

HOOSIER PIPELINE

The official publication of the Alliance of Indiana Rural Water

Spring/Summer 2024

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From French Lick to Fort Wayne: Alliance Adventures in Abundance

Hello, Alliance members! When you read this publication, the Spring Conference will have come and gone. I hope that all of you enjoyed your time in beautiful French Lick, catching up with your fellow peers, meeting new acquaintances and attending a wide array of informative training opportunities. Congratulations to all of the recipients of awards and scholarships handed out at the Wednesday luncheon! Each year, the nominations and applicants get more challenging to choose from. Thank you to all of the Platinum Sponsors for this luncheon! I also want to send out a big thank-you to National Water Services and Advanced Rehabilitation Technology for hosting the hospitality event on Tuesday night at Legendz. We all had a good time! This year, the Ultimate Meter Challenge that Zenner USA sponsored was new to the conference — great competition while having fun at the same time! Once again, the Best Tasting Water in Indiana was held on Thursday morning. Thank

you, Wessler Engineering, for your sponsorship of this popular event! At this time, I would like to thank two special people who have been a big part of the Alliance Board of Directors for quite a few years: Nancy Harmon, who has recently retired from the South Henry Regional Waste District, and David Harvey, who is now part of Hawkins Water Treatment Group. Thank you both for the time, effort and guidance that you have given to make the Alliance what it is today!

Don't worry, folks; David is still planning his famous hog roast at the very popular Outdoor Expos at Huntingburg and Akron in May! Don't forget that the Alliance hosts many training opportunities throughout the year, either on location or hybrid. Coming up in September is the annual Clay Shoot and Golf Outing. All of the proceeds go toward the annual scholarships given out at the Spring Conference. Once again, we will be holding the Fall Conference in Fort Wayne

in October. This conference gets bigger and better year after year!

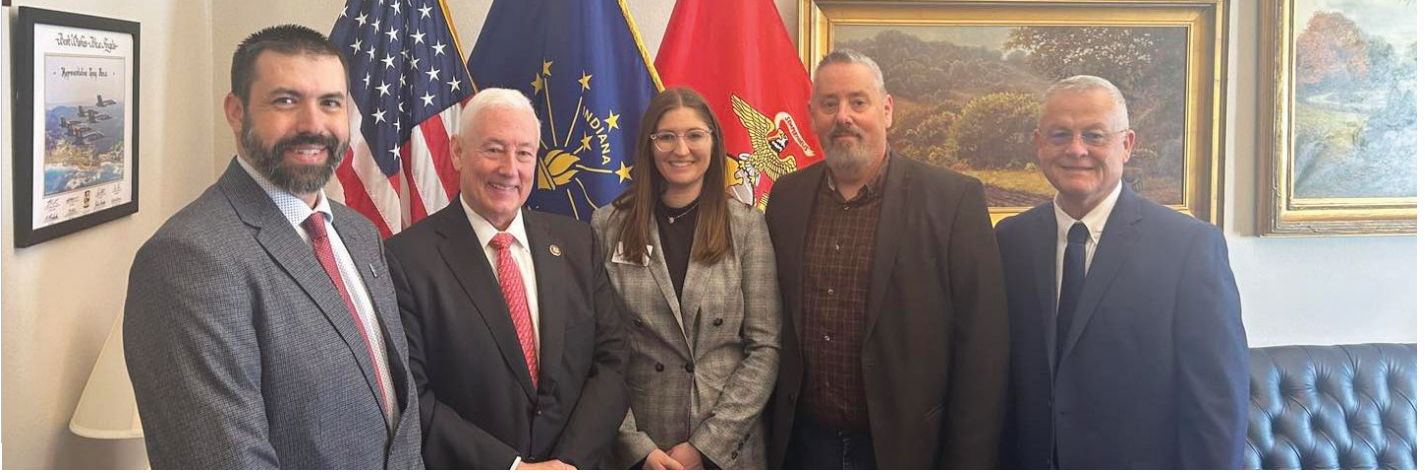
I am looking forward to seeing many of you at these events. Once more, a huge thank-you goes out to all the vendors, sponsors, and you — who not only make our association top notch, but also for your dedication and the work that you put in, day in and day out, to make your communities grow and thrive! Have a great spring and summer! 🌊



Tim Doersam
President – District 3 Director
Jasper Municipal Utilities



Recent Legislative Update



As I'm writing this letter, it is late winter 2024, and we're just around the corner from our largest event of the year: our annual Spring Conference. It has been a bustling period for our team as we gear up for our flagship event. As of late, several of our dedicated team members have been diligently scheduling visits to assist our utilities with water audits, while others have been working to assist our utilities with meeting the impending deadline for Lead Service Line Inventories. Rest assured, we are also deeply engaged in important legislative efforts, coinciding with the ongoing legislative session. We've been persistent in our efforts to stay abreast of the latest conversations, bills and key topics that could significantly impact our industry.

I am eager to share with you a comprehensive update on our recent advocacy efforts, both at the state and federal levels, as we continue to champion the interests of rural water utilities across Indiana.

Our association has been actively engaged in advocating for policies that directly benefit our rural water utilities, both in Washington, D.C., and at the Indiana Statehouse. In early February, the Alliance leadership team, including myself and five members of our Board of Directors, represented us admirably at the National Rural Water Association (NRWA) Rural Water Rally, where we engaged in productive discussions with our congressional delegation. This rally takes place each year in Washington,

D.C., and presents a unique opportunity for us to amplify our voices and make a substantial impact on the policies and funding decisions that affect our Indiana communities.

During these meetings, our representatives highlighted the critical need for our continued funding to support essential technical assistance, training and resources for our rural utilities throughout the state. By effectively conveying the challenges and opportunities facing rural water systems in Indiana, they ensured the voices of our members were heard loud and clear on Capitol Hill.

In addition to our federal advocacy efforts, we have been actively involved in state lobbying at the Indiana Statehouse. Notably, I recently testified on behalf of our rural utilities regarding House Bill 1206, which proposes changes to voting procedures for rural and small utilities opting in or out of the Indiana Utility Regulatory Commission (IURC). Through our testimony, we emphasized the importance of ensuring equitable representation and decision-making processes for all utilities and their constituents, especially those serving rural communities.

Our engagement in both state and federal advocacy underscores our commitment to addressing the unique challenges and opportunities faced by rural water systems in Indiana. By actively participating in the legislative process at both levels, we are advocating

for policies that promote fairness, transparency and sustainability within our industry.

To continue expanding our legislative engagement, we are diligently working toward the establishment of a Legislative Committee. This committee will serve as a platform for voicing concerns, sharing feedback and ensuring that the collective voice of our members and utilities statewide is resoundingly unified. If you have an interest in contributing to this committee or wish to share legislative concerns or insights, my metaphorical door is wide open to your input!

As we continue our advocacy efforts, I am grateful for your ongoing support and involvement in these endeavors. Together, we will continue to amplify the voices of rural water utilities and advance policies that uphold the integrity and resilience of our industry.

Thank you for your continued partnership and commitment to the Alliance of Indiana Rural Water Association. 🌊



Kristin Bean
Alliance Executive Director

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Be Safe Out There!

BY JOSH GINDER

If I have visited your community in the last six months, there is a very high chance you have heard this story, and for that I apologize.

This story happened a couple of years ago at the end of October as the disinfection season was winding down. I received a call from the operator on duty that the chlorine alarm was going off, meaning chlorine had been detected. He informed me that the chlorine alarm was ringing when he arrived for the morning shift. When he went to investigate, he cautiously opened the door and immediately noticed the distinct smell of chlorine. There was a piece of information in his story that would become very important in determining what caused this chlorine leak. When he told me his story, he casually mentioned that when he opened the door, he felt the room's warmth. When I arrived, the entrance to the chlorine room was open, but the alarm was still ringing. We called the fire department.

When the Assistant Chief arrived, I had already made up my bottle of ammonia. With personal protective gear in full force, the Assistant Chief carted out each cylinder of chlorine and sulfur dioxide. Immediately, we noticed that the lead plug on one of the chlorine cylinders had melted. I cautiously put my ammonia vapor next to the melted plug, and we found the leak without question. We had a couple of chlorine and sulfur dioxide tanks where the fusible lead plug had melted. We called the chemical supplier once we had the tanks outside and away from the building. I must note that the facility was in a rural area, and neighbors were not immediately threatened.

By this time, the exhaust fan in the room had cleared any chlorine, and the alarm returned to normal. The walls were warm when we entered the room, and the heater was still on. We had the city

electrician inspect the heater, and he determined that the heater was stuck in the "on" position. Apparently, this big heater, located in a small room, was hot enough to melt the fusible lead plugs. This is no small feat; the fusible lead plugs are designed to melt at a temperature of 158 to 165 degrees.

I tell this story because of the what-ifs. What if the fusible lead plug didn't melt? These are designed to melt to prevent the tank from building up too much pressure. It allows the gas to escape, bringing the pressure down inside the tank. I talked with the chemical supply company, and they said they had heard of these situations before, usually in states with colder climates, where the heaters in these rooms are more common.

Throughout my travels around the west side of Indiana, I tell this story. Many people do not have heaters in their chlorine rooms. Some have small heaters, but I have heard a couple of similar stories — maybe not to the point of the fusible lead plug melting — but to where the room was so hot that it flexed and stretched the PVC pipes, causing leaks. You can do everything right in setting up the cylinders, ensuring the gas feeder and lead gasket are correctly seated, etc. However, inspecting the heater and its components in the room might not be on the radar for chlorine safety. I recommend having the heater and thermostat inspected before every disinfection season to ensure that every component is working correctly and to make sure it is not oversized for the room where the cylinders will be stored.

Thankfully, no one was hurt during this event. Be safe out there! 💧



Josh Ginder
Wastewater Technician

HAWKINS INC. INVESTS IN THE FUTURE

WITH APPRENTICESHIP SCHOLARSHIPS

BY KELLY GARDNER

Hawkins Inc. is committed to investing in the training of the next generation, aiming to prepare individuals to earn a sustaining wage and equip them with the skills to operate and maintain critical infrastructure essential for providing clean water, ensuring the health and safety of all.

In a significant move toward supporting the industry's future, Hawkins Inc. has made a substantial investment in the Alliance of Indiana Rural Water Apprenticeship Program. The company is sponsoring \$8,000 in scholarships, earmarked for use toward the cost of related technical instruction. Hawkins has pledged to make this an annual sponsorship.

The first round of Hawkins Inc. scholarships, totaling \$4,000, will be presented at the Spring Conference in French Lick. Four participants will be awarded \$1,000 each toward their related technical instruction courses. The second round of scholarships will be presented at the Fall Conference in Fort Wayne.

The first-round scholarship recipients are as follows:

- **Wesley Hamilton** - Town of Wolcottville
- **Brian Cook** - Town of Lynnville

- **Troy Pond** - Oak Hill School Corp
- **James Hedrick** - Town of Knightstown

The Alliance of Indiana Rural Water expresses immense gratitude to Hawkins for their investment in Indiana's future workforce.

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If you are an industry partner interested in discussing sponsorship opportunities for apprenticeship scholarships, please contact the Alliance. 💧



Kelly Gardner
Apprenticeship Program Coordinator



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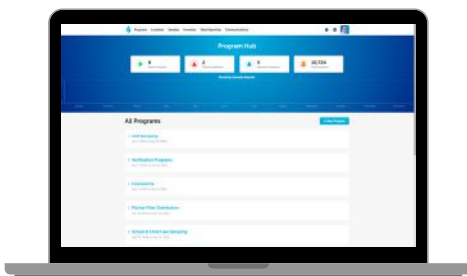
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Securing the Subsurface: Geodetic Vigilance in Safeguarding Carbon Sequestration Integrity

BY DANIEL TANK

With the ever-concerning effects of climate change becoming more prominent in the minds of voters and policymakers, the modern world begins to acknowledge the impact of carbon emissions and explore new ways to mitigate or eliminate this pollutant. Several companies strive to meet new zero-carbon goals, and more initiatives and projects seem to be announced every day. Over the years, a more time-tested and feasible method for large amounts of carbon emission reduction — geologic carbon storage, more commonly known as geologic carbon sequestration — has become the go-to solution for these companies. It is a process where captured anthropogenic carbon dioxide is sequestered or stored in geologic formations well below the surface and potable water aquifers.

The creation of anthropogenic carbon dioxide is commonly associated with oil refining and manufacturing byproducts. Thus, it should come as no surprise when carbon sequestration projects from companies like British Petroleum and Wabash Valley Resources are proposed throughout the state of Indiana. If approved, the Wabash Valley Resources carbon capture project would be the largest carbon sequestration initiative in the United States, with a planned storage of 1.67 million tons of anthropogenic carbon dioxide annually underground over 12 years. Consequently, these sequestration projects create carbon dioxide plumes, raising concerns about unintended contamination, including stored carbon seeping into and contaminating aquifers, rendering them unusable for potable water systems. Due to these concerns, several methods have been developed over the past decades to monitor these carbon plumes, helping predict and prevent potential contamination events.

Ensuring the secure and sustainable storage of geologic carbon relies significantly on geophysical monitoring. Before initiating the injection of captured carbon in a geologic carbon storage project, it is essential to conduct site characterization to assess the site's suitability. Monitoring carbon migration during and after injection is crucial. Various geophysical monitoring techniques play a pivotal role in remotely tracking carbon plumes, offering essential insights to manage potential leakage risks. The joint analysis of data from diverse monitoring approaches enhances overall monitoring confidence. Flexibility in monitoring plans is also essential across different geologic carbon storage project phases, spanning from site characterization to injection and post-injection site care.

Geodetic monitoring involves various methods, such as GPS monitoring, tilt measurement and Interferometric Synthetic Aperture Radar (InSAR), to quantify displacements and strains on the Earth's surface and interior. Over the past few decades, space-based InSAR has proven to be a particularly cost-effective geodetic technique, making it the go-to method for remotely monitoring storage sites. Geodetic monitoring also provides a cost-effective way of overseeing reservoir integrity and identifying potential carbon leakage. This approach entails routinely measuring the deformation of the carbon plume's surface topography.

Sequestration projects have found that InSAR, known for its high spatial resolution and extensive surface coverage, is especially well-suited for monitoring large-scale geologic carbon storage. Due to the accuracy of surface displacement measurements, the collected measurements can be enhanced through multitemporal analysis. Analyzing the collected data allows the correlation of observed displacements with volume changes induced by carbon

injection at depth. Geodetic monitoring also provides several advantages, including frequent observations ranging from minutes to months. The ease of conducting measurements remotely simplifies data collection, resulting in cost-effective monitoring. InSAR has the potential to accurately monitor ground deformation with a precision of 0.5 cm. However, the quality of InSAR data might be affected by various land surface conditions and unfavorable site factors, including mining operations and construction projects, aquifer recharge, swelling clay layers and slope instabilities. InSAR monitoring has been utilized at the Illinois Basin Decatur Project and has revealed no significant surface deformation attributable to stored carbon dioxide.

The potential environmental concerns associated with carbon sequestration underscore the importance of robust monitoring techniques, particularly geodetic methods such as InSAR. With its ability to provide precise and cost-effective insights into ground deformation, InSAR emerges as a reliable tool for ensuring the success of large-scale Geologic Carbon Sequestration initiatives. The ongoing commitment to geophysical monitoring, coupled with technological advancements, contributes to the sustainable and secure storage of geologic carbon, marking a pivotal step in addressing the pressing challenges posed by climate change. 🌍

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Daniel Tank
Source Water Specialist

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TRENCH SAFETY AWARENESS

BY CHAD REYNOLDS

Have you ever faced a digging job that you wanted to complete but also dreaded? Do we consistently take every necessary precaution when engaging in such tasks? Do we ensure we have the proper safety equipment, and more importantly, do we use it?

Let me recount a near-death experience that occurred to me in October 2011. In my small town, a stormwater project was underway involving relocating a few hundred feet of water main. Despite the challenges, the work progressed until a 4-inch water main unexpectedly fell in the middle of the area where the new storm tile had to be installed. It had to be removed to maintain the required grade for the tile.

The hole mainly was dug, and as we prepared to cut and lower the water main, we didn't use a shore box, assuming the banks were stable. While cleaning the water main's underside, my co-worker shouted a warning about the bank collapsing. If you've never been in a trench when this happens, you know that by the time you register the yell, it's too late. The bank struck me in the shoulder blade, rolling down my back and thrusting my midsection into the 4-inch water line with immense force. The shovel I was using was buried along with my legs, leaving me bent over the pipe in excruciating pain.

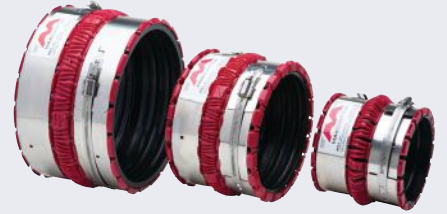
My co-worker began digging me out, but exhaustion prompted him to request a break. A passerby, initially dismissive, understood the severity and joined the rescue efforts. Once out of the trench, I wanted to go home, but the clerk insisted on an ambulance. It turned out to be a life-saving decision.

Upon reaching the hospital, I was swiftly ushered into the ER. Testing and X-rays revealed a torn colon, necessitating emergency surgery. Over the next 13 nights in the hospital, nearly 12 inches of my sigmoid colon were removed.

Do we always take precautions? We believe we do, as we did in this case. Shoring the banks could have prevented this accident. Stay vigilant, never work alone and always have a co-worker present. As for the water main, it broke 45 minutes after I was out of the trench. I am grateful to be here today. Please prioritize safety when working underground. 💧



Chad Reynolds
Water Circuit Rider



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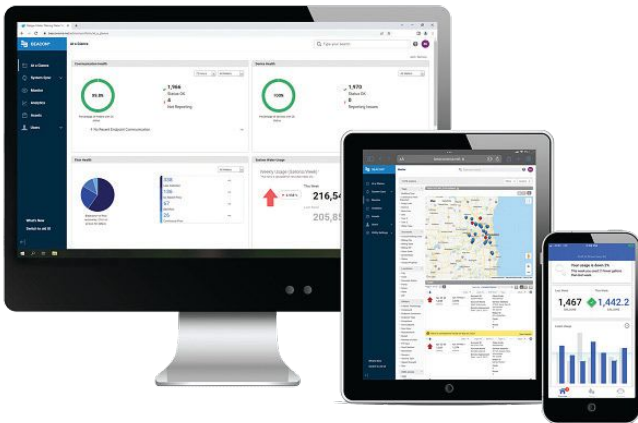
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ADVOCATING FOR RURAL WATER IN WASHINGTON, D.C.

BY KRISTIN BEAN

In early February, the Alliance of Indiana Rural Water Association leadership embarked on a fundamental journey to Washington, D.C., for the National Rural Water Association's Rural Water Rally. This annual event serves as a beacon of unity for rural water state associations across the nation as they meet to advocate for crucial funding and support from congressional delegates. Our group, alongside representatives from our 49 fellow state rural water associations, took over Capitol Hill to share the significance of sustaining our efforts in providing essential technical assistance and training to rural communities throughout our respective states.

Outside of myself, our representatives included Tim Doersam of Jasper (Board President), Adam Sams of LaGrange County (Vice President), Brad Colter of Connersville (Treasurer), Tom Speer of Lawrence (NRWA National Director), Jackie Hilgartner of And-Tro Water Authority, and Lorean Johnston of the Alliance (Deputy Director).

The trip commenced with an unexpected encounter as Lorean and I found ourselves seated beside Congressman Jim Baird during our flight to D.C. This surprising opportunity allowed us to have some excellent conversation with the congressman, providing us the chance to lay the groundwork for important dialogues ahead, as well as get to know him on a personal level.

Over the course of two days, our representatives split into two groups, engaging in a series of meetings with all nine

congressional district offices and our two esteemed Senators, Mike Braun and Todd Young. One highlight was the "Coffee & Conversation" event hosted by Senators Braun and Young, providing an intimate setting for candid discussions on the pressing needs of rural communities in Indiana.

The spirit of collaboration was evident throughout our meetings, with legislators demonstrating genuine interest and receptiveness to our concerns. A particularly encouraging moment occurred the day following our meeting with the Office of Jim Banks, District 3, where his Legislative Assistant went out of his way to come to NRWA's Great American Water Taste Test and present a plaque to Fort Wayne Utilities Representative, Michele Gerke, in recognition of their victory in the "2023 Best Tasting Water in Indiana" competition — an accolade symbolic of their commitment to delivering safe, clean and enjoyable drinking water to their community.

Moreover, we were honored to be joined by Mike Ricks, President of Water Solutions Unlimited, who lent his expertise to our advocacy efforts. Ricks' impassioned advocacy served as a powerful testament to the indispensable role of technical assistance in strengthening rural communities.

Our representatives' efforts were further lifted by unexpected moments of recognition, such as Congresswoman Victoria Spartz sharing a photo of our meeting on her Facebook page. It was a wonderful coincidence that she announced her decision to seek reelection

for Indiana's 5th Congressional District on the same day we met.

Amidst our packed schedule, we were granted a rare opportunity to tour the White House, coinciding with a speech by the President commemorating Black History Month.

As we reflect on our journey to Washington, D.C., we are filled with a renewed sense of purpose and determination. Our interactions with policymakers emphasized the vital importance of advocating for the needs of our rural communities, and we remain committed to ensuring access to safe, clean water for all Hoosiers.

I'd like to extend sincere gratitude to several members of our Board of Directors who joined me for this important event — Tim Doersam, Adam Sams, Brad Colter, Tom Speer and Jackie Hilgartner. Their dedication and leadership were instrumental in amplifying our message and advancing our mission. I'd also like to send my appreciation to Mike Ricks (WSU), Michele Gerke from Fort Wayne Utilities and our Deputy Director, Lorean Johnston, for their invaluable contributions to our advocacy efforts.

Through unity, advocacy and unwavering dedication, we will continue to pave the way for a brighter, more resilient future for rural Indiana.

Together, we are the voice of rural water. 💧



Kristin Bean
Executive Director

Senators

Each state in the United States elects two senators, regardless of the state's population. Senators serve six-year terms with staggered elections. Americans in the United States's six territories do not have senators.

Indiana's senators are:



Senior Senator

Todd Young

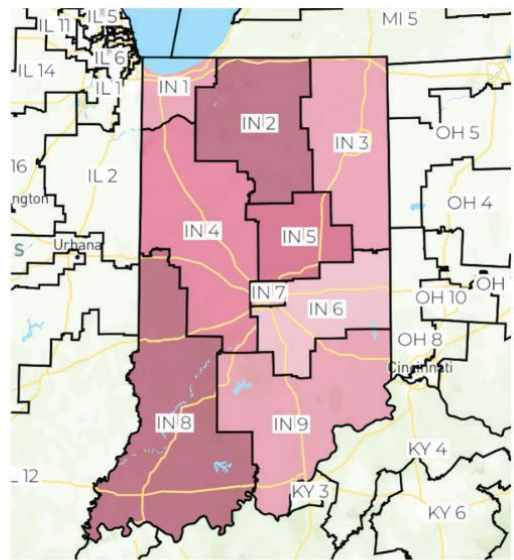
Republican
Since Jan 3, 2017
Next Election in 2028



Junior Senator

Mike Braun

Republican
Since Jan 3, 2019
Next Election in 2024



Representatives

The United States is divided into 435 congressional districts, each with a population of about 710,000 individuals. Each district elects a representative to the House of Representatives for a two-year term. Representatives are also called congressmen/congresswomen. Americans in the United States's six territories are represented in the House of Representatives by an additional six non-voting delegates.

Indiana's nine representatives are:



1st District

Frank Mrvan

Democrat
Since Jan 3, 2021



2nd District

Rudy Yakym

Republican
Since Nov 14, 2022



3rd District

Jim Banks

Republican
Since Jan 3, 2017



4th District

James Baird

Republican
Since Jan 3, 2019



5th District

Victoria Spartz

Republican
Since Jan 3, 2021



6th District

Greg Pence

Republican
Since Jan 3, 2019



7th District

André Carson

Democrat
Since Mar 13, 2008



8th District

Larry Bucshon

Republican
Since Jan 5, 2011



9th District

Erin Houchin

Republican
Since Jan 3, 2023

Information from www.govtrack.us/congress/members/IN.







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Maximizing Efficiency and Sustainability: *The Benefits of Variable Frequency Drives (VFDs) in Water and Wastewater Management*

BY TARA TERRELL

In water and wastewater management, the pursuit of efficiency and sustainability is paramount. One technology that has significantly contributed to achieving these goals is the Variable Frequency Drive (VFD). These electronic devices have revolutionized the way pumps and motors operate, offering many benefits extending far beyond traditional control methods.

At its core, a VFD regulates electric motors' speed and power consumption by adjusting the supplied electricity's frequency and voltage. In the context of water and wastewater systems, this level of control brings several advantages.

First and foremost, VFDs enhance energy efficiency. Unlike fixed-speed motors that run constantly, VFDs make dynamic adjustments regardless of demand. This allows pumps and motors to work at optimal speeds based on real-time needs, resulting in significant energy savings. It cuts unnecessary power use, reducing costs.

Furthermore, controlling the speed of pumps and motors enables better water flow and pressure management. VFDs

allow precise adjustments, ensuring water is distributed at the correct rate without excessive pressure. This minimizes wear and tear, reduces the risk of leaks and extends the equipment's lifespan.

VFDs are crucial in optimizing processes, especially in wastewater treatment plants where flow rates vary. Adjusting motor speeds based on demand, VFDs help maintain consistent water quality and treatment levels, improving system reliability and performance.

Addressing environmental concerns in water operations, VFDs contribute to sustainability goals by reducing energy consumption and optimizing processes. This decreases greenhouse

gas emissions, aligning with global efforts toward greener technologies and emphasizing the importance of sustainable practices.

In conclusion, integrating VFDs into water and wastewater systems brings forth many benefits, including enhanced energy efficiency, precise control, improved reliability and sustainability. As the demand for responsible resource management grows, VFDs become increasingly essential, paving the way for a more efficient, reliable and environmentally conscious future. 🌱



Tara Terrell
Energy Efficiency Technician



VFDs are crucial in optimizing processes, especially in wastewater treatment plants where flow rates vary.



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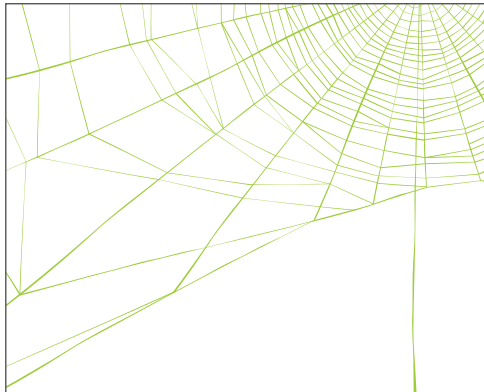
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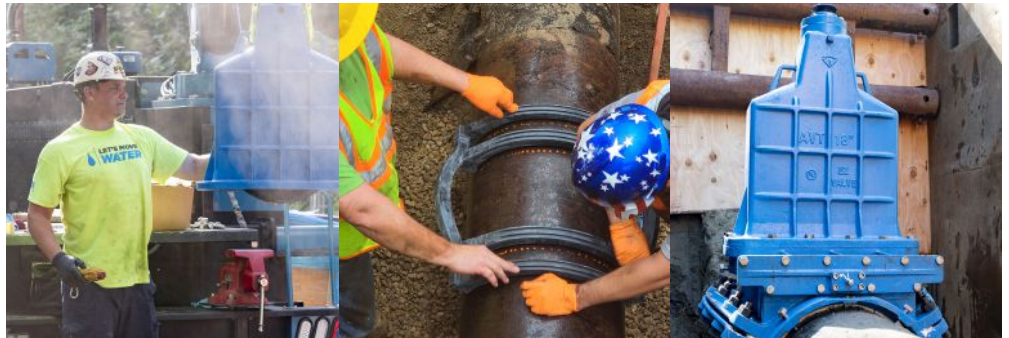
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Overcoming Infrastructure Challenges in Switz City:

A Collaborative Approach

BY ADAM HERSHBERGER



Switz City, a small town in rural Greene County, Indiana, needs help maintaining its aging water and sewer infrastructure. With financial constraints and increasing repair costs, the town sought assistance from the Alliance of Indiana Rural Water (AIRW) to develop a comprehensive asset management plan (AMP).

Town Overview

- Population: Approximately 275 residents
- Governance: Managed by a three-person voting board and a Clerk-Treasurer
- Water supply: Purchases water from Linton, Indiana, distributing to around 900 customers
- Utility operations: Contracted with Bynum Fanyo Utilities Inc., for operation, maintenance and repairs
- GIS hosting: Contracts with Ziptility for hosting digital water and sewer asset maps and infrastructure data



Infrastructure Challenges

- Aging water and sewer systems requiring unplanned repairs
- Significant water loss identified in a 2020 water loss audit
- Inflow and Infiltration (I/I) problems in the sewer system, costing approximately \$10,000 annually
- Financial constraints among ratepayers affecting the ability to invest in infrastructure improvements

Initiative by Alliance of Indiana Rural Water

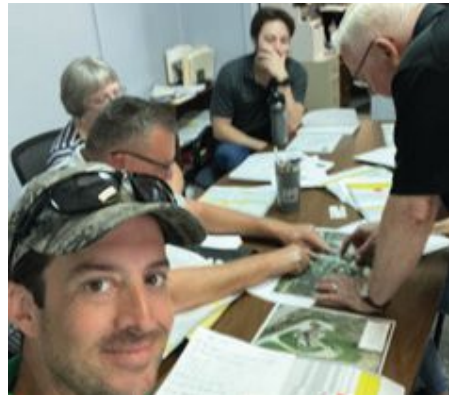
- Adam Hershberger, EPA Water Specialist, started working with Switz City in August 2023
- Proposed a risk-based AMP to guide infrastructure decisions
- AMP required to qualify for State Revolving Fund (SRF) programs and other funding opportunities

Collaborative Effort

- Prohibitive consultant costs led to a volunteer effort with subject experts
- Participants: AIRW, Buried Asset Management Institute — International (BAMI-I), Bynum Fanyo Utilities and Ziptility
- Assisted with data collection, preliminary condition assessments and GIS platform updates
- Educated board members and community stakeholders on the importance of asset management

University Involvement

- Dr. Tom Iseley, Chair of BAMI-I and Purdue University Civil Engineering professor, engaged his graduate engineering class
- Students divided into groups to assist with the financial and managerial components of the AMP



- Adam Hershberger presented background information and shared data with the students

Scheduled Deliverable

The group delivered its interim AMP to the town at the February 2024 Board meeting. Dr. Iseley overviewed each section of the plan and offered high-level recommendations to the Board. The group left the meeting with a plan to seek out more data on the town's collection system. This would be needed to better understand where the problem areas are located and look for clues about inflow and infiltration sources across the system.

InfoSense, based out of North Carolina, joined the volunteer group to help determine baseline conditions of the town's gravity sewer mains. Their product, SL-RAT (Sewer Line Rapid Assessment Tool) uses acoustic wave sensors — placed in adjoining manholes — to quickly assess the level of blockage in each pipe segment. This information can then be used to help guide cleaning work, CCTV, root cutting or repairs as needed.

In early March, Chris Callahan from InfoSense and I spent time assessing the



town's sewer system using SL-RAT. In total, 2.3 miles of gravity sewer lines were assessed in eight field hours. Eighty-two manholes were also visually inspected during the exercise. Ultimately, 11 percent of the assessed pipes were determined to deserve additional attention. Stay tuned for another innovative group that has agreed to assist with this phase of the project.

Conclusion

Switz City's collaborative approach, involving subject experts, volunteers and university engagement, showcases a cost-effective strategy to address infrastructure challenges. The completed AMP is expected to guide informed decisions and enhance the town's eligibility for funding opportunities.

Need Assistance?

If your utility requires help developing an AMP, contact the Alliance directly at alliance@inh2o.org or Adam Hershberger at ahershberger@inh2o.org. 💧



Adam Hershberger
EPA Water Specialist



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The background of the page is a photograph of a large, circular sewer tunnel. The tunnel is dimly lit, with a bright light source at the far end, creating a strong perspective and a sense of depth. The walls of the tunnel are dark and textured, and the floor is also dark. A person is visible in the distance, standing in the center of the tunnel, illuminated by the light at the end. The overall atmosphere is dark and somewhat mysterious.

Biochemical Oxygen Demand

and the Importance of Sewer Use Ordinance

BY PETE CROWL

What Is Biochemical Oxygen Demand (BOD)?

BOD is the amount of oxygen used by aerobic bacteria consuming organic material, serving as the primary food source for biomass (bugs) in a wastewater treatment plant. The BOD measurement involves a five-day incubation period between the first and final readings at 20 degrees Celsius, regulated by Standard Methods (Method 5210B), designed explicitly for Carbonaceous Biochemical Oxygen Demand (CBOD5). CBOD5 includes the addition of a nitrification inhibitor to halt the oxygen demand of ammonia and organic nitrogen. Without the inhibitor, the results do not accurately represent the oxygen demand of organic material (*Standard Methods for the Examination of Water and Wastewater 22nd Edition*).

Why the 5-Day Incubation period?

The history of the BOD5 test dates back to the early 1900s when the Royal Commission of Sewage Disposal in the United Kingdom selected it to measure organic pollution in rivers. The five-day timeframe was allegedly chosen because it was the estimated duration for river water to travel from the source to the ocean (Wikipedia).

With the enactment of the Clean Water Act in 1972, the Environmental Protection Agency (EPA) listed BOD as a conventional pollutant, subjecting it to limits under the National Pollutant Discharge Elimination System (NPDES). Excessive BOD discharge into water bodies depletes oxygen, harming aquatic life and causing foul odors.

Importance of Sewer Use Ordinance (SUO)

Communities must have an SUO, a legal document setting rules and pollutant limits for industrial and commercial contributors. The SUO should include approved surcharge levels for pollutants exceeding specified amounts, ensuring

that surcharge fees cover the extra expenses related to treating additional loadings. If a plant receives an excessive BOD from an industrial source, causing a halt in treatment, the SUO provisions should hold the contributor responsible for all related expenses to restore plant operation and compliance.

BOD5 in Wastewater Treatment Plants

BOD5 is a crucial parameter for designing and sizing wastewater treatment plants. Different treatment processes can remove BOD, including primary, secondary and tertiary treatments. Monitoring CBOD5 results is essential for plant operators to make effective adjustments to the treatment process. Creating trend graphs with results and comparing them with other plant operating tools helps identify patterns and supports decision-making.

CBOD5 Testing Basics

1. Record dates, times, temperatures and personnel testing.
2. Keep bottles and equipment clean.

3. Warm samples to 20 degrees Celsius with a pH of 7.0 to 7.2.
4. The first DO reading should be less than 9 mg/l.
5. Prepare nutrient buffer water just before it is needed.
6. Add proper nutrients, buffers and minerals for samples with more than 67 percent volume.
7. Blanks should not have more than 0.2 mg/l DO depletion.
8. Use seed in effluent samples during the disinfection season.
9. Follow the "Take 2 Leave 1" rule for final readings.
10. Consider the number of sample bottles and different dilutions.

This article covers the basics, and readers are encouraged to refer to the *Standard Methods* and consult with regulatory agencies or industry experts for further guidance. 🌊



Pete Crowl
Wastewater Technician

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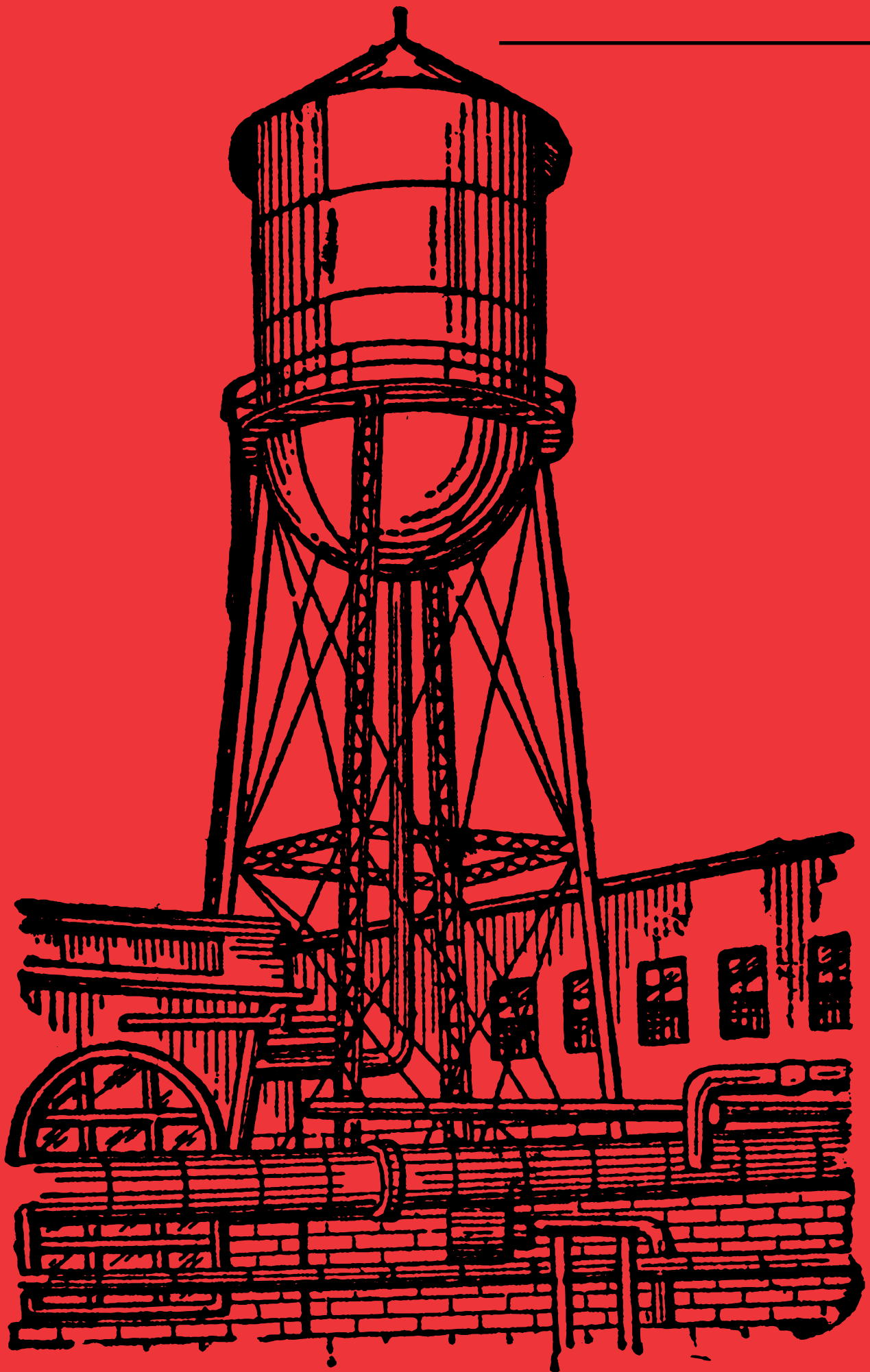
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Maintaining Municipal Water Towers

BY MARK HARLOW

Maintaining municipal water towers is crucial to ensuring the continued availability of clean and safe water for the community. Regular maintenance helps prevent structural issues, corrosion and contamination, ensuring the water tower operates efficiently. Here are some key aspects of municipal water tower maintenance.

Inspections

- Regular visual inspections should be conducted to identify any signs of damage, corrosion or leaks. This includes checks of the tank exterior, supports and associated piping.
- Periodic structural inspections, preferably performed by qualified engineers, should be scheduled to assess the overall integrity of the water tower.

Painting and Coating

- The exterior of the water tower should be painted and coated to protect against corrosion, extending the structure's life and maintaining water quality.
- Interior coating is essential to prevent tank corrosion and maintain water quality. Periodic inspections should assess the condition of the coating.

Cleaning

- Regular cleaning of the interior of the water tank is necessary to prevent the buildup of sediment, algae or other contaminants.
- Cleaning may involve draining the tank,

removing sediment and disinfecting the interior surfaces.

Safety Systems

- Ensure that safety systems, such as access ladders, platforms and safety rails, are in good condition to facilitate inspections and maintenance tasks.
- Inspect lightning protection systems to ensure they are functioning correctly.

Valve and Pipe Maintenance

- Inspect valves, pipes and other components for any signs of wear, leaks or malfunction.
- Lubricate moving parts as necessary and replace any damaged components.

Water Quality Monitoring

- Regularly monitor water quality to ensure it meets regulatory standards.
- Sampling and testing should be performed to identify and address any potential contamination issues.

Security Measures

- Implement security measures to prevent unauthorized access to the water tower, protecting the structure and the water supply.

- Install fencing, security cameras and access controls as needed.

Documentation

- Maintain comprehensive records of inspections, maintenance activities and repairs.
- Keep records of water quality testing and any corrective actions taken.

Emergency Preparedness

- Develop and regularly review emergency response plans in case of incidents such as leaks, contamination or natural disasters.
- Ensure that all personnel involved in maintenance are trained in emergency procedures.

By implementing a proactive and regular maintenance program, municipalities can ensure the longevity of their water towers and the quality of the water supplied to the community. Regular inspections and timely repairs can prevent costly infrastructure failures and help maintain a reliable water supply. 💧



Mark Harlow
Water Circuit Rider

HOW ABOUT SOME BRAINTEASERS

BY GORDY MEYER

Let's throw some questions at you to clear the cobwebs out of your brains. I wanted to go back to the start of your training, long ago for some but not that far for others, so everyone put on your thinking caps, and let's go for it.

1. What is the process of evaporation of water into the air and its return to Earth by precipitation of rain or snow, plant transpiration, groundwater movement and runoff into rivers, streams and oceans?

- A) Hydrologic Cycle or Water Cycle
- B) Natural Water Runoff
- C) Recycled Water
- D) Stormwater

2. What is water in its natural state prior to treatment called?

- A) Filtered Water
- B) Finished Water
- C) Process Water
- D) Raw Water

3. Water that does not contain objectionable pollution, contamination, minerals, or infective agents and is considered satisfactory for drinking is called what?

- A) Non-Potable Water
- B) Potable Water
- C) Raw Water
- D) Sample Water

4. The formation of separate layers of water in a lake or reservoir having similar characteristics is called what?

- A) Divisional Layers
- B) Equilibrium
- C) Natural Formation
- D) Stratification

5. What is the cloudy appearance of water caused by the presence of suspended and colloidal matter called?

- A) Contamination
- B) Stagnant
- C) Turbidity
- D) Wastewater

6. What is a natural underground layer of porous, water-bearing materials usually capable of yielding a large amount or supply of water?

- A) Aquifer
- B) Cistern
- C) Reservoir
- D) River

7. Palatable Water is pleasing to the senses and is free from objectionable what?

- A) Colors
- B) Odors
- C) Tastes
- D) Turbidity
- E) All of the above

The preceding questions were developed using the *Small Water System Operation and Maintenance Field Study Training Program Third Edition* from the California State University Sacramento School of Engineering. Hopefully, many of you were fine answering them. It does not mean you forgot things you have learned in the past; the information is still there, buried deep in your brain, and you need to get your old books out, blow the dust off of them and look them over from time to time. Trust me, with age, I occasionally need to go back to the old books to review stuff.



Gordy Meyer
Lead Water Circuit Rider

Correct Answers: 1. A, 2. D, 3. B, 4. D, 5. C, 6. A, 7. E

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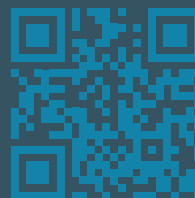
Quality On Tap! was created by NRWA in 1996 as the first practical, hands-on guide to better public relations for water utilities. Today, the QOT logo can be found around rural America on water towers and utility vehicles, spreading awareness to turn on the tap.



Photo taken by Aaron Schroeder near Delta, Iowa



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Pharmaceuticals in Wastewater Discharges

BY REX BLANTON

The presence of pharmaceuticals (medications and drugs) in streams and other bodies of water has been a concern for some time. Many studies and papers have been written and published, but pinpointing exact reactions and results from specific drugs is very complex and time-consuming.

With all of the drugs being used today, the effects of them on the ecosystem can be devastating. These drugs have so many benefits for humans, pets and livestock, but more research needs to be done to estimate the risks to the environment better. These pharmaceuticals and other emerging contaminants, such as PFOA, PFOS and PFAS (perfluoroalkyl and poly-fluoroalkyl substances), are being examined as possible reasons for half of the planet's wild animals being lost in the past 40 years.


These drug residues are most commonly found in freshwater ecosystems, where up to 75 percent of fish, frogs and other amphibians have been drastically diminished. Published on *The Guardian*, a web-based news site, are a few dramatic examples of wildlife harmed by drug contamination: male fish being feminized by synthetic hormones

used in birth control pills and vultures in India being virtually wiped out by consuming anti-inflammatory drugs in dead cattle. Intersex frogs have also been found in urban ponds contaminated with wastewater. Because the drugs are not made to kill, the results on wildlife can be very subtle.

In a study by Tom Bean at the University of York, he and his colleagues showed that the common antidepressant fluoxetine led starlings to feed less often during the critical foraging times of sunrise to sunset. Bean stated, "Fluoxetine is not the only drug or antidepressant found in the environment, and mixtures could potentially be more potent."

Another study by Karen Kidd at the University of Brunswick showed synthetic estrogen not only wiped out fathead minnows in lakes used for experiments in Ontario but seriously disrupted the whole ecosystem. Trout in the lake declined by 23 percent to 42 percent due to the loss of the minnow and other prey, while insects increased as the minnows no longer ate them.

According to Anette Kuster and Nicole Adler of Germany's Federal Environmental Agency, hormones, antibiotics, antidepressants, painkillers and



anti-cancer drugs are the most dangerous human medicinal products for the ecosystem. Hormones, antibiotics and parasiticides, which are also included in veterinary drugs, were highlighted as high environmental risks.

These are some of the results of research projects worldwide, but more needs to be done. An alarming fact is that even less is known about the effect of pharmaceutical pollution on the world's oceans. With the increasing growth of coastal fisheries across the globe and growing coastal populations, this area needs in-depth studies.

It is safe to say that we are responsible for a large percentage of pharmaceuticals and personal care products that are discharged into Indiana waterways. Most homes have unused or expired drugs in medicine cabinets, kitchen drawers and other storage compartments. These drugs usually are flushed down the toilet. But our bodies only metabolize some of them, and the remainder is excreted as urine or feces. Personal care products such as lotions or creams also contribute to the problem when they get washed off. Medications are also being prescribed in lotion and ointment form.

Another, even less researched source of contamination is the continued growth of the use of opioids, whether legal or not. Very little is known about the effects of these minute amounts excreted from our bodies on the environment. With the increased crackdown on prescription opioids around the country, fentanyl and other illegal substances are being used, which are even more substantial.

The waste produced by livestock and poultry operations, estimated to be more than 2 trillion tons per year, is another massive source due to the hormones and antibiotics they are given for growth and disease prevention. Hospitals and senior

care facilities also contribute to the situation. Hospitals usually have a buyback policy with some drug producers since they have in-house pharmacies. However, some senior living institutions generally put drugs down the drain. Drug manufacturers discharge varying amounts of their products worldwide because some have stricter regulations and discharge limits than others. However, it is to their benefit to recover as much as possible in the pretreatment process to cut down on resource costs.

It is surprising to many folks that most wastewater treatment plants do not remove pharmaceuticals from the water on a routine basis. So, how do everyday medicine and personal care product users do their part to protect our environment from these problematic discharges?

Medications and drugs have been not only lifesaving and a part of chronic pain management, but they're also a massive factor in our continued increase in human life expectancy. We can, however, do some things to lessen the effects. Only take the prescribed dosage when prescribed and ask your doctor for information on holistic alternatives. If all of your prescriptions are unused, ask your pharmacist if they have a drug takeback program or [if] your community has one. Do not flush it down the toilet.

Other ways to diminish the effects are to cut back on personal care products that contain harmful ingredients and look for more natural-based ones. Another way is, if you have a septic system, be sure it is cleaned on a regular basis and is not leaking into the local source water aquifers or wells. This can be done by testing nearby wells, ditches or streams for E. coli. 💧



Rex Blanton
Specialized Training Instructor

Hey Donald and Kelly,

I just wanted to take a moment to thank both of you for this awesome apprenticeship that you guys are running! Because of the knowledge I am gaining from the classes, I was just promoted from a fitter to an operator, so this class is going to help me immensely in my new role! I appreciate everything you guys have done for all of us so far and will do for us in the future! I look forward to learning more and being able to apply the knowledge gained to my new role!

Tyler Hill (Team Lima)
Operator
Indiana American Water -
Noblesville, Indiana

I wanted to send this to say I appreciate Gordon Meyer's help in locating a leak we had in our system on campus back around Christmas. I knew it was leaking. This had been going on an extended period of time, but it was not showing, and I could not find it. He came in, used his equipment and we found where the leak was. In fact, it came to the surface within the next several hours and was in the location Gordon pinpointed. I appreciate his help.

John Todd
Associate Director of Facilities
Hanover College

Good afternoon, Donald. Thanks for the Mid-Term Progress Report. Glad to see it! It was great finally meeting you at the Conference and being able to chat a little bit. Attending the Conference made me appreciate even more what everyone at the Alliance does for Rural Water in Indiana and all the citizens that are positively affected by your work. Thanks for all that you do. I appreciate it! Have an awesome week.

Nathan Monk

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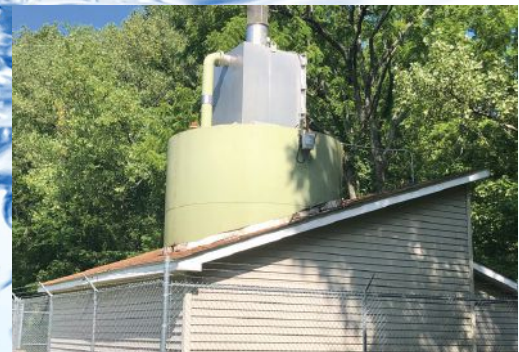
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