

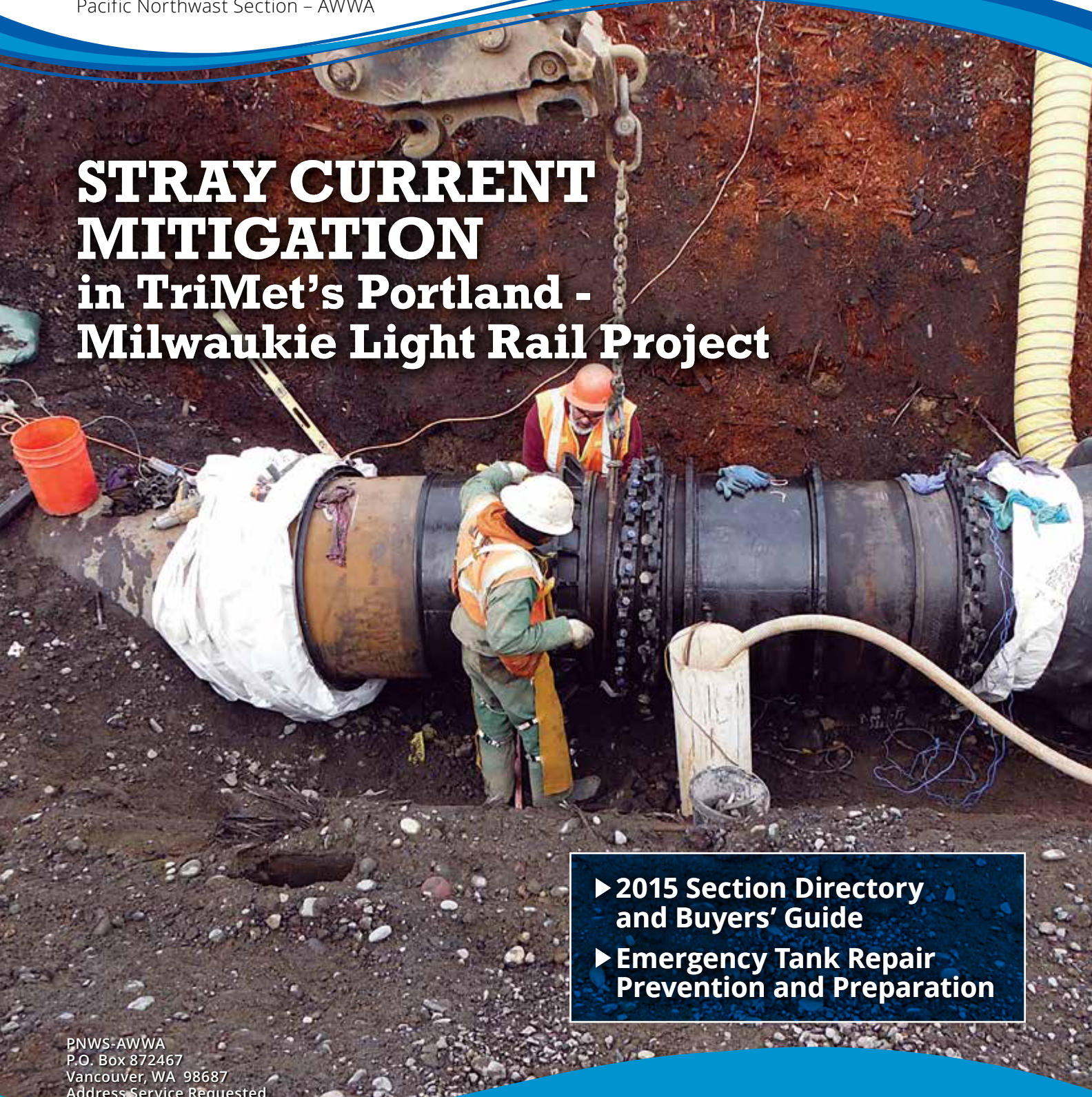


American Water Works Association
Pacific Northwest Section

WINTER 2014/15

WATER *matters*

The Official Magazine of the
Pacific Northwest Section – AWWA



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- ▶ 2015 Section Directory and Buyers' Guide
- ▶ Emergency Tank Repair Prevention and Preparation

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Cover Photo: The Portland Water Bureau maintains several large-diameter transmission mains that convey water from the city’s main supply in the east into downtown Portland. Two of these, an existing 30 inch diameter cast iron pipe and an existing 36 inch diameter ductile iron pipe, were replaced and installed in 48 and 54 inch diameter steel casings. See the article on page 30 for more information on this project.





A wonderful time of year

Fall finally arrived in Southern Oregon and it had seemed as though summer would drag on forever. The temperatures started to drop, rain in the air and Halloween with its children clad in costumes as ghosts, goblins, ghouls and witches came a knock, knock, knocking on neighborhood doors in hopes of delicious treats, and not to be the target of good natured all-hallows-eve trick! All in all, it is one of my favorite times of the year and I haven't even mentioned Thanksgiving yet!

As fall wanes and winter approaches our thoughts turn to Holidays spent with family and friends, enjoying the company of others at this time of year when we all seem to act just that little bit nicer... Momentarily, we put aside all the work we have just spent gearing down our plants to account for decreased consumption, making sure we have winterized all those pesky places that seem to freeze and break, calling us out in the middle of the night when it is 0 degrees and focus on that which is most important: our families and our friends!

It is also the time to turn out attention to our many Subsections and the Winter Subsection Officer Training and Trustee Meeting to be held this February 4-6 at the Portland Embassy Suites. This vital training is a crucial link in the chain that makes the Pacific Northwest Section one of the premiere Sections in the Nation. The meeting allows the Board to meet with all of our Subsection Officers, pass along significant information from the association, host trainings to develop future Section leaders and provide valuable networking opportunities to the members who make up our "boots on the ground" efforts. Without the Subsections and the dedicated officers who will be attending this meeting our section would not be able to accomplish the many successes that we achieve each year!

This year's training will follow a bit different format in an effort to make the time that our volunteers spend at our Section events more valuable. To that end, this year we will start at 5 p.m. with a social event and dinner. This will be followed by a full day

of training on Thursday which will include information on Association Initiatives that will impact Section and Subsection alike. On Friday Subsection Officers will get a chance to present their subsections activities and future plans to the Board and I. This is one of my favorite meetings as it is the one time of the year that I get to meet with all the Subsections in one location at the same time and hear about all the great work that they have produced and the plans they have for serving the water community in the upcoming year!

As I watch the Leaves of Southern Oregon really start to change and begin to litter my lawn I have the pleasure to tell you about another exciting change that is working its way from the Association to a small water utility near you. Our Section gets play an active role in bringing skills, knowledge and networking power to small water systems that proliferate throughout section in a revolutionary new outreach program funded by an EPA grant that will put AWWA in touch with a multitude of new water

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providers who may never have even heard of us before! Under this program, the PNWS will be hosting two training sessions, one in Oregon and the other in Washington that are will be specifically targeted at the small water utilities in a Nationwide effort to bring critically needed training to the small system operator. It is exciting that the PNWS gets to play a role in that effort. You will be hearing more about this in the upcoming year.

Lastly, as we move closer to closing out another year (and goodness has 2014 flown by!) I want to take a minute and thank each

and every one of you who are reading this. Thank you for being a member of AWWA! Thank you for dedicating your life to the provision of safe water to the communities that you serve! Thank you for volunteering your time to serve on committees and boards to drive this industry forward. We don't often hear it from those that we serve, but your efforts are not only appreciated, but vital to the health and vitality of our daily lives! Happy Holidays! I look forward to seeing you all in Portland this February and even more of you in Bellevue in May! 🇺🇸

Jason Canady, Chair

As fall wanes and winter approaches our thoughts turn to Holidays spent with family and friends, enjoying the company of others...



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New year, new opportunities

This New Year brings new opportunities in training and networking that I am very excited to share with all of you.

Free EPA Training for Small Systems

That is NOT a typo. Two free trainings for small systems under 10,000 connections will be offered this year in each of our three states as part of an EPA Small Systems Grant to develop and deliver technical assistance to small systems. The first of our two trainings will focus on small public water systems' ability to meet and maintain compliance with the Safe Drinking Water Act and will target these five areas:

- Water Treatment - Microbial Contaminants
- Disinfection By-Products Reduction and Control
- Distribution System Operation and Maintenance

- Regulatory Review – Revised Total Coliform Rule (RTCR), Lead/Copper, Groundwater Rule

The second of our two small system trainings will focus on delivering financial and managerial training to small systems. The training will target those small systems that may need assistance with budgeting and understanding the financial tools that they have available to them in addition to other asset management topics. To find out more information and to register for one or both of these free trainings visit the Section website and click on the Training Calendar.

Schedule Changes at the Section Conference in Bellevue

Registration is now open for the Section Conference in Bellevue, Washington, April 29 – May 1. If you haven't already registered you will find conference information and

registration links on our website homepage under Training. Like always we have a great technical program developed for you as well as a huge vendor trade show and numerous networking opportunities. Don't miss the largest conference for water professionals in the Pacific Northwest!

New this year we have adjusted the overall conference schedule a bit to better meet the needs of our attendees and the facilities that we will be using. With the increased space available to us at the Meydenbauer Convention Center we will be using the Vendor Hall for meals as well as the Water For People Silent Auction and all Competitions. Schedule changes include:

- Wednesday Evening Fun Night kicks off earlier this year. Enjoy the Bellevue Arts Museum venue from 5-8:30pm. Expect great food and drink, music and amazing art.



- Meter Madness is scheduled for Thursday at 11am in the Vendor Hall.
- Best Tasting Water as well as the presentation of the Engineering and Public Information Awards is scheduled for Thursday at noon in the Vendor Hall.
- Tapping is scheduled for Friday at 11:30 in the Vendor Hall.
- Don't miss the Friday night banquet at the Hyatt Regency where the Section will present its highest awards, we will close the Water For People Silent Auction and watch as Section Chair Jason Canady passes the gavel to incoming Chair Randy Black.


**Opening Session
Key Note Speaker**

I am very excited about the decision to bring back a Key Note Speaker for our Opening General Session at our Section Conference in Bellevue. Many of you have mentioned over the last few years that our Opening General Session had lost its appeal. It had become a business meeting rather than an upbeat kickoff to a great conference. We needed a motivational speaker that could energize us for the conference and year ahead. We listened and I guarantee you if you are looking for a humorous, highly energized, engaging speaker you need look no further than this year's Key Note Speaker – Chad Pregracke CNN's 2013 Hero of the Year.

Chad Pregracke is the President and Founder of Living Lands and Waters the world's only 'industrial strength' not for profit river cleanup organization. At the age of 23, after spending his life growing up and working on the Mississippi River, Chad became absolutely appalled by the amount of garbage that was in the river and he decided that if no one else was going to do something about it he would.

Over the last 16 years, he, his crew and nearly 70,000 volunteers have removed over 7 million pounds of garbage out of our nation's rivers. He

has also broadened his mission to include a classroom aboard a barge that he and his crew live on 7 months a year, teaching students, educators and individual citizens about the value of our rivers and natural resources. He has a very compelling story to tell and he does it in such a hilarious fashion

that you will be very entertained and leave the session realizing the importance of setting goals and how determination, hard work and persistence pay huge dividends. Don't miss it! 

Kyle Kihs, Executive Director



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Reflecting on a great year

Wow, where did the year go, are you ready for 2015? Reflecting on 2014 I am amazed at what we have accomplished as a Section and Association.

Section

The PNWS Fall Trustee meeting was very productive. Committees continue to have solid business plans for the upcoming year. Everyone did a great job of planning and coordinating budget requests to support efforts for 2015. A special thanks to everyone who assisted with the budget process which resulted in the board's adoption of a balanced budget.

Association Updates

I am honored to have the privilege of serving as your Association Director. As David LaFrance, AWWA Executive Director said, "this is the most exciting time to be an AWWA member since chlorine was put in water." In June 2014 AWWA Board of Directors accepted the AWWA2020: A Path to One AWWA report that sets a direction with five specific Strategic Themes as guides

for a 2020 future of OneAWWA: Communication, Education, Branding, Finance and Membership. The complexity of issues facing water professionals continue to grow. Economic and environmental pressures on utilities demand to be addressed. Global markets provide opportunities for growth.

You may have noticed our new PNWS logo that will become a consistent look in all 43 Sections. A common look and feel among Sections and the Association helps solidify that we are One AWWA united around a common mission and vision. AWWA webinars have addressed topics such as Philanthropic Initiatives, EPA Grants that will help provide training, Section Branding, and Community Engineering Corps. If any of the webinar topics peak your interest they can be viewed on the AWWA website on the Section Services page. www.awwa.org

As an AWWA Vice President I get to visit other sections. AWWA's vision statement "A better world through better water" comes through consistently as professionals share

their stories of their service and passion for water. The Rocky Mountain Section Chair Mary Prescan shared her family history. "Upon returning from battle in WWII, my grandfather Nicholas E Presecan got a job as an Operator for a water district in Southern California. Grandpa Nick became a Life Member of AWWA in 1986. My father Nicholas L. Presecan spent high school summers digging up broken waterlines. Dad went on to become a licensed P.E. in 34 states and a Life Member of AWWA." Mary is continuing the family tradition with a passion for water serving as Section Chair.

In Nebraska I was humbled to attend a session on the Pilger Tornado Response and the effectiveness of Nebraska WARN. You may recall the tornado, which was televised on national news in June that leveled the town of Pilger. The coordination efforts of surrounding communities, professionals and jurisdictions was amazing. The community that was literally wiped from existence was delivering safe water in less than one week. This validates the importance of our profession. It confirms the competency of our industry experts and their commitment. By working together as **ONE** amazing things are accomplished.

It is not surprising to me that no matter where you go water professionals are the best! Pacific Northwest Section is no exception and highly respected as leaders. Thank you for your role in our mission. I hope you enjoyed quality time with your families over the holidays and look forward to a busy and exciting 2015! 🇺🇸

Brenda Lennox
Association Director PNWS-AWWA

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Customer Service Committee

The PNWS Customer Service Committee has been working on the AWWA Customer Service Certificate Program schedule for 2015. It is a three course series that can be taken in any order and after all three are taken, the participant receives a certificate from the AWWA. We are very excited about the program and try to schedule the courses in Idaho, Washington, and Oregon every year to make it available to as many members as possible. In doing this we have had 216 attendees for course #1, 123 attendee for course #2, and 89 attendees for course #3.

The success of the program comes from having a local arrangements facilitator and or the assistance of a subsection. It is important to have at least three different organizations represented and a 50/50 mix between field and office personnel. Having a diverse group of people working together to solve customer service related issues is very useful and enlightening to some. You can see how the customer relations you have in the field will affect the office staff and the opposite. It also allows for the attendees to learn what other organizations do that

works and also what does not work. It is also a great networking tool.

Water Industry Operations and the Vital Importance of Teams (Course #3)

Camas, WA March 19 & 20
 Moscow, ID October TBD
 Central Point, OR September TBD

The Business of Customer Service for the Utility Work Force (Course #2)


Moscow, ID April or May TBD

Customer Relationship Building for the Utility Work Force (Course #1)

Wenatchee, WA June TBD

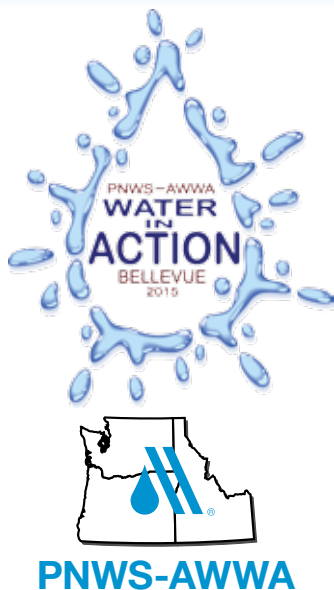
We have also had requests for the Program in Bellevue, WA – Boise, ID – Spanaway, WA.

For updated schedules please check out the PNWS Customer Committee Website <http://www.pnws-awwa.org/committees>.

If you are interested in finding out more about a course or scheduling the Customer Service Series in your area please contact Tonya Reiss at treiss@spokanecity.org or 509-625-7847. 

Visit our Website

www.pnws-awwa.org/committees



2015 Communication Awards

Applications available online beginning: January 5, 2015

Application Deadline: February 13, 2015

Questions? Tacy Steele: tacy.steele@hillsboro-oregon.gov

Awards to be presented at the Bellevue Conference!


Engineering Committee

Pump training

On Thursday, October 23 the PNWS Engineering Committee and the Northwest Washington Subsection joined together to host a pump training session and site tour in Woodinville, Washington. Joe Evans from PumpTech and Ron Kohler from King County Wastewater Treatment Division presented on several topics, including basic centrifugal pump operation, pump performance curves, pump affinity laws, function and operation of Variable Frequency Drives, and single phase and three phase power basics. The four-hour training was followed by a site tour of the Brightwater Influent Pump Station, a 135 MGD, high head (285 feet TDH) facility with six 2-stage centrifugal pumps. The turnout was phenomenal with over 120 attendees!

The Engineering Committee hosted another 4-hour pump training session in Eugene, Oregon on November 21. Joe Evans from PumpTech presented again on pump operation, performance curves, pump affinity laws, VFD's and power basics. The Eugene training was attended by almost 30 engineers and operators.

Upcoming events

The PNWS Engineering Committee once again plans to sponsor and participate in Engineer's Week activities in both Portland and Seattle. The 51st annual Engineers Week Banquet in Portland takes place on Wednesday, February 25 at the Lloyd Center DoubleTree Hotel. This event invites high school students from NW Oregon and SW Washington to explore engineering careers and be inspired throughout a day of field trips, interacting with practicing engineers, an exhibit hall, and a special banquet. Over 350 students participated in the 2014 event and every year this event inspires high school students to pursue college degrees in engineering disciplines. A big thanks to the generous sponsorship of the PNWS-AWWA for both the Seattle and Portland events. We are inspiring the next generation of engineers! 

Membership Committee

The Membership Database is active

Membership is proud to announce that the PNWS-AWWA section membership database is active and available to PNWS-AWWA officers, committee members and sub-section officers. You can access this database by navigating to the pnws-awwa.org homepage and selecting the committee tab and clicking on 'membership.' Once on the membership page click on 'Membership Data Request' and fill out the online forms. You will be contacted by a membership committee representative who will provide a link for you to access the database.

Specific membership question? Please give us any information that would help us provide you the data set that you are requesting. We have a large section, you might not need the whole 2,500 person list!


Direct link:

https://sites.google.com/a/pnws-awwa.org/membership_committee/home/membership-data-request

New Membership Brochure

Our hard working membership team has come up with a fabulous new design for our pamphlet. These can be requested by contacting the Membership Committee directly. The Brochure is posted online for download on the Section Membership home page. The PNWS has printed out an initial batch of high-quality hard copies. Contact Kyle Kihs at kkihs@pnws.org if you would like some for your next sub-section or committee event.

We have nearly reached our membership goals

With only a short time remaining we have come close to the membership goals set forth by the Membership Committee and AWWA for 2014. Keep contacting your new members, and keep an eye out for members who are in need of renewal. Not sure which members are in need of renewal or who is new in your sub-section? No problem, make a membership database request and we will provide you with a comprehensive list! 

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Personal Leadership Committee

The Personal Leadership Committee is comprised of several subcommittees that sponsor events in local areas. The mission is to provide individuals with the tools to thrive both personally and professionally within the water industry.

After a busy spring and conference events, the committee members are busy planning upcoming events.

Seattle

Seattle's upcoming Women in Leadership Symposium is scheduled for February 10, 2015. The day will focus on women in leadership positions at all stages of their careers and in different circumstances. With this year's theme 'Blazing New Paths: Locally

to Globally,' the symposium will feature local women who are creating their leadership legacy with both local and global impacts. We are honored to announce the keynote morning speakers who will share their inspiring stories of implementing their vision to achieve meaningful results:


- **Christie True**, *Director of King County Department of Natural Resources and Parks*
- **Diana Gale**, *Senior Lecturer Emeritus at Evans School of Public Affairs, University of Washington, and*
- **Pratistha Kansakar**, *Vice President at The Living Earth Institute*

The afternoon will include breakout sessions with three topics to choose from A) Personal Skills Building, B) Sustainability and Innovation, and C) Local and Global Partnerships. Come for a dose of inspiration and motivation! Learn how to blaze your own path to successful leadership in your daily life, your role in the water resources industry and the world in which we live. For more information visit our event website available through AWWA-PNWS events calendar. Contact Alma Rettinger arettinger@pnws-awwa.org for registration questions. Sponsorship opportunities are also available, please contact Erica Haenggi at erica.haenggi@pacelabs.com for more information.

Portland

The Aqua Athenas Portland Group hosted a networking event on November 5, 2014 at Lotus Cardroom & Café, where they discussed hidden biases and shared insight on how to overcome them. Typically these quarterly events alternate between breakfast and happy hour, and they are always a great way to meet other women working in the water industry. Planning meetings happen regularly, contact the committee to join us.

Lastly, we recently launched a mentoring program. If you are interested in being a mentor or are looking for a mentor, please contact the committee. If you have questions or would like to get more information on our upcoming events, please contact either Adrienne Lindsey at alindsey@gsiws.com or Sarah Betz at sbetz@farallonconsulting.com.

If you are interested in getting involved, please contact our leadership team:
Kristel Fesler (Chair)
Kristel.fesler@hillsboro-oregon.gov
503-615-6735
Jim Meierotto (Vice-chair)
jimm@tvwd.org
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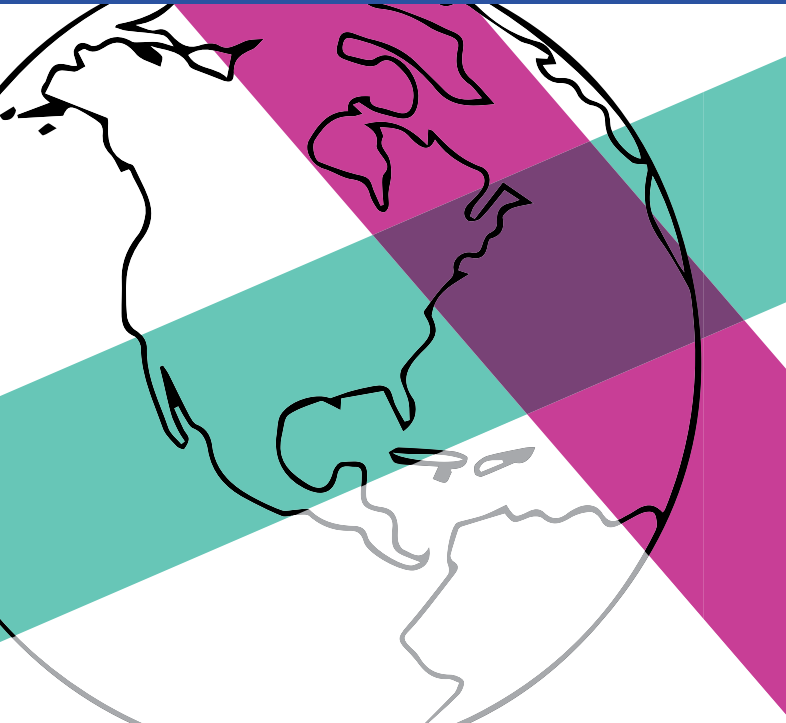
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You will walk away with:

- Tools to increase your own effectiveness
- Greater insight into your own potential
- The support of a network of women ready to increase the role of women in leadership positions

We aim to promote and encourage women to take an active role in blazing their own new path (both locally and globally) for personal growth, the benefit of their career, and industry.

Program Overview

This symposium will highlight local women leaders at all stages of their careers and in different circumstances. Speakers will share their professional insight and experiences. Come, learn, and be inspired!

SCHEDULE

8:30 – 9:00	Registration
9:00 – 9:30	Welcome
9:30 – 10:10	Christie True, <i>Director, King County Department of Natural Resources and Parks</i>
10:10 – 10:30	Break
10:30 – 11:10	Diana Gale, <i>Senior Lecturer Emeritus, Evans School of Public Affairs, University of Washington</i>
11:10 – 11:50	Pratistha Kansakar, <i>Vice President, The Living Earth Institute</i>
11:50 – 12:00	Lessons Learned/ Polling
12:00 – 1:15	Lunch
1:15 – 2:30	Afternoon Session*
2:30 – 2:45	Break
2:45 – 4:00	Afternoon Session *
4:00 – 4:30	Lessons Learned/Polling
4:30 – 6:00	Networking Social

*Choose two of the three afternoon sessions to attend:

- Session A: Personal Skills Building
- Session B: Sustainability and Innovation
- Session C: Local and Global Partnerships



Scholarship Committee

The Pacific Northwest Section has helped nearly 200 students further their college education over the past 20 years. This effort is supported by the Education & Training Fund, a scholarship provided to the top applicant each year from Ameron International, and additional contributions from Manufacturers and Suppliers conference registrations, Kelman and Associates (our *Water Matters* publishing partner), and the Section Board.


Each January, letters go out to educational institutions in the Pacific Northwest. Applications for the 2014-

15 academic year scholarships are available on the Section website now and are due February 27, 2015.

The Section now has 12 perpetual scholarships honoring members of the Pacific Northwest Section. These are:

- Ray Pettie / Bob Stiles,
- Archie Rice,
- Alan Jones,
- Cynthia Driscoll,
- Doane family,
- Wubbena family,
- Past Chairs,
- Southern Oregon subsection
- NW Washington subsection,
- RH2 Engineering,

- Al Alsing,
- Legacy Scholarship, which collectively honors those individuals yet to meet endowed status.

So what can you do to help our industry now? First, find an eligible student and make sure they are aware of this opportunity for help with their education. Second, consider making a tax-free donation to the Education & Training Endowment Fund! Finally, watch for young professionals ready to enter our profession. Give them a chance. As an industry, we need them as much as they need a start in their career. 

Training Coordination Committee

0.6 CEU Basic Waterworks Training is now available

This introduction to water supply, treatment, and distribution is focused toward new utility employees, office personnel, and others looking for a broad introduction to the industry.

- 0.6 CEUs each
- Can be held anywhere in the Section
- Standardized curriculum and prepared trainers

Topics covered include:

- Overview of water system
- Regulations and contaminants
- Water sources

- Hydrology and hydraulics
- Treatment and disinfection
- Water quality monitoring
- Water quality protection practices
- Construction and maintenance
- Disaster response


If you are interested in hosting a training, please contact any of the people listed below or see the list of approved trainers on the Training Coordination Committee's webpage.

For questions, please contact:
Lisa Snowden Lisa.Snowden@hdrinc.com
Loren Searl LSearl@SpokaneCity.org
Jeff Lundt Jeff.Lundt@KingCounty.gov

Update

Are you planning a training and not certain about the details required to achieve CEUs or to establish a budget? The TCC's webpage has links and tools to help. These include:

- State requirements of a training host
- CEU application links
- State-required attendance forms
- Workshop evaluation template
- Workshop finances spreadsheet

If you would prefer to review trainings that already have approved CEUs, a link to each state's library of current trainings is on our home page. 



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Water Conservation Committee

Fall Trustee Meeting – Lake Chelan, Washington

On October 1-3 the PNWS-AWWA Trustees hosted a series of meetings to allow committee leadership to present annual budgets and future training plans. Jeff Petersen, Water Conservation Chair and Julie Smitherman, Vice-chair attended the meetings.


Water Smart Innovations Conference – Las Vegas, Nevada

On October 8-10 the annual Water Smart Innovations Conference and

Exposition (WSI) was held at the South Point Hotel and Casino in Las Vegas, Nevada. More than 900 professionals working in a wide range of water-related disciplines participated in the seventh annual conference. WSI emphasizes the sharing of ideas and best practices to help water utilities achieve greater water efficiency and conservation. Several members of the Water Conservation Committee attended this year's event. Judi Ranton of Portland Water Bureau, Amy

Gerling from the City of Hillsboro, Jeff Petersen from Eugene Water & Electric Board, Julie Smitherman from the City of Ashland, Mike Buettner from City of Bend, Jeff Sandberg from Portland Water Bureau, and Laura Hodnett from Medford Water Commission.

Conference Call

A conference call for Water Conservation Committee members was held on December 9, 2014 at 10:00 a.m. Details will follow. 



From left to right - Mike Buettner, Jeff Sandberg, Jeff Petersen, Laura Hodnett, Julie Smitherman, Judi Ranton & Amy Gerling



Sunset from Campbell's Resort overlooking Lake Chelan



Wine grapes at Karma Vineyards



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Water For People Committee

The Water For People Committee would like to thank the members of the PNWS-AWWA for another wonderful year!

In 2014, the PNWS-AWWA raised **\$148,827** to support the Water For People mission. Please give yourselves a round of applause. We still came in second to the Indiana section, but what a great showing. The total raised by all AWWA Sections was 1.2 Million!



Many thanks go to all our 2014 Water For People sponsors.


Kenneth J Miller Award

Do you know someone who works tirelessly for Water For People? Then submit their name for the Kenneth J Miller award! This award recognizes volunteers for their outstanding service and leadership in the advancement of the Water For People mission. Last year's winner, Nicki Pozos, was nominated for her long-term commitment to the NW Oregon Water For People committee. Anyone can be nominated: Long time volunteers, section committee chairs or subsection event chairs, or that volunteer who is always working behind the scenes at Water For People events.

The 2015 winner will be recognized at the Section banquet and at the National Awards Ceremony held at ACE. Show those volunteers you appreciate their efforts to bring clean water and adequate sanitation to those in need by nominating their name.

For information on the nomination process, contact Stephanie Raddatz at stephanie.raddatz@unitedwater.com. Final nominations are due by February 1, 2015.

Upcoming events

The PNWS-AWWA Section of Water For People will be holding its 12th Annual Silent Auction at the Bellevue conference April 29 - May 1, 2015. Look for us in the vendor hall! 



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Water Resources Committee

The PNWS-AWWA Water Resources Committee (WRC) has been actively engaged in developing educational and professional networking opportunities to share experiences and expertise among water providers and among other water stakeholders in the Pacific Northwest. The WRC Executive Team attended the Fall Trustee Meeting to iron out PNWS Annual sessions and to gain some much needed education on hosting trainings and updating the Committee's webpage. Updates and trainings are now much easier to do thanks to the great work within the PNWS from a number of Committees and our Trustees.

The WRC is looking forward to moderating three Technical Sessions at PNWS Annual Conference in Bellevue, WA. The Technical Sessions are focused on: regional water resource project planning among stakeholders; mitigation methods in water rights and water-rights transfers; and source-water-protection program development.

Seasonally Varying Flows (SVF) Educational Outreach.

The WRC hosted a webinar on November 6, 2014 with two speakers from NOAA Fisheries, Dr. Anne Mullan and Paul Wagner. Their presentations addressed a range of issues regarding SVF including historic flow changes and how current flows in the Willamette and Columbia Rivers are managed to meet flood control, hydropower, fish and wildlife, recreation and diversion needs. They discussed the findings within the Biological Opinions (BiOps) for the two river's operations including desired outcomes for the timing of flow releases, the quantity and quality (e.g. temperature) of flows for anadromous fish migration, spawning and rearing. An audio-visual recording of their presentations can be found on the WRC Committee webpage under


the Workshops page. This was the second webinar on SVF with more planned on developing requirements in Oregon and other states. SVFs are currently a hot topic in Oregon as a Governor-appointed task force develops recommendations for SVF requirements tied to state funding of water storage projects. The WRC is in the preliminary planning for another webinar in early 2015.

AWWA Sustainability Conference March 2015 and WRC Pub Tour

The WRC will again organize an evening pub tour in conjunction with the national AWWA Sustainability Conference in Portland from March 15-18, 2015. The event was a great success during the 2013 Sustainability Conference, with dozens of attendees from all across the country enjoying craft beers from three local brewpubs. Details are posted on the WRC website.

Monthly Committee Meetings

The committee meets by electronic conference across the PNWS region the third Thursday of the month from 3:30 to 4:30 pm Pacific Time to discuss water resource issues in the PNWS region and to plan educational activities. The committee will be focusing on developing timely Lunch-n-Learn and webinar events during our fall 2014 and winter 2015 meetings. All interested parties are encouraged to join us, listen in, and provide input on water resource planning issues of interest to the region and its water purveyors.

For more information on WRC events please visit the website <https://sites.google.com/a/pnws-awwa.org/water-resources-committee/home>. To join into the WRC or get onto our e-mail distribution list please contact Jill Hoyenga, committee secretary, at jill.hoyenga@eweb.org to be added to our Constant Contact list or to the WRC roster. 



For more information on WRC events please visit the website <https://sites.google.com/a/pnws-awwa.org/water-resources-committee/home>.

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Young Professionals Committee

Engage your local Young Professionals

The Pacific Northwest Young Professionals have been very busy organizing fun and educational activities this fall. These events are a great opportunity to learn powerful skills to enhance your career, and network with other like-minded professionals and students. Think about what you could do in your area to increase YP participation. Here is what we've been up to and some great ideas for future events!

Follow us on social media

The Young Professionals Committee has increased its presence on social media. With an active Facebook and Twitter account, we are working to reach more people in real time. By posting directly to the pages of colleges and universities around the section, we can extend our message to a wider student audience. We keep you up-to-date on YP events around the section, training opportunities, job opportunities, and relevant industry news.

Follows us on Twitter @PNWSYP and visit our Facebook page PNWS of AWWA Young Professionals to stay connected!

Kirkland Pump Station tour a success

The King County Young Professionals group organized a joint event with the University of Washington WEF-AWWA group on October 10th. There were 48 people who came out for the King County Kirkland Pump Station

tour! The pump station had recently experienced a \$20 million dollar upgrade. The tour was spearheaded by the University of Washington student group in partnership with the PNWS-AWWA YPs. A big thank you to Bryce Figdore, Lynn Williams and Candice Au-Yeung for making the event such a success! If you'd like to get involved in the King County YP group, please contact Lynn at lwilliams@brwncaid.com.

Cascade to Coast activities and Lane Community College

Kevin Wyckoff, the YP lead for the Cascade to Coast subsection, hosted an event at Lane Community College on October 16th. Karl Morgenstern, Sourcewater Protection Coordinator at EWEB, gave an excellent presentation to students on the importance of Sourcewater Protection.

Kevin also tabled at the EWEB Construction and Utilities Career Fair this year with a "Careers in Drinking Water" booth. This is the beginning of an effort by the committee to have a presence at career fairs across the section, promoting AWWA and opportunities for students and young professionals.

Southern Oregon Sub-Section Lunch 'n Learn


The Southern Oregon Sub-Section Young Professionals hosted a Lunch 'n Learn on December 4th in Medford. The Sub-Section held its quarterly meeting followed by a presentation and tour of the Medford Water Commission's Martin Pump Station.

Afterward we enjoyed pizza and had a friendly bowling competition between the YPs and SPs (Seasoned Professionals)! Several Young Professionals and Students from the area attended this event. These gatherings are a great opportunity to have some fun, network and learn from water industry professionals in our region. To get involved in future events please contact julie.smitherman@ashland.or.us

Looking forward Fresh Ideas Poster Competition

It is never too early to think ahead when it comes to Fresh Ideas and the opportunity to win a trip to present your poster at ACE! Fresh Ideas is a student poster competition open to both graduate and undergraduate students to present on a topic related to the drinking water industry. Abstracts can be submitted beginning in January. Spread the word to students and keep an eye on the website for updates! If you have questions or would like to participate please contact Julie at julie.smitherman@ashland.or.us

Participate

Want to join the YP Committee in its efforts to connect students and YP's with PNWS-AWWA? There are lots of ways you can help, including website work, event planning, leadership roles, Scavenger Hunt planning, helping get a student chapter going, and beyond! Contact Meredith Noble, YP Committee Chair, for more information (meredith.noble@stantec.com). 



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Subsection Advisory Council

Your Subsection Advisory Council (SAC) has been busy this fall planning the 2014 SAC Training to be held February 4-6 at the Portland Airport Embassy Suites near the airport. This is an opportunity for subsection officers to exchange ideas with other subsections and learn new and effective ways to manage our subsection resources. On Wednesday, we will have a group dinner and meet and greet. Subsection training begins on Thursday, February 5 at 8:00 am and will conclude this year at the Trustee Meeting on Friday, February 6, where the Subsections will present reports to the Board. The Subsection Advisory Council has prepared a fully packed agenda and we encourage you to arrive on time and be ready to participate. Our agenda this year includes topics such as:

- How AWWA is structured
- The Section Mission
- AWWA Branding
- Next Year's focus for the Section
- Financial responsibility
- Social Media options
- Updating your website
- Updating your bylaws and do they comply with requirements

We are looking forward to seeing officers in February! And don't forget the opportunity to stay the weekend and attend the Water For People Gala, Saturday night, February 7, at the Red Rose Ballroom in Portland!

In addition, the SAC is headed into our busy time of year for activities. We are getting geared up for the subsection competitions in Top Ops, Meter Madness, Gimmicks and Gadgets and the Tapping Contest that will lead to our section contests at the 2015 Annual Conference in Bellevue, Washington. We continue to budget for travel/registration assistance for our Section winners to travel on to the National Conference, being held this year in Anaheim, California. Competitions should start at the Subsection level in January, so be sure to watch your email for dates and start practicing now!

If you are interested in joining the SAC, we are currently recruiting for someone to coordinate the tapping contest at the Section level. Please inquire with Corie Peterson for more information at corie.peterson@aecom.com or 503-937-2337. [FA](#)



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Northwest Washington Subsection

Training Highlights

Water Treatment Workshop – Held on October 16, 2014 @ Alderwood Water & Wastewater District in Lynnwood, WA.

The workshop included presentations on filter optimization, DOH Turbidity Data Verification Project, evaluating coagulation and flocculation processes, filter maintenance program, and a demonstration and discussion of jar test calibration. Workshop participants earned 0.6 Water CEUs.

Pump Workshop – Held on October 23, 2014 @ Brightwater Environmental Education & Community Center in Woodinville, WA. The workshop was jointly sponsored by the Northwest Washington Subsection and the PNWS Engineering committee.

Along with presentations on basic centrifugal pump operation, pump performance curves, pump affinity laws, function and operation of a Variable Frequency Drive (VFD), and trouble shoot and maintain of single phase and three phase power basics, the workshop



along included a tour of the Brightwater Influent Pump Station, a 135 MGD, high head (285 feet TDH) facility with six 2-stage centrifugal pumps. Workshop participants earned 0.6 Water CEUs.

The Best Tasting Water Contest

The annual Best Tasting Water Contest will be held February 25, 2015 @ the Skagit River Brewery, 404 S. 3rd St., Mount Vernon, WA. Sponsored by the Northwest Washington Subsection, PNWS-AWWA.

Help us determine who has the best tasting water in Northwest Washington. Come join the fun! Be part of the cheering crowd and taste for yourself! The contest is open to any utility, municipality or water district in Snohomish, Skagit, Whatcom, Island, San Juan, Jefferson or Clallam counties.

Water entries are due by 12:00pm on February 25 to the Skagit County PUD. Water samples will then be transported to the Skagit River Brewery by the Northwest Washington Subsection, PNWS-AWWA. Doors open at the Skagit River Brewery at 5:30pm and tasting will start at 6:00pm.

For more information about water entry size, labeling, drop off time, location and judging, go to the subsection webpage on the Section's website (www.pnws-awwa.org) or contact Erin Nishikawa at 425-259-0522.

Training Schedule

The Northwest Washington Subsection will be sponsoring training for operators, engineers and managers in the winter/spring/fall of 2015. Events scheduled so far include:

Water Storage Workshop – Wednesday, February 25, 2015 @ Skagit County PUD, 1415 Freeway Dr., Mount Vernon, WA. Fee will be \$75/person. 0.6 CEUs. Registration will open in early January and a link will be posted on the Northwest Washington Subsection webpage.

Topics currently include presentations:

- Reservoir Criteria and Alternatives
- Maintenance & Upgrades
- DOH Sanitary Survey
- Reservoirs & Seismic Events
- Small System Reservoirs
- Large Reservoirs
- Reservoir Water Quality
- Pressure Tank Storage

Water Loss Prevention Workshop – Wednesday, March 18, 2015, Location TBD. Fee will be \$85/person. 0.6 CEUs. The workshop is jointly sponsored by the Northwest Washington Subsection and the PNWS Water Distribution Committee. Registration will open in late January and a link will be posted on the Northwest Washington Subsection webpage.

Topics currently include presentations:

- Water Loss Control Programs for Water Utilities
- Water Loss Terms and Concepts
- Metering
- Elements of Water Loss Control Program

Excavation and Trench Safety Workshop – Spring 2015, Location TBD. 0.6 CEUs.

2015 Western Washington Short School & Trade Show

– Tuesday & Wednesday, June 2 & 3, 2015 @ the Lynnwood Convention Center, Lynnwood WA. The Short School is co-sponsored by the Northwest Washington Subsection, PNWS-AWWA and the Western Washington Region PNCWA-WEF. Registration will open in early April and a link will be posted on the Northwest Washington Subsection webpage. 1.2 CEUs.

The annual Short School will include 4 - 5 concurrent classes on a variety of topics for water and wastewater operators, engineers and managers. Along with presentations, the Short School will also feature water and wastewater treatment plant tours (tour locations TBD) and a trade show for equipment manufacturers, service providers and consultants.

For additional information or to sign up for email notification for these or any Northwest Washington Subsection workshops go to the subsection webpage on the Section's website (www.pnws-awwa.org) or contact Jeff Lundt at - jeff.lundt@kingcounty.gov or 260-477-5582.

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Emergency tank repair prevention and preparation

By Erika Henderson, Director of Research
Pittsburg Tank & Tower, Inc. www.watertank.com



Drinking water tanks are surrounded by threats daily, but most problems associated with emergency tank repairs can be prevented. Extra time and maintenance may be needed to ensure the tank is protected, and water operators should have an effective plan to restore water services if a tank emergency does occur.

Most problems that lead to emergency tank repairs can be prevented with proper maintenance and regular inspections. Obtaining accurate information and saving the documentation of every inspection and repair can enable a deeper level of understanding about the tank's history. The knowledge gained from its history can then be used to help create a more effective strategy in preventing and limiting future tank repairs.

Harsh winter weather often increases the risk for tank damage and emergency repairs. Last winter, several drinking water tanks nationwide experienced damage, leaks, and failures as a result. A Minnesota tank froze twice over the winter because of the prolonged deep freeze¹. And, according to *The Old Farmer's Almanac's* for 2014-2015, "this winter will be another arctic blast with above-normal snowfall throughout much of the nation." Therefore, measures should be taken now to protect the tanks and help prevent damage that could be caused by snow, ice and freezing temperatures.

Drinking water tanks are more susceptible to freeze during nighttime hours when water demand and turnover rate is low. Moving water is less prone to freezing, so keeping the turnover rate high or adding a mixing system can help. The National Fire Protection Association (NFPA) recommends maintaining the water temperature at or above 42°F to prevent tank freezing, and the water temperature can be monitored by installing a low-water temperature alarm². But, to maintain appropriate temperature, heating may be necessary. Insulation and standby electric heaters can be used for systems not already setup for steam or hot water.

All heater pipes, heating elements and temperature alarms should be tested, inspected and replaced as needed before the heating season begins and monthly thereafter or malfunctions are likely to occur. For example, the heater in a wooden Chicago water tank malfunctioned in March and the water inside froze solid. The tank's structural integrity was compromised and the tank had to be dismantled later that month³.


Changes in temperature can cause pipes to expand and contract making them vulnerable to breaks and leaks. Therefore, all pipes subjected to freezing or temperature change should be protected with insulation and heat tracing. The pipes inside small dry risers of elevated water tanks should also be insulated to prevent the inlet and outlet pipes from freezing. In January, a water pipe broke underneath the foundation of a Minnesota water tower and nearly 500,000 gallons of water was drained from the tank in a mere thirty minutes⁴.

Pipe connections and expansion joint connections should be monitored closely for leaks. Leaks hidden behind insulation can be difficult to locate, and insulation should be inspected and replaced as needed to reveal any defects hidden behind it and to remain effective. The American Water Works Association (AWWA), NFPA and Occupational Safety & Health Association (OSHA) have devised a

system of codes and standards that contain several recommendations on pipe inspections and a suggested timetable for inspecting each type of pipe.

Pumps, altitude valves, and overflow pipes should be checked before winter to prevent malfunctions. An overflow to grade may freeze solid if screens are plugged or flap valves are stuck, and vents can become clogged with ice and snow if they are not vacuum pressured and frost proof. Pumps or altitude valves that fail to shut off during tank filling can cause the tank to overflow. AWWA states, "A properly operated tank should not overflow during normal operation. An overflowing tank is considered an emergency condition and the malfunction causing the overflow should be determined and corrected as soon as possible." AWWA does not recommend the use of an internal overflow, because if an overflow failure occurs it could go unnoticed and empty the tank⁵. This past winter, five water distribution pumps in Arkansas froze overnight, leaving the city's above-ground storage tanks empty. Without water, the city's fire hydrants became useless and firefighters were left with nothing but the water on their trucks⁶.

All valves, pipes, controls, alarms, and liquid level indicators must be in proper working order for adequate water to be available. Failure of any component could have dire consequences, and all components may need to be inspected daily during extreme weather for signs of frozen, cracked or damaged areas. Sometimes despite all measures taken emergency repairs may still be needed. Therefore, effective strategies must be devised for a quick

response and recovery. An established relationship with a dependable and experienced tank professional, already familiar with the tank, can be extremely useful. The selected full-service tank company should be educated, certified and have received the proper safety training necessary to perform tank inspections, repairs and modifications. They should be available 365 day a year to answer questions, address concerns, and be flexible enough in their scheduling to make emergency repairs when needed. Please do not attempt to thaw or drain the tank without professional help if water freezing does occur; further damage or a tank rupture could result. Please contact the author or Don Johnston djohnston@watertank.com, 270-826-9000 for more information on emergency tank repairs. 

1. Hudson, Bill. "Tough Winter Leaves Municipal Water Towers Frozen" *Minnesota.cbslocal.com*. 14 April 2014.
2. National Fire Protection Association. *NFPA-22*. 2008 Edition. 43.
3. Emmanuel, Adeshina and Holliday, Darryl. "Andersonville Water Tower Removed, Frozen Solid" *DNAinfo.com*. 20 March 2014.
4. Hage, Jeff. "Catastrophic break: 500,000 gallons of water emptied from Milaca water tower in a half hour" *The Mille Lacs County Time.com*. 9 January 2014.
5. American Water Works Association. *AWWA Manual M42*. 2013 Edition. 91.
6. Suriani, Mike. "Frozen Pumps Leave West Memphis without Running Water" *WREG.com*. 6 January 2014.



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- and much, much more!

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[January 5, 2015!](#)



Lodging and Accommodations:

This year's headquarters hotel is the Hyatt Regency Bellevue with the overflow hotels being the Red Lion Hotel Bellevue and the Sheraton Bellevue Hotel. Rooms will be filling fast, be sure to make your reservations!

To register for the conference, find additional information about conference schedule, lodging, parking, and transportation, please visit our website: <http://www.pnws-awwa.org/training-events/conference>

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STRAY CURRENT MITIGATION

in TriMet's Portland - Milwaukie Light Rail Project

ABSTRACT: From the modest beginnings of horse-drawn rail cars on First Avenue in the early 1870s, light rail in Portland has flourished, declined, and gone through a resurgence. By 2030, planners forecast a million new residents in the Portland metropolitan area. The Portland - Milwaukie Light Rail project is a key component in the planning effort connecting Clackamas County, one of the region's fastest-growing areas, with Portland State University (PSU), the number one destination in its transit system. Light rail systems such as this impose unique impacts to utilities within the light rail corridor. This article presents the Portland Water Bureau's approach to mitigating light rail-related impacts to its potable water facilities.

By Aaron Eder, P.E.

From the modest beginnings of horse-drawn rail cars in the early 1870s, light rail in Portland, Oregon, has flourished, declined, and experienced a resurgence. By 2030, planners forecast a million new residents in the Portland metropolitan area. Scheduled for completion in 2015, the 7.3 mi long Portland–Milwaukie Light Rail Transit Project (see Figure 1) will play a key role in meeting future demands for transit by connecting Clackamas County, one of the region's fastest-growing areas, with Portland State University (PSU), the number-one destination in the transit system. Light-rail systems such as this uniquely affect utilities within the project corridor, particularly underground pipelines that are susceptible to corrosion caused by the electrical current powering the train engines. By carefully accounting for this source of corrosion and other effects associated with light-rail systems, the fast-tracked Portland–Milwaukie Light Rail Transit Project has mitigated such concerns while reducing construction duration and cost and minimizing upward effects to businesses along the alignment.

The new Portland–Milwaukie light-rail line constitutes the second phase of the South Corridor Project, an effort led by Metro – the metropolitan planning organization for the Portland region – together with the Tri-County Metropolitan Transportation District of Oregon (TriMet), the City of Portland, the City of Milwaukie, and Clackamas County. Begun in 1999, the South Corridor Project sought to identify transportation options for the fast-growing north–south corridors along Interstate 205 and between Milwaukie and Oregon City. Although light-rail originally was not considered as part of the project, neighborhoods along the project alignment requested that it be evaluated, and ultimately light rail was adopted as the preferred option. September 2009 saw the beginning of service along the South Corridor Project's first phase, an extension of the existing Metropolitan Area Express (MAX) Green Line from the Gateway Station south along the I-205 corridor to the Clackamas Town Center Station.

Light rail has enjoyed a long history in Portland. In the 1870's, the city's first trolleys were drawn by horse and mule. At the beginning of the 20th century, the Portland metropolitan area had the first interurban electric rail service in the nation. By 1912, Portland – by then a city of 250,000 – reached its apex of 28 electric rail lines. However, after World War I, electric rail lines began to feel the pinch from the emergence of the automobile. During the 1930s, buses began replacing streetcars, and the last street car was retired in 1950.



Figure 1: Rendering of the Portland-Milwaukie light rail system
Photo Credit: TriMet

By the 1960s and 1970s, Portland was consistently violating federal clean-air standards. Concurrently, planning had begun on a controversial new highway, the Mt. Hood Freeway, which would have sliced through Southeast Portland, forcing thousands to relocate.



Figure 2: Shoring can prove to be challenging in streets that are congested with other utilities.
Photo Credit: Portland Water Bureau

However, grassroots opposition eventually derailed the proposed freeway, helping to propel light rail to the forefront of plans to address traffic congestion in the Portland metropolitan region.

Established in 1969, TriMet quickly absorbed many of the outlying suburban bus services and began preparing for rapid transit solutions. In September 1986, the Eastside MAX line opened for revenue service, spanning 15 mi from Gresham to downtown Portland. One of the first light-rail systems in America, Eastside MAX helped set the standard for the future of American light-rail design. The new system also marked a critical point in Portland's history, as the region shifted from automobile-focused urban design to become a civic leader in land use and transportation. Since this initial light-rail project, TriMet has added 4 extensions, including the Westside MAX (Blue Line), Airport MAX (Red Line), Interstate MAX (Yellow Line), and Portland Mall Light Rail (Green Line) totaling nearly 53 miles of light rail lines.

Light-rail transit system operations uniquely affect utilities within the transit corridor. By the same token, utilities can impair transit system performance if problems arise. For example, light-rail trains, unlike cars or buses, cannot be detoured around a broken water main or other obstructions in the road. Therefore, utilities underneath the tracks must be either relocated or improved to minimize the possibility of damage and reduce the likelihood of having to excavate the roadway and shut down light-rail operations while maintenance is performed. Because of safety constraints, construction crews may not work too closely to moving trains or the high-voltage catenary power lines installed overhead. Further, excavation beneath or bordering the track is restricted because of the potential of undermining the track as well as reducing the load on the existing utility.

Construction parallel with rail systems can be more challenging than crossing under a track, because such parallel excavations warrant more extensive shoring or other trench safety systems to support the trench and protect crews. In streets that are congested with other utilities, such as downtown Portland, shoring can prove to be a challenging task in itself (see Figure 2). An additional challenge with excavations parallel to rail systems is the physical limitations of the heavy machinery used to install and maintain utilities. Construction machinery generally spans the excavation, which may infringe upon the rail system right-of-way and impede train movement.

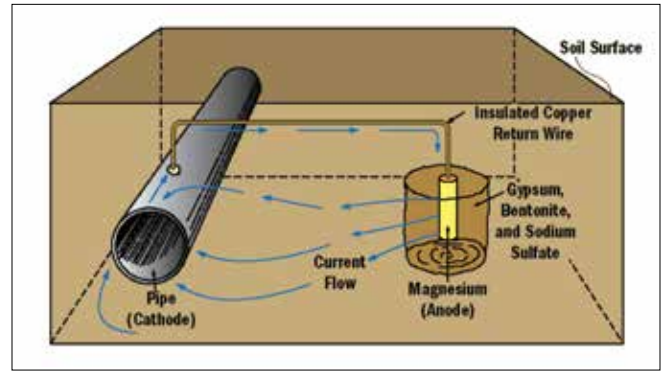


Figure 3: The electrical circuit is complete when the current flows from the pipe (cathode) to the magnesium (anode).
Figure Credit: AWWA M27

A less obvious effect of a new light-rail system is stray current corrosion. Light-rail trains are powered by electricity. Electrical current travels in a circuit from the power station to the train via the overhead wires above the tracks, through the train's electric engine, and back to the power station via the rail and ground. Because the soil serves as a parallel conductor to the track, a portion of the current will return to the power station through the ground. The current returning through the ground is known as a "stray current," because it follows a path other than the one intended. Electric current in the ground will use the most conductive medium to return to the power station. Water pipes made of iron or steel are often good conductors. However, when the current leaves the pipe, it takes electrons with it and corrodes the pipe.

The basic, fundamental cause of corrosion can be explained in terms of energy. A metal naturally tends to exist in the form of a compound, because such compounds as oxides contain less energy than metals and are therefore much more stable. During the manufacturing of metallic pipes, iron is separated from its associated oxygen in a blast furnace, producing significant amounts of energy. As long as they remain metallic, steel and iron pipes retain this chemical energy, bound up within themselves, resulting in a natural tendency to corrode back to the ore from which they were derived. It is this energy that drives the corrosion process.

For corrosion to occur, a complete electrical circuit, including an anode and a cathode, must be present. The anode is the location where the current leaves the metal, and the cathode is the location to which the current flows. In the case of electric light-rail systems, the current travels from the substation along the overhead wire until it reaches the train, passing through the motors and theoretically returning along the rails to the substation. In reality, most of the current returns along the rails to the substation. However, if a reasonably low-resistance parallel metallic path exists – for example, the current may follow pipelines and cables to return to the negative ground of the substation – a portion of the current will take this route.

Portions of water mains can be electrically continuous as a result of such typical construction methods as leaded joints on cast iron pipes and mechanically restrained joints on ductile iron pipes. Where the current jumps from the rails to a water main, the rail is serving as the anode and the water main is serving as the cathode. In these cases,

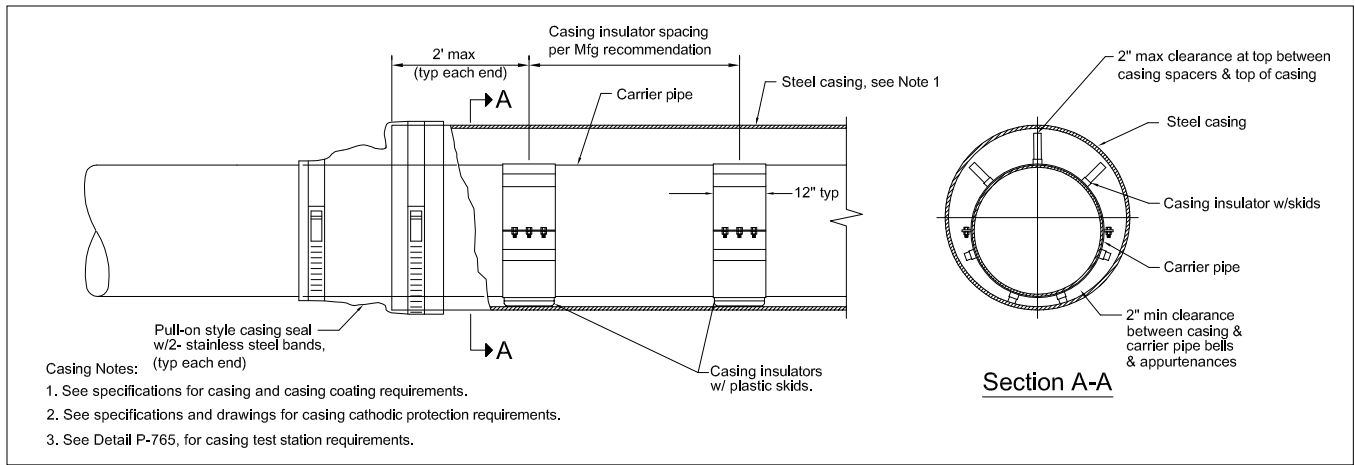


Figure 4: Steel-encased ductile iron pipes will be installed at all mains crossing under the tracks.
 Figure Credit: TriMet and Portland Water Bureau

the water main is protected, because electrons are not being removed from the pipe. Where the current leaves a water main to enter a lead cable, the water main is serving as the anode and the cable is serving as the cathode. In these cases, electrons are leaving the pipe with the current, causing the pipe to corrode. Table 1 presents a galvanic series of selected metals common in construction. In a galvanic cell of two dissimilar metals, the more active metal will act as the anode and be corroded. The more noble metal will act as the cathode and be protected.

Galvanic Series of Selected Metals Common in Construction

- Anodic, Active (Read Down)
- Magnesium
- Zinc
- Aluminum
- Mild Steel
- Wrought Iron
- Gray Iron and Ductile Iron
- Lead
- Tin
- Brass
- Copper
- Stainless Steel, Type 304
- Stainless Steel, Type 316
- Titanium
- Silver
- Gold
- Platinum
- Cathodic, Noble (Read Up)

The previous example was simple, but in the complexity of a metropolitan district, the path of stray currents can be difficult to follow. To reiterate the important point, anodes corrode; cathodes do not. As such, it is only necessary to make a pipeline sufficiently cathodic to prevent its corrosion. If a current is passed from the earth to a pipeline, the incoming current will nullify any outgoing currents from the anodes of local corrosion cells. Further, the pipe, receiving current over its entire area will be immune from corrosion. A current through the earth can be easily produced by galvanic action from the energy generated by the corrosion of a magnesium anode. In this

case, a piece of magnesium is connected to the pipe with wire and buried, away from the pipe. Because magnesium is much more active than the iron or steel in the pipe (as demonstrated in Table 1), a considerable voltage is established between the magnesium and the pipe. Current will flow from the magnesium (anode), through the earth, to the pipe (cathode). The electrical circuit is completed when the current flows from the pipe to the anode through the wire (See Figure 3).

Today, nearly all buried metallic pipelines are coated with some kind of organic coating. Corrosion can be prevented completely by either maintaining a perfect coating or impressing a protective cathodic current density on a bare line. However, maintaining a perfect coating is impossible, as a perfect coating does not exist. Meanwhile, impressing a protective cathodic current density is prohibitively expensive because of the high current demand. Somewhere between these two extremes lies the economically optimal combination of a good coating supplemented by cathodic protection to protect the inevitable imperfections in the coating from corrosion.

The City of Portland Water Bureau requires 10 ft of separation between its water mains and light-rail track. Known as the Electric Rail Design Criteria, this stipulation includes the requirements for ensuring access, controlling corrosion, and evaluating the potential costs and benefits of leaving a main in place closer than 10 ft from the track. As a result, all water mains within 10 ft of the proposed track slab for the Portland–Milwaukie line were to be relocated. For its part, TriMet hired the engineering design firm Kennedy/Jenks Consultants in 2010 to design the water system improvements.

Further, all mains crossing under the track were to consist of steel-encased ductile iron pipe, with the casing extending 10 ft from each side of the track slab, in keeping with the Bureau's requirements (See Figure 4). Encasement in steel facilitates maintenance or replacement of the encased pipe to occur in a manner that does not affect light-rail operations, as the track would not need to be excavated to perform this work. All told, more than 8,000 ft of the Bureau's water mains, ranging in diameter from 36 to 6 inches., have been relocated for the Portland–Milwaukie Light Rail Project. Existing service lines and hydrant runs crossing under the track slabs have

been replaced with ductile iron or copper pipe encased in polyvinyl chloride, depending on the existing pipe size.

To mitigate the corrosive effects of stray electric currents, 30 lb magnesium anodes have been placed every 100 ft along all water mains parallel to the track. Further, insulating joints, consisting of two flanged pipe ends with a di-electric gasket in between, have been placed at connections to existing mains, as well as at each end of the steel-encased mains. These insulating joints prevent stray currents from traveling too far along the pipeline. Test stations are located at these locations to monitor corrosion. A continuous electric circuit will be created between corrosion test stations by installing bonding wires across each pipe joint (see Figure 5). As an additional measure, all ductile iron pipe was wrapped with 4-mil polyethylene encasement (see Figure 6).

The Bureau maintains several large-diameter transmission mains that convey water from the city's main supply in the east into downtown Portland. Two of

these, an existing 30 inch diameter cast iron pipe and an existing 36 inch diameter ductile iron pipe, were replaced and installed in 48 and 54 inch diameter steel casings, respectively (see Figure 7).

In addition, the new light-rail tracks will cross the Bureau's 60 inch diameter Washington County Supply Line, which delivers up to 60 mgd from Powell Butte to wholesale customers in the Tualatin Valley Water District, the Raleigh Water District, and the City of Tualatin. Options for maintaining this water supply included replacing the existing pipeline with a new 60 inch diameter steel pipe or protecting the existing concrete pipe in place. In the end, it was decided to protect the pipeline in place with a concrete box culvert (see Figure 8), as new steel pipe that size could not be supplied and installed during the off-season period that the Washington County Supply Line could be taken off-line. This decision helped to reduce construction time as well as the project cost.



Figure 5: Bonding wires installed across each pipe joint creates a continuous electric circuit between corrosion test stations.
Photo Credit: Portland Water Bureau



Figure 6: Polyethylene encasement provides additional protection from corrosion.
Photo Credit: Portland Water Bureau




Figure 7: Several large-diameter transmission mains were replaced and encased in steel casings.
Photo Credit: Portland Water Bureau



Figure 8: The Washington County Supply Line was protected in place with a pre-cast box culvert.
Photo Credit: Portland Water Bureau

The Portland regional office of Stacy and Witbeck, which has its headquarters in Alameda, California, served as the general contractor on the pipeline upgrade project. Construction associated with the pipeline upgrades began in 2011 and was completed in 2013. Maintaining business and pedestrian access was critical to the success of the project. TriMet worked closely with its contractors to speed the pace of construction and ensure that customers always had access to businesses. To minimize untoward effects associated with construction, crews worked for up to eight weeks in zones extending for three to five blocks, and then moved to the next work zone.

This innovative engineering project ensures that routine or even emergency maintenance associated with Portland's water system will not affect light-rail operations along the new Portland-Milwaukie line. Further, the project provides cathodic protection from stray electric currents common with light-rail projects, helping to prevent corrosion of the Bureau's water lines. 

Project Credits

- Light-rail system owner: Tri-County Metropolitan Transportation District of Oregon (TriMet) Water main owner: Portland Water Bureau
- Water system improvements design: Kennedy/Jenks Consultants, Portland
- General contractor: Stacy and Witbeck, Alameda, California



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Aaron Eder, P.E., is a Project Manager in the Portland office of Kennedy/Jenks Consultants, one of the nation's leading water, wastewater, and stormwater design firms. He is a licensed professional Civil Engineer in Oregon and Washington. Aaron received his Bachelor's Degree in Civil Engineering from the University of Washington in 1995 and his Master's Degree in Civil Engineering from Portland State University in 2005. Mr. Eder was instrumental in Kennedy/Jenks recently being awarded several recent contracts with the Tualatin Valley Water District and Clean Water Services. He served as the Project Manager and Project Engineer for this project, with construction scheduled for completion in 2015. In his free time, Aaron is an avid weight lifter, mountain climber, and runner. He has run 6 marathons and reached the summits of Mt. Hood, Mt. Adams, South Sister, and Middle Sister, multiple times at each summit.



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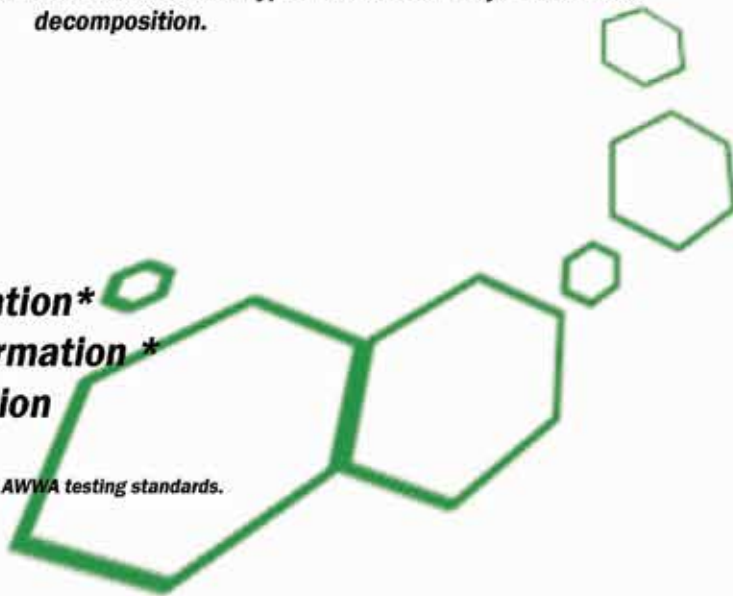
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Pipes and standards

A few years ago, a Portland Water Bureau crew removed a cast iron pipe with a manufacturer's stamp from 1883. The pipe was only removed because a new light rail system was going to be laid down over the top. The asset management team at the Water Bureau was amazed by the condition of the pipe. They found no sign of internal or external cracking, corrosion or pitting, just some barnacles on the inside bottom. Its wall thickness was at least ¾ of an inch, and it probably could have lasted at least another 100 years.

The manufacturer's stamp helped the team track down more information about the pipe's

manufacturer: New Jersey-based Florence Foundry (FF) and RD Wood & Company (R.D.W.&Co) had a strong reputation for reliable cast iron pipes. A brief history of the company states that the infrastructure of Paris, France consists mostly of these same cast iron pipes from New Jersey. Who knew that pipe connects the world.

As we all know, not all pipes have such a long and happy life. However, the AWWA has been helping to make sure that the pipes that are put in the ground meet the minimum requirements for materials required to maintain a good water supply. The first AWWA committee on product standards met for the first time in 1882, at the second

annual conference for AWWA. This committee wanted to simplify and improve the safety and production of pipe material used in water systems. In 1890 a report was prepared on the tabulation of standard makes and weights for cast-iron pipe and grades A, B, and C from 3" up to 48'.

In 1908 AWWA adopted its first standard: "Standard Specifications for Cast-Iron Water Pipe and Special Castings". This standard covered bell-and-spigot pit-cast pipe and fittings of ten thickness classes. In 1913 standards were developed for fire hydrants and gate valves, which were logical additions to the pipe standard.

We all take this for granted, but there a lot of volunteer hours that go into writing and updating the AWWA standards (well over 100) and we all benefit – customers, producers and consumers. The history of our water systems is entwined with the development of standards.

A copy of the 1908 AWWA standard is available on their website. [FA](#)

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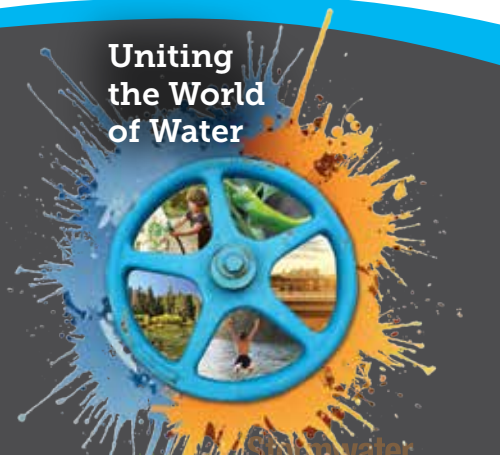


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You will find them quickly with our convenient, easy to use Buyers' Guide.

On these pages, you will find information that will help you meet your purchasing requirements throughout the year ahead. The initial section of this Guide lists categories of products and services along with the various companies that can provide them to you. The following section provides an alphabetical listing of those companies as well as the contact information you will need to reach them.

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ACCESSORIES

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Corrpro Companies
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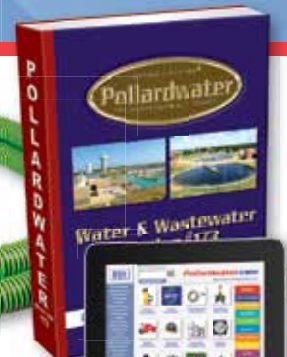
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