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Winter 2022

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The Wyoming Connection is the official publication of The Wyoming Association of Rural Water Systems. It is published quarterly for distribution to member systems, water and wastewater Operations Specialists, water related agencies and companies, legislators and government officials.

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Articles, letters, and photos are welcome.

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The Association

Wyoming Association of Rural Water Systems is a non-profit association that provides on-site, one-on-one technical assistance and training to small municipalities under 10,000 population and all water and wastewater systems throughout the state. Equal Opportunity Provider.

Cover Photo – This new water tank in Yoder is a USDA funded project that was engineered by Baker & Associates Torrington Office. It was manufactured onsite by Phoenix Fabrication, which is headquartered out of Avon, Indiana. The crane used for the project was manufactured by Sterling Crane, which is headquartered out of Edmonton, Alberta. It was a \$5,000,000 crane and was deployed for the first time in Yoder. Photo by Mark Court



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2021 – Everything is Closed, But Why are we so Busy?

As I write this, I feel like I have been road hard and put away wet, to coin the phrase used by cowboys over the years!!

The pandemic might have closed a lot of things, but water has to keep flowing and wastewater had to be dealt with and treated. Several systems had issues with COVID illnesses and so arranging for or providing “help” and assistance filled many of our days. Your Association staff were required to stay off the road for a couple months and we assisted by zoom or phone. After those first few months, we have been on the road or involved with Zoom, Team or Google sessions.

To say I am beyond proud of how the profession has responded to the pandemic would be a gross understatement. The public will never know (and trying to tell them would also be a gross understatement) what the professional utility workers have done, have gone above and beyond to provide quality on tap, keeping water flowing and safe to drink.

Now, in addition to continuing issues with illnesses causing staffing shortages, mask mandates, vaccine issues, we now find ourselves scrambling to address “supply chain issues”. Finding repair parts, PVC pipe, disinfectant or treatment chemicals and unfortunately, responding to some vacancies caused by COVID related deaths has added to the workload of the operators and to your Association staff as we attempt to assist as we can.

We assisted many systems that participated in a Wyoming Department of Health program testing their system wastewater for the COVID virus and measuring the trends on spikes or management. This program began in July of 2020 and will wrap up by December 31, 2021.

A special thanks to Rural West, Teton Water and your Association staff for their help in performing countless onsite visits to help with sampling issues, mailing of samples and any wastewater issues that came up in the process. The data I am positive helped the Department of Health and the participating systems to identify mitigation efforts or virus management strategies enabling Wyoming to maintain pretty manageable COVID virus numbers, all things considered.

The recently signed Infrastructure Bill coupled with the American Rescue Plan Act (ARPA) funding and quite possibly additional funding that may come about in the Build Back Better bill is adding to a heavy workload as we assist with project development, application assistance and fielding questions about the funding and how to access the funding.

From the start of 2021 till now, we have been extremely busy assisting systems with the AWIA cyber/physical security assessments (that were due by June 30) and then utilizing the assessment to update Emergency Response Plans that are due to be completed by December 31.

To assist systems with the AWIA requirements we entered into an agreement with Mission Critical Global Alliance (MCGA) to develop a certification training and targeted industry assessment tools. As part of that initiative, we also upped our agreement with Sanner IT. MGCA can help with the assessment and certification training, while Sanner IT can assist with implementation of the assessment recommendations.

2022 will bring the long-awaited Lead Copper Rule revisions. Chief among the proposed updates to the LCR will be conducting and verifying an inventory of all system lines, including service lines of all customers. The inventory will attempt to identify the type of pipe in the ground. Once identified, mitigation projects will commence. To help with this new requirement and project, we have entered into a partnership agreement with 120Water who have developed many tools to help complete the inventory.

Reading this, I guess I know why I’m tired now!! If you have any questions on funding and or applications, Cyber/Physical security help, the LCR inventory projects, supply chain issues (we can get you in touch with the right people who might be able to help) just give us a call!! Mr. P.

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Just Me Thinking Outloud

I first wrote a similar article to this about ten years ago and thought I would expound on it a little more.

It's hard to believe that 14 + years have come and gone since I became a Wyoming Rural Water Circuit Rider and what a ride it is!

I realized early on when I accepted this position with Wyoming Rural Water back in August of 2007, I had no idea where it would take me and what all the duties would be. One thing for sure is that I know less now than what I thought I knew back then. One of the first lessons learned is that if you think you really know something, teach a training class for operators and you'll quickly find out how much you don't know. Our Operators really are professionals and will/have called me on a couple of things.

Because my background was in municipal and rural utility administration, groundwater, and distribution when I began this circuit rider journey, my knowledge around surface water treatment was next to nothing, but only what I read to get my license. Fourteen years ago, I had no idea what Potassium Permanganate was, what it was used for, or even how to properly pronounce it! But thanks, and I mean a HUGE THANKS to the dedicated water operators throughout Wyoming. Because of you, this Old Dog is still being taught and I can say with all honesty that I have learned more from our surface water plant operators over the years of onsite visits than in the 35 plus years of classes I've attended. There is nothing like hand-on experience to get the light bulb to tun on in my mind.

Although I came into this job knowing that I wouldn't have all the answers, and so many times my answer was and still is "I don't know right now, but I'll try to find out." It didn't take long to realize just how large a part of my job is in using the vast amount of resources available through Rural Water locally and nationally in the quest of finding answers.

Undoubtedly, the largest resource available to me all along is the Water & Wastewater Operators throughout Wyoming that I give thanks to. They may not know or fully realize that by their willingness to answer questions and discuss issues at their water plant, groundwater system and distribution system about problems I'm assisting with at another system,

they are not only teaching this "Old Dog", but more importantly they are providing technical assistance and aiding in the teaching and technical assistance to the next generations of operators across the state.

While on the subject of assistance to me, I would be amiss not to mention how valuable Jim Van Dorn was to me, WARWS, and really the State of Wyoming. Jim was not only my go-to person with wells, pumps, motors, and controls, but he taught me how to be a Circuit Rider and build confidence with the Water and Wastewater Specialists throughout the state. He would always remind me that our job is not to fix a system's problem but to train them how to fix it themselves.

Another lesson learned along the way had to do with a monthly reporting requirement of a Circuit Rider that is referred to as a "Significant Contact". Every month a short one or two paragraph report giving the highlights of one of the onsite contacts made during that month. In the beginning, I would look back over the past month for a contact that was interesting to me and what I thought was the best assistance provided. I soon found that was the wrong way to look at this no matter what others may think.

WARWSDOKU

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The objective is to fill in the empty squares so each row, each column, and each 3x3 block contains the numbers 1-9 with no repeats.

While answering an e-mail one day on types of assistance I have provided it suddenly dawned on me that what I think is significant means nothing! What the system gets out of the assistance provided more times than not may seem small or basic to some but is very significant to that system and its operator(s). The example that still sticks with me was an onsite visit where the new operator for the system and I assisted with routine maintenance cleaning of a turbidimeter. At the time it seemed like nothing at all, but when the meter was put back on line and the turbidity readings dropped to where they should be I could see the immediate relief on the operator's face and hear it in his voice. This was very significant to him. So the lesson learned was that it's never about me or about what I think, it's about the system or the operator I'm assisting and their needs!

That lesson recalls my answer to a question asked during my interview for this job of why I thought I wanted to be a Circuit Rider. I remember telling my now boss, Mark Pepper, that Wyoming Rural Water Circuit Riders assisted me as a newbie water operator that got in trouble with EPA over 35 years ago and felt I owed it to the new operators of today to pass on what was passed on to me over 20 years ago. I then told Mark the story of my first encounter with Wyoming Rural Water.

"Back around 1989, a Wyoming Rural Water Circuit Rider took a newbie Water Operator of a very small water system (me) by the hand and without belittling me, kindly taught me the proper way to take a routine Total Coliform sample. I was doing everything possibly wrong in taking a bacteriological sample. I mean if there was a way to mess it up, I did it!

Did you know the powder inside of the bacteriological sample bottles is supposed to be there to neutralize any chlorine in the water? Well, I didn't and thought that the bottle was dirty and blew, yes inhaled deep and blew all that stuff out of there and couldn't understand why EPA didn't like the test results. After the first "unsatisfactory" result the lab sent me 3 bottles. Again, I did the same thing and had 3 "unsatisfactory" results and the lab sent me 9 sample bottles to retest. When I received 27 sample bottles from the lab, I began to think something was up. Luckily, the same day a Circuit Rider just happened to stop by.

This circuit rider explained to me the reason the powder was there is to neutralize the chlorine in the water so if there is any total coliforms growing in the distribution system and getting to the tap it would show up in the test and not be killed off by the chlorine with the additional contact time the chlorine would have during shipping and testing. After retaking the sample properly, the test results came back with

no detects of total coliform, and best yet, no more letters or phone calls from EPA!

To me, that first visit ranks way up as one of the most, if not the most significant assistance I have ever received. Over the years I have told this story when instructing a training class and it always got a good laugh from the operators in the room. I think it also helps to break the ice with the new operators hearing that at one time I was right where they are in the beginning.

So another big THANK YOU is in order and it goes out to Lloyd Brown, Jerry Chamberlain and Floyd Field of Wyoming Rural Water past for your "Significant Contacts" with this former newbie. I can only hope that some of your dedication and training had rubbed off onto me and I continue with the work you passed on to me. One day, I know another dedicated Wyoming Water Operations Specialist will pick up the torch and continue the work they started years ago.

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The Evolution of the Toilet

Oh yes, the solitude of being on the toilet. Nobody to bother you. You are in your own little world. It is the only time when your mind is at the highest level of cognitive ease. For that brief time, you can leave all your worries behind and some of them in the toilet. The toilet has been in your homes your entire lives and you do not give much thought to what life was like before there were toilets or what the earliest toilets were really like?

Squat-toilets of the Indus Valley Civilization (2,000 BC) along the banks of the Indus River in parts of India and Pakistan, where there is archaeological evidence of the earliest use of waterborne toilets. Every house during this era had a private squat-style toilet that was flushed simply by pouring water into the toilet. These toilets drained into a centralized drainage system to a cesspit. The design was intended to ensure that feces were not polluting the river. To many experts, this civilization was ahead of their times. It was not for another six hundred years before toilets began showing up in various parts of the world.

The people of the Indus Valley employed builders who implemented various principals of sanitary engineering science like the collection and disposal of household waste, collection and storage of rainwater, separate channels for drinking water, etc. They also created the world's oldest known public pool called "The Great Bath" which was meant to be used by the commoners and the ruling class to cleanse their bodies. At this time in history, civilizations knew nothing about germs and waterborne diseases. Yet without even realizing it, they were protecting public health and the watershed.

Despite being the pioneers of intricate city planning that were backed up by engineering principles, this civilization befell to an unknown catastrophe which resulted in an abrupt end for reasons that remain a mystery. Some theories speculate that the Indus River may have changed its course, while others believe that this civilization was wiped out from an invasion by the ruthless Aryans from Central Mongolia.

The Chinese Pig Toilets (206 BC)

The Han Dynasty began in 206 BC. This is also when the "Pig Toilet" emerged. The look much like the outhouses and porta-toilets that we are familiar with, but instead of having

a hole in the ground or a storage tank, the Pig Toilet was designed so that the excrements dropped onto the ground where pigs would consume them. Once the pigs ate the human poop, it would inevitably get transformed into piggy poop. They would then take the pig manure to market where it was sold.

The Chinese definitely developed a cheap alternative to toilets. At the same time, they also eliminated the need to build a sanitation system while being able to make some extra money in the process. I just cannot imagine how unsafe the pork was that they ate. Could you imagine eating something like Chinese Curled Pork Belly after knowing that the pigs ate human poop? Even some Cantonese Pork Belly? I like Chinese food, but this will make me think twice about eating Chinese pork dishes.

The Roman Get-Together Toilets (100 AD)

The Romans were well ahead of their time in so many ways such as their architectural marvels, their aqueduct system, the bath houses etc. What most people do not realize is that they also created a toilet which our modern-day toilets are based on. Way to go to Rome...another marvel of your time.

The Roman toilets were made of long stone slabs with holes spread about. These were made so that the commoners could be in a comfortable position while taking care of business. Unfortunately, your business was also everyone else's business as these toilets were a communal ordeal. It must have really sucked not having privacy when eliminating.

Once finished with their business, they would grab the ter-sorium (a stick with a sponge attached to the end). They would dip it in a bucket of water and wipe themselves. When finished, they would pass it on to the next person in line. Yuck!!!! They were okay with sharing the community butt cleaner.

Toilets of the Early Modern Era (1600-1700)

At the beginning of the early Modern Era, different variations of toilets were being utilized based on personal preferences. Most people would head down to the nearby cesspits for their moment of relief. This obviously was not the most convenient means since you had to walk to the cesspit whether it was raining, snowing, frigid cold, dark, or that you are just downright ill. Besides, without those conditions, some people were just not willing under any circumstance to walk down to the cesspit to poop.

Their reasons, whatever they may be for not wanting to walk to the cesspit led to the popularity of the small metal or ceramic chamber pots which were designed to hold waste and then later emptied into the cesspits. Stop!!!! Weren't the

chamber pots designed to hold waste and then later emptied in the cesspit? The laziness of people led them to carelessly toss the feces from the windows onto the streets below. Unbelievably, this custom can still be witnessed today in several small remote towns in Russia.

Modern-Day Toilets

John Harrington was known for more than his controversial poetry and political writings. He is also known for the invention of the first prototype of the flush toilet in the late 16th century. The annual summer season plague spread faster that John Harrington's invention as people were not ready to give up their chamber pots.

In the middle of the 18th century, the flushable toilet finally began to take off in popularity. Alexander Cumming, a Scottish inventor, patented an improvised flushing toilet with an "S" shaped pipe. This allowed for water to sit in the bowl as well as serve as a shield against foul odors that emit from the sewage. Wow...without all that odor it would also mean less flies when using the loo.

Once the industrial revolution hit, the population began to boom in metropolitan areas. This resulted in toilets selling like hotcakes beginning in the mid 18th century through the 19th century. This was the beginning of the toilet becoming a household utility. Three hundred years later the toilet is not vastly different from their original design.

Closing Thoughts

Since we are all living in houses that have toilets, soft toilet paper rolls, bathtubs, and sinks with clean water, we may think that the evolution of the toilet really is not particularly astonishing. However, in our modern world, despite achieving unimaginable advances in the field of science and technology, the United Nations estimates that two and a half billion people, yes nearly one-third of the world population still do not have access to toilets and are forced to defecate in the open, which puts their lives at risk of contracting deadly waterborne diseases.



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The Great State of Wyoming

As this crazy year ends, we can start looking forward to 2022. I, for one, can't wait for normal to return, if such a thing exists anymore. I have found several systems still struggling to find critical parts, to get construction projects finished by year end. There are many systems that run into problems simply finding rebuild kits for chlorine pumps more and more difficult. The list goes on and on throughout the water and wastewater industry across the country. Then there is the frustrating job of finding the required help to keep such things as Dude Ranches, NTNC systems, restaurants, fast food, grocery stores, etc. staffed at a sufficient level. Let alone, having COVID leaving some communities devastated by taking operators lives. As the average age of operators increase and younger operators not entering into our field, some may get stuck in the daily grind. However, the one saving grace is where we live.

The great state of Wyoming has so many outdoor activities to take advantage of. I had the pleasure of visiting one such place this summer, the awesome Seminoe Reservoir. This State Park is just up the road from the Town of Sinclair. As you start up into the hills, the lake and coves appear out of the sand dunes. The strange sight of sand blowing across the road was better than snow drifts, for sure. There are four boat ramps available to launch from, and many take advantage of them.

When I was there, the park was down to having only one open Boat ramp. As the summer goes on, the lack of water is hampering access to the pristine lake. The lower water level did make hiking around a bit easier, and some very cool spots to have a midday snack were abundant. The Park has plenty of camping sites available, and great tasting water is provided at a few spots if needed. The other side of the lake is open to the public and offers even more adventures just waiting to be discovered.

If hiking is your cup of tea, I strongly recommend adding this park to your to do list. The lake is a fisherman's dream, full of some of the best tasting table fair around. Yep, that would be my favorite, Walleye! Trout are also abundant in the lake if they are more to your liking. Anymore, just getting away is a welcome break for me. This Park also is home to a Carp shooting tournament once a year. This draws in competitors

from across the state, and then some. While this may not be for everyone, it does provide a bowhunter an opportunity to dust off the old bow before fall. After all, spending the day flinging arrows at some fish is a blast. I can sure say it beats fixing a broken water line in January, hands down.

When exploring the park comes to an end, take the scenic drive to Casper on the back roads. Traveling all over Wyoming, I am blessed to see many miles of back roads. This drive ranks right up there on the cool factor. The road is a little narrow for a full-size RV, however most any car should have no issues at all on the trip. Keeping an eye open during the drive, plenty of photo opportunities are available for all. The outlet below the Dam has limited access for fishing, but can be done if you're in shape. I do have it on my list of places to explore one day. I did not have the time to stay for the sunset myself, but was assured it is quite the site to see. Some of the most beautiful things in life are free if you know where to look! The staff that I had the pleasure of meeting were very helpful and knew the area extremely well. As with most State Parks, I always want to give a special shout out for the great job they do. Just one more set of water operators that are the unsung heroes that keep us all safe!

I, for one, sure hope Wyoming has a better snowpack this year, however, as of January, we are not off to a good start. I would hate to see our reservoirs and lakes drop much lower this next year. The picture says it all on the level of the lake. The few people that were here this day still enjoyed the awesome opportunities that make this Park so special. I do not want to see another fire season like we had in 2021. Besides making life miserable for many with breathing difficulties, it just flat out ruined many of our amazing views we have here in our Great State. I guess worrying about the things we can't change is a lost cause, but we can hope.

To get a complete list of the State Parks of Wyoming just get online some day when winter is forcing you inside. See what opportunities our State Parks have to offer, I bet there is something to offer everyone. One nice thing I did notice when I visited this park, was the lack of the crowds here at Seminoe. So, if crowds are not your thing, this little gem may be right up your alley.

Get out and enjoy our great State of Wyoming!



Operator's Corner

Wastewater Questions by Mark Court:

- What is regulated by 40 CFR Part 503?
 - Biomass Production
 - Stabilization
 - Sludge used for landfilling
 - Biosolids used for land application
- The list of 126 priority pollutants can be divided into four groups. They are?
 - Volatile organic compounds, volatile inorganic compounds, hydrocarbons, polychlorinated pesticides
 - Heavy metals and cyanide, volatile organic compounds, semi-volatile organic compounds, pesticides, polychlorinated biphenyls
 - Heavy metals and cyanide, volatile inorganic compounds, polycarbonated hydrocarbons, semi-volatile inorganic compounds
 - Trihalomethanes, cyanide and heavy metals, herbicides, polychlorinated hydrocarbons
- Facultative ponds are designed to operate at a water depth between _____ and _____ feet and are usually loaded between _____ and _____ pounds BOD/acre/day?
 - 3 to 8 ft, 15 to 80 lbs BOD/acre/day
 - 3 to 8 ft, 45 to 125 lbs BOD/acre/day
 - 6 to 12 ft, 15 to 80 lbs BOD/acre/day
 - 5 to 8 ft, 25 to 80 lbs BOD/acre/day
- Algae consumes oxygen during the daylight hours and produces oxygen during the nighttime hours?
 - True
 - False
- As the temperature of water drops 10 degrees F, the microbiological activity?
 - Increases 25%
 - Increases 50%
 - Decreases 25%
 - Decreases 50%

as well as heterotrophic plate count bacteria. What is happening in the system, and what actions should be taken?"

- Denitrification – increase ammonia levels to increase the nitrogen to chlorine ratio
 - Nothing – this is a normal occurrence in chloraminated systems
 - Nitrification – increase chlorine dosage to increase chlorine to nitrogen ratio and reduce detention time throughout distribution system
 - Nitrification – increase detention time throughout distribution system to improve nitrogen removal
- Why shouldn't fire hydrants be throttled using the operating valve?
 - Throttling flow with the operating valve reduces the usage and the town won't make as much money.
 - Throttling flow with the operating valve will cause back-pressure within the distribution system.
 - Throttling flow with the operating valve could cause excessive wear on the valve and damage the hydrant.
 - Throttling flow with the operating valve does no harm to the fire hydrant or distribution system.
 - True or False: pH meters do not require routine calibration
 - A system is considering switching from gas chlorine to sodium hypochlorite. How will this affect the water chemistry?
 - It won't affect water quality
 - It would raise the pH due to the formation of hydroxyl ions
 - It would lower the pH due to the formation of hydrochloric acid
 - It would keep the pH the same, but form more disinfection byproducts

Water Questions by Michelle Christopher

- A 1000-ft section of 4" main is to be flushed at a velocity of 5 fps. What is the flow through this section of pipe?
 - 651 gpm
 - 195 gpm
 - 248 gpm
 - 3.25 gpm
- "A system is using chloramines for disinfection. Monitoring data shows that nitrite levels are increasing

- Answers Wastewater
1. B (.333 ft*.333 ft*.785*5 fps=.435 cfs, .435*7.48 g/cf*60 s/m=195 gpm)
 2. C
 3. c
 4. False
 5. c
- Water
5. D
 4. B False. Algae produces oxygen during the daylight hours. During the nighttime hours, algae consume the oxygen that was produced resulting in the release of carbon dioxide.

Three New Things!

Here we are in winter again. Most of us are so frantically busy during the other three seasons that we hardly have time to think. For me this season is like a forced slow down where I can take stock of where I have been and what I have learned during the past year. 2021 was a good year for learning new things for me and I want to share three of them with you. The three things were Story Mapping, Atmospheric Water, and leak detection dogs.

Story Mapping is not something I thought I was going to be enthusiastic about. I came to know about this tool as part of the federal program that I work under. One of the requirements of this year's grant is that each Training Specialist must do a story map about one of their systems. I don't like must do's at all, but this one was a good thing. It got me out of my comfort zone and taught me about an app that I can not only use to tell my program's story, but I can help you tell yours. Story Mapping is a powerful application using GIS.

Story telling is powerful in itself. I learned that lesson from working with the tribes. If you want people to remember a lesson, effect change, influence opinion or create awareness about an issue, tell a story. By using maps, it can give your story a stronger sense of place and add credibility to what you are trying to convey. The app I am learning to use is ArcGis StoryMaps, but there are certainly other products out there that do similar things.

All these apps weave together text, photos, audios, videos and maps into a beautiful tapestry that can tell your story in a very compelling way. The only limitation is our imagination.

They are really pretty darn quick to complete, so notice I did not add time as a limiting factor. Whatever time may be required is going to be a good investment. During the many sustainability workshops that I have done across the state, building stakeholder support is inevitably one of the most often mentioned things that we need to do a better job of accomplishing. By building stakeholder understanding and support the resources we need to operate our systems will become less contentious and more plentiful. Telling our story is really important and this app will help you do it.

Atmospheric water is something I knew was happening in Israel, but I hadn't given it much thought until I saw a presentation about the topic at our National conference. Holy Cow! I think this could be a game changer in rural Wyoming especially during these times of drought. Creating drinking water from the air is a new paradigm. We need this! Here are a few facts why:

- Of the 18,831 public water systems which received a notice of non-compliance from regulators in the past three years, 97% serve populations of fewer than 10,000.
- More than five hundred thousand domestic well users not served by a utility throughout the country lack safe drinking water because of contamination by arsenic, nitrates, uranium and other contaminants.
- 45.2 gallons of bottled water was consumed per capita in 2020, implying that 113,107,577,879 plastic water bottles were used in America in 2020 alone, contributing over 395 million tons of CO₂ to the atmosphere and lets not even talk about all that waste going to our landfills.

Hauled water and bottled water are not sustainable solutions to access drinking water. Trying to operate a public water system on very few taps using existing technology is becoming more challenging every year and with every new rule.

According to USEPA, Atmospheric water generation (AWG) uses technology to produce potable water from surrounding air by employing condenser and cooling coil technology to pull moisture from the air in the same way a household dehumidifier does.

In the past this technology has been very energy intensive which made it expensive, but there is new technology that is being deployed as part of a solar panel. At the very least this technology could be very important during shortages, contamination events and any other issue that interrupts drinking water services. It may be something you would want to include as part of your Emergency Response Plan as a secondary water source.

Dogs as leak detectors – This is right up my alley! Dogs are being trained all over the country and the world as leak detectors. Canine leak detection is a method where dogs are used to detect the smell of chlorine in potable water. The dogs are imprinted with tiny amounts of chlorinated water when they are young. After imprinting, the dogs undergo regular training. According to the experts, it is important to constantly vary their exposure to leak situations. Proper training ensures that the dog knows what their job is.


Dogs are being used in a wide variety of leak detection situations including but not limited to the following:

- Cross-country water lines
- Water transmission mains
- Follow-up surveys to satellite leak detection
- Emergency leak detection
- Quiet leaks

Seth Rye, a handler of a leak detection canine says that “what sets his dog apart from conventional leak detection tools is the fact that he can think, he can adapt, and he has a real drive for what he is doing.”

Another thing that sets dogs apart from our traditional leak detection methods is their noses are better than our ears. It is very difficult to hear a leak on a PVC water main, but PVC does not keep the dog from smelling the chlorine. Need I even say that dogs are much more fun to work with than our electronic equipment? I can see a time where dogs would be part of our utility team.

See you really can teach an old dog new tricks and I for one am very happy about that. If you have any questions about these technologies or you have some new things to share with me give me a shout.



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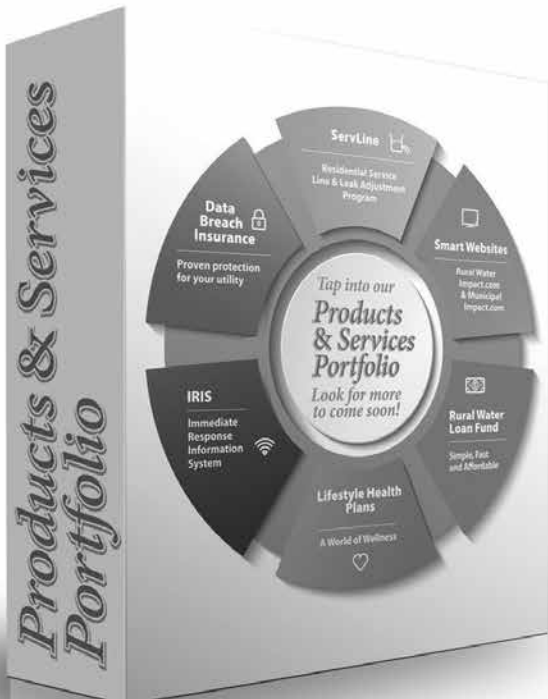



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31st Annual Spring Training Conference

April 19th - 22nd, 2022

Ramkota Hotel and Conference Center, Casper, WY

Resiliency is us!

Blow right on to WARWS Spring Training Conference which is happening live and in person. We have survived pandemics, economic shutdowns, and Wyoming winds. In honor of that we are going to theme this year's conference around resiliency, which we certainly are. Together we are going to share our stories and what we have learned. We will find out how to maximize our resources and minimize our losses while still providing the best Quality on Tap ever. The instructors and vendors will be stellar. I am having the honor of choosing from an incredible list of folks that want to share their stories and their products. One of the things I have discovered during the last couple of years is the number of new techniques that are being used in our industry, from using dogs to sniff out leaks to telling our stories in a compelling way by using story mapping technologies. Don't get left behind. Find out all the new happenings, learn about the new innovations and socialize with your peers. See you in Casper.

Board of Director Openings

Every year, the Wyoming Association of Rural Water Systems has Board of Director elections depending on the Region of the state of Wyoming for Board seats that are at the end of their term. These are 3 year terms and there are currently no term limits. Board members must be employees, elected officials or designated representatives of a voting member system (PWS's that are eligible for USDA RD funding typically serving populations under 10,000). The organization's By Laws define voting member as Non-profit public water, wastewater, associations, districts, municipalities and (or) other types of public utilities of any size with 10,000 or fewer population, engaged in the transportation, distribution and/or sale of public utility services in the rural areas of the State of Wyoming.

Board members provide oversight of and direction to the Executive Director on policy issues/items including budgetary, program, legislative and professional direction. Board members receive no direct compensation for serving. Board members are reimbursed for travel expenses to attend official association meetings, can attend in person conferences and training sessions at no cost including hotel and per diem. Board members can attend virtual training sessions at no cost.

For 2022, one region board seat is up for election. The Southeast region includes Carbon, Converse, Niobrara, Albany, Platte, Goshen, and Laramie counties.

Those interested can contact Mark Pepper, Executive Director for more information. A letter of interest must be received by March 31st to be included in Business Meeting materials distributed to voting member delegates. The Annual Business Meeting does entertain floor nominations for Board seats as well. Announcements for the Annual Business Meeting will be made during the first two weeks of April per the By Laws.

The Best Tasting Water in Wyoming

We invite every system attending conference to enter "The Best Tasting Water in Wyoming" contest. The winning system will be hosted (airfare, room, and meals, for one representative) in Washington D.C. at the National Rural Water Rally 2023 by the Wyoming Rural Water Executive Director and Wyoming's National Director. The delegation will meet with officials from the USDA Rural Development, USEPA and will visit with Wyoming's US Senators and Representative to discuss water issues facing systems in Wyoming. To enter, bring 1/2 gallon of your water, in glass and on ice to the registration booth when you check in.

Exhibit Hall

Set up can begin Tuesday 3-5pm. Official opening Wednesday at the 10am break. Tear down will be after the 3pm break on Thursday, or you can stay until the end if you choose.



CONFERENCE REGISTRATION

31st Annual Technical Conference

April 19th-22nd, 2022

Ramkota Hotel and Conference Center, Casper WY

Name for Badge: _____

Your Employer: _____ 5 Digit Operator ID# REQUIRED _____

Your Title or Position: _____ Daytime Phone: _____

Billing Address: _____

City/State/Zip: _____

Bill my employer: _____ Pay with credit card: _____ E-mail confirmation to: _____

Personal address to receive our magazine: _____

Email to receive training and other notifications: _____

I plan to attend only the Pre-Conference on the 19th (No Fee) _____

FULL REGISTRATION April 19th - 22nd

(Includes Pre-Conference, all classes, Exhibit Hall, meals and breaks, and **Certification processing**)

Member – Early Bird, payment included (By 3/15/22) \$395 _____

Member – After 3/15/22 \$445 _____

Non-Member Early Bird, including a new Individual Membership through 12/31/22..... \$505 _____

Non-Member after 3/15/22, including a new Individual Membership through 12/31/22..... \$555 _____

Decision Maker / Clerk \$150 _____

I plan to bring a water sample for the ‘Best Tasting Water in Wyoming’ contest (circle one) – YES NO

One-day only registrations

	Member	Non-member
Wednesday only: (classes, lunch, Exhibit Hall, Game Night)	\$225	\$250 = \$ _____
Thursday only: (classes, lunch, Exhibit Hall).....	\$225	\$250 = \$ _____
Friday only: (buffet breakfast, classes)	\$155	\$185 = \$ _____

Additional meal tickets, for guests, will be available at the Registration Booth

Refund policy: No refunds after 3/15/22. Amount can be credited to a future event

Total \$ _____

If paying with a credit card, please complete the following:

Master Card or Visa Number: _____ Expiration date on card: _____

Name (exactly as it appears on the card): _____

Billing Address: _____

Host Hotel:

Ramkota Hotel & Conference Center – \$80 room rate
800 N. Poplar, Casper, WY 82601
Reservations: www.ramkotacasper.com (307) 266-6000

Return this form with payment to:

WARWS, PO Box 1750, Glenrock, WY 82637 (307) 436-8636
or Fax (307) 436-8441 or Register on-line: www.warws.com

Wyoming Association of Rural Water Systems
31st Annual Training Conference – BOOTH REGISTRATION

April 19th - 22nd, 2022 Ramkota Hotel and Conference Center, Casper, WY

Please print legibly or type:

Company Name: _____

Mailing Address: _____

City/State/Zip: _____

Telephone: _____ Fax: _____

Type of Product/Service: _____

Name(s) and emails of those attending: _____

Exhibit Hall – 8' x 8' space, 6' skirted table, pipe and drape, 2 chairs, wireless internet, meals for two. If you have more than 2 representatives, a fee of \$40 per representative will be charged.

1st, 2nd, 3rd request for booth # _____, _____, _____

Note: Some booths are numbered the same as the sleeping room right behind it. If you choose one of those booths, you must also take that sleeping room. Reserve the room by emailing Megan Miller mmiller@ramkotacasper.com.

ASSOCIATE MEMBER – EARLY BIRD REGISTRATION by 3/15/22:

Member Exhibit Hall ____ x \$475 ____

ASSOCIATE MEMBER – REGISTRATION after 3/15/22

Member Exhibit Hall ____ x \$625 ____

NON-MEMBERS – EARLY BIRD by 3/15/22 (Includes non-advertising membership through 12/31/22 @ \$350)

Non-Member Exhibit Hall ____ x \$825 ____

NON-MEMBER – REGISTRATION after 3/15/22 (Includes non-advertising membership through 12/31/22 @ \$350)

Non-Member Exhibit Hall ____ x \$975 ____

NON-MEMBER (Does not include membership)

Non-Member Exhibit Hall ____ x \$1,000 ____

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(Company names will be listed in conference program and on signage)

Break/Food Sponsor _____ x \$250 = ____

Game Night (Food and prizes): _____ x \$100 = ____

Meals for representatives _____ x \$ 40 = ____

Sponsorships packages available: email Mark Pepper – markp@warws.com

- Donations for door prizes will be accepted and appreciated

Total \$ _____

- Refund Policy: No refunds after 3/15/22

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Billing Address: _____

Card Number: _____ Expiration date on card: _____

Host Hotel:

Ramkota Hotel and Conference Center – \$80 room rate
800 N. Poplar, Casper, WY 82601
www.ramkotacasper.com or call 1-307-266-6000

Return this form with payment to:

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For more information call our office at (307) 436-8636

Sampling – the Start of Good Data

Over the last two years, I've seen nothing but wild claims that a virus will decimate society (or not), that using PPE like masks will save the world (or not) and that vaccination will bring us back to normal (or destroy us). Honestly, I'm still waiting for my superpowers from the jab, and I'm getting impatient.

The cynical scientist in me has been reviewing the data as presented by the media, and I have some questions. My cynicism aside, questioning data has become vogue as of late. So as water and wastewater professionals, how can we prove that our data is good? We ensure quality, reliable data by having a sampling plan, training the personnel taking the samples to use the correct technique, and ensuring good lab practices.

We use sampling to prove that the water or wastewater we are treating meets state and federal requirements. We also use sampling to monitor treatment processes and make appropriate changes. Water quality sampling is also used to determine if a body of water such as a lake, stream or river is capable of fulfilling the use that it has been designated for. It is imperative that samples be taken correctly, so the results can be trusted. Poor sampling practices can lead to questionable results, and those results can lead to expensive decisions. Conversely, samplers who have been trained in correct sampling procedures and techniques provide better quality samples, which leads to defensible data, which leads to better decisions, which leads to world peace.

But I digress. When sampling, it is important to have trained samplers utilizing the correct techniques following an approved plan. This plan may be set up by a regulating authority, such as Wyoming Department of Environmental Quality (DEQ) or the Environmental Protection Agency (EPA); or it may be set up by the operators of a facility for in-house process monitoring. These plans tell the sampler where to take the sample, how to take the sample, what the sample will be analyzed for, and how the sample is to be preserved and transported. The DEQ provides guidance for monitoring surface waters on their Data Quality Assurance Page <https://deq.wyoming.gov/water-quality/watershed-protection-2/data-quality-assurance/>.

Samples must represent the water in question. Whether it's

a stream, a well, a tap at a customer's house, or water being discharged from a wastewater facility, the sample should be taken from a location, utilizing a technique that ensures that the sample is representative of the whole. Some sampling locations are predetermined by a regulating authority, such as the point of entry in a public water system, or the point of discharge for a wastewater system. Other sampling points may be negotiable, such as a Total Coliform Rule site or stream reach.

When choosing sampling sites, refer to any guidance by regulating authorities or other agencies such as the NRCS to ensure that the sites will be representative of the area as well as defensible, should the data from the samples be questioned. Samples should be taken from the center of the pipe, trough, or stream to avoid potential interferences with the walls. When installing sample taps, make sure there aren't elbows or tees too close to the tap that could interfere with the sample quality.

Samples should be taken according to the recommended procedure. First, use the correct sample container. Depending on the sample, this may be glass or plastic, amber or clear. The Standard Methods for Water and Wastewater will have this information. Then, take the sample in the approved method. This may include rinsing a sampling device or running a tap to ensure that the water hasn't stagnated and would give an


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unrepresentative sample. I say this, and then I'm suddenly reminded of the lead and copper sampling technique, which is a first draw sample, and there is some discussion of a 5th liter sample, where the 5th liter is collected for analysis. Basically, whatever sample you're taking, read the instructions for correct sampling and follow them. If you're writing a plan, make sure any unusual sampling techniques are noted, and samplers are trained in them. Always make sure an adequate sample amount is collected.

Total Coliform samples for drinking water compliance are specified at 100 mL. There are some lab analysts that will refuse a sample that is over full, because there may not be enough sodium thiosulfate to neutralize the chlorine, but all analysts will refuse a sample that does not contain 100 mL, because if a duplicate sample is required, there will not be enough of the sample to run the analysis.

Zero-headspace vials should be taken with a slight bubble on top of the vial. This ensures no air can contaminate the sample. In addition to taking the correct amount, it is important to preserve the sample correctly. The most common preservative is ice, but some samples require the addition of a preservative, which is sent by the lab. Take care when using preservatives such as acids or strong bases! These chemicals can damage Carhartts, truck seats and skin if spilled.

Samples that are taken for compliance are taken to certified labs, and the parameters are analyzed for using approved methods. Process samples are often analyzed in-house. While the methods used in-house may be EPA approved, the data may not be appropriate for compliance because strict Quality Assurance/Quality Control (QA/QC) may not be done, and the system is not certified. The Standard Methods for the Examination of Water and Wastewater, 23rd Edition gives all of the information for correct sampling and analysis procedures, as well as sample preservation and hold times.

Now that your samples have been taken correctly, and analysis is complete, how do you know that the analysis is accurate? First, make sure you're doing the correct technique for the sample. While nitrate samples for drinking water use one method, sampling for nitrates in streams and lakes utilizes a different method, with a lower detection limit. If the sample is for compliance, make sure you use that method.

Second, ensure all equipment has been calibrated, or verified for accuracy. Follow all QA/QC afterwards. These may include running a duplicate sample, where a second sample is taken at the same time and location as the first and analyzed in the same way. This verifies both the sampling technique as well as the analysis.

Another QA/QC method is to run a trip blank. This is a blank

sent out by the laboratory that shows up in the cooler. DO. NOT. MESS. WITH. THE. TRIP. BLANK. If it comes up with anything, then the sampling may have been done in a contaminated environment, and the samples should be re-taken.

Certified labs must not only calibrate equipment, but verify accuracy by testing known standards, and running other quality assurance tests such as a method blank where a blank is prepared and analyzed. The blank should of course, be non-detectable. Any detections indicate laboratory contamination. The blank and the sample can also be spiked with a known quantity of a contaminant, and then analyzed. This is known as a laboratory control sample for the blank or a matrix spike for the sample. These are used to document the accuracy of the analysis method being used. It may also show interferences that occur due to the sample matrix.

In the end, the samples we take show the proficiency of the treatment techniques used and the quality of the water after treatment. We tell the public that the water they are drinking in and recreating in is safe because of the samples taken. By ensuring proper sample collection and analysis, we can proudly stand behind our product and tell everyone we provide "Quality on Tap!"

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Happy New Year!

Happy New Year is the response we give during the new year's beginning days. And after the year that was, we need some happy in our lives. So, let's get happy!

Last year was a very difficult year for all of us, pandemic, misinformation, vaccines, weather events, politics, inflation, supply shortages, stupidity!! Wow, how did we get thru the year alive?

Because of you, the operators and the local administration that kept the water flowing. Our industry is the most important public service, the first of the first responders. Nothing in this world is more important than safe drinking water and no matter what world events happen, without your education and experience in doing your job, all the other essential workers during this year wouldn't be able to do theirs. Thank You.

During this past year I have commented on the new rules and regulations that are going to affect our industry and the employees that are needed to continue the work the public requires. New advancements in products and the application of these products will determine if our industry stays current or stays in the past.

Last quarter comments were about the new kids on the block. The need for our impressions of the new labor force to change and start embracing them for the abilities they have. Remember the first day we started our employment within our industry? We were the hippies. Unstructured, non-conforming, wanting to do it our way, and changing the way it was always done. This was me and now I'm employing a new generation to replace our older workers that are leaving. They must be allowed to use their updated intelligence and creative minds to keep our industry moving forward.

I read a report in the WaterWorld Magazine (wwdmag.com) this month that was inspiring to read. At last, the industry leaders are understanding that if our water/wastewater systems are to survive, operational costs must be addressed on both sides of the business structure. Technical and Employee input must be added to the growth model. The article has very good information, and all should go to website and check out the complete article. I included a portion of this report as follows:

"Smart Water and Wastewater Plants: How a Digitized Workforce Drives Higher Operational Expense (OpEx) Reductions"

A unique turning point has been reached in the history of industrial automation. Up until recently, reduction of OpEx through automation has been a top priority. One of the results of this OpEx reduction push has been the elimination of menial human jobs. But now, the story is changing. The question has become "How can we harness the power of the Industrial Internet of Things (IIoT) and the people working in plants, in order to create additional value, and achieve even higher OpEx efficiency through digitization?"

Water and wastewater plants depend heavily on a pool of experienced workers to ensure that operations are run efficiently, safely and securely; generating high quality output in a manner that adheres to regulations. However, controlling operating expense (OpEx) within water and wastewater environments presents a unique set of challenges. It is estimated today that, in some countries, 45% of existing water and wastewater distribution and water treatment infrastructures are near the end of their useful life. As the physical assets age, the cost of maintenance rises exponentially, and instances of downtime increase in frequency. Maintenance is often performed in a reactive mode; only once equipment breaks down. During such instances, stress levels are high, productivity is lost, and costs accelerate.

Aging facilities is not the only problem. A full 38% of utility employees will be eligible to retire within the next decade. The expertise they have nurtured over the years will be lost unless mechanisms are put into place that capture their knowledge and share it with the incoming generation of millennials. Bringing in a new, younger workforce also presents a barrier. For many young people graduating from colleges and universities, the water and wastewater industry does not immediately come to mind as a possible career choice where one can exploit the latest in modern technology. Interactive mobile workforce tools are scarce and application interfaces are not deemed as user friendly. The combination of an aging workforce and aging infrastructure, along with current cost control measures, mean that these issues need to be addressed quickly. Workers should be supported with tools that enable them to make better operational decisions. These technologies will both enhance knowledge retention and provide more flexibility when managing a changing workforce – another crucial part of the modernization puzzle which requires careful consideration.

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Digital technologies will be key for attracting and training new workers now and into the future. Such tools also enhance the ability of the plant to capture the knowledge of the more experienced workers so that it can be shared with the new generation of incoming workers.”

This article was written by Hermann Wartinger

As the future is an unknown to most of us, a few things must change to take us into the future.

- 1) Our operators need to be elevated to the professional entity they deserve. Our knowledge and experience of water quality is to be recognized.
- 2) Salaries and compensations must be aligned with other professionals within the industry. Small system employees need the income and appreciation to stay within their communities.


I know there are many other changes that are needed and hopefully they will, but, for now Wyoming Rural Water is here for you. Our staff will help you navigate the upcoming Rule and operational changes that the EPA and DEQ are requiring in the next year.

Services available to you:

- A) Pre-Sanitary Survey review, with an upcoming Survey of your system, let us ease your mind by doing an onsite review prior to the formal survey.
- B) LLCR information sharing
- C) Provide technical and instructional information on the how and why of your job and system requirements.
- D) License certification training.
- E) Compliance requirements for system deficiencies.
- F) Leak Detection service
- G) Lobbying for you and your systems concerns to Government Entities.
- H) If you need a lift in attitude, we are here to express the appreciation for a job well done.

Enough said!!

I want to say Happy New Year again to all will look forward to seeing you in the new year. Remember my phone is always available to you for questions and information that will make your job easier. With 43yrs in this industry I know the Bosses of the Bosses

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Wyoming Water Development Office 2022 Public Water System Survey

In early January, Wyoming Rural Water System administrators and operators will be receiving an email requesting updated information for the Wyoming Water Development Office (WWDO) Public Water System Survey Report. This survey report is conducted every two years. The results provide valuable information to state agencies funding water system improvements and allow public water system operators to compare rates, budgets and operational procedures with other systems around the state. The WWDO requests your assistance in keeping these records up to date through completion of this survey for your public water system. Completing this Public Water System survey is now a requirement for any applications for new projects through the Wyoming Water Development Program.

Water operators who are responsible for more than one water district/municipal water system will need to fill out a survey form for each of the districts or municipalities. Survey forms can be mailed to you upon request. The WWDO is asking that all surveys be completed by March 4, 2022. If you have any questions regarding the survey or would like a hard copy to complete and return by mail, please contact:

Mabel Jones mabel.jones1@wyo.gov
Tony Bergantino antonius@uwyo.edu
Mike Robertson mike.robertson1@wyo.gov

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SURVEY URL https://wwdc.state.wy.us/surveys/PWS_Survey.html

A comment from Mr. P: Please consider replying and completing this survey for the simple fact that the more information WWDO receives, given the amount of funding that will be coming to WWDO, SRF and SLIB and that all agencies have indicated they will cooperate with each other means that this info could help you in WWDO, SLIB or SRF (or even USDA RD) applications.

Please complete the survey!!

Mark Pepper, Executive Director
Wyoming Association of Rural Water Systems

RATES Program Results

Carl Brown, President –GettingGreatRate.com

Are your rates fair and adequate? Analysis of data for 79 utilities shown here should give you some clues. First, a summary.

Your utility needs adequate and fairly structured rates. Fairness must start with classification of a utility's cost-to-serve, one function of rate analysis. Determining adequacy requires cost and revenue projections into the future, another function of rate analysis. One way to gauge the value of rate analysis is to calculate its return on investment (ROI) rate. That is, at what rate the investment – the analyst's fee – generates higher revenues. Through the "RATES Program," each dollar of fees utilities paid for rate analysis increased revenues by \$337. Stated another way, the average ROI was 33,733 percent.

Now, the fuller story.

"RATES" Results

Ratepayers want fair rates. They deserve fair rates. Deliver adequate funding and fair rates and that is a "win" for the utility and a "win" for ratepayers.

The Association wants you to have win-win rates and do it economically and dependably. To accomplish that they teamed up with GettingGreatRates.com (GGR). We call that joint effort the "RATES Program."

This is the RATES Program in a nutshell:

- Association staff do basic rate calculations and rate setting assistance for free. Most years that is all you need.
- When the situation is more complex, and with your approval, the Association would refer you to me for needs scoping and a proposal. Our rate analysis work is not free. But Association member systems get a 25 percent discount off our regular fees. Our regular fees are usually in the lower third of our comparable competition, so it is likely that going through the program will get you this service for cheaper than the next best alternative.

Consider the following data, as of June 30, 2020.

Table 1 summarizes the results of GGR rate analyses where it is reasonable to calculate return on investment (ROI).

Table 1: RATES Program Results and Costs

\$158,078,835	Projected 5-year Revenue Increase, All Utilities Combined
\$2,000,998	5-year Average Revenue Increase per Utility Analyzed
\$5,932	Average Fee (Cost) per Utility Analyzed
1.80	Average Number of Utilities Analyzed for Each Client (mostly towns)
\$10,650	Average Fee per Client for Analysis
33,733%	Average Five-year Return on Investment (ROI) for Rate Analysis
\$337	Extra Revenue Dollars Generated by Each Fee Dollar Paid to GGR

- Line 1, if all our clients follow our rate setting advice and keep at it for five years, they will collectively increase their revenues by almost \$160 million over their current rates. Sure, some have or will fall off the wagon, but our follow-up shows most stick with it pretty well.
- Two-million dollars is the average per-utility revenue increase over five years. A few comments about that:
 - o On average, five-years is about the useful life of such financial and rate projections.
 - o Fees needed to get the \$2 million averaged \$5,932. Compare that to any other investment vehicle.

Table 2 breaks out extra revenues needed by utility type. All types needed some. Some needed a lot. Consider that data, then move on to Table 3.

The average utility we help has about 3,000 connections. Over the years they have ranged from 90 up to 65,000.

After 330 total rate analyses to-date, nearly half of our

Table 2: RATES Program Returns by Utility Type

Utility Type	Analyses	Revenue Increases		
		5-year Total, All Utilities	5-year Average per Utility	Annual Average per Utility
Water	38	\$69,160,749	\$1,820,020	\$364,004
Sewer	29	\$59,200,519	\$2,041,397	\$408,279
Stormwater	1	\$2,834,567	\$2,834,567	\$566,913
Electric	3	\$13,307,281	\$4,435,760	\$887,152
Trash	7	\$13,165,660	\$1,880,809	\$376,162
Landfill	1	\$410,058	\$410,058	\$82,012

Table 3: Basic RATES Program Client Data

3,169	Average Connections or Customers Served per Utility
88	Total Utilities Analyzed, Including Non-ROI Projects
40	Unique Clients (Cities, Districts), Including Non-ROI Projects
13	Clients That Have Returned at Least Once, so Far
9	Utilities Where Lawsuits, rate disputes, and Other Situations Where ROI Calculation is Not Relevant
6	Analyses Underway Now

clients are second and third timers. That holds for RATES Program participants, too. That is part of the reason why we have analyzed 79 utilities' rates through the program but only had 32 different clients.

Now, a downer. Sometimes somebody wants to sue their utility over rates. Or they make threats. It is critically important that rates are calculated appropriately in disagreement situations. To achieve that, we always do our calculations using the same cost-based methodology, regardless of which "side" we are on. We have supported clients in seven lawsuits and rate disputes through the RATES Programs.

We feel good about helping those folks, but we are sad it got so out of control. Lawsuits lead to – surprise – a loser, and a bigger loser:

- Win or lose the suit, the utility will lose ratepayer trust. Trust is valuable.
- If the plaintiff wins, they will be mad. If the plaintiff loses, they will be madder. Mad customers are bad for business.



The better alternative is to set rates that are demonstrably adequate and fairly structured. You should make it clear to ratepayers that the rates were calculated fairly. And make it clear to those who still do not like those rates that, while they could sue, they would lose.

Take-home Message

Your utility needs adequate and fairly structured rates. You arrive at those rates through analysis. You do not need analysis very often. Usually, the Association can give you all the rate setting help you need. When you need more help, we are there. When we help utilities, they normally can recover our fee out of their first five days or so of those extra revenues. The extra revenue for another five years or so is available to pay for things the utility needs.

Call the Association. Tell them your situation. They will see to it that you are helped by them, us, or whoever is appropriate.

Carl Brown is President of GettingGreatRates.com, which specializes in rate analysis for water, sewer and other utilities. The firm serves as the RATES Program rate analyst for the Colorado, Kansas, New Mexico, North Dakota, Virginia, and Wyoming Rural Water Associations. Contact: (573) 619-3411; Carl1@gettinggreatrates.com

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Our Western Heritage

by Kathy Weinsaft

Get to Crafting!

Pheew! It's winter, and us Wyomingites have a season to catch our breath. Most of us don't slow down until we are forced to by the weather or some other natural disaster. When I do slow down, I love to craft. I most often do stained glass projects, but when I can't get out of the house, I imagine myself as an old time Wyoming pioneer. Pioneers were good at making things they needed for everyday life. Stores were far away, and families had little money. Hummm, things haven't changed all that much. Pioneers wove reeds and grasses into baskets, pieced together scraps of fabric for quilts and made candles and lanterns to light their way in the dark.

Do you have a grandchild or someone else that is special visiting? Do a silhouette portrait. I am old enough that I can remember doing these in first grade and I have never forgotten the experience.

You will need the following:

- White paper (10in X 12 in)
- Masking tape
- A flashlight or adjustable desk lamp
- A sharp pencil
- Black tempera paint
- Scissors
- Black construction paper or Bristol board
- Glue

Attach the large white paper to a wall with masking tape. Make sure the room is dark. Have your model sit on a chair sideways to the paper so you may trace the side view of his or her face. Place the light so that it shines on your model's profile and a casts a shadow on the paper. You can move your model farther from or closer to the wall until the shadow on the paper is the size you want. With the pencil trace the outline on the paper. This profile can either be painted black or cut out. To cut it out, place black construction paper behind the traced profile. Holding the two sheets of paper together, cut around the profile. Glue the black silhouette onto a sheet of white paper or Bristol board.

While we are navigating the dark of the long winter, doing a punched tin lantern may lighten your path. I love these things and I have made several in all different sizes.

You will need the following:

- A clean can with one end removed at least 14 oz in size. My particular favorite are coffee cans.
- A felt tip marker
- A towel

- nails of different sizes
- A hammer
- A piece of wire about 12 inches long
- A short candle or tealight
- Wooden match or lighter

Fill the can with water and place it in the freezer. Leave it until the water is frozen solid. The ice will give a hard surface against which to hammer your pattern. Use the marker to draw a simple design on the can. It doesn't need to be fancy just so there are plenty of holes to let the light shine thru. Let your imagination guide your hand. Mine are almost always abstract. Lay the can on its side on a folded towel. Using the various sizes of nails hammer the design into the tin. For the handle, hammer a hole on the either side of the can near the top. Loosen the ice with hot water and remove it. Dry the can. Thread the wire through the handle holes and bend the ends up. Light the candle and drip a few drops of wax into the can. Put out the candle. Let the wax cool slightly, then stand the candle in the wax. Let the wax harden. Light the candle and see how the punched designs throw patterns onto the walls in a dark room. I also use mine as a lantern when I camp or as a smudge pot. I put some embers from the fire into the lantern and add wonderful smelling herbs such as sage or sweetgrass. Enjoy the lantern however you use it and be sure to share with the next generation of Wyomingites.

Stay in, sit down and start crafting.

It is, after all, our western heritage





Scrawny Girl's Chard Wraps

by Michelle Christopher

When I'm not out having adventures with John and Sherman or running stupidly long miles, I can usually be found in my garden. Gardening in Wyoming is akin to waging war. The threats are endless: extreme temperatures, drought, hail, wash-out thunderstorms, bugs, not enough pollinators, vermin of all sizes, and if that wasn't enough, the soil in my stretch of the world doubles as something you can create pottery out of and has a pH high enough to render most nutrients unavailable. Given the challenges of raising any crop in this environment, it's extremely satisfying to harvest anything. Over the years, I've noticed that some crops do well occasionally (beans), others produce one measly item,

despite my best garden voodoo (ahem, pumpkin, looking at you!) and there are crops that produce exorbitant amounts year-in, year-out, and only stop when the ground freezes solid or I rototill them in in the spring. Swiss chard is a rock star of a crop. It braves the early (and late) freezes, doesn't mind the hot temperatures, and bounces back if the irrigation system fails for a week. It's also a great cut-and-come-again crop, meaning that you can harvest the outside leaves, and several plants will produce all season long. Unfortunately, if you try to serve steamed Swiss chard every night for two weeks, your crew will probably rebel. Enter the chard wrap. Similar to a stuffed grape leaf, this meal is flexible enough to allow you to utilize any leafy green that may be taking over the garden, as well as sneak any other veggies that are enthusiastically over-producing. Like most things I make, this recipe is more guideline than rigid rule. Use whatever meats you have, seasonings you like, and veggies that your crew is no longer getting excited about.

Chard Wraps (makes 12)

12-15 large chard leaves (or bok choy, or other large-leafed green)

½ lb ground meat (I like using lean meat, like wild game)

½ cup cooked grain (quinoa, rice, couscous – honestly, whatever you have!)

1 TBSP Greek seasoning or maybe more...

Optional: Finely chopped raw bacon

Finely grated veggies such as zucchini, carrot, kohlrabi, turnip, cauliflower

* Depending on how many optional ingredients you add, you'll either need to increase the number of chard leaves or decrease the grains or meat.

Mix the ground meat, grains, seasoning and optional items thoroughly.

Prepare the chard leaves by trimming off the stem and rolling the leaf with a rolling pin to break down the crunchy ribs. Stiffer greens can be softened by steaming or microwaving them for 20 seconds. Basically, we're looking for a green that has the consistency of a soft tortilla.

Place a ball of the meat mixture about the size of a walnut on the end of the leaf. Roll the leaf around the ball, folding in the ends of the leaf, sorta like making a burrito or eggroll.

Melt 1 tbsp of butter in a heavy skillet. Place wraps in skillet, and cover with a lid. Keep an eye on them and turn them over in about 3-5 minutes. Continue cooking and turning until the greens are steamed and the meat is thoroughly cooked.

I like serving them over steamed grains (I just cook extra when I'm making it for the wraps), but John enjoys them plain, dipped in orange stir-fry sauce.

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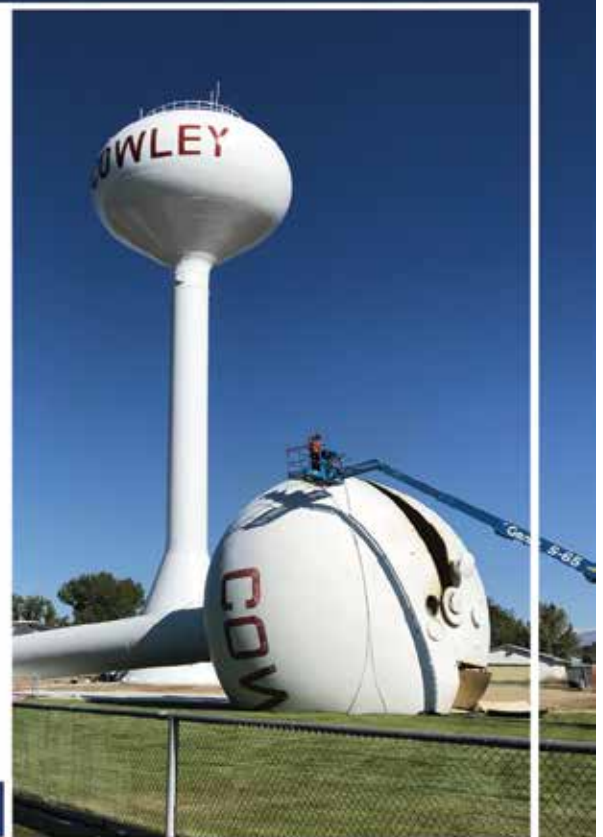
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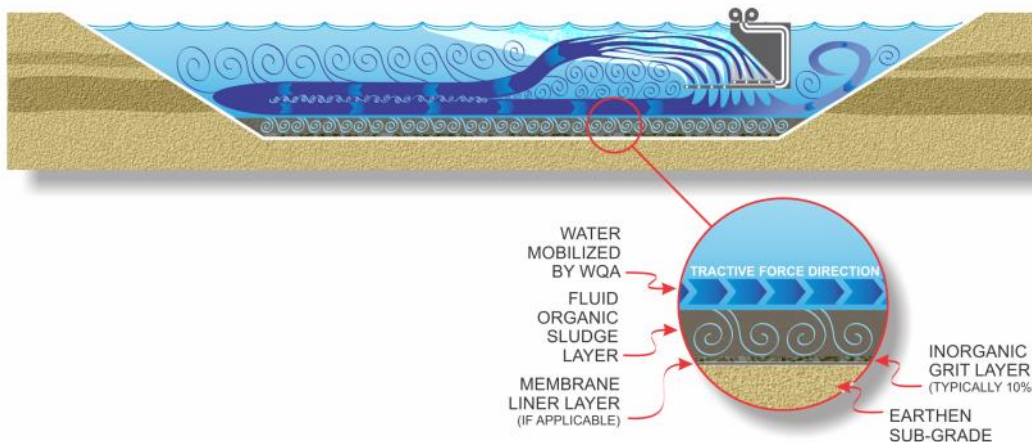
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