ADEQ PFAS Updates

Sara Konrad, ADEQ TA Grants Project Manager

Arizona PFAS Forum:
Industry Perspectives on Solutions

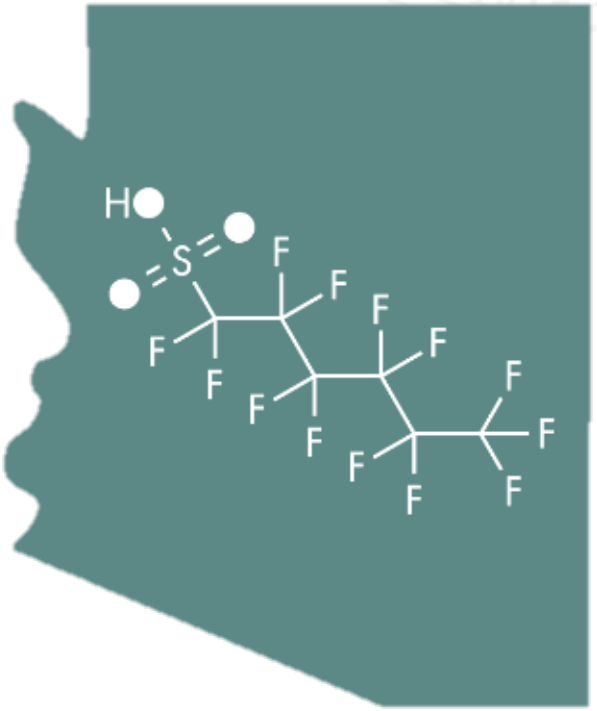
February 1, 2024

ADEQ Arizona Department of Environmental Quality

Clean Air, Safe Water,
Healthy Land for Everyone

Outline

- EPA Updates
  - Timeline of Proposed Rule
  - PFAS Piloting Assistance
  - UCMR 5 Sampling
- ADEQ Updates
  - ADEQ Sampling Project
  - Resources
  - Hydrogeologic Studies
  - Funding Resources



Timeline of Proposed Rule

- March 14, 2023: EPA announced the proposed National Primary Drinking Water Regulation (NPDWR) for six PFAS:
  - PFOA
  - PFOS
  - PFNA
  - HFPO-DA, commonly referred to as GenX Chemicals
  - PFHxS
  - PFBS
- December 15, 2023: EPA sent the PFAS NPDWR to the White House Office of Management & Budget (OMB)
- Early 2024: EPA expects to finalize rule

EPA PFAS Piloting Assistance

ADEQ Arizona Department of Environmental Quality

EPA United States Environmental Protection Agency

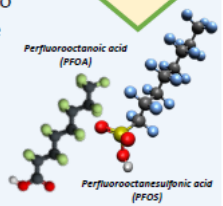
Technical Assistance Project for Treating Emerging Contaminants

Nicholas Dugan and Thomas Speth
Office of Research and Development (ORD)

EPA is looking for additional communities!

Introduction

- EPA's ORD is conducting a technical assistance project to help communities determine the most cost-effective approaches for removing emerging contaminants (EC) from drinking water.
- **The initial focus is on PFAS**, but other contaminants will be considered, such as lithium; manganese; and 1,4 dioxane.



Approach

- Partnering with systems that are **piloting**, running a **full-scale emergency treatment unit**, or have installed a **permanent full-scale unit**.
- Working with systems that are contemplating **residuals treatment**, specifically, reverse osmosis concentrate, granular activated carbon reactivation, and ion exchange regeneration.
- Optimizing treatment approaches with systems and developing a national database of approximately 50 systems so that all utilities can benefit.

Community Benefits

- ☑ **EPA-funded evaluation of the performance and operation of your EC treatment system.**
  - EPA will pay for bottles, shipping, training, and analytical costs.
  - All sampling results will be shared with the community.
  - Results will be used to provide support for design (if evaluating a pilot system) and long-term operational optimization.
  - EPA will pay for the residual treatment pilot systems, and in rare cases, the primary treatment pilot systems.
- ☑ **Tools, apps, and informational guides on the design, performance, operation, and cost of EC treatment systems.**
  - The tools and apps will be trained with the data from your community's system for increased accuracy for further optimization evaluations.
  - The tools and apps will allow your utility to see what other utilities have done.
- ☑ **Direct access to EPA/ORD technical experts.**
- ☑ **A connection to other EPA technical assistance programs (DWSRF application support, final design, AWOP, etc.).**
- ☑ **Depending on your state, ability to use the results for compliance sampling.**
- ☑ **An opportunity to collaborate on presentations and publications, including material for your community.**

Specific Needs/Criteria/Prioritization

What's needed from a prospective community

1. **Engage in a long-term sampling project for at least one year.**
2. **Collect samples after initial training.**
3. **Share water quality, design, cost, and operational data with EPA.**

Water quality criteria for system selection

- Sites with relatively high PFAS/EC concentrations.
- Sites that have different concentrations of water quality constituents (e.g., TOC, sulfate, nitrate, phosphate, chloride).
- Will prioritize systems with co-occurring contaminants (e.g., nitrate and cyanotoxins).

General system criteria for system selection

- Address unique residual stream issues/concerns.
- Start sampling at initial system startup or immediately following media replacement.
- Media columns with available mid-point sampling (preferred) to resolve breakthrough curves prior to media changeout.
- **Will prioritize small and/or underserved communities, including non-transient non-community water systems** (e.g., schools and hospitals), but will consider larger utilities if they offer unique water quality conditions.

Source: EPA's Office of Research and Development

Conditions to Capture

A wide variety of conditions are needed

- Concentrations of emerging contaminants (EC) / PFAS
- Background water quality
- Other contaminants
- Size of system
- Technical assistance needs
- Choice of technology
- Residual treatment
- Timing
- Desire to work with EPA
- Desire to commit to a long-term project
- Geographic dispersion

Slide source: EPA December 2023 presentation “ORD’s Technical Assistance Program for Emerging Contaminants”

Community Selection: Eligibility

Eligible for this program *(Any system that can access the DW-SRF)*

Non-Profit (public)

- Community
- Non-Transient Non-Community
- Transient Non-Community

For Profit (private)

- Community

Tribally-owned systems

Not eligible

For-Profit (private)

- Non-Transient Non-Community
- Transient Non-Community

Federally-owned tribal systems

Slide source: EPA December 2023 presentation "ORD's Technical Assistance Program for Emerging Contaminants"

Benefits to the system/community

- EPA-funded in-depth evaluation of the performance and operation of EC/PFAS treatment systems (6 months to multiple years)
  - Data collected with be made available to help local decision making on optimization of both the new technology and entire treatment scheme
- Access to new tools, apps, and informational guides on the design, performance, operation, and cost of EC/PFAS treatment technologies trained with the utility's data
  - Direct access to EPA's technical experts
- Potential use of EC/PFAS data for use as regulatory sampling (state dependent)
- An opportunity to collaborate with the EPA on presentations, publications, and other materials especially for the local community

Slide source: EPA December 2023 presentation "ORD's Technical Assistance Program for Emerging Contaminants"

EPA PFAS Piloting Assistance Contacts

Nicholas Dugan, PE
US EPA Office of Research and Development
dugan.nicholas@epa.gov
513-569-7239

Thomas Speth, PhD, PE
US EPA Office of Research and Development
speth.thomas@epa.gov
513-569-7208

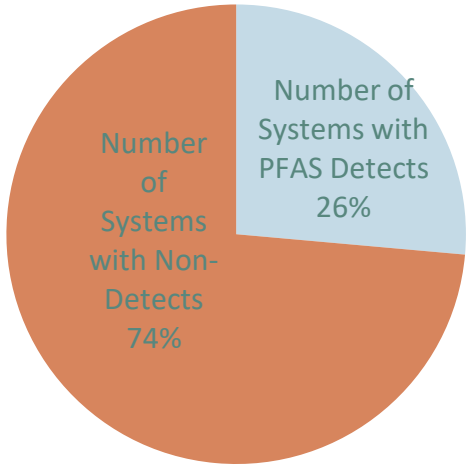
Slide source: EPA December 2023 presentation “ORD’s Technical Assistance Program for Emerging Contaminants”

EPA UCMR 5 Sampling

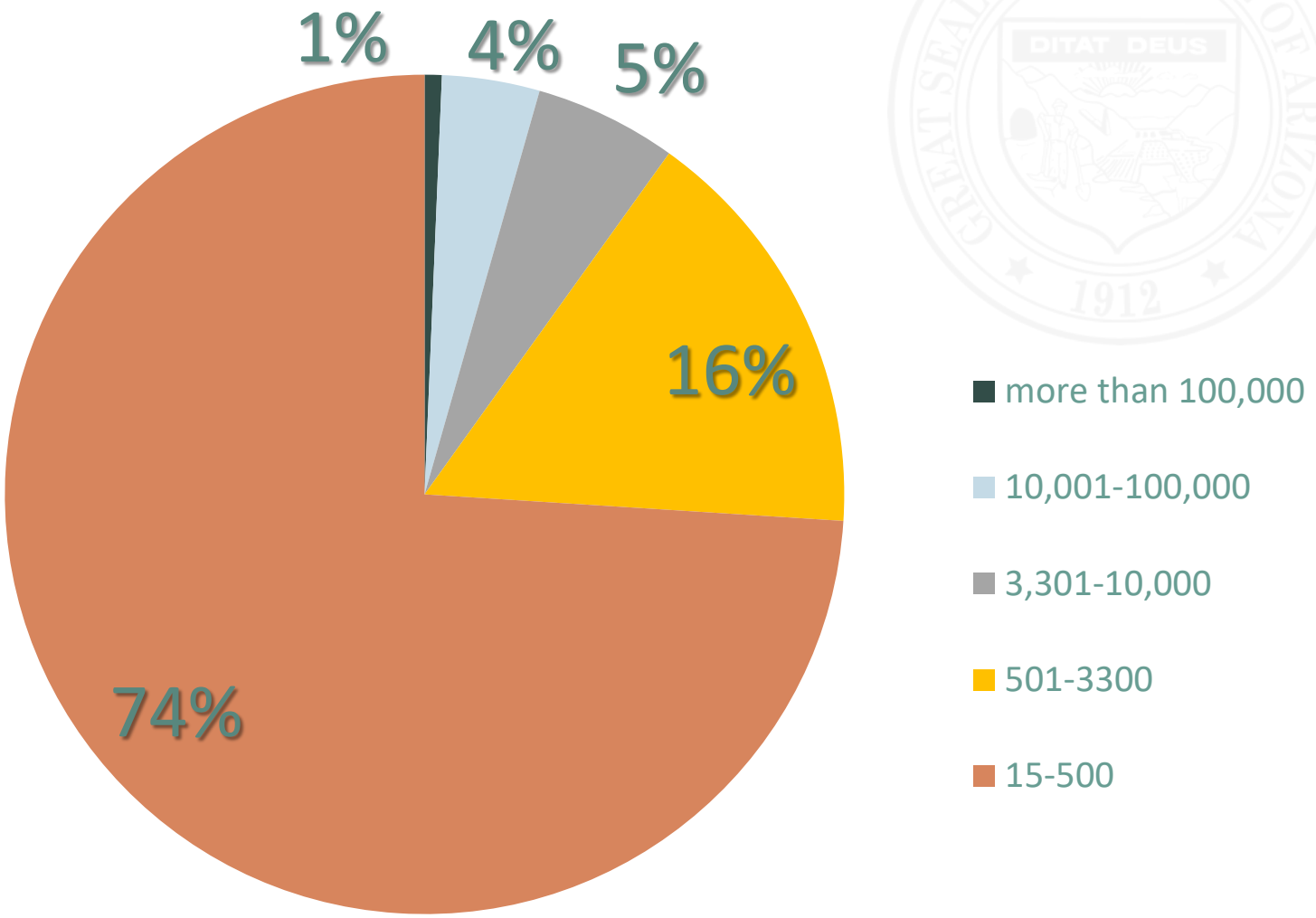
- Unregulated Contaminant Monitoring Rule (UCMR)
  - Established in 1996 to monitor drinking water for contaminants that are not yet regulated under the Safe Drinking Water Act (priority unregulated contaminants)

- UCMR 5
  - Applies to public water systems (PWS) serving 3,300 people or more
  - Between 2023 and 2025
  - Requires sample collection for 29 PFAS compounds
    - EPA Method 533 and EPA Method 537.1

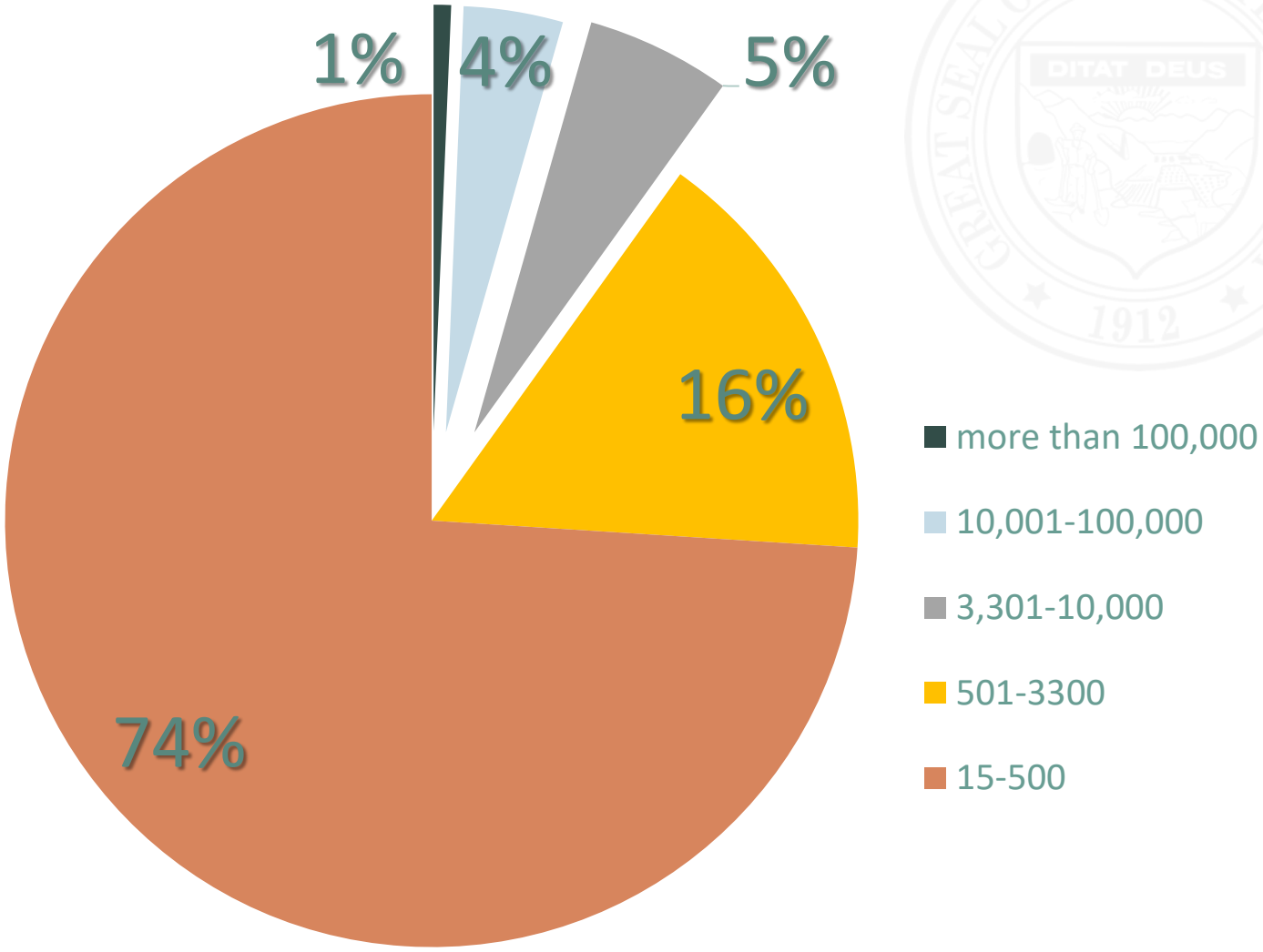
Arizona UCMR 5 Results to date
(53 systems sampled)



Arizona PWS Size, by Population Served



Arizona PWS Size, by Population Served



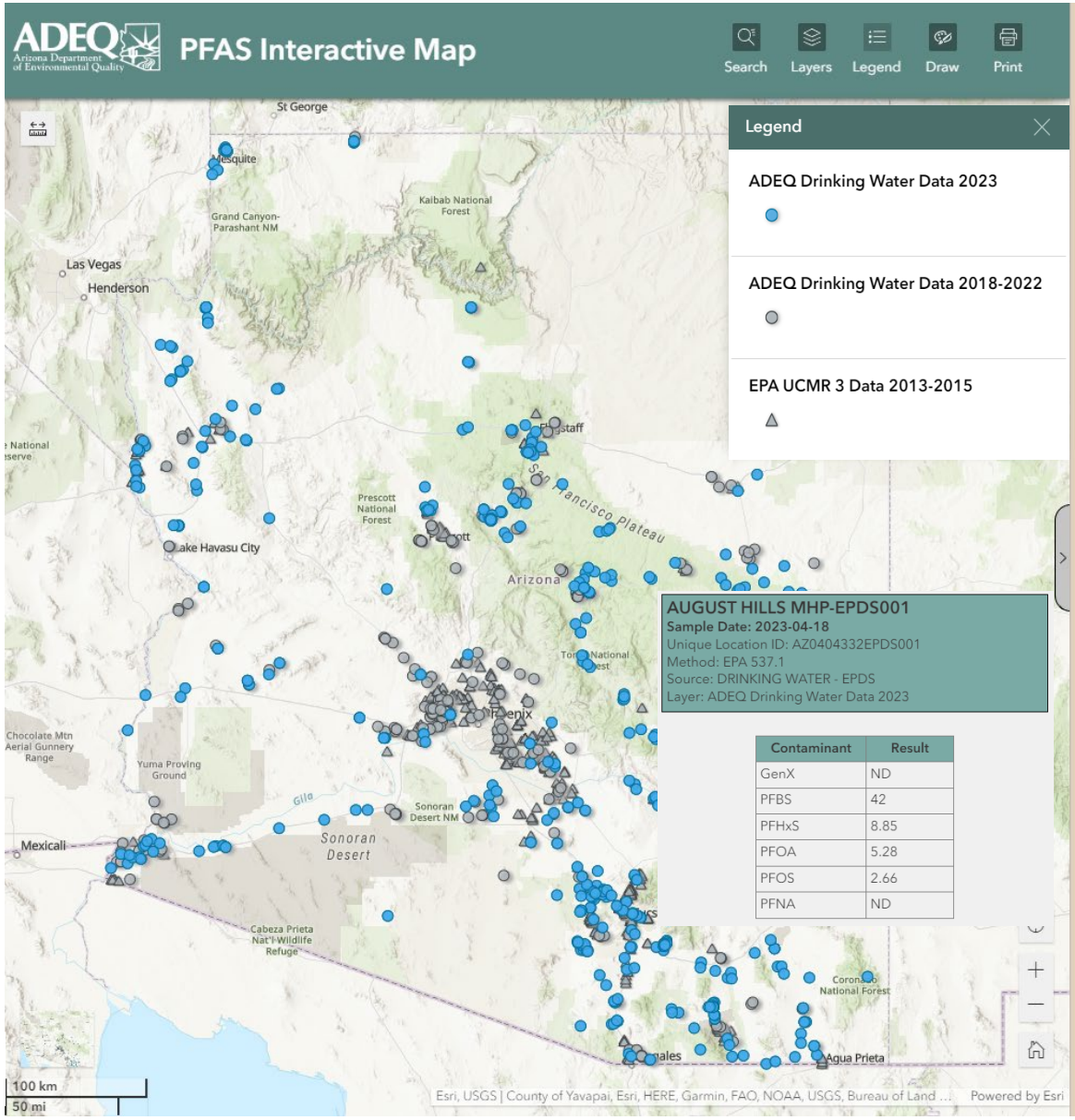
ADEQ Sampling Project

December 16, 2022
PRESS RELEASE
ADEQ Initiates Proactive $3M Public Water System Sampling Plan to Protect Arizona's Drinking Water from Per- and Polyfluoroalkyl Substances (PFAS) Contamination

bit.ly/AZSampling-PFAS

- Free baseline screening for small water systems
- Provide results to PWS owners
- Supply data to ADEQ PFAS Interactive Map

PFAS Interactive Map



Instructions >

What are PFAS?
Per- and polyfluoroalkyl substances (PFAS) are a group of man-made chemicals with fire-retardant properties that have been manufactured and used by a variety of industries since 1940. PFAS have been used commercially in the United States to make products like stain and water resistant carpet and textiles, food packaging, firefighting foam, as well as in other industrial processes. | EPA PFAS Webpage > | ATSDR PFAS Webpage >

On March 14, 2023, the U.S. EPA proposed a National Primary Drinking Water Regulation (NPDWR) to establish legally enforceable levels, called Maximum Contaminant Levels (MCLs), for six PFAS in drinking water; PFOA and PFOS as individual contaminants, and PFHxS, PFNA, PFBS, and HFPO-DA (commonly referred to as GenX Chemicals) as a mixture. **ADEQ will be updating this map in light of the proposed NPDWR.** | EPA Draft MCLs >

Why are we mapping PFAS data?
Regulation of PFAS is increasing at federal and state levels in the United States. New regulations are focusing on lowering the limits for acceptable levels of PFAS in groundwater and soil, as well as requiring remediation projects to address PFAS contamination. As developments continue to occur, it is increasingly important to understand the prevalence of PFAS in Arizona so that steps can be taken to reduce people's exposure to PFAS.

On March 14, 2023, the U.S. EPA proposed a National Primary Drinking Water Regulation (NPDWR) to establish legally enforceable levels, called Maximum Contaminant Levels (MCLs), for six PFAS in drinking water. **EPA has proposed MCLs for PFOA and PFOS to be 4 parts per trillion (ppt) each. PFHxS, PFNA, PFBS, and GenX Chemicals are proposed to be regulated using a Hazard Index (HI).** The HI is calculated using the concentration of each contaminant in ppt as follows:

HI = (PFHxS/9) + (PFNA/10) + (PFBS/2000) + (GenX/10)

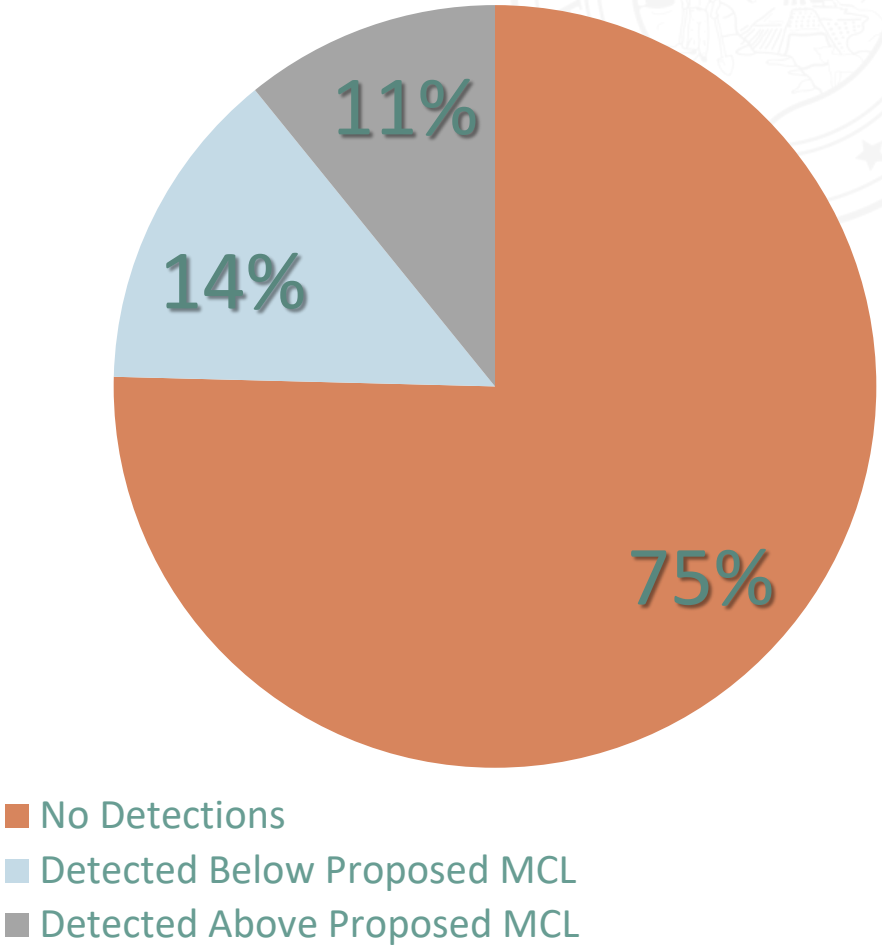
An HI greater than 1.0 would represent an exceedance of the MCL.

What is included on the map?
The map displays the results of testing conducted by ADEQ

bit.ly/myPFASmap

Current Sampling Status

- Sampling ≈750 PWSs for PFAS compounds
- As of 1/30/24
  - **90% complete**
  - Completing first round of testing
  - Beginning second round of testing



www.azdeq.gov/pfas-resources

— PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

PFAS Resources

Revised on: August 19, 2023 - 12:01 a.m.

ADEQ is monitoring scientific, regulatory and legal developments related to PFAS (per- and polyfluoroalkyl substances) and participating in related discussions with federal, state and local agency partners. PFAS exposure is linked to potential adverse human health outcomes and is the subject of increasing regulation and litigation. To keep the public and other stakeholders informed, ADEQ will update this PFAS Resources webpage with new information as it becomes available.

What are PFAS?

PFAS are a group of man-made chemicals with fire-retardant properties manufactured and used by various industries since the 1940s. PFAS have been used commercially in the United States to make products like stain and water-resistant carpets and textiles, food packaging, firefighting foam, and other industrial processes. The most studied PFAS compounds in the environment are perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS). Since 2000, many industries have phased out the use of some PFAS | Learn More ATSDR PFAS >

- PFAS 101 Fact Sheet | View/Download >

What PFAS regulations are there?

PFAS regulations are increasing at federal and state levels in the United States. New regulations are focusing on decreasing their use in manufacturing, lowering the limits for acceptable levels of PFAS in groundwater and soil, and requiring remediation projects to address PFAS contamination.

What is the Environmental Protection Agency (EPA) doing?

In March 2023, EPA proposed a National Primary Drinking Water Regulation (NPDWR) to establish legally enforceable levels, called Maximum Contaminant Levels (MCLs), for six PFAS in drinking

— INTRODUCTION TO PFAS IN ARIZONA

Watch a Video

CONTACT

SEE MORE

AFFF Resources >
AFFF Pilot Program Map >
Industry & PWS Screening >
PFAS 101 >
PFAS Map >
PFAS & You >
Protecting Tucson's Water >
Luke AFB Area PWS Data >

ADDITIONAL RESOURCES

www.azdeq.gov/pfas-resources

perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS). Since 2000, many industries have phased out the use of some PFAS | Learn More ATSDR PFAS >

- PFAS 101 Fact Sheet | View/Download >

What PFAS regulations are there?

PFAS regulations are increasing at federal and state levels in the United States. New regulations are focusing on decreasing their use in manufacturing, lowering the limits for acceptable levels of PFAS in groundwater and soil, and requiring remediation projects to address PFAS contamination.

What is the Environmental Protection Agency (EPA) doing?

In March 2023, EPA proposed a National Primary Drinking Water Regulation (NPDWR) to establish legally enforceable levels, called Maximum Contaminant Levels (MCLs), for six PFAS in drinking water; PFOA and PFOS as individual contaminants and PFHxS, PFNA, PFBS, and HFPO-DA (commonly referred to as GenX Chemicals) as a mixture.

Additional information on EPAs website:

- PFAS | View >
- EPA Actions | View >
- EPA Draft MCLs | View >

What is Arizona doing?

- Industry & Public Water System Screening | Learn More >
- Public Water System PFAS Data (Luke Air Force Base Area) | Learn More >
- Protecting Tucson's Drinking Water Supply | Learn More >

ADDITIONAL RESOURCES

Agency for Toxic Substances and Disease Registry

- PFAS & Your Health >
- Toxicological Profile for Perfluoroalkyls >

Advisory Panel on Emerging Contaminants

- About APEC >
- Final Report 2016 >

ADEQ

- AZ Public Water System PFAS Toolkit >
- Guidance for the Public >
- Guidance for Utilities >
- How to Sample Your Tap for PFAS >
- Letter to Health and Vector Control >
- Screening for PFOA/PFOS Report 2018 >

Arizona Department of Health Services

- PFAS Information Webpage >
- PFAS Infographic >
- Well Water Quality >

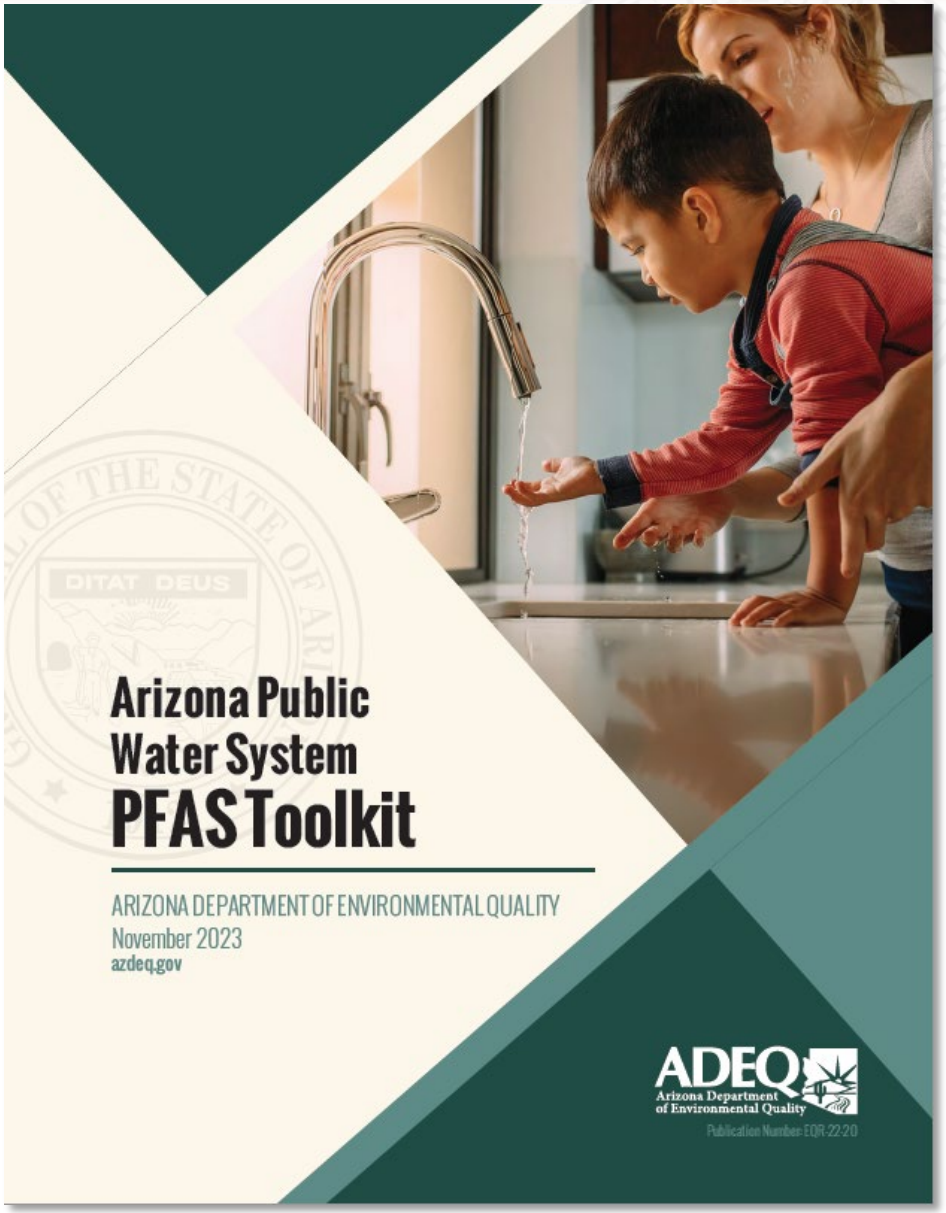
EPA

- PFAS >
- PFAS Action Plan & Updates >
- Drinking Water Health Advisories >

Arizona Public Water System PFAS Toolkit

- What are PFAS?
- Where do PFAS come from?
- Health Advisory Levels
- Test Methods
- Where to Sample
- What to do if you have PFAS
- Funding
- Non-Treatment Options
- Treatment Options
- Additional Resources

bit.ly/pfas-toolkit



Resources

azdeq.gov/pfas-resources

Coming soon:

- PFAS Decision Trees
- Protocols and Guidance for PFAS Pilot Testing

PFAS Decision Trees

ADEQ Arizona Department of Environmental Quality

ADEQ Arizona Department of Environmental Quality | Kimley»Horn

DRAFT

PFAS TREATMENT DECISION TREES

Purpose

This document includes general Per- and Polyfluoroalkyl Substance (PFAS) treatment information and design considerations for specific PFAS treatment processes recommended by the U.S. Environmental Protection Agency (USEPA). The document is intended to assist the utility in making informed decisions about the most suitable treatment removal methods for addressing PFAS concerns found in their specific systems before delving into detailed design considerations. At the time of this document, the USEPA has proposed the National Primary Drinking Water Regulation (NPDWR) for six (6) PFAS and the document has not been finalized. This document is subject to revisions as the proposed NPDWR regulation is revised and finalized.

Introduction

Many factors must be considered when navigating the various PFAS treatment technologies. Despite many water systems not originally designed for PFAS removal, existing systems may unintentionally achieve it. Existing Granulated Activated Carbon (GAC), Ion Exchange (IX), Reverse Osmosis (RO), and Nanofiltration (NF) systems might currently be treating for PFAS in their source water, even if not originally designed to do so. Optimizing existing treatment processes can be a practical choice for utilities. The utility should collaborate with the Arizona Department of Environmental Quality (ADEQ) drinking water program to coordinate the evaluation, selection, and implementation process.

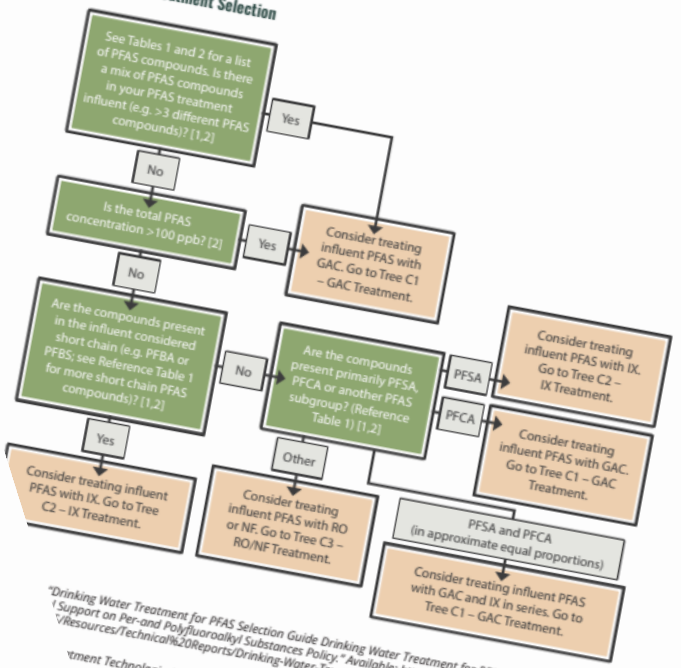
The quality of the source water influences the effectiveness of PFAS removal processes. Consequently, the process performance, the related operation and maintenance needs, and the disposal of residuals, determines the viability of a specific treatment approach. It is recommended that utilities diligently monitor water quality at all active sources in the initial stages to make well-informed decisions when selecting a treatment method. Background water quality is extremely important to keep in consideration when choosing a PFAS removal technology and pre-treatment is highly recommended or required in almost all instances. In addition, post-treatment disinfection is recommended due to potential for microbial growth on the media and membranes used in PFAS removal technologies.

1

ADEQ

Decision Trees

Tree B – Treatment Selection



"Drinking Water Treatment for PFAS Selection Guide Drinking Water Treatment for PFAS Selection Guide
t Support on Per-and Polyfluoroalkyl Substances Policy." Available: https://www.awwa.org/Portals/0/
%Resources/Technical%20Reports/Drinking-Water-Treatment-PFAS.pdf?ver=2020-11-10-100726-250

'tment Technologies" Available: https://pfas-1.itrcweb.org/12-treatment-technologies/#12_2

16

Protocols and Guidance for PFAS Pilot Testing

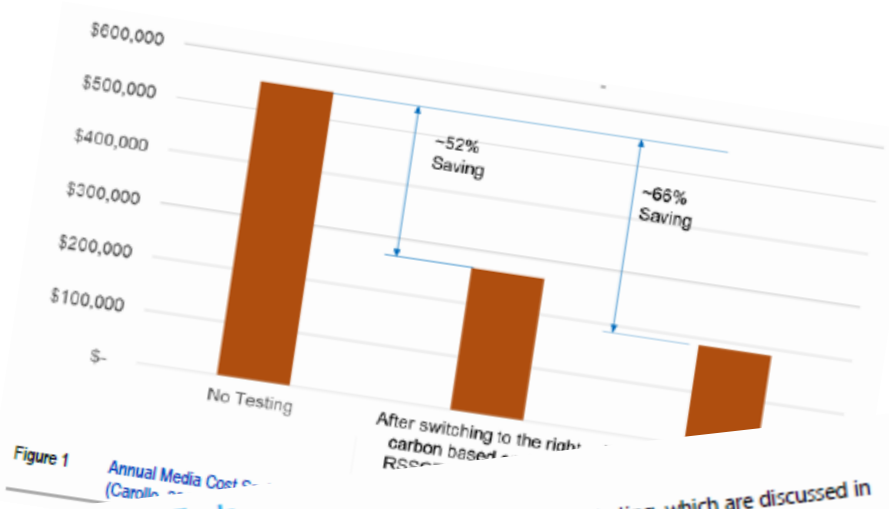


Figure 1 Annual Media Cost

Comparison of Testing Tools

Table 2 below provides information comparing isotherm, RSSCTs, and Pilot Testing, which are discussed in previous sections.

Table 2 Comparison of Testing Methods

	Isotherm Testing	RSSCT's	Pilot Testing
Typical Water Sample Used for Testing	~10 gallons.	50 to 200 gallons.	20 to 100,000 gallons.
Typical Duration of Testing	1 to 7 days.	1 to 4 weeks.	6 to 18 months.
Typical Costs for Testing	<$5,000.	$5,000 - $20,000.	$100,000+.
Benefits	Fast, simple, i ways to comp media.	ate. Match	Accurate.
Limitations	Not for scal estimate m frequency		

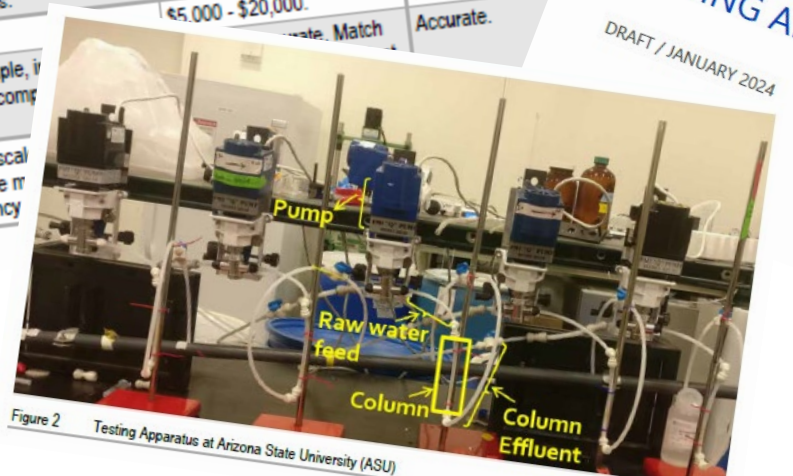
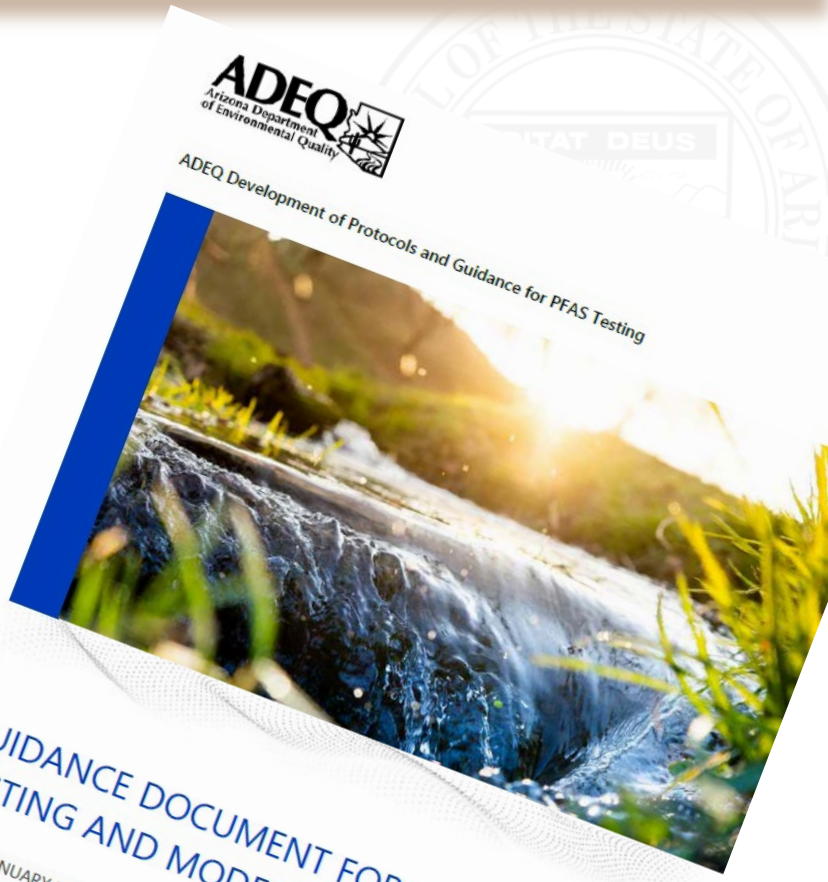


Figure 2 Testing Apparatus at Arizona State University (ASU)



Past PFAS Trainings

PFAS Drinking Water Treatment Webinar

- Audience: engineering firms (technical content)
- November 2, 2023
- Recording available on ADEQ's YouTube channel https://rb.gy/vfpzvp

PFAS 101 Workshop

- Audience: water system owners and operators
- November 6, 2023
- Recording available on ADEQ's YouTube channel https://rb.gy/vfpzvp

rb.gy/vfpzvp

Today's Forum hosted by ADEQ

Hydrogeologic Studies

- Conduct hydrogeologic studies to evaluate potential treatment alternatives
  - Evaluate all existing hydrogeologic information and PFAS sampling data
  - Fill data gaps by conducting fieldwork (e.g., sampling, monitoring well installation, etc.)
  - Create a conceptual site model for targeted counties
- Ultimate goal: help water providers assess alternatives
- Targeted areas:
  - Prescott/Prescott Valley/Chino Valley vicinity, Yavapai County
  - Globe/Payson, Gila County
  - Santa Cruz River Vicinity, Santa Cruz County/Southern Pima County

Funding Resources

PFAS Funding	
Amount	$47,000,000
Restrictions	• Emerging contaminants • Public water systems that serve <10,000 people or serve a disadvantaged community
Uses	• Projects for public water systems ($45M) • Hydrogeologic Studies ($1M) • Outreach, training, reference materials ($1M)
Timeframe	October 1, 2023 – September 30, 2028

PFAS Mitigation Strategies

- ADEQ will select public water systems most in need
  - Highest levels of PFAS
  - Small or disadvantaged
  - Non-competitive
  - Appropriate solutions
  - System must agree to participate
- ADEQ will contract directly with design engineers and construction contractors
  - ADEQ will handle all payments

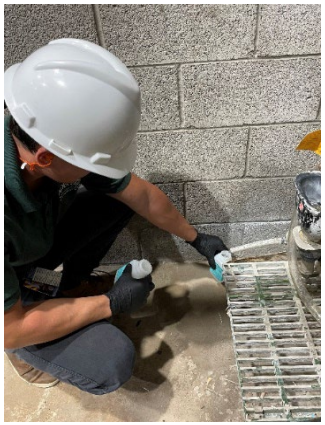
PFAS Mitigation Strategies

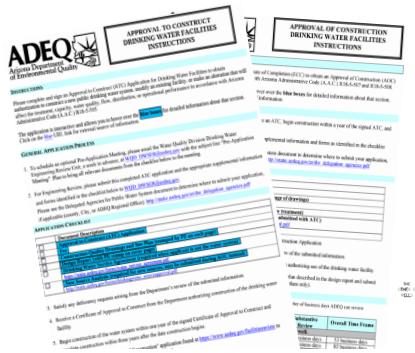
Appropriate solutions for small or disadvantaged systems:

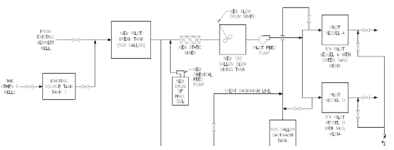
- Treatment not always best approach
- Cost must be commensurate with benefit
- Non-treatment alternates such as consolidation, interconnection, deeper wells may be better approach
  - Fast, cost-effective, sustainable
  - Long-term O&M of treatment system
    - Cost of media
    - Change out of media
    - Disposal of spent media
  - Technical, managerial, financial capability
    - Ease of operation
    - Level of operator certification

Eligible Uses of Funds

- Confirmation sampling and water quality parameter sampling
- Compliance Option Evaluation
- Design
- Permitting fees
- Project management
- Cost overruns
- PFAS mitigation
  - Treatment
  - New well
  - Restructuring
  - Consolidation

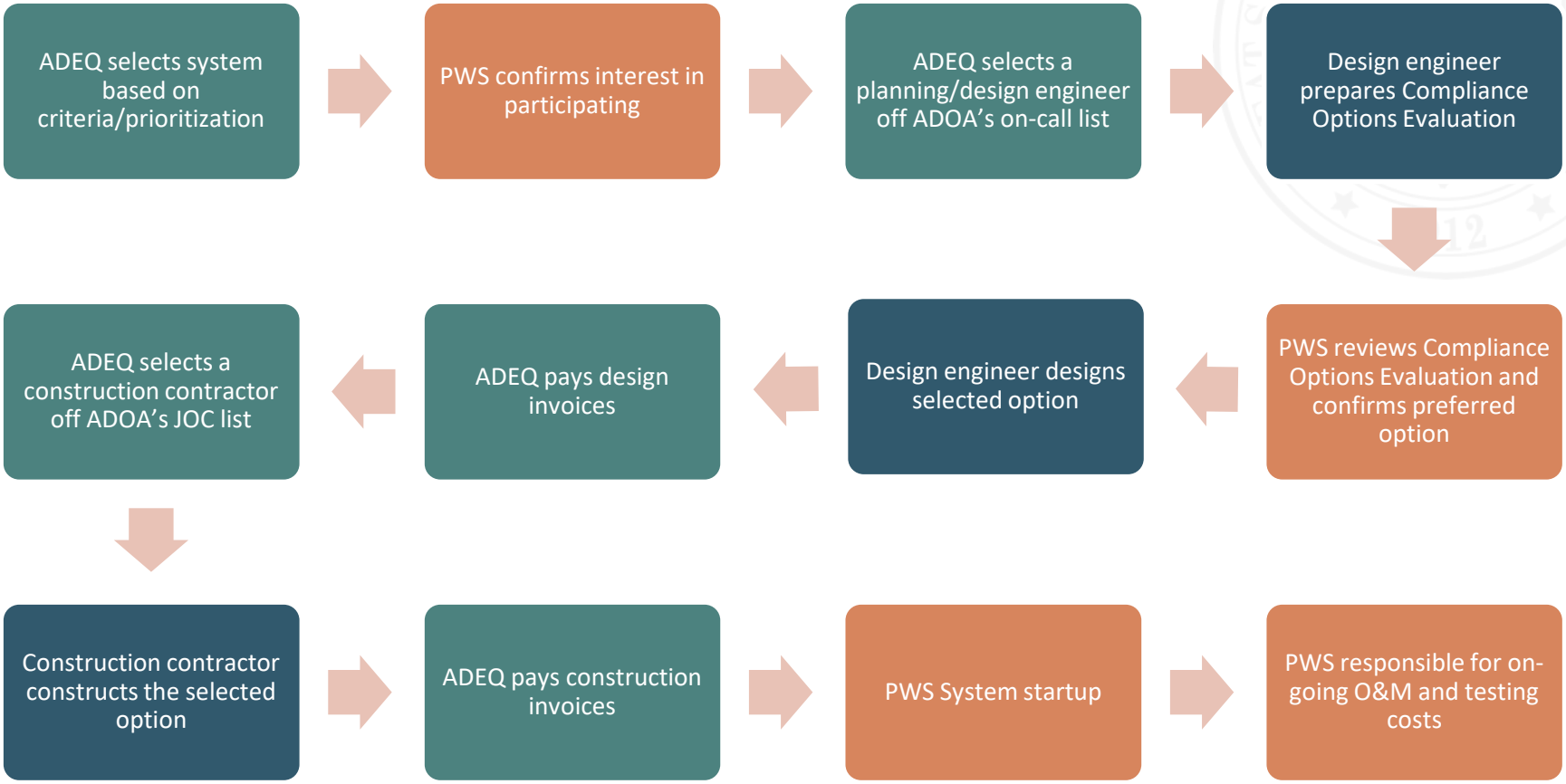






- *Can address other contaminants but must be primarily for PFAS / emerging contaminants*

Process


ADEQ selects system based on criteria/prioritization
PWS confirms interest in participating
ADEQ selects a planning/design engineer off ADOA's on-call list
Design engineer prepares Compliance Options Evaluation
PWS reviews Compliance Options Evaluation and confirms preferred option
Design engineer designs selected option
ADEQ pays design invoices
ADEQ selects a construction contractor off ADOA's JOC list
Construction contractor constructs the selected option
ADEQ pays construction invoices
PWS System startup
PWS responsible for on-going O&M and testing costs

In the News

AZCentral | The Arizona Republic

Globe will receive state support to deal with PFAS-contaminated water

Clara Migoya, Arizona Republic
Tue, January 23, 2024 at 5:01 AM PST · 6 min read

Two mobile home parks outside Globe's city limits will be connected to the municipal water system due to concerns over PFAS water contamination.

The Arizona Department of Environmental Quality detected some chemicals in private wells that supply residents in HAV Properties and August Hills. A partnership between the agency and the city will help connect those residents to the city supply, which is PFAS free, said Globe City Manager Paul Jepson.

PFAS, short for perfluoroalkyl and polyfluoroalkyl substances, are chemicals of increasing concern worldwide.

Industries have manufactured and used PFAS chemicals in a wide variety of products for decades, and traces of them can now be found globally in water and soil. Many of them don't break down easily and are difficult to get rid of, they've been dubbed "forever chemicals."

Scientific evidence shows that long term exposure to some of these chemicals can cause severe health issues that include cancer, developmental effects and reproductive disorders. Exposure to PFAS through drinking water is a main concern, but currently, there are no rules enforcing limits on public water systems.

A water storage tank on the outskirts of Sierra Vista in southern Arizona. Water tests in February 2023 showed levels of PFAS above the proposed EPA limit in distribution systems that serve about 450 residents. Tests revealed levels below the limit in May.

KTAR NEWS 92.3 FM

ARIZONA NEWS

Top Stories · Listen Live · Podcasts · Video

Globe, 2 other Arizona water systems to receive funding to combat PFAS

Jan 21, 2024, 12:30 PM

(Google Maps screenshot)

BY TOM KUEBEL
KTAR.com

Share

PHOENIX — Three public water systems will receive funding to help ensure drinking water is not contaminated by perfluoroalkyl and polyfluoroalkyl substances (PFAS).

Governor Katie Hobbs and the Arizona legislature allocated $5 million to the Arizona Department of Environmental Quality to determine what water sources were vulnerable to PFAS chemicals.

"The City of Globe, HAV Properties and August Hills Mobile Home Park are the first three public water systems in the state to benefit from this important PFAS funding," ADEQ cabinet executive officer Karen Peters said in a release.

ADEQ PFAS Contacts

Matthew Narter, PhD

Agency PFAS Lead

Ph: 520-770-3128

Narter.Matthew@azdeq.gov

Sara Konrad

$42M Grants Project Manager

Ph: 602-771-4734

Konrad.Sara@azdeq.gov

Jasmina Markovski, PhD, PE

Senior Engineer

Ph: 602-771-4827

Markovski.Jasmina@azdeq.gov

Matthew Olson

$5M Grants Project Manager / PFAS Sampling Project Manager

Ph: 602-695-7518

Olson.Matthew@azdeq.gov

azdeq.gov/pfas-resources

ADEQ
Arizona Department of Environmental Quality

Clean Air, Safe Water,
Healthy Land for Everyone