



MOUNTAIN STATE WATER LINE

A Publication of the West Virginia Rural Water Association

Winter 2026

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- ◆ **What to Know About PFAS 2026**
- ◆ **Chlorine Safe Handling and Leak Preparedness**

WEST VIRGINIA RURAL WATER ASSOCIATION



Winter 2026

Articles and Features



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West Virginia Rural Water Association, WVRWA, is a non-profit organization of rural and small publicly owned water and wastewater systems. The vision of the WVRWA is to be the recognized leader and respected voice for water and wastewater systems. The mission or purpose of WVRWA is to provide and promote the highest level of utility service, technical assistance, training, and advocacy for all West Virginia water and wastewater systems.

WVRWA is affiliated with the National Rural Water Association.

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Water and wastewater operators registering for e-Learning courses will have a menu of courses from which to choose. We are constantly adding and updating courseware to reflect changing industry needs and regulations. For more information, you can visit www.wvrwa.org or contact the office at 800-339-4513. Some of the available courses are shown below.

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By Shane Altizer, Water Circuit Rider

Passing Knowledge Down: Capturing Institutional Memory Before it's Gone

In the rural water world, experience is one of our most valuable assets—and one of the easiest to lose. Across the country, small systems rely heavily on longtenured operators, board members, and managers who have kept water flowing through decades of change. They know where the undocumented valves are buried, which pump only misbehaves during heavy rain, and how to coax an aging system through another summer peak. Much of that knowledge lives only in their heads. When those individuals retire, move on, or are suddenly unavailable, that institutional memory often walks out the door with them.

The result can be costly: longer outages, slower emergency response, regulatory missteps, and avoidable repairs. Capturing and passing down knowledge before it's gone is not just a “nice to have”—it's an operational necessity.

What Is Institutional Memory?

Institutional memory is the unwritten understanding of how a system really works. It can include:

- Why certain operational decisions were made years ago
- Known weak points in the distribution system
- Historical water quality trends
- Relationships with vendors, labs, and regulators
- Lessons learned from past emergencies and failures

While manuals and maps are important, they rarely tell the whole

story. Institutional memory fills the gaps between documentation and realworld operation.

Why Rural Systems Are Especially Vulnerable

Rural and small water systems often operate with minimal staff. One or two people may handle operations, compliance, maintenance, customer service, and emergency response. When that individual has been in the role for decades, the system becomes highly dependent on personal knowledge rather than shared processes.

At the same time, many rural systems are facing a wave of retirements. Without a plan in place, knowledge transfer becomes reactive instead of intentional—often occurring after a problem has already surfaced.

Moving From “What I Know” to “What We Know”

Preserving institutional memory doesn't require complex software or large budgets. It requires deliberate effort and consistency.

Start With Conversations

Some of the most valuable information comes out through simple, structured conversations. Ask experienced staff questions such as:

- What are the most common problems this system faces?
- What mistakes have we made in the past that others should avoid?
- What parts of the system worry you the most?

Recording these conversations—whether in writing or audio—cre-

ates a lasting reference for future staff.

Document the “Why,” Not Just the “What”

Many systems have maps, SOPs, and logs, but they often lack context. Instead of just noting what was done, include why it was done. That reasoning helps future operators make informed decisions when conditions change.

Create Simple, Living Documents

Institutional knowledge should be easy to update and easy to access. A shared binder, digital folder, or cloudbased document can work as long as it is maintained. The goal is usefulness, not perfection.

Mentorship as a Knowledge Transfer Tool

Pairing lessexperienced staff with seasoned operators creates natural opportunities for learning. Shadowing during routine tasks, repairs, and emergencies allows knowledge to be passed down in real time. Mentorship also reinforces confidence. When newer operators understand not just how tasks are performed but why, they are better equipped to respond under pressure.

Preparing for the Unexpected

Emergency preparedness and institutional memory are closely connected. In an emergency, there is little time to search for information—or guess how something used to be handled.

When key knowledge is documented and shared, systems can re-

spond faster, make better decisions, and reduce risk to public health.

A Legacy Worth Protecting

Those who have spent their careers serving rural water systems carry more than technical skill—

they carry hardearned wisdom. Capturing that knowledge honors their work and protects the communities they serve.

Passing knowledge down is not about replacing experience; it's

about preserving it. By acting now, systems can ensure that when the next generation steps in, they are not starting from scratch—but standing on a strong foundation built by those who came before. ■

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Decentralized Wastewater Communities

Management

Let's briefly discuss the hot topic of management in regards to small decentralized wastewater systems across the great state of WV. What does good management really look like? We talk a lot about the need for good management but let's dive into some of the basics of what define good management and some keys factors for success. The need for good management in small decentralized wastewater goes without saying but how can good management be achieved. These questions are common with small communities across West Virginia and many of the decentralized systems facing challenging financial times.



The need for small rural wastewater systems has not left. If anything, the need for small wastewater systems is increasing due to cost of infrastructure projects. With the cost of maintenance, labor, and projects continuing to increase, decentralized systems have very important decisions to make regarding the sustainability of their system into the future. Many times, small decentralized communities are making decisions regarding major projects for water and sewer that are costing millions of dollars.

If there are decisions to be made regarding millions of dollars, systems need to have the best management possible to give the system the

best decisions to succeed. The decisions will affect the future of the system, good or bad. Management will not always make the best decisions but with enough information good, management will succeed majority of time.

A question to consider, does your system have good management? Let's take a look at the definition of good management and some key factors management needs to succeed.



#1 Lead Others. For a manager or multiple managers to be successful at managing a utility, they first need to understand that people need lead to make the right decision and not forced. Leading others means to educate and give proper training to those under your management that you expect to accomplish the goals set before them. Pushing others to do work only makes average employees become bad employees in the future. Employees do not want to be pushed; they want to lead to the right decisions so there is a sense of accomplishment on their part. Leading mentors while pushing creates confusions and aggravation. Good management wants their employees to win in their careers

which in return helps the system to have the best motivated employees. Management needs to create a work environment that employees can win in.

#2 Delegate. At some point in the management of your system, you will need to consider not doing everything yourself! If you do #1 lead others, then you should be training and leading others to take important roles in the system underneath your leadership. Delegation is not easy and does not come without risk. If you do not delegate some of the responsibilities, eventually you will not be able to keep up with the work load of managing personnel, equipment, office, public, state agencies and much more. Delegation can be freeing for a manager that is under the burden of paper work, calls, emails, and many other hats that management juggles on a daily basis.

#3 Execute. Good management needs to be able to come up with a plan and then EXECUTE the plan. Planning meetings, talks, and emails are all fine and good but at some point, good management is needed to spearhead the projects and see them to completion. Systems owe it to their customer base, investors, lenders, and their council/board to accomplish what was decided as the best options for the system. There is nothing more fulfilling as a manager than to see a project or idea completed which makes the system safer and better for the community.

#4 Decision making. Management needs to be able to make hard decisions regarding employees, operators, financials, infrastructure projects, and many other decisions that impact many people. Decision making is a process that needs to have a basis for how to decide what the best decisions are for the system at that time. A good manager can look at all the “to do” items, and #1 decide what items should be on the list, #2 what order they should


be in, #3 be able to make a decision regarding that item. It is a very important trait of good management; to be able make a decision and see it finished all the way through. As the old saying goes, “how do you eat an Elephant? One bit at a time!”

In summary, **good management** will define a treatment system. It will define whether the system is sustainable or whether the system will fail due to poor management. To have a well-managed system,

there is no better time than today to start to educate, train, and prepare to succeed into the future. The question many systems ask, “is it even possible for a decentralized system to survive?” The answer is YES, but good management and practices are essential to make the right decisions to lead systems in the direction that will be good for our employees, customers, vendors, lenders, and our environment. With good management, everyone can win!! ■

Chuck Rockacy

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Using Booster Stations to Help with Water Loss

Booster stations come in all shapes and sizes but they are very similar in many ways. They take a water line with low pressure and boost it to a higher pressure for consumers use. It may fill a tank, pressurize a line or fill a pressure tank. The engineer studies the hydraulics and estimated demand of the system to design the proper station for the area served. In my experience all stations, from the smallest to the largest, have pressure gauges on the suction and discharge lines. These pressure gauges are used initially to setup the booster station for proper operation. The suction gauge is initially to make sure the pressure does not go too low when the pumps kick on. The discharge gauge is to make sure the pressure is high enough for the designed system. Of course, this explanation would be slightly different for a continuous run station, but the gauges are still installed.

One of the most important items to track on a normal basis is the operating pressure of the suction and dis-

charge gauges. The pressures should be written down and kept inside the booster station for all to see. If a person just looks at the gauges occasionally and keeps the pressures memorized it does not help the system in time of need, or emergency situations. Other important numbers to keep track of would be the water meter reading, gallons per minute pumped by each pump, and the amperage reading for each pump while running. Any problem past the booster station will show up in one or more of these numbers.

Examples:

1. The normal operating pressures are 40 psi on the suction side and 160 psi on the discharge side with the pumps running. When the pumps are off the suction pressure is 60 psi and the discharge pressure is 75 psi. The amperage for each motor is about 30 while running. The pumps usually flow about 150 gallons per minute. The

tank, which the pumps feed, is empty and the higher elevation customers are out of water.

With this scenario, a person would go directly to the booster pump station and see how the pressures and readings have changed or if the pumps are even running.

- A. Pumps are not running and the pressure on the suction side is 25 psi.

This tells you the pumps have shut down due to low suction pressure. The water line break is on the suction side of the booster station.

- B. Pump is running continuously and the operating pressure on the discharge side is 90 psi.

This tells you a pump is worn out, or a line break is on the discharge side of the booster station. Most booster stations have two pumps and a person could switch to the other pump and see if the pressure goes back to normal. If not, further action must be taken. Looking at the gallons per minute on the meter could tell you if you have a leak or a bad pump. The motor amperage would be higher than normal if the pressure is down for any reason. If the station has a high



pressure cut off switch you could shut a valve on the discharge side of the station and see if the pump shuts down. If it does shut down, it would indicate a problem, such as a leak, past the valve that was shut off. If it does not shut down, it would indicate a problem with the pump or a leak between the valve and the station.

- C. Pump is running, the discharge pressure is high and the gallons per minute is low.

This would indicate an obstruction on the discharge side of the booster station and the motor amperage would be lower than normal. Finding the obstruction can be difficult at times due to the underground devices in

a water system. Communications between personnel is key in troubleshooting such a problem. For example, if a valve was operated just before this problem occurred, it could be that the valve did not open back up as it should have. Another issue that could cause an obstruction might be an altitude valve malfunction. An air release Valve could have gone bad and a large air pocket could be stopping the water from flowing, or causing the obstruction. Most of the time pumps can shove an air pocket out of the line, but nothing should be overlooked.

- 2. The pressure gauges can also be used to narrow down a leak between valves. On either side of the station a con-

sistent pressure is present. If a person shuts one valve at a time and observes the pressure gauge they can tell if a leak is between the station and the valve that was shut. If the pressure is consistent or drops very slow it would indicate a good stretch of line with no bad leaks. You would open that valve and close the next one to check the line between the valves. If the next valve is shut and a quick pressure drop is observed then a leak is between the two valves.

Hope this helps systems find water loss issues with the aid of a booster station. Keep in mind the communications between personnel and the written records kept in an easy to locate place are very helpful. Good Luck to all in the ongoing battle with their water loss percentage! ■



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Keeping West Virginia's Water Flowing — Practical Guidance for Plant Operators

West Virginia's water and wastewater operators work behind the scenes to protect public health and the environment across a wide range of systems, from small rural utilities to larger municipal plants. The state's rugged terrain, aging infrastructure, and seasonal weather extremes create operational challenges that require practical strategies and disciplined daily practices.

Staying current with regulatory requirements is essential: the Safe Drinking Water Act (implemented in WV through the Office of Environmental Health Services) governs public water systems, while the Clean Water Act and NPDES permitting (overseen by the West Virginia Department of Environmental Protection) govern wastewater discharges. Recent priorities for regulators include lead and copper rule compliance and corrosion control, nutrient reduction and biosolids management, and expanded electronic monitoring and reporting. Operators should maintain clear lines of communication with state program managers, document regulatory changes, and update standard operating procedures promptly to remain compliant.

Daily operational control depends on consistent monitoring and calibrated instrumentation. Track influent and effluent flows, turbidity, chlorine residuals, pH, and dissolved oxygen each shift and use trend charts and alarm setpoints to catch deviations early. Regular calibration and logged maintenance of sensors prevent many common compliance issues.

Treatment optimization pays immediate dividends: verify chemical feed rates and tubing integrity, perform routine jar tests to adjust coagulant and polymer doses, and manage sludge blankets and dewatering schedules so solids handling does not become a bottleneck. Small adjustments in chemical feed or polymer application often reduce solids production and chemical costs while improving clarity and filter run-time.

Preventive maintenance must be formalized into a written program. Valves, pumps, blowers, mixers, aeration systems, and electrical starters all need scheduled inspections. Use checklists or a simple computerized maintenance management system (CMMS) when possible, to track completed work and upcoming tasks. Keep essen-

tial spares—seal kits, belts, starter components, and critical instrumentation sensors—on hand, particularly for remote systems where lead times can be long.

Safety protocols are non-negotiable: confined-space procedures, lockout/tagout, respiratory protection where required, and routine toolbox talks reduce incidents. Foster a culture of near-miss reporting and continuous improvement, and invest in cross-training so operations are resilient when a key operator is absent.

Troubleshooting common plant issues becomes simpler when operators understand typical root causes. Sudden turbidity spikes often trace back to raw water source changes after storms, intake issues, or upset in coagulation/mixing; inspect upstream conditions, coagulant feed, flocculation, and clarifier weirs. Low chlorine residuals may be due to feed pump issues, bypasses, or increases in disinfectant demand from organic loads; check pump operation, verify contact time, and investigate changes in raw water quality. Wet-weather NPDES exceedance risk can be mitigated with upstream equalization, optimized secondary clarifier operations,

and planned temporary diversions where permitted. Document each incident and corrective action to refine responses and strengthen your operating procedures.

Asset management and funding planning are vital given West Virginia's aging systems. Create an asset register with condition assessments, estimated remaining useful life, and prioritized capital needs. Explore funding options including state revolving funds, USDA Rural Development programs, and partnerships with neighboring utilities. Well-documented projects with clear cost/benefit narratives improve competitiveness for grants

and low-interest loans. Emergency preparedness should be integrated into operations: maintain an emergency operations plan covering power loss, floods, source contamination, and cyber incidents, and keep contact lists, mutual aid agreements, and contingency supplies (generators, chemical reserves) readily accessible. Regular tabletop exercises with staff and local responders help refine logistics and communication.

Community communication is also part of the operator's role. Be proactive and transparent about boil water notices, planned outages, or odor events—clear, timely infor-

mation reduces complaints and builds trust.

Finally, leverage local resources such as the West Virginia Rural Water Association, and state agencies for training, technical assistance, and regulatory updates. Operators who prioritize routine monitoring, preventive maintenance, safety, cross-training, and clear documentation will maintain compliance, improve reliability, and strengthen community confidence—ensuring safe water and effective wastewater service across the Mountain State. All of this information is discussed in WVRWA's trainings. See you in class. ■

RURAL WATER FLEET PROGRAM

The National Rural Water Association has created partnerships with motor groups to offer discounts to utilities around the country. Member utilities should contact their State Rural Water Association to access the Rural Water Fleet Program.

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BOD and Why it Matters

When we talk about water quality, one term that frequently comes up is biological oxygen demand, often abbreviated as BOD. But what does biological oxygen demand mean, and why is it important?

Biological Oxygen Demand (BOD) is the amount of dissolved oxygen needed by microorganisms to break down organic matter in a water sample. In simpler terms, it's a way to measure how much "work" bacteria must do to clean up pollution in water. BOD testing is essential for regulatory compliance and ensures that water treatment plants are effective in reducing organic waste and maintaining water quality.

BOD is typically measured in milligrams of oxygen consumed per liter of water, abbreviated as mg/L, representing the concentration of oxygen required to break down the biodegradable organic matter present in the sample. The higher the BOD, the more polluted the water is with organic waste. Environmental regulations set limits on the maximum allowable BOD concentrations in wastewater effluent discharge in order to prevent harmful effects on aquatic ecosystems. When effluent with high BOD is discharged, it depletes the oxygen available for aquatic life leading to fish kills and ecosystem damage. Reducing BOD is therefore vital to maintain the health and sustainability of rivers and streams.

Wastewater treatment facilities are designed to reduce the BOD load before the water is discharged back into the environment. Initial treatment stages, known as primary treatment, physically removes large, settleable organic and inorganic solids from the wastewater stream. Prima-

ry treatment involves screening, grit removal and primary clarifiers that remove solid materials that could damage equipment during the secondary wastewater treatment phase.

The most significant reduction in BOD occurs during secondary treatment, which relies on biological processes to consume the remaining dissolved and suspended organic matter. This phase often involves large aeration basins where air is actively pumped into the wastewater to maintain a high concentration of dissolved oxygen. The oxygen supports a large, active population of aerobic bacteria in the form of activated sludge, allowing the bacteria to reduce the organic pollutants.

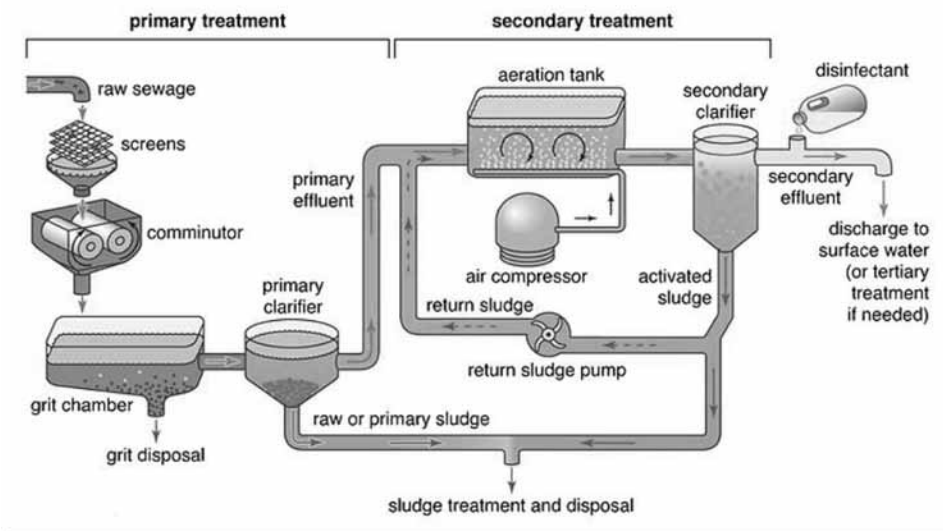
By providing an ideal environment for microbial growth, the treatment plant accelerates the natural decomposition process. The microorganisms convert the high-BOD organic compounds into carbon dioxide and new bacterial biomass, which is then separated from the clean water in a clarifier. This biological consumption can reduce the initial BOD of domestic sewage, typically around 300 mg/L to much

lower levels below 25 mg/L, ensuring the discharged water meets regulatory standards and minimizes environmental harm.

The standard method widely used for testing BOD is Standard Methods 5210B. For BOD results to be accurate, the test must be run within 48 hours of sample collection and there must be a sufficient population of healthy present. The BOD₅ value is calculated from the depletion in DO over those 5 days. A known volume of water sample is collected and its initial dissolved oxygen (DO) is measured. It is incubated at 20°C (68°F) for 5 days and then the DO measured again. DO levels are typically recorded in parts per million (ppm). A high BOD means more oxygen was consumed—signaling lower water quality.

In short, biological oxygen demand means the amount of oxygen needed by microorganisms to break down organic materials in water. It's a key indicator of pollution and is essential for maintaining healthy water systems.

Primary and Secondary Treatment of Wastewater ■





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LCRI

The purpose of this article is to summarize some of the required activities that should be completed between now and the LCRI compliance deadline of November 1, 2027.

1. **Material Identification During Normal Operations**

- Record materials of **both service lines and connectors** when encountered during normal operations such as replacements, repairs, meter reads, maintenance activities, etc. A connector, sometimes called a gooseneck or pigtail, is defined as a flexible pipe no longer than three (3) feet that connects the service to the main.

2. **Preparation of the Baseline Inventory** – Due November 1, 2027

- The baseline inventory builds on the initial inventory and must include information identified on connectors as well as any updated or new information on service line materials and

locations.

- Add new service lines that were not included in the initial inventory. Remove any service lines that no longer exist. Update material classifications for any service lines and connectors identified through normal operations.
- Review all available historical records for connector materials. Include any connector materials identified in the baseline inventory. If there is no connector present, record that information.
- Submit inventory updates to West Virginia Department of Health (WVDH) via the SWIFT Submittals Portal. <https://portal.gec-sws.com>

3. **Individual Service Line Notifications** – Due annually by November 15th; certification due December 31st

- Notify residents annually at addresses that are served by a lead, galvanized requiring re-

placement (GRR), or an unknown service line. This notice must include the 2021 LCRR revised mandatory lead health effects language.

- Notify residents within one business day of service initiation at addresses that are served by a lead, galvanized requiring replacement (GRR), or an unknown service line.
- Certify the distribution of annual notifications by December 31st

4. **Consumer Confidence Report (CCR)** – Due annually by July 1st

- Update the language in the annual Consumer Confidence Report (CCR) with the 2021 LCRR revised mandatory lead health effects language.
- Notify residents and customers of the completion of the initial inventory and where to access the inventory.

5. **Requirements in the Event of an P90 Lead Action Level Exceedance (ALE)**

(90th percentile value for lead is above 15 parts per billion (ppb))

- **Immediately:** Contact your district office for required notification templates.
- **Within 24 hours of learning of a lead ALE:** Distribute a Tier 1 Public Notification (PN) to all persons served by the water system.
- **As soon as the PN is completed:**
- Submit a completed

copy by fax to WVDH Charleston Compliance and Enforcement via (304) 558-0139.


- Submit a completed copy by email to EPA at leadALE@epa.gov.
- Note: The lead action level changes to 10 ppb after November 1, 2027.

6. Other Requirements Due by November 1, 2027

Compile a list of all schools and licensed childcare facilities served by your system (or certification that the wa-

ter system serves no schools or childcares) and submit to WVDH via SWIFT Submittals.

Prepare your Service Line Replacement Plan and submit via SWIFT Submittals by November 1, 2027. **This is only required if your inventory has unknown, GRR, or lead service lines.** A public version of the plan must be available for residents to review and be online if the system serves more than 50,000 people. ■



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Is Your Water or Wastewater System Prepared? What You Need to Know About Generators.

Loss of electricity quickly becomes a major challenge during natural disasters and could raise public health concerns. Without backup power for an extended period, many water and wastewater services cannot be provided. However, as demonstrated during incidents such as hurricanes and ice storms, not all utilities are prepared to get their systems operational again. This brochure provides tools and prompts utilities to better prepare for emergency generator needs, provides tips on running and maintaining generators, and includes an easy-to-copy form to determine and document backup power needs.



How do I know what my backup power needs are?

1. Classify the electrical needs at your utility:

- *Critical need.* Equipment essential to maintain public health protection (e.g., pumps).
- *Secondary need.* Equipment that would enhance operation, but is not critical (e.g., SCADA components).
- *Noncritical need.* Equipment provided for convenience/comfort, but not essential (e.g., pumphouse lights).



Only consider needs critical to maintaining an acceptable level of service during power outages at your utility.

2. Identify the electrical equipment within the critical needs at your utility and determine their voltage, phase configuration, and horsepower/amperage requirements. Remember, electrical equipment starting power demands are usually two to three times higher than their running demands, which may dictate a larger generator. A licensed electrician can provide assistance in determining your backup power needs.

3. List all your critical electrical equipment and their starting order to determine your required starting power. At a minimum, your generator(s) must have the capacity to supply the maximum starting power demands and the running demands of the connected equipment.

4. Determine your generator needs. Make it easy by using the attached form.

“Having a backup generator is essential, but ours failed when we needed it most. It is critical to keep your generator maintained and to test it regularly under its operating load. Our lesson learned? Make sure you get to know your local emergency planners and have a plan for backup power.”

-Massachusetts Operator

What other considerations are there?

1. Fuel Type - Fuel type greatly influences emergency generator(s) selection. Diesel generators are the most common, and offer the largest selection, availability, and power range (from 5 kilowatts [kW] to over 2,000 kW). To select an appropriate fuel supply, consider:

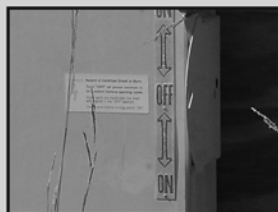
	Diesel ¹	Natural Gas ²	Propane ³	Gasoline
Fuel Storage	+	+	+	-
Fuel Delivery Method	-	+	-	-
Generator Availability	+	-	-	+
Generator Portability	-	-	-	+

¹ Assume a consumption rate of 0.07 gallons per hour for every 1kW of power generated.
² Assumes access to a pipeline. Can use propane as a backup fuel, but requires an adapter.
³ Use the generator specification sheet to calculate expected runtime for a given load and propane tank capacity.

Also check any local or state regulations regarding air quality, as these may affect the generator(s) you select.

2. Hook-Up Method - Generators do not simply plug into a piece of equipment that you would like to power. You have to install a connection that will enable you to rapidly hook up the generator to your well or sewer lift station pumps, and not accidentally “backfeed” electricity into utility company lines, which could electrocute a line worker. Connection methods include transfer switches and camlocks.

Transfer switches can be either automatic or manual, and will let you easily switch back and forth between commercial and generator power sources. These switches are typically installed close to your main breaker box.



Transfer Switch

Camlocks are connectors that can be used to connect a generator directly to a critical piece of equipment, such as a pump at a wellhead or lift station.



Camlock

You will need a licensed electrician to help you determine which method is best for you and to assist with installation. A licensed electrician can also help you size the connector and ground cables.

3. Location - Emergency generators must be able to withstand climate extremes and be able to operate under all conditions. Things to consider when locating a generator at your utility include:

- *Environmental considerations.*
It is important to prevent contamination of source water by fuel, and state requirements, such as containment measures, should be checked. Generators and their fuel storage tanks must be located above potential floodwater levels. Generators should also be protected by using a weatherproof enclosure. Check with your state for other requirements.
- *Siting considerations.*
A flat surface (e.g., concrete slab) without obstacles is needed for a portable generator. In addition, be sure that the generator is in a well-lit or patrolled area to avoid theft and vandalism.

4. Other Options - For added flexibility, consider a variable frequency drive (VFD). The VFD is easy to operate, can convert single-phase power from small generators to three-phase power, and can supply power under a variety of horsepower demands. Small, portable generators that can be used with a VFD are readily available from the nearest hardware supplier. Consult your licensed electrician to see if a VFD is right for your utility.



VFD mounted in box

Should I purchase, rent, borrow, or share?

Many factors affect the decision to buy, rent, borrow, or share a generator(s). Funding, maintenance requirements, rental availability, and mutual aid and assistance agreements should all be considered. If you are sharing, who gets the generator first? It is probably easiest to make the decision by considering the advantages and disadvantages of having a generator onsite (purchase) versus obtaining a generator offsite (rent, borrow, or share).

The tables shown here highlight some of the advantages and disadvantages of each option.

Onsite Generator (Purchase)	
<i>Advantages</i>	<i>Disadvantages</i>
Immediate start-up during a power failure, as it's already at your utility and ready to go	Up-front capital investment could be costly
You are familiar with the generator and its operation	Long-term maintenance is required
Can be any size	A disaster that damages your plant may also damage your generator

Offsite Generator (Rent/Borrow/Share)	
<i>Advantages</i>	<i>Disadvantages</i>
No large up-front capital cost if rented, or, if purchase cost shared with other utilities	Travel time delays to get generator to your site, especially if roads are impassable
Flexibility in where you get it from, could have multiple sources	May require special equipment (e.g., crane) and extra personnel (e.g., electrician) to install
Shared (or no) long-term maintenance costs	In a large incident, may be hard to locate a generator due to competing demands

Unique circumstances at your utility will ultimately determine whether purchasing, renting, borrowing, or sharing a generator will work best. Regardless, once you have determined your backup power needs, you should communicate those needs to your Local Emergency Planning Committee (LEPC) or emergency management director. This allows them to be aware of the generator resources that you already have (if any) and what generator resources you will need during a power emergency, and any priority public health aspects related to power loss.

Operation and Maintenance Tips

- Exercise your generator periodically under the actual electrical load required of the unit to keep it ready for use;
- Develop a "start and connect" checklist specific to each individual generator and keep it where staff can easily find it;
- Do not operate the generator in excess of its rated capacity;
- Be sure the generator is properly grounded;
- Keep portable generators outside and at least 10 feet away and downwind from inhabited, enclosed areas to prevent the buildup of carbon monoxide fumes;
- Maintain 3 to 4 feet of clear space on all sides and above a generator for adequate ventilation;
- Perform scheduled maintenance as recommended by the generator manufacturer;
- Incorporate fuel management into the maintenance schedule to ensure availability of clean, reliable fuel;
- Do not refuel the generator while it is running, turn it off first and let it cool, especially if the generator uses gasoline;
- Keep the generator dry by keeping it elevated and away from possible flooding;
- Support electrical cords off the ground and do not let cords run through low-lying areas or puddles;
- Replace any cords with damaged insulation;
- Train all staff on how to operate the generator safely; and
- Wear hearing protection if you have to work close to a generator.

Where can I go to find out more about generators?

Emergency Response Portal, U.S. Army Corps of Engineers (USACE) https://eportal.usace.army.mil/sites/ENGLink/EmergencyPower/default.aspx	Information sharing tool to build federal, state and local capabilities to respond to disasters. Contains links to documents on Standard Operating Procedures of the Temporary Emergency Power Mission
Electrical Generating Systems Association (EGSA) http://www.egsa.org/index.cfm	Association dedicated to on-site power generation that includes over 500 companies that make, sell, distribute, and use onsite power generation technology and equipment.
Water & Wastewater Mutual Aid & Assistance Resource Typing Manual www.nationalwarn.org	This manual provides guidance to water and wastewater utilities when they request and provide mutual aid and assistance resources (such as generators) during and after an emergency.
OSHA Hurricane Safety Tips http://www.osha.gov/pls/publications/publication.athruz?pType=Industry&pID=107	Although dedicated to hurricanes, this site contains many safety tips regarding generator usage and other topics that are common to all disasters.
FlaWARN Best Management Practices For Water and Wastewater Systems http://www.flawarn.org/Documents/BMPs.pdf	Guidance document produced by the Florida WARN including Best Management Practices for water facility emergency preparedness and response.

“When the power went out, we couldn’t pump and pressurize our system. But we are a small utility, and can’t afford a generator. We joined the WARN as one way to locate a generator the next time we need one.”

- Maine Operator

Who can I contact in my state?

Call your consulting engineer or licensed electrician if you have specific questions regarding a generator(s) at your utility. Each utility is unique in its critical treatment processes and its design, and you will want your own experts to help you answer any questions you may have regarding backup power generation. Also, check with your state drinking water primacy agency to see what (if any) generator or fuel storage requirements there are for utilities in your state.

TIP: Joining a Water/Wastewater Agency Response Network (WARN) is one way to borrow or share generators.

www.ctwarn.org

www.mawarn.org

www.mewarn.org

www.nhwarn.org

www.rwarn.org

www.vtwarn.org

EMERGENCY GENERATOR INFORMATION FORM – Side 1 (complete prior to an emergency)

Instructions – Side 1

- Get a licensed electrician to help complete this form.
- Fill out a copy of the form for each generator location.
- Store copy in multiple safe places (ERP, truck, offsite file).
- Share the form with LEPC, WARN or state primacy agency.
- Update form periodically.

Contact Information

Name: _____

Title: _____

Day Phone: _____

Emerg. Phone: _____

System Name: _____ PWSS ID: _____

Street Address, City, and State: _____

Max Day Demand (MGD*): _____ Avg. Daily Demand (MGD*) _____

* Million Gallons per Day

Critical Utility Electrical Needs: (copy form as necessary)

Location (Name/#): _____

Location (Name/#): _____

Location (Name/#): _____

Generator Needs: (copy form as necessary)

Location (Name/#): _____

Existing transfer switch: Yes _____ No _____; Existing 'add-a-phase' or 'roto-phase' unit: Yes _____ No _____

(These units convert a single phase line to a three-phase line)

Size of electrical main breaker: _____ Amps

System Voltage: 240 volt single phase _____ 240 volt three phase _____

208 volt three phase _____ 480 volt three phase _____

Major motors, in starting order, used for facility operations:

(example: 75 HP 2 Quantity 460 Volts 3 Phase)

_____ HP _____ Quantity _____ Volts _____ Phase

_____ HP _____ Quantity _____ Volts _____ Phase

_____ HP _____ Quantity _____ Volts _____ Phase

_____ HP _____ Quantity _____ Volts _____ Phase

Note: at a minimum, a generator must have capacity to supply maximum starting power demands and running demands of connected electrical equipment.

Existing concrete pad to locate generator? Yes _____ No _____ Distance of pad to connection point: _____

System meter kilowatt reading: _____

Generator Type (from AWWA Water & Wastewater Mutual Aid & Assistance Resource Typing Manual):

Additional comments: _____

EMERGENCY GENERATOR INFORMATION FORM – Side 2 (complete prior to an emergency)

Instructions – Side 2

- Get a licensed electrician to help complete this form.
- Fill out a copy of the form for each generator location.
- Store copy in multiple safe places (ERP, truck, offsite file).
- Share the form with LEPC, WARN or state primacy agency.
- Update form periodically.

Contact Information

Name: _____

Title: _____

Day Phone: _____

Emerg. Phone: _____

System Name: _____ PWSS ID: _____

Street Address, City, and State: _____

Max Day Demand (MGD*): _____ Avg. Daily Demand (MGD*) _____

* Million Gallons per Day

Existing Generators: (copy form as necessary)

On-site generator location (name/#): _____

Is on-site generator portable? Yes ___ No ___

If facility has an off-site generator ready for use in an emergency, what is the source/location of the generator? _____

Existing transfer switch: Yes ___ No ___ AND, if yes, is switch manual? ___ or automatic? _____

If automatic, what brand is the switch and how many wires are required to start? _____

Size of generator: _____ kilo Volt Amperes (kVA) _____ kilowatts (kW)

Configuration: (Wye or Delta): _____ (A Wye configuration is in the shape of a “Y”, and a Delta configuration is in the shape of the Greek letter delta “Δ”, a triangle)

Load cable length: _____ Feet Load cable size: _____ Thousand Circular Mills (MCM)

or _____ American Wire Gauge (AWG)

Ground cable length: _____ Feet Ground cable size: _____ (MCM or AWG)

Generator connection point: _____ Fuel tank size: _____

Fuel type: diesel ___ natural gas ___ propane gas ___ gasoline ___ other _____

Fuel available on-site? Yes ___ No ___ If yes, how much? _____ How stored? _____

Who provides generator maintenance and testing service? _____

What is the testing cycle and last test date? _____

Does utility have access to an electrician? Yes ___ No ___ # of power company transformers: _____

Transformer size(s) painted on front of the unit(s): kVA _____ kVA _____ kVA _____ kVA _____

Generator Type (from AWWA Water & Wastewater Mutual Aid & Assistance Resource Typing Manual): _____

System is WARN member and willing to list as an available WARN resource? ___ Yes ___ No

Additional comments: _____



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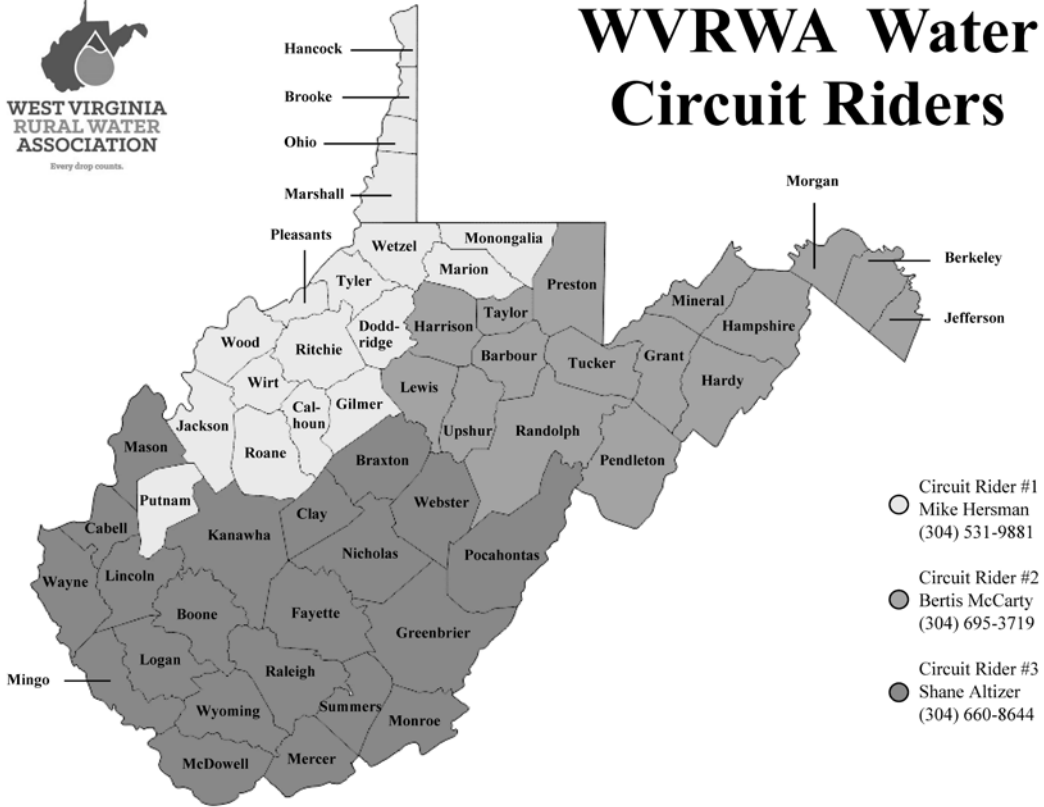
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- Circuit Rider #3
Shane Altizer
(304) 660-8644



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 PH: (304) 201-1689 Fax (304) 201-1694



- WW Circuit Rider #1
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304-704-3830

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Our Circuit Riders provide training and technical assistance to operations specialists, water utility managers, and boards. On-site help is available upon request when a system needs it.

- Leak detection and water audits
- Sampling and testing
- System troubleshooting
- CCRs



Our Source Water Protection Specialist provides on-site help for systems to assess, delineate sources of water, and reduce/eliminate the potential of contamination.

- Source water protection plans
- Emergency response plans
- Measure well draw downs
- Perform TV inspection of wells



Training is available to obtain continuing education hours (CEHs) for license renewals.

As part of this training endeavor, training videos have been developed to help bring about compliance with safe drinking water regulations and to enhance system operations.

Videos and study material are available upon request.



Our ARC Specialist provides technical, training, financial, and managerial assistance for water and wastewater systems in economically distressed Appalachian counties.

- Asset management plans
- Rate analysis
- Leak detection
- Preventing inflow & infiltration (I&I)



Our Wastewater Technicians provide assistance to enhance and maintain financial sustainability of wastewater systems through technical support and/or training.

- Smoke testing and camera inspections
- Nitrogen problems
- Solids handling
- Compliance issues



Our Energy Efficiency Technician provides assistance to rural and small community water and wastewater utility systems to help in becoming more energy efficient.

- Evaluates energy needs, consumption, and costs
- Recommends measures to reduce energy consumption
- Identifies potential funding sources for improvements



Our EPA Water Technical Assistance Specialist provides training and technical assistance to water systems that struggle to achieve compliance with regulations.

A key priority is assisting small systems with their technical, managerial, and financial capacity to achieve long-term sustainability and resiliency.

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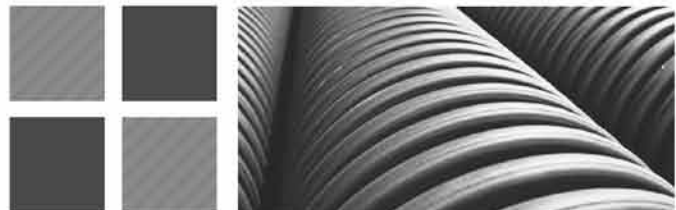
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SUDOKU PUZZLE

			9	7	2		8	3
		9			6		4	
6		3		4	1			
	5							6
8		2				7		1
4							9	
			8	2		5		4
	6		7			3		
3	2		4	6	5			

The aim of the canonical puzzle is to enter a numerical digit from 1 through 9 in each cell starting with various digits given in some cells (the "givens"). Each row, column, and region must contain only one instance of each numerical. Completing the puzzle requires patience and logical ability.

Answers can be found on page 38.



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What to Know About PFAS 2026

Per- and polyfluoroalkyl substances (PFAS) are found in a wide range of industrial and consumer products, from firefighting foams to textiles to beauty products. PFAS compounds are valued for their unique chemical qualities, which are used to imbue products with oil and water repellent surfactant qualities, chemical or heat resistance and non-stick surfaces.

However, over the last few decades, there has been growing concern about the long-term impact of some PFAS on human

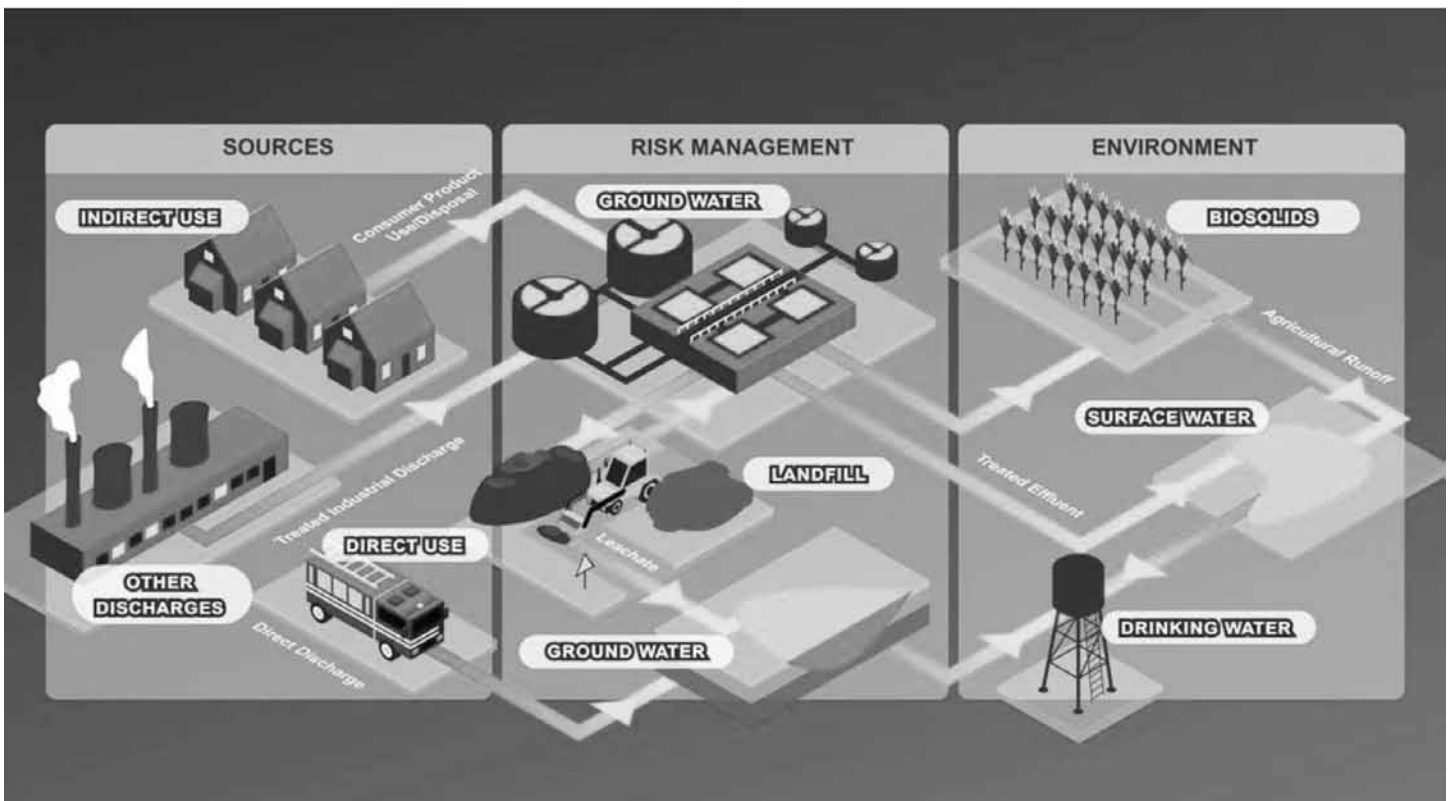
health and the environment. PFAS are known as “forever chemicals” because they are very persistent in the environment. PFAS contamination can enter the environment through industrial waste streams, municipal waste, agricultural runoff, and runoff from military bases or airports using aqueous film-forming firefighting foams (AFFFs). PFAS chemicals are now widely found in groundwater, surface water, soil, and biological tissues of plants and wildlife around the globe, even in remote Arctic and Antarctic locations.

In April of 2024 the EPA set limits and regulations for PFAS “forever chemical” for the Water Industry. New MCL’s will go into full effect by 2031. Please make sure your system is doing their initial monitoring, according to WV BPH guidelines that came out April 2025.

All water systems must complete their quarterly sampling for PFAS using either 533 or 537.1 method. Before April 2027

Charlie Cooper

WVRWA Emerging Contaminants Tech. ■





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1	4	5	9	7	2	6	8	3
2	7	9	3	8	6	1	4	5
6	8	3	5	4	1	2	7	9
7	5	1	2	9	8	4	3	6
8	9	2	6	3	4	7	5	1
4	3	6	1	5	7	8	9	2
9	1	7	8	2	3	5	6	4
5	6	4	7	1	9	3	2	8
3	2	8	4	6	5	9	1	7



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Managing Fire Hydrants to Control Water Loss

Many water utilities lose an appreciable amount of water from fire hydrants that are opened without authorization or knowledge of the water utility. This not only results in an apparent loss but also frequently results in damage to fire hydrants from improper operation. In addition to loss concerns, fire hydrants are viewed more seriously as a security issue in the post 9/11 world. Hydrants could potentially be used as an entry point to intentionally inject contaminants into the drinking water supply; therefore, having strong oversight of fire hydrants is now viewed as more critical as in the past.

The primary purposes of fire hydrants are firefighting and water distribution system testing and maintenance, including flushing water mains. In many water utilities, however, the use of fire hydrants for both authorized and unauthorized purposes goes far beyond these functions. Unauthorized use from fire hydrants, which is classified as apparent losses, occurs when water is drawn illegally from hydrants to fill tank trucks for construction purposes. Many water utilities have policies that permit water to be drawn from fire hydrants for a variety of purposes. This water

typically falls under unmetered, unbilled authorized consumption in the water audit and includes water used in street cleaning and filling swimming pools.

These varied uses of fire hydrants pose potential problems for water utilities and a customer, including water taken from fire hydrants is often unmetered. The more hydrants that are opened the greater the amount of water that must be metered or estimated to quantify this consumption in the water audit. Water taken continuously from fire hydrants should include backflow protection to prevent contaminants from entering the distribution system during a negative pressure event. Water drawn from a fire hydrant could pose a health risk if used for human consumption since water quality degradation can occur as the water passes through the barrel of the hydrant. Widespread unauthorized openings of fire hydrants can result in greatly reduced pressure in the distribution system, crippling firefighting capability and greatly increasing the risk of backflow contamination. Allowing a variety of people to operate fire hydrants increases

the likelihood of damage occurring to hydrants due to lack of familiarity with operating procedures or use improper tools to operate the fire hydrant. And allowing multiple uses of fire hydrants sends a poor public relations message that water is free for the taking to those who can manage to open a hydrant.

In closing; for the above reasons it is recommended that water utilities keep the number of permitted uses of fire hydrants to a minimum, and such usage should be carefully regulated and overseen. Utilities should vigorously maintain control of their fire hydrants and resist request for sundry uses of hydrants. It is important that the utility establish a sound policy for fire hydrant usage that is supported by the fire department and political leaders. Procedures for permitting and tracking allowable uses should be put into place and enforced. ■

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Chlorine Safe Handling and Leak Preparedness

Chlorine has been an essential component of wastewater treatment for more than a century. It has the ability to kill pathogens quickly and in an extremely cost-effective manner. However, handled in an unsafe manner, can be very toxic, corrosive and lethal. A major leak at a wastewater treatment facility can escalate into a major crisis very quickly.

Chlorine is used in wastewater treatment because of its ability to disinfect or destroy bacteria, viruses and protozoa. It remains active in water at low doses until it is used up and this helps to control contamination. Compared to many disinfection processes used in the wastewater industry it is cost effective and very easy to apply. It is available in gas, liquid and solid form. However, with these facts stated chlorine is very hazardous if not used properly and you must use strict protocols for safe handling.

Chlorine gas is heavier than air, this means it will settle to the floor instead of rising or dispersing evenly throughout a building. At low concentrations, chlorine exposure causes coughing, chest pain, pulmonary edema and eye and throat irritation. At higher concentrations, chlorine can be fatal in a very short time frame.

Some common reasons for chlorine leaks are.

1. Pipe Rupture usually due to excessive pressure.
2. Cylinder or Drum leaks usually due to a bad seal.

3. Vacuum Regulator Failure which could cause an uncontrolled leak.
4. Relief Valve Failure again from excessive pressure.
5. Human Error in handling or storage however, in the wastewater field this is rare.

Chlorine leaks getting into the atmosphere can cause injury, illness or death to human and animal life. Airbourne chlorine leaks can drift to nearby communities. A chlorine leak that goes to the water can cause damage and death to aquatic life. If you have a chlorine leak, it should activate an alarm to let staff know there is a chlorine leak. If the leak is out of control evacuate your staff and possibly the nearby area. Notify emergency services, especially fire departments. If it is safe to do so shut the valves. Sometimes chlorine gas can be contained using scrubbers. These scrubbers would use sodium hydroxide or sodium sulfite to neutralize the chlorine gas. If possible, increase ventilation to the area.

If someone is exposed to chlorine, move the person to an area where they can get fresh air. Give them oxygen if their breathing is difficult. Immediately seek medical attention for the exposed individual. If the exposure is severe, the individual is usually admitted to the hospital.

Some chlorine damage prevention strategies would include an automatic chlorine leak detection system with a chlorine sensor and

alarm. You could contact the fire department and let them know what your chlorine system has and let them see where things are located. Them and the system may want to set up a drill or simulation of an incident. The system could possibly have a secondary containment area for cylinders and piping. In this day and age, it would be very possible to have shut off valves that can be controlled from somewhere outside the probable contaminated area. Possibly an office computer, maybe even one at the main office instead of the plant office. Obviously, you would want to have job hazard analyses and employee training. It is necessary to have Personal protective equipment for all staff. This would include a full-face respirator or SCBA. Chemical resistant suits, gloves, eye and face protection and emergency showers.

Conclusion

Chlorine is a very vital component of the wastewater treatment field. I'm guessing that is going to continue long into the future. Many operators work with chlorine on a daily basis. Do not underestimate its hazards. Preparedness, prevention and rapid response are some of the keys to working with this essential product in a safe manner. By combining engineering controls, operator training and compliance, wastewater plants can protect staff, their community and the environment both safely and effectively. ■



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By Jerry Dotson, Sourcewater Specialist

Early Warning Systems for Surface Water (Part 2)

The last article provided an overview of Early Warning Systems for surface water systems. Today we are going to address some of the specific considerations for early warning systems. In particular, this article is going to look at installation and maintenance of these systems.

The first question one should ask about installation is “Where?” Determining where and how to install this equipment is an important part of the process. This is frequently an area that requires compromise. Do you install it upstream of the intake, at the intake or in the plant? More to the point can you install it where you think it would be the best? What would be most beneficial? Unfortunately, the optimal location is not always practical. Upstream of the intake at a location that would provide a warning early enough to allow the intake to be shut down before the potential contaminant entered the treatment system would be best. But this option comes with some issues. Three come to mind immediately. Security, Communications and cost.

How do we make certain it is secure against weather, vandalism, and theft? How is it going to communicate the data back to the operator? Can you get power to it or can it run on solar power? Is it reasonable to believe that the equipment can be

mounted upstream and be safe and able to communicate back to the system? So, upstream may be best but it may not be practical. That is something that you will have to determine.

Next best might be at the intake. But that still presents some challenges: can it be secured from damage? Is the area subject to flooding? Can it be secured so that unsavory people cannot gain access to it and damage or steal it? Is power available and accessible? And again, how will it communicate? Will you need to install telemetry and transmission equipment at that location? Is that feasible? And what will it cost to ensure that it is useful and safe? For those reasons, many utilities opt to mount the unit in the plant and feed raw water to it.

Mounting the equipment near the raw water line inside the plant has many advantages. It is easier to keep safe and secure. Power for the unit is closer than some of the other options. And it is closer to the telemetry or controls which may make that interface easier and less expensive to accomplish. However, this choice is not perfect because when you detect the contaminant, it is already in the plant or very near to the treatment equipment. Detecting potential contaminants before they get to the intake and into the plant is always

best, but a compromised location is better than not detecting the potential contaminant at all. So, often, the least favorable solution is the most feasible option. Every installation is different. You have to evaluate and find the best solution for your system. You may be able to improve things later.

Another issue is maintenance. Be certain that you know what it is going to take to maintain the system you choose. Some utilities have purchased this type of equipment only to find out that the maintenance contract was too expensive for them. Know the cost before you buy. If you can't afford to maintain it, it will eventually become a wall decoration. The main issue is maintenance and calibration of the probes. Some systems are simple enough that the operator can calibrate and maintain the equipment; others require a manufacturer's technician. How much will that cost? What parts do you have to buy and stock? This is why it is important to find out exactly what is required to maintain it before you buy it. So, do your research and look at all the options.

If you need help or have questions about early warning systems or other source water issues, contact me, Jerry Dotson, Source Water Specialist for WVRWA at jerrydotson@wvrwa.org or 304-483-3497. ■

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PPE – Safeguarding Our Protectors During Winter

An introduction to the water industry comprised of both drinking water utilities and wastewater treatment facilities, which are essential for public health and environmental well-being and stability. The dedicated workers of these utility sectors face unique risks due to their close contact with water, chemicals, and contaminants. Personal Protective Equipment (PPE) plays a critical role ensuring the safety of “OUR PROTECTORS.” In this article, we’ll explore the importance of PPE, guidelines for its use, and challenges faced by our water and wastewater industry professionals.

With winter in full force, the harsh conditions of rain, snow, and ice provide many challenges for the personnel that must work and maintain equipment outdoors. Working in this extreme environment makes insulated, waterproof clothing essential and why waterproof PPE plays such a crucial factor to protect from risks associated from these harsh conditions.

Protecting Against Cold Weather Hazards

Hypothermia and Frostbite Prevention: Cold weather poses serious risks like hypothermia and frostbite. Hypothermia occurs when the body loses heat faster than it can produce, leading to dangerously low body temperatures.

Frostbite, on the other hand, happens when skin and underlying tissues freeze. PPE such as insulated gloves, thermal underlayers, and waterproof outerwear are essential in mitigating these risks.

Preventing Slips and Falls: Winter conditions often lead to icy, slippery surfaces, increasing the likelihood of slips and falls. Non-slip, insulated boots with good traction are crucial for maintaining stability and safety while navigating these hazardous environments. Additionally, waterproof PPE ensures that clothes remain dry, reducing the risk of discomfort and accidents due to wet, heavy garments.

Maintaining Productivity and Comfort

Weather-Resistant Gear: Winter work demands waterproof and windproof clothing to keep workers dry and warm. High-quality, breathable materials allow moisture to escape from inside the clothing while preventing water from penetrating from the outside. This dual functionality is key to maintaining comfort and efficiency throughout the workday.

Layering for Adaptability: The principle of layering is particularly important in winter. Base layers made of moisture-wicking materials, middle layers for insulation, and outer layers that are waterproof


and windproof provide comprehensive protection. This layering system allows workers to adjust their clothing based on varying weather conditions, ensuring optimal comfort and safety.

Enhancing Safety Through Visibility

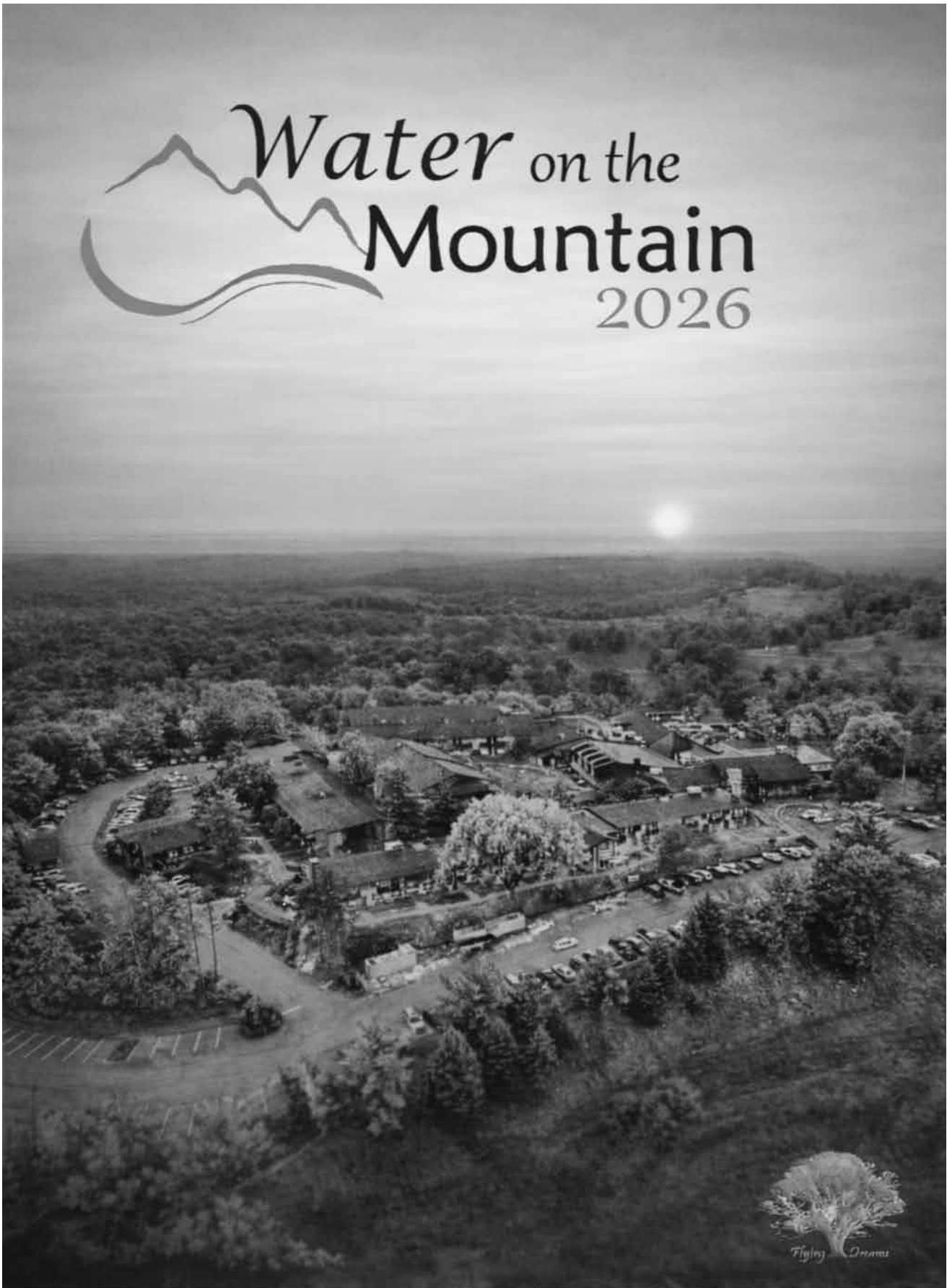
High-Visibility Clothing: Shorter daylight hours and often poor visibility conditions require high-visibility clothing to ensure workers are easily seen. Bright colors and reflective strips are standard in winter PPE, helping to prevent accidents, especially near roadways or construction zones where visibility is reduced.

Effective Communication: In addition to PPE, communication devices that are protected from the elements enable workers to stay in contact with each other, enhancing overall safety and coordination on the job site.

For domestic water and wastewater personnel, winter can be a particularly challenging time. However, with the right PPE, workers can stay safe, comfortable, and productive. Investing in high-quality, weather-appropriate PPE not only protects against the cold and wet conditions but also ensures that essential services continue to operate smoothly throughout the winter months. ■



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How to Join the WVRWA Registered Apprenticeship Program

West Virginia's water and wastewater systems depend on skilled operators to keep communities healthy, safe, and thriving. As retirements increase and demand for certified professionals grows, the West Virginia Rural Water Association (WVRWA) is preparing the next generation of operators through its Registered Apprenticeship Program (RAP).

What Is the WVRWA Registered Apprenticeship Program?

The WVRWA Registered Apprenticeship Program prepares individuals to become certified Water or Wastewater Operators through a structured, earn-while-you-learn model. Apprentices receive:

1. Paid, on-the-job training with a local utility (wages are provided through normal employment; in some cases, new hires may qualify for Workforce Development Board funding)

2. Classroom and technical instruction provided by WVRWA across the state
3. Career advancement opportunities
4. A nationally recognized credential from the U.S. Department of Labor upon completion

The program spans approximately two years, combining hands-on experience with the education needed for state operator certification. No prior experience is required, making this an accessible pathway into a high-demand career field.

Employers may enroll new Operators-in-Training (OITs) or support current (incumbent) employees through the program to assist with career progression toward a Class 2 Operator license.

How Employers Can Participate

Utilities interested in strengthening their workforce can participate

by identifying new hires or existing employees who would benefit from the Registered Apprenticeship Program.

Participating employers agree to:

1. Provide a progressive wage scale
2. Allow travel for required WVRWA apprenticeship classes
3. Sign apprenticeship employer standards
4. Assign a mentor/journey worker with a 1:1 training ratio

Classes begin each January and July.

To get started, contact:

Miranda Lough – mirandalough@wvrwa.org

Marybeth Altizer – maltizer@wvrwa.org

Learn more at:

<https://wvrwa.org/apprenticeship-program> ■



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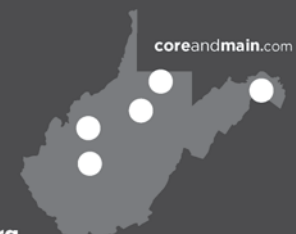
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Is Your Wastewater Treatment Plant Ready for Weather-Related Disasters?

Wastewater treatment plants (WWTPs) are critical infrastructure that must be prepared to withstand weather-related disasters such as hurricanes, floods, and blizzards. These events can disrupt operations, damage equipment, and pose significant risks to public health and the environment. Here are some steps you can take to help with the resilience of your WWTP: **Preparing Wastewater Treatment Plants for Weather-Related Disasters**

Weather-related disasters pose significant threats to wastewater treatment plants WWTPs, potentially disrupting operations and causing extensive damage. To ensure resilience and continuity, WWTPs must implement comprehensive preparedness plans. These are some key strategies and steps that WWTPs can take to prepare for and mitigate the impacts of weather-related disasters.

Conducting a Risk Assessment

The first step in preparing for weather-related disasters is to conduct a thorough risk assessment. This involves identifying potential hazards, such as hurricanes, floods, and blizzards, and evaluating their likelihood and potential impact on the plant. A risk assessment helps prioritize resources and focus on the most critical areas for preparedness.

Developing an Emergency Response Plan

An effective emergency response plan (ERP) is essential for guiding WWTPs through disaster scenarios.

The ERP should outline procedures for responding to several types of emergencies, including evacuation protocols, communication plans, and resource allocation. It should also designate roles and responsibilities for staff members to ensure a coordinated response.

Infrastructure Upgrades and Maintenance

To enhance resilience, WWTPs should invest in infrastructure upgrades and regular maintenance. This includes reinforcing structures, elevating critical equipment, and installing backup power systems. Regular maintenance ensures that the equipment is in good working condition and can withstand extreme weather conditions.

Flood-Proofing Measures

Floods are a common threat to WWTPs, especially those located in flood-prone areas. Flood-proofing measures include elevating electrical equipment, installing flood barriers, and creating drainage systems to divert excess water away from critical areas. Sandbagging and sealing vulnerable openings can also help prevent water ingress.

Backup Power and Generators

Power outages are a frequent consequence of severe weather events. WWTPs should have backup power systems, such as generators, to maintain operations during outages. Generators should be regularly evaluated and maintained to ensure they are ready for use when needed. Fuel reserves should also be stocked to

support extended power outages.

Communication and Coordination

Effective communication is crucial during a disaster. WWTPs should establish clear lines of communication with local authorities, emergency services, and other relevant agencies. This includes sharing contact information, establishing a command center, and conducting regular drills to practice emergency response procedures.

Staff Training and Drills

Regular training and drills are essential for preparing staff to respond effectively to weather-related disasters. Training should cover emergency procedures, equipment operation, and safety protocols. Drills help staff become familiar with their roles and responsibilities, ensuring a swift and coordinated response during an actual emergency.

Monitoring and Early Warning Systems

Implementing monitoring and early warning systems can provide advance notice of impending weather events. These systems can help WWTPs take proactive measures to protect infrastructure and minimize damage. Monitoring weather forecasts and staying informed about local conditions is also crucial for timely decision-making.

Post-Disaster Recovery and Assessment

After a disaster, it is important to conduct a thorough assessment of the damage and initiate recovery

efforts promptly. This includes inspecting infrastructure, repairing damaged equipment, and restoring operations. Documenting the response and recovery process can provide valuable insights for improving future preparedness plans.

Conclusion

Weather-related disasters present significant challenges to wastewater treatment plants, but with proper preparation, these challenges can be mitigated. Conducting risk assessments, developing emergency response plans, upgrading infrastructure, and ensuring effective

communication are key steps in preparing for and responding to weather-related disasters. By taking these proactive measures, WWTPs can enhance their resilience and continue to provide essential services even in the face of severe weather events. ■

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About the Program

This program provides funding for clean and reliable drinking water systems, sanitary sewage disposal, sanitary solid waste disposal, and storm water drainage to households and businesses in eligible rural areas.

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Why Water Systems Benefit from Participating in Apprenticeship Programs

For water and wastewater utilities, workforce stability is just as critical as infrastructure investment. Apprenticeship programs offered through the West Virginia Rural Water Association provide water systems with a practical, long-term solution to staffing challenges while strengthening daily operations and regulatory compliance.

1. Workforce Succession Planning

Many water and wastewater systems rely on a small number of highly experienced operators, often with decades of institutional knowledge. As these operators approach retirement, systems face the risk of losing critical expertise.

Apprenticeships allow employers to:

- Train replacements before retirements occur.
- Facilitate knowledge transfer from senior operators to apprentices.
- Reduce operational disruption caused by sudden vacancies.

This proactive approach ensures continuity and preserves system-specific knowledge that cannot be replaced quickly through outside hiring.

2. Reduced Recruitment and Turnover Costs

Recruiting qualified operators can be expensive, time-consuming, and uncertain—particularly in rural areas.

By participating in an apprenticeship program, water systems:

- Develop employees internally rather than competing in a limited labor market.
- Increase employee loyalty through structured career pathways.
- Reduce turnover by offering clear advancement opportunities.

Apprentices who are trained within a system are more likely to remain long-term, saving employers repeated hiring and training costs.

3. Improved Operational Performance

Apprenticeship programs combine structured learning with hands-on experience, resulting in better-trained employees.

Benefits include:

- Stronger understanding of treatment processes and system operations.
- Improved preventative maintenance practices.
- Increased ability to identify and resolve issues before they escalate.

Over time, systems often see improved efficiency, fewer emergencies, and reduced operational risk.

4. Stronger Regulatory Compliance

Water and wastewater regulations continue to grow in complexity, particularly in areas such as sampling, reporting, and asset man-

agement.

Apprenticeships help ensure employees are trained in:

- State and federal regulatory requirements.
- Proper sampling techniques and documentation.
- Compliance best practices that reduce violations and enforcement actions.

This translates to fewer compliance issues and greater confidence during inspections and audits.

5. Development of Leadership from Within

Apprenticeships are not just about technical skills — they help build future leaders.

Participating employers can:

- Identify high-potential employees early.
- Develop supervisors who understand both operations and regulatory responsibilities.
- Prepare staff for lead operator, supervisor, or managerial roles.

Homegrown leaders often bring stronger commitment and a deeper understanding of the system's needs.

6. Increased Safety and Risk Reduction

Safety is a critical concern in water and wastewater operations.

Through formal training, apprentices learn:

- Proper use of personal protective equipment (PPE).
- Confined space awareness.

- Chemical handling and emergency response procedures.

This reduces workplace accidents, liability risks, and insurance-related concerns for employers.

7. Positive Community and Board Relations

Participation in apprenticeship programs demonstrates a commitment to:

- Workforce development.
- Community investment.
- Long-term system sustainability.

This can strengthen relationships with:

- Governing boards and elected officials.
- Community members.
- Funding agencies and regulators.

Systems that invest in training are often viewed as forward-thinking and well-managed.

8. Flexibility for Systems of All Sizes

One common misconception is that apprenticeship programs are only suitable for large utilities. In reality, these programs can be adapted for small and rural systems.

WVRWA helps participating employers:

- Align training schedules with staffing limitations.

- Customize on-the-job training to system size and complexity.
- Access technical assistance throughout the apprenticeship process.

This support makes apprenticeships feasible even for systems with limited staff.

9. Long-Term Cost Savings

The long-term financial benefits are significant.

Employers often experience:

- Lower overtime costs due to improved staffing coverage.
- Reduced emergency repair expenses.
- Less reliance on contract operators or outside consultants.

Over time, apprenticeship participation contributes to more predictable and manageable operational costs.

10. Partnership and Support from WVRWA

Water systems do not navigate apprenticeship programs alone.

Through WVRWA, em-


ployers receive:

- Guidance on program requirements and documentation.
- Coordination of classroom training and related instruction.
- Ongoing technical assistance and workforce development support.

This partnership reduces administrative burden and allows systems to focus on operations while building their workforce.

Strong Systems Start with Strong People

By investing in apprenticeships, water systems are investing in their most critical asset — their people. The result is a more skilled workforce, improved compliance, stronger leadership, and long-term system resilience. ■



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*Daman Superior

754 Kittanning Hollow Road
East Brady, PA 16028
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*Dorsett Controls

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Winston-Salem, NC 27101
Phone: (855) 387-2232
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*DRV, Inc.

6 Commerce Drive
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**E.J. Prescott, Inc.

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Phone (937) 941-5716

**EPC Ltd.

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Clarksburg, WV 26301
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*Extreme Endeavors

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Philippi, WV 26416
Phone: (304) 457-2500
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*Ferguson Waterworks

698 Middletown Rd.
White Hall, WV 26554
Phone: (681) 404-2857
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**Forberg Smith

800 Old Pond Road, Suite 705
Bridgeville, PA 15017
Phone (412) 420-7262

*Ford Meter Box

775 Manchester Avenue
Wabash, IN 43056
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*Gilson Engineering Sales, Inc.

535 Rochester Road
Pittsburgh, PA 15237
Phone: (304) 342-0012

*Golden Equipment Co., Inc.

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26620 Rose Rd.
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Phone: (440) 249-9367
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*High Performance Products

4111 Browns Lane
Louisville, KY 40220
Phone: (502) 451-2226

*Infratech Solutions, LLC

6004 Wellesley Drive
Wilmington, NC 28409
Phone: (910) 617-0291
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**ISCO Industries

100 Witherspoon 2 West
Louisville, KY 40202
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***JABO Supply Corporation, Inc.

5164 Braley Street
Huntington, WV 25705
Phone: (304) 736-8333
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*JHA Companies

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*Nexbillpay, LLC

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South Charleston, WV 25303
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*State Equipment Inc.

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**Sullivan Environmental

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Ft. Mitchell, KY 41017
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*Tepco-Trombold Equipment Co., Inc.

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Mars, PA 16046
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*Warren Pump & Supply

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*Water Development Authority

1009 Bullitt Street
Charleston, WV 25301
Phone: (304) 414-6500
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