Meet The Newest Member

USDA's Conservation Reserve Program

Surface Water System Contamination Vulnerability

Troubleshooting Fire Hydrant Problems

Variable Frequency Drives In Water & Wastewater Treatment

Smoking Makes Sense
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Hello Neighbors,

As the result of our recent efforts in developing a more comprehensive training program and with the acquisition of an adjacent property for equipment storage and “Hands On” laboratory style training, I reflect on the growth of the Association over the last 20 years. We have worked our way from renting a two-bedroom basement apartment to our present and recently expanded training center.

In addition to our over 50 training offerings this year our newest training offerings in development are to include hands on laboratory style training for distribution systems O&M, backflow training for system operators, process control laboratory testing, confined space training to mention a few. Success could be defined by our 349% growth in Membership and our 479% growth in programs awarded to us by National Rural Water since 1996. But percentages alone do not take into account the dedication of our employees and the generous assistance of our board members, and especially the support of members like you!

It is satisfying to see this growth over the years and that is based on service to our industry. It also encourages me to look to the future as we strive to provide more services for our membership.

“Improve the Quality of Life in Rural Ohio”

Dusty Parker
OHRWA President

I would also like to take this opportunity to remind our membership of two of our most well-attended events in which they can participate. First is our Summer Quarterly Meeting held at Put-In-Bay, one of Ohio’s most renowned tourist destinations. Northwestern Water & Sewer District will sponsor this annual event. Make your plans today to visit the scenic Lake Erie islands and relax and reconnect with old friends while enjoying the unique atmosphere.

Second, please don’t forget our annual Operator Expo, held at the Roberts Inn in Wilmington, Ohio. This event continues to grow and has become our most well-attended event of the season. This is a great venue to acquire up to 12 contact hours and see the latest in equipment and presentations on operations, maintenance, and regulatory issues; all while enjoying food, fun and reconnecting with old friends. Also at the Fall Expo, don’t forget to participate in the Annual Sportsman’s Auction!

Kevin Strang
ORWA Executive Director
Hi, my name is Joseph Pheil, and I am the new Energy Efficiency Circuit Rider at Ohio Rural Water Association. I was raised in Guernsey County, Ohio, so I know a thing or two about rural communities. I earned my bachelor’s degree in business from Muskingum University in 2012. I am a certified Commercial Energy Auditor and proud to be a member of this great organization striving to better the water quality of America’s rural residents.

The goal of an Energy Efficiency Circuit Rider is to educate Water and Wastewater operators on the energy consumption patterns of their facilities, recommend methods of reducing that consumption, and identify potential funding sources for improvements. Nationally, the energy used by water and wastewater utilities account for 35 percent of typical U.S. municipal energy budgets (NYSERDA, 2008). Some water and wastewater facilities require pumps, motors, and other equipment to operate and function properly 24 hours a day, seven days a week, and can easily be the largest consumer of energy in a rural community. Thanks to advances in technology and the growing awareness of the need for energy efficiency, there have been significant improvements in products and devices geared towards the water and wastewater industry.

Many rural water and wastewater facilities were constructed decades ago, when electricity costs were low and energy efficiency was not considered. A lot of facilities were designed in communities that expected to have continued population growth and are now operating far below the optimal designed flow. Facility operators generally have their hands full fulfilling their daily obligations and rarely have the time to invest in properly analyzing their energy usage. By doing physical, on-location assessments of the processes, equipment, and operation of water and wastewater facilities and by educating operators on the most cost effective areas to focus their energy reducing efforts and the possibilities available, the facility has the potential to reduce their power needs and free up community resources for other opportunities or additional investments in energy efficiency. Energy efficiency projects can also help reduce air pollution, improve treatment performance, and provide better financial & energy sustainability.

The Newest Member

By Joe Pheil
Created in 1985 and still in use to this day, the Conservation Reserve Program is a federal land conservation program signed into law by President Reagan and managed by the Farm Service Agency (FSA) under the U.S. Department of Agriculture (USDA). The program as it is known today was put into place under the Farm Bill. Currently the largest private-lands conservation program in the country, CRP provides a valuable service to both farmers and non-farmers alike. It is designed to assist in the management of water quality, topsoil retention, and habit development for threatened plant and animal species. It has proven itself to be successful in all these goals, and participation statistics show that it is quite popular with farmers as well.

CRP is managed like a traditional cost-share and rental payment program. The concept is relatively simple: the FSA pays participating land owners “rental payments,” and in exchange, the owner allows long-term, natural ground cover to grow on the acres rented. This provides owners with income from potentially non-productive or at-risk farmland and allows said farmland to regenerate for long-term health. Rental payments are generally determined by both the productivity of the land and the average rent value. Owners ordinarily sign contracts that designate the land as CRP enrolled space for a length of 10-15 years. During this time owners are permitted to sell the property which essentially terminates the contract. Participation in the program is completely voluntary.

The ultimate goal of CRP is to assist in preserving the natural resources of our nation’s more rural areas. Converting farmland to its natural state provides a number of benefits for the local environment. Water quality is improved due to a lower number of chemical fertilizers, pesticides, and herbicides being spread in the area. During heavy rain events these substances often wash off of tilled farmland and into streams or rivers. CRP often targets land close to waterways which limits the amount of contaminants that are able to reach them. Soil erosion is also limited under CRP managed lands. As trees and grasses grow, their roots help keep soil locked in place. When these plants die their nutrients are added back into the soil, creating a much richer topsoil layer for future use. An added benefit of these natural growth areas is habit development for animal species. Areas that were long unlivable for many species are now able to be repopulated. CRP provides a number of side-benefits in the areas it is used, including wind breakage, property buffer strips, waterway filter strips, shade, etc.

A number of land owners, namely farmers, are readily utilizing CRP. Managing farmland to maximize production can sometimes be a difficult prospect even in the best conditions. A farmer’s income is often subject to the unpredictable changes of economies and weather. Farmers may also occasionally find themselves with land they are unable to produce on or simply do not have any interest in using. In situations like these, many farmers turn to the Conservation Reserve Program. As of March 2016, over 23.8 million acres across the United States are covered under CRP. The acreage is managed under hundreds of thousands of farms and contracts. CRP land stretches from coast to coast with the majority located in the western and mid-western states. Due to its clear benefits for both farmers and local communities as well as its massive scale, it is likely that CRP with continue to assist in the management of our natural resources for the foreseeable future.
Predicting potential threats to a community’s water source is one of the most important duties that a water or wastewater operator has. Though important for any water system, strategies for mitigating these threats differ depending upon the nature of the system. A number of factors contribute to these differences. Land usage, topography, population, aquifer geology, ground cover, infrastructure quality, etc. all require some amount of attention. Perhaps one of the most important aspects is the water source itself. Many systems in Ohio rely on groundwater, which provides an added layer of protection as any contaminants must penetrate many layers of earth to even approach an aquifer. For those systems that rely on surface water, the issue of managing contamination threats is a bit more pressing. Surface water systems are inherently vulnerable to contamination due to their (generally) widespread surface area and ease of access. They do not have the benefit of a protective over-layer like aquifers do. Surface water can be polluted from roadways, direct dumping, industrial water usage, agricultural runoff, and a number of other sources. In the case of rivers, communities can see contaminants enter their raw water from
dozens of miles upstream. Substances in surface water sources travel extremely quickly from the point of contamination to the intake. Where it may take years for a spill to reach an underground aquifer, surface water contamination can be detected in raw water intakes in minutes. Couple that with the fact that contamination can quickly reach every section of a surface water source, and it becomes clear that keeping these areas safe is extremely important.

In Ohio, the largest threat to surface water systems tends to be agriculture. Although specific single-source contaminators like factories can certainly merit concern, agriculture is so widespread that almost all communities with surface water sources need to address it at one time or another. Agriculture presents a threat primarily through runoff. When landowners spray chemicals on their fields or lay manure, it often sits loosely on the surface of the field. During heavy rain events these materials can be washed off of the surface where they enter drainage tile and eventually drain into lakes, rivers, and streams. Many of the herbicides and pesticides used in farming contain poisonous heavy metals, and manure often contains harmful bacteria like E. coli. Many fertilizers also foster the growth of harmful algal blooms, an issue becoming increasingly common in many of Ohio’s most agricultural regions.

There are a number of strategies that can be developed to combat surface water contamination. One of the most efficient and cost-effective is simple public education. Educating the public on the importance of clean surface water can make a big impact on avoiding contamination events. Encouraging best management practices for farmers and informing them of their proximity to water systems can also go a long way. Regular sampling of raw water will let operators know if there is an issue that needs to be addressed with their source water. Maintaining communication with other towns that share a water source or are upstream of an intake makes a big difference too, as they can spread valuable information on any spills in their area with other local operators. When taking the proper precautions, the potential for serious contamination of surface water sources can be drastically reduced so that our valuable natural resources will be protected for many years to come.

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Although a fire hydrant’s primary purpose is to provide fire protection, it is typically the property of the water utility. During an emergency, they will be operated by the fire department. The utility should schedule regular and frequent inspections to ensure proper operation. Hydrants are diverse and require detailed maintenance as specified by the specific manufacturer. Some problems are universal. The following trouble shooting tips may be helpful for your utility:

**Problem:** Chattering or pulsating during opening of and with flow coming from the hydrant.

**Cause:** Loose stem at lower valve nut. Tighten lower valve nut and make sure the lock washer is still in place.

**Cause:** Use of multiple extensions. Replace stems with a single stem.

**Cause:** Worn couplings. Replace couplings.

**Problem:** Hard to operate

**Cause:** Debris in operating mechanism of hydrant within the bonnet. Clean and lubricate. Replace worn anti-friction washer if needed.

**Problem:** Hydrant slams shut while being closed.

**Cause:** Wear on stem couplings. Replace worn couplings

**Cause:** Loose main valve assembly. Tighten lower valve plate nut. Be sure locknut is in place.

**Problem:** Excessive leakage from drain when hydrant is open.

**Cause:** Damaged or worn drain valve mechanism. Replace drain valve mechanism.

**Cause:** Damaged upper o-ring. Replace o-ring.

**Problem:** Leakage when hydrant is shut off.

**Cause:** Lower seat o-ring is damaged. Replace o-ring.

**Cause:** Damaged valve seat or valve. Replace main valve or o-ring.

**Problem:** Hydrant opens but will not close.

**Cause:** Coupling broken or came loose. Replace coupling.

**Cause:** Stem broken. Replace stem.

**Problem:** Hydrant will not drain.

**Cause:** Drain holes plugged. Clean drain holes.
Variable frequency drives, or VFDs, are electronic controllers that can adjust the speed of an electric motor by fluctuating the power being delivered. When linked to sensors, transmitters, and programmable logic controllers, or PLCs, VFDs can provide continuous control, matching motor speed to the specific demands of the system. Recently, the water and wastewater industry has seen a significant increase in the adaptation of VFDs to control the flow through facilities, increase process control, reduce energy costs, provide smoother operation, and prolong equipment life.

Many rural water and wastewater facilities were constructed when electricity costs were low and energy efficiency wasn’t even considered. A lot of facilities were designed in communities that expected to have continued population growth and are now operating far below the optimal designed flow. Variable frequency drives are excellent at optimizing the energy draw that comes from pumping and aeration - the two most energy consuming processes in water and wastewater facilities. For applications where flow requirements vary, mechanical devices such as flow-restricting valves were traditional used to control flow. This method uses excessive energy and can put a lot of stress on equipment. VFDs enable pumps to meet the needs of a fluctuating system by adjusting motor speeds and energy consumption. VFDs work with most three-phase electric motors, so existing pumps and blowers can be easily retrofitted. Water & Wastewater treatment plants, utilizing variable frequency drives in unison with sensors and PLCs, can consistently maintain desired variables including flow, dissolved oxygen, turbidity, pH, pressure, tank level, and more. By constantly monitoring key variables, operators can identify potential problems sooner, and with a more stable system, they can focus their time and attention on more sensitive variables.

Benefits from variable frequency drives vary greatly depending on system variables such as pump size, load profile, total static head, and friction, so it’s important to calculate benefits for each application. To aid in the adoption and installation of VFDs to reduce energy consumption, many electric utilities provide rebates for new installations and retrofits to existing systems. There are also multiple sources of low-interest loans available to assist water & wastewater systems in financing such projects.
With spring around the corner, I thought it would be a good time to share some info on the benefits of smoke testing.

Smoke testing is one of the most efficient and most cost-effective ways to locate and identify the source of an inflow or infiltration problem. It is important to find and identify these sources because they may seriously affect the efficiency of the wastewater treatment facility and increase operating expense. Some examples of the impact that it may cause are as follows.

- **Pump station run time**
- **Increased operating cost due to more treatment time**
- **Equipment wear**
- **Collection system maintenance**

These are just a few things to consider when deciding if implementing a smoke testing program will be beneficial to your facility.

For example, what ages and types of materials are used in the collection system? Many sanitary systems are 50 to 100 years old. Over time, decay and roots cause breaks in lines that will allow excessive infiltration to enter during rainy or wet conditions.

The presence of undesired connections such as basement and yard drains, catch basins, cross connections from storm sewers, foundations drains, and downspouts will cause high flows every time it rains. The easiest way to tell if this exists in your collection system is to look at the plants influent flow meter.

Smoke testing is a very quick and easy way to determine if the buildings or residents are properly connected to your system. Smoke should come out the vent stack, if any traces of smoke or its odor enter the building, it is an indication that the gases from the sewer system may also be entering.

Smoke that enters the building can cause panic and stress to an unsuspecting individual. This will require some good public relations skills and allow for an opportunity to stress the importance of correcting the problem. Remind people that the smoke entering their building or residence is actually their friend. If smoke is entering, dangerous gases could be as well.

The smoke that is manufactured specifically for testing is not dangerous or toxic, it will not leave residual or stain and has no effect on plants or animals.

The visible smoke and odor will last for only a few minutes if there is adequate ventilation. Sewer Gases are dangerous, These gases have no odor and present the most serious problem because they can enter the building undetected and cause anything from minor illness to death. Identifying and correcting the source of any smoke entering a building is highly advised.

Smoke testing can also be very useful in locating lost manholes. Although collection
systems can cost millions of dollars, they are one of the first things to be neglected when there is a decrease in funding and staff. They become out of sight and out of mind until a problem occurs.

POSSIBLE CAUSES FOR SMOKE ENTERING A BUILDING

• The vents connected to the buildings sewer lateral are inadequate, defective, or improperly installed.

• The traps under the sinks, tubs, showers, or floor drains are dry, defective, or not installed properly.

• Bad wax ring or gasket

In my opinion, the biggest benefit of conducting a smoke test program is the high visibility and learning opportunities for the village staff as they enter the collection system for a day or so and learn the direction of flow and really get an idea of what is really going on.

Check all connected lines including abandoned and supposedly disconnected service lines. Do not hurry because minor leaks can show up or be overlooked.

PREPARATION

• Maps of the collection system should be reviewed

• Ordinance wording for corrective action

• Public Notice

• Incident reports / Documentation of problem

• Cameras / Radio

• Safety vests for staff

Smoke testing may involve many hours of labor. It has the potential to affect the occupants of the buildings connected to the collection system, disrupt traffic, and cause people to call 911; therefore, advance preparation is important for a successful smoke test. Be safe out there and happy smoking.

The public, in general, have this idea that wastewater operators don’t do anything. Make sure to seize the opportunities that arise while conducting this test to explain what you are doing and why.

HOW DOES IT WORK

Smoke testing is conducted by placing a blower over the manhole and forcing non-toxic smoke into the collection system. We use liquid smoke. It seems to be the most cost effective way.

The smoke, under pressure, will fill the main line and any other connections. It then flows the path of the leak to the ground surface, quickly revealing the source of inflow and infiltration. Only enough force to overcome atmospheric pressure is required.

After placing the blower and filling the lines with smoke, staff must perform a visual inspection of the area being tested. When using liquid smoke, you can control the time you want to test. Typically you will let the smoke run until the staff have had ample time to return to the smoker.
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