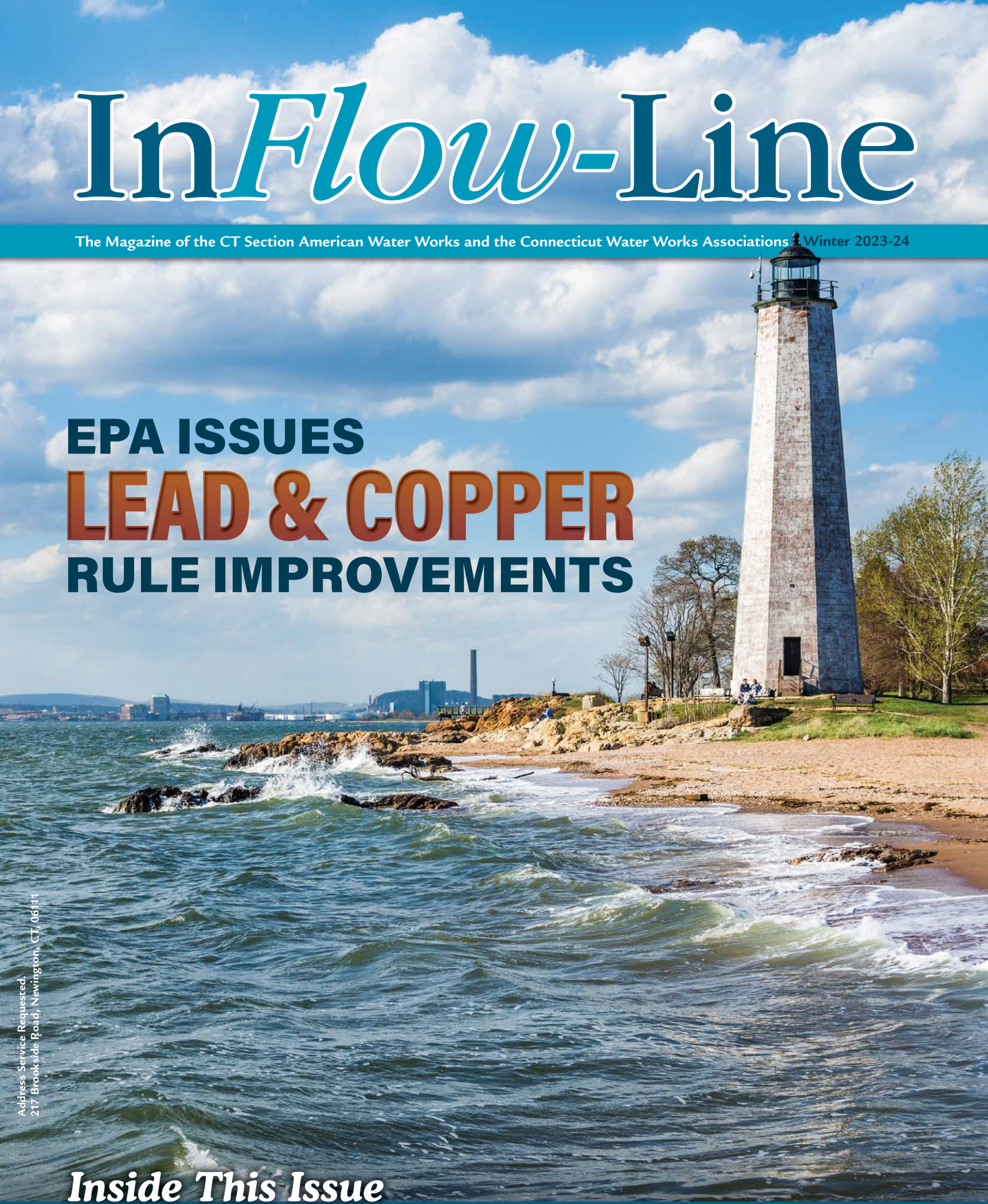
InFlow-Line

The Magazine of the CT Section American Water Works and the Connecticut Water Works Associations | Winter 2023-24



EPA ISSUES LEAD & COPPER RULE IMPROVEMENTS

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Inside This Issue

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Bringing Visibility to the Water Industry

I hope the passing of the year into 2024 finds you, your family, and friends well.

Building and maintaining personal and professional relationships involves choices we make day to day to dedicate our time, energy, and resources as we find value in these relationships. We go out to dinner, watch a movie, attend a sporting event, play games, and talk about what is going on in our lives. In the world we live in, the principle of being present is true more than ever. It is not just being in the room, but rather engaged and listening to those you are with. Building relationships takes time but has such great value in our lives, whether that is with friends, family, or colleagues where you work.





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The water industry conferences and meetings are unique in that I see a lot of people sharing stories, catching up with friends, laughing, reaching out to connect and being present with those across the table. This is such an encouragement.

Can we take this approach with our regulators and legislators? Can we be this engaged and present? Are we willing to invest the time to do a facility tour, a meeting, or send emails so the regulators and legislators understand how a bill or new regulation will impact the water industry?

During 2023, the CWWA Board and Executive Director were working to change the language on a proposed bill that would exempt the water industry from certain requirements. As the Board worked through the outreach program, I was provided with a list of legislators I could connect with to explain the issues with the proposed bill. I sat down and reached out to 12 legislators that represented communities that had customers we service to explain the issue, why the exemption was important and how it would impact water utilities. I received one response out of the 12, which tells me I need to invest more into these relationships and help them understand and be willing to listen. The one who responded was grateful for the information and stated:

"Building relationships takes time but has such great value in our lives, whether that is with friends, family, or colleagues where you work."

"I agree with you, but we need more water companies and municipalities to join and express their concerns on proposed bills and regulations."

This statement was simple and important. He was saying I hear you, but your voice alone is not going to change the views of legislators and regulators. So where are you today? This bill is coming back in the winter session, and we need to be ready as an industry to respond, inform and be present. The legislators want to hear from you on how the legislation and/or regulations impact your water system and rates to customers.

I look forward to working with all of you in 2024 and am hopeful you will join our efforts to advocate, educate, communicate, and bring visibility to the water industry.

CWWA's mission is advocating on behalf of the water industry at the state Capitol and before state agencies to address concerns facing Connecticut's water companies. Come join us at Legislative Committee meetings and make sure the customers in your water system get the representation they deserve. If you have questions or want to get involved, reach out to Executive Director Betsy Gara at *gara@gmlobbying.com* or 860-841-7350. We look forward to hearing from you and are looking forward to a great 2024.





New Year, **Same Problems**

Happy New Year and welcome to 2024! The New Year is often seen as a time to revisit, reevaluate and reset priorities. However, in the water industry our top priority never changes – to deliver safe, clean, reliable drinking water to our customers. In 2024, that priority will continue to be challenged by PFAS and lead. The EPA is expected to finalize its National Primary Drinking Water Standards for PFAS in early 2024. And with regards to lead, the clock keeps ticking towards the Lead and Copper Rule Revisions (LCRR) mandated public water system service line inventory compliance date of October 16, 2024.

Two articles recently came across my desk that illustrate how these issues will continue to challenge our industry over the next year. I found these articles to be among the most enlightening I have read on the subjects thus far, and I encourage you to give both a read when you have a few moments.

The first article, The Cost of Freeing Drinking Water from 'Forever Chemicals,' (*www.undark.org/2024/01/15/drinking-water-pfas-cost*) does a magnificent job explaining the different approaches regulatory agencies around the world have taken in trying to quantify the toxicity of PFAS exposure in humans. As outlined in its proposed rule, the EPA is tying PFAS MCLs to the lowest concentration that analytical instruments can reliably detect. The article explains why the EPA chose this approach and how this differs from other countries. As you might expect, some toxicologists do not agree with the EPAs conservative approach and question whether reducing barely detectable PFAS levels in drinking water will have any effect on total PFAS exposure and intake. Likewise, the article sheds light on the enormous costs that will be needed to meet the EPA standards and examines if the effort to lower PFAS concentrations to meet these conservative standards is the best use of our customers' money. Some utilities will end up spending significant funds to reduce their PFAS levels by a few parts per trillion. Conversations should continue with our stakeholders on balancing the competing priorities of aging infrastructure and the ever-increasing bar of compliance requirements.

The second article, published in Bloomberg Law, discusses the Lead and Copper Rule Improvements (LCRI) ambitious 10-year timeline for replacement of all lead service lines. (*https://news.bloomberglaw.com/environment-and-energy/epa-lead-pipe-rule-good-for-justice-but-may-come-at-high-cost*). While most agree that getting the lead out is a critically important goal, the article highlights how some industry insiders feel the proposed timeline is too aggressive and unrealistic. The article also emphasizes that the $15 billion Congress has set aside for lead service line replacements is well short of the expected costs. AWWA has estimated that these costs could easily exceed $90 billion. While these feelings are likely shared by many of us in the water industry, it was refreshing to see them clearly stated in mainstream media. I encourage you to use this information to educate your regulators and customers on the cost of LCRI compliance in an accelerated timeframe.

> ***"As we move into 2024, solving PFAS and lead issues will continue to compete not only for our precious capital improvement dollars, but also our labor and manufacturing capacity."***

As we move into 2024, solving PFAS and lead issues will continue to compete not only for our precious capital improvement dollars, but also our labor and manufacturing capacity. It will be up to us, the water professionals, to develop creative solutions and educate our regulators and customers on the best approach to meet these challenges and future threats to our #1 priority – providing safe, clean and reliable drinking water.

Best wishes for a safe, healthy, and productive 2024. We hope to see you at the Annual Technical Conference and Vendor Expo at the Aqua Turf Club in Southington on March 5, where we will hear from industry experts on these challenges and more.



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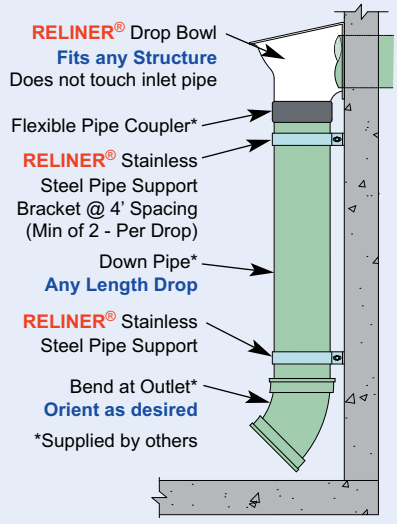
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Public Involvement **is Vital**

As we all encounter an increase in the number of public-facing issues, I want to share with everyone what I believe to be an increasingly important consideration whenever we develop our internal plans – our critical need to include public involvement.

At the bottom of this article, I've included a link to AWWA's Policy Statement on Public Involvement and Customer Communication. I will be borrowing from this policy statement throughout this article.

Whether we are addressing regulatory modifications, burdensome legislation, data sharing transparency, or seeking fair rate adjustments, we must earn and maintain the trust of these various constituencies and our customers. It's been my observation that over time, but especially in more recent years, public expectations are commonly driven by those outside our industry. This often places water professionals in a reactive position, making the public perceive that we are being defensive. This perception contributes to public distrust of the water utility. To combat this, I advocate that we double down in our efforts and lead the way with timely and comprehensive communication, information sharing, and addressing the most valued of questions, "who," "what," "why," and "how." Proactive communications promote our views and fulfill the public's expectations, including those who seek to influence our objectives.

For example, the Regional Water Authority is actively meeting with municipal leaders and local civic groups as part of our LCRR/LCRI compliance efforts. During meetings with municipal leaders, we explain the history of the LCRR/LCRI, our field activities that will impact their residents, and our plan to communicate our activities directly to customers. We also request their feedback on the plans and guidance on which local civic groups we should educate before our field activities begin. When communicated proactively, municipal leaders become our advocates and will help us schedule meetings with relevant civic groups. Educating and partnering with various local groups who are well known and active in the community has built trust and created a team of "third-party validators" or advocates for our initiative. To accomplish our goals, we are utilizing multiple communication tools, both traditional and modern, to reach customers of all ages, ethnicities, and backgrounds. We are striving to be in front of the lead issue; we'd prefer not to chase it.

An equally important aspect of communication is our ability to listen and adapt based on the feedback we receive; incoming information is valuable. It can identify alternate perspectives, clarify misunderstandings, and advise us of expectations. If we pay attention to the information being offered, we can modify our message, improve our communication, and/or identify different methods to communicate more effectively.

Interactions with the public are becoming increasingly diverse, occurring more frequently, and must be two-way. By recognizing these changes and staying in front of issues, we will strengthen our existing relationships, develop new partnerships, and build confidence and trust with all subsets of the public.

Learn more at *www.awwa.org/policy-advocacy/awwa-policy-statements/public-involvement-and-customer-communication*.

"Proactive communications promote our views and fulfill the public's expectations, including those who seek to influence our objectives."



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CWWA's Legislative Committee

The mission of the Connecticut Water Works Association (CWWA) is to promote state legislative and regulatory policies that ensure that the state's water companies can continue to provide safe, high-quality drinking water to residents and businesses at a reasonable cost.

CWWA maintains a full-time presence at the state Capitol to communicate directly with legislators and other stakeholders on pending legislation affecting water companies. More importantly, we rely on the input and expertise of our members to let us know how a proposed bill or policy may impact their operations.

How do we do this? Each fall, CWWA's Legislative Committee holds legislative planning sessions and develops a Government Affairs Agenda, which outlines the legislative and regulatory priorities for the upcoming year. CTAWWA committee chairs and CWWA associate members are also invited to participate. The Government Affairs Agenda is reviewed and voted on by CWWA's Board of Directors in December.

The Legislative Committee meets monthly during the legislative session to review and discuss proposed legislation and amendments. Given the complex nature of many legislative proposals affecting public water supplies, the input and expertise of water professionals is critical in outlining CWWA's position.

To ensure that the Legislative Committee's positions reflect the concerns and priorities of all forms of water utilities – municipal, private, and regional – CWWA's bylaws provide that the Legislative Committee is chaired by one representative from each form of utility. CWWA's Tri-Chairs, President, and Executive Director draft testimony for public hearings and meet with legislators and agency officials to discuss how a proposed bill or regulation may impact the industry.

CWWA's Legislative Committee process ensures that the water industry speaks with one voice on legislative and other policy issues. Given the hundreds of other organizations vying for attention from lawmakers, speaking with one consistent voice is critical to getting our message across to lawmakers.

"CWWA's Legislative Committee process ensures that the water industry speaks with one voice on legislative and other policy issues."

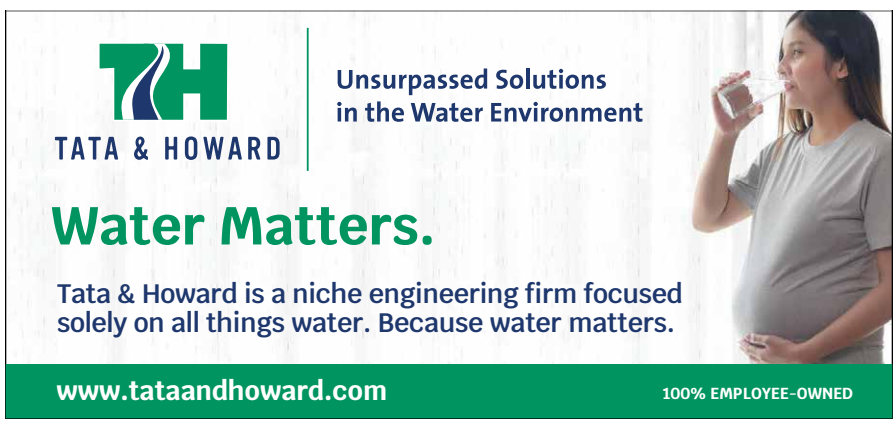


Working together, CWWA has a long record of success at the state Capitol. Each year, CWWA helps defeat dozens of bills that would impose significant costs or compliance burdens on water utilities, such as legislation to eliminate the continued use of registered diversions. In addition, CWWA has won passage of key legislation to assist water utilities in operating effectively, including eliminating the Safe Drinking Water fee on customers' bills.

Membership on the Legislative Committee is open to all CWWA member utilities and CWWA's Associate Members are welcome to attend and share their expertise.

If you are interested in joining CWWA's Legislative Committee or becoming a member of CWWA, please contact Betsy Gara at *gara@gmlobbying.com*.





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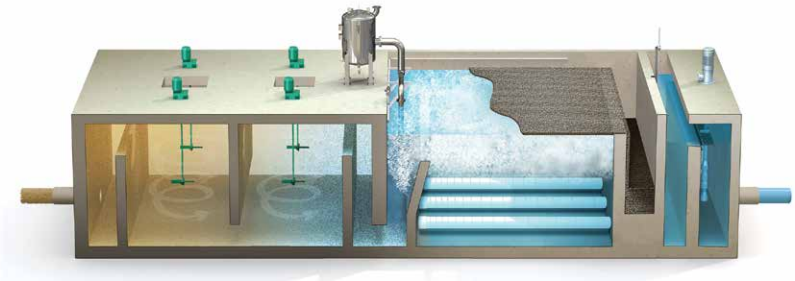
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CWWA Legislative Update

CWWA Legislative Update

By Elizabeth Gara, Executive Director, CWWA

2024 Legislative Session Kicks Off

The Connecticut General Assembly kicked off on February 7 for a short legislative session that will end on May 8.

CWWA's 2024 Government Affairs Agenda, which reflects input from CWWA's Board, Legislative Committee members, and CTAWWA committee members, includes the following priorities:

- Provide public water systems with clear, consistent guidelines and reasonable compliance timeframes to comply with water quality limits for PFAS.
- Ensure consistency between state and federal Lead Service Line replacement requirements to facilitate compliance and reduce regulatory burdens.
- Enhance DEEP's Dam Safety program to address concerns regarding dam owners that fail to inspect and repair dams and facilitate the ability of public water systems to upgrade and repair dams by streamlining permit processes.
- Support and promote programs at the state's colleges and universities to prepare students for careers in the water sector, including the programs at Gateway Community College and Southern CT State University.
- Prioritize opportunities for water companies to reduce energy costs and improve energy efficiency by ensuring eligibility for the state's various energy programs.

The agenda also includes a number of other recommendations on issues ranging from water quality, infrastructure investment, operational issues, and source water protection.

In an effort to strengthen its advocacy efforts, CWWA will be ramping up efforts to ensure that members contact their legislators on issues affecting drinking water.

"As they say, 'all politics is local.' It makes a big difference when lawmakers hear from the company that provides water to their community about how proposed legislation may impact the availability and cost of safe, reliable, high-quality water," said Betsy Gara, CWWA's Executive Director. "Making sure our members can connect with their legislators on a regular basis to discuss proposed legislation and how it may impact public water supplies is a top priority this year."

"Making sure our members can connect with their legislators on a regular basis to discuss proposed legislation and how it may impact public water supplies is a top priority this year."

Gara added: "In addition, it is critical that lawmakers understand the challenges facing water companies in complying with new and emerging state and federal regulations, such as PFAS limits, lead service line replacement, and ongoing water infrastructure replacement and upgrades."

If you are interested in participating in CWWA's Legislative Committee meetings, please contact Betsy Gara at *gara@gmlobbying.com*.



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EPA ISSUES LEAD & COPPER RULE IMPROVEMENTS

The Lead and Copper Rule Improvements (LCRI) proposed by the US Environmental Protection Agency (EPA) will require public water systems to replace lead service lines within 10 years. The EPA also announced additional improvements to protect public health, such as lowering the lead action level and improving sampling protocols utilized by water systems. Below are links to additional information:

- **Rule Summary** – www.epa.gov/ground-water-and-drinking-water/proposed-lead-and-copper-rule-improvements#summary
- **General Fact Sheet** – *www.epa.gov/system/files/documents/2023-11/lcri-fact-sheet-for-the-public_final.pdf*
- **General Questions and Answers** – *www.epa.gov/ground-water-and-drinking-water/proposed-lead-and-copper-rule-improvements#qa*
- **Supporting Materials, including the Federal Register Notice and technical fact sheets** – *www.epa.gov/ground-water-and-drinking-water/proposed-lead-and-copper-rule-improvements#support*

The EPA held a virtual public hearing on January 16, 2024 to receive public comments. The comments can be reviewed at *www.regulations.gov*, Docket ID Number: EPA-HQ-OW-2022-0801.

For more information, visit the EPA's Lead and Copper Rule Improvements website (*www.epa.gov/ground-water-and-drinking-water/lead-and-copper-rule-improvements*).

THE EPA'S PFAS STRATEGIC ROADMAP: SECOND ANNUAL PROGRESS REPORT

In December 2023, EPA released its second-annual report on progress under the PFAS Strategic Roadmap (*www.epa.gov/system/files/documents/2023-12/epas-pfas-strategic-roadmap-dec-2023508v2.pdf*). In its second year of implementation, the EPA has remained focused on the three overarching goals established in the roadmap:

- **Restrict** – Pursuing a comprehensive approach to proactively prevent PFAS from entering air, land, and water at levels that can adversely impact human health and the environment.
- **Remediate** – Broadening and accelerating the cleanup of PFAS contamination to protect human health and ecological systems.
- **Research** – Investing in research, development, and innovation to increase understanding of PFAS methods, human health and environmental risks, and technologies.

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Proposed Slate of Officers 2024-2025

Listed below is the proposed Slate of Officers for term 2024-2025 for the Connecticut Section AWWA:

Chair	One Year Term	Nick Rossi
Vice Chair	One Year Term	Peter Grabowski
Past Chair	One Year Term	Alex Cosentino
Secretary	One Year Term	Judy Soda
Treasurer	One Year Term	Rochelle Kowalski
2nd Year Trustee	One Year Term	Carolyn Giampe
1st Year Trustee	One Year Term	David Banker
National Director	3rd Year of a Three-Year Term	Tom Barger

For Three Year Term of 2025/2026 to 2027/2028:

National Director	Three Year Term	Steve Rupar

The CTAWWA Board of Directors expedited the election process for the AWWA Director position only. The decision was made to expedite the nomination/election process by one year to allow the incoming Director to attend the AWWA Board of Directors Winter Board Meeting in January 2025.

The term of the AWWA Director will begin with the Annual Meeting in May 2025 and is a three-year term.

Article VII of the Section's Bylaws govern the election and nominations process and may be viewed at our website, *www.ctawwa.org* (select "About Us" and "Bylaws"). Any questions may be directed to Judy Soda at *jesoda38@gmail.com*.

If no further nominations are received by April 20, 2024, Judy Soda, as Secretary, will cast a ballot for the above slate and issue a notice to the membership via the next available issue of the Section magazine.

Other Board Positions for 2024-2025:

Trustee at Large 2nd	Steve Vitko
Trustee at Large 1st	Meagan Heslin
Administrative & Policy Council Chair	Shannon Miles
Associates Council Chair	Kris Bates
Education & Public Affairs Council Chair	Peter Galant
Technical & Standards Council Chair	Yesher Larsen
Water Utility Council Chair	Tom Barger

Officers of the Board voted at their January 2024 board meeting to approve the Other Board Positions whose terms shall begin at the annual meeting in May 2024.

Per the CTAWWA Bylaws, this announcement is notifying membership of the election of the Other Board Positions and Proposed Slate of Officers for the 2024-2025 term and National Director for term beginning May 2025.



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A Successful CWWA/CTAWWA FALL CONFERENCE

More than 200 water industry professionals and a record number of sponsors and exhibitors participated in the 2023 CWWA/CTAWWA Fall Conference at the Aqua Turf in Plantsville, CT on October 26, 2023.

CWWA's President, Dan Lawrence, Aquarion Water Company, and CTAWWA's Chair, Alex Cosentino, MDC, welcomed attendees, both commenting on the importance of working together to address the many challenges facing the water industry, including testing and treating for PFAS, developing, and implementing lead service line replacement programs, and addressing climate impacts.

THE AGENDA INCLUDED PRESENTATIONS ON A WIDE RANGE OF WATER ISSUES, INCLUDING:

The Southwest Regional Pipeline: Improving Supply Resilience

Dan Lawrence, PE, Aquarion Water and **Peter Galant, PE, Tighe & Bond** provided an overview of Aquarion's Southwest Regional Pipeline project to address public water supply issues, improve drought resilience and meet reservoir release requirements under the state's streamflow regulations. The presentation walked attendees through efforts to develop and implement the project, including diversion permitting processes and the importance of drought planning to meet public water supply needs.

Confronting Climate Change Impacts in the Water Sector

David Murphy, PE, CFM, Principal, Resilient Land and Water, LLC and the CT Institute for Resiliency & Climate Adaptation (CIRCA) presented on climate challenges facing the water sector, including guidance, resources, and grants to assist public water systems. He also outlined the climate-related concerns raised by towns across the state, such as flooding, stormwater runoff, power outages, and stream crossings.

PFAS Litigation

Connecticut's Attorney General William Tong discussed issues relating to the class action lawsuits against DuPont and 3M, including the proposed settlements and issues public water systems should consider in deciding whether to remain in the settlement class or opt out.

Key Issues Update: Department of Public Health Drinking Water Section

Cindy Sek, Sara Ramsbottom, Patricia Bisacky, and **Cheryl Fields** of the Department of Public Health Drinking Water Section updated attendees on a wide range of issues, including the state's Lead Service Line Replacement inventory template, the Drinking Water State Revolving Fund, and issues relating to the regulation of PFAS and other unregulated contaminants.

EPA's Water Initiatives

CWWA and CTAWWA were honored to welcome **David W. Cash, US Environmental Protection Agency (EPA) Region 1 Administrator** as this year's keynote speaker. He discussed the EPA's water initiatives, including funding available for drinking water under the Bipartisan Infrastructure Law, the EPA's proposed PFAS drinking water regulation, and implementation of the Lead and Copper Rule revisions. Cash also shared a video of his efforts to highlight the anniversary of the *Safe Drinking Water Act* by plunging into Boston Harbor!

Imagine A Day Without Water

The event concluded with CTAWWA's Imagine A Day Without Water Poster Contest, which featured dozens of colorful posters created by students in the Bristol school system to highlight the importance of water in our daily lives.

A BIG THANKS TO OUR SPONSORS FOR SUPPORTING THIS EVENT!

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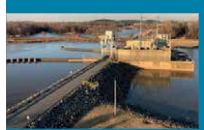
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28th Annual ATCAVE

March 5, 2024 | 8:00 am-3:30 pm | Aqua Turf Club, Southington, CT

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28th Annual ATCAVE

March 5, 2024 | 8:00 am-3:30 pm | Aqua Turf Club, Southington, CT

Get the most from ATCAVE by earning Training Contact Hours (TCH) toward your Connecticut Treatment and Distribution System Operator Certification. Select from tracks in Water Quality and Treatment, Distribution and Storage, or Management.

March 5, 2024

Track	SESSION A-1: WATER QUALITY AND TREATMENT 2.0 TCH*	SECTION B-1: DISTRIBUTION AND STORAGE 2.0 TCH*	SESSION C-1: MANAGEMENT 2.0 TCH*	VENDOR EXPO Kay Pier North
9:00 am to 11:00 am	**pH Adjustment by Aeration Units** Cynthia Castellon, Tighe & Bond Alan Wells, Tighe & Bond	**Lead and Copper Rule Improvements (LCRI) Summary** Cindy Sek, CTDPH	**Beyond Maintenance: Transformative Strategies for Comprehensive Pump Management** Jessica Wagner, JKMuir Paul Campbell, JKMuir	Join us for coffee/ pastries and visit the vendor expo before the morning technical sessions begin. The 2024 Vendor Expo is your chance to see the latest in water supply related technologies and equipment from 70 vendors and specialists in the water supply industry. For many attendees, the knowledge gained, and the contacts made at the Vendor Expo add significant value to their attendance at ATCAVE.
	PFAS Over 200 ppt Removed to Non-Detect for Three Years Running Alan LeBlanc, CDM Smith Jihyon Im, CDM Smith	**Solutions to Construction Challenges for an Equitable and Incentivized Lead Service Line Replacement Program** Amy Anderson-George, Arcadis Joseph Lanzafame, City of New London Public Utilities	**DWS Updates and What's Coming Next** Lori Mathieu, CTDPH	
	Removing a Needle from a Haystack: Application of Selective Novel Adsorbents for PFAS Removal Bryan Sadowski, AECOM	**Distribution System Monitoring with Hydrant "SmartCap" Technology** Jessica Coelho, The Metropolitan District	**Liquid Logic: Developing Approaches for Effective Lead Line Inventories** Ajay Sharma, Kleinfelder	
	SWTP Treatment Effluent Log Package Review Thomas Chyra, CTDPH Carissa Madonna, CTDPH	**Understanding the Benefits and Insights of a Predictive Model for Lead Service Line Replacement in Norwich, CT** Mikayla Billiter, Arcadis Alisa Morrison, Norwich Public Utilities	**Leveraging Data Throughout the Asset Life Cycle** Trent Guihan, Tighe & Bond Daniel Carney, Tighe & Bond	
1:00 pm to 2:30 pm	**ATCAVE LUNCHEON** Between the morning and afternoon technical sessions, tour the Vendor Expo, participate in the Vendor Booth Raffles and enjoy the ATCAVE Luncheon Buffet.			

Track	SESSION A-2: WATER QUALITY AND TREATMENT 2.5 TCH*	SECTION B-2: DISTRIBUTION AND STORAGE 2.5 TCH*	SECTION C-2: MANAGEMENT 2.5 TCH*
1:00 pm to 3:00 pm	**Lost In Translation: How Proper Planning and Execution of Pilot Studies Can Enhance Design Outcomes** Ryan Fleming, Tighe & Bond	**The National Primary Drinking Water Rule for PFAS-Overview and Timeframes** Aaron Medford, CTDPH	1:15 pm to 3:15 pm **40 Years of Management at Lake Shenipsit, a Large Drinking Water Reservoir** Ben Burpee, ECS, a division of GZA Benjamin Rach, ECS, a division of GZA
	Chemical Feed and Storage Systems Improvements: The Challenges We Face Brandon Giardino, Snyder Civil Engineering, LLC	**LCRR Planning for School and Childcare Sampling** Allie Donahue, CDM Smith	**How to Keep Your Ground Water Supply Reliable** Karen Benson, H2M architects + engineers John Collins, H2M architects + engineers
	Optimizing Two Chemical Feed Systems at the Lake Whitney Water Plant in Hamden, CT Ryan Benoit, Tighe & Bond	**Keeping Water Flowing at West Parish Filters** Christina Jones, Springfield Water and Sewer Commission Michael Popko, Springfield Water and Sewer Commission Peter Thayer, Springfield Water and Sewer Commission Chris Nelson, AECOM	**Evaluating Safety Training Effectiveness** Tina Merritt, AECOM
	Proactive Planning for PFAS in Water Treatment Residuals James Collins, Arcadis	**Industry Guidance on How to Conduct Pipe Studies for Corrosion Control Treatment** Adrienne Conigliaro, Arcadis Rebecca Slabaugh, Arcadis	**From Concept to Capital: CT Water Company's Strategic Blueprint for Solar Implementation** Molly Keleher, JKMuir Scott Bonett, CT Water Company

8:00 am to 3:00 pm

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PARTIAL LEAD SERVICE LINE REPLACEMENTS:

UNDERSTANDING THE HISTORY, POLICIES, AND PRACTICE

By Javier Locsin, Environmental Engineer, CDM Smith
Sandra Kutzing, Lead and Copper Strategy Leader, CDM Smith
Brian Farrelly, Senior Construction Manager, CDM Smith
Matthew Young, Program Manager, CDM Smith

Removing lead service lines is regarded as one of the most effective measures for reducing lead exposure through drinking water. In the past 30 years or so, policy and industry practice have moved towards strengthening public health by discouraging, and in some jurisdictions, prohibiting partial service line replacements (PLSLR) given its risks of elevated short and long-term lead concentrations at the tap.

In December 2023, the US EPA released a draft of the Lead and Copper Rule Improvements (LCRI) for public consultation. One of the more notable changes in the LCRI is the requirement for utilities to replace all galvanized requiring replacement (GRR) and lead service lines (LSL) within 10 years after the LCRI is finalized.

The aggressive timeframe proposed in the LCRI obligates utility decision-makers to prioritize service line replacement and

how to garner sufficient customer support to replace the private portion of the service line. Full lead service line replacement (FLSLR) is the recommended approach because only FLSLR eliminates the exposure risk from LSLs as sources of lead. However, there may be instances wherein a utility will have to perform PLSLRs. Considering these situations, the LCRI will prohibit PLSLRs except under two conditions: (1) During planned infrastructure work or (2) emergency repairs.

The move towards prohibiting PLSLRs has strengthened public health goals but has also provided technical and operational challenges to utilities that may need to perform PLSLRs. Here, we present the history of PLSLR policy, discuss key findings from available literature on PLSLR, and summarize best practices if PLSLRs cannot be avoided.

HISTORY OF PARTIAL LEAD SERVICE LINE REPLACEMENT POLICIES

Lead and Copper Rule

In the wake of numerous health studies associating lead in drinking water with cases of severely elevated blood lead levels, the US EPA started regulating lead in tap water in 1991. Utilities generally try to keep lead levels low by controlling water chemistry but if tap water lead levels continued to exceed the action level (AL) after corrosion control was implemented, the federal Lead and Copper Rule (LCR) required utilities to replace lead service lines.

The LCR required utilities to develop an LSL inventory but there was no requirement to update it and only the public side was typically inventoried. Utilities that exceeded the 90th percentile 15 µg/L lead AL after CCT was installed were required to replace at least 7% of the total number of LSLs in its service area. Initially, the LCR required the replacement of the entire service line, both the publicly and privately owned sections. However, requiring utilities to remove privately owned lead service lines raised constitutional and legal issues in terms of private property and eminent domain. A 1994 challenge by the American Water Works Association (AWWA) in the DC Circuit Court limited the EPA's jurisdiction to just the public portion of the service line (40 F.3d 1266, D.C. Cir. 1994). As a result, the LCR was revised to allow for PLSLRs in 2000. Utilities were required to offer homeowners the option of replacing the private portion of the service line at the homeowner's cost.

> **In December 2023, the US EPA released a draft of the Lead and Copper Rule Improvements (LCRI) for public consultation.**

The LCR did not place large focus on replacing all LSLs since a replacement was only needed when the utility exceeded the AL and optimizing its CCT program was insufficient to bring the lead levels below the AL. Utilities that did not exceed the AL would not have needed to replace any LSLs.

Lead and Copper Rule Revisions

In 2008 and 2009, the US EPA committed to re-evaluating its regulations covering PLSLRs and sponsored the Scientific Advisory Board (SAB) to evaluate current scientific information regarding the effectiveness of PLSLRs in 2011. While the SAB found that the quantity and quality of data to fully determine the effectiveness of PLSLR were insufficient, it concluded that PLSLRs have not been observed to reliably reduce drinking water lead levels and were frequently associated with short-term elevated drinking water lead levels replacement, suggesting the potential for harm, rather than benefit during that time period. Whereas the FLSLR would result in lower lead levels following a replacement.

In January 15, 2021, the *Lead and Copper Rule Revisions* (LCRR) (86 FR 4198) were published to improve upon the LCR with updated provisions to lead tap sampling, CCT, consumer awareness and public education, LSL inventory, and LSLR. The LCRR required utilities to develop an LSL inventory or demonstrate the absence of LSLs within three years of the rule's final publication. Galvanized service lines that were ever downstream of an LSL were also counted as LSLs for the purpose of replacement.

Under the LCRR, utilities are required to replace a smaller percentage of its LSLs and only after they exceed the 90th percentile AL or trigger levels. Utilities serving more than 10,000 people that exceed the 90th percentile of 15 µg/L were required to replace 3% of its LSLs per year and could stop its LSLR programs in two years if it met the AL in four consecutive six-month monitoring periods. Large systems with 90th percentile lead concentrations above the trigger level of 0.010 mg/L were required to replace LSLs at a goal rate proposed by the utility and approved by the state. It could stop these goal-based LSLR programs in one year if it met the trigger level in two consecutive six-month monitoring periods. Recognizing that risks of elevated lead levels after PLSLRs, the LCRR strongly discouraged, but did not prohibit, utilities from conducting PLSLRs by including extra risk mitigation and notification actions. The LCRR also required utilities, regardless of their 90th percentile lead level, to replace the public portion of an LSL when customers choose to replace their portion of the line. Moreover, the LCRR updated the LSL replacement rate criteria to only count FLSLRs towards replacement rate.

On January 20, 2021, the federal government issued Executive Order 13990 requiring all federal agencies to review regulations that may be inconsistent with, or present obstacles to, the policy it establishes. The prompted the US EPA to delay the effective compliance date to October 16, 2024, and review the policies outlined in the LCRR (86 FR 31939).

Environmental justice and public health concerns were raised regarding LSLR and its inequitable financial burden on historically disadvantaged populations. A recent US EPA-funded study estimated disproportionately high baseline levels of lead exposure risk for minority and low-income households due to the higher probability of these populations occupying older dwellings built before the lead ban in 1987 (Abt Associates, 2019). This study included several sources of lead including paint and drinking water. Regarding lead exposure through drinking water, actual rates of FLSLR are lower for low-income, minority households when there are cost-sharing arrangements, requiring property owners to pay to replace LSL components located on private property. Some local governments and utilities were already proactively addressing the equity issues by fully funding FLSLR, but this practice remains rare (Pakenham et al., 2019).

> The US EPA started regulating lead in tap water in 1991.

To help enact that goal and to provide equitable access to LSLRs, the federal government enacted the Bipartisan Infrastructure Law (BIL), providing $15 billion in funding over five years for LSLR projects. The intent of this was that the utilities will only incur costs for the public side LSLR and the fund could be used to alleviate customer financial burden by covering the cost of the private side LSLR. Unfortunately, in most areas, the loan portion of the BIL funding cannot be used for private side replacements since the loan is paid back with ratepayer, public funds. This reduces the money available to pay for the private side with the BIL to approximately half, the grant portion.

Proposed Lead and Copper Rule Improvements

As a result of federal funding and the regulations review, the US EPA published the proposed LCRI on December 6, 2023 (88 FR 84878). One critical change to the LSLR program is the requirement for a FLSLR program that is no longer based on a 90th percentile AL. Instead, the proposed LCRI will require all utilities to identify all service line materials and remove all LSLs within 10 years of the final rule's publication (anticipated to be 2037).

If approved, utilities will have to replace LSLs at an annual average rate of 10% calculated across a three-year rolling period unless subject to a shortened deadline by the state. Large utilities needing to replace at least 10,000 service lines per year or those exceeding 0.039 replacements per household would be eligible for extended deadlines beyond the 10-year requirement. The proposed LCRI maintains the LCRR requirements to only count FLSLRs towards the replacement rate. Moreover, the LCRI will prohibit PLSLRs unless they are conducted as part of an emergency repair or in coordination with planned infrastructure work (i.e., water infrastructure or capital improvement) that is not solely for the purpose of LSLR. Paving projects are not considered capital improvement projects according to the EPA and therefore, PLSLRs cannot be conducted to improve paving efficiency and avoid repaving a street. This was intended to strengthen environmental justice outcomes by eliminating partial replacements for lower-income customers solely for the purpose of service line replacement. In cases where a PLSLR is planned to occur with non-emergency infrastructure work such as water main replacements, utilities must offer to replace the customer-owned portion at least 45 days prior to the replacement with a minimum of four attempts. Utilities would not be required to complete the FLSLR where it does not have access to the customer-owned portion of the service line, such as when a customer does not allow access.

RISKS OF PARTIAL LEAD SERVICE LINES

Full is More Effective than Partial Lead Service Line Replacement at Reducing Lead

Partial LSLRs have not been shown to be reliably effective in reducing lead in drinking water compared to FLSLR or even pre-replacement concentrations (Figure 1). Trueman et al. (2016) observed 90th percentile lead concentrations decrease from 10-44 µg/L to 2-12 µg/L one month after FLSLRs. In the long term, elevated lead was observed more often at sites with PLSLRs than at sites with either full LSLs or after FLSLRs (Trueman et al., 2016). This coincides with expectations since the main source of lead – the LSL – is completely removed in a FLSLR (Figure 2), whereas the remaining leaded portion of the service line still acts as a source of lead in PLSLR (Figure 3). However, both FLSLRs and PLSLRs generally result in elevated lead levels for a variable period of time after replacement, but the limited evidence available suggests that the duration and magnitude of the elevated lead concentrations may be greater with PLSLR than FLSLR (Cartier et al., 2013; Deshommes, Laroche, et al., 2018; Sandvig et al., 2008; Trueman et al., 2016). In FLSLR's this can be attributed to particulate lead due to an LSL disturbance (Brown & Cornwell, 2015) (Figure 2). In PLSLR's spikes in lead can be caused by a disturbance or galvanic corrosion (Brown & Cornwell, 2015; Triantafyllidou & Edwards, 2011; Trueman et al., 2016) (Figure 3).

Immediate Increases in Lead after Partial Lead Service Line Replacement

Across the studies evaluated, PLSLR resulted in extreme elevated lead concentrations, reaching concentrations 130 times greater than pre-LSLR concentrations, immediately after and even up to two years after the LSLR (Figure 4). Trueman et al, (2016) found that PLSLR doubled short term lead release with more than a quarter of sites tested seeing increases of 20 µg/L in a system with CCT. Short term lead release has been reported to be as high as 4981 µg/L (Cartier et al., 2013) in water without CCT.

The risks of immediate spikes in lead from the physical disturbance of the pipe

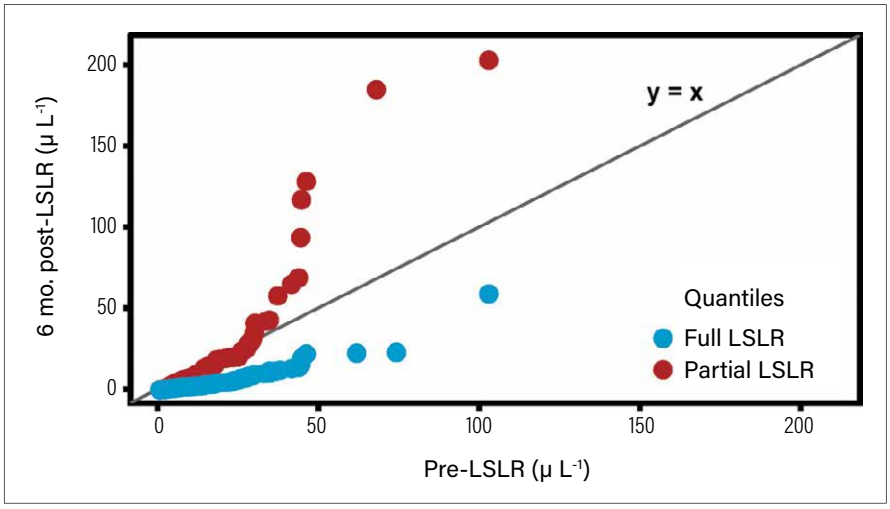


Figure 1: Total Lead Concentrations from Pre- and Post- Lead Service Line Replacements. (From Trueman et al., 2016)

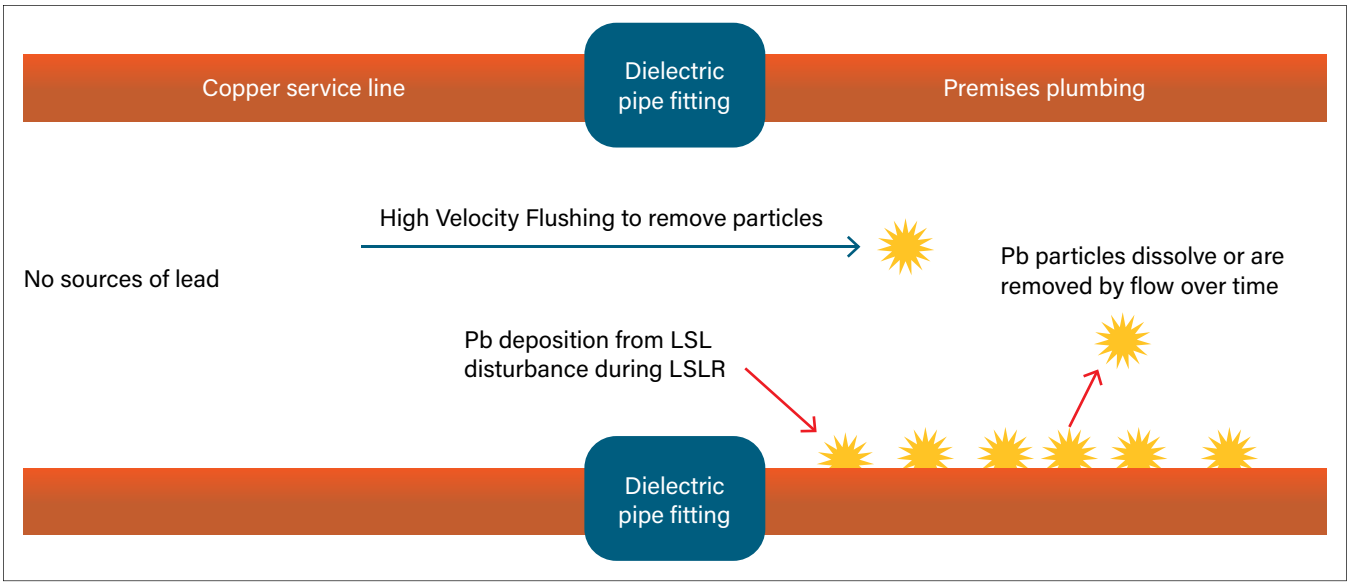


Figure 2: Particulate Lead Release After Full Lead Service Lines Replacements.

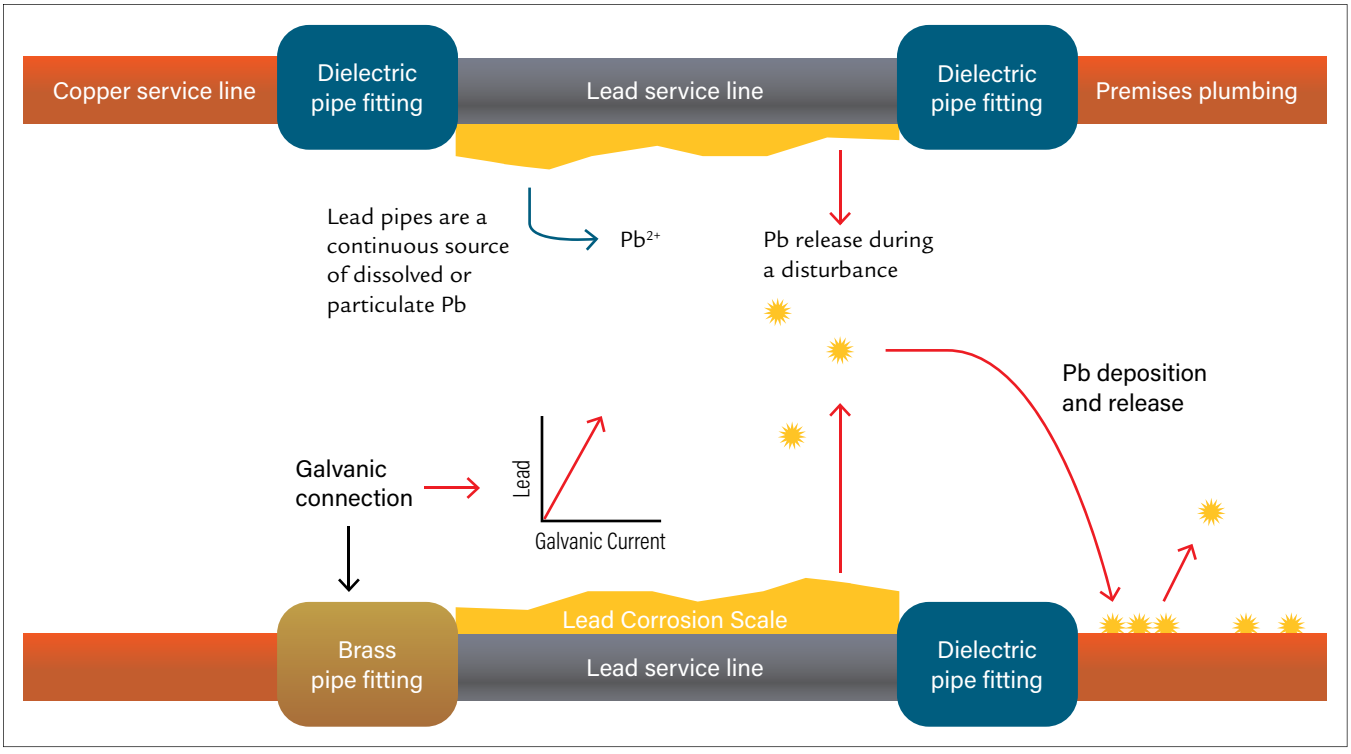


Figure 3: Mechanisms of Galvanic, Dissolved and Particulate Lead Release After Partial Lead Service Lines Replacements.

during LSLRs are well known. This effect is attributed to galvanic connections created with some PLSLR installation methods (i.e., brass or copper connectors) as well as lead particle release during an LSL disturbance, forming lead reservoirs inside the home (Camara et al., 2013; Deshommes, Trueman, et al., 2018; Sandvig et al., 2008; St. Clair et al., 2016) (Figure 3).

Partial LSLs can be prone to galvanic corrosion. Water quality parameters such as chloride-to-sulfate mass ratio (CSMR) and phosphate can accelerate galvanic corrosion by increasing the transfer of electrons from the lead to the copper (Nguyen et al., 2011a, 2011b). Moreover, galvanic corrosion at the lead-copper junction has been linked with elevated particulate lead release (Cartier et al., 2012, 2013; Triantafyllidou & Edwards, 2011; Wang et al, 2012). Galvanic corrosion can be minimized by using a dielectric connector to break the electrical

continuity between the lead and copper pipes. However, this would not address the continuous source of lead from the remaining LSL portion. Dissolved and particulate lead can still be released by the remaining lead portion of the service line.

Longer-term Lead Release after Partial Lead Service Line Replacement

Partial LSLs may still pose longer-term lead release risks into drinking water (Figure 4). One notable issue is that a large source of lead, an LSL, still remains connected to the property after a PLSLR which can continue to release dissolved and particulate lead (Figure 3). Trueman et al (2016) found that over one-quarter of the first-draw lead levels in tap samples were over the US EPA's 15 µg/L action level 6 months following PLSLR and was double the pre-LSLR fraction. Similar results were reported by Dore et al (2019), wherein 90th percentile lead concentrations after 39 weeks from partial LSLs in a pipe loop were higher across all test conditions except in water with low CSMR (CMSR = 0.3 vs CSMR = 0.9). Lower CSMR is expected to be less corrosive to galvanic connections.

> **Water systems are encouraged to avoid PLSLRs whenever possible.**

After 155 weeks (Approximately three years), orthophosphate treatment presented the lowest lead concentrations but were still above 15 µg/L (Doré et al., 2019). Therefore, partial LSLs may continue to contribute a dangerous amount of lead to drinking water over the long term even with CCT.

Flushing Does Not Eliminate Lead Release in Partial Service Lines

Flushing is often promoted as a simple and low-cost approach to reduce lead exposure. Three Water Research Foundation (WRF) Projects evaluated the impact on high-velocity flushing on lead concentrations following full and partial LSLRs (WRF 4409, WRF 4584, and WRF 4713). High-velocity flushing post-FLSLR resulted in substantially reduced filtered, particulate, and total lead at the customer tap and did not produce negative consequences after FLSLR (Cornwell, 2018, 2021). Since the source of lead is removed during FLSLR, there is lower risk of lead exposure after flushing than with PLSLR (Brown & Cornwell, 2015) (Figure 2).

Brown and Cornwell (2015), WRF 4584 (Cornwell, 2018), and WRF 4409 (Brown, 2015) reported that additional flushing of the service line did not improve lead levels observed during at least the first three months after PLSLR. A portion of the LSL remains and continues to release lead to drinking water (Figure 3).

CONDUCTING PARTIAL LEAD SERVICE LINE REPLACEMENTS RESPONSIBLY

Water systems are encouraged to avoid PLSLRs whenever possible. In addition to the risks associated with PLSLRs, FLSLR have many benefits to a utility including:

- Lower post-LSLR lead concentrations.
- Cost savings associated with not having to perform construction twice at the same location.
- Longer-term savings with a decrease in emergency work in the future with newer infrastructure.

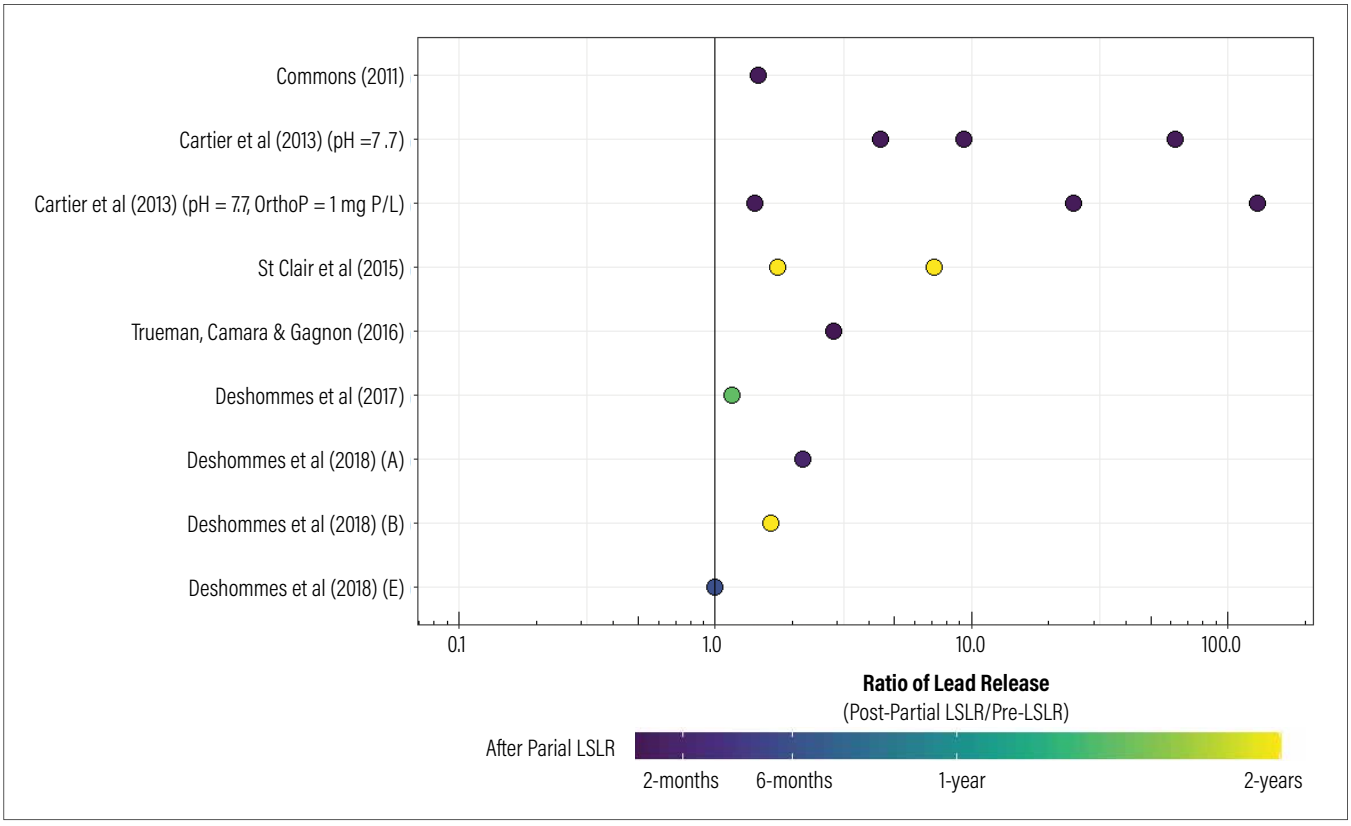


Figure 4: Ratio of Lead Release Before and Within Two Years After Partial Lead Service Line Replacement.

While PLSLRs are strongly discouraged, there are times when a utility cannot avoid conducting a PLSLR. In those instances, best practices – consistent with recommendations from the US EPA, AWWA, and WRF – should be followed to minimize the public health risk to residents including:

- A dielectric coupling or a plastic meter setter can be installed between a new copper service line and an existing lead service line to reduce the risks of galvanic corrosion. Alternately, a plastic pipe can be installed in lieu of a copper pipe. Lab experiments using harvested pipes have shown decreased in lead release when the electrical connection is broken or removed (Clark et al., 2013; St. Clair et al., 2016; Wang et al., 2012).
- High velocity whole house flushing for 30 minutes can help reduce immediate lead release for PLSLRs, however, flushing does not reduce lead levels in PLSLRs as much as it does for FLSLRs. For flushing premises where access is not available, the water should be turned back on when the service is reconnected. A "turn on" notice should be left on the front door for the customer to call to have the water turned back on. At that time, access will be provided for flushing. Instructions should be provided to the residents regarding regular whole house flushing for six months as well as daily mini-flushes.
- A filter certified to meet NSF 42 and NSF 53 standards in reducing lead and particulates can be provided to residents. Filters are very effective method for reducing both dissolved and particulate lead in drinking water (Purchase et al., 2021; Tang et al., 2023), especially when combined with flushing (Kutzing et al., 2023). The LCRR requires utilities to provide filters for 6-months after the LSLR. However, elevated lead concentrations have been reported even past 1.5-years after a PLSLR (Deshommes, Trueman, et al., 2018; St. Clair et al., 2016).
- Conducting a follow-up water sample between three and six months of a PLSLR will provide the current lead levels at the tap. It is recommended that for a PLSLR, both a first liter sample and a sample that would represent the water in the service line should be taken and analyzed for lead. This is consistent with the proposed LCRI requirements. If lead levels remain elevated, a utility can continue to provide filter cartridges and repeat the water sampling after another six months.

> **A first liter sample and a sample that would represent the water in the service line should be taken and analyzed for lead.**

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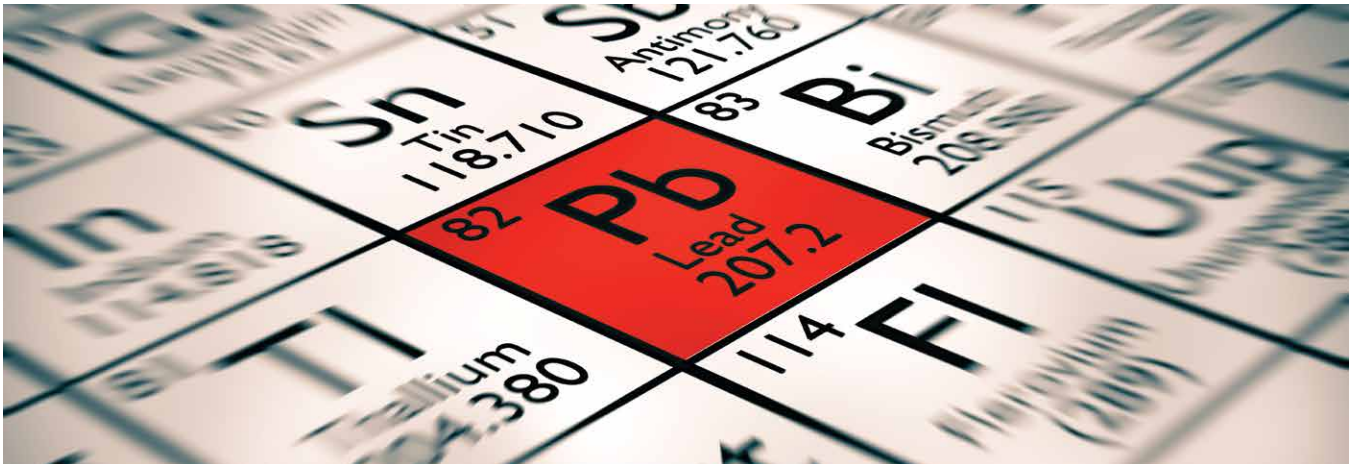
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The EPA's Get the Lead Out Initiative



"The EPA recently launched the Get the Lead Out (GLO) Initiative to assist 200 underserved communities in identifying lead services lines, developing replacement plans, and applying for funding to get the lead out."

The EPA recently launched the Get the Lead Out (GLO) Initiative to assist 200 underserved communities in identifying lead services lines, developing replacement plans, and applying for funding to get the lead out. The GLO Initiative will help communities nationwide address barriers to lead pipe removal by providing tools, best practices, and peer exchange and learning.

What Kind of Actions will the GLO Initiative Support?

The EPA will work with communities to get the lead out by supporting the development of:

- LSL Inventories that meet 2021 Lead and Copper Rule Revisions requirements deadline. An LSL Inventory is necessary to fully identify the funding needs of the community.
- Community Engagement Plans that invite community input, provide educational resources, and meaningfully engage affected community members while identifying and replacing LSLs.
- Lead Service Line Replacement Plans to provide each municipality a roadmap for 100% identification and full replacement of all LSLs, including public and private portions.
- State Revolving Fund (SRF) Applications to help communities fund their service line replacement. Each recipient of this technical assistance will receive a customized plan to facilitate their work with the state.

Additionally, EPA will develop tools and case studies to share information and best practices between the Agency, state and Tribal programs, water system managers, and community leaders.

How Can My Community Participate in the GLO Initiative?

Communities can request assistance from the GLO Initiative by completing request form at *www.epa.gov/water-infrastructure/forms/water-technical-assistance-request-form*.

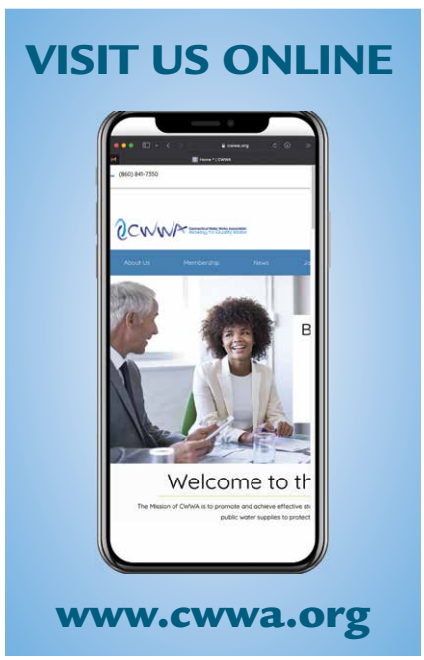
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Course	Name	Location	Day	Time	Credits
BUSN 2095	Business (Utility) Practicum - Internship	Online			3
BMGT 1410/CWM 1006	Public Utility Management	Live Remote Online (Hybrid)	Monday	5:30-6:45 pm	3
BMGT 2416	Rates and Revenues	Live Remote Online	Tuesday	5:30-8:10 pm	3
BMGT 2419	Asset & Infrastructure Management	Live Remote Online	Wednesday	5:30-8:10 pm	3
WMTR 1002	Special Topics in Water Treatment	Live Remote Online	Thursday	5:30-8:10 pm	3
WMTR 1003	Special Topics in Water Distribution	Live Remote Online	Thursday	5:30-8:10 pm	3

The Spring 2024 Semester starts on January 19, 2024, and ends on May 13, 2024.

All courses, except BUSN 2095, can be used to meet CT DPH Continuing Education CEU requirements for already licensed water treatment and distribution system operators.

New students can receive admissions and registration materials by contacting the Admissions Office at *admissions@gwcc.commnet.edu*. Continuing students, already admitted to the college, can receive registration materials by contacting the Registrar's Office at *gw-recordsstaff@gwcc.commnet.edu*.

Continuing students may also register on-line at the following address: *www.gatewayct.edu*.

Please contact Professor Wesley L. Winterbottom, PE at *wwinterbottom@gwcc.commnet.edu* with questions about these courses or the Water Management and Public Utility Management programs.



Welcome New Members

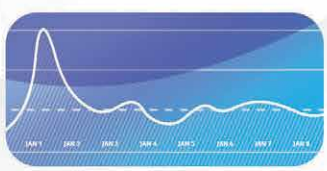
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Aquarion Water Company's Daniel Lawrence Receives Leadership Award from the New England Water Works Association

On October 26, 2023, Daniel Lawrence, Aquarion Water Company Vice President, was recognized at the CWWA/CTAWWA Fall Conference with the New England Water Works Association's (NEWWA) State Leadership Award. Lawrence is a VP of Engineering and Real Estate for Aquarion Water Company's Connecticut, Massachusetts, and New Hampshire water systems and also serves as Board President of CWWA.

"We're incredibly proud of Dan and his work, not only at Aquarion but also as the Board President at CWWA," said Donald Morrissey, Aquarion Water Company President. "His decades of experience, dedication to this industry, and commitment to our customers are just a few of the qualities that make him so deserving of this special recognition."

Each year, the NEWWA State Leadership Award is given to a board member of either a state or regional association for their contribution to association activities that have achieved public recognition of the excellence of the water works profession or innovative ideas or programs that have improved service to customers.

Lawrence is a licensed Professional Engineer in Connecticut with 31 years of experience and has a BS in Civil Engineering with an emphasis in Environmental Engineering from the University of Massachusetts. He is part of the Lead Service Collaborative, AWWA, NAWC, CWWA, the Co-Chair of the Western Utility Coordinating Committee (WUCC) in Connecticut, and Co-Chair of the Water Planning Council Advisory Group.





"His decades of experience, dedication to this industry, and commitment to our customers are just a few of the qualities that make him so deserving of this special recognition."

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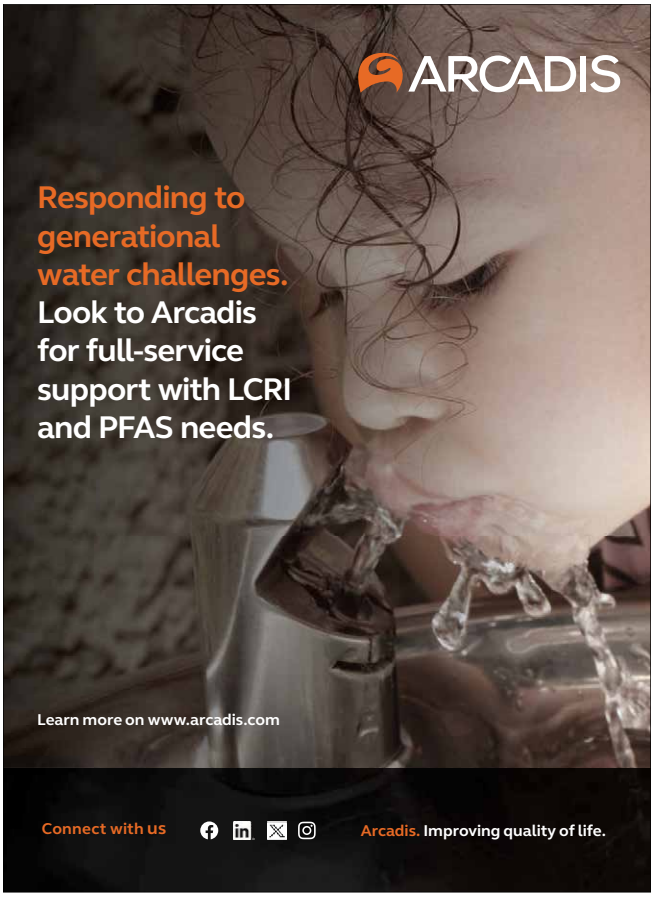
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