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PFAS 101: AN INTRODUCTION TO PER- AND POLYFLUOROALKYL SUBSTANCES
Several states have implemented more stringent guidelines for per- and polyfluoroalkyl substances, resulting in the need for treatment systems to remove these compounds.

INNOVATING THE FUTURE OF WATER AT ACE18 AND BEYOND
ACE18 offered the largest number of sessions dedicated to innovation ever. Randy Moore, Vice President of the AWWA Board of Directors, shares the highlights.

THE MISSOURI FRESH IDEAS STUDENT POSTER COMPETITION
MO-AWWA launches a new poster competition, offering university students the opportunity to share their research or project work related to water, wastewater, water resources, and other environmental engineering subjects.

NATIONAL DRINKING WATER WEEK
A recap of state-level Drinking Water Week 2018 activities and an invitation for the water industry to participate in Drinking Water Week 2019. The national event seeks to engage local communities in recognizing the vital role of clean, safe drinking water in our daily lives.

IMAGINE A DAY WITHOUT WATER
A powerful thought experiment reveals that water is essential to our simplest daily activities. The annual Value of Water Campaign was held on October 10, 2018.
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I hope everyone is staying warm this winter. MO-AWWA volunteers are busy continuously working to improve the Section and provide benefits to our members. We have been working hard to provide another exceptional program at the annual MO-AWWA/MWEA Joint Conference, which will open on Sunday, March 31, 2019. We are also pulling out all the stops to provide something new for the Tuesday night banquet entertainment, so make sure to get your banquet tickets when you register for the conference.

Our membership and young professionals are continuing to set up events for our members, including facility tours, sporting events, and membership appreciation events. I’m excited to see what they have planned for 2019, so keep an eye out for email invites or social media posts on our Facebook and LinkedIn pages.

We also have several AWWA meetings to take note of in 2019. Here are the dates and locations of a few of the meetings that Section volunteers will attend in 2019. These meetings are a great opportunity for networking, training, and exchanging ideas and experiences among different AWWA sections:

- AWWA/WEF Young Professionals (YP) Summit: March 5, 2019 in Nashville, TN
- 2019 Membership Summit: February 6-8, 2019 in Denver, CO
- Regional Meeting of Section Officers, Region II: March 2-4, 2019 in Oxford, MS
- ACE19: June 9-12, 2019 in Denver, CO
- 2019 Summer Workshop: July 24-26, 2019 in Denver, CO

We are also working to update the MO-AWWA and Joint Conference registration websites. Due to the evolution of technology and companies, both updates are necessary, and we hope to keep these transitions as smooth as possible.

I’m happy to announce that the Missouri Section has started to conduct monthly Board meetings. These meetings will be held on the first Thursday of every month. Members will discuss Section business arising from the previous month. The meetings will be held in the form of conference calls and they will be open to the membership, so if you are interested in being involved, please contact Gailla Rogers, MO-AWWA Administrative Manager: gailla.rogers@gmail.com.

Our various awards committees are always looking for nominees in the following categories:

- Landmark
- Service Citation
- Operations Service
- Professional

There are many deserving candidates, so please consider nominating one of your colleagues so that they may be recognized for their contributions to the betterment of our water systems and the maintenance of public health. They deserve it. To nominate someone, please contact Gailla Rogers, MO-AWWA Administrative Manager: gailla.rogers@gmail.com. She will direct you to the Chair of the appropriate committee.

I look forward to a prosperous 2019 and hope to see you at Tan-Tar-A in March.

Thank you,

Drew Hess
Many Developments at the Association Level

It has been busy as usual at the AWWA. The following is a summary:

The AWWA Finance Committee developed the 2019 budget for a new process, incorporating review by the Board. The budget was also submitted to the Executive Committee. The current budget is tracking very close to plan.

A good progressive step in developing AWWAIndia is their version of ACE, AICE’18, which took place on November 16-17, 2018 in Hyderabad. The conference’s aim was “Uniting the World of Indian Water Industry” and sought to create a platform to help policymakers, utilities, practicing engineers, and academics to collaboratively find innovative solutions for the challenges facing the water industry. AWWA Chief Executive Director David LaFrance and President Elect Jim Williams traveled to India for the conference.

The 2019 AWWA winter Board meeting will be held on January 24-26, 2019 in Vancouver, BC.

The AWWA Veterans Workforce Initiative held a conference call with Section liaisons on October 3, 2018. Staff encouraged liaisons to work in collaboration with AWWA Section staff to promote the toolkits to water sector employers and to attempt to reach more veterans by attending job fairs and identifying local contacts who regularly work with veterans. Sections were encouraged to provide a link to the toolkits (available at www.awwa.org/veterans) on their websites. MO-AWWA still needs to identify a liaison for this effort.

To date, the AWWA Community Engineering Corps has received 34 new project applications, 17 of which were for water and sanitation projects. AWWA Section teams have adopted six of these projects. The Community Engineering Corps grant application for development of the “What’s in My Backyard” campaign has been approved and is pending a subcontract with Engineers Without Borders USA. This project will facilitate the development of connections between communities, project volunteers, and other key project stakeholders at the local level.

The onsite review portion of the American National Standards Institute (ANSI) audit of the AWWA Standards Program was completed during the week of August 20, 2018. The remaining portions of the audit (written audit report, written AWWA response, and review and audit closure by the ANSI Executive Standards Council) will take about two to three months to complete. AWWA’s Standards Program is audited by ANSI every five years and a successful audit result will maintain ANSI accreditation through 2023.

Total Water Solutions concepts continue to be incorporated into conference content, resource development, standards development, and current projects, including the recently released 2019 State of the Water Industry Survey, which will be available online shortly.

I hope several took the opportunity to participate in the Imagine a Day Without Water Value of Water Campaign on October 10, 2018 (see page 24 for an article on the campaign). City Utilities of Springfield hosted a Facebook live stream and several other utilities across the nation hosted tours or similar social media events. To help promote the Value of Water Campaign’s Imagine a Day Without Water, a series of social media images were made available online for use (see http://thevalueofwater.org/content/social-media-graphics). The images have been downloaded more than 6,000 times.

A legislative agenda was written in two different versions for the next session of Congress, to be used according to which party has control of the House and/or Senate. AWWA legislative staff continue to monitor and provide input to the 2018 Farm Bill. They are also encouraging Congress to complete work on a comprehensive water infrastructure/policy bill, S. 3021.

On the regulatory front, a Memorandum of Understanding was finalized with the Federal Emergency Management Agency to collaborate on the development of Resource Typing for the water sector. Additionally, the Wastewater Agency Response Network’s response to Hurricane Florence was supported and a forum to discuss regional utility collaboration was hosted in the D.C. area.

Lastly, potential collaborations to advance source water protection on U.S. Forest Service lands was discussed with Forest Service representatives. A forum on water system energy efficiency was jointly held with the Alliance to Save Energy and the Water Environment Federation.

This year’s ACE will be held in Denver, CO and registration will open soon on a new ACE web page (see https://events.awwa.org for more information).

Finally, thank you for allowing me to serve you at the association level, where so many good, productive efforts are taking place.
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Per- and polyfluoroalkyl substances (PFAS) have received intense focus over the past few years due to the discovery of their presence in drinking water supplies. These largely unregulated chemicals have properties that suit a wide range of industrial and consumer applications, from firefighting materials to food packaging. However, these same properties have promoted the migration and persistence of PFAS in the environment. A growing number of these chemicals are found to be bioaccumulative and toxic, yet for a clear majority of perfluoroalkyls, little is known. Fortunately, the body of knowledge on this class of chemicals is rapidly expanding due to growing scrutiny from health agencies, utilities, and the public. While the U.S. Environmental Protection Agency (EPA) has established health advisories for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), no federal regulations currently exist for these compounds. Several states have implemented more stringent guidelines and, in some cases, maximum contaminant levels (MCLs), resulting in the need for treatment systems to remove these compounds.

PFAS Chemistry
PFAS are a class of synthetic chemicals that are used in the manufacture of many industrial and consumer products. PFAS consist of a carbon chain (alkyl) that is highly substituted with fluorine atoms and contains other functional groups, such as ethers, carboxylates, and sulfonates. Basic structures for several different PFAS are shown in Figure 1.

The carbon-fluorine bonds make the carbon chain section of per- and polyfluorinated molecules very stable, oil- and water-repellant, and resistant to heat and degradation. Consequently, this feature is what prevents PFAS compounds from naturally breaking down in the environment. Opposite the fluorinated carbon chain is a functional group that provides other useful properties to the compound, such as adhesion or solubility. Substitution of different functional groups allows the stable carbon-fluorine bonds to be utilized for many different applications, including coatings, surfactants, and dispersants, as shown in Figure 2.
PFAS History

PFOA and PFOS are considered legacy PFAS since they were of the first perfluoroalkyls introduced and have persisted in the environment.

The production of PFAS started in the 1940s with the invention of Teflon®, generically known as polytetrafluoroethylene (PTFE). The 1950s and 1960s saw expanded use of PFAS, including the invention of Scotchgard® and Zonyl®. The history of their evolution and use in industry since then is difficult to follow due to their proprietary nature.

Problems with PFAS contamination became apparent as early as 1984, when the compounds were discovered in drinking water supplies near a manufacturing facility in West Virginia. Then, in 1998, 3M reported that two long-chain legacy PFAS – PFOA and PFOS – had been discovered in human blood bank samples worldwide. Since then, manufacturers have worked to phase out the use of these legacy PFAS but, in most cases, have developed new short-chain PFAS with similar properties to replace them. The development of these short-chain PFAS has compounded the problem of managing their presence in the environment.

Today, there are thousands of PFAS used worldwide. For most of these compounds, little information is available, including their identity. Methods for measurement of these compounds are even scarce. At present, standardized and validated analytical methods for measurement exist for only 16 compounds and in only one matrix – drinking water (EPA Method 537.1).

Their use, however, has resulted in the pervasion of PFAS in the environment and in humans. PFAS are now commonly detected in human populations at parts per trillion (ppt) levels and have been found in animals in remote locations far from industrial sources. The properties that make PFAS useful in industry are the same properties that promote their migration and persistence in the environment, resulting in contamination of our drinking water sources.

Contamination Extent and Mechanisms

The EPA, as part of the Third Unregulated Contaminant Monitoring Rule (UCMR 3), performed a survey of drinking water supplies across the nation for six perfluoroalkyl substances using EPA Method 537. Under UCMR 3, PFAS was not detected in any public water supply systems in Missouri. However, the minimum reporting levels for PFAS detections in UCMR 3 were relatively high (e.g., 20 ppt for PFOA and 40 ppt for PFOS), and Method 537 is capable of reliably measuring PFAS concentrations at much lower levels. It is also suitable for measurement of 14 different PFAS compounds. Thus, a repeated survey may yield different results in the future if more PFAS compounds are included and lower reporting limits are used.

A map showing the extent of known PFAS contamination in the United States is shown in Figure 3.

Three major sources have contributed to PFAS contamination in the United States:

1. Aqueous Film-Forming Foams

   The use of aqueous film-forming foams (AFFF) at military bases, airports, and firefighting schools for suppression of flammable liquid fires has led to the contamination of surrounding water supplies. PFAS have traditionally been used as a primary ingredient in these foams for their surfactant properties. Runoff from the use of AFFF, if not contained, can migrate through the soil and contaminate nearby aquifers and surface waters (see Pease, NH; Leavenworth, KS; and Fountain, CO).

2. PFAS Manufacturing

   Manufacturing sites where PFAS are used in production, such as in the manufacture of PTFE, are often a source of contamination due to air and wastewater emissions. Two prominent cases are communities near Merrimack, NH and along the Cape Fear River in North Carolina, both of which have been affected by industrial emissions.
3. **Landfill Disposal**

Landfill disposal of PFAS-laden waste is another potential source of contamination. These chemicals end up in runoff and leachate and can penetrate some landfill liner systems (see Rockford, MI and Washington County, MN).

**Health Effects**

Little is known about most of the thousands of fluorinated chemicals in the environment today. Studies evaluating the health effects of PFAS are even more limited. Two perfluoroalkyls that have been most heavily researched are PFOA and PFOS. A draft toxicological study released in June 2018 by the Agency for Toxic Substances and Disease Registry (ATSDR) lists 489 total health effects studies on PFOA and PFOS, compared to only 127 studies for the 12 other PFAS combined.

From those studies, it is known that perfluoroalkyls are readily absorbed through ingestion, inhalation, and dermal exposure. They are also known to be transferred to the fetus during pregnancy and to nursing infants, making them the most susceptible to PFAS contamination.

Once absorbed, perfluoroalkyls persist in the body and bioaccumulate since they are poorly metabolized. Some perfluoroalkyls exhibit half-lives of eight years in the human body. Generally, longer-chain perfluoroalkyls exhibit longer half-lives and greater toxicity in humans than short-chain types, although functional groups are also a factor in PFAS bioaccumulation.

The ATSDR study suggests the following health effects are associated with PFAS exposure:

- Testicular and kidney cancer.
- Pregnancy complications.
- Liver damage.
- Increased risks of asthma, thyroid disease, infertility, and high cholesterol.

**Regulatory Efforts**

To date, PFAS have avoided significant regulatory oversight and remain unregulated at the federal level due in large part to the lack of sufficient studies on their health effects. However, the issue is receiving greater attention from regulatory agencies. In 2016, the EPA established health advisory levels for both PFOA and PFOS of 70 ng/L, measured individually or combined. In May 2018, the EPA held a PFAS National Leadership Summit to collaborate with other federal and state agencies and committed to four actions:

1. Initiate steps to evaluate the need for MCLs for PFOA and PFOS. The EPA will convene federal partners and examine everything known about PFOA and PFOS in drinking water.
2. Propose the designation of PFOA and PFOS as “hazardous substances” through one of the available statutory mechanisms, including potentially CERCLA Section 102.
3. Develop groundwater cleanup recommendations for PFOA and PFOS at contaminated sites.
4. Develop toxicity values for GenX chemicals and perfluorobutanesulfonic acid (PFBS). Promulgation of federal drinking water standards (Action 1) and designation as hazardous substances (Action 2) for PFOA and PFOS will certainly impact
both industry and utilities. Draft toxicity values for GenX chemicals and PFBS (Action 4) were released by the EPA in November 2018, but those values have not been converted into values that represent safe concentrations in drinking water.

Multiple states have issued more stringent guidelines than the health advisory levels established by the EPA. Guidance and regulations passed by a few select states are shown in Table 1.

**Treatment Methods**

There is no one-size-fits-all approach to addressing PFAS contamination in drinking water supplies. Many complexities must be considered when determining the appropriate solution, such as state and local guidance and regulations, water source, scope of contamination, existing treatment, types and concentrations of PFAS present (known and unknown), and background water quality.

In some cases, making changes to the water supply is the best option, especially with groundwater supplies, where only a few wells may be contaminated. Alternatives include securing new water sources (i.e., by drilling new wells, relocating raw water intake, or through water purchasing), and blending supplies. A combination of these options can be applied to reduce PFAS concentrations below health limits.

Treatment for removal of PFAS can be applied locally, such as at a single wellhead, or centrally, where an entire supply system is impacted. Commonly applied treatment technologies include granular activated carbon (GAC), ion exchange resins, and reverse osmosis. Each technology has advantages and limitations that must be considered in its application.

**Adsorption Technologies**

*GAC and Ion Exchange*

GAC and ion exchange resins are adsorbents with a long history of use in water treatment. GAC has an affinity for a broad range of organics, including PFAS. Ion exchange resins come in several forms and some single-use resins have been specialized to target PFAS removal. Thus, ion exchange resins are less susceptible to the presence of other organics, such as total organic carbon. Each can be effective, depending on PFAS concentrations and treatment goals. Both have a limited capacity for adsorption, however, and are susceptible to types and concentrations of PFAS. Generally, these adsorbents are more effective at removal of long-chain PFAS, for which they exhibit a higher affinity than short-chain PFAS. Once exhausted, adsorbents must

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**TABLE 1: Select state guidelines and MCLs for PFAS.**

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<thead>
<tr>
<th>Guideline/Limits (ng/L)</th>
<th>GenX</th>
<th>PFBA</th>
<th>PFHpA</th>
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**Legend**

a. The concentrations of PFOA and PFOS measured individually or combined.

b. The concentrations of PFHpA, PFOA, PFNA, PFHxS, and PFOS measured individually or combined.

c. Promulgated MCL.

PFBA: pentafluorobenzoic acid
PFHpA: perfluoroheptanoic acid
PFNA: perfluorononanoic acid
PFHxS: perfluorohexanesulphonic acid

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**FIGURE 4:** Pilot skids for GAC (left) and ion exchange (right).
be replaced with virgin or reactivated media. Media replacement frequency and costs are important aspects that should be considered during technology selection. A pilot study should be performed prior to full-scale implementation of either technology to determine effectiveness at meeting treatment goals and to evaluate the cost of treatment.

Reverse Osmosis

Reverse osmosis has also been applied for PFAS removal, although not as widely. Some studies have shown high rejection (> 95%) of PFAS, making the technology potentially advantageous for sources with high concentrations. Per gallon of treatment capacity, reverse osmosis has a higher installation cost. The technology typically requires about 15% more raw water, generates a concentrated waste stream, and often requires pre- and post-treatment. However, reverse osmosis can have lower overall operating and life cycle costs in comparison to GAC and ion exchange technologies when frequent media replacement is required for high concentrations of PFAS. Careful consideration should be given to water quality and piloting prior to selection of reverse osmosis as a PFAS removal technology.

Dustin Mobley, PE is a process engineer in the Water Technology Group at Black & Veatch. He has 12 years of experience in the evaluation and design of water, wastewater, and produced water treatment processes for oil and gas, power, and municipal water treatment clients. He has worked on water treatment systems involving filtration, softening, GAC adsorption, ion exchange, and reverse osmosis for high-purity steam cycle makeup and municipal drinking water. Most recently, Mr. Mobley has been involved in pilot testing and full-scale design of activated carbon and ion exchange technologies for the removal of PFAS from drinking water. He holds a Bachelor of Science in Chemical Engineering from the University of Florida.
Innovating the Future of Water at ACE18 and Beyond

By Randy Moore, Tnemec Company, Inc.

The theme for ACE18 in Las Vegas, NV was innovation, and AWWA really delivered. ACE18 offered the largest number of sessions dedicated to innovation ever. There were several innovation-focused technical sessions as well as an expanded Innovation Lounge in the Exhibit Hall.

The AWWA Innovation Initiative program offered two technical sessions. The first was (TUE24) Utility Optimization: Innovations and New Technologies. This exciting session of cutting-edge technologies included the following:

- Partnership Programs a Pathway to Optimization: Todd Brewer, AWWA.
- Innovative Hexavalent Chromium Remediation System: Richard Bacon, Aqua Metrology Systems Ltd.
- Data as Innovation: Travis Wagner, Pure Technologies US.
- OCWA’s Continuous Adoption of Innovative Technologies: Michael Hooker, Onondaga County Water Authority.

The Innovation Initiative’s second session was (WED35) Innovation Initiative: State of the Innovation State. The session included an excellent panel discussion facilitated by AWWA CEO David LaFrance with Peter Grevatt and Andrew Sawyers from the U.S. Environmental Protection Agency (EPA). They offered insights on how the EPA is promoting the adoption of innovation in the water sector.

Initiative Announcements

Peter Kraft (Confluence Group) and I co-chair the AWWA Innovation Initiative, so we took advantage of the WED35 session to report on the accomplishments of the committees working on deliverables for the initiative’s strategic plan. Our highlights included announcing a new innovation page on the AWWA website (www.awwa.org/innovation). There you’ll find a new whiteboard video about innovation at AWWA along with an overview of an Innovation Roadmap for utilities.

The innovation video discusses all the activities Innovation Initiative committees are working on. They center on the three primary goals detailed in the initiative’s strategic plan: the roadmap, accelerating the adoption of new technologies/innovation, and promoting more participation in the water sector. The three goals flow out of the Innovation Initiative’s mission “to advance a culture and structure for innovation to address the challenges facing the water industry.”

The final presentation in the WED35 session, Connecting the Dots With the LIFT Program, included an excellent overview and discussion led by Rob Renner, Executive Director of the Water Research Foundation, followed by an interesting discussion of the Leaders Innovation Forum for Technology (LIFT) program by Jeff Moeller of the Water Research Foundation. The presentation concluded with a capstone presentation by DC Water’s Sudhir Murthy.

Innovation Lounge Highlights

This year’s expanded Innovation Lounge drew a record number of participating companies and attendees. The Innovation Lounge, which was created in collaboration with Isle Utilities, featured a pool of emerging technologies and innovation resources offering new approaches and solutions for the water sector.

The lounge featured 31 exhibitors and offered 13 presentations or panel discussions. Also featured in the lounge was Isle Utilities’ Tech Pitch Competition, with seven companies (Abyss Solutions, Fluid Imaging, InVizion, Nobel Systems, Pipeguard Robotics, Sapphire Water, and Siga OT Solutions) competing. Abyss Solutions, an asset assessment and monitoring company, won the competition for exhibiting the greatest business potential, uniqueness, and long-term vision.

The lounge’s educational highlights included a lead-off presentation by George Hawkins, former CEO and General Manager of DC Water, and Tony Kelly, former Managing Director of Yarra Valley Water, Australia. Cristina Ahmadpour, President of Isle’s North American business, led the discussion, which sought international perspectives on executive utility management styles, organizational challenges, and strategies.

The next morning, a panel of industry thought-leaders tackled the following topic: The Innovation of Change: What Does Continuous Improvement Look Like for Utilities Today? The heavy-hitting panel brought together George Hawkins (DC Water), Clifford Chan (East Bay Municipal Utility District), Julie Anderson (Denver Water), Colleen Arnold (Aqua America), and Cynthia Lane (Platte Canyon Water and Sanitation District) in a facilitated discussion led by Peter Kraft.

There were many other timely innovation presentations in the lounge, and all were well-attended. Thanks go to the Innovation Lounge sponsors, which included Brown and Caldwell, machineQ, Mueller Water Products, SUEZ, and WaterSmart.

The Innovation Initiative continues to gain momentum with all the activity around innovation at ACE18, and even more is planned for ACE19 in Denver, CO. If you’d like to join the fun, feel free to email me: moore@tnemec.com.

Randy Moore is Director of Sales – Agency Development and Industry Affairs at Tnemec Company, Inc. (www.tnemec.com) in Kansas City. He is also Co-Chair of the AWWA Innovation Initiative and Vice President of the AWWA Board of Directors.

AWWA proudly announces the Partnership for Clean Water, adding wastewater utility optimization to the growing suite of Partnership programs.

For the past 20 years, the Partnership for Safe Water has successfully helped drinking water utilities optimize performance. Now, the new Partnership for Clean Water program brings the same comprehensive self-assessment approach to wastewater treatment plants of all sizes and configurations, helping improve treated wastewater effluent quality and energy efficiency—and recognizing their efforts to preserve environmental water quality and protect public health.

Coupled with the Partnership for Safe Water, the Partnership for Clean Water brings optimization full circle—from source to tap, and back to the source again.

Learn how the Partnership’s optimization programs help utilities understand and optimize operations and performance, and join the Partnership for Clean Water as a Charter Subscriber through December 2016.

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www.awwa.org/partnershipforcleanwater

The Partnership for Safe Water is a partnership of American Water Works Association; US Environmental Protection Agency; Association of Metropolitan Water Agencies; Association of State Drinking Water Administrators; National Association of Water Companies; and Water Research Foundation.
MO-AWWA is excited to announce the introduction of the Missouri Fresh Ideas Student Poster Competition at the MWEA/MO-AWWA Joint Meeting in April 2019!

The poster competition offers university students the opportunity to share their research or project work related to water, wastewater, water resources, and other environmental engineering subjects. The winner of the Fresh Ideas Student Poster Competition will be invited to represent their state and university in the national poster competition at the AWWA Annual Conference and Exposition (ACE) on June 9-12, 2019 in Denver, CO. The winner’s ACE travel expenses will be sponsored by MO-AWWA. MO-AWWA will also provide cash prizes to students who place second and third in the poster competition.

The poster competition is open to undergraduate and graduate (MS and PhD) students. This is a great opportunity for MO-AWWA members to meet talented young students from across the state who are interested in entering the water industry. Be sure to plan on attending the Fresh Ideas Student Poster Competition, which will be held outside the Exhibit Hall on Monday, April 1, 2019.

Call for Judges!
Posters will be evaluated based on technical content, benefit to the water and wastewater industries, quality of oral presentation, and poster organization. If you are interested in being a judge for the student poster competition, please email Karen Marie Dietze at dietzek@bv.com.

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National Drinking Water Week 2018 was held on May 6-12. For the occasion, Tim Ganz, Director of Water Quality and Environmental Compliance with Missouri American Water, gave an interview at the Central St. Louis water treatment plant and explained the water treatment process. Missouri American Water also organized a social media contest, encouraging customers to post photos of themselves drinking tap water.

Drinking Water Week is an easy way to educate the public, connect with the community, and promote employee morale. Too often, water utilities receive publicity only when something bad happens: a water main breaks in the middle of rush hour or rates increase – again. Drinking Water Week gives you an opportunity for some positive communication.

Drinking Water Week is a perfect time to educate children about their water supply in an atmosphere of fun. Community events are fun and festive ways to make sure that your customers know about their drinking water – where it comes from, how they get it, and what they can do to help ensure their drinking water quality. Finally, it is a way to reaffirm to your employees the importance of what it is they do: provide clean, safe drinking water for the public.

Drinking Water Week 2019 will be held on May 5-11.

Community events are fun and festive ways to make sure that your customers know about their drinking water – where it comes from, how they get it, and what they can do to help ensure their drinking water quality.
For more than 40 years, AWWA and its members have celebrated Drinking Water Week. Drinking Water Week is an opportunity for the water industry to engage local communities in recognizing the vital role of clean, safe drinking water in our daily lives.

**How Can Your Utility Get Involved?**
AWWA makes it easy to organize events and create promotional materials for Drinking Water Week. The 2019 website has a list of community events and public communication ideas. Themed campaign materials will be available on this page in January 2019. Visit https://www.awwa.org/resources-tools/public-affairs/public-affairs-events/drinking-water-week.aspx or contact Amber Wilson in the AWWA Communications Department at awilson@awwa.org.

**Public Communications**
You can also check out AWWA’s 2018 campaign page for reference. It has a wide selection of images, sample ads, press releases, social media posts, and children’s art contest materials in both English and Spanish. All materials are either ready to use or require minimal customization. Visit https://www.awwa.org/resources-tools/public-affairs/public-affairs-events/drinking-water-week/dww-materials.aspx.

**Educational Resources**
DrinkTap.org, AWWA’s public-facing blog, covers a lot of public education topics such as understanding water bills and Consumer Confidence Reports, bottled water vs. tap water, why some water supplies are fluoridated, and how to prevent water pollution.

**How Are Other Utilities Across the State Celebrating Drinking Water Week?**
MO-AWWA members are also a great resource for questions about organizing Drinking Water Week activities. Across the state, water utilities have engaged their customers and promoted the benefits of tap water in many different ways. Here are some examples based on activities publicized by City Utilities of Springfield, KC Water, and Missouri American Water for Drinking Water Week 2018.

- Offer customers a tour of the water treatment facility or a presentation on the history of the community’s water supply.
- Hold a children’s art contest and submit the winning entry to the Missouri Department of Natural Resources’ annual Drinking Water Week poster competition.
- Contact a local newspaper or news channel about doing a story on your water system during Drinking Water Week.
- Set up a water-themed book display at the local library.
- Publicize the annual Consumer Confidence Report.
- Organize an activity related to source water protection, such as a river or lakeside cleanup.
- Give school presentations about the water cycle, the local drinking water source, or the community’s water treatment process.
- Social media posts (Facebook, Twitter, Nextdoor, etc.) highlighting interesting facts about the local water utility, drinking water supply, or drinking water quality.

Please join in the effort to promote the good work that we in the water industry do every day to keep our communities healthy and productive! Whether your organization puts on one event or several for Drinking Water Week 2019, it will help improve public awareness of our most precious resource.

If you would like more information on the resources mentioned in this article, please contact Karen Marie Dietze, Drinking Water Week Committee Chair: dietzek@bv.com.
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The alarm goes off and you turn on the faucet for that first drink in the morning but there is NO WATER. You go to the bathroom but can't flush the toilet because there is NO WATER. You can't shower. You get to work and realize they are closed because, just like the Seven Degrees of Kevin Bacon, whatever you do, it most likely depends on or requires water to be viable. Finally, your spouse calls you from the doctor's office and everything that happened up to this point in your day becomes relatively mundane because they tell you that one of your four children is weak and sick from dehydration. This may all seem like Orwellian hyperbole, but for over two billion people in the world, it is reality. To heighten awareness of this precious resource that we habitually take for granted, on October 10, 2018 the AWWA invited you to Imagine a Day Without Water.

In the developing world, all the above events occur in a typical day. There is no need to imagine it. Their first waking thoughts and most of their day are consumed with acquiring enough water to survive, often walking miles to carry it back to their homes. Here, we put more water on our lawns in a day than most families in the developing world use in 60 days just to survive. There, one in four children under five dies of water-related inadequacies. And now, it is not just in the developing world that water crises exist. There are numerous highly developed and established locations, from

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Cape Town, South Africa to California, in which the lack of water dominates headlines, politics, and peoples' daily lives. Many world conflicts have their roots in water wars and ISIS is now using water – or control thereof – as a weapon.

Thankfully, we only have to imagine a day without water. And while the water systems we use require complex processes, long-range planning, and billions of dollars in infrastructure, it only costs us about 60 cents a day. Relative to the value of water, that is dirt cheap. Literally. A gallon of water costs you over 20 times LESS than a gallon of dirt. Clean, affordable water requires an appropriately informed stewardship responsibility. The next time you use water, which will be soon, think about using it only for essentials. Simple things like turning the faucet off when you brush your teeth can have an impact. Irrigation systems can be turned off when it’s raining or has rained. Temper social media misinformation that public water is a “chemical soup” with the facts arising from decades of scientific research and studies that have proven over and over that our treatment processes benefit us and are among the greatest public health achievements.

The next time your water system or utility brings forth an initiative for a new water source or infrastructure to implement a water source, realize it is for you, your children, and grandchildren. Along with air, water is the most necessary essential for life itself. There is NO substitute for WATER. We aren’t important to water. It’s the other way around. A public utility or water entity can store, treat, and deliver water, but the facility cannot create it. It is a gift for all of us – and of which we are all stewards.

To imagine days without water is to cease to be able to imagine anything at all. If there NO WATER, there is NO FUTURE. Better said – WATER is our FUTURE.

Public officials at the local, state, and national level must prioritize investment in water and build stronger water and wastewater systems. Investing in our water is investing in a future where no American will have to imagine a day without water.

Imagine a Day Without Water will be held on October 23, 2019.
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SCHOLARSHIP COMMITTEE

The J.R. Popalisky Scholarship Fund

The Missouri Section has established the J. R. Popalisky Scholarship Fund for qualified students enrolled in an accredited college or university in the state of Missouri. Qualifying curriculum for scholarship applicants includes courses related to civil or environmental engineering or environmental science with an emphasis on career fields associated with water supply. The J. R. Popalisky Scholarship Fund will consider applications for one or more scholarships per year in the amount of $1,000.

Additional scholarship information and application forms are available on the MO-AWWA website (https://awwa-mo.org/J_R_Popalisky_Scholarship). The deadline for applications is March 28, 2019. The scholarships will be awarded by the end of April 2019.

If you know someone who might be interested in these scholarships or if you would like to join the committee, please contact me:

Chester Bender, P.E.
Chair, Scholarship Committee, MO-AWWA
c/o Ponzer Youngquist, P.A.
227 E. Dennis Ave.
Olathe, KS 66061
Tel: 913-782-0541
Email: cbender@pyengineers.com

The Missouri Section is participating in the association's One AWWA Operator Scholarship program. The water industry faces a critical shortage of operators, and the need is expected to increase by 6% in the next decade. The One AWWA Operator Scholarship was created to address the present and future need for operators by providing training and educational funding. Matching dollars from the American Water Works Association and the Missouri Section provide the funding for the operator scholarships. Additional information and an application form can be found on the Section’s website. Please encourage all operators to consider applying for a scholarship to help defray the costs of their training.
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PROFESSIONAL AWARDS COMMITTEE

The Donald R. Boyd Utility Manager Award and the Dr. Kramer Award

Nominations Sought for the MO-AWWA Donald R. Boyd Utility Manager Award

MO-AWWA seeks nominations for the Donald R. Boyd Water Utility Manager Award. The award recognizes exceptional managerial abilities with a community water supply. Eligibility requires the individual to be 1) a member of MO-AWWA and 2) in a managerial position of a community water supply. Award guidelines can be found on the AWWA website (www.awwa.org). A two-page nomination form is available on the MO-AWWA website under the “Awards/Scholarships” tab (www.awwa-mo.org/Boyd_Utility_Manager_Award). The award will be presented at the 2019 MWEA/MO-AWWA Joint Annual Conference. Nominations must be submitted by February 15, 2019 to: Tony O’Malley, Chair, Professional Awards Committee c/o Larkin Lamp Rynearson 9001 State Line Rd., Ste 200 Kansas City, MO 64114 tony.omalley@lra-inc.com Tel.: 816-823-7282 Fax: 816-361-0045

Call for Papers for the MO-AWWA Dr. Kramer Award

MO-AWWA presents an award in honor of Dr. Warren A. Kramer for a paper that addresses an aspect of the drinking water industry. This award recognizes excellence and professionalism, as well as presentation of useful and timely knowledge regarding drinking water. Examples of subject matter include but are not limited to:
- Treatment plant design, operation, or maintenance
- Utility design
- Testing
- Water quality research
- Development of water resources
- Utility operation
- Economics
- Utility administration
- Utility accounting and billing procedures
The author(s) of the paper must be regular or student MO-AWWA member(s). MO-AWWA is willing to reimburse annual student member dues for up to 25 current students per year that are pursuing water- or water technology-related degrees in Missouri. Papers must conform to Journal AWWA submission guidelines (see www.awwa.org/Portals/0/files/publications/journal/documents/JAWWASubmissionGuidelines.pdf). Dr. Kramer Award guidelines can be found on the MO-AWWA website under the “Awards/Scholarships” tab (www.awwa-mo.org/Dr._Kramer_Award). The winner will receive a plaque and a prize of $500, both of which will be awarded at the 2019 MWEA/MO-AWWA Joint Annual Conference.

Please send a hard copy of your manuscript by mail or email an electronic copy by February 15, 2019 to: Tony O’Malley, Chair, Professional Awards Committee c/o Larkin Lamp Rynearson 9001 State Line Rd., Ste 200 Kansas City, MO 64114 tony.omalley@lra-inc.com Tel.: 816-823-7282 Fax: 816-361-0045

“Award guidelines can be found on the AWWA website (www.awwa.org).”
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NEW MEMBERS

Welcome to our New MO-AWWA Members

Your AWWA membership gives you access to the valuable tools, technical resources, training, and publications that help you sharpen your skills and advance your career in the water sector. Becoming a member means connecting with a whole community of people who are dedicated to the same important goal. If you know someone who would benefit from networking within AWWA or if you would like to become more engaged in the Missouri Section, please contact Jenny Doyle, Membership Engagement Chair, at doylejm@bv.com.

The following is a list of professionals who have recently joined the Missouri Section. Welcome!
• Mike Beatty, Liberty Utilities
• Paul Carson, Liberty Utilities
• Brandon Craig, City of Higginsville Utilities
• Michael Duncan, Central States Water Resources
• Stephen Gooden, Environmental Resources Training Center, Southern Illinois University, Edwardsville
• Chris Kabonic, City Utilities of Springfield
• Liberty Utilities
• Thomas Mullenberg, MIOX Corporation
• Charles Nichols, Jackson County Public Water Supply District No. 1
• John Payne, Innovaprep
• Jim Saller, R.E. Pedrotti Co., Inc.
• Cara Sandbothe, Cole County Public Water District No. 4
• David Swain, Liberty Utilities
• Matt Vander Tuig, Bartlett & West
• Dale Watkins

Submission Guidelines

Show-Me Magazine's mandate is to provide high-quality information to water professionals who make up the Missouri Section AWWA membership. Articles should address issues of interest and concern to water professionals and may focus on technical, educational, organizational, or policy matters. Show-Me will consider all submissions that are educational and informative, whether they are research-based technical articles or personal accounts written from the user's point of view as a water professional. Articles should not contain customer testimonials supplied by a manufacturer. Unless they appear in a paid advertisement, product testimonials will not be considered for publication.
• Articles should be between approximately 700 and 2,000 words in length.

• Articles must be submitted by the deadline in a complete format that includes the text and all images, captions, and credit lines, as applicable.
• All images should be submitted as separate high-resolution (300 dpi) digital files in jpeg or tiff format.
• Authors are encouraged to include a brief bio of approximately 50 words and a headshot. The bio should include the author's current affiliation, background, and any other relevant professional information.
• The Editors reserve the right to edit accepted submissions for content (grammar, sentence structure, etc.) and to exclude any content not deemed relevant (non-industry material or sales-focused articles).
• The Editors may hold all non-time-sensitive content for future issues.

For consideration in the Spring 2019 issue, please submit articles by January 25, 2019 to Gailla Rogers, MO-AWWA Administrative Manager: gailla.rogers@gmail.com.
To reach water professionals through Show-Me Magazine and their targeted readership, contact Jeff to discuss your company's promotional plans.

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