAS remediation technologies at FAI and assess their feasibility for implementation nationwide

Consortium

- Shannon & Wilson (PFAS investigation)
- Aquagga (liquid PFAS destruction)
- Arctic Slope Regional Corporation (soil PFAS destruction)
- DOT&PF
- DEC
- American Associate of Airport Executives (AAAE)

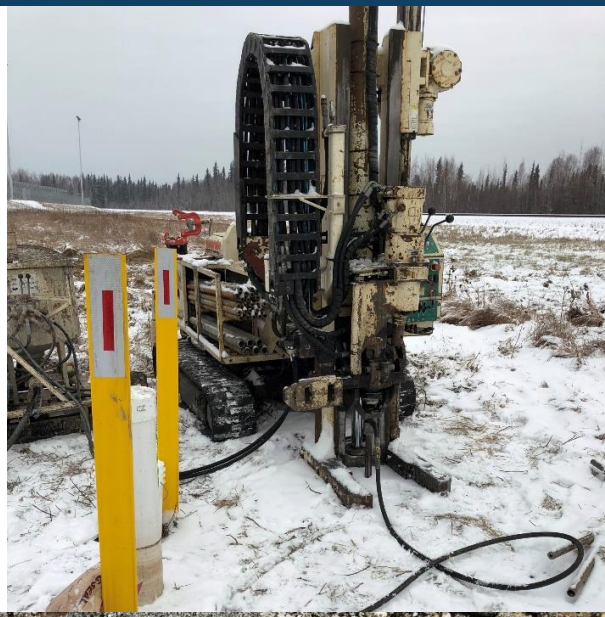
Results

- Liquid concentrations reduced by >99.9%
- High-level PFAS in soil reduced to Non Detect (ND) levels

FAI PFAS MITIGATION PILOT STUDY: GROUNDWATER

2019/2020 Project Pilot Study

- Goal: Inject Regenesis PlumeStop into known PFAS-contaminated groundwater to evaluate the effectiveness for sequestering PFOS, PFOA, PFHpA (Perfluoroheptanoic acid), PFHxS (Perfluorohexane sulfonic acid), and PFNA (Perfluorononanoic acid)
- Consortium
  - Regenesis
  - Shannon & Wilson
  - DOT&PF
  - Geotek, Alaska
- Results: Non-detect results for the five PFAS compounds that the product was formulated to sequester



DISPOSAL OPTIONS IN ALASKA

Water

- On-site treatment and disposal to sewer line or ground surface
- Ship to Lower 48 to approved facility

Soil

- Thermal treatment (fixed location) – Moose Creek, Alaska (Republic Services)
- On-site treatment (generally only cost feasible for large quantities)
- Thermal, soil washing, smoldering, soil solidification
- Ship to Lower 48 to approved facility

AFFF

- On-site treatment (generally only cost feasible for large quantities)
- Ship to Lower 48 to approved facility

Waste Product (Rinsate, Personal Protective Equipment, spent filter media, etc.)

- Ship to Lower 48 to approved facility

PFAS REMEDIATION TECHNOLOGIES: PART 1

Water Treatment

Proven Methods

- Pump and Treat/Sorption Media (Granular Activated Carbon, Ion Exchange, Resin)
- In ground colloidal carbon injection into soils below groundwater

New Technology

- Foam fractionation
- Bioremediation

Foam/Liquid Treatment

Destruction Technologies

- Chemical Oxidation (In Testing)
- Chemical Reduction (In Testing)
- Thermal Technologies (In Testing)
- Battelle PFAS Annihilator (Proven)
- Hydrothermal Alkaline Treatment (Proven)

Soil Treatment

Proven Methods

- Excavate and dispose

New Technologies

- Thermal Soil Treatment
- Smoldering combustion
- Carbon barrier
- Soil Washing
- Soil solidification

Many of these technologies can be implemented on-site.

PFAS REMEDIATION TECHNOLOGIES: PART 2

Factors that affect technology selection

- Type(s) of PFAS found at the site
- Comingled contamination
- Geochemical site properties
- Organic matter content
- Project goals
- Site location – likely the biggest factor for Alaska-based projects – For this reason it is likely that on-site options will be more favorable for Alaskan projects in the future
- Carbon emissions
- Community acceptance
- Proven use of technology

DOT&PF COMMITMENT TO ADDRESSING PFAS

Private Well Impact Studies at 28 Airports Completed

- Bottled water provided, where above DEC Drinking Water Action Level
- Proactive approach, including community engagement

No AFFF sprayed to the ground (except in emergency situations) since 2019

- Robust waste management practices

DOT&PF PFAS Research / Staying up with the industry

- Leading the Industry with Pilot Projects
  - Regenesis PlumeStop Groundwater Treatment
  - ASRC Thermal Soil Treatment
  - Aquagga Liquid Treatment
  - Cleaning ARFF Vehicles in the Arctic
- Concrete and Asphalt testing

Construction projects address PFAS contamination to prevent the spread of PFAS

Early Remediation Efforts at FAI

- FAI burn pit closure

Additional funds would continue efforts for impacted communities

- Monitoring
- Addressing private well additional impacts upon adoption of the MCL and providing temporary and long-term alternative water solutions.
- Transitioning from AFFF to F3 at the rural airports, Phase 2 support

THANK YOU

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