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Overcoming SDWA Barriers for POU/POE

A WQRF Demonstration Project to establish Fit-for-Purpose Compliance guidelines for Small Public Water Systems

White Paper

Prepared for	Researchers
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Project Type: Prioritized Research

Purpose

This document is intended to help prospective researchers understand the vision, rationale, and desired outcomes of a potential WQRF research project. By outlining the challenges, opportunities, and key themes WQRF hopes to explore, it provides a starting point for the development of innovative, practical proposals that can advance understanding of POU/POE treatment as a compliance option for small public water systems.

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1. Executive Summary

Small and very small public water systems often face a difficult compliance gap: they must meet the same enforceable drinking water standards as larger systems, but may lack the customer base, staff capacity, engineering support, and financing needed for conventional centralized treatment projects. As a result, many communities can remain out of compliance for years while planning, funding, and construction proceed.

POU and POE treatment can be a lawful and technically appropriate compliance tool when it is designed, installed, operated, monitored, and documented under state-approved conditions. The difficulty is not simply whether treatment devices can remove a contaminant. The difficulty is building a compliance pathway that satisfies state primacy agencies, protects every consumer, assigns ownership and maintenance responsibility, controls liability, ensures access, and produces compliance data that regulators can accept.

This project should be framed as a fit-for-purpose compliance demonstration. It will select one small public water system, convene the decision makers who control the compliance outcome, implement a regulator-approved POU/POE program under defined guardrails, and document the lessons in a repeatable roadmap for other systems and states.

The project should remain geographically flexible while showing regulatory support, possible funding leverage, and project readiness.

The project should also remain contaminant-flexible, but not open-ended. Eligible contaminants should have an enforceable federal or state maximum contaminant level, demonstrated treatment feasibility, claim-specific product certification or state-acceptable performance support, and sufficient market availability to avoid creating the appearance of a single-vendor project. Arsenic remains a strong candidate because arsenic reduction using appropriate POU/POE technologies is well established, and federal regulations identify point-of-use activated alumina and reverse osmosis as small-system compliance technologies for arsenic under defined conditions. Other regulated contaminants may also be eligible if they meet the same guardrails.

2. Problem Statement and Opportunity

2.1 The compliance problem

- A very small system may have only dozens to a few hundred service connections over which to spread engineering, design, construction, operator, monitoring, and financing costs.
- Conventional centralized projects can take years, especially when planning, funding, design review, environmental review, procurement, construction, and operator certification are included.
- POU/POE compliance paths face non-technical barriers: state-specific rules, inconsistent regulator familiarity, upfront participation requirements, home access, data reporting, liability, device ownership, O&M responsibility, sampling frequency, and the practical role of the certified operator.
- When the POU/POE path is not evaluated at the beginning of a compliance project, communities may lose the chance to choose a lower-cost or faster protective option.

2.2 Project Opportunities

Opportunity	Project response
Demonstrate compliance, not just removal.	Document a state-approved compliance plan, monitoring protocol, installation program, O&M responsibilities, sampling results, and consumer acceptance.
Create a repeatable roadmap.	Translate the case study into guidance for states, small systems, engineers, operators, and industry partners.
Reduce regulator and engineer uncertainty.	Bring the state primacy agency, EPA, engineers, operators, nonprofit technical assistance, the PWS, and industry to the table at project start.
Protect project credibility.	Use contaminant and product guardrails, claim-specific certification, field verification, and transparent data reporting.
Support WQRF strategy.	Investigate long-term performance of POU/POE under real-world water quality and compliance conditions.

3. Regulatory Foundation for POU/POE Compliance

The project should be positioned as a compliance demonstration within existing law and primacy-state discretion, not as an attempt to bypass the Safe Drinking Water Act. The regulatory framework already recognizes non-centralized treatment in specific contexts, but it imposes implementation duties that must be designed into the project from the start.

Regulatory / standards foundation	Practical meaning for the project	White paper implication
NPDWR enforceability	Primary drinking water standards and treatment techniques apply to public water systems.	The case study must be structured around enforceable compliance outcomes, not voluntary residential treatment.
SDWA and EPA guidance on POU/POE	EPA guidance explains that the 1996 SDWA amendments allowed POU/POE devices to achieve compliance with some MCLs for small systems.	The project can be framed as using a recognized compliance tool while documenting the barriers that keep it from being routinely adopted. Specific approval mechanism remains state-specific and must be confirmed by the primacy agency, especially when the pathway is not a variance/exemption.
40 CFR 141.100 - POE	A PWS using POE for MCL compliance is responsible for operation and maintenance, must obtain state approval of a monitoring plan before installation, must provide health protection equivalent to central treatment, and must protect all consumers.	The RFP must require a state-approved monitoring plan, access strategy, O&M plan, ownership plan, and consumer-protection plan before installation.
40 CFR 142.62(h) - POU/POE under variances/exemptions	The PWS remains responsible for operation and maintenance; state approval, effective technology, microbiological safety, adequate certification, field testing, and consumer protection are required.	The case study should intentionally test the administrative path, not merely install devices.
Arsenic SSCTs	For arsenic, federal rules identify POU activated alumina and POU reverse osmosis as small-system compliance technologies for systems serving 10,000 persons or fewer, with long-term O&M and monitoring provided by the water system.	Arsenic is a strong first-case candidate if the selected water chemistry and community access conditions are workable.
NSF/ANSI standards and certification databases	NSF/ANSI standards include health-effect and reverse osmosis standards, and certified-product databases can verify standard-specific, contaminant-specific reduction claims.	Product eligibility must be claim-specific and verified at the model/configuration level; certification to a general standard is not enough.

Primary sources include EPA POU/POE guidance, 40 CFR 141.100, 40 CFR 142.62(h), 40 CFR 141.62(d), and NSF resources listed in the references.

4. Proposed Project Design

4.1 Objective

The objective of this project is to develop, demonstrate, and document a practical, regulator-approved pathway that enables very small and small public water systems to achieve Safe Drinking Water Act compliance through the appropriate use of certified, fit-for-purpose point-of-use and/or point-of-entry treatment technologies.

While the project will include implementation at one selected small public water system, the broader purpose is to use that real-world case study as a structured forum for bringing the key decision-makers and stakeholders to the table at the same time.

For more than two decades, small systems have faced recurring barriers when attempting to use POU/POE treatment for compliance, including inconsistent state and local regulatory requirements, uncertainty around approval pathways, 100% participation expectations, expanded monitoring requirements, access to homes or buildings, equipment ownership, long-term maintenance responsibility, operator involvement, liability concerns, certified product availability, data reporting, and the role of engineers and regulators who may be unfamiliar with this compliance approach.

This project is intended to openly identify those barriers, place them in front of the appropriate stakeholders, and systematically work through them during the planning, approval, installation, monitoring, maintenance, and compliance-verification phases of the demonstration. The desired outcome is not only that one small system achieves compliance, but that WQRF produces a clear, credible, enforceable, and repeatable roadmap that other small systems, states, regulators, engineers, and technical-assistance providers can use when evaluating POU/POE treatment as a compliance option.

The final roadmap should define the technical, regulatory, operational, financial, legal, monitoring, maintenance, ownership, access, enforcement, community-engagement, and data-reporting guardrails necessary to make POU/POE compliance projects safe, monitorable, financially realistic, enforceable, and scalable across jurisdictions. In this way, the project will help reduce uncertainty for regulators, engineers, operators, small systems, and communities; establish

a more consistent national framework; and support broader acceptance of certified POU/POE treatment as a viable compliance pathway where centralized treatment is impractical, unaffordable, or unnecessarily burdensome.

4.2 Project hypothesis

If the key decision-makers and stakeholders involved in small-system Safe Drinking Water Act compliance are convened at the beginning of a POU/POE compliance project, and if the project is structured around a real non-compliant small public water system, then the regulatory, technical, operational, financial, legal, monitoring, maintenance, and community-participation barriers that have historically delayed or prevented these projects can be openly identified, addressed, and documented.

The project hypothesis is that many of the obstacles preventing broader use of POU/POE treatment are not solely technology-related, but are instead caused by uncertainty, inconsistency, and lack of coordination among regulatory agencies, engineers, operators, funding partners, installers, community representatives, and other parties involved in compliance decisions. These barriers may include differing requirements across states, counties, and cities; uncertainty over approval pathways; expectations for 100% participation; expanded monitoring and sampling requirements; questions about access to homes or buildings; device ownership; long-term maintenance responsibility; operator involvement; liability; certified product availability; data reporting; and enforcement.

By selecting an appropriate contaminant, treatment configuration, participating small system, and regulatory environment under rigorous technical and community guardrails, the project can test whether these barriers can be systematically resolved in a way that allows the small system to achieve a regulator-approved compliance outcome using certified, fit-for-purpose POU/POE treatment.

The broader hypothesis is that the lessons learned from this demonstration can be translated into a practical roadmap that other small systems, states, engineers, regulators, and technical-assistance providers can use to evaluate and implement POU/POE compliance projects. If successful, the project will show that POU/POE treatment can be more than a site-specific alternative; it can become part of a safe, monitorable, financially realistic, enforceable, and repeatable compliance framework for small public water systems across the country.

4.3 Core case study model

Element	Recommended design
Demonstration site	One small or very small PWS that is out of compliance or demonstrably on a compliance schedule for an enforceable contaminant, with option for an additional site only if outside funding and management capacity are secured.
Compliance approach	POU and/or POE treatment using certified or state-accepted devices installed under a state-approved plan.
Stakeholder convening	State primacy agency, EPA as appropriate, engineering partner, system owner/operator, local operator, nonprofit technical assistance partner, WQA/WQRF, installers/plumbers, and community representatives.
Program controls	Access agreements, device ownership/maintenance assignment, sampling plan, device registry, installation QA/QC, O&M schedule, alarm/shutoff protocol, replacement protocol, and data reporting format.
Research output	A case study and roadmap that explain exactly what worked, what delayed progress, how barriers were solved, and what regulatory changes or guidance would reduce future friction.

5. Guardrails: Site, Contaminant, Product, and Regulatory Eligibility

The project should be flexible enough to attract the strongest candidate, but not so broad that it becomes vague or risky. The project guardrails are: location, contaminant selection, product certification, and scope control.

5.1 Site guardrails

- Eligible PWS type: Community Water System (CWS) preferred. WQRF would prefer that multiple smaller PWSs are served throughout this project. For example, three CWS with 500 people or fewer and at least 15 service connections each have their own case study aiming for SDWA compliance.
- System size: Systems serving 500 or fewer people and at least 15 service connections.
- Where practical, the selected PWS should include a manageable mix of residential and non-residential accounts, such as light commercial, public facilities, or schools, so the project can test common access and implementation issues without creating unnecessary complexity.

- Compliance status: Currently noncompliant, subject to an enforcement/compliance order, or a state-identified failing system likely to remain years from a permanent solution.
- Regulatory readiness: Written state primacy agency willingness to evaluate a POU/POE compliance plan before the project proceeds beyond feasibility.
- Community readiness: Local governing body/operator support documented before device installations and a credible path to access agreements for required buildings or taps.
- Transferability: Water quality, governance, and regulatory issues should be common enough that lessons can benefit other systems.

5.2 Contaminant guardrails

Eligible	Avoid unless separately approved by WQRF
Enforceable federal NPDWR contaminant or state-regulated contaminant with an established MCL and compliance method.	Unregulated or emerging contaminants without an enforceable MCL for the selected PWS.
Treatment mechanisms are well understood and can be validated by certification, accepted performance data, or existing state-approved engineering review.	Highly contentious contaminants where the project would become a policy debate rather than a compliance demonstration.
Examples if guardrails are met: arsenic, nitrate/nitrite, selected VOCs, chromium/hexavalent chromium where an applicable MCL exists, and other established contaminants with product availability.	PFAS should not be the first case unless WQRF explicitly chooses to take on the additional technical, political, and cost complexity.

5.3 Product and technology guardrails

- Devices must be certified to the applicable NSF/ANSI standard and contaminant reduction claim or otherwise accepted by the state under a documented engineering review. Certification must be verified by model number, configuration, capacity, and claim.
- A WQA-certified installer must install all devices.
- The project must avoid an appearance of favoring a single manufacturer. A contaminant should have sufficient product availability or a transparent justification for any narrow technology choice.
- The plan must address material safety, structural integrity, flow, pressure, waste streams, bypass prevention, alarms or shutoffs, cartridge/media replacement, and service access.
- Microbiological safety must be maintained, particularly where activated carbon or other media could affect heterotrophic bacteria concentrations.

6. Governance

6.1 Governance model

Group / role	Recommended participants	Responsibilities
Core task force	WQRF/WQA staff, Research Advisory Committee representatives, project sponsor/industry technical lead.	Maintain scope, manage RFP, evaluate proposals, control budget, and prepare WQRF Board updates.
Regulatory coordination group	State primacy agency, EPA regional/national staff as appropriate, system operator, engineer.	Define compliance pathway, monitoring plan, sampling points, reporting requirements, and acceptance criteria.
Technical advisory group	Certified product experts, independent engineer/researcher, operator, nonprofit assistance partner, selected external validators.	Review treatment feasibility, certification claims, O&M assumptions, and data quality.
Community implementation group	Small system leadership, operator, installer/plumber, community liaison, nonprofit partner.	Execute outreach, access agreements, installations, service visits, and resident feedback.

7. Success Criteria and Deliverables

7.1 Definition of Success

Success should not be defined solely by whether point-of-use or point-of-entry devices are installed at one small public water system. The broader purpose is to use a real-world small-system compliance project as the platform for identifying, discussing, resolving, and documenting the barriers that have historically limited the use of POU/POE treatment as a Safe Drinking Water Act compliance pathway.

The project will be considered successful if WQRF can convene the essential decision-makers; identify and work through the technical, regulatory, operational, financial, legal, monitoring, maintenance, data-reporting, and community-

participation barriers; and produce a regulator-accepted compliance pathway for the participating small system. The project should also produce a clear roadmap that other small systems, regulators, engineers, operators, and technical-assistance providers can use when evaluating POU/POE treatment as a fit-for-purpose compliance option.

Success may include a permanent compliance pathway, a conditional compliance pathway, or a temporary compliance pathway with defined monitoring, maintenance, reporting, review, and renewal requirements, provided that the pathway is accepted by the applicable primacy agency or other governing regulatory authority.

The following criteria should be used to evaluate whether the project has achieved its intended purpose.

Success Area	Definition of Success	Evidence / Documentation
Stakeholder convening and alignment	The project brings the essential decision-makers and stakeholders to the table early enough to influence the compliance pathway before design, installation, monitoring, and enforcement decisions are finalized. Participants may include the state primacy agency, federal EPA, local or county regulators, the small public water system, engineers, operators, nonprofit technical-assistance providers, funding partners, installers or plumbers, WQA/WQRF industry representatives, and other organizations needed for success.	Stakeholder roster; meeting minutes; decision log; roles and responsibilities matrix; record of unresolved issues and assigned owners.
Barrier identification	The project clearly identifies the major barriers that have historically delayed or prevented small systems from using POU/POE treatment for SDWA compliance. These may include regulatory inconsistency, approval uncertainty, monitoring requirements, participation expectations, access to homes or buildings, device ownership, operator responsibility, maintenance obligations, liability, certified product availability, data reporting, enforcement, and funding structure.	Barrier matrix; stakeholder comments; regulatory review notes; engineering review notes; community feedback; issue-resolution tracking document.
Barrier resolution or decision framework	Each major barrier is either resolved for the demonstration project or converted into a documented decision point for future projects. The project should not simply list obstacles; it should show how each obstacle was addressed, who had authority to address it, and what guardrail or decision rule should apply in future projects.	Barrier-resolution matrix; decision tree; model approval steps; recommended regulatory language; unresolved-issue summary where applicable.
Regulatory acceptance	The participating small public water system receives a regulator-accepted POU/POE compliance pathway. This may be a formal approval, permit condition, compliance order amendment, enforcement agreement, conditional approval, temporary pathway, or other written state-approved mechanism.	Approval letter; permit language; compliance order amendment; written agency determination; conditional or temporary compliance documentation; monitoring plan approval.
Appropriate contaminant and technology selection	The selected contaminant is a currently regulated drinking water contaminant with an established maximum contaminant level or enforceable state standard and a technically supportable treatment approach. The selected POU/POE products or treatment train must have appropriate certification, efficacy data, market availability, and suitability for the water quality and compliance objective.	Contaminant selection memo; product certification records; treatment performance data; engineering review; water quality assessment; product availability review.
Treatment performance	The selected POU/POE treatment configuration reduces the target contaminant below the applicable maximum contaminant level or other regulator-approved compliance threshold at the approved monitoring points and frequency.	Laboratory results; QA/QC records; sampling plan; chain-of-custody documentation; compliance monitoring reports.
Operational control and enforceability	The project establishes a practical and enforceable operating model for long-term success. This includes a device registry, installation records, maintenance schedule, replacement protocol, access plan, operator or service-provider responsibility, emergency response process, and reporting expectations.	Device inventory; O&M plan; service records; maintenance logs; replacement schedule; operator/service-provider agreement; access agreement template.
Community understanding and feedback	The project evaluates community acceptance, customer experience, access concerns, satisfaction with water quality, satisfaction with the program, and reasons for or against participation. The charter target of at least a 70 percent community survey response rate should remain the preferred target where practical.	Survey instrument; raw survey data; analyzed survey results; English and Spanish materials where applicable; summary of community concerns and lessons learned.
Cost, schedule, and community-burden learning	Without turning this white paper into a detailed budget document, the project should still document the real-world cost, schedule, administrative burden, and community burden of the POU/POE pathway compared with available conventional alternatives, engineering estimates, or historical experience where available.	High-level cost summary; implementation timeline; comparison to available centralized-treatment estimate or alternative compliance option; summary of delays avoided or encountered.
Transferability and roadmap value	The final project output provides a practical roadmap that other small systems, states, regulators, engineers, operators, and technical-assistance providers can use. The roadmap should explain the required guardrails, decision points, templates, stakeholder roles, monitoring expectations, maintenance requirements, and regulatory approval steps.	Final report; case study; roadmap; templates; briefing deck; recommended regulatory pathway; list of lessons learned; recommended next steps for WQA/WQRF and state partners.

7.2 Primary Success Standard

The primary success standard for the project is the creation of a documented, regulator-accepted, and repeatable pathway for using certified, fit-for-purpose POU/POE treatment to help a very small or small public water system address a regulated drinking water contaminant.

A successful project should demonstrate that:

- The right stakeholders were convened early;
- The real barriers were identified and discussed openly;

- The barriers were resolved or translated into clear decision rules;
- The selected small system received a regulator-accepted compliance pathway;
- The POU/POE treatment approach was technically sound, monitorable, maintainable, and enforceable;
- The community was informed, engaged, and protected; and
- The final report provides a roadmap that can be used beyond the selected demonstration site.

This definition is important because the project's long-term value is not limited to one community. The larger WQRF value is the development of a defensible framework that can reduce uncertainty for regulators, engineers, operators, and small systems across multiple jurisdictions.

7.3 Deliverables

The project should produce the following deliverables:

Deliverable	Purpose
1. Final SDWA POU/POE Compliance Case Study Report	Documents the selected system, contaminant, regulatory pathway, stakeholder process, treatment approach, installation process, monitoring results, maintenance approach, community response, barriers encountered, and solutions developed.
2. Barrier Identification and Resolution Matrix	Identifies each major regulatory, technical, operational, legal, financial, monitoring, maintenance, data, and community-participation barrier and explains how it was addressed or what decision framework should apply in future projects.
3. Stakeholder Engagement Roadmap	Provides a step-by-step guide for identifying and convening the correct stakeholders at the beginning of a small-system POU/POE compliance project. This should include recommended roles for regulators, engineers, operators, small systems, technical-assistance providers, installers, funders, and industry representatives.
4. Regulatory Pathway / Guardrail Framework	Defines the recommended guardrails for future projects, including contaminant eligibility, certified product requirements, treatment train considerations, monitoring requirements, access requirements, maintenance responsibility, ownership, operator involvement, data reporting, and enforcement.
5. Monitoring and Maintenance Framework	Provides a practical model for sampling, laboratory analysis, device tracking, filter replacement, maintenance documentation, non-response follow-up, access limitations, and long-term operational control.
6. Community Engagement and Satisfaction Survey Results	Presents the survey method, response rate, raw and analyzed results, key concerns, customer satisfaction, access issues, and lessons learned for future community engagement.
7. Cost, Schedule, and Community-Burden Summary	Provides a high-level summary of project timing, implementation burden, administrative burden, and comparative cost information without requiring a detailed budget section at this stage.
8. Templates and Tools for Future Use	Includes practical templates such as stakeholder rosters, decision logs, access agreements, customer notices, device registry formats, maintenance logs, sampling plans, and barrier-resolution tables.
9. Executive Summary and Board Briefing Deck	Provides a concise summary of the project, findings, success criteria, lessons learned, and recommended next steps for WQRF, WQA, state partners, and other stakeholders.
10. Recommendations for Broader Adoption	Provides data-based recommendations for how states and small systems can evaluate POU/POE treatment as a fit-for-purpose SDWA compliance option in appropriate cases.

7.4 What Success Does Not Require

To avoid misunderstanding, this project should also clarify what is not required for success.

Success does not require WQRF to prove that POU/POE is the correct solution for every small public water system or every contaminant. It also does not require every state to adopt the same approval process immediately. Instead, success requires WQRF to demonstrate a credible, regulator-accepted process for evaluating and implementing POU/POE treatment in appropriate small-system compliance situations.

Success also does not require eliminating every barrier. Some barriers may remain due to state law, local rules, site-specific conditions, funding constraints, or community participation issues. However, each barrier should be documented, assigned to the appropriate decision-maker, and addressed through a recommended pathway, guardrail, or future action.

7.5 Success Statement for the White Paper

For the purposes of this white paper, WQRF should define success as follows:

Success statement
This project will be successful if it brings the essential small-system compliance stakeholders together, uses a real-world non-compliant small public water system to identify and address the barriers to POU/POE compliance, obtains a regulator-accepted compliance pathway for the selected system, and produces a practical, enforceable, and repeatable roadmap that other small systems, regulators, engineers, operators, and technical-assistance providers can use to evaluate POU/POE treatment as a fit-for-purpose Safe Drinking Water Act compliance option.

Appendix A - Selected References and Source Documents

Ref.	Source
[1]	U.S. Environmental Protection Agency. Point-of-Use and Point-of-Entry Treatment Devices. Last updated October 23, 2025. https://www.epa.gov/dwreginfo/point-use-and-point-entry-treatment-devices
[2]	U.S. Environmental Protection Agency. Point-of-Use or Point-of-Entry Treatment Options for Small Drinking Water Systems. EPA 815-R-06-010. April 2006. https://www.epa.gov/sites/default/files/2015-09/documents/guide_smallsystems_pou-poe_june6-2006.pdf
[3]	40 CFR 141.100. Criteria and procedures for public water systems using point-of-entry devices. https://www.law.cornell.edu/cfr/text/40/141.100
[4]	40 CFR 142.62. Variances and exemptions from the maximum contaminant levels for organic and inorganic chemicals; paragraph (h) requirements for POU/POE devices. https://www.law.cornell.edu/cfr/text/40/142.62
[5]	40 CFR 141.62. Maximum contaminant levels for inorganic contaminants; arsenic small system compliance technologies. https://www.law.cornell.edu/cfr/text/40/141.62
[6]	U.S. Environmental Protection Agency. Cost Evaluation of Point-of-Use and Point-of-Entry Treatment Units for Small Systems: Cost Estimating Tool and User Guide. May 2023. https://www.epa.gov/system/files/documents/2024-04/pou-poe-cost-estimating-user-guide-may-2023_final-508.pdf
[7]	NSF. NSF Standards for Water Treatment Systems. https://www.nsf.org/consumer-resources/articles/standards-water-treatment-systems
[8]	NSF Certified Drinking Water Treatment Units database. https://info.nsf.org/Certified/DWTU/