American Water Works Association
Pacific Northwest Section

SPRING 2022

WATER matters

The Official Magazine of the
Pacific Northwest Section – AWWA

WELCOME TO THE PNWS-AWWA'S ANNUAL CONFERENCE

April 27-29, 2022 | Tacoma, Washington

- Highlights for the Drinking Water Community H.R. 3684, the Infrastructure Investment and Jobs Act of 2021
- Pilot Testing: A Powerful Tool to Help Manage Change

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Message from the Chair • PNWS Association Director Report

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The Official Magazine of the
Pacific Northwest Section – AWWA
VOLUME 19, NUMBER 1
SPRING 2022

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FOR MORE INFORMATION PLEASE VISIT:
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Published by
Craig Kelman & Associates

Managing Editor: Megan Funnell
Layout & Design: Dani Goulet
Sales Manager: Kris Fillion
Advertising Coordinator: Stefanie Hagidiakow

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Departments

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PUTTING THE "PRO" IN PROJECT MANAGEMENT

WHAT DOES PROJECT MANAGEMENT MEAN TO YOU?

For some, it's simple scheduling and logistics. For others, it's making sure the budget stays on track. For us, it's deeper than that.

Our project management experts serve as an extension of your team, working alongside you from start to finish. When you collaborate with us, you benefit from access to an expansive portfolio of online and in-person tools and capabilities to track projects, materials, costs and more. Beyond that, you benefit from expertise you can trust, experience you can count on and an unparalleled inventory of products—all from a single, dedicated partner.

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A Note of Gratitude

This will be my final message to you as the Chair of our Section: we are in great hands with our diverse and dedicated Board of Directors. Our leadership is dynamic, with diverse perspectives and a common goal of bringing value to our members, and we have new leaders waiting eagerly to serve. Our mission is to foster a network of professionals and provide opportunities and leadership to the water industry in the Pacific Northwest; we are in great hands.

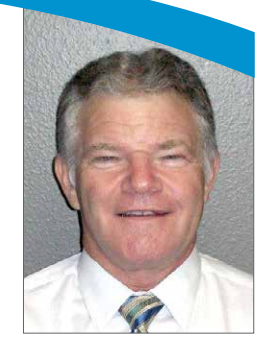
I am grateful for our Board of Directors and their dedication to the Section through a tumultuous time. Because of the global pandemic, we cancelled or repackaged numerous in-person activities into virtual events, including two annual conferences. Thank you to Ronda and James for their leadership and adaptability over the past two years: you guided us through unprecedented difficulties, and I am grateful for your service. The Board continues to be very active (even if we have not been meeting in person) by facilitating quarterly Board meetings and additional workshops to update our by-laws and rules of procedure (ROPs).

The ROP update has been a major focus for this Board; hundreds of hours have gone into updating and formatting this governing document. Each officer has reviewed, edited, commented, collaborated, and discussed what our business practices are and how we can better describe and document our work. We have made a conscious effort to be more transparent and improve its usability. The draft is now available for the membership to review and provide comments for the Board to consider. The goal is to have a comprehensive, collaborative, and resourceful document available for the Board's consideration at our Spring Meeting, taking place at the Annual Conference in April. I invite you to look at the draft and share your thoughts – either during the comment period or Spring Meeting. I am extremely proud and grateful for the work of our esteemed Board of Directors.

I am also grateful for Michelle. The experience of leading this Section is new and unique for each of us – you learn as you go and the folks in front of us are experiencing their role for the first time as well – and Michelle has always been eager and supportive. Michelle's calm and deliberate manner is very reassuring, and she shares great experiences and fantastic ideas. She has always been available for a quick phone call or consult and I feel very blessed to have served with her.

Finally, I cannot fully express my appreciation to our volunteers and members. Thank you for the opportunity and your confidence. It has been challenging, rewarding and a tremendous growth opportunity for me, personally and professionally. Our commitment to leadership development and providing opportunities is a huge benefit to our membership. I would encourage anyone with aspirations of professional growth to consider some of our leadership roles. You will be gaining some great skills around planning, budgeting, volunteer work, public speaking, and reporting. A common refrain I hear from colleagues is that it was their service in the Section that provided them the skills, connections, and confidence to pursue their career advancement. I have heard employers express how impressed they are with the professionalism and professional contacts that our members demonstrate.

Thank you for all the support and great memories.
John Roth
PNWS Section Chair



Three Years of Memories

This is my final article as your PNWS Association Director and Vice President of the AWWA; my term will conclude after the AWWA ACE Conference, taking place from June 12-15 in San Antonio, TX. As you may know, James Dean, who works for the City of Yakima and is very active in our Section, will be your next Association Director. James and I have been very good friends for many years, and I am excited for him to continue his service as our next Association Director. He will be a great ambassador for our Section. In transition, James and I are working together to ensure that he has what he needs to know in relation to the many activities currently in the works by the AWWA; meanwhile, I will be available to support him as needed.

AWWA Update

I am pleased to share the latest updates and relevant information currently with the AWWA. On January 12-14, 2022, the Board of Directors meeting was supposed to be in-person; however, because of the surge of the Omicron varient, AWWA President ChiHo Sham felt it was best to reduce the risks of exposure to the virus and proceeded with a virtual meeting.

David LaFrance, CEO of AWWA, reported that the 2021 financial growth and health expectations had been exceeded. Section engagement of 24,600 event attendees was higher than forecasted. Financially, the 2021 budget revenues were forecasted at $29.8 million but finished the year at $26.5 million. Project expenses were $32.7 million but efforts by the staff reduced expenses to $30.6 million. Operating revenue income came in at about $3.1 million, $1.9 million above the original budget. Bottom line, the 2021 forecasted deficit was projected to be $2.9 million but came in at $1.9 million.

For 2022, the AWWA has expenses at $32.31 million and revenue at $30.76 million projected to finish year end at a ($1.55) deficit. The Association is planning for more in-person events as it prepares for returning to pre-pandemic practices – including six council members Summit Meetings, the officers' visits to Section Conferences, and committee meetings for the members – which means more travel expenses.

Water 2050

Water 2050 is a vision that current President of AWWA ChiHo Sham, incoming President Joe Jacangelo, and David LeFrance share regarding the challenges and issues that the water community will be facing by 2050. The Association plans to establish a long-term vision of water's future (Water 2050), develop a water community-focus on long-term planning, and build

water community thought leadership to influence water's future.

Over the next six months, the plan is to continue building upon the concept with the Board of Directors, engaging with an expert consultant, finalizing the business plan and putting together an advisory team – all to announce and launch Water 2050 at ACE. Over the next two years, the goal will be to create think tanks and identify locations, recruit strategic partners, engage young professionals and create a scholarship program; meanwhile, start looking at new partners from outside of the water sector to be a part of the formation of the vision to help create thought pieces, future projections, and data support by December 2023.

To do all of the above, there are six key drivers:

1) demographics like population shifts, ethnicity, income, economics in relationship to economies of scale and/or circular economy;
2) governance, and regulations on the local, state, and federal impacts to water;
3) social, customer trust, affordability, and equity;
4) sustainability effects from climate change, supply, and ensuring infrastructure to deliver water;
5) technology; and
6) innovation advancements today and in the future.

As we think about key drivers, we wonder which leaders – from utility, service, and technology providers – could help in laying down a foundation and, at the Section level, what academic/developing professional can help contribute to this effort?

What is the end game for the Water 2050 initiative? To provide a long-term vision for water so that the water community can develop a strategy for meeting its challenges; create products that enhance AWWA's thought through leadership brand and influence; retain and extend water community relationships and non-traditional partnerships; expand AWWA's brand, relevance, and sustainability; and strengthen public trust in water services. By 2023, we would like to have clear and presentable goals - of the long-term view of what's possible by 2050 - to share with members.

AWWA Award

I am happy to report that this year's recipient for the *A. P. Black Research Award* is Melinda Friedman with Confluence Engineering Group. Thank you to Alex Mofidi and others who helped a deserving member of our Section receive this prestigious Award.

Elections

During the Board meeting, elections were held for the following positions: 2023-24 President-Elect, Patrick Kerr from the Southwest Section and recent chair of the WUC; one Director-at-Large position, Mary Gugliuzza; and four Vice President positions, which will be Ari Copeland, Randy Moore, Juanita Reyher, and Michelle Stockness.

ACE 2022 Conference

ACE will take place on June 12-15 in San Antonio, TX, and as a hybrid conference. The Association wants to make members as comfortable as possible in attending and are ensuring arrangements will be in place. Meeting rooms will have additional space between chairs, mask wearing will be required, signs and messaging will include reminders, and hand sanitizer will be available. The opening general session will feature Dr. Thomas Zurbuchen, NASA's Associate Administrator for the Science Mission Directorate. Dr. Zurbuchen works to ensure that NASA's science missions build partnerships across disciplines to generate new questions and help advance the frontiers of knowledge and explorations. The ACE opening general session will extend this to the water sector in an engaging conversation with AWWA CEO David LeFrance. I hope that you will consider attending the conference in person so you can catch up with old friends and acquaintances.

Thank you

Reflecting on my three years, serving as your Association Director, and this last year becoming a Vice President for the AWWA, this has been one of the most rewarding opportunities in my career. My first year started off as I expected after Kari Duncan mentored me in the roles, duties, and ways the Association does business before flying solo. I started to settle in, get comfortable in my role as an Association Director, then COVID-19 came and completely changed the way the Association and water community conducted business. But our strong organization faced the drastic changes by adapting, overcoming to the conditions, and meeting the needs of its members, resulting in many memorable and positive experiences over the last two years.

I am very grateful for the opportunity that PNWS members gave me in representing our Section at the national level. My involvement in AWWA, both at the Section level and nationally, has helped me become a better leader and water professional because of the experiences and opportunities given to me. Thank you to the Lakewood Water District Board of Commissioners for their support in my role, representing our Section and as Vice President for AWWA. Also, thank you to the staff at Lakewood Water District for doing such an excellent job handling the extra duties when I was away from the office. I look forward to volunteering and helping the Section continue its stellar reputation within the AWWA.

Randy Black
PNWS Association Director and
Vice President of the AWWA

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Member Engagement and Development Committee (MEDC) and 2020 Vision Subcommittee

MEDC Purpose: To support the Pacific Northwest Section of AWWA (PNWS) in the engagement, retention, and growth of membership.
2020 Vision: To align with AWWA's strategic initiative for a sustainable future by bridging young talent with the water industry.

Spring is Almost Here

As the weather warms and the days get longer, the MEDC is working hard to prepare for the upcoming Section Conference in May. In preparation for the Conference, be on the lookout for information for upcoming MEDC events:

- **PNWS Mentorship Program:** The Program will kick-off at the Conference with the opportunity to sign up and get paired with a mentor/protégé.
- **First Timer's Meet and Greet:** If you are a first-time attendee (or would just like the opportunity to network), please join us at the Conference First Timer's Meet and Greet on Thursday, April 28 at 7:00 a.m.
- **Mentorship Booth:** Please come visit us at the Conference! We will have a booth near the registration desk and look forward to seeing our friends and industry colleagues!

Promote the Value of Membership

Whether you are a new or longtime member, the MEDC is here for you. We want to be your resource to:

- Connect new members with resources, events, and opportunities.
- Provide membership lists to Subsection leaders. If you are a Subsection leader and need help connecting with your members, we're here for you.
- Create connections through the **PNWS Mentorship Program**.
- Support student involvement in partnership with the YP Committee.

For membership support, please contact MEDC Chair Chris Young (*chris.young@murraysmith.us*) or visit us at *www.pnws-awwa.org/member-groups/committees/membership-committee*.

SCAN ME

Diversity & Inclusion (D&I) Committee Updates

The D&I Committee aims to foster a welcoming and inclusive AWWA culture that champions meaningful institutional and individual change regarding diversity and equity in the water industry. The Committee is looking forward to the Conference this May, with several presentations focused on topics related to diversity, equity, and inclusion in the water industry, as well as presenting the Section's inaugural Diversity and Inclusion Award.

The Committee is looking to spotlight members – to share members' stories and the impact AWWA has had on their career – in the D&I Water Matters updates. To nominate yourself or others, please contact D&I Chair Esther Chang at *esther.chang@jacobs.com*.

Interested in getting involved? The D&I Committee meets every first Wednesday of the month and welcomes new members to the table.

Member Spotlight:
Kent Downs, Oregon Health Authority

Interview write-up by Jay Macpherson, Oregon Health Authority

Kent Downs joined Oregon Health Authority Drinking Water Services (DWS) in early 2021, transitioning from a role with Curry County, and filling a need in DWS Technical Services group. Kent has proven a diligent and effective asset to DWS. Kent's first experience in the water industry dates back to 2011, when he worked as an environmental health specialist contracted by the public health department of the island of San Andres, Colombia. One of his jobs was to educate homeowners on the importance of safe drinking water and evaluate the installation of rainwater collection and storage systems for 300 rural homes. For the next several years he continued working as an environmental health specialist in a variety of projects related to sanitation, solid waste management, and other public health related issues. In 2017, Kent's family moved to a small rural community in Oregon, where he had the opportunity to work for the county public health department, providing regulatory and technical assistance to small public water systems using groundwater sources. A key career milestone Kent accomplished is his certification as a Registered Environmental Health Specialist (REHS). That opened the door to working with DWS, with whom he had worked as a partner while with Curry County. Kent expresses his gratitude for this opportunity to become more knowledgeable in this field and better serve the community, "So far, I have found my experience working as a drinking water specialist to be very gratifying. It has allowed me to combine technical skills, public health competencies and serve my local community. It can be complex, but never boring."

Vessel and her handler, Tim Preator, review the Recover leak maps before beginning their search.

Canines and Satellite Team Up to Find Leaking Water in Central Arkansas

BY PAUL GAGLIARDO, Gagliacqua

Rescue dogs are in the spotlight these days with Major, a German Shepherd rescue dog, the first dog from an animal shelter to reside in the White House. Another rescue dog named Vessel, in a shelter in Arkansas, was discovered to have the necessary skills to be trained as a Special Service Dog. At the same time, the CEO of Central Arkansas Water (CAW) attended a water seminar in Oxford, England, and learned about a UK water utility using dogs to sniff out leaks from the potable water system. A CAW employee put him in touch with a local shelter trainer, and Vessel was selected as a Leak Detector Trainee and sent to training at ***On the Nose*** Leak Detection School outside Little Rock. Vessel is now a full-time member of the CAW leak detection team!

CAW uses ASTERRA's Utilis technology to pre-locate leaks in the water distribution system with the Recover product. Recover utilizes specialized radar signals from satellites to illuminate the area of interest and collect the resulting reflected signals. These signals are analyzed and processed to identify specific indicators of wet soil saturated with potable water. The result is a map showing Likely Leak Locations (LLLs) or Points of Interest (POIs). These results typically encompass 5% of the entire system length. Only those locations where a leak is expected to be found are inspected. This is where Vessel comes in.

CAW started to inspect LLLs identified with Recover leak detection in December 2017. The results are consistent with other Recover projects and much better than traditional boots-on-the-ground (TBOTG) methods, as shown in the table below. Recover's performance at CAW is a nine-times improvement over TBOTG in the number of leaks found per mile inspected and three times better on the leaks-per-day metric.

Dogs possess a sense of smell many times more sensitive than even the most advanced man-made instrument. The leak detection team, Vessel and her handler, Tim Preator, are sent out to areas identified by Recover to search for leaks. Vessel is put to work using the command "Find Leak," making a broad sweep of the LLL, and then she pinpoints the leak. She shows a passive alert, lying down and barking when she finds a leak. She is rewarded for her efforts with tennis ball play.

ASTERRA
Technology by Utilis

LEAK DETECTION PERFORMANCE AT CENTRAL ARKANSAS WATER

	LEAKS PER MILE	LEAKS PER DAY
Recover North American Average	2.8	3.6
TBOTG North American Average	0.3	1.2
CAW Results with Recover	2.8	3.3

Vessel has been working in the field since October 2019, and she is more than 90% accurate in detecting leaks. The CAW staff performs conventional acoustic correlation using pinpointing tools to more precisely locate the leak so that crews can dig and repair the pipe. This reduces the number of leaks found per day in the field as Vessel's indications are confirmed with human validation. But as confidence in the efficacy of Vessel's pinpointing ability and the ability of the handler to accurately read her body language continues to grow, the number of leaks pinpointed per day will rise, and overall efficiency will improve. In one case, Vessel found a non-surfacing leak that was between a six-inch valve and the tapping saddle off of a 12-inch cast-iron main under a concrete parking lot. The lot is built over a gravel base, allowing the water to flow directly into a storm drain. This leak alone was costing CAW 2.3 MGD.

Leak detection has evolved from old school divining rods and listening sticks to space-age satellites and now back to basics, using the innate capabilities found in nature. Check out ASTERRA at *https://asterra.io* or email *inquiry@asterra.io* to bring Recover leak detection and analysis to your community.

Engineering Committee

Reservoir and ASR Tour

Mark your calendars and join us for a tour of the City of Beaverton's Cooper Mountain Reservoir project on April 6, 2022. The tour will likely include the concrete reservoir, an aquifer storage and recovery (ASR) well facility, and a great view! Sign up for the Engineering Committee email list and look for an upcoming email with the event details.

Section Conference and In-person Committee Meeting

The Engineering Committee is looking forward to the 2022 Tacoma Conference and has some great technical tracks planned! We're especially excited about our pre-conference session developed in partnership with the Distribution Committee, covering resilience lessons from the recent ice storms and wildfires. Other sessions cover new technology and fundamentals across a range of water system areas and project delivery methods.

During the Conference, we will hold an in-person Committee social/meeting that will include officer elections. This will follow the Utilities Operations Division meeting, scheduled from 5-6 p.m. in Room 316 (join us there, too). We will meet at 6 p.m., then head out for drinks and food at a location TBD. As the time approaches, see our website for details or reach out to our Chair for more information.

Committee Meetings Schedule

If you have an idea for engineering-related learning or industry collaboration, please contact one of the officers or join our next meeting to discuss the idea and hear about others in process. We are meeting the second Wednesday of each month from noon – 1 p.m. via Teams.

If you have any questions, please contact Chair Joelle Bennett at joelle.*bennett@tvwd.org.*

> Mark your calendars and join us for a tour of the City of Beaverton's Cooper Mountain Reservoir project on April 6, 2022.

The Future is Bright

By Mel Damewood

Predicting the future is always a risky business. Some make a profession of it, and one is considered successful if they get one out of ten predictions correct. Even professional baseball players need to have a higher batting percentage than that to be considered successful. My prediction for the water and wastewater industry is that the future horizon is looking bright. After two years of dealing with a pandemic, there is a light at the end of the tunnel. I don't know if COVID will ever go away, but it seems that we are learning to live with it, and our day-to-day business and interactions are becoming more natural and at ease. I think that virtual meetings will be part of our normal day-to-day routines instead of travelling across town; however, hope that face-to-face meetings and conferences will be an integral part of our new normal, too. I miss the personal contact and have great hope that the Spring Conference in April will be in person!

Another reason why I think the future is bright is because I am seeing an uptick in big infrastructure projects that are addressing legacy issues in aging infrastructure

> Although your efforts may not seem significant in the moment, I guarantee that at the end of your career, you will not regret the effort spent and the relationships built because of those efforts.

and resiliency. This shows that our operators, engineers, managers and elected officials are finally taking these issues seriously enough to fund and for our communities. One of the biggest surprises that has come full circle for many utilities is the various funding mechanisms that are now available in the industry via state and federal programs.

The Water Infrastructure Finance and Innovation Act (WIFIA) has been available since 2014, but after several years of figuring out the processes, 72 loans have closed and $13.3 billion total financing has been allocated since 2018. This is not chump change. This did not come about on a whim: this was an initiative that the AWWA Water Utility Council (WUC) pressed hard on over a decade ago. I personally participated in the AWWA Fly-In and talked with Senator Merkley (D-OR), who ended up being a champion for WIFIA in helping it get passed into law. Although my participation was minor, it feels good to look back and think that I was among many people who played a small role in making something big. I know of many communities in the Pacific Northwest who have received WIFIA Funding, and I am happy that they have that funding available to them.

I also think our future is bright is due to the young professionals that I see learning our industry trade. Since retiring from EWEB and working on the consultant side of the industry, I have had the opportunity to work with numerous professionals just starting their careers. They are energetic and very smart. I am amazed at how skilled they are at using the modern tools that are available to help make everyone's job a little easier. I have also had the opportunity to meet several operations professionals, who are starting out in their career or moving into lead roles within their organization and are eagerly learning the trades of our industry. From where I stand, it seems that the silver tsunami is being mitigated by some very bright millennials – the first of that generation are now turning 40 – and the Gen Z'ers are now knocking on the door.

I bring up these thoughts to encourage our young professionals to get involved with the AWWA as soon as you can. Looking back on my career, there was nothing earth shattering or monumental in one event; however, many of us *Gray Matters* authors can look back at our careers and see all the small things we participated in that have a profound impact on our industry today. To those who put in a lot of volunteer time today, thank you! Although your efforts may not seem significant in the moment, I guarantee that at the end of your career, you will not regret the effort spent and the relationships built because of those efforts. AWWA, especially the PNWS, is a special place to participate and get to network with like-minded and career-oriented people: all you have to do is ask.

I hope that everyone stays safe and healthy and has a great conference in Tacoma!

Mel Damewood retired from Eugene Water & Electric Board, in 2019, after 31 years working with the company. Mel works for West Yost in Eugene as a Principal Engineer and Project Manager.

AWWA Water Equation

Donor Impact

American Water Works Association

$350k

Raised in 2021

Scholarships

30

30 water & wastewater operator scholarships awarded in partnership with AWWA Sections & WRT

73%

Dr. Philip C. Singer Scholarship endowment fund is 73% funded

$200k

20 corporate-sponsored and 4 AWWA academic scholarships awarded totaling nearly $200,000

Student & YP Leadership

Virtual YP Leader Training Day and YP Summit

- 21 FREE registrations to YP Summit
- Swag box for all attendees of both events

WE Build! Water Tower Competition provided 2022 YP Registrations to 11 Winners!

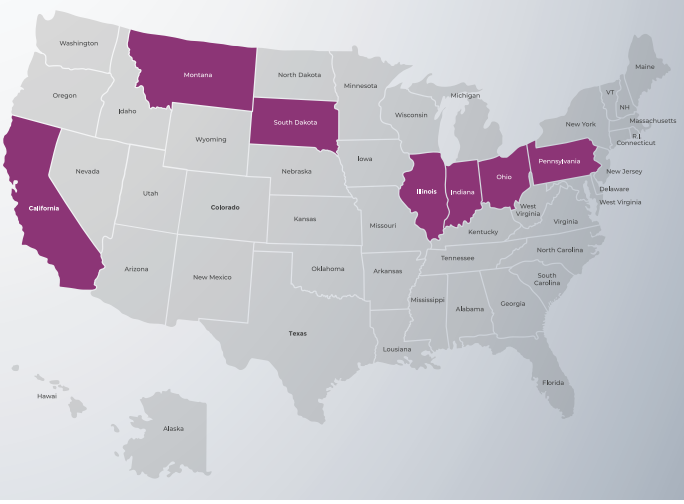
Funded seven Youth STEAM (science, technology, engineering, arts, math) programs:

- New Jersey Sea Grant, NJ
- Girl Scouts STEM conference, NJ
- Girls of Promise, AR
- Women's Foundation of Arkansas, AR
- 2022 Water Festival, Pinellas County Utility, FL
- Seminole County High School Academy, FL
- Loggerhead Marine Life Center, FL

Community Engineering Corps

34 Active Water & Sanitation Projects in the USA

- **$330,000** in volunteer labor
- **4300** Individuals assisted in 8 completed projects
  - Hopkins Park Sanitation, IL
  - St Clairsville Water, PA
  - Troy Township Water, IN
  - Stevensville Water, MT
  - Morristown Water, SD
  - Colonia Lake Morena, CA
  - Cherry Ridge Water, OH
  - Cazadero Water, CA



Welcome to the PNWS-AWWA's Annual Conference

April 27-29, 2022 | Tacoma, Washington

Tacoma is your "City of Destiny" for this year's Conference! Tacoma, abounding with creativity and city sophistication, welcomes you to take in its rich history, culture, and stunning views during this year's conference. You will easily find a restaurant to suit your needs downtown or on the two-mile paved waterfront. It's simple to get around the city with the free Link Light Rail which runs every 12 minutes. Check out *www.traveltacoma.com* for helpful information on Tacoma.

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RH2 successfully brings increased reliability, resiliency, and flexibility to our clients' water systems.

Project Highlight

Reservoir No. 3 Landslide Remediation and Seismic Upgrades

Rivergrove Water District

Whether maintaining existing or developing new infrastructure, RH2 is able and ready.

The 2021 Reservoir No. 3 Landslide Remediation and Seismic Upgrades project answered many of the reliability and maintenance questions for the District's largest zone. Built in 1977, the tank site experienced a landslide shortly after construction was complete, severely limiting access to the reservoir. The lack of critical infrastructure to efficiently take this tank offline hindered the District's ability to perform regular operations and maintenance safely and effectively, including crucial repairs needed to ensure that the reservoir could remain in service during and after an earthquake.

RH2 addressed these challenges through a carefully orchestrated series of improvements, including: top-down soil nail slope stabilization to protect against future landslides; pump station and pipeline improvements to increase redundancy and resilience; intertie and PRV improvements to improve reliability; and reservoir foundation and mechanical improvements to improve seismic performance. These improvements also provided the District with increased operational flexibility, ensuring the District can continue to provide its customers with safe, reliable drinking water.

Schedule Highlights
We have a packed schedule with lots of opportunities for you to collect education credits, network with others, celebrate and recognize accomplishments and share in fun activities!

Pre-conference Sessions
Attend a full-day session on Wednesday to receive in-depth information on cybersecurity or supply resilience.

Technical Sessions
The Conference schedule provides technical sessions on multiple disciplines and fields of interest. Begin early on Thursday with distribution, engineering, or customer service then continue your day with your choice of 80 different sessions covering eight different disciplines. Start again early on Friday with distribution or engineering and continue through the day with your choice of 56 sessions covering eight different disciplines.

Vendors
Visit vendors on Wednesday evening, during the Opening Night Vendor Hall reception, and all day Thursday.

Special Events
Numerous special events are taking place during the conference that you won't want to miss!

First-time Attendees' Breakfast
Join first-time attendees for breakfast on Thursday morning to share your plan – and excitement – for the Conference.

PNWS Awards Lunch Banquet
Join our celebration during lunch on Friday as we present awards to our Section's most worthy volunteers.

Section Board of Trustee Meeting
Hear from our AWWA Conference Visiting Officer, Angela Ballard-Landers, as she shares an AWWA national update. Witness the passing of the gavel from Section Chair John Roth to Incoming Chair Michelle Cheek. And join in other award presentations and recognition during this meeting Friday afternoon.

Closing Conference and Incoming Chair Reception
The conference concludes Friday evening with a banquet reception, toast to our new Section Chair Michelle Cheek, and collection of silent auction purchases.

Venue and Accommodations

Photo courtesy of City of Tacoma.

This year's Conference is held in the spacious Greater Tacoma Convention Center in Downtown Tacoma at 1500 Commerce Street. We are thrilled to provide the new Marriott Tacoma Downtown as our headquarter hotel which is connected to the Convention Center on the ballroom level. This beautiful four-star hotel has stylish décor and breathtaking views of the Tacoma Waterfront and Mount Rainier. As a reminder, in accordance with Washington state protocols, mask-wearing will be required at both facilities during the Conference.

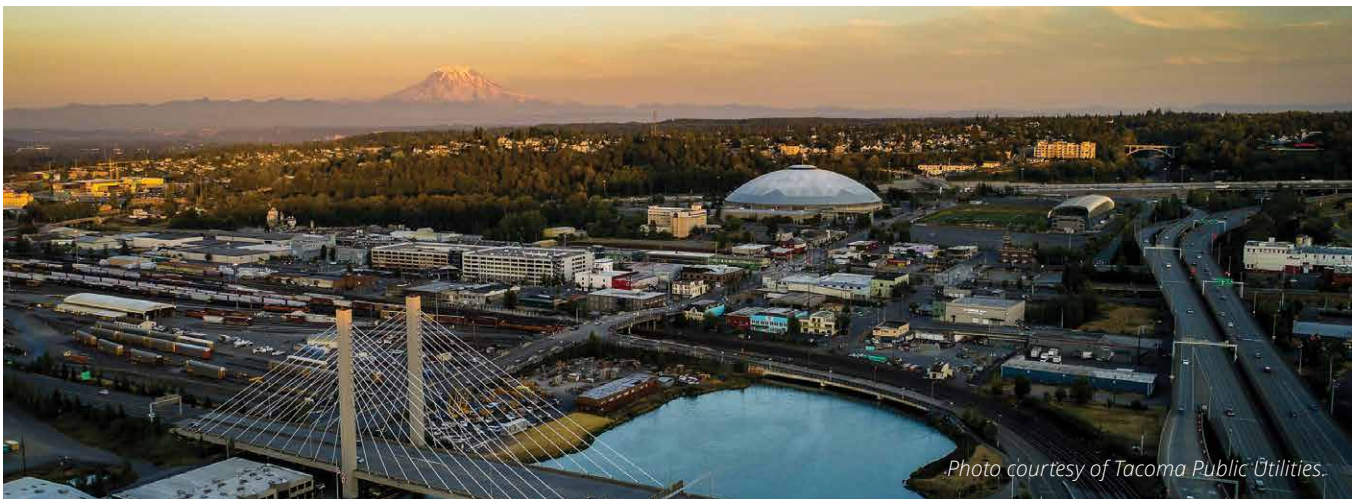
Photo courtesy of Tacoma Public Utilities.

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Activities

Golf

Kick off your 2022 Conference experience with a round of golf at North Shore Golf Course on Wednesday, April 27. North Shore is a challenging and well-kept public golf course celebrating more than 55 years in historic northeast Tacoma. The fun begins at 8 a.m. Breakfast and lunch are included.

Best Tasting Water

Each year winners of the PNWS Subsection taste tests compete at the Section Conference for a chance to enter the Best Tasting Water Contest at AWWA's Annual Conference and Exposition. Don't miss this exciting contest on Wednesday!

Trivia Night

Test your Top Ops knowledge during our trivia contest on Wednesday evening during the Vendor Reception.

Silent Auction

The Silent Auction is your opportunity to give back as all proceeds benefit PNWS-AWWA's philanthropic efforts, Water For People, The Water Equation, and the Education & Training Fund. Submit your bid anytime throughout the conference with your final winning bid on Friday afternoon.

Young Professional Scavenger Hunt

Take part in a fun-filled scavenger hunt on Thursday night beginning in the Marriott Tacoma Downtown hotel lobby.

We are very excited to see everyone again after two years of not having a conference. **Be sure to take advantage of the early bird savings by registering before March 31. Conference rates increase April 1.** See you in Tacoma!

For more information, please contact KayLyne Newell at *knewell2@cityoftacoma.org* or 253-722-9548.

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2022 Women in Leadership Symposium an In-Person

CALL TO ADVOCACY

"Thank you for inviting us to the 2022 Women In Leadership Symposium. I enjoyed everything and came out with a different look into my life path. Everyone speaking about infrastructure building, rebuilding, etc. has opened my eyes as to how much most of us take for granted."

Lorrie Rogers, Cross Valley Water District

The 9th Annual PNWS-AWWA Women in Leadership Symposium was held at the Education & Community Center at Brightwater on February 9, 2022. Due to COVID uncertainties the event was scaled back to a half-day program featuring four speakers and break-out sessions for networking. The theme "*Achieving a _____ Future*" was addressed in presentations by State Senator **Lisa Wellman**; **Lesley Martinez**, P.E., (Tetra Tech); **Ann Hajnosz,** P.E. (Harris & Associates); and **Lisa Brown**, Director of the State Department of Commerce. Topics included career stories and lessons learned, supporting the next generation of STEM professionals, being an advocate for infrastructure, especially for disadvantaged communities, and how leading on equity is crucial to our economic future. Nearly 70 women participated in the symposium.

There was also a nature walk led by Brightwater staff around the beautiful grounds of the Brightwater WWTP. Many thanks to the Planning Committee – **Kelly Boswell**, **Ann Hajnosz**, **Kelsey Hu**, **Katy Isaksen**, **Lara Kammereck, Darcie McAlister**, **Lish Moreau**, **Diane Pottinger**, **Jennifer Rice**, **Grizelda Sarris**, **Erika Schuyler** and **Robyn Wilmouth**. We look forward to seeing you at our 10th Anniversary event in 2023!

FROM

American Water Works Association

HIGHLIGHTS FOR THE DRINKING WATER COMMUNITY

H.R. 3684, the Infrastructure Investment and Jobs Act of 2021

With enactment of H.R. 3684, the *Infrastructure Investment and Jobs Act*, in early November, the nation should begin to see a kick-start in rehabilitating and updating its water infrastructure. This Act reauthorizes a number of existing drinking water programs, appropriates expanded funding for water infrastructure and other programs, and commits $15 billion for lead service line replacement.

Now comes the challenge of implementing the programs in the bill. Staff at the U.S. Environmental Protection Agency (EPA) will have to develop guidance and policies for dispersing the funds, and since a lot of the funds are then to be distributed via each state's revolving loan fund (SRF) program, those agencies will have to accept and process applications. In other words, money will not immediately be flowing from Washington; however, EPA water staff informed AWWA staff that ever since the Senate passed this bill, they have been preparing to administer programs within H.R. 3684.

Here are some highlights of the legislation:

Drinking Water Authorizations

(Note that authorization is an initial step; the actual release of funds requires appropriations legislation, which is also in this bill, listed after this section):

- $75 million for technical assistance and grants for emergencies affecting public water systems, including natural hazards and cybersecurity.
- $14.65 billion for the drinking water state revolving fund (SRF) program for fiscal years 2022-2026.
- $510 million in assistance for small and disadvantaged communities.
- $500 million for reducing lead in drinking water by removing lead service lines and other relevant activities, with an emphasis on assisting disadvantaged communities.
- $250 million to improve operational sustainability of small water systems.
- $250 million for the mid-size and large drinking water system resilience and sustainability program.
- A needs assessment for a nationwide low-income water bill assistance program.
- 40 pilot projects to provide financial assistance to low-income water customers.
- $200 million for lead testing and remediation in schools.
- $5 million for water workforce efforts; applies to drinking water and wastewater.
- $50 million for a study assessing emerging technologies that could address cybersecurity and water monitoring issues and a grant program to deploy technologies.

Drinking Water Appropriations

- $50 million annually for the Water Infrastructure Finance and Innovation Act programs for FY2022-2026.
- $11.713 billion for the drinking water SRF; 49% to be in the form of grants or loans with principal forgiveness; only 10% state match required in FY2022 and FY2023 (the wastewater SRF program got an equal amount).
- $15 billion for lead service line replacement, with 49% to be in the form of grants or loans with principal forgiveness; no state match required; $3 billion annually for FY2022-20226.
- $4 billion to be channeled through the drinking water SRF for emerging contaminants, all in the form of grants or principal forgiveness.
- $5 billion to deal with emerging contaminants in economically distressed communities.
- $1.126 billion annually in additional funding for the drinking water SRF through FY2026.
- $1.6 billion annually in additional funding for the wastewater SRF through FY2026.

Related Appropriations

- $50 million for Underground Injection Control grants to support state efforts.
- $1.5 billion for Brownfields activities under the Comprehensive Environmental Response, Compensation and Liability Act.

Cybersecurity

- EPA and the U.S. Cybersecurity and Infrastructure Security Agency (CISA) are to identify public water systems, that if degraded or rendered inoperable, would lead to significant impacts on the public's health and safety.
- EPA and CISA are to develop a technical cybersecurity plan support plan for public water systems.
- The two agencies are to submit to Congress a list of public water systems needing technical support.

Buy America, Build America

- Extends "Buy American" requirements to include not only steel and iron products, but "manufactured products" and "construction materials" as well.
- "Produced" in the U.S. means a product was manufactured in the U.S. and the cost of its components that are mined, produced, or manufactured in the U.S. is greater than 55% of the total cost of the manufactured product.
- Waivers may be granted if the iron, steel or manufactured product are not produced in the U.S. in sufficient and reasonably available quantities or of "satisfactory" quality.

Wastewater Authorizations

- $14.65 billion for the wastewater SRF program; FY 2022-2026.
- $1.4 billion for grants through FY 2026 to municipal entities to control and treat sewer overflows and stormwater and to provide public notification systems for such overflows.
- $250 million through FY 2026 for grants to private and non-profit organizations to provide assistance to low-to-moderate income individuals for the construction, repair or replacement of an individual household decentralized wastewater treatment system or for the installation of a larger decentralized wastewater system designed to provide treatment for two or more households.

- $200 million through FY 2026 for a grant program to help low-to-moderate-income individuals connect to a publicly owned treatment works.
- $125 million through FY 2026 to establish a clean water infrastructure resiliency and sustainability program to address natural hazard or cybersecurity vulnerabilities.
- $125 million through FY 2026 to continue a pilot program to help municipal, industrial or agricultural interests find alternative sources of water in areas experiencing critical water supply needs.
- $100 million through FY 2026 to establish a pilot wastewater efficiency grant program for owners or operators of publicly owned treatment works to carry out projects that create or improve waste-to-energy systems.
- $75 million through FY 2026 for a competitive grant program to establish systems that improve the sharing of information concerning water quality, water infrastructure needs, and water technology, including cybersecurity technology, between states or among counties and other units of local government within a state.
- $50 million through FY 2026 for a circuit rider program to provide assistance to owners and operators of small and medium-sized publicly owned treatment works.
- EPA must establish a Water Reuse Interagency Workgroup to develop and coordinate actions, tools, and resources to advance water reuse across the U.S., including through the implementation of the February 2020 National Water Reuse Action Plan.
- EPA is to establish three to five Centers of Excellence for Stormwater Control Infrastructure Technologies.
- Subject to the availability of funds, EPA would conduct a study of existing and potential future technology, including technology that could address cybersecurity vulnerabilities, that enhances or could enhance the treatment, monitoring, affordability, efficiency, and safety of wastewater services provided by a treatment works.
- $25 million through FY 2026 for research on enhanced aquifer use and recharge in support of sole-source aquifers.
- $5 million for an assessment of capital improvement needs for watersheds.

Wastewater Appropriations

- $11.713 billion through FY 2026 for the *Clean Water Act* state revolving loan fund program.
- $1 billion through the Clean Water SRF program to address emerging contaminants.
- Other Authorizations.
- $118 million for the U.S. Department of Agriculture to conduct watershed rehabilitation.
- $300 million for USDA to repair damages to waterways and watersheds due to natural disasters.

Questions can be directed to Tommy Holmes, *tholmes@awwa.org*, or Nate Norris, *nnorris@awwa.org*, at AWWA's Government Affairs Office.

BE PROACTIVE ABOUT CYBERSECURITY –

You Will Sleep Better at Night

By Patti Kay Wisniewski, Drinking Water Security/ Preparedness/Resilience Coordinator, USEPA Region 3

Many things will keep water suppliers up at night – supply chain issues, COVID illnesses of staff, family and friends, approaching severe weather, and cybersecurity breaches. There are numerous resources to assist water suppliers with unraveling the complicated web of how someone can attack the IT of a water system. But the key is to begin to take steps now to protect our infrastructure and to continue to provide safe drinking water.

WHY: Water systems have been attacked and this will very likely happen again. It is important to minimize impacts in the event of a successful attack. Impacts to a utility may include, but are not limited to: interruption of treatment, distribution or conveyance processes from opening and closing valves, overriding alarms or disabling pumps or other equipment; theft of customers' personal data such as credit card information or Social Security numbers stored in online billing systems; loss of use of industrial control systems (e.g., SCADA system) for remote monitoring of automated treatment and distribution processes, encrypted data files and more. Any of these can erode public confidence in water supply safety.

WHAT: According to IBM, cybersecurity is the practice of protecting critical systems and sensitive information from digital attacks. Also known as information technology (IT) security, cybersecurity measures are designed to combat threats against networked systems and applications, whether those threats originate from inside or outside of an organization. In 2020, the average cost of a data breach was $3.86 million globally, and $8.64 million in the United States.

WHO: All water utilities need to understand the problem and be proactive in addressing it. State primacy agencies need to address the status of cybersecurity programs during site visits such as sanitary surveys and share resources for improvements with water suppliers. EPA will develop guidance and conduct training for sanitary survey inspectors and water suppliers. It is anticipated that the Department of Homeland Security (DHS) will issue cybersecurity performance goals for critical infrastructure control systems.

WHEN: *NOW!* Don't be overwhelmed by the myriad of ways you could be attacked or the tremendous amount of resources that exist to assist you. "Just do it," as Nike says. Think of spring as the time to spring into action to protect your IT system.

If you have completed your risk and resilience assessment (RRA) and have updated your emergency response plan (ERP) as required under the America's Water Infrastructure Act, but failed to include addressing cybersecurity events, do this now. The RRA should cover electronic, computer, or other automated systems and the security of such systems. An ERP should include strategies and resources to improve the resilience of the system, including physical security and cybersecurity of the water system. In addition, the ERP should include plans to address malevolent acts, which is what a cyber-attack is considered.

HOW: Here are some ideas to get you started, but this is not an exhaustive list.

- Follow the recommendations in EPA's Cyber Incident Action Checklist to prepare, respond, and recover from an attack. *www.epa.gov/sites/default/files/2017-11/documents/171013-incidentactionchecklist-cybersecurity_form_508c.pdf*
- Develop a cybersecurity culture by training staff and establishing and enforcing policies.
- Be suspicious of emails. Curb your curiosity to open all emails and click on links. Don't trust anyone unless you know them and yet, you still need to be cautious and leery of anything that does not look or feel right.
- Require changing of passwords every 90 days and do not allow sharing of passwords.

- Use multi-factor authentication: what you have and what you know (similar to how most banks require you to log in to your account by sending you a text with a code to your cell phone or email).
- Revoke/inactivate credentials of former employees.
- Keep software up to date and install patches when available.
- Limit remote access and allow only for those with a verified operational need.
- Practice shifting to manual operations to be more familiar if or when the need arises.
- Back up data and store offline, allowing for easier restoration if data is lost, stolen, or encrypted.
- Keep servers in a secure room, lock the door, and limit access.
- Keep billing IT separate from SCADA IT.
- Consider cybersecurity when undertaking other projects so it isn't an add-on or an afterthought.
- Sign up for a FREE, confidential, cybersecurity assessment and technical assistance offered by EPA's contractors at *https://horsleywitten.com/cybersecurityutilities/*.

WHERE: Numerous resources exist and advisories are shared by CISA, EPA, AWWA, and WaterISAC to name a few. Many are free and without membership subscriptions. Sign up for these and stay on top of updating software.

EPA: *www.epa.gov/waterriskassessment/epa-cybersecurity-best-practices-water-sector*

CISA Advisories: *https://www.cisa.gov/uscert/ncas/alerts;* subscribe at the link at the bottom of their page

WaterISAC: *www.waterisac.org/fundamentals*

AWWA: *www.awwa.org/Resources-Tools/Resource-Topics/Risk-Resilience/Cybersecurity-Guidance*

WHO (again): Consider reporting events to the WaterISAC which compiles water sector incident information to share with the sector. This assists other water suppliers with knowing what events are occurring across the sector. Information shared is done anonymously. *www.waterisac.org/report-incident*

Capture response assistance contacts, such as the Critical Infrastructure Security Agency (CISA) per Cyber Incident Reporting: A Unified Message for Reporting to the Federal Government (*www.dhs.gov/publication/cyber-incident-reporting-unified-message-reporting-federal-government*) which explains when, what, and how to report a cyber incident to the federal government. Key contact information is:

Cybersecurity and Infrastructure Security Agency (CISA)
www.cisa.gov
To report incidents, phishing, malware, or vulnerabilities:
Online forms: *www.cisa.gov/uscert/report*
Email CISA Service Desk: *cisaservicedesk@cisa.dhs.gov*
Phone: 888-282-0870

Federal Bureau of Investigation (FBI)
www.fbi.gov

Finally, remember to capture your planned response and recovery actions in emergency response plans and Continuity of Operation Plans and exercise these plans at least annually. If an event has occurred be sure to conduct an after-action review, capture ideas for improvements in your plans and provide additional staff training.

Taking steps now to further protect your water system will help you sleep at night. At least until the next storm is heading your way.

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Risk Management and Insurance Considerations for Major Capital Projects

By Brian D. Child, CLCS, CIC; IMS-AWWA Safety & Security Committee Vice Chair; Account Executive, Olympus Insurance

Large capital projects involve years of planning by engineers, architects, and project managers, among others, to construct critical infrastructure as part of our systems. Within the planning process, it important to evaluate the risk management and insurance implications that these projects can have on our organizations.

Large construction projects present risks in several areas, many of which may not be apparent at the outset of a project:

- Damage to property adjacent to the project site from the vibration of construction equipment.
- Damage to third party utilities and infrastructure adjacent to construction site (e.g. sanitary sewer, storm water, natural gas, electric, petroleum, telecommunications).
- Improper road signage, resulting in vehicle accidents.
- Improper pedestrian signage (e.g., closed sidewalk routes), resulting in injuries to pedestrians without a safe walking route.
- Environmental impairment from damage to third party utilities or the unintended release of pollutants from the project site.

While contractors perform most, if not all of the work on large projects, project owners are often named in claims and involved in subsequent litigation when incidents occur. Shielding your organization from third-party claims is key, and most effective when we have comprehensive insurance and risk management requirements embedded in our contracts. Two key issues to consider when preparing contract insurance requirements:

COVERAGE ANALYSIS

Are we requiring the appropriate types of liability insurance policies from the contractor? Some liability policies are often overlooked – automobile liability for the use vehicles, environmental liability, if the project could impact our drinking water utility or a neighboring utility, or professional liability for engineering, design and other technical experts we contract with.

LIABILITY LIMITS

Basic liability limits are often the default when contracts are prepared. The liability limits we require should be established commensurate with the risks of the project. Some of our greatest risks may arise from very small elements of the project, or from activities that seem innocuous. Many of the largest third-party liability claims in this area have involved demolition contractors, excavation contractors and even contracted street sweepers. One incident involving a contracted street sweeper resulted in a catastrophic accident with three fatalities and total claim costs of over $10 million.

ADDITIONAL INSURED STATUS

Many of us are aware that, as the owner of a large project, our organization should be listed as an 'Additional Insured.' Additional Insured endorsements extend our contractors insurance policies to protect us as project owners, if we are named in claims arising from their work. What we may not realize is that there are several nuances to additional insured status that we need to be aware of.

There are dozens of additional Insured endorsements and, unfortunately, there is not a single endorsement that adequately protects a project owner against all claims. To remedy this situation, we should request that we are listed as an additional insured for both ongoing and completed operations. Also, most of the additional insured endorsements now state that as the additional insured, you are only entitled to access the liability limits that you required, not the liability insurance limits that a contractor ultimately purchased. This could result in a shortfall in the liability limits available to protect you in the event of a large claim.

BUILDER'S RISK INSURANCE

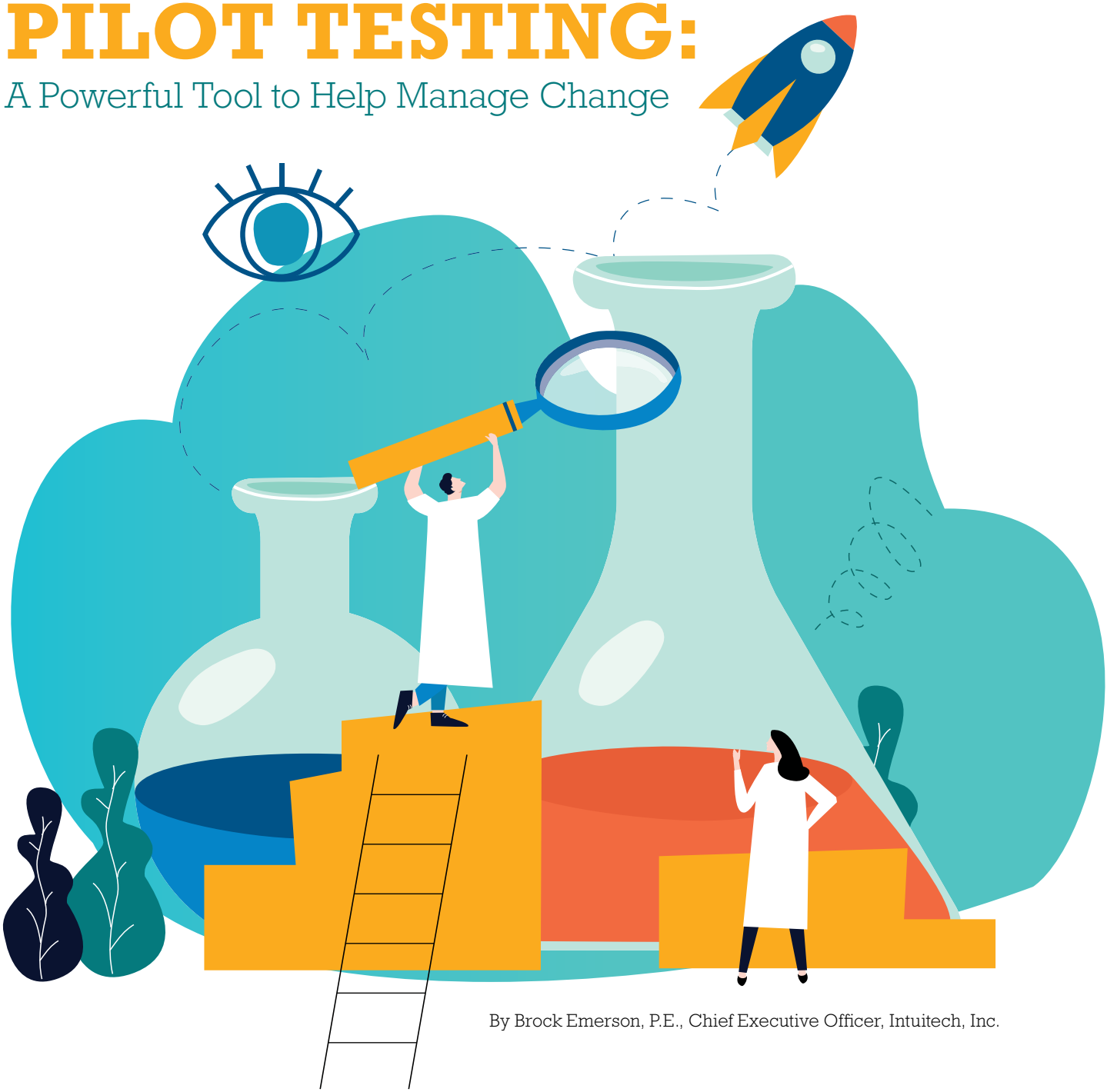
Builder's Risk Insurance policies are a form of property insurance, protecting facilities under construction against direct physical loss. While it is not uncommon for project owners to leave the responsibility for the builder's risk insurance to the general contractor, project owners should be involved in settling the coverage parameters of the builder's risk insurance. There are many areas that can be incorporated in the overall insurance program that are not standard, some of which include:

- coverage for manmade earth movement,
- earthquake,
- expediting expenses (to expedite the replacement of key equipment),
- extra expenses,
- failure of trenching and shoring,
- property in transit, and
- temporary storage.

There are many other areas to address when evaluating the insurance and risk issues for large construction projects, but hopefully this will serve as a primer to have more detailed conversations in your own organizations about how to most effectively prepare for the unexpected during major construction projects.

PILOT TESTING:

A Powerful Tool to Help Manage Change



By Brock Emerson, P.E., Chief Executive Officer, Intuitech, Inc.

> Pilot testing can identify process changes that improve operations, quality, compliance (or all combined) and can save money over the long term by recognizing process changes that don't work before putting them into costly full-scale implementation.

Water utilities constantly face change. Whether it be increasing demands from changes in populations bases, water quality standards, water quality or the need to address aging infrastructure, utilities need tools to help them manage change and make decisions. Pilot testing is a tool that several utilities have employed to help them manage change. Understanding what a pilot campaign is and how water utilities have used them can help facilities effectively reap the rewards of pilot testing through third-party consultants or specialist vendors.

Pilot testing can identify process changes that improve operations, quality, compliance (or all combined) and can save money over the long term by recognizing process changes that don't work before putting them into costly full-scale implementation.

In order for a pilot campaign to be effective and worthwhile, it must be properly planned and carried out, and its results must be shared with key stakeholders. At its best, pilot testing lands at the intersection of research, design, and operations – pulling on all three thought areas to deliver meaningful results. Building a good pilot campaign with the right industry experts can make the difference between just testing and successful testing.

Whether it's to improve water quality, reduce maintenance, improve operations or perhaps to meet new regulations, a pilot campaign starts with understanding the fundamental objective. With a clear objective, you can build out a pilot that will ultimately quantify the financial benefit of the desired improvement.

With a clear objective, it is time to formulate a plan that answers the remaining questions of who, what, where and how. The answers to these questions will determine the pilot design, the testing schedule, sampling and staffing plans, as well as the safety plan.

It's necessary to consider that utilities commonly have multiple stakeholders, and the planning process must account for these. Not all pilots will include every stakeholder. It's important to recognize what information will be important for each of these stakeholders. Typically, these stakeholders can include:

- Regulators – (How much data will they need to approve your new idea?)
- Managers/ Board of Directors – (What financial back-up will they need to approve your new idea?)
- Design Engineers – (What data will they need to turn the idea into a reality?)
- Public Relations – (Is there an opportunity to use the pilot to communicate a larger message to the public?)

Thorough planning is the foundation for any process testing. Tailor your planning efforts to your specific pilot needs. For instance, for a small utility with limited resources, developing a simple filter loading or coagulation study in-house is possible. For a full treatment train pilot with multiple unit processes and stringent regulatory and laboratory needs, facilities can benefit from an experienced consultant or third-party vendor – one that also understands the practical and particular elements of turning the plan into action. Once the plan is finally in place, it's time to move into the operations portion of the process.

> Thorough planning is the foundation for any process testing. Tailor your planning efforts to your specific pilot needs.

Understanding Pilot Testing

A pilot test is a continuous treatability test usually in the 10-gpm flow range. It can be used to evaluate the performance of various design criteria to achieve unit process treatment goals. Design criteria or unit processes may change during testing; the goal is to collect data over a range of design criteria so that decisions can be made for the subsequent project phase.

A complete piloting campaign can typically be broken down into three phases – planning, operations and reporting – and all three are vital to accomplish the objectives. Lack of foresight during the planning phase could render the testing inadequate or incomplete for your goals, and improper or insufficient reporting could fail to justify your proposed implementations.

Planning

As with most anything, the first key step is planning and that involves understanding exactly what you want to accomplish. In most cases, it starts with questions: what change is the utility seeing, what are the impacts, and what are we trying to improve?

Operations

With a solid plan in place, the natural next step is to carry out the plan. That usually means the arrival and installation of testing equipment. Most pilot equipment for conventional treatment can be leased or purchased, depending on the needs of the utility. Typically, if there is a very defined question that needs to addressed in a short amount of time, leasing is a preferred approach. Regardless of leasing or purchasing, the equipment must be appropriate for extracting the data you need from the pilot.

Once equipment is in place and testing is ready to begin, it's important to think about staffing and laboratory needs throughout the process. It's also important to identify opportunities to adjust variables throughout the testing phase. It's not a bad idea to incorporate time to test 'blue sky' or 'outside the box' ideas. That said, it's also critical to remember that you've spent a lot of time developing a plan, so stick to that plan in order to accomplish your stated objectives.

Operating a pilot system can be a dynamic and challenging experience, but also extremely enlightening and enjoyable once you start seeing the results. And once you have those results, it's important to convey them effectively.

Reporting

It's often said that you can't improve what you can't measure, and the point of your testing is to quantify the financial benefits of process changes. That means accurate and informative charts, graphics and figures. All the data in the world isn't valuable if it isn't presented in a format that tells the story and elicits action.

An easy mistake to make is not tailoring that data to its proper audience. Remember that you identified multiple stakeholders during the planning process. These different stakeholders will have different needs and perspectives for the data. A regulator, for example, will have different interests

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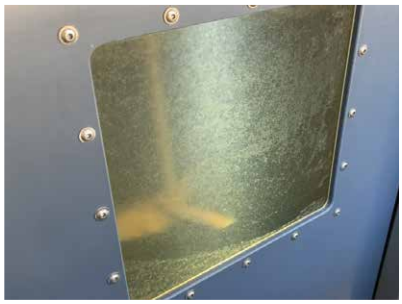

Alum Floc formation at JSSD Pilot.

Floc Sed Pilot at JVWCD.

Filter Pilot at JVWCD with one column in service.

in your results than a board member, who will have different uses for the data than the PR department.

It's also worth considering how your testing results could have an impact beyond your facility or utility. The findings could be noteworthy to the wider water community. If you believe they might be, look at options for distributing and publishing your results for others to see.

Piloting in the Intermountain Section

As a leader in water treatment and research, Intermountain Section utilities have operated several water treatment pilots in recent years. Here's a snapshot of four piloting efforts, if you have additional questions about the study, please contact one of the listed utilities.

Jordanelle Special Service District

JSSD currently uses lime for softening, organics, and metal removal upstream of filtration. Whereas there are many benefits to this treatment scheme, the disposal of the lime solids represents a significant cost to the utilities. In the fall of 2020, JSSD leased a 10 gpm floc/ sed pilot plant to evaluate an alternative treatment scheme. Through using alum and caustic, JSSD was able to demonstrate comparable removal to their existing treatment and generate 40-60% less solids in the process. For more information, contact Wade Webster at *wade@jssd.us*.

> Remember that you identified multiple stakeholders during the planning process. These different stakeholders will have different needs and perspectives for the data.

Jordan Valley Water Conservancy District

JVWCD invested in a 10 gpm floc/sed pilot plant and a four column granular media filtration plant in the summer of 2019. With possible plant upgrade and media replacements on their planning horizon, JVWCD wanted a tool that could help them make proactive decisions for their treatment facilities. Currently, JVWCD is using the equipment to test an alternative media profile. In two columns of their filter pilot, they have installed their existing profile and in the remaining two columns that have installed their experimental profile. Since their filter skid allows for two water sources to be fed at the same time, they are sending plant settled water to two columns and settled water being generated from their floc/sed pilot to the other two columns. With this testing protocol, JVWCD is gathering data on how the alternative media performs and is also fine tuning their floc/ sed pilot to match their full-scale facility. Since their pilot is fully automated, the pilot is able to gather a large body of data without a significant time commitment from District staff. For more information, contact Stephen Blake at *stephenb@jvwcd.org*.

Salt Lake City Department of Public Utilities

In the spring of 2021, SLCDPU undertook an ambitious 13-week pilot at their City Creek Water Treatment Plant. Through their consultant, Brown and Caldwell, they leased a mobile pilot enclosure, a floc/ sed pilot module, and a granular media filter module. The duration was compressed due to weather-related factors of installing/ operating the unit and the need to catch the spring run-off for their test. The dry winter failed to produce the typical high spring runoff and associated turbidity spikes, so the team performed a spiking study to mimic historic water quality events.

During the pilot testing, the team evaluated changing coagulant from ferric chloride to ferric sulfate, including modifications to the pre-treatment regime to facilitate high-rate filtration. With the filtration pilot, the team evaluated alternative deep-bed filter media profiles to increase filtration rate up to 10 gpm/ sf. Additionally, the team used the pilot test to demonstrate direct filtration operations for an emergency scenario such as a loss of the pre-treatment basins that were damaged in the Magna earthquake. Finally, the direct filtration data was used in discussion with regulators about temporary operating conditions that would be needed for construction sequencing of a major facility upgrade.

For more information, contact Jeremy Williams at *jwilliams1@brwncald.com*.

Central Utah Water Conservancy District

In 2006, CUWCD acquired a floc/sed pilot and granular media pilot for the Duchesne Valley Water Treatment Plant. Over the last 16 years, CUWCD has utilized the equipment for many water treatment studies. Over the years, they have used their equipment to test media profiles, evaluate algae treatment, and test bio-filtration. After the Dollar Ridge Fire in 2018, CUWCD once again turned to their pilot equipment to evaluate treatment with the changed water quality. Most recently, they have used the equipment to evaluate changing coagulants from ferric chloride to ferric sulfate. For more information, contact Mike Rau at *miker@cuwcd.com*.

Mobile Piloting Container at City Creek WTP.

Filter and Floc/Sed Equipment inside enclosure.

CUWCD Filtration Pilot.

COVID-19, Were You Prepared?

By Jeff Betton, Safety Manager, Jordan Valley Water Conservancy District

It wasn't long ago when we were saying, "Oh another virus, that's scary, hopefully it doesn't come around here." Before we knew it, we were thinking, "This thing may actually come around here." Then shortly after that, the conversation wasn't about if it comes, but when. At that point, we had to start thinking of what we were going to do to prepare for a possible viral pandemic. Were you prepared for COVID-19?

Good thing we all had a detailed, well thought out, viral pandemic action plan in our Emergency Response Plan (ERP). What, you didn't? Well okay, who did? Nobody, right? We had a "Flu-Pandemic" in our ERP, but it basically stated we will handle it, when there is a flu-pandemic. Flu/viral pandemics were known possibilities but considered very unlikely; therefore, treated as such.

Majority of us are well prepared for other emergencies, such as fires, earthquakes, or active shooters. We have detailed plans with step-by-step actions to take, received proper training, and even done drills for such events. Why go through all of that for a flu/viral pandemic? Well, I think the answer is clear now. We need to treat a viral pandemic emergency like we would an earthquake, fire, or other emergency, with a solid plan and training. I'm sure most of you have a plan in place now, but remember to review it periodically and make relevant updates, provide training on your plan, and leave a little room for flexibility, because emergency situations tend not to go as planned (like experiencing an actual earthquake along the Wasatch Front during the early months of COVID-19).

Then there are the masks, oh the masks! Did you have enough, or any at all? Then we all wondered what kind of masks do we need. There were many options, mixed messages, and different price ranges (not to mention, price markups!). Once we figured out which kind of mask worked best, they were out of stock anyway. So, let that be our first lesson learned: have a stock of face coverings, like we would other emergency supplies. Those of us who work for a water utility know that many of our employees fall under the "essential worker" category; no matter what kind of emergency is going on, water delivery is paramount. Consider how many employees work for your organization (along with their families), and what kind of masks you need based on their job function and possible exposure. Also, keep in mind that masks have a shelf-life. How and

where they are stored will make a difference on how long they will last before having to be replaced.

Ahh, the joys of working from home. Well, depending on who you ask, it's either welcomed with joy or just the opposite (with misery and despair). I am sure there are plenty of 'in-betweeners' depending if the kids are around, you're homeschooling at the same time (and teaching them geometry), and like your family (or not). The question is, "Were you prepared to have so many employees working from home?" Again, probably not. (Noticing a theme here?)

If your IT department was scrambling to find laptops and upload software, don't feel bad – you weren't alone. Moving forward, you may want to consider what capabilities are needed when employees are working from home: laptops, software, printing/scanning, good internet connections, phone connectivity; also, will you have to reimburse some of these expenses? As part of your detailed plan, you may want to list out by position (not name, as people get promoted and switch positions) and which jobs can be done from home. This information is helpful to know in a viral-pandemic scenario and other emergency situations. Maybe your organization is saving on its electricity (or elsewhere) by having less people around. One more thing to consider is to have employees, even during "normal" times, work from home so that they are used to it. That way, when the time comes when they are required to work from home, they know what to do. There are pros and cons to working from home and knowing them better benefits your organization.

Get away from me! I mean, social distancing at work. This was a new one for most of us, and some of us cannot wait for it to go away (as it has come back around again), while others are enjoying a little more breathing room. As you are working through distancing challenges, keep in mind of what is working, so it can be implemented when necessary, and if there are things that you want to permanently change because they are better work practices. Things to consider or ask are: Do you have enough vehicles for your crews? How close are your office employees to each other? Is it better to have field employees report directly to a worksite instead of coming into the shop first? Are your distance training/communications capabilities adequate? How large of a group are you willing to have in the same place?

Germs, germs, germs! Were your cleaning and sanitizing processes adequate? Along with masks and toilet paper, hand sanitizer was another elusive item at the onset of COVID-19. Moving forward, you will also want to keep your cleaning and sanitizing supplies in stock for future events. We have all been thoroughly trained now on how to wash our hands; maybe we should keep some of that extra signage up as a constant reminder (because _____ never washes their hands, you can fill in the blank). You may find your organization cleaning/sanitizing much more frequently and thoroughly than ever before; are you willing to go back to what you were doing before, keeping the more stringent practices in place, or thinking somewhere in between is more feasible? Maybe you do not feel it is necessary to have somebody following people around wiping down everything that was just touched; however, keeping cleaning/sanitizing available in shared spaces (i.e., conference rooms, kitchens) is good practice going forward.

Were your sick/leave policies ready for COVID-19? You may find that you had to update some of these policies. It is important to have something in the policy that states that things could change during such events. It is important to give your organization and employees sick/leave flexibility during a viral pandemic.

So, were you prepared for COVID-19? Personally, I do not think anyone was prepared for what has happened. Now's the time to learn what is working, what is not, what we will do differently next time around, what action plans will need to be put in place, and the things we can do to put ourselves in a better position to handle and better understand such an event. It is during such trials that working together and sharing ideas that we can be more prepared for the next pandemic or emergency that comes our way.

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STEEL PIPE INTERIOR COATINGS FOR TRANSPORTING POTABLE WATER

Types and Considerations

By Lake H. Barrett Jr., Corporate Business Development Manager, KTA-Tator Inc.

INTRODUCTION

Potable water frequently traverses through steel pipe so that it's delivered safely and economically; however, since steel will corrode over time, when in contact with water, the interior of the pipe is coated or lined. This article discusses testing procedures and the types of coatings that are frequently used to line water pipe, including their inherent advantages and limitations.

DIFFERENCES BETWEEN AN INTERIOR COATING AND A LINING

The McGraw-Hill Dictionary of Scientific and Technical Terms generally defines a coating as any material that will form a continuous film over a surface. A lining is described as a material used to protect inner surfaces as of tunnels, pipe, or process equipment. In the pipe industry vernacular, the term "coating" is often referenced for the exterior surface of the pipe and "lining" is the term used to distinguish material on the internal pipe surface. With that being said, an interior coating may suggest a thinner applied material compared to a lining that is often a thicker applied material; therefore, an interior coating can be applied as a lining, and a lining is a type of coating.

INDUSTRY STANDARDS FOR INTERIOR COATINGS FOR POTABLE WATER

In North America, water treatment and distribution products are required to comply with National Sanitation Foundation (NSF) International – The Public Health and Safety Organization. 48 U.S. states have legislation, regulations, or policies requiring potable water system components to comply to NSF/ANSI 61; meanwhile, 11 Canadian provinces/territories have similar compliance regulations. NSF/ANSI 61 sets health effects criteria for many water system components, including:

- Protective barrier materials (cements, paints, and coatings).
- Joining and sealing materials (adhesives, caulks, lubricants).
- Pipes and related products (pipe, hose, fittings).
- Mechanical devices (water meters, valves, filters).
- Plumbing devices (faucets, drinking fountains).
- Process media (filter media, ion exchange resins).
- Non-metallic potable water materials.

NSF SE 9857 is a specification for special engineered products and requirement for internal epoxy pipe coatings produced specifically for use on the interior of metallic potable water pipe as applied by a mechanical means. The specification establishes the minimum testing, marking, and in-plant Quality Control (QC) requirements for epoxy coatings to be used on the internal surfaces of potable water pipe.

Specifications written to protect owner assets often include requirements of material conformance to American Water Works Association (AWWA) standards for coating systems to be used on the interior of water transmission pipe. Currently, there are 23 approved standards under the auspices of AWWA's Steel Pipe Committee. Of these standards, 14 deal with coatings and linings that are available for the protection of metallic pipe, and five are applicable to linings of water transmission pipe. Distinct AWWA testing standards exist for each type of lining:

C203 – Coal-Tar Enamel Lining for Steel Water Pipelines.

C205 – Cement–Mortar Protective Lining and Coating for Steel Water Pipe 4-inch (100 mm) and larger – Shop Applied.

C210 – Liquid-Epoxy Coating System for the Interior and Exterior of Steel Water Pipelines.

C213 – Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines.

C222 – Polyurethane Coatings for the Interior and Exterior of Steel Water Pipe and Fittings.

All AWWA steel pipe coating standards are based on the maximum service temperature of potable water. The purpose of the standards is to provide the minimum requirements for coating systems for the interior of steel water pipelines, including material, application, inspection, testing, handling, and packaging requirements.

TESTING REQUIRED TO DETERMINE SUITABILITY FOR CONTACT WITH POTABLE WATER

NSF/ANSI 61 is a health effects standard that evaluates the level of contaminants that leach from the products into drinking water, rather than setting prescriptive limits on content. This differs from U.S. Food and Drug Administration (FDA) requirements that are based on prescriptive content requirements. NSF/ANSI 61 requires analysis for any chemicals that leach from a material into drinking water and it requires a toxicological evaluation of chemical concentrations to ensure that they are below levels that may cause potential adverse human health effects. The toxicological evaluation criteria are based on lifetime exposure to the concentration of contaminants in drinking water.

NSF toxicologists perform a formulation review of each water contact material to determine any possible ingredients, contaminants or reaction by-products that may potentially leach from the material into drinking water. This formulation review then determines the battery of chemical analyses that will be performed on a particular material. The testing of the finished product is performed by exposing the product to pH 5 and pH 10 waters and analyzing for regulated metals such as antimony, arsenic, barium, cadmium, chromium (including chromium VI), copper, lead, mercury, selenium, thallium and nickel.

The product is also exposed to pH 8 water which is tested for organic chemical contaminants that could leach out into the water. The certification process covers two separate applications: ambient/cold water use, which is tested at 23°C, and domestic or commercial hot water use, which is tested at 60°C or 82°C.

COMMON INTERIOR COATING TYPES

There are five common types of interior coating or lining material for steel potable water transmission pipe: coal tar enamel, cement mortar, liquid-applied epoxy, fusion bonded epoxy (FBE), and polyurethane (PU). Each of these lining technologies have inherent advantages and limitations. Additionally, each interior coating type has installation requirements for surface preparation and application.

Coal Tar Enamel – The coal tar pitch, which forms the basis for the coal tar enamel (CTE), consists of stable molecules that are formed during cooking operations at about 1,300°C. The fillers and coal add flexibility and strength to the product. The strong molecular arrangement provides CTE with the characteristics necessary to produce pipeline corrosion protection. These can be summarized as follows:

- *Water resistant* – negligible water absorption and vapor transmission.
- *Stable chemical structure* – resistant to acid and alkali.
- *Resistant to cathodic disbonding* – most pipelines are protected using impressed current or sacrificial metal anodes; CTE is resistant to the alkaline environment formed at exposed metal surfaces.
- *High electrical resistance* – even after two years' immersion in water, the electrical resistivity remains 1014-ohm cm^3.
- *Adhesion* – forms a strong permanent bond to the steel surface.
- Resistant to attack by bacteria, marine organisms and root penetration.

Shortages in the availability of qualified applicators, increasing costs, challenges of worker exposure during application, concerns of leachability of trace contaminants into the potable water, and effects on human health have contributed to the decline in usage of coal tar enamel, specifically in the United States.

Application considerations: Surface preparation is critical to CTE performance, and application of the CTE requires an understanding of its limitations during cold-weather and high humidity. Coal tar enamels generally require heating and continuous agitation of the material during application, and the enamel is required to be maintained moisture and dirt-free during application.

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Cement Mortar – Cement mortar linings provide long-term protection at a low cost, and remain one of the standard linings for potable water pipes.

A major benefit with cement mortar is the ease of application. The mixing and application of mortar is straight forward, leading to low risks in application. Cement mortar linings provide active protection of the steel pipe by creating a stable hydroxide film at the steel-mortar interface. The corrosion protection is referred to as active, because it provides protection even where there are discontinuities in the lining. Cement mortar linings have a track record of conveying water for extended periods to required water quality standards, and currently meets all applicable standards throughout the world. Cement mortar does not support microbiological growth.

The actual cement application of cement-mortar linings is performed by pumping or pouring a high slump cement mixture onto a slowly rotating length of pipe. The rotating speed is then increased, creating centrifugal forces that level out the wet mortar to a uniform thickness. Continued spinning removes the excess water and compacts the mixture to a dense and solid surface. After the spinning process, the lining is cured either by moist air at ambient temperature or by an accelerated process using steam. Like concrete, cement-mortar linings can develop drying cracks, but these cracks will self-heal when the lining is wet. Wetting the cement lining also causes the lining to swell, which increases strength and adherence. Cement-mortar linings can add significant stiffness for resistance to deflection forces. The strength of the mortar lining may be added to the strength of the steel when calculating stiffness.

Soft, aggressive waters, as well as prolonged contact with heavily chlorinated water, may be detrimental to cement-mortar linings. Cement-mortar linings perform best when flow velocity is 20 feet per second or less. In situations where the conveyed water is aggressive and the flow rate is low (resulting in a long residence time), a high pH can develop with cement mortar lined pipe. Cement-mortar linings add considerable weight and reduce the available flow volume of a transmission pipe.

Liquid Applied Epoxy – The liquid applied epoxy lining systems may consist of any of the following three types:

- A two-part, chemically cured epoxy primer and one or more coats of a different two-part, chemically cured epoxy topcoat;
- Two or more coats of the same two-part, chemically cured epoxy coating; or
- A single coat of a two-part, chemically cured epoxy coating.

Epoxy linings have excellent water and chemical resistance properties. They can be applied at various thicknesses and are factory applied to provide a dielectric lining. Bonded dielectric lining systems can be applied as either a single or a multiple-coat process. They are tough, resilient, and extremely abrasion resistant, making them a lining choice for high internal velocity service environments.

Epoxy linings do have some limitations that must be considered prior to application. A critical performance factor to all linings is the surface preparation of the metal. In most cases, SSPC-SP 10/NACE No. 2 near-white blast with a nominal surface profile of 2-3 mils) is required for proper adhesion. Minimum curing times and temperatures must also be closely followed, and can range from hours to days depending on the formulation. Epoxies are typically applied by airless spray or brushed on to the pipe. They are considered barrier linings, requiring 100% continuity to achieve corrosion protection. Any discontinuity can result in corrosion; unless a cathodic protection system is employed on the pipeline.

With proper surface preparation, controlled application, and conformance to strict curing procedures, thin-film epoxies can provide a strong, resistant, durable lining.

Fusion Bonded Epoxies – Fusion bonded epoxies are a one part, heat curable, thermosetting epoxy. FBEs are applied to heated parts in a powder form (10-40 mils) that rapidly gels from liquid to a solid, have excellent adhesion to the steel surface, and are very resilient coatings that resist damage during handling. FBEs are considered environmentally friendly since they contain no volatile organic compounds (VOCs).

FBE should be applied immediately following the heating process to avoid excess pipe cool down (if the pipe cools below 450°F the FBE may not fully cure). The powder is generally applied using semi-automated application rings, electrostatic guns or flocking units to a minimum thickness of 14 to 16 mils. The FBE material is generally applied in several passes of 2 to 5 mils and should always be completed in an expedient manner to avoid lamination. The FBE will usually be dry to the touch in less than a minute and be fully cured within three minutes or less depending on the formulation of the material. Handling and testing commences once the applied coating cools to approximately 200°F.

Polyurethane – The aromatic polyurethanes are 100% solids materials that contain no VOCs. Polyurethane linings are typically applied at 20 mils minimum thickness; however, thicker lining applications

are possible. Specific to the internal surface of potable water pipes, polyurethane materials have following advantages:

- *Fast curing* – ensures economy of high production rates and efficiency.
- Excellent adhesion to ferrous and properly prepared steel surfaces.
- High impact resistance.
- Effectively protects pipe from corrosion.
- Lower lining thickness is required compared to other technologies, and hence pipe design can be more efficient, reliable and economical as the wastage factor will be reduced, and pipeline capacity is higher for the same size of pipe.
- Reduced head loss and pumping losses due to a smoother internal surface of the pipes.
- Longer economic life as deterioration due to erosion cavitation is low.

There are some limitations associated with polyurethane material when used for lining steel water transmission pipe. Polyurethanes require heated, plural-component equipment and qualified, experienced applicators. Polyurethane coatings require that the host pipe be thoroughly cleaned and for in-service pipe that includes removal of hard deposits, nodules, scale, corrosion and other debris and be substantially dry prior to application of the coating to ensure good adhesion between the liner and the pipe wall. Voids and blisters may form if the pipe is not properly prepared and there is a potential for uneven liner thickness due to inconsistencies in dual material component pumps associated with the application equipment.

SUMMARY

In an effort to provide safe drinking water, coating materials intended for contact with potable water are evaluated for of the level of contaminants and chemicals that leach from the products into drinking water. The coatings products typically are coal tar enamel, cement mortar, liquid-applied epoxy, fusion bonded epoxy (FBE), or polyurethane (PU) and all are initially required to have a toxicological evaluation of chemical concentrations. NSF toxicologists then perform a formulation review which determines the battery of chemical analyses that will be performed. Lastly, the finished product is tested by exposing the product to pH 5 and pH 10 waters and analyzing for regulated metals. Each of the coating types have inherent performance and application advantages and challenges which should be considered when selecting a coating for the intended service environment.

KTA-Tator Inc. is an employee-owned consulting engineering firm founded in 1949. We specialize in providing quality assurance services within the water, chemical and transportation market. These services include analytical, physical and NDE testing labs; engineering design and support; cathodic protection; coatings and welding inspection review.

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Inland Empire Subsection

Save the date: ok, not a wedding but more like the fun reception where you may see some guy dancing by himself in between songs. Or perhaps it's a good time to get together with old friends, new colleagues, and soon-to-be friends. Look out for the IESS Annual Golf Tournament, scheduled on July 22, 2022.

We have found a lot of success during these unusual times. We raised thousands of dollars for charities, protected our aquifer, and provided education about in providing safe, reliable drinking water. This is because of the wonderful people and organization we work with. If you, or someone you know, is interested in being a bigger part of this great organization, please reach out. It is a great opportunity to expand your network, learn, and support our industry.

We have a hodge-podge of trainings coming up. Some have a hybrid option allowing remote learning. For those of you ready for some in-person, real face-to-face human interactions, we have that too!

March 29 – First Aid and CPR at Spokane County Water District #3. Pick from an a.m. or p.m. session.

April 7 – Chlorine class with Doug Greenlund and Branden Rose, covering Idaho and Washington protocols. 8-11:30 a.m., in person at Spokane County Water District #3 and via Zoom.

Our current Board is:

- President – **Bob Cunningham**, Irvin Water District #6
- Vice President – **Seth McIntosh**, City of Spokane
- Past President – **BiJay Adams**, Liberty Lake Sewer and Water District
- Director #1 – **Branden Rose**, Hayden Irrigation District
- Director #2 – **Andy Wilson**, Consolidated Supply
- Director #3 – **Jessica Waller**, JUB Engineer
- Director #4 – **Doug Greenlund**, City of Spokane
- Director #5 – **Dan Kegley**, GSI
- Secretary and Treasurer – **Maura Kegley**

It is with a heavy heart we announce Dennie Byram passed away on July 29, 2021. He was one of the founding members of the Inland Empire Subsection. Dennie continued active participation for over 40 years. He was a willing ear and a significant source of knowledge. His presence and participation are missed.

Thank you to the many making us successful, and I am excited to continue working with all of you.

Best wishes,
Bob Cunningham, IESS President
irvinwater@windwireless.net
509-939-7660

> Look out for the IESS Annual Golf Tournament, scheduled on July 22, 2022.

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King County Subsection

With the start of Spring comes the excitement of planning for our Conference (after two years apart) and a year of training and social programs for KCSS members. The Board is also pleased to welcome new members since the winter, and celebrate our continued growth as a Section.

Events

2022 Water Olympics – Featuring Best Tasting Water, March 10, 2022

The KCSS hosted the annual Water Olympics – Featuring Best Tasting Water event on March 10, 2022. The event was held at Sumerian Brewery, in Woodinville, WA, following local requirements for COVID safety. It was great to be back in person after a hiatus last year, and a limited event in 2020. The PNWS-AWWA Section Conference had to limit the official competitions to Best Tasting Water; therefore the official competitions at the event were limited to BTW.

The Conference is planning to bring back Hydrant Hysteria and the Meter Challenge next year! We held an "unofficial" meter challenge and Corn-Hole contest, for prizes and bragging rights. The event was a blast, bringing together KCSS members for some friendly competition and celebration of providing clean and safe drinking water to our communities. The BTW winner was still to be determined at the time of this publication, and will be announced in the next edition of *Water Matters*.

Thank you to our Competitions Coordinator, Ted Stonebridge, for another successful Water Olympics event, and the Board for your support! We couldn't have done the event without our sponsors! Stay tuned till the next issue for a list of our event sponsors.

New Members

Welcome new members! If you are a new member to the King County Subsection, we would love to get you connected and learn more about your interests. Join us at one of our monthly meetings – every third Wednesday of the month – to learn more. If you are interested in attending any of these meetings, contact the Subsection's Secretary, Jon Miner, at *jon.miner@murraysmith.us*.

Welcome New Members – Spring 2022

- Tim Chan
- Catherine Collins
- Marius Eugenio
- Maeve Harris
- Jacilyn Hayden
- Mitchell Hoffman
- Brandon Kizer
- Chris Porter
- Ryan Vogel
- Bolun Wang

Training

The Subsection is committed to offer classes and help our members meet their CEU requirements. The Board's goal is to offer a minimum of four classes within the calendar year.

Planning is underway for the 2022 technical program with more virtual classes and plans for the return of in-person classes. Look out for further announcements and registration information. For questions related to classes, whether that's an idea for a class, or suggestion for speakers, or general information about training and CEUs, please contact our Program Director Jim Konigsfeld at *jim.konigsfeld@spwater.org* or 425-295-3217.

KCSS Board Transitions and Recruitment

The Subsection is still looking to fill one additional role for 2022-23:

- Communications Coordinator: We are looking for a KCSS Communications Coordinator to keep the Subsection website up-to-date and help get information out to members. The role is a one-year term, with the option to extend for more terms. We are looking for someone who has a passion for communications, and an interest in helping the subsection improve our online resources. Please contact the Subsection President, Joanie Stultz, if you are interested in the Communications Coordinator role at *jstultz@brwncald.com*

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BHC Consultants	23	206-505-3400	www.bhcconsultants.com
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