

**Innovation Applied: Streamlining Access
and Approvals of Treatment Technologies**

University of
Massachusetts
Amherst



Year One Activity Report Out

Project Team

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UMass Team Activities

- **Interviewing stakeholders from state drinking water programs**
 - Learning about processes for approving treatment technologies (some focus on PFAS)
 - Identifying commonalities and differences in approaches
 - Identifying areas for deeper study
- **Performed coding and thematic analysis**
- **Collecting state specific guidance on PFAS regulations and treatment**



Interviews

- **Semi-structured interviews**
 - Mix of predetermined and ‘in the moment’ questions to participants
 - 13 states
- **Approved by UMass Institutional Review Board (IRB)**

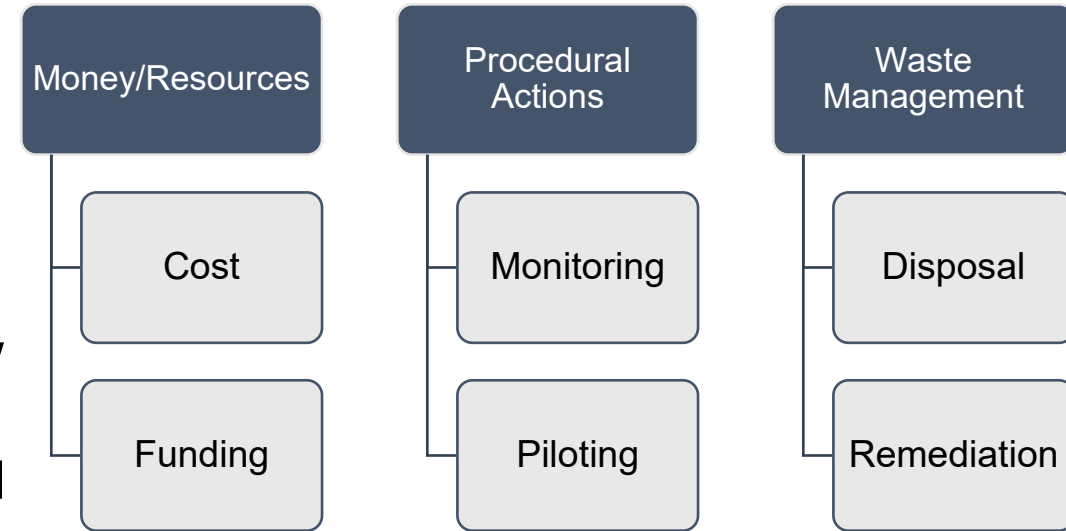


- 1) What constitutes an “innovative technology” in your state?
- 2) Are there specific guidelines based on either the size of the system (population) or the type of PWS (CWS vs. NTCWS vs. TNCWS)?
- 3) Is there specific guidance on technologies based on the type of contaminant?
- 4) Are there pilot testing requirements for innovative technologies?
 - a) What do these testing requirements look like?
- 5) What is the process/ set of steps to approve and install an innovative technology in a water system?
 - a) What are the steps in the process (approval, engineering consultation, piloting, permitting, etc.)?
- 6) Are there any case study examples you can share where an innovative technology was implemented?
 - a) Successes and challenges?
- 7) Are there additional sampling/monitoring costs or analyses associated with implementing innovative technologies that are different from what would be required with other technology solutions?
- 8) Regarding PFAS specifically:
 - a) Does your state currently have a guideline/regulation in place or underdevelopment for PFAs?
 - b) Does your state have a strategy specifically for PFAS removal? Are there specific strategies you will or will not approve in water systems?
 - c) How well documented is PFAS contamination in your state? Is there a specific monitoring program?
- 9) Disposal of GAC media with PFAS in it?
- 10) PFAS sampling program in private wells? How are private wells regulated?
- 11) Does the state have specific guidance on POU/POE devices in general as an approach to removing specific contaminants?
- 12) Does the state ever consider other strategies besides treatment such as interconnection or drilling new wells before treatment?

Predetermined Questions for Interviewees

Coding and Thematic Analysis

- **Code:** descriptor assigned to a word or phrase from interview notes
- **Theme:** higher level grouping of codes that are related in some way
- **Coding approach**
 - Inductive - codes arise directly from interview responses
 - Hierarchical – helps to organize codes based on how they relate to one another. Allows for different levels of specificity



Example: Themes and Codes

What Constitutes an “Innovative Technology” in Your State?

- **Often not strictly defined**
- **No universal definition**
- **Some states don’t use this term/designation**
- **Common factors – not a BAT, new application of known technology (preference), not in regulations or manuals**
- **Lean conservative towards accepting new approaches**
- **States look to outside guidance with authority**
 - 10SS, ASDWA, EPA
- **Existing data from other systems and other outside documentation are essential**
- **Requirement of piloting often mentioned**
- **Important procedural actions**
 - piloting, monitoring, reporting



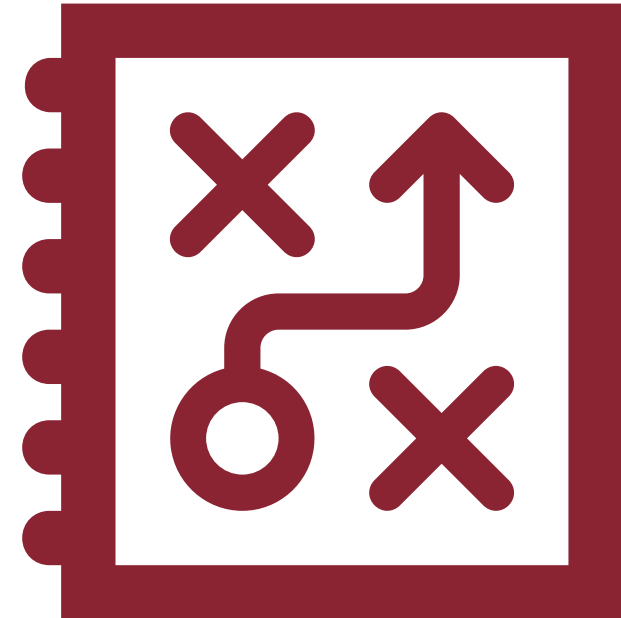
What Does This Communicate to Us?

- **The definition we use for ‘innovative technology’ drives the regulatory approach and associated challenges**
- **To effectively define this term, we need to identify and be specific about the processes associated with it by state stakeholders**
 - e.g. piloting, monitoring, reporting



Describing Processes for Approval of Innovative Tech

- **Procedural Descriptors**
 - Case-by-case, flexible
 - Don't want to be overly restrictive
 - No cookie cutter approach
- **System Characteristic Based Factors**
 - Some states have different standards/processes for different water system sizes and types
 - Primarily mention different approach for small systems
 - Others have a uniform process
 - Large systems typically pilot before small systems
 - TMF* capacity, cost, affordability dependent
- **Mix between case-by-case approach and uniform approach for different contaminants**



Implications for This Project

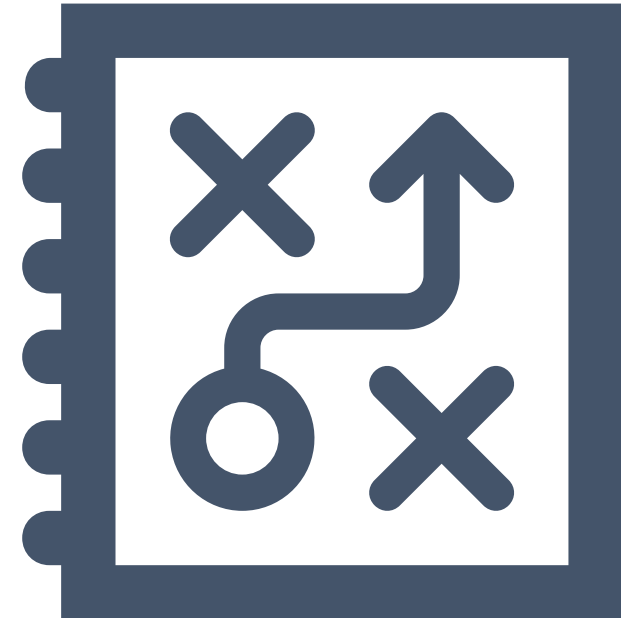
What does 'case-by-case' mean?

- Is each case evaluated as a unique scenario?
- Or are specific system sizes (small vs large) and/or system types (e.g. CWS vs. TNCWS vs. NTNCWS) combinations considered to be “cases”?

What are the factors that lead to using a case-by-case approach compared to a uniform approach?

If dependency on system size and type is important, how does this get incorporated into multi-state standards?

- What would reaching consensus look like for this?



Governance and a Key Concern

- **Standards in general**
 - Many states defer to federal/EPA or other standards
 - Some exceed federal regulations
 - Differing requirements for different system types or source waters
- **Concerns with simultaneous compliance**

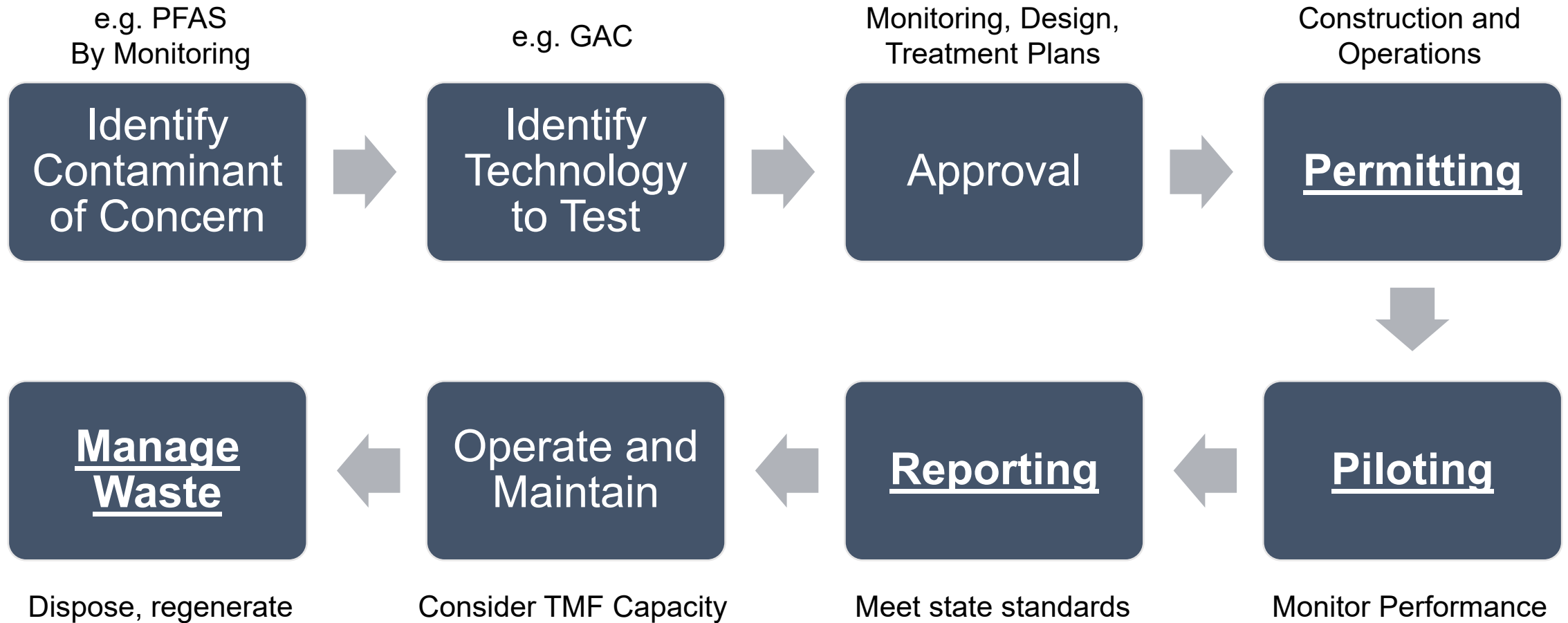


Governance Approach to PFAS

- **Want to follow EPA standards**
 - Approach described as “match federal”
- **Varying levels of enforceability for PFAS regulations**
- **Health advisory levels are followed or established**
 - Protection of public health can drive requirements for monitoring, treatment



Approving and Installing an Innovative Technology



Identify Contaminants

- **Monitoring – contaminant presence**
 - UCMR process leads to sampling that wouldn't be done otherwise
 - States will monitor when money is given
- **Contaminants mentioned during interviews**
 - PFAS
 - Arsenic
 - Nitrate
 - Manganese
 - Radionuclides



Identifying Technologies – How? Knowledge Transfer

- **States look to EPA for guidance**
- **Regional sharing – e.g. EPA region or New England**
- **10SS**
- **Interstate requests for outside documentation**
- **NSF/ANSI**
- **Vendor and engineering reports**



Knowledge Transfer (Data)

- **Consensus is that data (from other pilots, installations) are needed to more effectively implement innovative technologies**
- **States want good data collection**
- **States sometimes use data from other states/sources as justification for use of an innovative technology**
- **How do we facilitate communication?**
 - “What are the pathways to get people connected?”



How Do We Transfer Knowledge More Effectively and How Can This Drive Down the Resource Burden?

- **Many states interviewed indicate that engineering reports are required after pilot implementations. Where do these reports go? Can they be shared in a place of common access?**
- **Likewise, where does data from pilots go? Can this data be shared in a place of common access?**
- **What would be the base requirements for reports and/or data for a state to consider accepting outside knowledge as a source of information for implementation of innovative technologies?**
- **Are there benefits to regional approaches for knowledge transfer processes?**

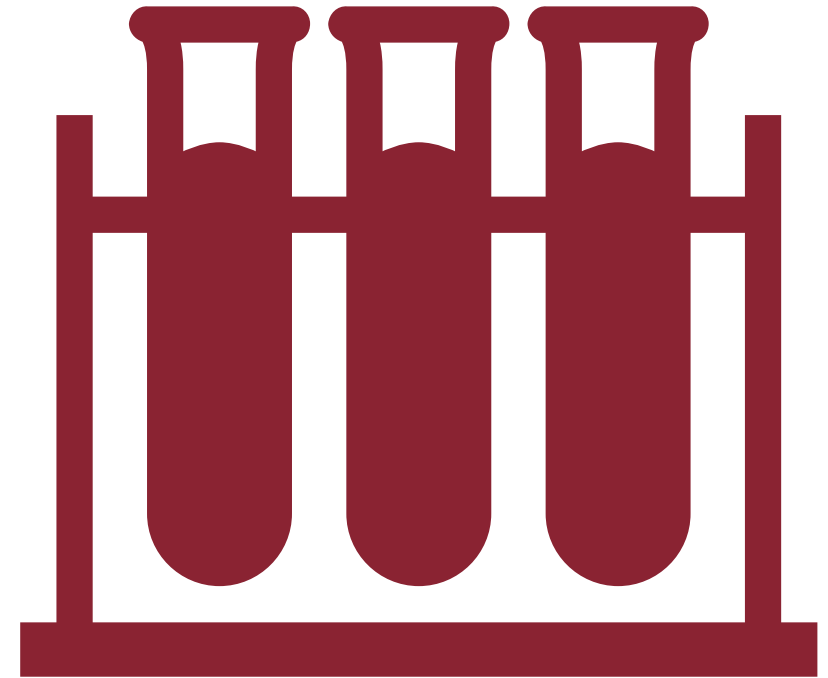
Permitting, Reporting, Approval

- **Permitting**
 - For construction and/or operation
 - Some states don't or can't require permits
- **Reporting**
 - States specify need for engineering reports
 - Reports required after piloting
- **Approval**
 - Reports must be approved by state
 - States approve design & treatment plans
 - States approve monitoring required during piloting



Piloting for Innovative Technologies

- **Most states interviewed indicated that piloting is required or at least highly recommended when implementing innovative technology**
- **Reasons for piloting – new media, not a BAT, DPR, not conventional, new contaminant**
- **Often required along with reporting requirements**
- **Technologies most mentioned for PFAS – GAC and IX**



Further Points on Piloting

- **Challenges include system size, determining success, lack of resources, and technology used**
- **Can be required even if a technology has been used before**
- **Bench scales pilots can be used when resource limited**
- **Phrase “case-by-case” abounds**



Making Pilots with Broader Impact

- **What are the details of piloting requirements of different states?**
 - How can these requirements be detailed in such a way to facilitate knowledge sharing between states or regions?
- **What are the criteria for evaluating a pilot? What makes a pilot “successful”?**
 - Adequacy, quantity of monitoring data?
 - Operational descriptions?
 - Something else?



Let's Make It Happen!

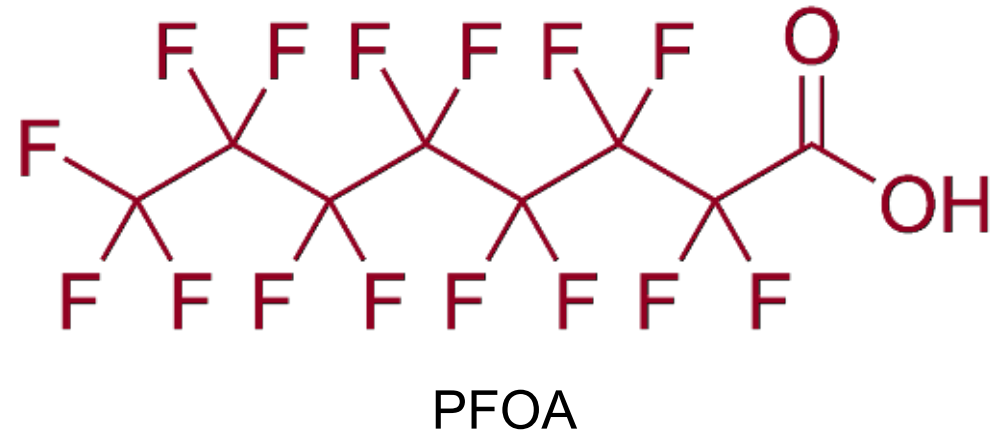
- **Funding**
 - Mechanisms – EPA, state revolving funds, responsible parties (e.g. DOD, manufacturers)
 - Some difference into whether funds are for private wells or for PWS
- **Cost**
 - Key areas of concern are disposal of media, monitoring, and O&M
 - Costs relating to waste were often mentioned
 - Cost of monitoring can be prohibitive
 - Economy of scale matters – difficulties for small systems



Regarding PFAS Specifically

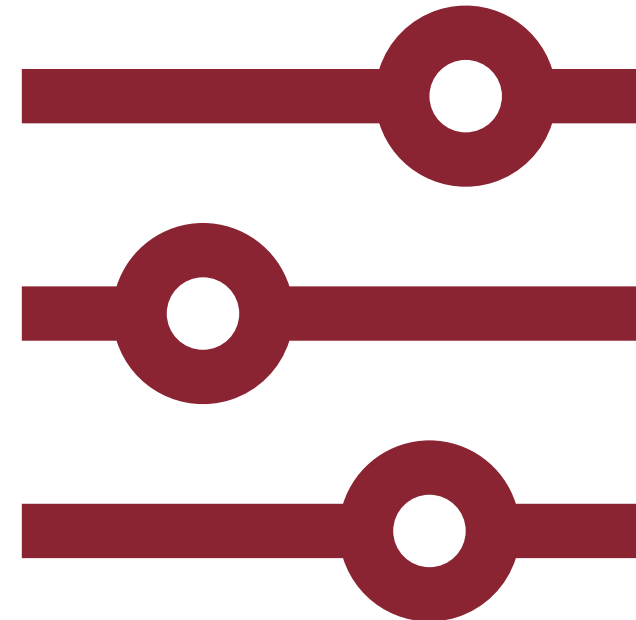
Note: Interviews conducted before June 15, 2022
(Interim Updated PFOA and PFOS Health Advisories)

- **States want to follow EPA standards**
 - Go with what EPA says, many don't want to be more stringent
- **There are varying levels of enforceability for PFAS regulations**
- **GAC and IX seem to be preferred treatment technologies**
- **Geographic factors: airports, military installations**
- **States establish health advisories when PFAS is detected through monitoring**
 - Some revealed through UCMR process



Options Besides Centralized Treatment

- **Consolidation seen as a good option sometimes, but can be cost prohibitive**
- **Bottled water in some cases (short-term)**
- **Source blending or switching if possible**
- **Point of Use/Point of Entry (POU/E)**
 - States generally want to avoid
 - Hard to achieve compliance with SDWA
 - O&M a concern
 - Application in some places, but not widespread by any means
 - Some mention specifically not for PFAS, at least yet



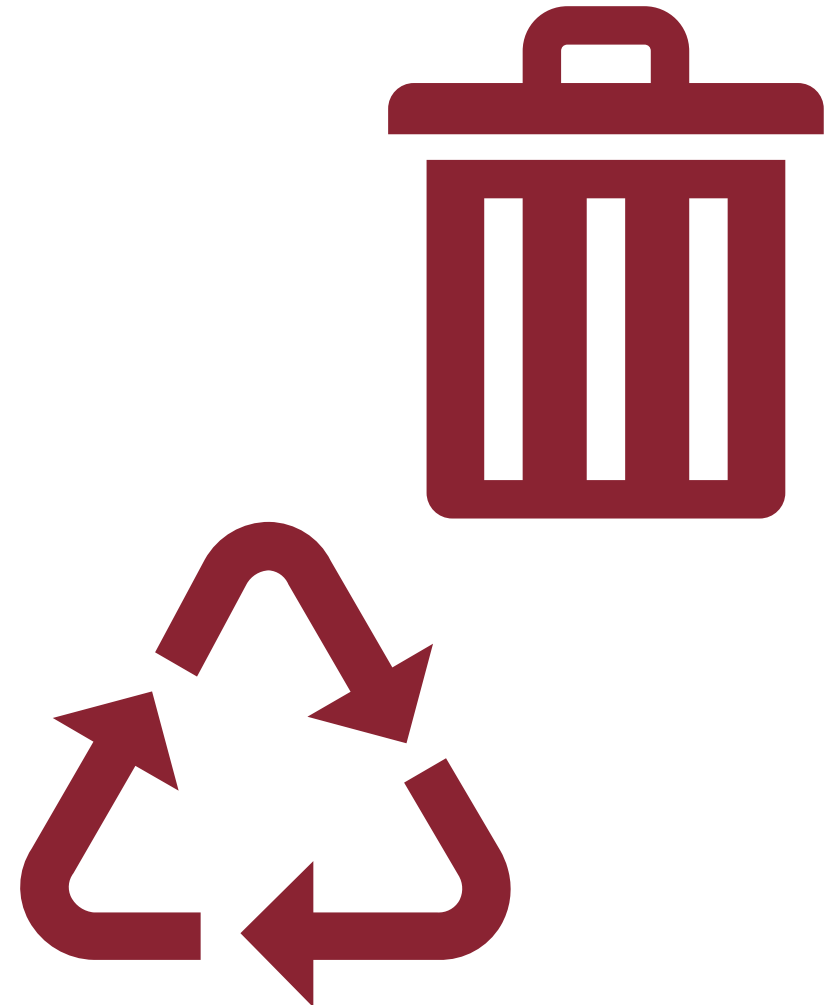
Private Wells (Self-Supply) and Privately Owned PWS

- **Funding for PFAS monitoring leans towards private wells**
- **Lack ability to mandate monitoring for self-supply**
- **For Privately Owned PWS**
 - Lean towards not allowing POU/E due to lack of TMF capacity and O&M concerns



Waste Management for PFAS

- **Disposal, regeneration, backwash, reject water**
- **Mentioned by most states in terms of disposal**
- **Hazard waste status variable and matters largely**
 - Where is it going? Shipping?
 - **August 26th – EPA Proposed Designation of PFOA and PFOS as CERCLA Hazardous Substances**
- **Concern surrounding POU systems in many cases**
- **For GAC - Carbon disposal & media changeout**
 - Cooperation with vendors beneficial
- **Cost for waste management is a concern**
- **Arsenic mentioned often as an area of past experience with this issue**

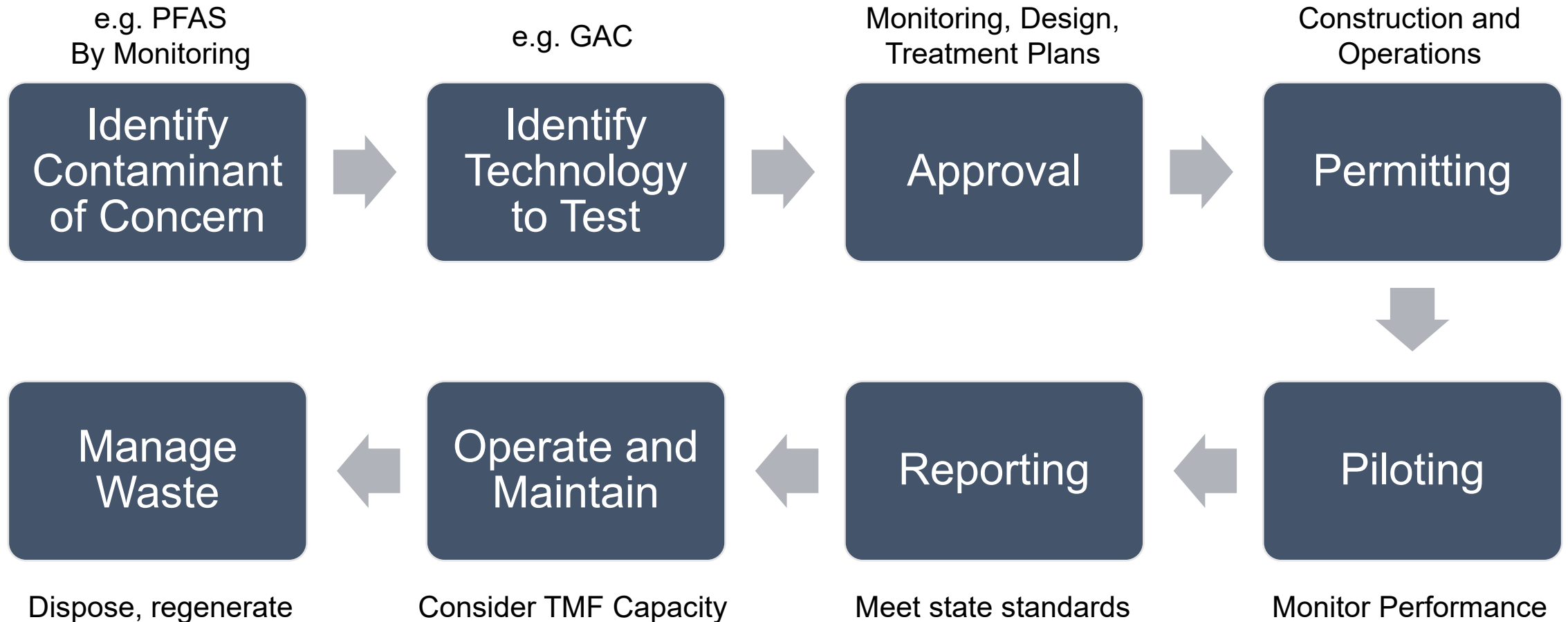


Waste Management for PFAS

- **How can we use our past experience with managing arsenic in efforts around PFAS?**
- **How can we support states in their handling of waste management?**
 - Guidance?



Approving and Installing an Innovative Technology



Facilitating Use of Innovative Technology

- **States want to provide PWS with guidelines for piloting, design, etc.**
- **States also want to provide guidance for homeowners/ private well owners**
- **Can our project outputs help facilitate this further?**



Next Steps

- **Continue to collect state specific guidance on PFAS regulations and treatment (e.g. GAC)**
- **Compare these documents to each other and information learned from these interviews**



Final Thoughts

- **The definition we use for ‘innovative technology’ drives the regulatory approach and associated challenges**
- **Questions to consider at the forum and beyond:**
 - What does ‘case-by-case’ mean?
 - What are the requirements for knowledge sharing effectively?
 - What makes a “successful pilot”?
 - How can we support waste management efforts?

QUESTIONS
&
ANSWERS

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