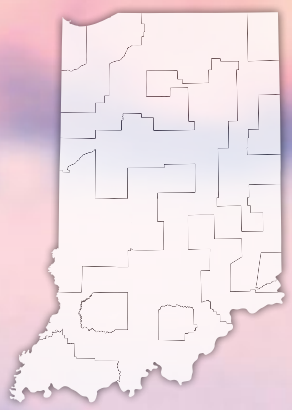
HOOSIER PIPELINE

SUMMER/FALL 2020



The official publication of the Alliance of Indiana Rural Water

ALLIANCE OF INDIANA RURAL WATER

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October 7 & 8

Fort Wayne, IN

INSIDE: FALL CONFERENCE | PLANNING FOR THE UNEXPECTED | ECONOMIC SHOCK

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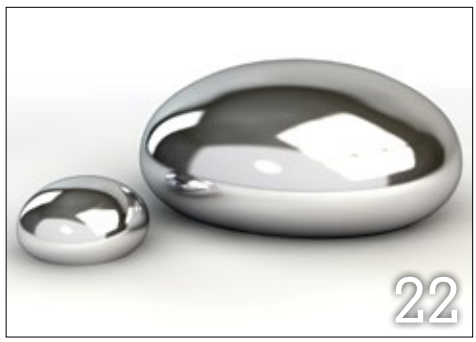
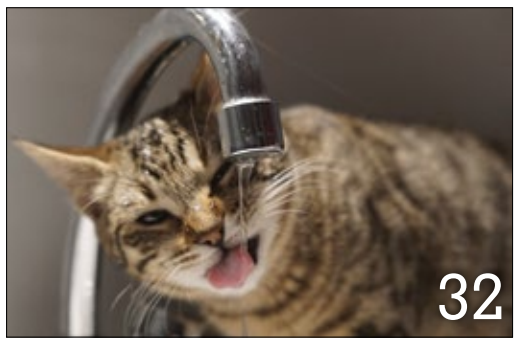
FEATURES





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Adapting to the New Normal

This year started out great. Mapleturn Utilities Manager, Steve Collins, attended the National Rural Water Rally in Washington DC with Executive Director, Connie Stevens, and some Alliance board members in early February. At the rally, Mapleturn Utilities won the silver medal for America's Best Tasting Water at the Great American Water Taste Test. It was exciting to see an Indiana water utility receive the national recognition.

Plans moved forward for the Spring Conference in French Lick. It seems that it gets bigger and better each year. Then March came along and the world as we knew it changed. The coronavirus (COVID-19) caused the cancellation of the conference as well as the postponement of the Northern and Southern Expos. The Alliance and utilities across the state suddenly had to find creative ways to keep in operation. Working remotely, having the office lobby closed and working with staggered schedules is starting to feel a little normal now. Hopefully the COVID-19 pandemic will soon be behind us and we can all settle into the new normal.

On-line training sessions this year have been well received and attended. We are very fortunate to have such a resourceful and knowledgeable staff that coordinates all of the training events, which are crucial for water and wastewater professionals.

Since you missed the Spring Conference, plan to attend the Fall Conference on October 7 – 8 in Fort Wayne. The Annual Membership Meeting is held during the Fall Conference.

The Alliance staff is very qualified and eager to help with any water or wastewater issues which you may have.

I wish you a happy, successful and safe rest of 2020. ★

Mapleturn Utilities' Water Places Second in the Nation!

If you're looking for the some of the best tasting water in the nation, look no further than Mapleturn Utilities in Martinsville, Indiana. In this rural community, all you have to do is turn on the faucet for pure "Quality On Tap!" Mapleturn Utilities claimed the Silver Medal of America's Best Tasting Drinking Water at the 21st Anniversary of the Great American Water Taste Test, held on February 5, 2020 in Washington, DC, as part of the National Rural Water Association's Rural Water Rally.

When asked how he felt about winning, Manager, Steve Collins said, "This is a really big deal and we should feel blessed to have such good quality water!"

North Marshall Water District, located in Benton, Kentucky, claimed the title, and tied with Mapleturn Utilities was Jenkensville Water Company of South Carolina. The Bronze Medal went to California Pines Community Services District located in California. The other finalist in the top five was Auburn Board of Public Works from Nebraska. These five water systems competed against 37 total entries from across the country. State Rural Water Associations hold their own taste test finals and send the winners to compete at the Great American Water Taste Test.

These finalists are selected in a preliminary round, with the finals judged by a panel of experts. The honorary judging panel this year included Edna Primrose, Assistant Administrator, USDA Rural Development Office of Water & Environment Programs; Diane Nellor, Clerk of the Senate Appropriation Subcommittee on Agriculture, Rural Development, Food and Drug Administration, and Related Agencies; and Morgan Ulmer, Clerk of the Senate Appropriation Subcommittee on Agriculture, Rural Development, Food and Drug Administration, and Related Agencies.

Judges rated each water sample based on its clarity, bouquet and taste. Each of the judges commended the quality of water that Rural Water provides and noted the difficulty in choosing the best tasting water in the nation.

NRWA represents over 31,000 rural and small utilities. It is a huge accomplishment to make it to the top five finalists, but then to go on to take home the silver medal is a testament to the quality and taste of the water in Indiana! ★

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Connie Stevens
Executive Director

Leading by Example

It is during the COVID-19 Quarantine that I write this article. Wow! I never really gave much thought to how this pandemic could change our everyday lives. But the reality is, it has, and we were not as ready as I thought we would be. After all, we have all been talking about Emergency Response Plans (ERPs), Standard Operating Procedures (SOPs), Cyber Security Plans (CSP) and the associated training. We put time and effort into creating these documents and putting them in their proper place so we would know where to find them. We should be ready for anything, right?

Well…wait a minute. Maybe we are more prepared than we think. We just need to tweak the plans a little. If we must work alone or at least six feet from another person, we can do that. We can wash our hands, wipe down counters, desk, handles or frequently touched areas more often than we used to. If we have a pump down during the emergency and need two or three people, we can have gloves, goggles, face shields/masks available. We will keep sanitizing wipes (Clorox wipes) in all our vehicles (always disposing in the trash after use). We know the names and cell numbers of our neighboring utilities and/or someone from the Alliance so if we need someone in an emergency, we will have each other's back. We just need to have this list saved in our phones and written down where someone else can find and utilize it.

Another "tweak/change" we need to make as we move forward is when we are sick, we need to stay home. This is difficult for me to do because I think I can work through anything. I know I'm not the only one that thinks this way. Many of us grew up with the attitude that "you work hard every day, do your best and only miss work if you are dying," but that is not the real point. The point is that we need to stay away from everyone else so that we do not make them sick. Now that we have the technology available to work from home, that is much easier to do.

So, if your water/wastewater system has not gotten on board with a laptop computer, a SCADA system or some other techy gadget, you need to talk with your people about that. Boards, Mayors and Councils need to hear about these needs and keep them updated. Most all of us have now been introduced to Zoom or Team meetings. This has allowed us to have training sessions, board or staff meetings, visual contact with our lab or office people to get some work done. Pretty cool, huh?! Technology can make our lives easier by allowing us to monitor our water/wastewater systems at any time from almost anywhere. In most cases we can make changes or adjustments from these "gadgets."

Now to be clear, I do not believe we should attend meetings, trainings and work with our co-workers through this technology all the time. This should be utilized during a time that personal attendance is not in the best interest of the health and wellbeing of others. Technology is great, but personal interaction is great, too, and needed. I personally, enjoy meeting people face to face, reading their body language and the expressions on their faces – especially their smiles. As human beings, we were meant to interact with each other.

Yes, our lives have changed due to this pandemic, but it's not a bad thing to implement more efforts as listed above. Washing our hands often, covering our mouths when we cough or sneeze, sanitizing the "often touched" things around us is the new norm and it will help keep us all healthy.

The Water and Wastewater professionals are the best at taking care of their communities and each other. You will lead by example with these changes as it will be part of your legacy. Thank you all for doing what you do every day to keep your people safe and healthy. I applaud you. ★

"Washing our hands often, covering our mouths when we cough or sneeze, sanitizing the "often touched" things around us is the new norm and it will help keep us all healthy."

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Apprenticeship Program Update

Kelly Gardner
Assistant Executive Director

The Alliance of Indiana Rural Water's (AIRW) nationally registered Apprenticeship Program is an excellent way to transition water and wastewater employees into their systems' water/wastewater operation specialists. The program was developed in response to the industry's need for assistance in training the next generation of skilled workers and to standardize training across the state. An Apprentice who completes the two-year program and passes the State aptitude test is considered a journey worker according to national apprenticeship standards and a licensed operator in the state of Indiana. An operator is allowed to do the daily tasks of running and operating a water or wastewater system unsupervised.

The AIRW currently has 45 apprentices in the program across the state. Many operators have inquired what utilities are enrolled in the program. There are multiple types of systems in the apprenticeship program, ranging from small to large municipalities, including cities, towns, regional sewer districts, and non-profit systems. The apprenticeship program assists employers and new hires with training in many locations across the entire state.

Of the licensed operators mentoring apprentices, many have worked for their systems for most of their careers. The knowledge they share with apprentices during the training process will pass on valuable knowledge and experience of their systems to the next generation. The Apprenticeship Program provides utilities with the training needed for their new employees to learn all aspects of the industry and is an excellent alternative to an expensive college education.

The first Indiana apprentice, Nicholas Hines, completed the nationally recognized apprenticeship program with the Alliance of Indiana Rural Water in 2019 and was recognized at WaterPro in Nashville, TN. Nicholas received his WT3 and his DSL operator's licenses with the Indiana Department of Environmental Management. Having finished the program, he now acts as a mentor at his utility by training the next generation. He is currently training the youngest apprentice in the program. In fact, the utility had to wait until the apprentice turned eighteen to enroll him. Nicholas is also helping assist a neighboring utility as the operator in charge of the water plant. In June, he will be mentoring a second apprentice at this neighboring utility, which will enable them to have their own licensed operator in two years.

Water/Wastewater workers were essential employees long before the COVID-19 but their importance has come into greater focus during the pandemic crisis. They must all pay close attention to supporting and protecting their workforce. The question is always, who would fill their shoes should one of them become ill? We all know the abundance of licensed operators is not overflowing. If you are interested in the Apprenticeship Program please contact Kelly Gardner at *kgardner@inh2o.org* for more information. ★

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BY DAVID ADKINS
WATER CIRCUIT RIDER

Planning for the UNEXPECTED

I just want to start off by saying I hope everyone reading this is safe and well. Since March 17, we at the Alliance have been working for the most part remotely from home. This has forced us to come up with ways to stay connected to each other and our members as well.

For our members we have tried to stay in contact through calls, texts, emails and onsite visits if necessary. Donald Papai had been teaching a water exam review class each week until the pandemic hit and then it seemed it as though it would have to be canceled. Thankfully, the members of the Alliance team came up with a way to do it in a webinar format and it has worked very well.

We have had to conduct staff meetings in the same way with positive results. Going forward, this may be a tool we can use to deliver future training classes. It just goes to show that, sometimes, difficult times will cause you to think outside the box and come up with solutions to problems you are facing.

I know that other members of the staff are writing about the importance of ERPs and SOPs. It's easy to overlook how important these two things can be, but in a situation like the one we have been going through, they could really make a difference to someone who has to operate as system without the ability to be on site.

Last year a staff member and I traveled to Arkansas for a three-day emergency response training class. Each and every presenter talked about how important ERPs and SOPs are in a disaster situation. They spoke about how important it is to have the information about your lift stations readily available: pump hp, type of pumps, pump rotation, amperage, single phase/three-phase. It just made it easier for them to ensure they had the right size generator to operate the lift station. These are just little things but they make a big difference.

That's a question you should ask yourself as operators of a system: have I provided my staff with all the information and tools they need to operate the system in an emergency? I would think this pandemic has given everyone a chance to see where they might need to make improvements in planning for the unexpected. In closing I want to say "THANK YOU" to each and every one of you who went to work each day, operating our water and wastewater plants and maintaining our distribution systems. You are all heroes in your own right it's just that most people don't realize how important your job truly is. Stay safe. ★

BY GORDON MEYER,
WATER CIRCUIT RIDER

The Need for Standard Operating Procedures (SOP) DURING EMERGENCY SITUATIONS

As we have seen during the last few months of the COVID-19 Pandemic, Standard Operating Procedures (SOP) are a vital and important tool. Hopefully, no one that you know encountered someone infected with the virus and were incapacitated, in the hospital, or quarantined due to the possibility of being infected. But if the situation did arrive that you were unable to do the job, another operator could come in to cover for you. Remember, the person coming in may have the same certification that you do, but, as we all know, each plant is different in its own way. The best way to guarantee that the work is properly being done is by having simple step-by-step operating procedures for each task.

The best way to do this is to simply put the procedures into a format that is easy to follow for staff at your treatment plant and available in a manual of operations binder that is easily accessible. Each daily check is different for systems. Some could be time-consuming and others may simply involve recording master meter readings and pump hour meters, or running lab tests. Or it may be a question of checking chemical weights and levels, or chemical feed pumps service pumps and motors for proper operation.

The lab testing should consist of simple step-by-step procedures which basically involve turning on a test meter, grabbing a sample of finished water from the tap, filling a sample cell to the amount indicated for testing, calibrating meters with blanks for testing, adding reagents to sample cells, placing sample cells in the meter, and testing the sample. Then, record the results on the daily lab sheet. This needs to be done for every lab test run. The step-by-step procedures should be in the operation manual for your specific meter. Just copy them and place them in the operations binder.

If filters are used at the plant the step-by-step procedures for when, how long and how to backwash the filters should be written down and included in the binder. The proper step-by-step procedures should also include how to replenish chemicals when needed and when to order chemicals, with supplier name and number.

If compliance sampling needs to be completed, then the binder needs to include the sample locations and procedures to properly collect them.

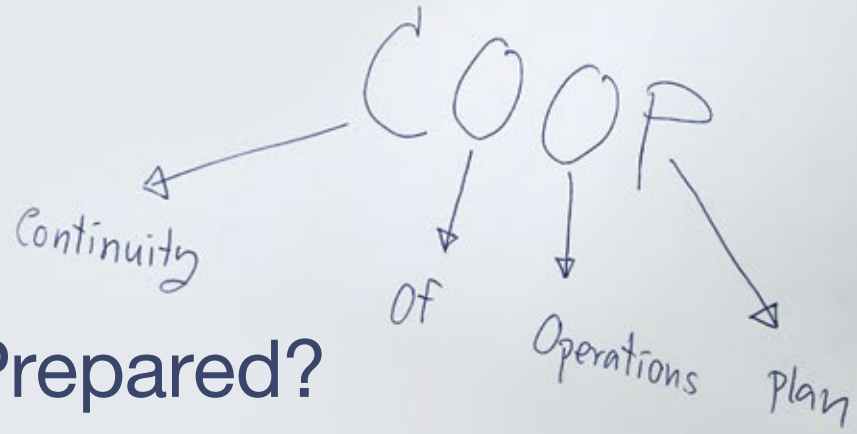
There are many other things that should be in the binder such as checking your source water such as the wells for ground water and intakes for surface water to make sure the area is secured and to check the pumps for proper operation. Booster stations should also be checked daily for proper pump operation and recording pressure gauge and meter readings if applicable. If you purchase water, check the meter where it enters your system and check your storage tanks for security.

Another good rule of thumb is to record the procedures that were done during a water main break, including the location of the break, size and type of pipe material, valves closed if needed, what materials were used and how the break was repaired. If this information is included in the binder it may be useful in the event of another break in the area that occurs at another time.

Each system is different and any step-by-step procedures need to be recorded for that system. This may seem like a daunting task, but If you set down and think of the procedures that are required, you can produce a good tool for your system that can be used not only for emergencies but also when you are in need of some time off. These daily procedures are vital to day-to-day operations and need to be done while you are away from work in order to keep the system running smoothly. If you put together a simple step-by-step procedure manual with tasks that need to be completed and how to do them, another operator can step in and help you out until you return to work.

It would be a blessing to not go through another situation like the COVID-19 pandemic, but things do happen, whether they are natural disasters, man-made events, or any other type of disruption to life as we know it. It is always better to be proactive instead of reactive. Producing a step-by-step manual to cover the needs of operating your water system and to continue providing safe potable drinking water to your customers is always a good move. ★

BY SHERRI WINTERS,
WATER PROGRAMS DIRECTOR



Are You Really Prepared?

Are you really prepared for catastrophic events? I believe many of us found out during this COVID-19 pandemic, that our plans could use a little updating. ERPs, SOPs, COOP, what does it all mean?

Well, if your utility has an Emergency Response Plan (ERP), chances are, it hasn't been updated on a regular basis. I'm just speaking from experience as a regulator and trainer. These should be updated at least annually or as personnel, contractors and other essential processes/protocols change.

I have found that not many utilities have detailed Standard Operating Procedures (SOP). Think about every single thing a utility does, from maintaining your water source through treatment and distribution, to business protocols like billing, maintenance records and even complaint tracking. Begin a SOP for each and every action. Then create a SOP to maintain the SOPs. No, I'm not kidding. Updated and archived SOPs are a must.

But what I really wanted to outline is a Continuity of Operations Plan (COOP). It is rare to find a water or wastewater utility that has a complete, detailed and accurate COOP. Think of it as the most detailed account of how smoothly your utility runs, then ask yourself, 'What if our Operation Specialists or billing personnel were unable to perform their duties?' How do you bring someone else in to assist that has never been exposed to your particular treatment processes? Who can you bring in to handle the billing software? Where do we take our samples and when? How do I shut down or start up a particular booster or lift station? Where do we order chemicals or spare parts?

This is where having your ERPs and SOPs up to date is critical. The COOP should reference proper certifications where required and reference any necessary SOP, as well as who to contact for assistance, such as your primacy agency contact, vendors, repair contractors, and so on. It doesn't really have to be a daunting task. Just remember seven key things; a 'don't' list, if you will. (Reference: *Seven Critical Mistakes to Avoid in Continuity of Operations Planning,* White Paper by Bold Planning)

1. Don't overlook essential business operations and their associated risks. Ensure you outline what can happen if specific operations are disrupted.
2. Don't forget to update your contact information on a regular basis. Do this annually or as things change. Make someone in charge of this.
3. Don't be ambiguous about roles, responsibilities and duties. Be specific about everyone's roles.
4. Don't forget to outline delegations of authority. Make sure everyone knows the chain of command.
5. Don't forget to detail information about facilities and where plans and/or procedures are located. Make sure all staff knows this information.
6. Don't forget to emphasize and document what is absolutely vital to operations. Make sure these are listed as priorities and staff knows what they are and where to find this list.
7. Don't make the COOP inaccessible or un-editable! This is a living document. Keep it secure and make protected copies available to all necessary staff. Again, assign proper staff to this task.

I know that you all know exactly what to do and when to do it. However, if this pandemic has shown us one thing, it is that it is not guaranteed that you and other utility staff will be left unscathed or unaffected by a situation of this nature. Ensure that everyone knows or has access to what you know and do. Work with neighboring systems to potentially cover for each other if incapacitated. Also, stay safe and be smart! There are examples available for all of the above. Just reach out to us at the Alliance and, as always, we'll assist in any way we can. ★

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BY DONALD PAPAI
NORTHERN INDIANA WATER
CIRCUIT RIDER

Need to MIX IT UP

There are many water systems across our great nation, and they all have some sort of water storage tank to hold their precious liquid. Depending on the demand of the water supply, sometimes the water can sit for an extended period, causing thermal stratification. I know what you're thinking: Not "us" because we cycle our plant on/off a couple times a day to help limit water age and weakening of disinfectant chemicals such as chlorine.

This in our industry is called "passive mixing." Passive mixing is usually not enough to prevent stratification, which can result in lower chlorine residuals, bacterial growth and sampling inconsistencies. Still thinking everything is all right. Yes, I know, because that's the way its always been done here. Right?

Let's look at Thermal Stratification; thermal stratification is the phenomenon in which two layers of water of different temperatures stratify in a tank. The colder denser water is on the bottom and the warmer less dense water rises to the surface. Unfortunately, most tanks were built before this phenomenon was fully understood. Tanks are typically constructed with a common inlet/outlet pipe, which means daily cycling of the tank often does not have adequate velocity to disturb the upper layer of water therefore stratification can and will occur.

Thermal stratification not only occurs when temperatures are warm. Tanks can become stratified during the winter as well. During subfreezing temperatures in the lower portion of the tank, it is the warmest because the influent water is the primary source of heat, when influent flow is low the water temperatures decline quickly and the fresh water stays in the lower part of the tank. Water temperatures in the tank decline with increasing elevation until ice forms, so, as you can see stratification is always occurring in our tanks.

What can we do about it?
Use mixers.

Mixers

There are many types of mixers available on the market. Selecting the right one for your application is crucial and there are numerous vendors to help with that decision. After talking with several of you that currently use mixers in your tanks, I've made a list of some advantages and disadvantages.

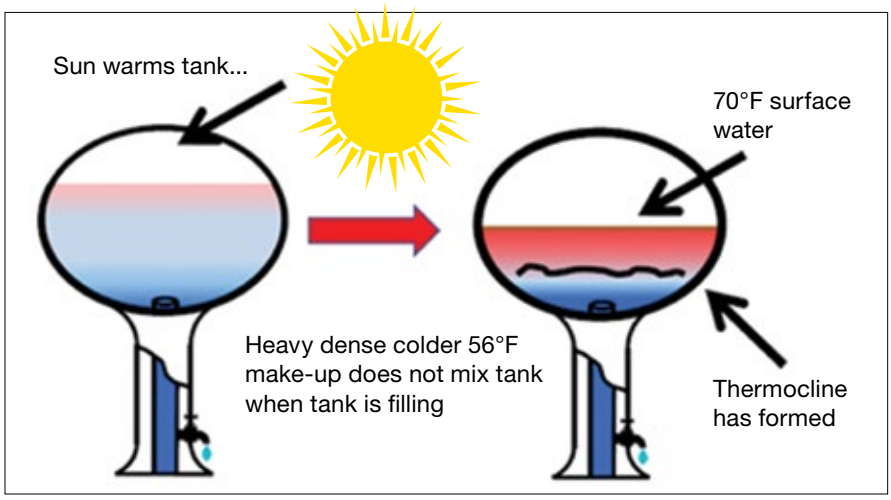
Advantages:

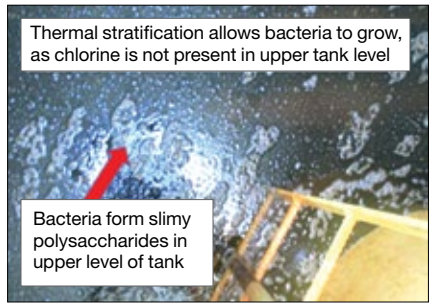
- Provide unified temperatures throughout the tank
- Reduce ice build up and result in less structural damage due to ice
- Provide cohesive disinfectant residual throughout the tank
- Eliminate bacteria growth on the waters surface
- Reduce disinfectant usage
- Reduce disinfection by-products

Disadvantages:

- Initial cost
- Increased electrical usage (some use solar power)
- Selecting the wrong mixer for your application; its not one size fits all

As you can see the advantages outweigh the disadvantages by far. I might have missed something in either column, but the bottom line is that mixers have a proven track record. You can find tons of articles written on this subject. If you are having water quality issues, take the time and look into "Mixers" you won't be sorry, and neither will your customers. ★





BY KEVIN WENZEL
WASTEWATER CIRCUIT RIDER

Mercury

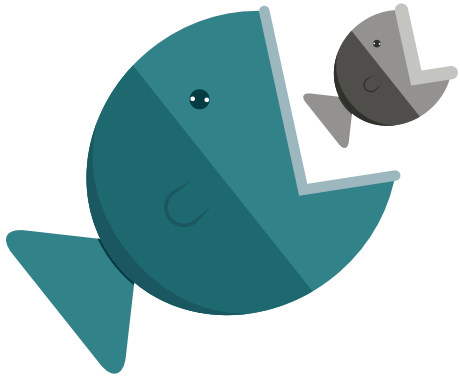
With the recent crisis, a lot of towns had to deal with people flushing wipes and other cleaning supplies down the drain. People have no idea what that does to pipes, lift-stations, and wastewater plants. Do people realize other things that they flush can cause problems to the wastewater system and harm the environment?

One of those things is mercury.

Mercury can be in household products as well as commercial products. Thermometers, Fluorescent lights, barometers, batteries, contact solutions and some antibacterial products. For more information about mercury visit *www.epa.gov/mercury.*

Even though the wastewater plant process removes about 98% of the mercury it receives, the remaining 2% can be harmful to you. When the mercury enters the stream it turns into methylmercury, which is a toxin. This mercury travels up the food chain. Little fish eat the mercury, then bigger fish eat the smaller fish. The mercury taken up by the fish is distributed throughout their body, including the fillets that you eat. If people eat a lot of large predatory fish, they can accumulate enough methylmercury in their bodies to cause health problems. Methylmercury buildup in fish-eating wildlife has been linked to reproductive problems, impaired growth and development, behavior abnormalities, and even death.

As you can see it is very important to properly dispose of your mercury products. Some communities have disposal sites to which you can take your mercury. A person can find proper ways to transport mercury on the EPA website. ★



BY DEE DEIG,
ENERGY EFFICIENCY CIRCUIT RIDER

VFDs and Soft Starters: Which One Should I Use?

Let's do some general housekeeping first:

What is a VFD?

A Variable Frequency Drive (VFD) is a type of motor regulator that drives an electric motor by changing the frequency and voltage supplied to it.

Some other names for a VFD include: variable speed drive, adjustable speed drive and adjustable frequency drive.

The frequency of the power applied to an AC motor determines the motor speed.

What is a soft starter?

A soft-starter (SS) is a thruster-based electronic device, used with AC electrical motors to momentarily reduce the torque in the power train, and the electric current surge of the motor during start-up by controlling the conduction time of the thrusters. They provide a gentle ramp up to full speed and are used for both start-up and stopping. Soft-starters reduce the mechanical stress on the motor and shaft, as well as the electrodynamic stresses on the attached power cables and electrical supply system.

When should I use a VFD?

When total or partial speed control is needed. Depending on use, VFDs provide a substantial opportunity for reduced energy consumption.

How will a VFD benefit me?

Fully adjustable speed. Controlled starting, stopping and acceleration. Active torque control. Pump operation curve monitoring.

When should I use a Soft Start?

For smooth starting and stopping. Efficient operation at rated speed.

How will a Soft Start benefit me?

Reduced starting current and mechanical wear. Increased contact life of starter contactors. Adjustable acceleration time. Chance of increased starts per hour.

Energy Savings Realized with a VFD

VFDs work using the affinity laws for pumps. In hydraulics, to express the relationship between variables involved in pump or fan performance (such as head, volumetric flow rate, and shaft speed) and power. In rotary implements, the affinity laws apply both to centrifugal and axial flows.

The affinity laws are a set of formulas that calculate the impact of a change in revolving speed or impeller diameter on the head and flow produced by a pump and power demanded by a pump.

In active use, if at any time during operation we need to run the pump at 80% of its speed, using a VFD we will be able to reduce the speed during operation, and this will lead to a significant decrease in absorbed power.

So, at 80% speed, we can save up to 50% of the motor power using the VFD, which will lead to increasing motor life time and significantly reduce energy consumption.

If you are looking for ways to save energy and money in your utility, contact me for a no cost, no obligation energy assessment at 317-508-1505 or *ddeig@inh2o.org.* ★

Economic Shock

Can Affect Water Utilities and the Residents They Serve

By Summer Minger

As a rural water utility, serving your community is your job, but economic shock on the utility side can affect your ability to deliver outstanding service. For your customers, an economic shock from loss of income or a large unforeseen expense can cause long-term hardship. At the current time, the worldwide pandemic is creating economic shock for an alarming number of citizens and businesses.

Economic Shock for Utilities

The astronomical cost of maintaining and upgrading aging infrastructure is an ever-growing financial drain for water utilities. Capital infrastructure costs account for a very large portion of utilities' total costs, and utilities without strong capital improvement and asset management planning may experience economic shocks that ultimately could lead to deteriorating service and health risks.

Broken water mains, an estimated 850 per day in the US and rising, create significant economic issues for water utilities from repair/replacement costs as well as lost water. In addition to the physical expense, aging water infrastructure threatens public health from the millions of remaining lead service lines and forced discharge of partially treated water caused by combined sewer overflow and inflow and infiltration.

According to a University of Utah study, water main breaks increased by 27% between 2012 and 2018 and breaks in cast iron and asbestos cement pipe, which make up a significant portion of those in the North American water system, are up over 40% during that period. The study also points out that smaller utilities have break rates more than twice as high as larger utilities. The reason for this may simply be less funding for data, engineering and asset management. Additionally, small and rural utilities typically have a higher number of pipe miles per customer, resulting in a more significant financial load for infrastructure maintenance.

Daily, American water utilities lose 7 billion gallons of treated potable water, which adds up to 2.1 trillion a year. Water is not only lost because of aging infrastructure, but also through mechanical damage, lack of corrosion protection and theft.

This is water you're not delivering to customers and receiving revenue from – losses are estimated at billions of dollars each year. It is estimated that $97 billion is needed to address non-revenue water issues across the country. A utility's average non-revenue water loss is 16%, but most utilities can reduce that by two-thirds with the proper measures. These include auditing, to differentiate between actual and apparent losses from theft; billing and metering errors, as well as in physical inspections of the system; and the use of technology such as sonic leak detection and smart meters.

This data can help pinpoint areas that should be investigated more thoroughly – it is possible water is being lost through damaged pipes. It also can highlight where capital maintenance projects are most needed in your system – maintenance that needs to be done and will reduce non-revenue water.

Another utility expense related to water loss results from unknown water leaks on customers' private service

lines. When this occurs, a resident can be confronted with an unexpected and costly water bill. While the utility is not responsible, in many cases they will absorb a portion of the charge, and in some cases the entire charge (in the form of bad debt expense) if the customer is unable to pay their portion.

The trend toward privatization is being fueled by aging infrastructure. Most utilities sold to private entities have reached a point where they are not keeping pace with the infrastructure needs. However, a focus on profitability often results in cutting utility staff and other costs that lead to a lower quality service to customers. Privatization also eliminates oversight and eventually leads to rate increases.

Economic Shock for Citizens

The effects of an economic shock, such as an unanticipated costly home repair or a sudden loss of income, can be devastating to homeowners on a fixed income. The United Nations estimates that 40 million Americans are living in poverty, and 18.5 million are living in "extreme poverty," defined as an income of $12,000 or less for a family of four.

The UN report also found that the US has the largest "health gap" in any industrialized country and ranked America 36th in accessibility to potable water and sanitation. Estimates range from three in four to three in five Americans who, while not necessarily in poverty, are living from paycheck to paycheck. More than 40% face a high likelihood of material hardship.

Many of those struggling in the day-to-day are not prepared to endure an economic shock, yet approximately 60% of American households endured one in a calendar year, according to the Pew Trust. Among those who did experience such a shock, the most expensive median cost was $2,000 and 55% of households struggled to make ends meet afterwards.

The elderly population is rising every year and census data indicates that over 1 million Indiana residents are currently 65 years of age or older. Many senior citizens live on a fixed income and, more and more, they are opting to remain in their homes as they age. The elderly, therefore, are particularly vulnerable to economic shock from a number of unexpected expenses, including home repairs.

A comprehensive study of how aging affects one's ability to perform home maintenance tasks concluded that home service providers, technology developers, home designers and senior agencies can help create and promote solutions to facilitate aging in place.

A recent survey conducted by the Harris Poll in partnership with HomeServe found more than half of Americans had a home repair in the prior 12 months, while one in five has nothing set aside in a "rainy day fund." That increases to more than 50% among those who have a household income of $50,000 or less – in short, a vulnerable population already struggling.

Americans with more limited financial means are the most vulnerable to the monetary impact of a home repair. As infrastructure continues to deteriorate, homeowners are experiencing more and more costly and unexpected problems related to water and sewer lines.

CostOwl estimates the cost of replacing a water service line at between $1,500 and $5,000, depending on the extent of the work, layout of the home and region. Replacing a sewer service line would cost an average of $3,000 to $12,000. Many homeowners don't know they are responsible for the maintenance of a service line until an issue arises – sometimes literally.

The Prosperity Now Scorecard estimates that 40% of American households don't have the savings to weather an economic shock and 20% don't have access to mainstream credit. This means such a household would

be unable to meet that expense, a crippling blow that may force them from their home if they don't have access to potable water and sanitation.

What residents often don't know is the water and sewer service lines that connect to their homes aren't part of the utility's system. They are not aware that, despite the line extending from the outside of their home to the property line or even past it, the service lines are part of their home plumbing – and their responsibility. When a service line fails, it's unpleasant for everyone involved, especially when a utility official must inform the resident in crisis that the utility cannot help them with this problem.

A majority of homeowners (69%) in the previously mentioned Harris Poll say they would like their local utility provider to offer an optional service repair plan from an outside company for major home systems. Homeowners would favor paying for a water line repair through a service plan over an insurance rider.

As a rural water utility, what can you do to address the financial impact of aging infrastructure? And how do you protect your customers from potentially devastating economic shock?

Consider public-private partnerships with solution providers. ServLine by HomeServe, for example, works with 144 participating rural water utilities in 18 states through an exclusive affinity partnership with the National Rural Water Association (NRWA) and 28 State Rural Water Associations (SRWAs). The business offers a unique leak adjustment product to participating utilities, which can help cover high water bill costs that result from leaking water pipes on a homeowner's property, delivering financial protection from an unforeseen water loss event to the utility as well as the customer. This program complements HomeServe's National League of Cities Service Line Warranty Program, which educates homeowners about their responsibility for private-side service lines and offers optional repair service plans for water and sewer lines and interior plumbing. HomeServe and ServLine combined currently have more than 900 municipal and water utility partnerships.

Public entities and private companies have been successfully collaborating for years via advisory boards, stakeholder groups, and governance bodies to leverage the collective experience, knowledge, and expertise of a broader group. In an environment of increasing pressure to maintain and upgrade aging infrastructure with increasingly smaller budgets, public-private partnerships are an alternative worth pursuing for many rural water utilities. ★

Homeserve Acquires ServLine

HomeServe, a leading provider of home repair solutions serving more than 4.2 million customers across the US and Canada, has acquired ServLine, a business division of Sunbelt Insurance. Started in 2014, ServLine works with rural water utilities in 18 states through an exclusive affinity partnership with the National Rural Water Association (NRWA) and 28 State Rural Water Associations (SRWAs).

The ServLine Leak Adjustment Program offers financial protection to water utilities and theircustomers from a water loss expense resulting from a leak on a homeowner's property. This program complements HomeServe's National League of Cities Service Line Warranty Program, which educates homeowners about their responsibility for private-side service lines and offers optional repair service plans for water and sewer lines and interior plumbing. HomeServe and ServLine combined currently have over 900 municipal and water utility partnerships.

"ServLine's unique business model will enhance HomeServe's offering to our municipal and water utility partners and their customers," said John Kitzie, Chief Executive Officer of HomeServe. "The acquisition of ServLine, with its strong partnership with the National Rural Water Association, strengthens HomeServe's position in the market as the leading provider of home repair solutions."

For more information visit *www.servline.com.*

I Am Here

By Clem Wethington, Compliance Specialist

Reprinted from *Waterproof*, Winter 2018, with permission

I am a certified water utility operations specialist and I am here to produce water and make sure it gets to the customer in a safe and efficient manner. My responsibilities include water system operations, maintenance and monitoring. Duties at the treatment plant include operation and maintenance of pumps, motors, and chemical feed equipment. Duties in the distribution system include maintenance of miles of piping, pumps, and storage tanks. Monitoring the water during and after treatment and throughout the distribution system is done on a daily basis, even on weekends and holidays. Some samples are collected on a daily basis and testing is done at our facilities. Other samples are collected on routine schedules and testing is performed by a certified laboratory. Each day has specific duties that are required to be performed and reported, and each day can have an emergency situation that requires immediate attention. Even though each day is filled with various activities and the "to-do" list is never completed, the two main functions are to produce/purchase drinking water and deliver it to the customers in the community. That is why I am here.

- Produce safe water
- Deliver to customers efficiently
- Operations
- Maintenance
- Monitoring
- Pumps
- Motors
- Chemical feed
- Piping
- Storage tanks
- Collect samples

Certified Water Utility Operations Specialist

I am a water utility manager and I am here to oversee the entire drinking water system, which includes operations, administration, and personnel. It is my responsibility to assure that others working under my supervision are performing their tasks well and that all requirements are being met. I am responsible for maintaining records for water quality, usage, treatment, and production and providing required reports to regulatory agencies and to our board of directors. I assist in the development of bid specifications and participate in bid reviews and the awarding of contracts. I need to be aware of legislative activities and safety standards and provide direction to our board and personnel. It is also my responsibility to obtain information from each department and prepare budgets and assist our board with setting rates for our products and services. It is my responsibility to see that the needs of the water utility and the needs of the community are being met. That is why I am here.

- Oversee entire DW System
- Operations
- Administration
- Personnel
- Supervise
- Maintain records
- Provide reports
- Develop bid specifications
- Award contracts
- Safety standards
- Perpare budgets
- Assist Board

Water Utility Manager

I am a water utility clerk and I am here to perform many of the administrative requirements. I make vendor and service payments, generate and mail documents, take and deliver messages, keep financial records, make bank deposits, and perform all payroll functions. I assist management with preparing reports to present to our board. I also work with operations personnel to enter meter readings and generate customer billing. I am here also to collect customer payments and hear their complaints. Many times I am the person of initial contact between the community members and operations or management personnel. It is my responsibility to work with and communicate with management, the board, all departments and employees, vendors, regulators, and the general public. I am here to multi task.

- Peform administrative duties
- Make payments
- Documents
- Messages
- Financial records
- Deposits
- Payroll
- Reports
- Enter meter readings
- Customer billing
- Collect payments
- Handle complaints

Water Utility Clerk

I am a water utility board member and I am here to make sure that our community members and businesses have a safe and reliable water supply. The board is responsible for hiring management that will in turn hire competent personnel to perform operations and administrative functions. It is the responsibility of the board to establish policies and procedures, and to constantly plan for short-term and long-term needs. The board must be attentive to the needs of the residential customers, the needs of business, and the needs of the water utility and, with the assistance from management, make decisions that will assure the financial stability of the water utility. As a board member I must set aside my personal desires and ambitions to meet the needs of my community. That is why I am here.

- Ensure safe, reliable water supply
- Hire management
- Establish policies & procedures
- Continuously plan
- Long-term needs
- Short-term needs
- Residential customers
- Businesses
- Water utility
- Assure financial stability
- Meet community needs

Water Utility Board Member

I am a business owner and I am here to make a profit and to provide jobs to the people of the community. Water is necessary for production, safety, and hygiene. Almost all manufacturing and commercial establishments depend upon adequate and affordable water supplies in order to exist. Water used for industrial purposes must meet specific quality standards and must be constantly available. Safe and abundant water must be available for employees to perform job functions, to consume and use for showering and other hygienic functions. The board and management of the local water system have made decisions that have enticed businesses to be established and to provide jobs to the local residents. That is why I am here.

- Make a profit
- Provide community jobs
- Water needed to meet production
- Water used to ensure safety
- Water necessary for hygiene
- Need adequate, affordable water
- Water meets quality standards
- Need safe and abundant water
- Water must be always available

Business Owner

I am a firefighter and I use water to fight fires in homes and businesses. Even though I have nothing to do with the water treatment or distribution, my actions can have a major impact on the community's water supply and the integrity of the infrastructure. A large fire may require immediate use of water at high volume and velocity that affects water quality and adds stress to pipes and distribution components. The hydrants we firefighters connect to are part of the water distribution system and the water we use was treated primarily for purposes other than putting out fires. It would be a disservice to the community if we damaged the distribution system or wasted water intended for them. I am here to protect the community.

- Use water to fight fires
- Actions impact water supply
- Integrity of infrastructure
- Need immediate use of water
- High volume and velocity
- Added stress to pipes
- Fire hydrants part of system
- Mindful to not waste water
- Protect the community

Firefighter

I am a parent and I know nothing about the treatment process or distribution of water. All I know is that water comes into and out of my home through pipes. The pipes coming in are attached to faucets and the pipes going out are attached to drains.

- Expect safe water in home
- Use water to drink, cook, mix baby formula, bathe, do laundry, dispose of waste, and many other activities
- Teach family to conserve water
- Pay for water
- Need water to survive
- Provide for family

Parent

Water is used in my home for drinking, cooking, mixing baby formula, bathing, laundry, waste disposal, and many other activities. I am here to teach my family to conserve water because I am here to pay for it. If the price of water is too high or I am paying for more than necessary, then other family necessities are jeopardized. Without water my family could not survive. I am here to assure that my family has water. I am here to provide for my family.

I am a wastewater operations specialist and I am here to clean the water after it has been used for a variety of functions by a variety of users. Wastewater coming into my treatment facility has been contaminated with human waste, industrial waste, chemicals, and medications, and contaminants from many other sources.

Clean the water
Operate equipment
Maintain equipment
Monitor and report requirements
Remove contaminants
Environmental awareness
Protect water for community
Protect water for those downstream

Wastewater Operations Specialist

Like the water utility operations specialist, I too have a lot of equipment to operate and maintain as well as monitoring and reporting requirements. The cost of treating the wastewater is often more than the cost of treating source water for consumption. It is my responsibility to remove the contaminants from the water and discharge it back into a receiving stream in a condition that is environmentally acceptable. It is my responsibility to protect the water in our community and to protect the water for the communities downstream. That is why I am here.

I am a regulator and I am here to enforce the regulations established to protect water. There are regulations to protect water sources, regulations to protect drinking water, and regulations to assure that water is cleaned to specific standards after it is used. Water utilities, wastewater treatment facilities, industries, and businesses have monitoring and reporting requirements to confirm that they are meeting or exceeding the regulatory requirements. I am here to provide protection to the water that everyone depends upon.

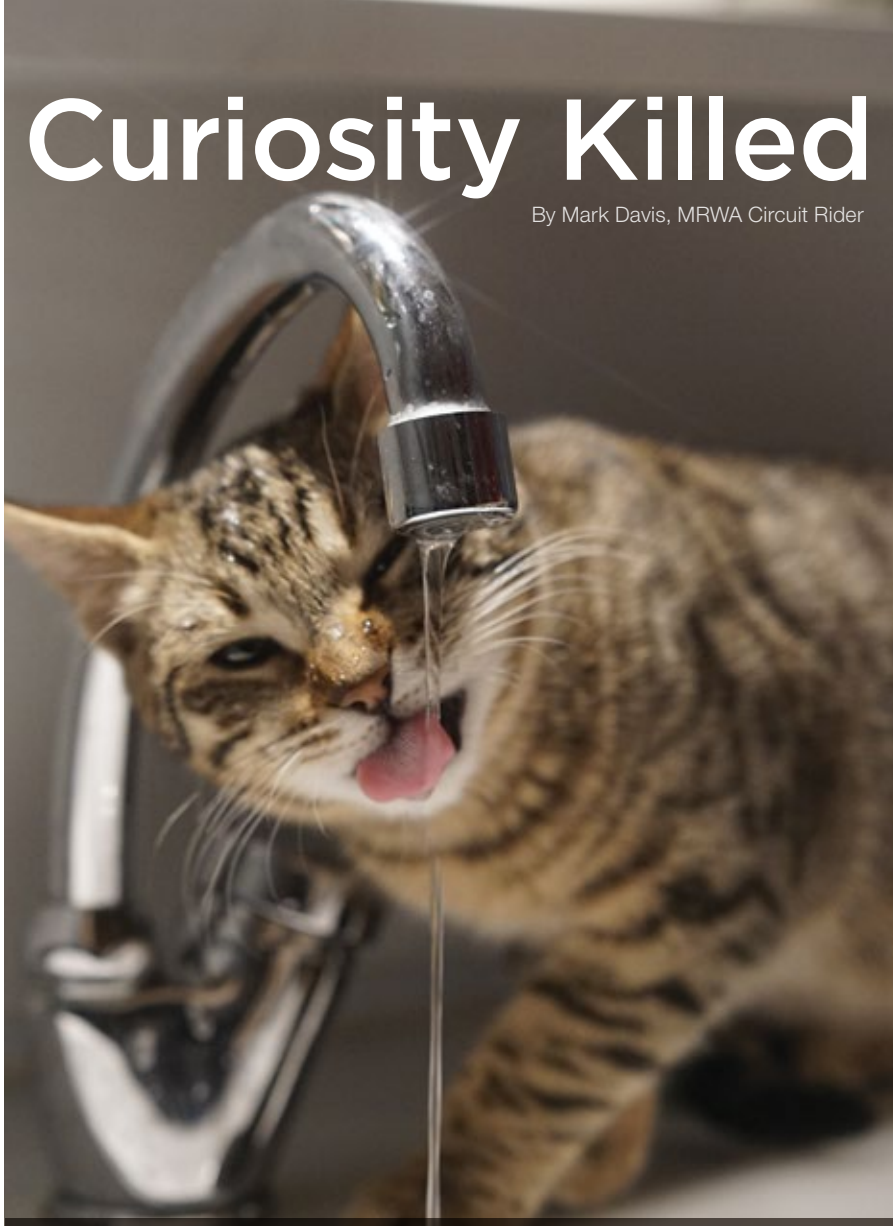
Enforce regulations that protect water, water sources, and drinking water
Assure used water is cleaned to specific standards
Ensure regulatory requirements are exceeded or met by water utilities, wastewater treatment facilities, industries and businesses
Protect the water

Regulator

We are all here. We live in the same community. We shop in the same stores. We dine in the same restaurants. We attend sporting events, civic functions, and local festivities together. We often worship together. We each have our own personal agendas and we each have different roles, but we all have the same goal. We all want to have a safe, dependable, and affordable supply of water. We are here together. We are neighbors. ★

Curiosity Killed the Cat

By Mark Davis, MRWA Circuit Rider



Reprinted from *Maryland Rural Water Association Fall 2017 (15).*

If I asked you to recite a famous quote about water, I would bet a dollar that many of you would say, "Water, water, everywhere and not a drop to drink." If I were to ask you, "Who said it?" I would bet the farm that many of you would say, "Beats me." Now for the sake of full disclosure I would have had no idea who it was either. However, thanks to a smartphone and the internet, it is really easy to find the answer. "Water, water, everywhere, and all the boards did shrink; Water, water, everywhere, nor any drop to drink." It is from a really long poem written by some guy named Samuel Taylor Coleridge a really long time ago.

Now we all know that curiosity killed the cat. You can look that one up for yourself. I became curious and started to look up other quotes about water. The amazing thing is that there are really a lot of quotes about water and a lot of them are really thought provoking. So, for the sake of filling up some space in this article, I will share some of the more interesting ones that I found. Some of these quotes contain ancient wisdom that is still relevant to what we do on a daily basis; others are a bit more current and relevant, while others that I have included will have nothing to do with the water treatment industry.

So let's start with a quote that has nothing to do with what we do. "Don't get set into one form, adapt it and build your own, and let it grow, be like water. Empty your mind, be formless, shapeless – like water. Now you put water in a cup, it becomes the cup; you put water into a bottle it becomes the bottle; you put it in a teapot it becomes the teapot. Water can flow or it can crash. Be water, my friend." Now the real reason that I used this quote was not because it used water to illustrate a point. The real reason for using this quote was because it was from Bruce Lee. Now come on and admit it, that was a cool quote, and Bruce Lee was about as "fluid" as you could get.

Here is an interesting quote on the characteristics of water. This is a subject which when "Googled" can be used to fill up an entire evening, or possible maybe even a future story. John Emsly, cited in an article for *Awake* magazine said that, "Water is one of the most investigated of all chemicals, but it is still the least understood... nothing is as complex in its behavior. H,0 should be a gas... but it is a liquid. Moreover, when it freezes... its solid form, ice, floats instead of sinking." I found his statement one of the most interesting because our industry revolves around the complexity of the behavior of water.

"There is nothing softer and weaker than water, and yet there is nothing better for attacking hard and strong things. For this reason there is no substitute for it." This was said by an ancient Chinese philosopher named Lao Tzu. While there is some truth in there somewhere and it has to do with water, I used it to get to another quote by Lao Tzu which has nothing to do with water, but has everything to do with how we should handle the current issues that we confront every day in our industry. "Do the difficult things while they are easy and do the great things while they are small. A journey of a thousand miles must begin with a single step." And with staying in this current line of thought, here is one from Kelli Jae Baeli, "You can bail water 24/7, and no matter how good you are at not sinking, you still have a hole in your boat." In other words, "Stop kicking the can down the road." Good luck finding out who gets credit for that one.

Here are a couple more that seem to fit into a centralized theme. See if you can guess what it is. Jean Giraudoux said that, "Water is the one substance from which the earth can conceal nothing; it sucks out its innermost secrets and brings them to our very lips." Thomas Fuller said that, "We never know the worth of water till the well is dry." An ancient Chinese proverb states, "When you drink the water, remember the spring." If you said Source Water Protection then that means you are still reading this article.

So as not to press my luck any longer, I will leave you with this one last quote. It relates completely as to why you do what you do each and every day. What you do is important. What you do matters. In fact, what you do is truly a matter of life and death. These words were spoken by then Senator Edmund Muskie of Maine as he was arguing in 1972 for the passage of the *Clean Water Act.* "Can we afford clean water? Can we afford rivers and lakes and streams and oceans, which continue to make possible life on this planet? Can we afford life itself? Those questions were never asked as we destroyed the waters of our nation, and they deserve no answers as we finally move to restore and renew them. These questions answer themselves." ★

LAKESIDE Screw Pumps Bring Peace

It's oh-so-quiet at the Mahanoy City Wastewater Treatment Plant in Pennsylvania.

Unless you'd been told otherwise, you wouldn't know that close by, a 36-inch diameter pump is operating night and day in a giant concreted basin.

And even when one of the two larger screw pumps (84-inch diameter) is also being put through its paces, remarkably there's still a kind of a hush.

With the town's school district just 300 feet away, this very well-run treatment plant is a good neighbour.

Today's calmness though is quite an altogether different story from previous dramas experienced at Mahanoy City WWTP. The original 36-inch diameter raw sewage enclosed screw pump, which had become increasing unreliable, failed twice, ultimately giving the plant operators no option but to look for a more sturdy and efficient alternative. The heavy-duty enclosed Type C screw pump from Lakeside Equipment Corporation was chosen – a design with two convoluted flights that are welded to the rotating outer tube, with the lower bearing mounted above water level.

'Intelligently designed'

Mahanoy WWTP's Assistant Chief Operator, Josh Ball, commented: "Through Lakeside's representative Doug McCord in Exton, PA, we'd always had a very good relationship - and with this new enclosed Type C screw pump we immediately benefitted from an intelligently designed and very well engineered product."

Two years later though, one of the original 84-inch diameter enclosed internal-lift type screw pumps suffered a catastrophic failure, forcing the operators to introduce a temporary (three-month) bypass system.

"At the time, this was pretty nerve-wracking," added Josh Ball. "The bolts on the stainless steel ring, on which the vast majority of the weight rests, simultaneously broke, causing the structure to break in half. It was scary."

For storm events, the town has to have sufficient back up capacity, so the decision was taken to replace both of the larger pumps – and Mahanoy City had little hesitation in deciding to replace the old units with two brand new 84-inch diameter enclosed Type C screw pumps to line up alongside the 36-inch diameter pump that had been working without any issues for the past 24 months.

Lakeside's enclosed screw pump (left) and its twin screw pumps used for storm duty.

"The difference between how the old pumps used to sound is like night and day – and we've also seen a big improvement in reliability."

The two new larger screw pumps, utilized alternately during heavy rainfall, have so far only been needed for flow rates of two million gallons per day, though they can handle a total of 50 million gallons per day. Installed in the wet well at an angle of 38 degrees, these larger pumps sit next to the workhorse 36-inch diameter pump that on average handles 850,000 gallons per day, but can go up to 1.38 million gallons per day.

Designed for trouble-free operation, with options for either an open or enclosed design, the new Screw Pumps lift large quantities of water or wastewater at low heads for applications such as return activated sludge or storm water pumping. The Open Design consists of the spiral screw, upper and lower bearings and a drive arrangement, using a tube and spiral flights set in an open, inclined trough that permits both simplicity and reliability.

Lakeside's Enclosed Screw Pumps utilize the same operating principles, but are encased within a tube and use either rotating or stationary outer tubes inclined at up to 45 degrees, allowing the shortest horizontal space required for a given lift.

The enclosed Type C 84-inch diameter screw pumps, which were a drop-in replacement for the failed original internal-lift type pumps, have allowed the plant to get back to normal for the 4,000 residents of the town (plus 2,800 at a local state prison).

Once at the heart of the coal industry, Mahanoy City's wastewater that goes through to the combined sewer overflow is all from domestic use.

Lakeside's screw pumps in Pennsylvania.

'It is only stainless steel that ultimately survives'

"In this volatile environment, it is only stainless steel that ultimately survives", added Josh Ball, who has been working at the plant since he was a teenager almost two decades ago.

Doug McCord added: "We aimed to bring about the best and most long-lasting solution for Mahanoy City. This scale of pump installation is a significant investment and needs to be applied with the utmost precision. Lakeside used all of its vast engineering, fabrication, machining and aligning experience to bring about a truly first class job".

The smaller of the pumps, which is installed in the deeper part of the wet well, has required only minimum maintenance since its installation – a weekly treat of oil and grease, plus a change of oil just twice per year. For the two new larger screw pumps, an oil change is required just once per year.

"We do of course carry out regular visual inspections", continued Josh, "but all three enclosed Type C pumps are extremely reliable. Doug and Lakeside are helpful as well as consistent, and always apply common sense.

"Compared to the previous cross-start motors on the old pumps, the Type C's are also more efficient, using far less energy. When needed, the capability of these pumps also gives us the advantage of being able to clean out the well without going over the bearings. The power is there to bring it down to operating levels very quickly".

He added: "We have a new soft start-up with 200 HP motors, but it is incredible that the Lakeside pumps are so quiet. In fact, when we first had them installed, we couldn't hear anything, so we had to go outside to check that they were running! If we'd had loads of noise from the start-ups and constant humming, it could have led to possible complaints from the school district that's so close to us, but because of the very high quality work by Doug McCord and Lakeside, everything is running smoothly and quietly. The difference between how the old pumps used to sound is like night and day – and we've also seen a big improvement in reliability."

For more information, visit *www.lakeside-equipment.com*.

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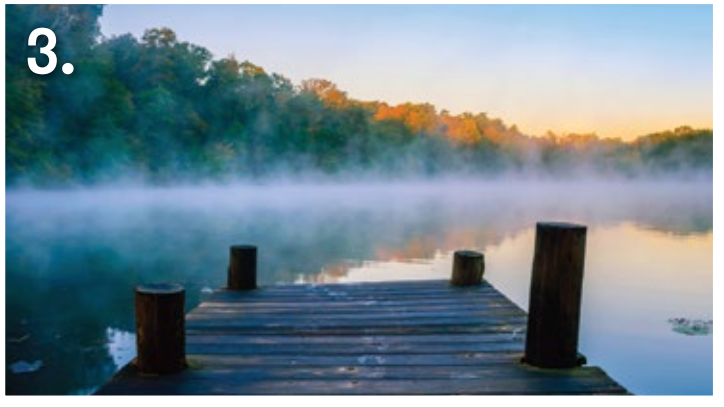
These photos were all taken somewhere in Indiana. Can you pinpoint the location? (Answers at bottom.)



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