# Water Log

A publication of the Ohio Rural Water Association
*www.ohioruralwater.org*

Fall/Winter 2018
Issue 2 of 2

## Also

- Water Infrastructure Projects-Garnering Support from Local Officials and Customers
- Impact of DEMAND Charges on Your Plant's Electric Bill
- Addressing Inorganic and Organic Contamination
- Understanding Water Hammer

# 2018 Second Quarter Report

## The Ohio Rural Water Association Provided Over $657,000 In Benefits To Rural Communities During The Second Quarter Of 2018

Zanesville, Ohio: The Ohio Rural Water Association (ORWA) reviewed our work for the second quarter of 2018 and determined that the **organization provided over $657,000 in total benefits to Ohio's rural water and wastewater utilities.** These benefits included training operators, detecting water leaks, protecting drinking water sources, providing energy audits, and inspecting sewer systems.

Considering our federal grant income of about $150,000 this quarter, ORWA estimates that we provided an **overall net benefit (without federal assistance) of over $507,000 to rural water and wastewater systems** during these three months.

**Put another way, ORWA's grant management is extremely effective and efficient as for every dollar of federal assistance we were given, ORWA provided $3.38 in extra benefits to rural Ohio**.

To illustrate the work of the Ohio Rural Water Association (ORWA) through an example: A village in eastern Ohio requested assistance with locating lead water lines in their system. The lines were somewhere under a state highway.

An Ohio Rural Water Association Circuit Rider not only provided the equipment, but also held hands-on training to locate the lines. Thus, the interaction successfully found the lines, but as per the mission of ORWA, the Circuit Rider used the opportunity to provide training, making it an educational experience for the village.

During this visit, the village also wanted to investigate an area for a possible leak. The Ohio Rural Water Association Circuit Rider proceeded to use leak locating equipment, provided by ORWA, to confirm and pinpoint the leak.

Provisions were made to replace the lead lines and repair the leak. The village received multiple benefits from the Circuit Rider's visit and is extremely grateful.

*The Ohio Rural Water Association was founded in 1976, with the goal of improving the quality of life in rural Ohio. With funding primarily through membership dues and federal grants, ORWA offers free on-site technical support to water and wastewater systems, both large and small. This includes: assistance with the operation and maintenance of water and wastewater treatment plants; source water protection planning; and distribution system troubleshooting such as leak detection, smoke testing, line locating, and sewer line inspecting. ORWA also offers training opportunities on the operation, management, finance, and governance of water and wastewater utilities.*

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# Executive Director's Message

## *REFLECTION:*

*A Letter from Ohio Rural Water Association's Executive Director.*

Hello everyone, and thank you for all the support over the past year, my first full year as the Executive Director. It has been a whirlwind of ups and downs for me over the past year steering this wonderful Association. Mostly ups, but I think we all have days when we don't feel like we're performing at our best. Fortunately this past week I had the opportunity to reflect on all the progress that has been made this year, and I was very pleased with what I saw.

My main two goals when I started were: to empower the field Staff by acquiring newer and better equipment, and to improve our financial situation so that we can less stressfully navigate any future changes to our funding.

This past year, thanks to a grant from the Ohio Water Development Authority, we've been able to acquire an array of the latest and greatest mobile equipment that our Field Technicians will be able to use to help ORWA System Members with the planning & implementation of their Asset Management Programs. This equipment will be utilized for the benefit of hundreds of ORWA System Members for years to come, and our Technicians will be able to train & instruct operators on how to get the best results out of the equipment.

Last week I received our year-end financials, and we more than doubled our anticipated outcome based on the budget for this year. That kind of improvement in such a short time was surprising even to me, but I am grateful, and I am confident that this coming year will be just as fruitful, and hopefully more so.

I would also like to inform you all that this will be the last bi-annual magazine. Starting next year, we will only put out one magazine each year, and a membership directory. We really want to improve the content of our magazine, and to condense everything we do throughout the year into one higher quality magazine. We are hoping to include more from and about ORWA's Membership as well. If you have any ideas, or suggestions feel free to email them to me any time.

Thank you all for supporting us over this past year, we hope that you've valued your membership to ORWA, and we hope to have your continued support for many years to come. I am looking forward to what the future holds for this Association, and I am proud to be a part of it. ■

Joseph Pheil
*ORWA Executive Director*

# President's Message

## *HELLO RURAL WATER,*

From the start of the Annual Conference /Golf Outing and on to Put-in-Bay, this has been a great 10 months. Thanks to you, the Board, Joe and his staff, sponsors, and most importantly you, the Waste and Water Utilities and individual members.

Some details on our Annual Conference , led by Mark Bennett, had increases in attendance and exhibitors; great job Mark. Thanks to Jim Truesdell for heading up the golf outing which was a success.

In my opinion there were three great accomplishes this year by us. First, getting awarded a grant from OWDA of $368,000.00 to assist small utilities with compliance for EPA's Asset Management planning.

Secondly, obtaining our Apprenticeship Registration from Apprentice Ohio. We will receive $75,000.00 from National Rural Water Association to hire an Associate Director to run this program.

Lastly, being acknowledged with an award from National Rural Water Association as the best in the nation at providing technical assistance for our Asset Management plan.

In conclusion, thank you board, staff, associates, utilities and individuals for a great year. Your organization is only as strong as its membership participation, please continue to contribute.

Merry Christmas and a Happy New Year ■

Sincerely,

Tom Reese
*ORWA President*

# HELLO my name is Brandon Fetzer

*Hello,*

my name is Brandon Fetzer. I am from Van Wert, Ohio. I was born and raised here. I am married to my wife of 20 years and we have two amazing children together. I have worked for the City of Van Wert for 17 and a half years. I started off in the Sewer Collection Department where I learned how to; install Sanitary Sewers, jet and clean sewer lines, camera sewer lines, sonar lines, and a variety of other things. In January 2008, I moved to the Waste Water Treatment Plant. I took an Advanced Waste Water Class and went on to get my Class 1, 2, and then 3 Waste Water Certificate. While in the plant, I also learned how to do a variety of lab work which, in my opinion, is where you learn what is really going on in the plant.

When I saw this job opening, I was intrigued so I inquired about it. The more I learned about the position, the more interesting it sounded, so I applied and was hired for the job. This is a very rewarding job for me, because I get to go out and meet new people everyday and help these people out with there problems. I feel very blessed that this opportunity came along, and I am hoping to be doing this for a long time.

Ohio Rural Water Association is a great organization for Rural Communities across Ohio. Small towns that just don't have the funds to purchase the equipment to do a job can reach out to us and we are there to help.

In closing, I would say before being hired here I didn't know what all ORWA offered and I now can say that I am amazed at what we do and am proud to be a part of the team. ■

# Water Infrastructure Projects- Garnering Support from Local Officials and Customers

Water Infrastructure Projects- Garnering Support from Local Officials and Customers

Operating and maintaining water systems is a continuous and expensive process. Important to the process is communicating and interacting with local government officials and customers who must approve system upgrades and pay for them. In small rural systems, the relationship between the water operations personnel, local officials and customers can be very intimate and often overlap. As with most situations in life, effectively managing these relationships while operating and maintaining a 24-hour 365-day operation can be challenging, especially when it comes to financing large capital projects.

Below are some tips about how to communicate complex water operational needs to people in the community who rarely think about such issues and may be skeptical about spending a great deal of money.

A. *Understand your system*. Take time to dive in and understand the water or wastewater system you are operating. When trying to convince people to support or fund work within the system, it helps if they feel you fully understand how the system operates. There should be no part of the system where you use the phrase "we haven't touched that in years" or "I am not sure what that does". People can usually sense if you really know the system you are operating.

B. Be prepared to translate technical terms you may be familiar with to those who do not work with water systems every day. The effort will be appreciated and help gain support.

C. One of the worst things you can do is sit idle during times of calm. Just because there is no water break, or an oversight agency is not issuing a notice of violation does not mean there is nothing to do. Make good use of the time between emergencies and political crisis to review the mechanics of the system and anticipate future needs. Asset management plans require active review of the system. In addition, assessing the system usually leads to many revelations that can be addressed before a crisis. It will also reduce the anxiety of "what will go wrong next".

D. It often helps to point to industry standards or how successful an upgrade was in a surrounding community that the audience may be familiar with. Officials normally feel more comfortable supporting proposals that have been proven successful elsewhere. Talk to other systems to learn how they have addressed similar problems. You may learn as much about how not to address an issue as you will about how to address an issue.

E. Be prepared to explain why a project needs to be completed. What problems are you experiencing or what problems is the work designed to avoid.

F. Use maps and other graphics to visually show details of a project or problem. Paper and GIS maps are great but even hand drawings can be effective.

G. Prepare for meetings. Make sure you have enough handouts or graphics for all who may need or want them. If you are preparing a presentation make sure you practice beforehand.

H. If you do not know the answer to a question, state that you do not know. If you promise to try to find the answer, make sure you follow up with a response. Your thoroughness in addressing questions will give officials confidence that you will react the same when faced with issues during the project.

I. Be patient with you audience. Remember they do not work on these issues all the time. They my ask numerous questions in an attempt to fully understand what you are trying to communicate.

J. Start the conversation early. Don't spring projects on stakeholders unless it is a true emergency. This can cause unnecessary stress and may cause a negative reaction to a project.

**K.** Give officials and the public time to digest and ask follow-up questions about a project. This allows them an opportunity to get used to the idea.

**L.** Be honest, people can sense it. Do not hide details because you feel stakeholders may not understand. Those details may eventually come to light and undermine your project while in progress.

**M.** Seek outside engineering support to help verify the need for the project and to assure the correct technical details are addressed. Small systems can easily identify if there is a problem, but normally lack the full range of expertise or time to prescribe an ideal remedy. Outside engineers, that have dealt with similar issues in other communities, can offer can great deal of help in explaining a project from a third-party perspective.

**N.** Use the questioning from others to test your idea and plan. A good plan should stand up to scrutiny. Be prepared to assess other options and why they are not as good as the plan you have put forth.

**O.** Use email to communicate and disseminate documents. Not only does email provide a verifiable trail of communication, it provides a direct link. It also allows for documents to be easily stored and reviewed at a time that is convenient for the person you are asking to support the plan.

**P.** Be prepared to alter your plan based on new information or concerns expressed by others. Often people suggest changes that improve your original plan or customize it to your community. Allow as much time as possible for this process to occur.

**Q.** Listen and be aware of context. Local officials and customers may have different motivations for thinking or acting a certain way. They may oppose or support a plan based on a preconceived notion, bias or strategy. They may also just be stressed due to events in their personal life. In any event, system operators must rely on good management practices, data and industry standards to guide the planning and project proposal. In most cases if a system operator can show that they have properly analyzed an issue and provided a well thought out, honest and straightforward solution, support for the project will usually follow.

**R.** List the tangible benefits of an improvement and a properly operating system. Water systems directly affect the quality of life of the people served. Detail the health effects and practical impacts, such as better water pressure, cleaner waterways and improved business support.

It is important to keep in mind that properly operating and maintained water systems are not only required by law, they are desired by everyone. As the operator that oversees a system, you are in the primary position to communicate the needs to local stakeholders and articulate how to address any issues. Due to political pressures or differing ideas on how governmental agencies should operate, an operator will need to try to offer explanation of projects based on the unique personality of the community. While at times meetings may be heated or you may encounter a person who can never be convinced, staying focused on promoting what needs to be done to properly operate a system will usually lead to support for a project.

While trying not to take these discussions personally can be difficult, you can take solace in maintaining a calm professional attitude and working toward a healthy water system. It may not always be evident, but people will very much appreciate the impact your efforts will have on both the business of their community and their personal lives. ■

Feature

# IMPACT OF DEMAND CHARGES ON YOUR PLANT'S ELECTRIC BILL

*(ONE SIZE DOES NOT FIT ALL)*

Electric bills consist of consumption charges for energy used (kilowatt-hours or kWh) and demand (kilowatt-demand or kW) charges. Although residential customers have generally steady demand, water and wastewater operations experience demand for electricity that can vary from minute to minute. Demand may be very high during certain parts of the day, week or year and very low during other times. For instance, a wastewater plant might have high demand during heavy rainfall from infiltration and storm water inflow, and very low demand during dry periods and/or overnight periods. A water plant might have its highest electricity demand when multiple pumps are operated to supply high water demand (e.g., morning when residential use is generally high).

The billing electric utility must plan and be prepared to meet each customer's demand needs even when it is not a daily occurrence. Power company generation, transmission, and distribution equipment to meet water and wastewater energy needs must be on stand-by and ready to fill any increased need for electricity immediately. This might include installation and maintenance of transformers, wires, substations and even additional power plants.

All customers pay for the equipment and maintenance needed to serve their needs. The demand charge is determined by assigning costs based on each user's electricity requirements. It must be emphasized that each electricity utility establishes the pricing and monitoring of demand, so no two power companies may be the same. Thus, this article contains general information and examples for illustration purposes and may not apply to the power provider for your water or wastewater plant.

Larger usage customers such as water and wastewater plants typically pay a portion of their bills based on their highest 15-minute, 30-minute or other specific time demand each billing period (again, unique to each power provider), no matter how often that demand is required.

Invoiced demand charges may be based on either the plant's highest demand during the billing period or a minimum demand based on historical information from the plant's last 12 months of usage, depending on each power provider's rate and tariff structures.

For example, billing demand charges may be based on the current use, or for some power providers on the highest of the 3 following numbers (varies across each electric utility):

1. Current Use – You are charged for 100% of your highest demand at any time from your current billing period;

2. Off-Peak – You are charged only 75% of your highest off-peak demand 8 p.m.-8 a.m. (and most holidays and weekends). If your highest off-peak demand was 1,000 kW, then your charge would only be for 750 kW *; or

3. Peak Month – You are charged 75% of your highest billing demand used anytime during June-August and December-February for the last 11 months before your last billing period. If your highest demand during the peak months was 1,000 kW, then your charge would be for 750 kW, instead of any amount used during your current billing period lower than 750 kW.

* NOT ALL POWER COMPANIES OFFER OFF-PEAK METERING. If available, then in order to be charged by off-peak demand, a plant must have an

off-peak meter. If a plant does not have an off-peak meter, the power company can supply information on the availability and cost savings by using one. For each plant's power provider, contact that provider's business customer service number as shown on the monthly power invoice. An example follows, taken directly from a 24-month review of a small water plant. The electric power provider for this plant uses only current demand and does not offer off-peak metering. Four separate electric invoices from that 24-month period are shown in the table below:

The billed kW demand varied over that 24 months from a low of 25.0 to a high of 50.0, with the average demand being 35.6 over the entire period. Note that the calculation of the demand charge amounts are primarily a result of the "Billed kW Demand" factor on each invoice, but a demand cost/kWh for each invoice is computed for comparison purposes. The Sep-17 and Nov-16 invoices are close in kWh consumption, but the increase in cost due to the 36.0 demand versus a 26.0 demand is $152.22 (9,216 kWh x $0.0386/kWh = $355.74).

As the table illustrates in the last column, the demand cost per kWh consumed varied significantly. A detailed review of plant operations during each of those periods would likely indicate when the highest level of demand was experienced and what contributed to it (e.g., multiple pumps operating simultaneously during a peak period). For the 24-month period, the Demand Cost/kWh ranged from a low of $0.03607/kWh to a high of $0.06846/kWh; the average was $0.04764/kWh. There are clearly energy cost reduction opportunities if operational factors that impact the demand portion of the kW consumption can be reduced.

Power utilities vary also in how demand charges are calculated, and these are not always apparent on the electricity invoice; rate schedules that detail those calculations should be available from the power utility. There are also variations in what savings opportunities are available from each power utility (e.g., peak/off-peak metering, rebates, etc.). Some power companies offer attractive rebates for upgrading devices to more power-conserving ones; others do not. The power company generally has a business/government representative available by phone or online to assist with questions about your plant's rate, available rebates, etc.

Water and wastewater plants may be able to minimize electricity demand, and thus reduce total energy costs associated with operations. One way to reduce demand while maintaining operational requirements is to spread out your plant's usage throughout the day if possible. For example, rather than operating multiple distribution pumps to refill water system storage, fewer pumps could be used and operated for a longer period of time. Using variable frequency drives for pump and blower motors may also generally lower demand charges, since across-the-line motor starting creates an in-rush of current that is generally 8-10 times that which is required to run the motor.

A good starting point for reducing electricity demand charges, and power consumption in general, is to monitor, record and review a plant's monthly billed electricity consumption data. This then can be directly compared to the plant's operations data (recorded hours of pump and/or blower operation, times of use throughout the day, operating set-points for tank levels, set-points for dissolved oxygen control, etc.), and noting any mechanically throttled flows, etc. As noted above, the electric power supplier can often help plant operators understand the components of a plant's power bill and assist in power conservation measures.

The ORWA Energy Efficiency Circuit Rider can assist in such a review also, without cost to water and wastewater systems serving populations of 10,000 or less. If your water or wastewater plant would like to schedule an ORWA Energy Efficiency Assessment, please contact Tim Ray, ORWA EE Circuit Rider, tray@ohioruralwater.org, 740-624-1972. ■

| Billing Period | Day Use | kWh Used | Invoice Amount ($) | Billed KW (Demand) | Demand Charge | kWh Use Charge | Demand Cost/kWh |
|---|---|---|---|---|---|---|---|
| Jul - 18 | 32 | 11,040 | $1,517.23 | 50.0 | $705.50 | $811.73 | $0.06390 |
| Jan - 18 | 31 | 4,16,608 | $1,859.38 | 43.0 | $606.73 | $1,252.65 | $0.03653 |
| Sept - 17 | 30 | 9,504 | $1,085.02 | 26.0 | $366.86 | $718.16 | $0.03860 |
| Nov - 16 | 30 | 9,216 | $1,200.98 | 36.0 | $507.96 | $693.02 | $0.05512 |

# ADDRESSING INORGANIC AND ORGANIC CONTAMINATION

By: Ben Merrill

If there is anything that the blue-green algae dilemma in Ohio has shown us, it is that source water contamination can place enormous financial, infrastructural, and operational pressure on water utility systems. In more serious instances in can prevent managers and operators from being able to see to other needs in their systems and present enormous health hazards to consumers. For these reasons it is vitally important that we are prepared to address both inorganic and organic contamination in our sources before they become even bigger concerns.

When contaminants are detected in a water source, operators will generally attempt to determine the specific substance that caused the contamination. If the substance is a chemical it is useful to know its hazard classification. There are generally considered to be four broad hazard classifications. The first is a pollution hazard and is described as a condition through which an aesthetically objectionable or degrading material not dangerous to health enters a water system or another consumer's potable water supply. An example of a pollution hazard would be a food grade material. The second hazard classification is a system hazard. A system hazard is described as a condition, device, or practice posing an actual or potential threat of damage to the physical properties of the public water system or a consumer's potable water system. However, a system hazard will not cause an adverse health effect. An example of a system hazard would be an inert material that clogs a water line but not cause illness if ingested.

The last two hazard classifications are much more threatening and must be given a high degree of attention to ensure their potential for harm is eliminated. The first is a health hazard, and it is defined as any condition, device, or practice in a water supply system or its operation that creates, or may create a danger to the health and well being of others. An example of this would be a fluoride overfeed that results in a dangerously high concentration. The last hazard classification is a severe hazard. A severe hazard is defined as any health hazard that could reasonably be expected to result in significant morbidity or death. A large influx of industrial pesticide into a water supply would be considered a severe hazard. In general, if the degree of hazard cannot be determined, an operator should assume that it is a severe hazard.

In the event of a health or severe hazard, it is important to take a number of steps to ensure consumer safety. A no-use advisory should be issued immediately (a boil advisory will generally not be adequate) and operators should determine if the contamination can be isolated. Critical users of the water supply should be informed immediately and any emergency agencies and personnel should be contacted as well. It is important to have all of this contact information easy to access prior to an emergency situation. If at all possible, determine the cause and source of the contamination. Proceed to eliminate the source. Check to see if the cause may be due to a cross connection, backflow, or back siphonage. You can then begin flushing the distribution system to eliminate the contaminant from the public water supply. ■

# CONFERENCE TIME!






Feature

# UNDERSTANDING WATER HAMMER

By: Tim Ballard

If you do not understand water hammer… that is a big problem. It happens more often than you realize and it is more of an issue as systems become older.

Water hammer events are occurring on pressure pipes, especially common in water distribution systems, and can occur for a variety of reasons. Utility operators do not measure these events.

Water hammer occurs when there are sudden spikes or drops in the pressure in a water system by sudden large water withdrawal pumps turning off or on, distribution control valves opening or closing too rapidly.

When water hammer occurs it sends a wave through the pipe. Overtime these events put additional stress on the system. This stress can cause older piping and joints that will cause them to leak. In addition to leaks it can cause backflow incidents, which raises the possibility of contamination. First we must determine where and when it occurs. Secondly, we must determine cause. Can we measure it? Knowing the extent of water hammer in a system is critical in determining what we need to do to help prevent it. Measuring the degree of water hammer is really hard because it does not last long.

Using pressure loggers on hydrants or some other location is vital to finding areas that have experienced water hammer. Preforming system hydraulic studies and monitoring system activities with pressure data logger will help you understand why something happens in one area of your system more than others. ■

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