USWAG
UTILITY SOLID WASTE ACTIVITIES GROUP

Mitigating PFAS Risks:
A Comprehensive Strategy for Utility Operations to Transition from Aqueous Film-Forming Foam to Fluorine-Free Alternatives

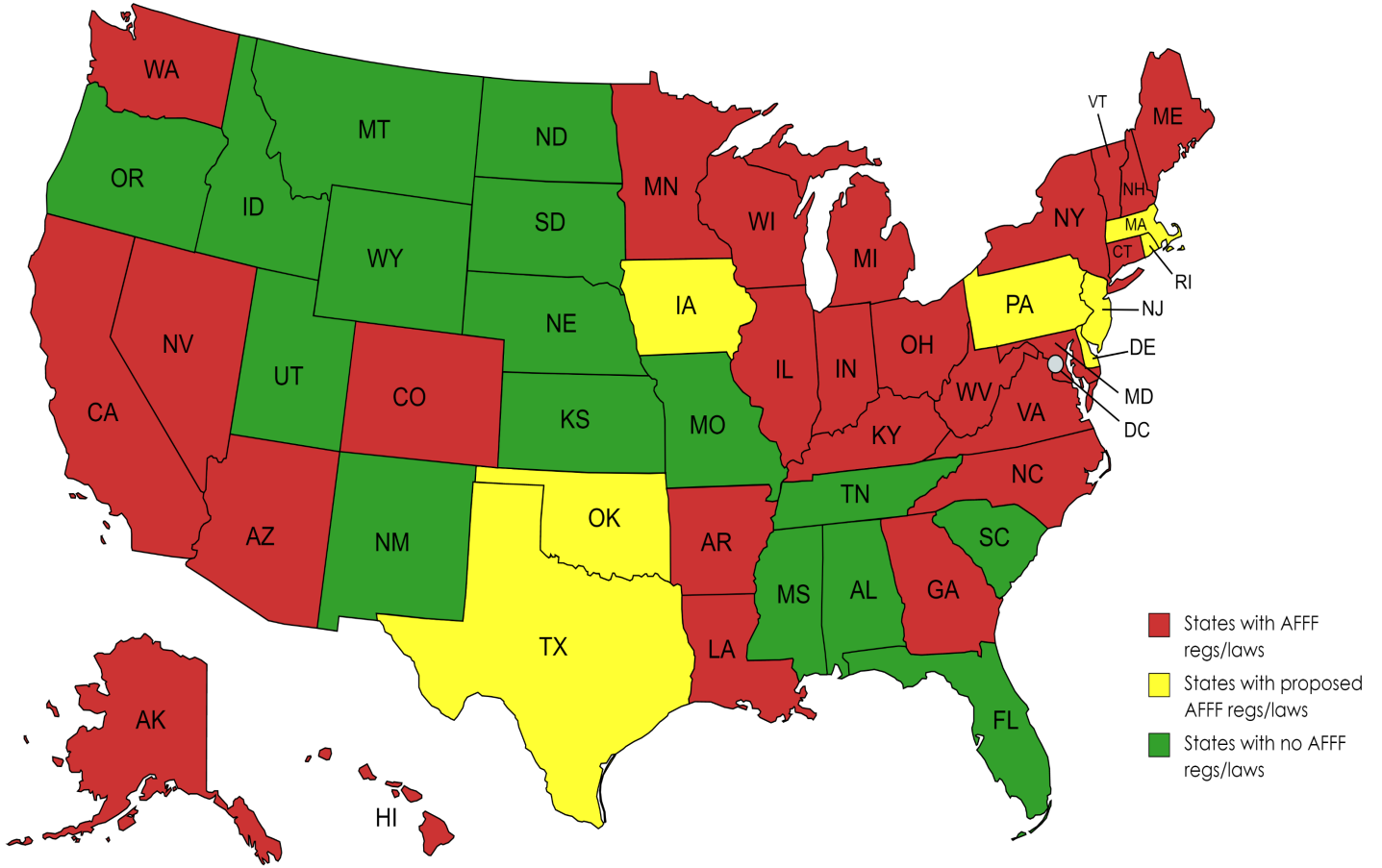
David Fulton, PG
Program Director, Tetra Tech

Introduction

- Utility companies face several challenges related to per- and polyfluoroalkyl substances (PFAS).
- One of the most significant sources of PFAS contamination is using aqueous film-forming foam (AFFF).
- Fire suppression systems commonly found in power generation facilities include substations, maintenance shops, and storage areas for fuels and chemicals.
- A critical risk mitigation strategy is to transition the fire suppression systems from AFFF to a fluorine-free foam (FFF) alternative to avoid the potential for long-term environmental liabilities.

AFFF Transition – What is Driving a Change?

- AFFF is Being Phased Out – Lack of Availability
- Avoiding Potential Environmental and Human Health Liability
- Increasing Regulation
- Lawsuits



Key Take Aways Concerning AFFF

- **Stricter regulations are coming at the Federal and State level.**
- AFFF availability is getting scarce
- Time for planning your transition program to F3 is **now**.
- AFFF Transition projects do not fall under CERCLA or qualify as a RCRA corrective action
- AFFF transition is considered system maintenance dealing with regulated materials and unregulated waste.

EPA United States Environmental Protectio Agency

U.S. State Resources about PFAS

www.epa.gov/pfas/us-state-resources-about-pfas

Essential Steps To Transition Away From AFFF

- A successful foam transition program requires a thorough understanding of regulatory requirements, waste disposal options, and the decontamination processes.
- This presentation outlines five essential steps to accomplish a successful AFFF transition program.

Step 1. Perform A Comprehensive Assessment Of The Conversion.

Step 2. Seek alignment with key stakeholders early in the process.

Step 3. Determine what components of the existing system should be retained.

Step 4. Properly clean retained equipment.

Step 5. Engage an experienced environmental contractor with expertise in AFFF transition.

Step 1. Perform a Comprehensive Assessment

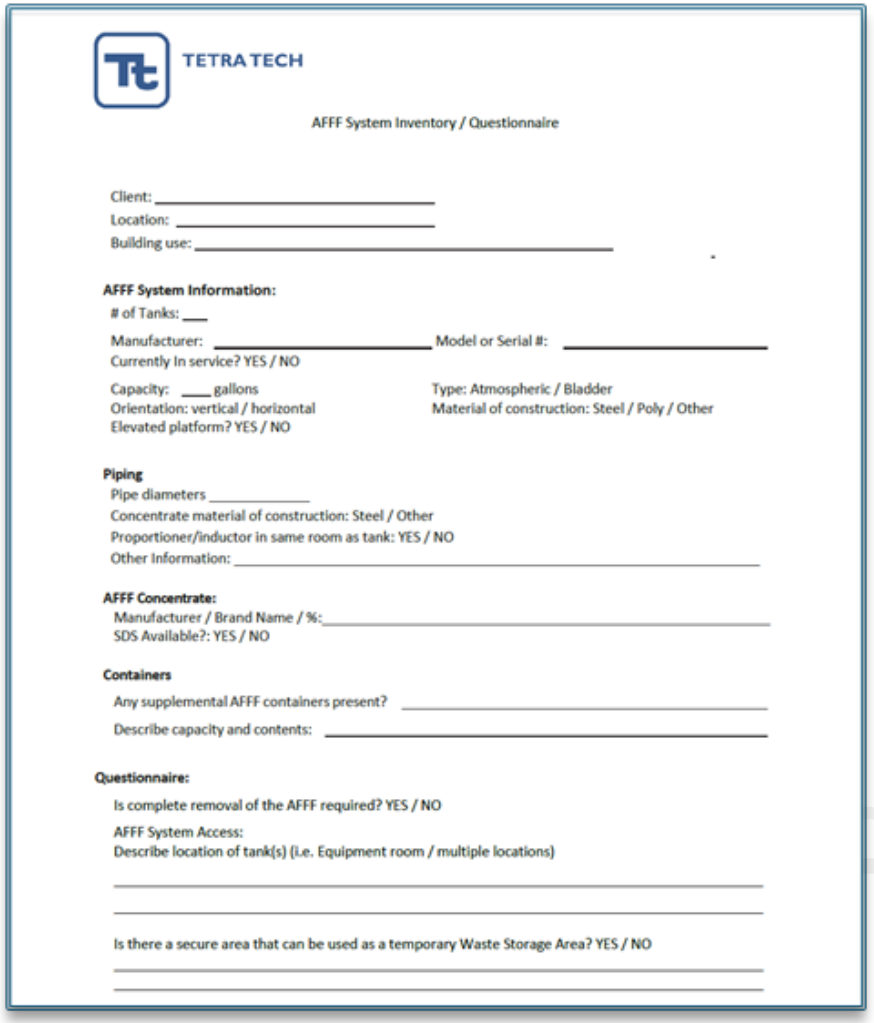
A foam system evaluation must consider many factors to effectively convert the foam systems from AFFF to an FFF. Evaluations should include:

A. Complete an inventory of all system components.

B. Full or partial code review of the existing facility to affirm the requirements of a foam application

C. Develop performance-based design criteria and compatibility of an FFF with existing foam equipment.

NOTE: Understanding the compatibility of a new foam with existing equipment requires comprehensive engineering calculations based on new fluid properties



TETRA TECH

AFFF System Inventory / Questionnaire

Client: _____
Location: _____
Building use: _____

AFFF System Information:

# of Tanks: ___
Manufacturer: _____ Model or Serial #: _____
Currently In service? YES / NO
Capacity: ___ gallons
Orientation: vertical / horizontal
Elevated platform? YES / NO
Type: Atmospheric / Bladder
Material of construction: Steel / Poly / Other

Piping

Pipe diameters _____
Concentrate material of construction: Steel / Other
Proportioner/inductor in same room as tank: YES / NO
Other Information: _____

AFFF Concentrate:

Manufacturer / Brand Name / %: _____
SDS Available?: YES / NO

Containers

Any supplemental AFFF containers present? _____
Describe capacity and contents: _____

Questionnaire:

Is complete removal of the AFFF required? YES / NO
AFFF System Access:
Describe location of tank(s) (i.e. Equipment room / multiple locations)

Is there a secure area that can be used as a temporary Waste Storage Area? YES / NO

Step 2. Seek alignment with key stakeholders early in the process

Early stakeholder engagement promotes a successful outcome. Stakeholders typically include:

- Facility Representatives: Fire-Life Safety / Operations / Legal / Procurement
- Insurance Carrier
- Local Fire Marshall

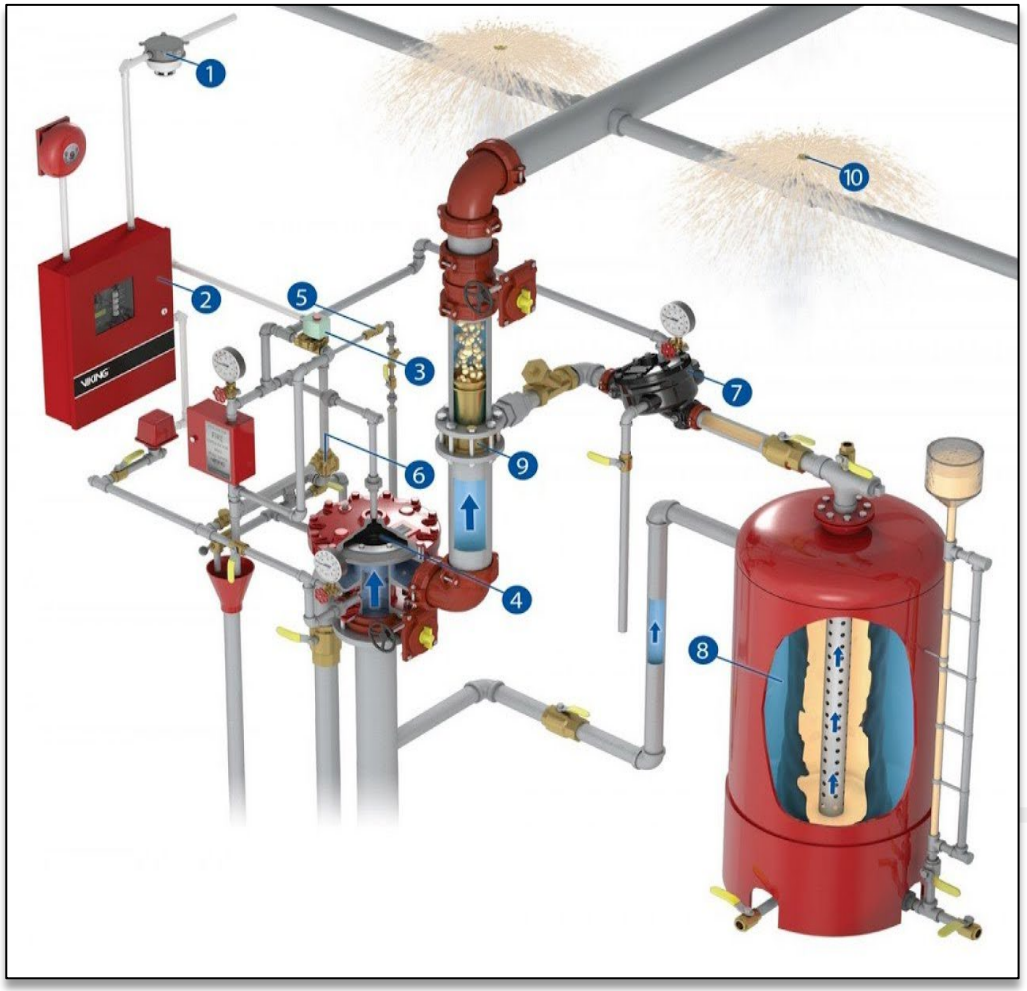
Utility companies should establish a Project Management Team (PMT) comprised of internal stakeholders, the Engineer-of-Record, the fire suppression system contractor, and the environmental contractor experienced with AFFF decontamination and demolition.

Lessons Learned when aligning Stakeholders:

- Leverage a multi-discipline team to evaluate life-cycle costs from concept to completion.
- Take a step back and reassess the fire risk hazards and scenarios (reduce the footprint).
- Do not assume it is simply a replacement-in-kind.

Step 3. Determine what components of the existing system should be retained.

- Given the significance of the transition cost and permanence of the new system, retaining existing system piping (if compatible) is desirable over replacement.
- Perform an analysis to determine the value of replacing versus decontamination, including downtime, impairment requirements, and capital costs.
- Balancing replacement versus retainage reduces AFFF transition costs.
- To clean or not to clean ….



AFFF Transition – Who Advocates For Cleaning?

- U.S. Environmental Protection Agency (EPA)
- National Fire Protection Association (NFPA)
- International Fire Chiefs Association (IAFC)
- Fire Protection Research Foundation
- State Environmental Agencies
- The Foam Coalition
- National Association of State Fire Marshals (NASFM)

These organizations emphasize the importance of properly cleaning and decommissioning AFFF systems to mitigate environmental contamination and ensure safety during the transition to alternative foam products.

AFFF Transition – Is Cleaning Right for You?

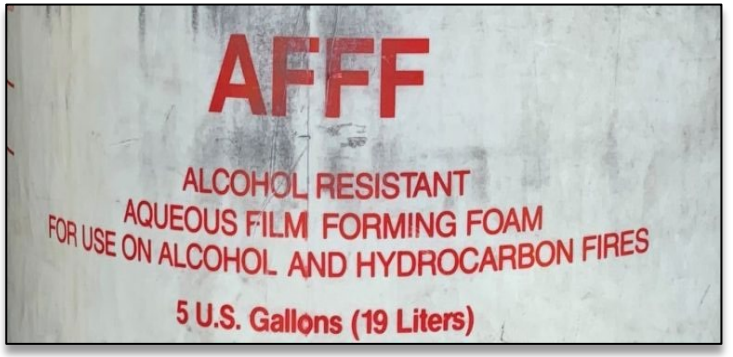
Key questions for determining whether cleaning should be a part of your transition program:

- ***FOAM-BASED SYSTEM***: Has a fire risk scenario assessment been performed to determine the need for a foam-based suppression system?
- ***FOAM CAPTURE*:** Will the discharge of a foam-based system be captured using engineering controls (i.e., trench drains, secondary containment) and standardized protocols?
- ***FOAM REPLACEMENT*:** Has replacement foam been engineered to determine if suppression system infrastructure modifications are required?
- ***INFRASTRUCTURE REPLACEMENT*:** Has a cost-benefit analysis been performed to compare infrastructure replacement vs. decontamination?

AFFF Transition – How Clean is Clean?

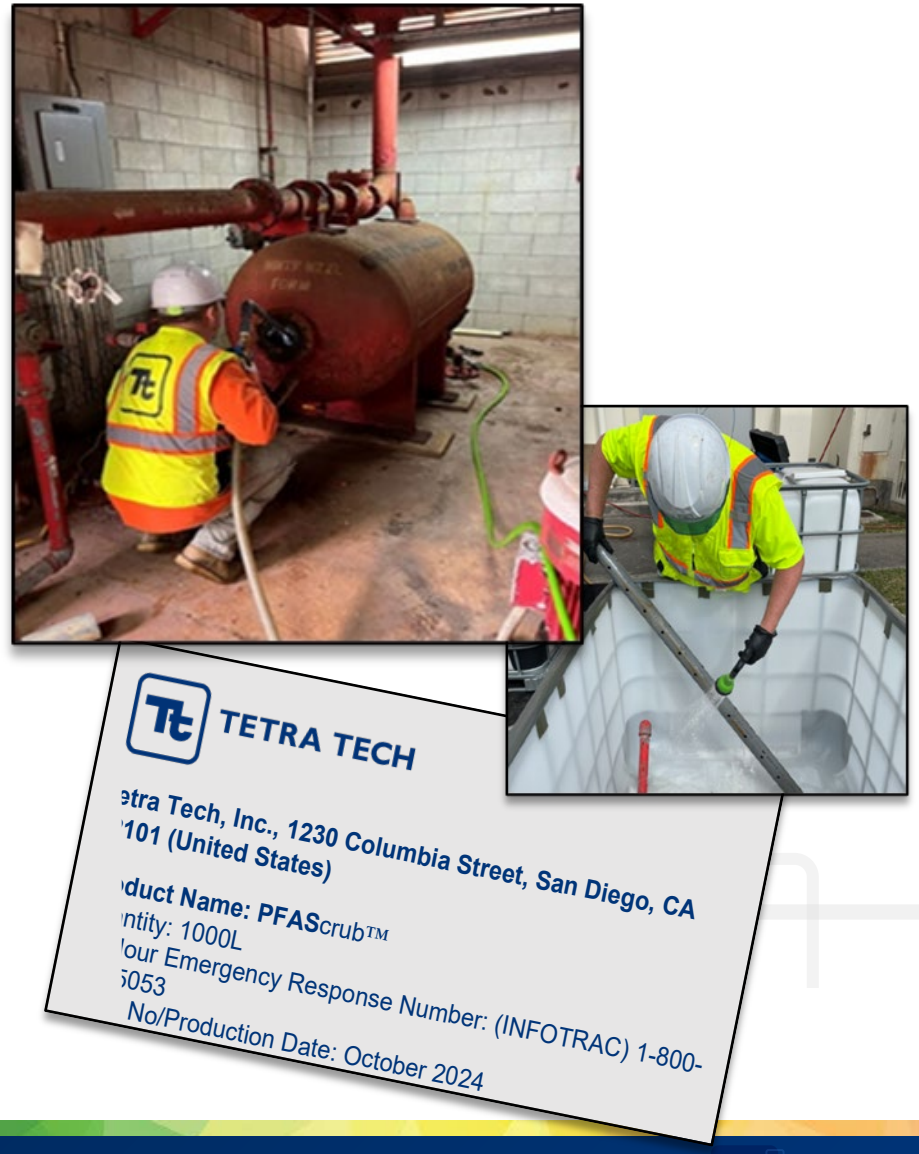
What level of cleaning (i.e., PFAS removal) is required for AFFF systems?

- U.S. has no standard
- First generation F3's were labeled as containing <1ppb PFAS intentionally added
- The European Chemicals Agency has proposed a limit of 1 mg/L (ppm) total PFAS within F3 firefighting foams, knowing that decontamination can be difficult.
- Europe has determined that if an F3 foam contains more than 25 ppb of PFOA or 1,000 ppb of PFOA precursors, it can't be used if it is not 100% contained when discharged.



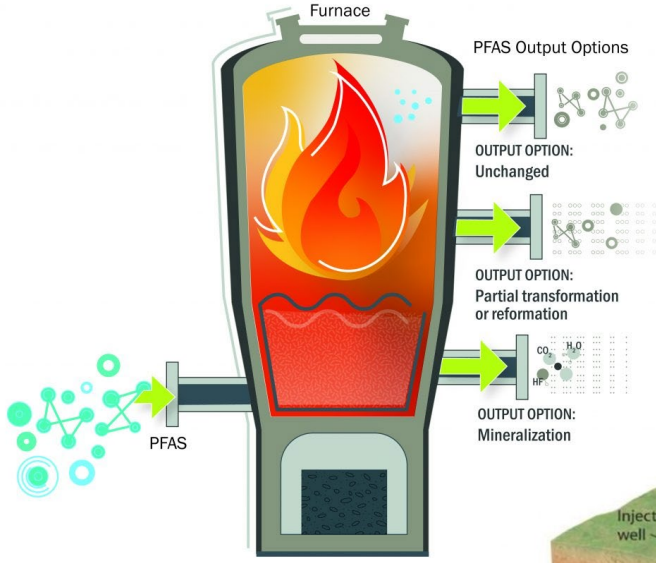
Step 4. Properly Clean Retained Equipment.

- Tap water is insufficient.
- Scientific literature recommends Butyl CARBITOL™ (BC) glycol ether solvent as the most effective.
- Tetra Tech **PFAS**crub™ is a (BC) glycol ether solvent developed exclusively to address PFAS



Step 5. Engage an Experienced Environmental Contractor with Expertise in AFFF Transition.

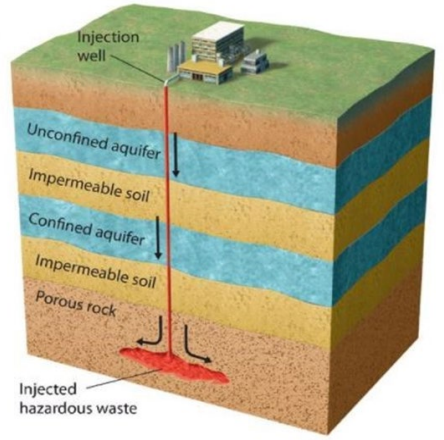
- An experienced environmental contractor ensures solid and liquid waste is profiled correctly, manifested, containerized, labeled, and shipped in compliance with Department of Transportation requirements.
- Various disposal options exist for waste streams generated during the facility decommissioning process.
- Each disposal option has unique data-driven requirements.
- Waste disposal options should align with the company's risk tolerance regarding PFAS-contaminated materials and foam.



INCINERATION

RCRA - Subtitle C
HazWaste Management

- Hazardous Waste is a solid (liquid) waste or combination of wastes that due to quantity, concentration, or properties may
  - cause or contribute to an increase in mortality, serious irreversible, or reversible incapacitating illness
  - pose a substantial present or potential hazard to human health or environment when improperly treated, stored, or disposed.



DEEP WELL INJECTION

SUMMARY

- A critical risk mitigation strategy is to transition fire suppression systems from AFFF to a fluorine-free foam (FFF).
- Avoid the potential for human health exposure, long-term environmental liabilities, and lawsuits.
- Successful foam transition programs require a thorough understanding of regulatory requirements, waste disposal options, and the decontamination processes.
- This presentation identified five key steps to facilitate a successful AFFF transition program.

Thank You

Contact Information:

David Fulton | Environmental Program Director
Direct **+1 (609) 390-0902** | Mobile **+1 (215) 779-9172** | Dave.Fulton@tetratech.com
2300 Lincoln Hwy East, One Oxford Valley, Suite 200 | Langhorne, PA 19047 | www.tetratech.com
Tetra Tech | **Leading with Science®**

Leading with Science®