



Wisconsin **Rural Water** **Journal**

Summer 2021

Sustaining
Artesian Wells

Cybersecurity and
Ransomware Attacks

Wisconsin Well Water
Quality Viewer

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*Details and information are found on pages 25-27.
Forms are found on pages 30-31.*



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Message from the President

Dean Bergstrom,
WRWA President, Cumberland

As I write my first "Message from the President", I hope this is finding everyone enjoying the summer months in Wisconsin and I hope that all is going well with your summer projects. I would like to take the opportunity to introduce myself. My name is Dean Bergstrom from Cumberland, in District 4. I consider it a privilege to be elected as President of the WRWA and to serve in this capacity and to represent all of our members. I was first elected to the board in 2011 and I have really enjoyed getting to know my businesses that help in supporting and sponsoring WRWA's conferences, expos and advertisements in our quarterly journal magazines. When I first started working back in 2000, WRWA was an excellent resource for the training and knowledge required to do my everyday responsibilities to my water system. I look forward to continuing helping out WRWA in any way that I possibly can. I would like to thank Ramon Knudtson for his many years of service on the board and also his role as President in the recent years. Ramon will still be active on the WRWA board as he has now moved to the Past President position. I hope everyone that was able to attend the Outdoor Expo enjoyed all the classes, vendor booths, and talking with your fellow constituents in the industry. Unfortunately, I was unable to attend, but I heard there was a great turnout and it was a good day for learning what is new out in the industry. I hope you all are able to join us in La Crosse on the week of August 31st - September 3rd for the Annual Conference, which was moved later in the year in hopes of having health restrictions lifted prior to hosting such a big event. I am looking forward to seeing you all down in La Crosse. Feel free to introduce yourselves to me and offer any ideas or concerns you may have with WRWA as we move forward in the years to come.

Until then, stay safe.

Dean



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Industries.



Chris Groh,
WRWA Executive Director

Message from the Executive Director

Sometimes It's Fun, Sometimes It's Not

As with most jobs there are times where work is not very fun at all, and times when it is fun. Let's face it, March 2020 through May 2021 has not been a barrel of laughs. Covid, presidential elections, reruns on TV and being shut in the house was pretty tough to take. Speaking with and working with operators who contacted me with water and wastewater issues was fun. I got a chance to speak with friends and exercise my brain again with some familiar problems. It was actually fun to speak with and work with our Congressmen and Senator on our funding and infrastructure issues in Washington DC. Some of these staff people and federal representatives have become friends and it was nice to see them (albeit virtually). I had a chance to testify at a state Congressional committee in Madison just a few weeks ago and it was a very interesting process. Of course, nerves played a role but after getting the committee to laugh at one of my jokes it became a fun as well as important process.

Fighting with the emergency vaccination committee was a real eye opener. I was surprised to learn that being front line employees that provide something as important as water to drink, wash hands, put out fires and wastewater treatment that provides flushing toilets, sanitation and environmental protection was not an automatic in for getting vaccines that could keep everything going without interruption. After pointing this out to the committee we got nudged up to 1B, right behind health care workers and teachers.

We shifted from having our Annual Technical Conference to staying shut in at home and contacting our operators to be sure that maintenance and safety was still in our operator's daily routine. I went from getting ready for our premiere event to canceling it, crying a little bit and then working on emergency plans for our thousands of water and wastewater systems. I was touched by how responsive our operators were to volunteer in case a system's employees go down to COVID. Many operators, staff and I worked together quickly to be sure people had the best options to run and maintain operations across the state. It became so clear as to why we talk about and work on Emergency Response Plans and drill that into everyone's minds.

After a year of mostly downs, we now have crossed over an inflection point where we now experience more ups. Just last week we had our Outdoor Expo in Plover in the usual face to face format. We set records as far as vendor booths, training, attendees and FUN! It was so nice to see all my friends from around the state, shake hands and catch up with what's new. I very much appreciated seeing so many operators and vendors having such a good time. Now that Expo is past, we are turning towards Conference which is the high point of the year. We will be interacting with many more friends and operators to have the best conference ever. Now that is fun!

Everyone's job has this range of fun and not fun, but hopefully we will be able to supply education, information and fun for now on. I'll be sure to try!

Chris

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We'd love to hear from you...

Dear Andrew-

On behalf of our students and staff and what to extend a sincere thank you for your "ground-water" presentation at our school on Wednesday. Great information and the model was so cool to view as you spoke.

Again we appreciate your outreach and passion for keeping our water systems clean!

Sincerely,

Jeff Reiche, St. John Lutheran School
Wausau, WI

I'm finally getting around to sending this email out. I just want to notify WRWA that I sat in the AWIA risk assessment class in Waterford last month. I thought Andrew Aslesen did an outstanding job with Kelly Thomas's assistance. Andrew did a thorough job in his explanation of this EPA form that municipalities have to work through. Thanks WRWA for having these classes that help municipalities stay in compliance.

Dave Felkner
Village of Hartland Utilities

Renee,

I am just replying all to one of your Rural Water E-News emails so Chris is also copied. However, if you could pass this along to the WRWA staff for me it would be appreciated.

Yesterday in the raffle I won the "money tree" from the WRWA staff. It is actually the second time I won this exceptional prize in the last 5-6 years! I thought it was the best raffle prize in the group yesterday. I appreciate that everyone in your organization is willing to chip in for a good cause. I will do my best to "pay it forward".

Thank you very much.

Joseph T. Hoban, P.E., Vice President
Dixon Engineering, Inc.

Dear Todd,

Thank you for coming to our Village to help us find our leak. Your time and effort was greatly appreciated. As we are a small Village, your work to help us find our leak quickly was amazing.

Thanks so much and have a great day.

Char Meier, Clerk/Treasurer
Municipal Court Clerk, Village of Lena

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Hello Chris, Kay and Jeff,

I've been meaning to get this out for a few weeks. Want to thank the Wisconsin Rural Water Association for the use of your portable Isco refrigerated composite sampler. Our sampler cooling system failed back in December and a new replacement was months before we could get one. I called up Kay to ask if the WRWA had a loaner. To my surprise Kay said yes and had it here the same week. She was great to get it to us fast and it worked great. This is the first time I have utilized the loaner program. We finally received our new sampler the first of April. It is great that you offer this service. When someone is in search of something and I'm not able to help them with I tell them to check with WRWA as you may have one in the loan program. Thank you again from The City of New Richmond Wastewater. Please pass along to anyone I maybe forgetting that was part of helping us out.

Steve Skinner, Lead Wastewater Operator
City of New Richmond

Greetings, Chris and Renee,

Thank you for your excellent service and for providing speakers to my Wisconsin Section of AWWA Customer Service Seminars a few years. I appreciate all you do for Wisconsin water!

I am retiring Friday after 18 years with Milwaukee Water, so am asking to remove my email from your distribution list. Thank you!

Wishing you all the best in your professional and personal lives. Enjoy the summertime!

Warm regards,

Rosalind Rouse, Water Marketing Specialist

Milwaukee Water Works

Dear Kay,

I wanted to let you know that all of the guidance you've given us and equipment (EcoSense ORP meter, WW sampler, Hach DR900, and Hach Nitrate reagents) you've loaned us are bearing fruit. Can I give you the latest?

Although I was crestfallen when the sampler Rural Water loaned us in early winter had to be loaned to another utility, it forced me to think very carefully about how we could safely get a "minimally disturbed" sample out of the tanks, whose water surface is 5' below the concrete cover. I was able to find a tiny submersible hydroponics pump (EcoPlus132, about \$15) with about 3' of discharge head. I added a sample bottle about mid-way on the power cord, and had the pump discharge tubing enter straight into the bottle. We then used a \$44 UPS in a backpack to power to pump. We lowered the pump into the tank, with the bottle suspended 2.5' above the water surface, and turned on the pump, allowing it to gently fill and then overflow the bottle for about a minute. When we switched off the pump, the discharge tubing (which was 25% submerged in the sample bottle) emptied back into the tank, and we were left with our minimally disturbed sample.

Why was a minimally disturbed sample so important? We wanted to measure the ORP of the Anoxic tank to see if we were in the -50 to +50 sweet spot range, as you had recommended back in November. But the measured ORP value might be significantly affected if the sample had gotten at all aerated in the process. The benchtop, budget YSI EcoSense ORP meter only has a 3-foot cable, making it almost impossible to do a true in-tank measurement. However, YSI's ORP meters with long leads (appropriate for field measurements) have a pricetag of several times the EcoSense. Figuring the EcoSense was the only ORP option in our price range, Merrimac did end up purchasing our own EcoSense ORP, after having borrowed it from Rural Water in early winter.

Yesterday we performed our first field measurements. SO INTERESTING. Right before our LS 1 pumps discharged to the WWTP, we took a measurement in the Anoxic Tanks. ORP = +28. When LS1 runs it adds roughly 1,000 gallons (of Raw WW, ORP = -200ish) to our 50,000 gallon Primary tank (so, 2% of tank volume), which then transfers 1,000 gallons of primary effluent to the 50,000 gallon Anoxic zone. Five minutes after LS1 ran, we measured again, and the ORP had plunged to -40. I tested a sample of the tank contents with

Hach's Low Range Nitrate test (Range 0.01 to 0.50 mg/L) and found a rock bottom value of 0.02 mg/L with the Village's new DR900. So, right now, our Anoxic zone is in the ORP sweet spot, and is nearly perfectly denitrifying about 7 mg/L Nitrate-N from our recycle!

What was so gratifying about the field measurements was how well they matched the general behavior of ORP from my benchtop experiments. When I did benchtop experimentation with the ORP meter with our +200 ORP Recycle and our -200 ORP Influent, I discovered that even a mixture of 90% Recycle and 10% Influent saw the ORP of the mixture to plunge to about 0, and then it would slowly recover its ORP, maybe back to about 160. Don't quote me on those numbers; the point is that ORP is absolutely, positively NOT arithmetic in the "short term."

We now have all the equipment and materials in place to start carefully monitoring and documenting how the Anoxic zone behaves once our R5F (recirculating sand filter) is nitrifying at 100%, and to determine how much supplemental carbon (MicroC 2000) we need to stay in the sweet spot and allow our anoxic zone to fully denitrify!

So, again, I want to thank you for clueing us into the centrality of ORP, and introducing us to all the right equipment and methods. I'm also going to thank Troy Larson at Strand for putting us in contact with you.

Margaret Budde, Village Assistant

Village of Merrimac

continued on page 6

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continued from page 5

Assembly Passes VanderMeer Water Meter Replacement Legislation

Madison, WI – Yesterday during a floor session at the Capitol, the State Assembly passed 2021 Assembly Bill 302, authored by Representative Nancy VanderMeer (R-Tomah), via voice vote. The bill, relating to, water meter installation or replacement projects by water utilities, was unanimously passed out of the Assembly Committee on Energy and Utilities earlier this month. Senator Rob Cowles (R-Green Bay), Chairman of the Senate Committee on Natural Resources and Energy, is the Senate author of that house's companion legislation.

"I'm really pleased that we were able to get this bill passed today. Under two months from bill introduction to committee and floor passage is quite the feat in it of itself, and I want to make sure to thank the Village of Vesper and their now retired Public Works Director Don Jagodzinski, the Wisconsin Rural Water Association and their Executive Director Chris Groh, and the League of Wisconsin Municipalities for bringing this to my attention over two years ago, and their help and support to develop this legislation and move it forward," VanderMeer said.

"Unfortunately, relatively smaller municipalities in the state, like the Village of Vesper and many others in the 70th Assembly District, are inordinately affected by bureaucratic hurdles and contradictory or unnecessary directives from state agencies. They simply don't have the administrative bandwidth or financial reserves to cater to subjective interpretations of state statutes by pretentious bureaucrats in Madison. This bill



Rep VanderMeer speaking on the bill prior to passage during floor session yesterday/on June 22nd, 2021. Photo taken by Legislative Photography team.

provides clarity to existing statutes and provides remedy to municipalities needing to take on a water meter installation or replacement project. The strongest critique of this legislation that I'm aware of came from my colleague Dave Steffen (R-Green Bay), Vice Chair of the Assembly Committee on Energy and Utilities, who understandably was agitated that we in the Legislature would need to run a bill to help try to make the Public Service Commission responsive to it's customers, the people of Wisconsin," VanderMeer continued.

The 70th Assembly District includes portions of Monroe, Jackson, Portage and Wood counties.

Would like to thank Annie with helping on trying to find leaks in our distribution system we didn't find anything but she spent two days here.

Thanks again

Village of Monticello Public Works



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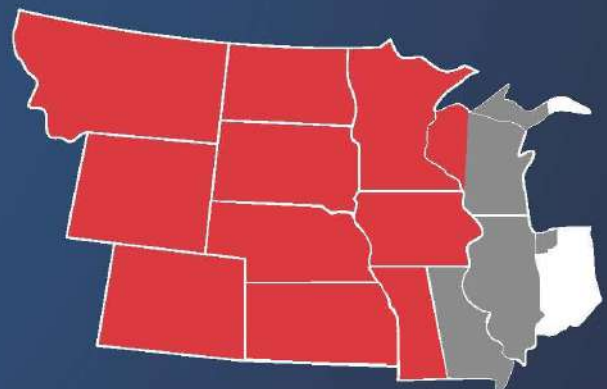
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SUSTAINABILITY



Jesse Hass,
WRWA Wastewater Technician/Trainer
Wastewater Specialist

Each department has a different and unique perspective about the most effective way to run a utility.

Just recently WRWA conducted a class about sustainable utility management. This class was developed about 10 years ago by the EPA. The class was designed to have different stake-holders within a utility attend and assess their utility. The interesting thing that comes out of these workshops is how different people within a utility view their utility. The first sustainability workshop that I attended was about 5 years ago. The attendees for that workshop included a clerk and a DPW who had worked together for over 30 years. During the workshop each person is asked to assess their utility independently. I assumed that the clerk and the DPW would have similar assessments of their system. What came to pass that day and what usually happens during these sessions is priorities are much different for different departments. Each department has a different and unique perspective about the most effective way to run a utility. No side is right or wrong, each side wants what's best for the Village or City but there are differing opinions on how to manage a utility.

By bringing the differences out in the open, stake holders are able to see and discuss a different person's point of view.

Another thing that is really helpful during one of these workshops is when board members attend. Most board members have experience from areas outside of a government agency. The issues that face a city or Village are probably much different than issues a board member deals with at their job or at home. Trying to educate board members and board presidents about city workings is sometimes a daunting task. Let's face it, being a board member is a thankless job. Boards have to make tough decisions with budgets tightening everywhere. Trying to convince board members and community members to invest in infrastructure by raising rates can be a difficult proposition. Even though it may be difficult to explain why infrastructure needs to be invested in it is imperative on all of us to start doing so. In my years working for a utility, I had four or five

board members visit the treatment facility. It isn't ideal when the people making the financial decisions about your facilities have never actually visit the facilities. We discussed few ideas that you may be able to use during class that may help inform decision makers. One idea would be to use technology so you can show pictures of assets to further explain them during meetings. Another idea is scheduling a tour of all the facilities once or twice a year so the board has a grasp of where the facilities are and what things are inside these buildings.

These classes also bring to light the obstacles we face as operators in the upcoming years. First of all, and if you have read my articles before, we need to attract new operators to this field and start appreciating the operators we already have. This is a very technical field where operators need to wear many different hats. Along with having to be a jack of all trades, an operator is on call many parts of the year, has to deal with the public, and dealing with a lot more paperwork than years past. All of these things add up to what can be an increasingly stressful work environment. And when the overall employment sector is struggling to find skilled workers the men and women who are operators for cities are becoming more sought after by other industries. In the past year I have seen numerous operators who have been recruited by the private sector. If being a utility worker is becoming more and more technical then the pay needs to start keeping pace. Part of having a sustainable utility is training and retaining talented people. I sat in on a class a few weeks ago at NRWA in-service where the speaker said the investment and cost to a utility in training a new employee is \$25,000 dollars. So, if a Village thinks it's not important to hold on to talented people, each time a utility lets someone walk over a few dollars an hour, the cost to the utility is much higher than I think they understand.

The last thing I want to mention about sustainability is our aging infrastructure. Along with needing workers, a lot of cities have assets that are getting close to their expiration date. No mayor, council member, clerk,



or operator wants to be the bad guy and raise the rates. But cities need to start developing plans on how these infrastructure issues will be resolved. Along with all the assets above ground, there are many underground assets that will need replacing as well. A lot of the pipes in this country are over 50 years old, stake holders need to know that pipes and underground assets do not last forever. The "out of sight out of mind" issue is a big concern for utilities. Trying to get your board to understand that a distribution system and collection system is just as important as a water tower or a treatment facility is a tough sell. I don't have the answers but I do know that planning for, thinking about, and discussing these issues is the first step.

Jesse

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Artesian Wells

Did you know that there are many artesian wells in Wisconsin?

Todd Weich,
WRWA Water Circuit Rider

It is as if the most simple thing of water has always been with me from being a fire fighter to water and wastewater operator and now, with WRWA. Even while not “working”, there is still that part of my mind that takes a constant interest in the water industry. I just cannot get away from it. A few weeks back, I took time away from my day job as a Circuit Rider and visited the Ashland area which is home to the Maslowski Beach Artesian Well. While driving to the lake to do some fishing with a friend, we came up to a sign for an artesian well. Me being a water guy I had to pull over; my friend had absolutely no idea why I was so excited or even what an artesian well was.

Do you know what an artesian well is? The word artesian comes from the town of Artois in France which is the old Roman city of Artesium, which is where the best known flowing artesian wells were drilled in the Middle Ages. Artesian wells start with something called artesian aquifers. An artesian aquifer is a confined aquifer containing fresh groundwater held under pressure. The walls of the aquifer are covered with compressed impermeable rock or clay which then applies

pressure to the water within that area. The pressure then powers the water upwards where it eventually reaches near the Earth’s surface which is why artesian wells do not need a pump to pump water. A vast majority of artesian aquifers are constantly replenished non-stop by groundwater and rain. A flowing artesian well is a type of well that has been drilled down the artesian aquifer and due to the constant pressure, the water naturally rises above the Earth’s surface into what we all know as an artesian well which flows on a continuous basis.

Did you know that there are many artesian wells in Wisconsin? According to findaspring.com, Cornucopia, Grantsburg, Kossuth Artesian in Manitowoc and the artesian well in Plymouth are just a few of the multiple wells in Wisconsin. Even though artesian wells produce some of the “healthiest and cleanest” water available, take caution in knowing which wells are tested and maintained on a regular basis.

During this already hot summer, maybe take some time to explore some of Wisconsin’s finest artesian wells. —Todd

EPA Program

By George Taylor

Hello Everyone,

Today I wanted to talk with you about some of the Training Needs and Technical assistance we provide through our EPA program. We provide Training and Technical Assistance for Tribal water Systems and Overburdened systems.

Most of my travels I've been reaching out to the Tribal Water Systems. We now provide any assistance and formal trainings they may need. On most of my travels I've met with Supervisors / Water operators. Letting them know all about the different training we provide. Here are some of the topics we will cover:

- Top compliance training needs
- Operator training to assist with implementing the Lead and Copper Rule including preparing for proposed changes and increasing sampling reliability for small systems, schools and childcare facilities
- Revised Total Coliform Rule
- Risk and resilience assessments using VSAT
- Decision-maker and board member training on SDWA requirements and their responsibilities under the SDWA
- Operator certification and continuing education training
- AWIA Training

Any other trainings you may seek please contact me or any of the WI- Water Circuit riders. The Technical assistance always varies. I've been called out to do leak detection, Hydrant repair and just some guidance to help keep their water system in compliance. Remember, we are here to help with any kind of water issues you may have. If you would like to schedule a visit, please give me a call. We would be more than happy to help.

Thanks for reading everyone! Hope to see you soon!

George Taylor,
Small Water System Circuit Rider
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NEXT STEP FOR AWIA COMPLIANCE

Please DO NOT wait until December to look into this part of America's Water Infrastructure Act (AWIA).



Jeff LaBelle,
WRWA Technical Assistance Director

For systems with populations from 3,301-49,999, now that the systems have gone through the Vulnerability Assessment and Certification process with the EPA, you have 6 months from Certification or until December 31, 2021 to complete the EPA Emergency Response Plan that is included in the AWIA Act.

This Emergency Response Plan will use the information from your DNR Emergency Response Plan and expand upon it. Please DO NOT wait until December to look into this part of America's Water Infrastructure Act (AWIA). The EPA version of Emergency Response Planning is very in-depth and will take time to wade through. It talks about working with Local Emergency Management while putting the plan together and also running scenarios and table top exercises to test the plan you have developed. When developing this document use all your resources including coworkers, bouncing ideas off each other can be a help in determining results. You will find that each incident possibility is to be addressed, Floods, Pandemics, Tornadoes, Chemicals Etc.

To get to the EPA Emergency Response Plan Template, go to the same page you used for the Vulnerability Assessment (Guidance for Small Community Water Systems on Risk and Resilience Assessments under America's Water Infrastructure Act) on EPA Website. Another option is type emergency response plan into the search box on EPA website and on the next page go to (Develop or update a Drinking Water Emergency Response Plan) click it, on next page, go to the bottom and click on Emergency Response plan Template, next page go to AWIA ERP Template with the word Symbol on right side of page, click on the box and it downloads to your computer where you can work on it.

If you have any questions or need assistance please contact your Water Circuit Rider. *Jeff*

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PSC WATER RATE INCREASE ORDERS ISSUED

MARCH 1, 2021 – JUNE 29, 2021

UTILITY NAME	ORDER ISSUED	OVERALL% INCREASE
Town of Shelby Sanitary District #2	03/11/21	104.19%
City of West Bend Water Utility	03/17/21	7.29%
New Holstein Public Utility	03/23/21	16.2%
Tennyson Water Utility	03/30/21	127.2%
Shawano Lake Sanitary District #1	04/01/21	4.2%
Village of Maiden Rock Municipal Water Utility	04/21/21	84.53%
Gresham Municipal Water and Sewer Utility	04/23/21	32.73%
Monona Water Utility	04/27/21	5.13%
Iron River Sanitary District No 1	05/12/21	34.97%
City of Baraboo Water Utility	05/12/21	47.82%
Oliver Municipal Water Plant	05/12/21	53.36%
Weyerhaeuser Municipal Water Utility	05/21/21	45.19%
Shullsburg Water Utility	06/01/21	36.38%
Reedsville Municipal Water Utility	06/02/21	30.92%
Wilton Municipal Water and Sewer Utility	06/03/21	126%
Coleman Water Utility	06/06/21	48.36%
Freedom Sanitary District No 1	06/11/21	11.66%
Mcfarland Water and Sewer Utility	06/16/21	29.26%
Hudson Public Utilities	06/24/21	17.16%

PSC CONSTRUCTION AUTHORIZATIONS ISSUED

MARCH 1, 2021 – JUNE 29, 2021

UTILITY NAME	ORDER ISSUED	CONSTRUCTION COST
Cedarburg Light and Water	03/09/21	\$1,551,100
City of Cudahy Water Utility	03/30/21	\$480,000
Valders Public Utility	03/31/21	\$78,690
Rice Lake Municipal Water	04/19/21	\$3,456,400
Whitewater Municipal Water Utility	04/27/21	\$3,460,000
Germantown Water Utility	04/28/21	\$480,000
City of Oconomowoc Utility	04/28/21	\$2,662,500
Eagle River Light an Water	05/14/21	\$443,834
Waterloo Water and Light	05/25/21	\$296,101
Hustisford Utilities	06/21/21	\$87,732

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6,001 – 10,000	\$520
Over 10,000	\$585
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Quarter page	\$215	\$800	\$270	\$860
Business card	\$160	\$575	\$200	\$600

	MEMBER		NON-MEMBER	
Color Advertising	1-Time	Yearly	1-Time	Yearly
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Outside back cover	\$800	\$2,540	NA	NA
Full page	\$575	\$1,970	\$770	\$2,670
Half page	\$370	\$1,265	\$575	\$1,965
Quarter page	\$270	\$860	\$400	\$1,400
Business card	\$200	\$600	\$335	\$1,000

For information on advertising & the benefits of membership at the different levels, please contact Renee at the WRWA office: 715-344-7778 or rkoback@wrwa.org. *Must be employed by a WRWA system, associate, or corporate member, retired and state or federal employees



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BE PROACTIVE, NOT REACTIVE THE BASICS OF OPERATION

Kay Curtin
WRWA Trainer/Technician

If something isn't outright killing the bacteria, it's changing their environment.

You operators are like anyone that is responsible for the health of others. You're similar to nurses, doctors, farmers, horticulturists, etc., with the difference being that you are responsible for the health of trillions of bacteria. (Oh, and that you're paid less, but that's another column.) It's sometimes a big task, isn't it? And if you don't pay attention, sure enough, you have a plant upset from organic or toxic discharges, pH fluctuations, hot/cold weather, floods, and the list goes on and on. You're dealing with mostly aerobic bacteria, with temporary exceptions if you do biological nutrient removal and have anoxic or anaerobic zones in your system. You've probably heard me say again and again that bacteria don't like sudden changes, which most of the forementioned causes of upsets will do to your plant. If something isn't outright killing the bacteria, it's changing their environment. When they adapt to the new environment, whether it's sludge age, high/low dissolved oxygen, F:M ratios, etc., it takes time. They can't run and put a coat on, go to Kwik Trip for food, or kick out their free-loading relatives like we can. So, this column is about tending to your little free workers and keeping them happy.

PORTABLE DISSOLVED OXYGEN (DO) METER. I've been pretty shocked lately to see that so many plants have no portable dissolved oxygen meters. Some operators will tell me they don't need one, and that they can tell by looking if everything is OK. Guess what! Sooner or later, you'll get burned. If you have in-line meters, you still need to compare them with a calibrated hand-held. The instrument calibration is only as good as the condition of the probe. You need a calibration verification with a CALIBRATED hand-held meter with the probe place alongside the inline probe. I mean calibrated with temperature and barometric pressure. Call me if you don't have a chart. And no, you can't run a DO sample into a lab and test it with your BOD DO meter or some other test kit. And document, document, document.

Pond systems operate by providing dissolved oxygen to organisms, whether it's from mechanical aeration or wind/algae action. On a hot

August day, are you providing at least 2.0 mg/L D.O. to your bacteria? How do you know? For activated sludge, DO measurement is crucial. It will tell you if you've received an organic shock load (it drops) a toxic shock load (it rises), if you're having diffuser problems, plus many other things. Bacteria and other aerobic microorganisms require about 1.5-2.0 mg/L of oxygen to survive.

MIXED LIQUOR SUSPENDED SOLIDS EQUIPMENT. The bacteria in your plant require a balance of food to the number of microorganisms in activated sludge. They also do best at certain sludge ages, or the theoretical time they spend hanging out in the aeration basins. Detention time, whether a pond system or activated sludge, is crucial to the waste being broken down to a manageable level prior to digestion, thickening, or other biosolids treatments or land-spreading. If you operate any type of activated sludge system, you absolutely need to know the amount of solids in your basins in order to calculate wasting rates, detention time, or F:M. If you are sending this test to a commercial lab, you'll probably not receive results for a few days, and you'll need this analysis to be done ASAP in order to keep control of your plant. It costs a bit for the equipment initially, but after paying enforcement fees to the DNR, it will seem like a bargain.

SLUDGE JUDGE. For less than \$200, these will give you the ability to know if your return rates from the clarifier is at a proper rate, if the sludge is nitrifying or getting septic, or a vast amount of other information. For ponds, you'll be required by the DNR to check sludge levels. Purchase the heavy-duty ones with wider diameter. They cost very little more, and are much less susceptible to breaking.

30 MINUTE SETTLING KIT. Heck, you don't even need a kit, just a 1000 mL cylinder and a timer will do. This is another quick and easy test that will warn you about all kinds of issues you may be encountering with your plant in the near future. It also allows you to calculate your Sludge Volume Index, another helpful tool. If you do purchase a kit, Raven has a nice one.



COLORIMETER/SPECTROPHOTOMETER. Almost every facility in the state now has total phosphorus, ammonia nitrogen, nitrate, or total nitrogen limits. Many of you send these tests into another lab for testing for your DMR, which is fine. But, how about in the meantime? Are you adding enough ferric or alum to meet your crazy low total phosphorus limit? Are you nitrifying and denitrifying to meet your nitrogen limits? You can purchase an inexpensive colorimeter that tests for one parameter. This will tell you where you're at, instead of learning weeks later that you're over your permit limits. If you're looking at multiple parameters, spectrophotometers have come a long way in ease of use and price. Jesse and I have hand-held ones that will test for 92 different parameters, depending on the reagents used. Of course, the price is higher, but it pays to be proactive.



If your employer questions the costs of some of this equipment, ask them if they ever check the oil in their cars. That's how I relate process control to everyday life. Let it slide, and you may have a nasty expensive surprise. One time to request process control equipment is during an upgrade to your plant. If your design engineer doesn't think it's necessary, you've chosen the wrong engineer. Some of the biggest disasters we've seen lately have been upgrades from low-control plants such as ponds or RBCs to activated sludge,

with no process control tests done with the new facility.

If you call Jesse and I (or any other consultant worth their salt) for help with a plant upset, the first things that you're going to be asked are "What's your DO?" "What's your MLSS?" "What's your sludge age?" or "What's your 30-minute settling?" We're hoping you'll know the answer.

Kay

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CURB STOP PROJECTS



Annetta Von Rueden,
WRWA Water Circuit Rider

Do you know where your curb stops are?

Hello everyone! Hope you all are enjoying the start of a well-deserved summer! And we can all get back into doing things we were used to.

When we were kids, Mom used to say, “Get outside and get some fresh air! It’s good for you!”

In the water utility now that the warm weather is upon us, there are lots of jobs that can be done out in the fresh air.

Do you know where your curb stops are? In the time of need, re: during a water emergency, is not the time to be trying to locate a curb stop. Being able to go right up to the curb stop eliminates wasted valuable time during a leak.

There should be a filing system with the locations of the curb stops, usually on cards. This may seem old-fashioned and outdated, but when the electricity goes and there is no computer, those cards in the file sure are a reliable stand-by.

Create an excel worksheet, or implement an GIS mapping system. WRWA has a GIS mapping system that is extremely useful in entering measurements and applying them to maps. Several layers with individual maps can be installed. It is pretty neat to see, and makes life a WHOLE LOT easier.

If you want to see the whole water system, it brings up the whole system. Some of the points on the map are hydrants, valves, curb stops, pipe size, distance between valves, and pipe material. If you want to see just the hydrants on the system map, choose that layer. The map system also has satellite imagery, and topographical maps.

Once you have located the curb stop, document two measurements at the minimum from permanent reference points. Be specific. For example: electric poles (usually have an I.D. plate to reference), sidewalks, concrete and asphalt driveways are pretty permanent fixtures. Keep in mind, trees, bushes, flower beds, poles in the yard can be cut down and moved. Not really reliable.

Paint the curb stop with blue marking paint. Then paint a blue line on the curb so it is easily visible. Painting will have to be re-done as the lines fade with time. Take the cap off slowly with care, and exercise the





curb stop. Over time the valve can be hard to move at first, make sure you turn it with extra caution. Putting a little anti-seize on the cap helps when you need to get on the curb stop at a later time.

Some curb stops are too tall, buried, covers bent over, or under grade. They can all be repaired inexpensively. Contact your water parts supplier for the repair parts and extensions.

Doing these simple repairs keeps the curb stop operable for years when you need them. Again, keeping the curb stop and curb line painted blue makes it a lot easier to find. Especially in the winter under a snowbank. If you think you will remember where they are, believe me, time goes by way too fast, and that curb stop isn't in the spot where "it used to be years ago"

Same concept with the street valves. Summer is a great time to locate, measure, document and maintain, and exercise valves.

Get out the metal detector, especially if they are on the system map. You probably might find a few that are not on the water system map. Repair any chipped or broken covers. Raise up valves that are too low, with risers in various sizes (Obtained from your water parts supplier). Mainly the valves in ditch lines need risers and be sure to mark them with a metal fence post. Lower valves in the street to grade so they don't get knock by the snow plow.

Valves can be installed on the GIS map as their own layer. Call any of us at WRWA, and we can get you started on GIS for your water system.

It feels good for all of us to "get outside" and move around again. Enjoy the Summer!! And remember..... Hindsight is 2020.

Annie

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Cybersecurity & Ransomware Attacks

By Tony Roche

There is not one IT/OT system that is completely secure, and consequently, cybersecurity has become a very important issue.

The Covid-19 pandemic has resulted in many professions transitioning to “virtual workplaces”. As more people work from home there has also been an increase in the dependence of information technology and operations technology (IT/OT). In the water sector IT/OT brings many advantages – SCADA systems, meter reading, billing software, etc. – and the widespread adoption of IT/OT is likely to continue. There is not one IT/OT system that is completely secure, and consequently, cybersecurity has become a very important issue.

Cybersecurity includes practices of protecting networks, servers, programs, and systems from attacks. Cyber-attacks can happen at any time and are usually targeted at gaining access to sensitive information. Cyber-attackers (AKA computer hackers) target sensitive information and can alter or destroy it. In some instances, hackers will even hold the sensitive information hostage and extort business to pay a ransom to recover the information – these types of cyber-attacks are known as ransomware.

Ransomware is a term that has recently made headlines around the world. Ransomware can be thought of as a computer virus that holds sensitive information hostage in exchange for some form of ransom – U.S. dollars, bitcoin, or some other form of currency. Ransomware works when a computer hacker infiltrates a computer system and then encrypts sensitive information, thereby rendering it useless. When a ransom is paid to the hacker, the sensitive information is decrypted

and becomes usable again. 2021 has already seen ransomware attacks against large utilities (Colonial Pipeline) and meat processors (JBS Foods), but for every ransomware attack that makes news headlines there are countless other attacks that do not. Some IT industry professionals (John Chambers, former CEO of Cisco Systems) conservatively estimate that over 65,000 U.S. companies will be attacked with ransomware this year alone! That is a staggering number, and as more professions become virtual it is likely to increase.

As IT/OT cyber-attacks continue to increase in number and sophistication, utilities in the water and wastewater sector have evolved to become more resilient to these types of threats. A relatively new concept known as cyber hygiene has become a cornerstone of cybersecurity for some utilities. Cyber hygiene practices include complex passwords, avoiding phishing through employee training, and multi-factor verification. While cyber hygiene is important and does aid in mitigating some cyber-attacks, there is not one catch-all to prevent every type of cybersecurity breach. That being said, it is still a good idea for utilities to formulate emergency response plans that specify how to respond to a cyber-attack.

I hope you all can attend our Outdoor Expo in Plover and our Annual Technical Conference in La Crosse this year. We are excited to see everyone! *Tony*



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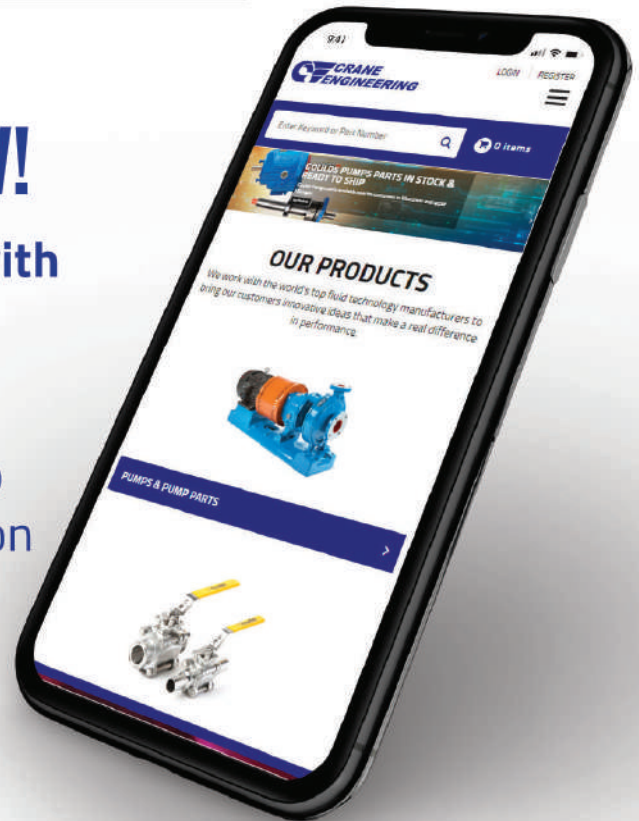
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Cornhole Set	Lee Anderson-La Crosse	M.E. Simpson
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Yeti Mugs (Draw 4)	Scott Greschnmann-Clinton/ Paul Smith-Milton/Rob Fichter-Baraboo/ Wade Peterson-Baraboo	Boerger LLC
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New Focus on Energy Efficiency

By Dan Wundrow

For many of us, WRWA is a big part of the daily, monthly, or yearly operation of our systems. With all the talented individuals at WRWA, current and former, I am proud to join the team. For some of you I am a skilled veteran of public works life. For others I am a new face, so for those that don't know me here is a brief summary of who I am and what I am here to provide to Wisconsin municipalities.

My name is Dan Wundrow and I have taken over for Tony Roche as the energy efficient circuit rider for WRWA. Tony has taken on a new role within WRWA. He is a great mentor and I hope to learn much from him over the years to come. I will be conducting energy efficiency assessments for municipalities of 10,000 residents or less. I am excited to enter this new career and use the skills I have obtained over the last 15 years in public works and utilities. I enjoy being in the outdoors in Wisconsin, hunting, fishing, and camping. I look forward to meeting and working with you soon.

Some of us are unaware of this program, and those that have used this have made a great step in the right direction. This program is aimed to assist your utilities in becoming more energy efficient and reduce your municipality's monthly utility bills. By reducing your energy use, utility departments will obtain a positive impact on their operation expense.

The 1972 Clean Water Act provided federal funds that would support 75% of project costs, with the state and local funds providing the remaining 25%. In 1981 Congress reduced the federal funding proportion for most grants to 55%. Now 50 years later most of the plants built in the 1970s are still in operation and either failing or extremely inefficient. It is difficult to find the money necessary to repair or replace these aging units without raising rates on the consumers. Focus on Energy provides incentives, or rebates, to assist financially with the funding for qualifying items.

Pairing the Clean Water Act with Focus on Energy is still an excellent opportunity for your community to obtain more funding to build a new plant or complete significant upgrades. Focus on Energy has multiple incentive items that you can apply to for your new plants or upgrades. Here is the website <https://www.focusonenergy.com/business#program->

catalogs-applications. Take a look and see if any of these items can help you out.

For example, with lighting depending on size and type of fixture, LED can have an incentive from \$4 to \$15. Retrofitting an old 8-foot fixture to a 4-foot LED can see a rebate from \$7.50 to \$20 per fixture, not including the savings you will have in energy consumption. The website will help walk you through the things that will be required along with applications. Questions can be directed to Focus on Energy, especially for larger projects.

Focus on Energy also has incentives on VFDs (Variable Frequency Drives). VFDs can save a significant amount of energy on monthly electric bills and the incentives are amazing. Variable torque VFDs that operate a minimum of 2,000 hours annually, do not exceed 500 HP, controlled by differential pressures, flow, temperature, or another variable signal can see incentives of \$35 per horsepower on equipment upgrades and retrofits. New construction and major renovations can see \$25 per horsepower for incentives plus monthly savings on energy bills. Constant torque VFDs must be installed on equipment such as conveyors, positive displacement pumps, extruders, mixers, and shredders. The same requirements apply to constant torque VFDs. Incentives on this are \$30 per horsepower. Unsure if the VFD you are looking at installing qualifies for an incentive? A custom incentive may be obtained for that piece of equipment.

Focus on Energy has numerous incentives in their arsenal. I encourage you all to take a explore the website. Also take a peek at this website to see what other programs and funding are available in your area: www.dsireusa.org. Type in your zip code and the website will provide you with a list of programs for your area. Who knows, you might even find something you can use at your residence as well. If you are still unsure of all of this, please contact me and we can set up an energy assessment and get you started on the right path to saving money.

I wish you all a great and safe summer, hopefully enjoying the great outdoors. I hope to meet you at WRWA Outdoor Expo and the 35th Annual WRWA Technical Conference in La Crosse. *Dan*



33RD | WRWA ANNUAL TECHNICAL CONFERENCE

The La Crosse Center, La Crosse, WI
August 31-September 3, 2021

TUESDAY PRE-CONFERENCE WORKSHOPS

This year's agenda includes two concurrent Operation & Maintenance sessions, one in water and one in wastewater with a variety of educational & informative presentations.

OPENING SESSION

Always a highlight of the Conference, learn about the challenges facing our industry and solutions to the issues we're facing. Enjoy the opening session speaker and help us congratulate the winners of this year's WRWA Annual Awards.

EDUCATIONAL SESSIONS

With over 40 hours of educational sessions offered there is something for everyone. This includes specific classes on topics of interest for operators, managers, PEs, administrative personnel and board members over the course of the four day event. Extra classrooms offers more choices of classes to attend.

THURSDAY NIGHT BANQUET

Join us for dinner and an entertaining night at our banquet. Meet and eat with old friends and maybe go home with a Sportsman's Raffle Prize! Drawings for dozens of exciting prizes are conducted and the Grand Prize winner is selected.

WATER TASTE TEST

Bring a sample of your water to see if it is the best tasting water in Wisconsin and represent our state in the national competition.

EXHIBIT HALL

Browse through over 200 vendor exhibits to see the latest in technology and services in the water and wastewater industries. Talk with industry experts and get information for your future projects and facilities.



Sportsman Raffle Packages

The list of raffle prizes continues to grow and is listed on the WRWA website: www.wrwa.org.

(Individual packages may not be displayed as shown and may be last year's models. Price packages shown are valued at \$4,999. Winners are responsible for any additional costs above \$4,999 including tax, title, license, transport, preparation and other fees.)



2021 Honda TRX420FM1



2022 Sea-Doo Spark



2021 Honda CRF250F



2021 Honda EU7000i -
Fuel injected - inverter
style generator



2021 Honda Monkey 125
& Honda EU2200i Package

DON'T MISS OUT ON THIS YEAR'S SPORTSMAN'S RAFFLE!

(Disclaimer: Model colors may vary and are subject to change upon availability.)

JOIN US | 33RD ANNUAL WRWA TECHNICAL CONFERENCE

TUESDAY, AUGUST 31, 2021

PRE-CONFERENCE WORKSHOPS

	WATER OPERATION & MAINTENANCE	WASTEWATER OPERATION & MAINTENANCE
9:00 - Noon	<i>Need more Pressure? Raise the Water Tower</i> Brad Stuszynski – P.E. LEED AP MSA Professional Services Josh Gajewski – Lake Geneva Utility Commission	<i>E. coli Testing in Wastewater: Transitioning from Fecal Coliform</i> Brooke Klingbeil – City of Medford Wastewater
	<i>New VFD features for the water industry. Simplifying pumping systems</i> Jeff Miller – JMB & Associates	<i>Coagulant and Flocculant 101: Fundamentals of Thickening and Dewatering</i> Yong Kim, PhD. – USGI Solutions, Inc.
	<i>Seeing Beneath the Surface</i> Doug Gries – Ferguson Waterworks	<i>Disc Thickening – An innovative new thickening technology</i> Eric Lynne P. E. – Donohue & Associates, Inc. Ben Brooks & Alex Zenner, City of Medford WWTP
12:00	LUNCH – Ballroom Area	
1:00 - 4:00	<i>Water Utility AMI: Information, Analysis, Opportunity</i> Steve Dauster – Midwest Meter, Inc.	<i>Package Treatment Technology Removes Phosphorus from fixed film WWTP to Low Levels</i> Tom Dumbaugh P.E. WesTech Engineering, Inc.
	<i>State of the Art Water Treatment Facility for Groundwater with High TOC</i> Allen Williams – Donohue & Associates, Inc.	<i>Phosphorus Removal and Control</i> Benjamin Barker – YSI Inc, a Xylem brand
	<i>Reduce Non-Revenue Water with Cost Effective Leak and Pressure Data</i> Steve Bruskiewicz – McWane – Nighthawk Controls	<i>Enhanced Solid Flotation without Dissolved Air</i> Mike Barreau – Dorner Company

WEDNESDAY, SEPTEMBER 1, 2021

8:00	Registration – La Crosse Center South Lobby
9:00	Opening Session – Ballrooms A, B, C <ul style="list-style-type: none"> • Welcome - Chris Groh, WRWA Executive Director • Opening Speaker – Michael Harris, Formerly with National Rural Water Association (NRWA) • WRWA Annual Awards Presentations
*	Exhibit Hall opens following Opening Session – South Hall & Large Equipment in Arena
11:30	Lunch – South Hall Exhibit Area
1:00-5:00	DNR - Regulatory Updates WI Public Service Commission - Updates: Rate and construction cases, customer service, and other timely topics. USDA Rural Development Updates

THURSDAY, SEPTEMBER 2, 2021

7:30	REGISTRATION – LA CROSSE CENTER MAIN ENTRANCE			
9:30	Department of Safety & Professional Services, Public Employee Safety & Health Update Vince Matarrese -Advanced Safety Technology, Inc.	Lagoon Optimization for 2021 and Beyond Tom Hinde - Air Diffusion Systems	Navigating through the PSC Rate Case Process Ed Maxwell & Bridgot Gysbers Ruekert & Mielke, Inc.	Construction, Commissioning and Start Up of the World’s First ABNR Autumn Fisher – CLEARAS Water Recovery
10:30	PFAS Treatment and Technology Implementation: Lessons Learned Mark White – CDM Smith	Providing Long-term Certainty with Water Quality Trading Erin Delawalla – RES LLC Katie Jo Jerzak - SEH	Asset Management that fits YOUR community Chad Paulson – Rice Lake Utilities Dave Kunze – Village of Shorewood Jeff Powell & Scott Kiley – MSA Professional Services	Tracking your Lead Replacement Program with GIS Kyle Engelking - Symbiont
11:30	Lunch – South Hall & Arena Exhibit Areas			
12:00	Water Taste Test – Commons Area			
1:00	Exhibit Hall Closes			
1:00	Asset Management for Communities/Utilities – Size Does Not Matter Jon Schwichtenberg - GRAEF	Producing Class A Biosolids with a Thermal Dryer Tom Fitzwilliams – MSA Professional Services	PFOS Contamination Cost Recovery Sam Wade, Michelle Greene, and Harold Naughton Napoli Shkolnik Law	PFAS, The New Phantom Menace Heather Jennings – Probiotic Solutions
2:00	Water Tower Coatings NSF 61-600 Rule Change Shawn Mulhern & Dewey Prinzing – KLM Engineering, Inc.	Evaluating Lagoon Upgrades for Increasingly Stringent Effluent Limits Sacha Tetzlaff – Strand Associates, Inc.	How to Plan & Fund Capital Improvement Projects Kurt Muchow & Mark Steward - Vierbicher	Social Security (2:00 pm – 4:00 pm) Ricardo Acevedo - Social Security Administration
3:00	Large and Small Diameter Leak Detection – Using the water column to find leaks Carlos A. Covarrubias – M.E. Simpson, Inc.	Zero, Single, Double, and Triple Offset Butterfly Valves; What’s the Difference? Greg Bilbao – Av-Tek, Inc.	New PFAS Drinking Water Treatment Technology Servicing a Sensitive Population Nicole Bolea – ECT2	
6:00	Banquet – South Hall – Sportsman’s Raffle Drawing and Prize Presentation			

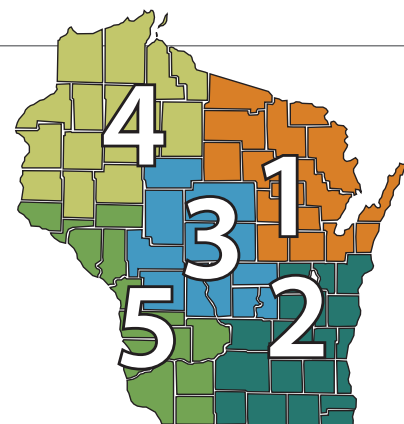
FRIDAY, SEPTEMBER 3, 2021

8:00	Asset Management/Towers-Tank Maintenance Tim Wilson – Dixon Engineering	Using Process Modeling Software to meet stringent nutrient limits in Lagoon Based Treatment Systems Jim Martin – Lemna Environmental Technologies, Inc.
9:00	Mix it Up Thom Tackman and Lucy Allen – Kasco Marine	Case Study – Holmen WWTP upgrade without interrupting existing treatment Doug Johnson, Pete Mezera-Village of Holmen and Jerry Doriott - SEH
10:00	No Sweat: Aerogel-Infused Thermal Insulating Coatings for Condensation Control Randy Bartz – TNEMEC Company	How to successfully protect concrete in HS2 gas environments James Orr – James Orr Coating Inspection, LLC.

CEC's	Tuesday	Wednesday	Thursday	Friday	Total
Water/Wastewater/PDH	6	6	6	3	21

WRWA

System Member List



DISTRICT 1 (Northeast)

**2YK, LLC
Algoma
*Allouez
Antigo
*Ashwaubenon
Bailey's Harbor WWTP
Bear Creek
Bellevue
Birnamwood
Black Creek
Bonduel
Bowler
Brazeau Sanitary System #1
Cecil
Clintonville
Coleman
Combined Locks
**Conserve School
Crandon
Crivitz
Darboy Sanitary District
Denmark
*DePere
Eagle River
Egg Harbor
Elcho Sanitary District
Embarrass
Ephraim
Fish Creek Sanitary District #1
Florence
Forest County Potawatomi
Freedom Sanitary District #1
**Geiss Inc
Gillett
Goodman Sanitary District
Grand Chute
*Green Bay
Greenville Sanitary District
Gresham
**Hiawatha Mobile Homes
Estates
Hobart
Holland Sanitary District #1
Hortonville
*Howard
Iola
*Kaukauna
Kewaunee
Kimberly
Lakeland Sanitary District
**Lakeland Village
Lakewood Sanitary District #1
Laona Sanitary District
Lawrence Utility District
Ledgewiew
Lena
Little Chute
Luxemburg Wastewater
Treatment Facility
Manawa
*Marinette
Marion

Mattoon
Menominee Tribal
*Merrill
**Merrill Area Public Schools
**Natural Beauty Growers
New London
Niagara
Nichols
**Northern Sanitary District
Oconto
Oconto Sanitary District #1
Oconto Falls
Oneida Nation Utility
Peshtigo
Phelps Sanitary District
Pound
Pulaski
Rhineland
Russell Sanitary District #1
Scott
Seymour
Shawano
Shawano County Utilities
Shawano Lake Sanitary District
Shiocton
Sister Bay
Sturgeon Bay
Suamico
Suring
Three Lakes Sanitary District
**Thunder Properties, LLC
Tigerton
Tomahawk
Wabeno Sanitary District
Waupaca
Wausaukee
Weyauwega
White Lake
**Wisconsin Veterans Home
Wittenberg
Wrightstown
Wrightstown Sanitary District #1

DISTRICT 2 (Southeast)

**7 Mile Fair Inc.
Adell
Albany
Algoma Sanitary District #1
Allenton Sanitary District
Arlington
Ashippun Sanitary District
**Asset Development Group Inc.
**Autumn Ridge Water System, LLC
*Beaver Dam
Belgium
Belleville
*Beloit
Black Earth
Bloomfield
Blue Mounds
Brandon
Brillion
Bristol

Brodhead
*Brookfield
Brookfield Sanitary District
Brooklyn
Brownsville
Browntown
Burlington
Caledonia Water Utility District
Cambria
Cambridge
Cambridge – Oakland
Wastewater Commission
Campbellsport
Cedarburg
**Cedar Crest Specialties Inc
Cedar Grove
**Cedar Lake Home
Chilton
Cleveland
Clinton
Clyman
Columbus
**Concordia University Wisconsin
Consolidated Koshkonong
Sanitary District
Cottage Grove
**Country Acres Mobile Home
Park Ltd
**Country Aire Mobile Home Park
Country Estates Sanitary District
Cross Plains
**Crystal Lake RV Park
*Cudahy
**Dakota Capital Park
Dane
**Dairyfood USA, Inc.
Darien
Deerfield
DeForest
Delafield
Delavan
Delavan Lake Sanitary District
**Don's Mobile Manor Inc
Dousman
East Troy, Town of
East Troy, Village of
Eden
Edgerton
Elkhart Lake
Elkhorn
Evansville
Fairwater
Fall River
*Fitchburg
*Fond du Lac
Fontana
Footville
*Fort Atkinson
Fox Lake
Fox Point
Franklin
Fredonia
Friesland

Fulton
**Geneva National Services
Genoa City
*Germantown
Glenbeulah
*Glendale
*Green Bay
*Greendale
**Hale Park Meadows Water Trust
Harmony Grove Sanitary
District
Harrison
Hartford
Hartland
**HB Performance Systems Inc.
Hilbert
Horicon
Hustisford
Ixonia Sanitary District #1
Jackson
*Janesville
Jefferson
Johnson Creek
Juneau
Kellnersville
Kewaskum
Kiel
**Kikkoman Foods Inc
Kohler
**Lad Lake Inc
Lake Como Sanitary District #1
Lake Geneva
**Lake Meadows Water Trust
Lake Mills
Lannon
LeRoy
Lodi
Lomira
Lowell
*Madison
Maple Bluff
Maribel
Marshall
Mary Hill Park Sanitary District
Mayville
Mazomanie
McFarland
*Menasha
Menasha Utility District
Menomonee Falls
*Middleton
*Milwaukee
Milton
Mishicot
Monona
*Monroe
Monticello
Mount Horeb
Mukwonago
*Muskego
*Neenah
New Berlin
New Glarus

New Holstein
North Fond du Lac
Northern Moraine Utility
Commission
*Oak Creek
Oakfield
*Oconomowoc
Oostburg
Omro
Oregon
Orfordville
*Oshkosh
Palmyra
Pardeeville
**Pat's Services, Inc.
Pewaukee, City of
Pewaukee, Village of
*Pleasant Prairie
Plymouth
**Plymouth Joint School District
Plymouth Sanitary District
(Hanover)
Portage
Poynette
**Rainbow Lake Manor
Randolph
Random Lake
Reedsville
Reeseville
Rio
Ripon
**Robert William Park Water Assoc
Rochester Sewer Department
**Rock Prairie Montessori School
**Rock River Leisure Estates
Cooperative
**Rock River Shores
Manufactured
Housing Community
Rosendale
S & R Egg Farm, Inc.
**St. Benedict's Abby
St. Cloud
St. Nazianz
Salem Utility District
Saukville
**School District of Beloit
Turner
**School Sisters of Notre Dame
**Shady Hill Mobile Home Park
Sharon
Sheboygan Falls
Sheboygan, Town of
Sherwood
*Shorewood
Shorewood Hills
Slinger
**Snug Harbor Inn
Somers
*South Milwaukee
Stoughton
*Sun Prairie
**Sunnyfield Acres Water

*Associate Members (Over 10,000 pop.) **Other Than Municipal

Association
 **Sunnyside Estates
 Sussex
 **The Knolls Water Co-Operative
 Theresa
 **Tremain Mobile Home Park
 **Twin Lakes Park Co. Op. Inc
 *Two Rivers
 Union Grove
 Valders
 Verona
 WalCoMet
 Waldo
 Walworth
 Waterford
 Waterloo
 *Watertown
 *Waukesha
 Waunakee
 *Waupun
 *Wauwatosa
 *West Allis
 *West Bend
 Westport
 **Wheatland Estates Mobile Home Park
 **Wheel Estates, Inc Mobile Home Park
 Whitelaw
 *Whitewater
 Williams Bay
 Wind Point
 Windsor Sanitary District #1
 Winneconne
 **Winneconne Community School District
 **Wright's Mobile Home Park
 Wyocena

DISTRICT 3 (Central)

Abbotsford
 Adams
 Alma Center
 Almond
 Amherst
 Athens
 Berlin
 Biron
 Black River Falls
 Brockway Sanitary District #1
 Brokaw
 Camp Douglas
 Cashton
 **Cawley Creek Village Inc.
 Chelsea Sanitary District
 Chili Sanitary District #1
 **Clark Co Health Care Center
 Colby
 Coloma
 **Community Water & Sewer
 Curtiss
 Dorchester
 Edgar
 Elroy
 **Fox Marquette Estates
 Friendship
 Gilman
 Granton
 Green Lake
 **Green Lake Conference Center
 Green Lake Sanitary District
 Greenwood
 Hancock
 Hatfield Sanitary District 1
 Hatley
 Hixton
 **Holiday Park I & II

Hustler
 Junction City
 Kendall
 Kronenwetter
 Little Green Lake Protection & Rehab. District
 Loyal
 Lyndon Station
 Marathon
 Markesan
 *Marshfield
 Mauston
 Medford
 Melrose
 Merrillan
 Milladore
 Montello
 Mosinee
 Necedah
 Neillsville
 Nekoosa
 Neshkoro
 New Lisbon
 Norwalk
 Oakdale
 **Ocean Spray Cranberries, Inc. - Tomah
 Owen

**Pineland Park Enterprises
 LTD
 Pittsville
 Plainfield
 Plover
 Port Edwards
 Princeton
 Redgranite
 Rib Lake
 Rib Mountain Sanitary District
 Rome
 Rosholt Sewer Commission
 Rothschild
 Schofield
 Silver Lake Sanitary District
 Sparta
 Spencer
 Stetsonville
 *Stevens Point
 Stratford
 Taylor
 Thorp
 Tomah
 Union Center
 Unity
 **Village Acres Mobile Home
 Court
 Vesper
 Warrens
 *Wausau
 Wautoma
 Westboro Sanitary District #1
 Westfield
 *Weston
 Whiting
 Wilton
 Withee
 Wonewoc

DISTRICT 4 (Northwest)

Almena
 Amery
 Ashland
 Baldwin
 Balsam Lake
 Barron
 Bayfield
 Birchwood
 Bloomer
 Boyceville

Boyd
 Bruce
 Butternut
 Cable Sanitary District #1
 Cadott
 Cameron
 Catawba-Kennan Joint Sewage Commission
 Centuria
 Chetek
 *Chippewa Falls
 Clayton
 Clear Lake
 Clover Sanitary District #1
 Colfax
 Cornell
 Cumberland
 Dallas
 Deer Park WWTP
 Downsville Sanitary District #1
 Dresser
 Drummond Sanitary District #1
 Elk Mound
 Exeland
 Fifield Sanitary District #1
 Frederic
 Glen Flora
 Glenwood City
 Glidden Sanitary District
 Grantsburg
 Hammond
 Hawkins
 Hayward
 Hudson
 Hurley
 Iron River Sanitary District #1
 Joint Water Quality Commission of Danbury & St. Croix Chippewa Indians of WI
 Knapp
 Knight
 Lac Courte Oreilles Public Works Department
 Ladysmith
 Lake Hallie
 Lake Holcombe Sanitary District #1
 Luck
 Madeline Sanitary District
 Manitou Falls Sanitary District #1
 Mason
 Mellen
 *Menomonie
 Mercer Sanitary District #1
 **Middle River Health & Rehab Center
 Milltown
 Minong
 Montreal
 New Auburn
 New Richmond
 North Hudson
 **Northwood School District
 Oliver
 Osceola
 Park Falls
 Phillips
 **Pleasant Valley Properties of WI, LLC
 Port Wing Sanitary District
 Prentice
 **Primera Foods Corporation
 Radisson
 Red Cliff North
 Rice Lake
 *River Falls
 Roberts
 **S&J Wild River Mobile Home Park

St. Croix Falls
 Saxon Sanitary District #1
 Sheldon
 Shell Lake
 Siren
 Solon Springs WWTF
 Somerset
 Spooner
 Spring Valley
 Stanley
 Star Prairie
 Stone Lake Sanitary District
 **Stresau Lab Inc
 *Superior
 **T.A.P. Investments
 Tony
 Trade Lake
 **Troy Glen Court
 Turtle Lake
 Washburn
 Webster
 Weyerhaeuser
 Wheeler
 **Whitecap Mountains Resort
 Winter
 **Wisconsin Structural Steel
 Woodville

DISTRICT 5 (Southwest)

**Advanced Plumbing Systems
 Alma
 Altoona
 Arcadia
 Arena
 Argyle
 Augusta
 Avoca
 Bagley
 Bangor
 Baraboo
 Barneveld
 Bay City
 Belmont
 Benton
 Blair
 Blanchardville
 Bloomington
 Blue River
 Boscobel
 **Bush Brothers & Company
 Cassville
 Cazenovia
 Chesebrough
 Cobb
 Cochrane
 Coon Valley
 **Coulee Region Enterprises Inc
 Cuba City
 Darlington
 **De Soto Area School District
 **Dell Creek Estates
 Dickeyville
 Dodge Sanitary District #1
 Dodgeville
 Durand
 Eastman
 Eleva
 Ellsworth
 Elmwood
 Ettrick
 Fairchild
 Fall Creek
 Fennimore
 Fountain City
 Galesville
 Gays Mills
 Genoa

Gratiot
 Hazel Green
 Highland
 Hillsboro
 Hollandale
 Holmen
 Independence
 Ironton
 Kieler Sanitary District #1
 *La Crosse
 La Farge
 La Valle
 Lake Delton
 Lancaster
 Lincoln Sanitary District #1
 Linden
 Livingston
 Loganville
 Lone Rock
 Maiden Rock
 **Marell Mobile Home Courts
 Merrimac
 Mineral Point
 Mondovi
 Montfort
 Mt Hope
 Muscoda
 Nelson
 North Freedom
 *Onalaska
 Ontario
 Osseo
 Patch Grove
 Pepin
 Pigeon Falls
 **Pine Creek Water
 **Pine Edge Mobile Home Park
 **Pinewood Court Inc.
 Plain
 *Platteville
 Potosi-Tennyson
 Prairie du Chien
 Prairie du Sac
 Prescott
 Readstown
 Reedsburg
 Rewey
 Richland Center
 Ridgeway
 Rockland
 Rock Springs
 **Saint Bede Monastery
 Sauk City
 **Sauk County Health Care Center
 **School District of Alma
 **School District of Mondovi
 Seneca Sanitary District #1
 Sextonville
 Shelby Sanitary District #2
 Shullsburg
 Soldiers Grove
 South Wayne
 Spring Green
 St. Joseph Sanitary District #1
 Stoddard
 Strum
 Trempealeau
 Viola
 Viroqua
 Wauzeka
 West Baraboo
 West Central Wisconsin
 Biosolids Facility
 West Salem
 Westby
 Whitehall
 Wiota Sanitary District
 Wisconsin Dells

*Associate Members (Over 10,000 pop.) **Other Than Municipal

WRWA 33rd ANNUAL TECHNICAL CONFERENCE

BUSINESS REGISTRATION FORM

(Vendors/Businesses Only)

August 31 – September 3, 2021



ONE FORM PER PERSON

Full Name: _____ *DNR Op. Cert. No. _____

Company: _____

Address: _____ City: _____ State: _____ Zip: _____

Telephone: (____) _____ Email: _____

PLEASE CHECK APPROPRIATE BOXES AND ENTER AMOUNTS FOR DAYS ATTENDING

1. **Tuesday, August 31, 2021**

(Includes educational sessions, continental breakfast, lunch)

WRWA Member
Non-Member

REGISTRATION

☐ \$75
☐ \$90 \$ _____

2. **Wednesday, Sept 1, 2021 & Thursday, Sept 2, 2021**

(Includes educational sessions, exhibit hall, breakfast buffet, lunch and banquet)

WRWA Member
Non-member

REGISTRATION

☐ \$175
☐ \$185 \$ _____

3. **Friday, Sept 3, 2021**

(Includes educational sessions & continental breakfast)

WRWA Member
Non-member

REGISTRATION

☐ \$50
☐ \$65 \$ _____

*** ON-SITE REGISTRATION – Add \$25 to cost shown

TOTAL REGISTRATION: \$ _____

***FOR WRWA to SUBMIT YOUR CEU'S to the DNR, YOU MUST INCLUDE YOUR CERTIFICATION NUMBER ABOVE**

Cancellations/Changes and Refunds: No later than August 9, 2021. After that date, fees are non-refundable. All refunds will be processed after the conference. Substitutions are allowed at no charge.

Please check appropriate box: ☐ Check enclosed ☐ Paid by Credit Card

Please mail completed registration form with payment to:
Make checks payable to:

**WRWA, 350 Water Way, Plover, WI 54467
WRWA**

To pay by Credit Card: (Visa, Discover, MasterCard, E-Check, Debit Card Only) Go to www.wrwa.org

*** **MUST fax completed form(s) to (715) 344-5555 or email to wrwa@wrwa.org**

QUESTIONS: (715) 344-7778 - Program and lodging information: www.wrwa.org



WRWA 33rd ANNUAL TECHNICAL CONFERENCE

GENERAL REGISTRATION FORM

(Municipal Systems, Gov't Agencies Only)

August 31 – September 3, 2021



ONE FORM PER PERSON

Full Name: _____ *DNR Op. Cert. No. _____

System: _____

Address: _____ City: _____ State: _____ Zip: _____

Telephone: (____) _____ Email: _____

PLEASE CHECK APPROPRIATE BOXES AND ENTER AMOUNTS FOR DAYS ATTENDING

1. **Tuesday, August 31, 2021**

(Includes educational sessions, continental breakfast, lunch)

WRWA Member

Non-Member

REGISTRATION

☐ \$75

☐ \$90

\$ _____

2. **Wednesday, September 1, 2021**

(Includes educational sessions, exhibit hall, continental breakfast & lunch)

WRWA Member

Non-member

REGISTRATION

☐ \$75

☐ \$90

\$ _____

3. **Thursday, September 2, 2021**

(Includes educational sessions, exhibit hall, breakfast buffet, lunch and banquet)

WRWA Member

Non-member

REGISTRATION

☐ \$100

☐ \$130

\$ _____

4. **Friday, September 3, 2021**

(Includes educational sessions & continental breakfast)

WRWA Member

Non-member

REGISTRATION

☐ \$50

☐ \$65

\$ _____

5. **Additional Banquet Ticket**

Print full name: _____

Thursday – 9/2

☐ \$50

\$ _____

***** ON-SITE REGISTRATION – Add \$25 to cost shown**

TOTAL REGISTRATION:

\$ _____

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Please check appropriate box: ☐ Check enclosed ☐ Paid by Credit Card

Please mail completed registration form with payment to:

Make checks payable to:

WRWA, 350 Water Way, Plover, WI 54467

WRWA

To pay by Credit Card: (Visa, Discover, MasterCard, E-Check, Debit Card Only) Go to www.wrwa.org

***** MUST fax completed form(s) to (715)344-5555 or email to wrwa@wrwa.org**

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Wisconsin Well Water Quality Viewer

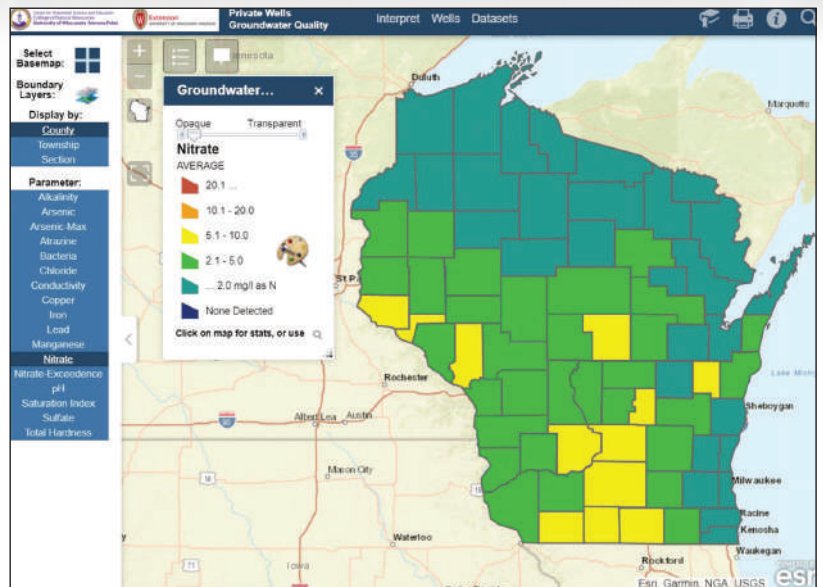
Understanding local and regional groundwater quality is important.



Andrew Aslesen,
WRWA Source Water Specialist

Wisconsin is known for having an abundant supply of good quality groundwater. While a majority of the groundwater in Wisconsin is generally of good quality, groundwater quality can often be very site specific and there are certain places in the state where particular groundwater contaminants are present and create a concern for municipal water systems or private well owners. These include contaminants like Nitrate in agricultural regions or areas with a high density of septic systems or naturally occurring Arsenic released from specific geologic formations. It can also include water quality constituents that aren't a health concern but create an inconvenience such as elevated hardness, Iron or Manganese.

Understanding local and regional groundwater quality is important. It can help promote protection of good quality groundwater or raise awareness for specific water quality issues that need to be dealt with. That is why it is important to have an easy to access repository of water quality data from across the state. Of course all of the water quality testing data for public water supplies is available on the DNR website, and while you can easily access that data for a specific system, there is no easy way to aggregate or view data for more general localities or regions. The limited number of public wells, particularly in rural areas may not provide the full picture of local or regional groundwater quality. Additionally, a municipality may want to know if their well water quality is consistent with groundwater quality in the area. Fortunately, some groundwater scientists with UW-Extension recognized the need for making groundwater quality information more readily available and developed a great tool that can be used to better understand Wisconsin's groundwater resources. It is called the Wisconsin Well Water Quality Viewer.



The Wisconsin Well Water Quality Viewer was developed and housed by the Center for Watershed Science and Education at UW Steven's Point. The viewer is an interactive web based tool that combines both well water data collected by state agencies and well water samples voluntarily submitted from homeowners. By combining private well data with the data collected by state agencies for public wells, we can get a more complete picture of groundwater quality. The viewer shows 14 different water quality parameters as the average number of samples that exceed drinking water standards for the selected parameter. Results are displayed on a color coded map that can be zoomed in to three scales of detail, County, Township or Section. The viewer does a great job of identifying areas where water quality issues exist and can help communities focus future water quality testing efforts in areas where problems exist. I would encourage everyone to visit the website and check out the Wisconsin Well Water Quality Viewer located at: <https://www.uwsp.edu/cnr-ap/watershed/Pages/WellWaterViewer.aspx> and see how your groundwater quality compares to the surrounding area.

Andrew

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THURSDAY, SEPTEMBER 2, 2021

CONTEST RULES:

- Only one sample per system please.
- Bring a 1 quart sample to the WRWA Booth before 11:00 am,
Thursday, September 2, 2021 (HINT: use a glass container)
- Fill out the entry form.

.....

WATER TASTE CONTEST ENTRY FORM

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Promoting the Profession

By Kelly Thomas

Who is going to fill those shoes???

A few years ago, I had an opportunity to “ride-a-long” on an 8-hour shift with the Wisconsin State Patrol. I witnessed many traffic stops (pulling people over) for various reasons. Violations included speeding, failure to wear a seatbelt, and no working tail/trailer lights. I also experienced a short high-speed chase of two vehicle. (We got one to pull over. The other got away.)

Even prior to this ride-a-log, I had always respected ‘the badge’, but after, I had a whole new outlook on what it means to be a police officer. For instance, prior to the shift, I had to sign a waiver agreeing I was willingly volunteering to ride. The Trooper then showed me the button in the Crown Victoria’s glove box which popped the trunk. He said, “If I go down, pop the trunk. There is a shotgun and an automatic rifle in there. Both are loaded. Protect yourself.” Yikes!

My point being, I never really understood what police officers go through and the risks involved with getting the job until I witnessed it for myself.

In my nearly 30 years in the water industry, one topic has never changed. It has been brought up every year for as long as I can remember. “All the current water operators will be retiring soon.” Who is going to fill those shoes???

Let’s be honest, this job you are doing day after day is not the most attractive from the outside looking in. It can be hot, cold, dirty, stinky, and wet, with long hours, on-call, and weekend or holiday work. The job does not offer the glamour or excitement that law enforcement may experience. But we need people to respect your job and your responsibilities and understand its requirements.

So how can we make this job a bit more attractive as a career opportunity for the younger crowd? Some people will say that making a water utility job look attractive is like putting lipstick on a pig. But if you can spark the interest of even one person to consider water utility as a career, it could be well worth the effort of using the lipstick theory.

This is going to take a bit of effort from the utility team to attract attention. It may take a bit of money to “beautify” the work environment. We are talking paint, landscaping, cleaning—all the duties that the summer help will get taxed with, but needs to be kept up throughout the year.

Consider having an open house. An open house can offer insight to the requirements and duties required in supplying safe drinking water to your community. Guests will have the opportunity to have their questions answered by you, the water professionals. Be able to give a small history lesson of your water utility. Talk about the first wooden water mains and water towers. When was your first well drilled and placed into service? What was used for drinking water prior to our water utility?

Show your visitors your daily responsibilities and duties necessary to provide safe drinking water. Show off your preventative maintenance schedule and offer the reasons for performing these tasks. Bring the community together to recognize the vital role drinking water plays in everyday life. If you are doing tours, start where the water comes in through to where it comes out of the faucet. Don’t offer bottled water. Give Sport Bottle containers to all who come through the doors to promote your safe tap water. Offer something for the kids like face painting, treats or a “goodie bag” with coloring books and such.

Reach out to your local schools and offer class trips for students of all ages. Many of the teachers and parents that come along will also learn plenty at a class trip/open house.

I am sure that there are many other ways to advertise your job openings. There are many ways to make a job look attractive. But I believe that you may need to play the role of a salesman, and really sell the position of a water operator. And one way to do that is to get people to respect the service that you are currently providing.

Stay safe. Stay healthy. *Kelly*

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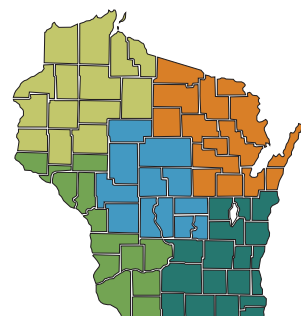


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UP THE CREEK



Ken Blomberg,
WRWA past
Executive Director



SUMMER HEAT, RAIN and WIND

The 40 days beginning July 3rd and ending August 11th, according to the Old Farmer's Almanac, coincide with the ancient heliacal morning rising of the Dog Star, Sirius – and the traditional period recognized as *Dog Days*.

A period of the year with the least amount of precipitation in the Northern Hemisphere. A time for high temperatures, humidity, dew points and heat indexes. When conditions get downright brutal – the sultry, *Dog Days of summer*.

The dogs in our lives are weathering the heat just fine. A couple – the house dogs – spend much of the day in our air conditioned home. A couple more enjoy my air conditioned kennel office. The rest respire near fans in well-ventilated indoor pens connected to shaded outdoor kennel runs.

When set loose in the 10,000 square foot fenced-in exercise area, or in the surrounding training fields, they know enough to occasionally seek shade from trees and buildings – or take a quick dip in a small pond, 200 yards from the kennel. Mother Nature has been kind to our pond this time around the sun. Just enough spring and early summer rain has kept water levels up. Some years – like past drought years – reduce the pond to a mere puddle.

When temperatures rise into the 80s and 90s, the heat index reaches 95 to 100, dew points climb above 70 degrees and humidity levels push the saturation point, humans perceive much more than thermometers indicate. Heat indexes combine air temperature and relative humidity – attempting to determine in what way the human body perceives how hot it feels. By way of example, with 90 °F and high humidity, the heat index can be about 105 °F.

Cooled by perspiration, the human body attempts to regulate its core temperature. Evaporation of the sweat removes the heat. Relative humidity slows the evaporation rate, as higher water content of the surrounding air reduces evaporation from the body. Thus proving my friend Pastor Craig's theory of relative humidity, "It ain't the heat, it's the gall darn humidity!"

Back in 1813, author John Brady described the Dog Days as an evil time when "the Sea boiled, the Wine turned sour, Dogs grew mad, and all other creatures became languid – weak – listless – slack – dull – feeble." And that's exactly how the boss describes me. Yep, that about sums up the way I feel on 90 degree days when I'm outdoors away from the comfort of our air

conditioners – all that, except for dull. There's nothing dull about summer – with blue skies, puffy white clouds, colorful wildflowers blooming, farmer's crops growing, and trees in their full, green glory. And sweet, sweet summer breezes in the shade. An unknown author once said, "You can never appreciate the shade of a tree unless you sweat in the sun."

Writer John Steinbeck once said "What good is the warmth of summer, without the cold of winter to give it sweetness." Please remind me of that in six months, when it's 10 below zero and the winds howl at 30 miles an hour!

Sitting on the back porch with the boss the other day I gazed skyward and watched small, scattered stratus clouds racing to the southeast. Following waves of severe thunderstorms in June, we were spared wind damage and power outages that occurred north and south of our place. Of course, now that we had a whole house back-up generator installed in May.

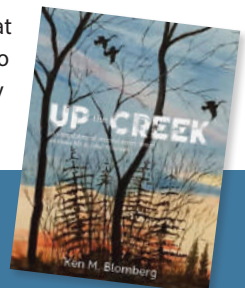
The speeding clouds caused a song to ring in my head. It was Bob Dylan's 1962 classic, *Blowin' in the Wind*. "How many times must a man look up before he can see the sky? The answer, my friend, is blowin' in the wind." I dare you to look at the lyrics of this nearly 60 year old song. Then reach with me for answers about freedom and death.

The great conservationist and hunter Aldo Leopold listened to geese and wind "blowing taps for summer" in his book, *A Sand County Almanac*. He watched geese disappear on southerly winds and dreamed he could too, "If I were the wind". Do yourself a favor and read, or re-read his Almanac. His land ethic includes words of wisdom on human ethics. Both in short supply these days.

Henry David Thoreau speculated that when things were at loose ends, "Who knows which way the wind will blow tomorrow?" John Muir once said, "The winds will blow their own freshness into you, and the storms their energy, while cares will drop away from you like the leaves of Autumn."

Thoreau also reminded us, "The morning wind forever blows, the poem of creation is uninterrupted; but few are the ears to hear it."

So, during these troubled times I urge you to stop what you're doing, and from time to time turn your face into the wind, close your eyes and listen. Your answers my friends, might just be blowin' in the wind.



Ken M. Blomberg is the past Executive Director of the Wisconsin Rural Water Association. Ken has written 2 books since his retirement. Autographed copies of his first book, *UP THE CREEK*, are now available for \$16.33, postage paid. A portion of the sale proceeds will be donated to WRWA's scholarship program. Send checks payable to Ken M. Blomberg, 2099 Mayflower Road, Junction City, WI 54443.



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Insulating Your



Tank

By Erin Schmitt, technical writer and media director for Pittsburg Tank & Tower Group

A fresh coat of paint is one of the best ways to help preserve the structural integrity of a storage tank. But it does have its limits. Exposure to wind, sun, and rain causes exterior paint to chip and flake off over time, leaving rust spots behind. Insulating a tank adds another layer of protection beyond a standard coating system.

More than half of the contiguous United States is in areas inclined to freezing at some point during the year. That means that water storage tanks, whether they be potable, fire protection, or designated for some other use, have the potential to freeze. Fire protection tanks subjected to freezing should be heated, according to NFPA 22-2018 16.1.1.

Fire protection tanks can be heated in several ways – via heater pipes, electric immersion heater elements, and open coil element heaters.

Heater pipes should be replaced when warranted, with ten years being the typical life cycle, according to NFPA 22-2018; A.16.15. Replacing the heater elements can be done during routine maintenance to minimize disruption.

Open coil element heaters allow economical and convenient maintenance. The open coil element heaters are inserted into a carbon steel pipe and mounted into the tank shell. Once the initial installation is complete, the elements can be replaced without draining the tank. So, installing open coil element heaters can help tank owners save money since the tank only has to be drained during the first installation.

If you are looking to heat your tank quickly and efficiently, immersion heaters may be the way to go. They are also relatively cheap to maintain. Unlike open coil element heaters, tanks must be drained and emptied before the immersion heaters can be replaced.

Heating systems function well, but insulation provides another layer of protection. Insulating a storage tank helps serve the same purpose as insulating a home – it helps the structure retain heat. Two of the most common types of insulation for storage tanks are panel and spray foam.

Made of polyisocyanurate that's bonded to embossed aluminum and factory-coated, panel insulation is manufactured to resist storm damage like hail. Panels are attached using circumferential galvanized steel cables that are properly equipped with pressure pads and tensioned with turnbuckles. Roof seams are enfolded in the downslope direction.

The mechanical precision with which the panel insulation is applied gives a panel insulated tank a smooth appearance that's much more aesthetically pleasing than spray foam insulation. The panels are a standard length and width that can be placed uniformly on the tank whereas foam spray is harder to evenly apply, giving it a rougher appearance.

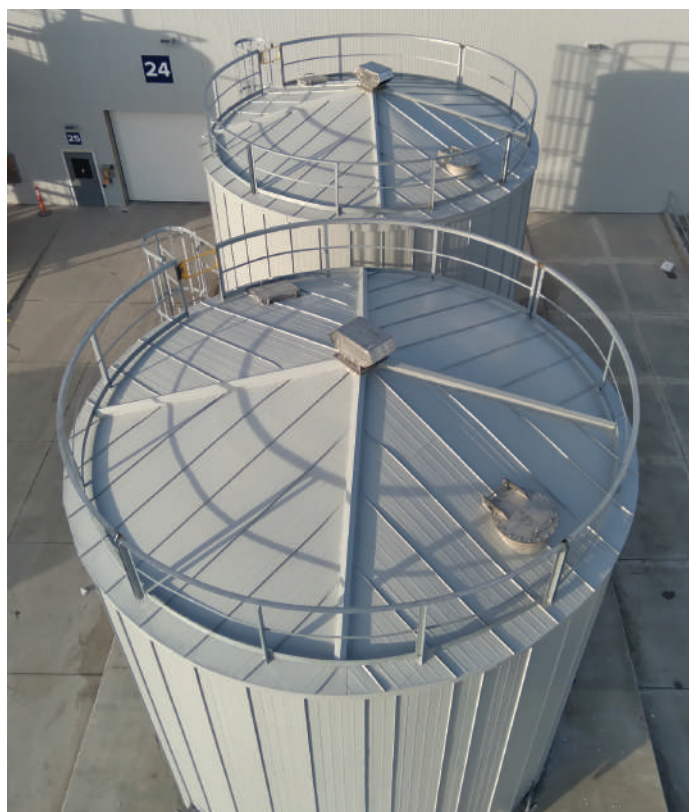
The upfront cost for panel insulation is more than for spray foam insulation. However, panel insulation requires less upkeep, so the overall cost could be very similar in the long run. It can also be applied no matter the season.

Moisture-resistant spray foam adheres to a tank and creates more protection against rain, sun, and wind. It should be sealed to maximize its effectiveness. Spray foam is appealing because not only is it an affordable insulation option, it's also non-hazardous and environmentally friendly.

It's best to make sure a tank's surface is clean and ready for a new application – whether that be paint or spray foam. The spray foam should be applied when the temperature is above freezing and when the wind is calm. If it's too cold, the spray foam won't adhere to the steel and if it's too windy, the foam can land everywhere but on the intended surface. Shrouds can be used to ensure there's no overspray on the surrounding structures, but they are expensive.

Over time, exposure to the sun's UV rays will cause the foam to break down. Since spray foam is susceptible to wear and tear, this can lead to unsightly damaged areas. Once the spray foam is no longer adhering to the tank, it should be repaired or touched up, depending on the shape of the existing spray foam. Repairing the damaged area requires cutting and removing the edge of the existing foam to provide a clean edge. Then the area must be cleaned to allow for a proper coating bond. Once it's cleaned, a primer can be applied to prevent corrosion before spraying foam to match the existing foam.

Whether it's spray foam or panel, insulation is a worthwhile investment for a tank if your tank is being heated.





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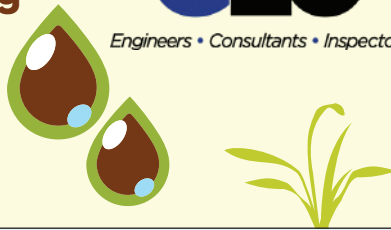
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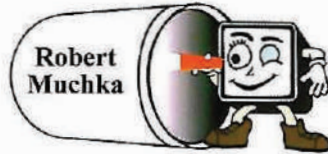
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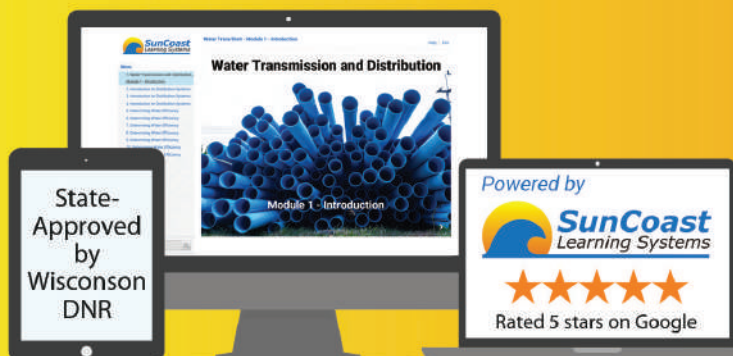
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