

MISSOURI WATER LINES

A PUBLICATION FOR MISSOURI'S WATER AND WASTEWATER INDUSTRY

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Instructions: Missouri Public Water Supply System - Lead Service Line Inventory (LSLI) Spreadsheet:

2 Applicability:
All Community and Non-Transient Non-Community Public Water Systems must complete a lead service line inventory (LSLI) and submit the information for their system using this form. This is required regardless of whether the system has identified the presence of any lead service lines in their distribution or not. Transient Non-Community Public Water Systems are not required to submit a LSLI.

4 Deadline:
Public Water Systems (PWS) must submit their initial LSLI on or before **October 16, 2024**. Identifications do not have to be 100% complete at that time, but the system should identify as many service lines as possible as either "Lead", "GRR" (Galvanized Requiring Replacement), "Non-Lead", or "Unknown: Possibly Lead" upon submission. Updated spreadsheets will be required to be submitted to the Department of Natural Resources (Department) annually for systems that monitor on a six month or annual schedule and every three years for systems on a three year monitoring schedule. The spreadsheets must include the most up to date service line materials information for the system. Unknown service lines will be labeled "Unknown: possibly Lead" until properly identified.

6 General Guidance for Completing Inventory:
Each water system's unique 9-digit ID can be found in Drinking Water Watch. It will begin with the prefix "MO" followed by seven numbers (Example: MO1234567). It is referred to as the Federal Public Water System ID# (PWSID#). You will need this ID to complete the survey.
The legal definition of where a given system's public and private service line begins or ends may vary. Usually, the publicly-owned service line is from the water main to the meter and the privately-owned service line is from the property line or meter to the indoor shutoff valve. Please refer to your system's agreements, laws or ordinances to legally define where each service line ownership changes.
If multiple service lines are present at the same address location, a unique "Specific System ID" number must be used to distinguish each service line. This will be automatically generated by the State--or the PWS may use their own naming convention.
Service lines listed as "unknown" are assumed to be Lead unless proven otherwise. In addition to "Lead" or "Non-Lead," systems need to identify the service line material on the public and private side of the service line (Lead, Copper, GRR, PVC, HDPE, PEX, Asbestos-Cement).
Contract operators or operators for multiple water systems must use a separate spreadsheet for each PWSID. A new copy of the original LSLI Excel document can be saved with the name of the system.

12 Instructions for the MO_LSLI Tab:
The "MO_LSLI" tab (blue tab) is the main spreadsheet for inventory information. Systems must provide the requested information for each column with a blue or green highlighted heading for each service line in their system.
You may click on the headings of the individual columns for more information about the information to be collected and how the data should be entered.

In this Issue:

From the Executive Director	4
Abandoned Wells.....	8
Computer-Based Exams Available for Operator Certification	10
Murphy's Law	14
Lead Service Line Inventory: Are you prepared? Have you started?	22
MBBR Technologies: Revolutionizing the Way We Clean Wastewater	28
Master Time Management:	
The Crucial Skills for Office Management as the Clerk	32
Ask the Dumb Question.....	34
What is GIS Mapping, and How Can it Help Me?	37
Protecting Water Quality: The Problem with Pharmaceuticals.....	39
Improving Wastewater Remediation with Oxynova	43
Streamlining Sewage Solutions: Spotlight on Variable Frequency Drives.....	52
Calendar of Events.....	70




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Harry S. Truman PWSD No. 2 of Henry County, Missouri


\$2,582,000
Waterworks System Revenue Bonds

Proceeds were used to finance improvements to publicly owned drinking water treatment facilities.

City of Stover, Missouri

\$1,009,078
Combined Waterworks and Sewerage System Refunding Revenue Bonds

Proceeds were used to refund the City's Series 2006 A&B Combined Waterworks and Sewerage System Revenue Bonds.



PWSD No. 4 of Cass County, Missouri

\$600,000
Equipment Lease Purchase Agreement

Proceeds were used to install approximately 9,300 linear feet of 8-inch PVC water mains and appurtenances.

City of Auxvasse, Missouri

\$514,480
Combined Waterworks and Sewerage System Refunding Revenue Bonds

Proceeds were used to refund the City's Series 2008A Combined Waterworks and Sewerage System Revenue Bonds.

Clarence Cannon Wholesale Water Commission

\$1,200,000
Water Revenue Bonds

Proceeds were used to acquire, construct and equip a distribution system and appurtenance facilities to the City of Laddonia, Missouri, and the City of Monroe City, Missouri.

City of Iberia, Missouri

\$723,636
Combined Waterworks and Sewerage Revenue Bonds

Proceeds were used for engineering design services related to the acquisition and construction of extensions and improvement to the City's system.

Missouri Public Utilities Commission

\$85,000,000
Interim Construction Notes

Proceeds of the Notes were issued to provide interim funding for Missouri municipal projects being funded through the United States Department of Agriculture, Rural Development.

Lake Area Waste Water Association, Inc.


\$13,028,000
Bank Loan

Proceeds were used to pay costs of planning, designing and constructing improvements related to a new wastewater facility.

City of Goodman, Missouri

\$775,000
Equipment Lease Purchase Agreement

Proceeds from the sale of the lease were used in part to provide improvements to the Water System.



PWSD No. 3 of Johnson County, Missouri


\$418,300
Waterworks System Revenue Bond

Proceeds of the Bond were used to acquire, construct, furnish, equip, extend and improve the District's Waterworks System.

City of Cole Camp, Missouri

\$253,300
Lease Purchase Agreement

Proceeds of the Lease were used in part for capital improvements and purchase of capital equipment including a Police Interceptor, a Bobcat Compact Excavator and for other equipment and appurtenances.



PWSD No. 1 of Greene County, Missouri

\$419,500
Equipment Lease Purchase Agreement

Proceeds from the sale of the lease were used to acquire, construct and extend the waterworks distribution system.

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Contents

From the Executive Director.....	4
Abandoned Wells.....	8
Computer-Based Exams Available for Operator Certification.....	10
Murphy's Law	14
Lead Service Line Inventory: Are you prepared? Have you started?.....	22
MBBR Technologies: Revolutionizing the Way We Clean Wastewater.....	28
Master Time Management: The Crucial Skills for Office Management as the Clerk.....	32
Ask the Dumb Question	34
What is GIS Mapping, and How Can it Help Me?.....	37
Protecting Water Quality: The Problem with Pharmaceuticals	39
Improving Wastewater Remediation with Oxynova.....	43
Streamlining Sewage Solutions: Spotlight on Variable Frequency Drives	52
Calendar of Events	70

About the Cover:

Just a reminder, October 16, 2024 is the deadline to submit your system's Lead Service Line Inventory. If you think your system is exempt, you should double check and contact the Missouri Department of Natural Resources.

Remember . . .

Call us and let us know your needs so we can stop and visit with you when we are in your area. There is no charge for our services. Call Missouri Rural Water Association at 573-657-5533.

Missouri Rural Water Association Mission Statement:

"To be the leading source of professional services, support and representation for water and wastewater utilities."

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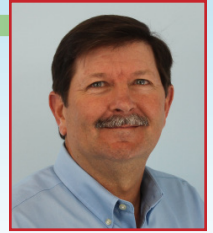
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From the Executive Director

Howard Baker, MRWA Executive Director



At the very core of MRWA lies a dedicated team of professionals who consistently go above and beyond to serve the water and wastewater systems of Missouri.

This association was established with a sole purpose - to provide exemplary support and assistance to its member systems. This state association takes great pride in its staff, who are the backbone of its member services. With years of experience and a genuine commitment to understanding the needs of its systems, MRWA's staff consistently delivers innovative solutions.

One outstanding example of MRWA's commitment to member services was the development of a highly affordable and user-friendly billing software. Upon discovering that many small systems were unable to access a suitable billing software solution, MRWA's staff took it upon themselves to create one. This software, **S.U.B.S.**, offered at an annual cost of only \$300, has not only saved MRWA's members thousands of dollars each year but has also been adopted by close to 100 systems. Recognizing its tremendous value, MRWA decided to extend its availability to other states, thereby benefiting a broader range of water and wastewater systems.

Another remarkable initiative taken by your association was in response to the lead and copper inventory challenges faced by its members. Utilizing the power of modern technology, MRWA's staff collaborated with Diamond Maps to develop an inventory worksheet within a GIS format. This groundbreaking tool was made available to association members free of charge and serves as a comprehensive and practical solution. By being the first association in the nation to offer such a resource, MRWA once again showcased its commitment to innovation and excellence in member services.

The dedication, expertise, and genuine care demonstrated by this state association's staff in providing exceptional member services have made a significant impact on the water and wastewater systems of Missouri. The ability of MRWA staff to listen to the needs of its members, actively seek solutions, and deliver tangible results is truly commendable.

Their unwavering commitment to member services and their exceptional accomplishments in the development of an affordable billing software and innovative inventory solutions make them highly deserving of the **National Rural Water Association's Outstanding Member Services Award**.

We are very proud of this award, and I wanted to share it with all of our members!





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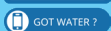
If you do, you're fortunate. We all forget that sometimes. Water must be managed so it's there when we need it — whether for drinking, bathing, or activities vital to our local economies like agriculture and manufacturing.

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Advertisers Index

We Appreciate Your Support

ACE PIPE CLEANING INC.....	20
ADVANCED MICROBIAL SOLUTIONS	31
AGRANCO CORP USA	43
ALLIANCE PUMP AND MECHANICAL	27
ALLIANCE WATER RESOURCES INC	65
ALLSTATE CONSULTANTS LLC	67
ARMOR EQUIPMENT	17
BARTLETT & WEST INC.....	6
BROTCKE WELL & PUMP INC	33
C AND C PUMPS & SUPPLY	64
CADY AQUASTORE	54
CLEARWATER SOLUTIONS.....	60
COCHRAN	51
COE EQUIPMENT.....	63
CORE & MAIN	7
COURTMONEY/UTILIPAY	46
CUNNINGHAM, INC.....	58
CUSI	64
D A DAVIDSON & CO.....	IFC
D A DAVIDSON & CO.....	IBC
DHSS - OFFICE OF DENTAL HEALTH.....	15
DOUGLAS PUMP SERVICE.....	7
DUKE'S.....	49
ECC ELECTRIC CONTROLS COMPANY	51
EJ USA.....	7
EJ EQUIPMENT	13
EMPIRE ELECTRIC SERVICE & TECHNOLOGIES	16
ENVIRONMENTAL WORKS.....	45
EQUIPMENT SHARE.....	61
ESI	66
EVAPAR	58
FLO-SYSTEMS INC.....	7
FLUID EQUIPMENT – A Cogent Company	36
FLYNN DRILLING CO INC.....	38
FORD METER BOX CO	6
GPM ENVIRONMENTAL SOLUTIONS	69
HAWKINS INC.....	26
HOGANS	60
HYDRO-KINETICS CORP	45
ILLINOIS ELECTRIC WORKS	58
JAYHAWK SOFT WARE.....	58
JIM JOLLY SALES	30
KD JOHNSON INC	55
KEY EQUIPMENT & SUPPLY	30
KLM ENGINEERING	49
KUBOTA TRACTOR CORP.....	19
KUPFERLE FOUNDRY CO	60
LAMP RYNEARSON.....	55
LAYNE.....	64
MAGUIRE	30
MASTER METER INC.....	5
MECO ENGINEERING CO INC.....	18
MELLEN & ASSOCIATES	25
MESSPLAY MACHINERY	33
METRON-FARNIER	27
MICRO-COMM	62
MIDWEST COATING	25
MIDWEST INFRASTRUCTURE COATINGS	48
MIDWEST INJECTION.....	35
MIDWEST METER INC	57
MIDWEST METER INC	51
MIDWEST METER INC.....	60
MIDWEST METER INC.....	60
MISSOURI LAGERS	12
MRWA e-News.....	Back Cover
MRWA S.U.B.S.....	46
MSDI	11
MUNICIPAL EQUIPMENT CO.....	64
NRWA Fleet Program	54
NRWA PFAS ad (Napoli contact)	40
NUTRI-JECT SYSTEMS INC.....	40
OWN (formerly Anderson Engineering)	9
OZARK APPLICATORS LLC.....	68
R E PEDROTTI CO INC.....	37
RED EQUIPMENT.....	42
RURAL WATER IMPACT	21
Rural Water Loan Fund	23
SCHAEFFER SPECIALIZED LUBRICANTS.....	21
SCHULTE SUPPLY INC.....	56
SEILER INSTRUMENT	7
SIDENER ENVIRONMENTAL SERVICES	51
SMICO	59
SPRINGFIELD WINWATER WORKS CO	50
STIFEL.....	58
T G RANKIN	64
TANKSPEKCORP	70
TOMCAT CONSULTANTS LLC – TAPCO.....	62
USG	17
VANDEVANTER – A Cogent Company.....	47
VEENSTRA & KIMM.....	30
VELOCITY – A Cogent Company	41
VIKING INDUSTRIAL PAINTING	30
ZENNER	35

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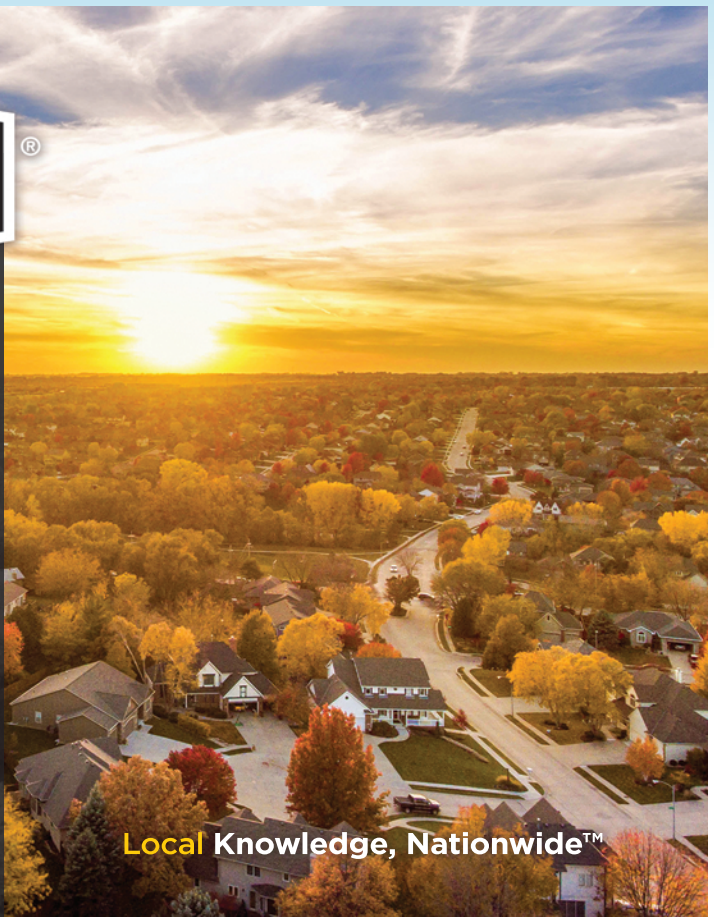
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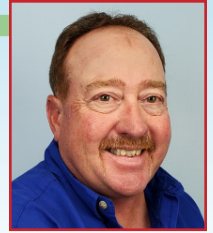


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Abandoned Wells

Klark Bohling, Sourcewater Protection Specialist



Water is one of our state's most precious resources. It is crucial to all aspects of our economy and society. Ground water supplied from our many aquifers provides a large amount of the water used in the state. Protecting the quality of this vital resource is the responsibility of all Missourians.

For many years groundwater has been pumped through water wells. Over the years, many wells around homes, farms, industrial sites, and rural areas have been abandon without being properly plugged. Not only can these abandoned wells become potential avenues for ground water-contamination, but they can also be a safety hazard for children and animals. Plugging an abandoned well takes time and money, but these wells are a threat that should not be ignored. An abandon well is a direct conduit from the surface to the aquifer below. Contaminants that enter the well are introduced directly into the aquifer with no opportunity for natural filtration by soils or geological materials.



If a contamination incident involves a concentrated chemical, the potential for reaching health-threatening levels in the underlying aquifer is high. Just a small amount of chemicals (pesticides, solvents, and petroleum products) can contaminate millions of gallons of groundwater.



Abandoned wells may allow contaminated water or poor-quality water to move between aquifers. Abandoned artesian wells (groundwater in an aquifer that is under pressure by an overlaying of soil such as clay, which can result in natural groundwater flow at the surface) may also unnecessarily waste water because of their constant flow. These wells pose a needless contamination risk to clean aquifers by bringing water from the aquifer to the surface.

A well is considered abandoned when it can no longer produce water, transport water to its point of use, or causes a contamination risk to groundwater and has not been used for two or more years. Over time, thousands of water wells were abandoned without being properly plugged. By Missouri law, abandoned wells are required to be properly plugged. This responsibility usually falls on the landowner. Landowners may plug abandoned wells on their property themselves, or if special circumstances exist, the Missouri Department of Natural Resources (MoDNR) may require the well to be plugged by a permitted contractor. If a landowner hires a person to plug a well, the hired person must have a well or pump installation permit issued by MoDNR. An exception to the permit rule applies to hand dug wells and bored wells no greater than 80 feet in depth.

Domestic (Private) Bedrock Wells

Bedrock water supply wells (domestic/private) typically have a steel or PVC casing 6" in diameter. The amount of casing and total depth of these wells varies widely with geological conditions across the state. To plug a bedrock well, here's a general summary of steps:

1. Remove the pump and any debris.

2. Dig around the casing digging 2' below grade and cut the casing off.
3. Clean fill materials may be used from bottom of the well to a point 50' below the bottom of the casing.
4. Grout is then used from the top of the clean fill upward to within 2' of the surface extending into the excavated area.
5. At least 1' should be filled with clay or clay rich soil.
6. If the casing is unknown, the well must be plugged in its full length with approved grout.



Hand Dug Wells -

Wells that were dug by hand are usually 3' – 6' in diameter and 10' – 30' in depth. Wells less than 10' in depth are exempt from the plugging rules. To plug a hand dug well:

1. Fill the well within 2' of surface with clean fill.
2. The remainder of the well should be filled with clay-rich soil.
3. Carefully push in the upper 2' of lining.



If you discover an abandoned well, please contact the MoDNR for assistance at 573-368-2165 or email welldrillers@dnr.mo.gov.



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Computer-Based Exams Available for Operator Certification

Darlene Helmig, MoDNR Operator Certification Unit Chief



The Missouri Department of Natural Resources is pleased to announce that computer-based operator certification exams are available for drinking water distribution and treatment, wastewater treatment and concentrated animal feeding operations (CAFO). The department began offering computer-based operator certification exams June 7, 2023, following a contract with Water Professionals International that became effective Jan. 1, 2023.



The transition to computer-based exams replaces a decades-old process for paper certification exams, which the department administered by hosting group exam sessions monthly in Jefferson City and quarterly at each of the department's regional offices. The department scored the "bubble sheets" from each exam session using a scanner and examinees had to wait for the department to mail the exam results, which often took a few weeks to receive.

Early into the new contract, the department placed a high priority on ensuring there was no break in exam availability during the transition to computer-based exams. Uninterrupted exam availability is essential for professional development for operators working to advance their careers, requirements for possible salary increases, workforce development as new people join the industry, and overall system compliance. Further, properly certified operators are critical to the protection

of public health and the environment.

So, to avoid a break in service, the department decided to provide both paper and computer-based exams during an overlapping period.

After a smooth transition period, the department hosted the last paper exam session Aug. 1, 2023, in Jefferson City. Examinees have embraced the new platform and the benefits that it offers. As a result, only four examinees attended the final paper exam session. As the projected availability of the new exam system slipped from April 1 into June, most applicants decided to wait for the computer-based exams to become available, even though the department continued to offer paper exam sessions.

In the first two months, the department processed 455 exam applications and 223 applicants completed their exams. The department is excited about the benefits that computer-based exams offer to Missouri's water, wastewater and CAFO professionals. Those benefits include:

Faster Exam Scheduling:

Once the department processes an exam application, the examinee receives an email from **PSI Exams** with instructions to self-schedule their exam. PSI, a third-party contractor, provides exam delivery software and maintains the testing centers. Many different professions use PSI to administer exams. Availability can vary, but in many cases if an examinee receives an email from PSI Exams on a Monday, they could schedule their exam for Wednesday of the same week. Because the email is not from the department, examinees should regularly check for the email after submitting an application. If they don't find the email in their inbox, we recommend looking in the spam, junk and trash folders. Examinees can always contact our office for a more exact date to help find the email.

(continued on page 12)

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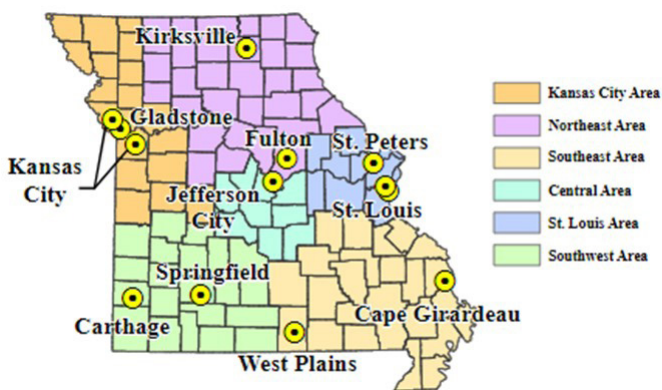
(continued from page 10)

Choice of an In-Person or Remotely Proctored Exam:

Examinees can choose between taking an exam at one of the testing centers using the provided computer equipment or a remotely proctored exam.

Convenient In-Person Testing Locations: A list of the 13 test center locations in Missouri is available on the department's website by visiting:

<https://dnr.mo.gov/water/business-industry-other-entities/permits-certification-engineering-fees/operator-certification/exams>



Locations outside of Missouri are also available for examinees who live close to state lines. These locations provide exams to a variety of professions. Examinees use small computer kiosks similar to those found at libraries. Some test locations are open on Saturdays.

Remote Testing Available:

A trained proctor monitors examinees live during the exam. For this option, examinees must have a computer with functioning web camera, microphone, stable broadband internet connection and a quiet room free of distractions, notes, and other people. More information about remote testing, including equipment requirements, is available on the department's website.

Immediate Exam Results:

Examinees receive their exam score immediately upon completing the computer-based exam. This replaces the four weeks it often took to receive exam results when the department was administering paper exams.

Unchanged Exam Content:

The exam content did not change during the transition period. This allowed the department to provide the same content in both paper and computer-based exams during the transition. Math formulas are still available as a reference resource during computer-based exams. **All exams continue to be closed-book exams.**

Unchanged Fees:

Fees have not changed. Wastewater and CAFO exams remain \$45, while drinking water treatment and distribution exams are still \$50 each.

Special thanks to the applicants who were early adopters of computer-based exams. We invite examinees to share feedback about their experience. If you have questions or want to share feedback, please contact the department's Operator Certification Unit at 573-751-1600 or by email at opcert@dnr.mo.gov.

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Murphy's Law

Nathan Lines, Drinking Water Circuit Rider



Growing up I always heard reference to Murphy's Law; "ANYTHING THAT CAN GO WRONG, WILL GO WRONG." As I have gone through life, I have found this to be the case more often than not. No matter how much planning, organizing, or thought goes into what it is you may be doing, chances are that something will go wrong.

Most recently I was tasked with organizing and planning MRWA's Networking Wednesday golf tournament. First off, I am not a golfer. I do have a son that plays golf and I have a basic understanding of the game. I learned a lot along the way and spent months organizing, preparing, and trying to think of everything that could possibly go wrong so there would be no *hiccups* on the day of the event. We had numerous planning meetings, walk-through visits with the golf course and hotel staff, and received input from vendors as well as past staff that had planned past events. The days leading up to the event looked as though all was on track for a perfect tournament with nothing left to be done or planned. The day before the tournament Murphy's Law reared its ugly head and everything felt like it was falling apart. Last-minute changes needed to be made and co-workers as well as some participants had to be flexible and understanding. The morning of the tournament, things were not getting any better. The golf staff weren't who I had normally dealt with and there was a communication breakdown between them and myself. The stress was no doubt high, and my patience was wearing thin as was the patience of several participants. After a lot of flexibility and the ability to negotiate to find common ground, we were finally ready to get started. Eventually everyone participating found their carts, got their briefing and

the tournament was in full swing. The rest of the day seemed to go off smoothly and everyone playing seemed to have a great time and loved the event.



Now I know not many of you will be planning any golf tournaments in the near future, or maybe ever, so you're probably wondering why I am sharing this. Well, the moral of that story goes right back to Murphys Law; Anything that can go wrong, will go wrong.



As operators, clerks, office managers, board members, or whatever position you hold within your system, at some point you are part of a project that involves a lot of planning, design, and decision-making. You will probably work alongside engineers that spend months or even a year or more designing a project. You will work alongside contractors that are going to build or install what the engineers spent all that time designing to make sure it was perfect. Those contractors are going to order supplies from a vendor. There are so many moving pieces and parts that you can almost guarantee Murphy's Law will show up somewhere

(continued on page 21)

2 Ways to earn CEUs for Water Fluoridation

1. Missouri Water Resources Research Center

This course consists of three modules for water operators, administrators and the public, and three additional modules for water facility operators. It is FREE and approved for one CEU hour towards drinking water licenses by the Missouri Department of Natural Resources. Participants can access the modules at Health.Mo.Gov/waterfluoridation.

Topics covered are:

- + Fluoridation introduction.
- + Fluoridation costs and benefits.
- + Drinking water treatment overview.
- + Fluoridation technology and equipment.
- + Fluoride analysis/laboratory techniques and safety.
- + Fluoridation system design.



2. Centers for Disease Control and Prevention Water Fluoridation

This course is designed to build the capability of state fluoridation programs, and to help increase knowledge and refine skills to implement and maintain community water fluoridation. It is FREE and approved for eight CEU hours towards drinking water licenses by the Missouri Department of Natural Resources. Participants can access the modules at cdc.gov/fluoridation/engineering/training.htm.

- + Module 1: Science - history and science of fluoridation, benefits and health effects.
- + Module 2: Program – state program management and oversight, and communication principles.
- + Module 3: Water system overview and design.
- + Module 4: Technical information for water fluoridation additives and operations.

Upon completion of the course, please email your name, operator number and course completion certificate to oralhealth@health.mo.gov for CE credits to be awarded.



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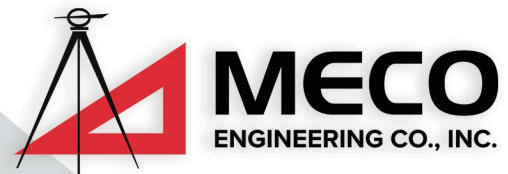
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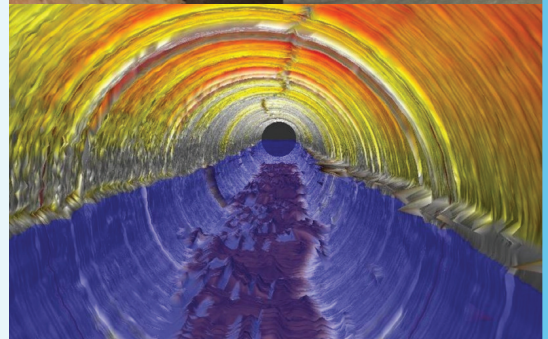
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(continued from page 14)

along the way. Maybe something was missed in the engineering phase, or the contractor hits a utility that no one knew was even there, or maybe it's as simple as a vendor's lead time on a specific spec'd out part causing the project to be delayed. There will always be some sort of mishap along the way.

The same rings true in our everyday job. Things break, wear out or an act of God just decides for us that today is the day something is no longer going to work the way it's supposed to. At some point, every one of us will experience Murphy's Law and we all need to be ready when we do have that experience. Here are a handful of tips that I have learned along the way:

- Be flexible, learn to bend without breaking.
- Always have a backup plan!
- Keep your composure and work out a solution.
- Take a step back and think before you react.
- Call in resources if you need help.
- BONUS TIP...and probably the most important: **NEVER DIG ON A FRIDAY**

I wish everyone the best in all your projects and plans or even your daily routine, and as always feel free to reach out to any of the MRWA staff to assist you with all of your water or wastewater troubles.

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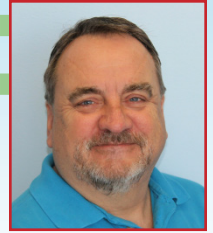


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Lead Service Line Inventory: Are you prepared? Have you started?

Jim Patton, EPA Training Specialist



With the October 16, 2024, deadline quickly approaching, I thought it would be relevant to begin with sharing a quick progression of the **History of Lead Reduction Acts in the State of Missouri:**

- June 19, 1986: Safe Drinking Water Act (SDWA) National Lead Ban
- 1988 Lead Contamination Control Act (LCCA) enacted by Congress to protect schools/childcare (remove lead-lined water-cooler tanks)
- January 1, 1989: Missouri Lead Ban effective date: It was “illegal” to install a LSL in Missouri after this date 100% Lead water pipes reduced to < 8% Lead 50% Lead solder reduced to 0.2% Lead for plumbing
- 1991 original Lead & Copper Rule (LCR) becomes effective as a “National Primary Drinking Water Regulation”

- August 6, 1998 Leaded plumbing fixtures “banned” from sale in USA
- 2011 Reduction of Lead in Drinking Water Act (RLDWA) Effective: January 4, 2014 in Missouri - Amends 1986 SDWA to define “Lead free” water pipes & fittings.
- January 15, 2021 – “Lead & Copper Rule Revisions” (LCRR) published in Federal Register “86 FR 4198” “New Primary Drinking Water Regulation”
- January 20, 2021 – Executive Order 13990 delays “effective date” (Presidential directive)
- March 12, 2021 – EPA ruled to delay effective date until June 17, 2021 to allow time for public comment April-August 2021 – EPA engagement for public input and received >80,000 comments
- June 16, 2021 – EPA said new “effective date” of LCRR is December 16, 2021 and new “compliance date” is October 16, 2024
- December 16, 2021 – LCRR did become “effective” on this date
- December 17, 2021 – EPA announced intention to propose “Lead & Copper Rule Improvements” (LCRI) to replace LCRR before October 16, 2024 compliance date
- August 4, 2022 – EPA Federal Guidance on maintaining & developing LSLI (>160 pages)
- September 12, 2022 – LSL Inventory Excel Spreadsheet published: MO DNR webpage
- **October 16, 2024—Deadline to submit initial LSLI spreadsheet to MoDNR.**

(continued on page 24)

RURAL WATER Loan Fund



About The Program

The NRWA Rural Water Loan Fund (RWLF) is a funding program specifically designed to meet the unique needs of small water and wastewater utilities.

The RWLF provides low-cost loans for short-term repair costs, small capital projects, or pre-development costs associated with larger projects. The RWLF was established through a grant from the USDA/RUS, and repaid funds used to replenish the fund and make new loans.

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Reasons to Apply

- Reasonable interest rates
- No administrative or processing fees
- Straightforward application process and quick turnaround
- Systems must be public entities serving up to 10,000 persons, or in rural areas with no population limits
- Loan amounts may not exceed \$200,000 or 75% of the total project cost, whichever is less
- Emergency loans are 90-day no interest, with immediate turn around on applications

Eligible Projects

- Pre-development (planning) costs for infrastructure projects
- Replacement equipment, system upgrades, maintenance and small capital projects
- Energy efficiency projects to lower costs and improve sustainability
- Disaster recovery or other emergency loans available

Applications, information and forms can be downloaded from the NRWA website at nrwa.org or by scanning the QR Code above. For help, please call 1.800.332.8715 or email nrwarwlf@nrwa.org.



National Rural Water Association is an equal opportunity provider and employer. This material is based upon work supported by the Rural Utilities Service, United States Department of Agriculture.

(continued from page 22)

In traveling the state with onsite visits and phone conversations, I have encountered some systems stating that they will not be performing a Lead Service Line Inventory of their systems. For that reason, I'd like to share the following:

From the National Archives Code of Federal Regulations –

“Lead & Copper Rule Revisions” (LCRR) effective December 16, 2021 “All water systems must prepare an inventory of service lines connected to its distribution system, whether or not they are owned or controlled by the water system, to identify those service lines made of lead or of unknown material. . . Community water systems and non-transient, non-community water systems must comply with the requirements of this subpart no later than October 16, 2024 . . .”

From Cornell's Legal Information Institute –

“Systems must include all service lines (40 CFR 141.84(a)(2)), regardless of the actual or intended use. These include, for example, service lines with non-potable applications such as fire suppression or those designated for emergency. These service lines could be repurposed in the future for a potable or non-emergency use. Water systems must include in their inventory service lines connected to vacant or abandoned buildings, even if they are unoccupied and the water service is turned off.”

From a presentation given July 25, 2023 by MRWA Management Circuit Rider Liz Grove –

All CWS & NTNCWS must create a service line inventory regardless of whether or not they have confirmed Lead Service Lines (LSL) or GRR. Inventory is a “living record” to develop, maintain, & submit to MoDNR. PWS must use MoDNR spreadsheet for official submission to the State. Do NOT use EPA's federal template (that is example—not for reporting) October 16, 2024 is deadline to submit “initial” inventory to MoDNR. This date will not change—even if LCRI is proposed in 2023. First submission does not need to be 100% completed as far as identifications (include as many identified service lines as possible). Remaining service lines must be labeled “Unknown: Possibly Lead” until they are identified using records and/or approved methods. If done early, submit LSLI by email or upload to DNR's secure FTP site. Includes all service lines in the distribution system regardless of actual or intended use. Even if this service is not currently connected to a house—it could be in the future.

From the EPA's Developing and Maintaining a Service Line Inventory: Small Entity Compliance Guide

Must list total number of service lines in the water system and as many identified materials as possible (goal is to eliminate unknowns). System must show progress each time they submit updated inventory. Beneficial to identify as many unknowns as possible before submission. Remaining unidentified service lines are “Unknown: Possibly Lead” “Unknowns” are “guilty” (Lead) until “proven innocent” (Non-lead). LCRR requires systems to notify customers annually until the given “unknown” is verified to be “non-lead.” GRR treated same as LSL. Provide updated LSLI spreadsheet to MoDNR on a 1 or 3 year basis (After initial, it follows your Lead & Copper monitoring schedule.)

If you have not already downloaded the MoDNR LSLI spreadsheet, you may download from the MRWA website at <https://moruralwater.org/lead-and-copper-rule-resources/>

To better assist you with how your system is classified:

A small/medium sized system is up to 50,000 connections. A large sized system is 50,000 to 500,000 connections.

Whoever takes-over a water system inherits the responsibility of maintaining & developing the service line inventory as a “living document.” Communication with customers is key in identifying service lines on the customer’s side of the meter. Systems should assure customers they will not “get in trouble” if a Lead Service Line is discovered. There is no penalty or fine if a customer refuses to replace privately-owned LSL or GRR. Most service lines will probably be “non-lead.” The PWS has right of easement to perform meter inspections, but PWS needs permission before entering private property. Customers have the right to refuse access to private property for inventory or replacements. If so, the system should document this as a “refusal” and move on. A customer may still be willing to share a picture of service line with the system. Otherwise, service line must remain classified as “Unknown: Possibly Lead.”

In order to use low interest loans or grants through BIL/DWSRF, the customer must agree to “full replacement” of a confirmed LSL or GRR. Partial replacements are not eligible to use federal funding allocations. Systems may offer a monetary incentive, such as water bill credit, for customers who provide documents of the service line entering their house and mail, text, or email it to the system. System verifies & keeps records as “proof.”

If customer/staff saw service lines installed—they can sign affidavit. This counts as visual inspection and there is no need to dig it up again. Use paper or digital records (if available) to eliminate as many unknowns as possible. Each record set (regardless of year) must have > 10% validation (ideally, visual inspection with at least 95% accuracy)—to prove the record set is reasonably reliable. Look at tap cards, plumbing permits/codes, maintenance records, meter installation records, “As Built” plans, & property tax records. Electrical Resistivity: this method is not yet approved by EPA for drinking water. It is used for wastewater, but not ID Method for LSLI yet. Stay tuned. If you need any more information or assistance with inventory spreadsheets, you are welcome to contact me:

Jim Patton, EPA specialist

573-337-0053 or email at jpatton@moruralwater.org

And please write this on your calendar:

October 16, 2024, is the deadline to submit your system’s initial LSLI spreadsheet to MoDNR.

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MBBR Technologies: Revolutionizing the Way We Clean Wastewater

Loyd Rawlings, Water Quality Action Specialist



Wastewater treatment is a critical process that plays a vital role in maintaining public health and protecting the environment. Over the years, various innovative technologies have emerged to improve the efficiency and sustainability of wastewater treatment plants. One such technology, Moving Bed Biofilm Reactor (MBBR), has gained widespread recognition for its ability to address the challenges of modern wastewater treatment. In this article, we will explore the concept of MBBR technologies, their applications, advantages, and their role in the future of wastewater treatment.

So, just how does it work? The MBBR process begins with the introduction of wastewater into a reactor or tank filled with plastic carriers. Microorganisms, including bacteria, naturally colonize the surface of these carriers. As the carriers move freely within the tank, they continuously come into contact with the organic matter present in the wastewater. This interaction allows the microorganisms to biologically break down the pollutants and convert them into harmless byproducts, such as carbon dioxide and water.



MBBR Technology is versatile and can be applied to various wastewater treatment scenarios, including **Municipal Wastewater Treatment, Industrial Wastewater Treatment, and Nutrient Removal**. These MBBR systems are uniquely designed for the removal of organic matter and nutrients from sewage on the municipal treatment side to removing petrochemical and pharmaceuticals from the industrial side. With this, MBBR technology can help remove other effective nutrients like nitrogen and ammonia, which are often responsible for water body eutrophication.

MBBR Technology has some advantages:

- **High Treatment Efficiency** - MBBR systems are known for their high treatment efficiency and the ability to achieve high-quality effluent, meeting stringent environmental standards.
- **Compact Footprint** - MBBR systems require less space compared to traditional activated sludge systems, making them ideal for retrofitting existing wastewater treatment plants with limited space.
- **Enhanced Stability** - The moving bed design ensures that the biofilm remains highly active and stable, even during flow fluctuations or shock loads.
- **Low Maintenance** - MBBR systems have a relatively low maintenance requirement, making them cost-effective in the long run.
- **Energy Efficiency** - MBBR technology generally consumes less energy than some other wastewater treatment methods, which aligns with sustainability goals.



Temperature is an important factor in the performance of MBBR technology in wastewater treatment. The temperature at which an MBBR system operates can have significant effects on its efficiency and the microbiological processes within. Here are some of the key temperature-related issues and considerations with MBBR technology:

- **Temperature Sensitivity** - the activity and growth of microorganisms in MBBR systems are temperature-sensitive. Warmer temperatures generally lead to increased microbial activity and faster biological reactions. Conversely, colder temperatures can slow down biological processes.
- **Seasonal Variations** - in regions with significant seasonal temperature fluctuations, MBBR systems may experience varying performance. During colder seasons, the efficiency of the system might decrease, leading to reduced treatment capacity and longer retention times.
- **Temperature Control** - maintaining the desired temperature within the MBBR system is crucial. This can be achieved through insulation, heat exchangers, or other temperature control mechanisms. For colder climates, heating might be necessary to ensure proper system performance. This too can affect not only your process efficiency but may in turn be an increased operational energy cost. The optimal temperature ranges for the microorganisms in this process seem to range from 15°C to 35°C (59°F to 95°F), but can vary based on the type of microorganisms and the wastewater composition. The temperature range also influences the diversity of microorganisms within the MBBR. Different microorganisms thrive at different temperatures, and variations outside the optimal range can lead to shifts in the microbial community, potentially affecting treatment performance.

MBBR technology has made significant advancements over the years, with ongoing research and development leading to improved designs and better performance. As wastewater treatment regulations become more stringent, MBBR systems are likely to play a pivotal role in the future of wastewater treatment. They offer an eco-friendly and efficient solution to address the ever-increasing challenges of urbanization and industrialization.

MBBR technologies have revolutionized the wastewater treatment industry by offering an effective, efficient, and sustainable solution. Their versatility and adaptability make them suitable for a wide range of applications, from municipal wastewater treatment to industrial settings. As environmental concerns continue to grow, MBBR technology is set to play a central role in ensuring clean water and a healthier planet for future generations.





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Master Time Management: The Crucial Skills for Office Management as the Clerk

Melody Molder, *Drinking Water Circuit Rider*



Time management is the bedrock of efficient and effective office operations. Within the role of the clerk, who juggles the multifaceted responsibilities of a Customer Service Representative and Office Manager, the orchestration of diverse tasks and duties demands a strategic approach to time allocation. Balancing ordinances, financial matters, elections, public interactions, and administrative tasks, this role necessitates not only a diverse skill set but also adept time management capabilities.

Essential Time Management Skills

Mastering time management is a culmination of various essential skills that pave the way for smooth and effective workflow. The following eight skills are pivotal in navigating the demands of an office environment:



1. *Goal Setting:* Establishing short-term, actionable goals that align with the long-term vision to drive progress and motivation.
2. *Stress Management:* Mitigating stress not only enhances productivity but also ensures a clearer focus and better decision-making.
3. *Planning:* Structuring the use of time and resources effectively, ensuring that each task is approached systematically.
4. *Prioritization:* Identifying and focusing on the most crucial tasks to maximize efficiency and efficacy.
5. *Avoiding Distractions:* Maintaining focus by minimizing disruptions to reduce errors and optimize output.

6. *Avoiding Procrastination:* Meeting deadlines by combating the tendency to postpone tasks, ensuring steady progress.
7. *Delegating Tasks:* Entrusting and collaborating with others to complete tasks, fostering a cohesive work environment.
8. *Multi-tasking:* Adapting to handle simultaneous tasks when necessary, a skill that demands focus and flexibility.

The Significance of Time Management in Office Operations

In an environment where a single individual shoulders the weight of numerous office-related duties, effective time management becomes the linchpin of success. Prioritization and adherence to deadlines play a pivotal role in the smooth operation of the office. From managing reports and meetings to handling day-to-day administrative tasks, the clerk's role is multi-faceted and demands acute time management.

Understanding the necessity of time management in delegating duties and executing them efficiently is crucial for the seamless operation of the office. The ability to navigate through tasks, prioritize effectively, and manage time proficiently not only ensures tasks are completed on time but also elevates the quality of the work conducted.

Mastering time management within the role of a clerk, as both a Customer Service Representative and Office Manager, ensures the office functions as a well-oiled machine. It's not merely about completing tasks but about doing so effectively, efficiently, and with precision, ensuring the smooth operation and success of the office's daily functions.

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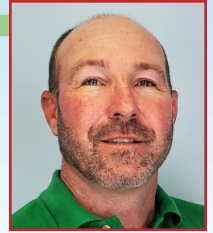


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Ask the Dumb Question

Barry Barnes, Wastewater Technician



Have you ever been to a class or a board meeting and wanted to ask a question but didn't? I have. The old saying, "There are no dumb questions" never made any sense to me as it always seemed that I could ask plenty of them. This was always hard for me, as I am sure it is for a lot of you. With all the acronyms and lawyer language that we hear in the water and wastewater industry, a lot of us lose out. Maybe we are just quiet, or maybe the instructor is intimidating or maybe, not my case, we know the subject better than who is teaching. Or, maybe we are afraid we will ask the dreaded "Dumb question."

Being quiet isn't always a bad thing. When you are trying to learn or get information, it is a good idea to come out of your shell if you want to get the most out of your class or board meeting. Just take a chance of maybe being embarrassed, if the reward is knowledge.

When a municipality, district board, or your boss is planning to send you to a class, it would be cost effective and worth the money, if you ask all the "dumb questions" you can for their benefit. I am not saying turn a one-day class into a two-day class, but if you don't quite understand, ask. A lot of instructors have a presentation in their mind when they prepare a seminar, and sometimes we need them to slow down and give a little more detail for it to sink in, and that's okay.

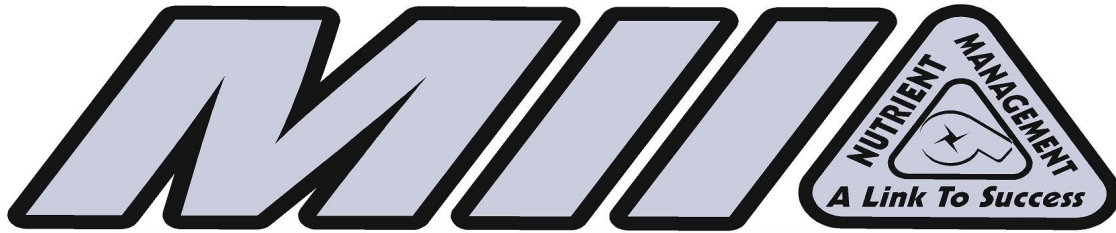
Sometimes instructors want you to know how smart they are. If they are floating up above the class in their knowledge, stop them with a question. Most of the time that will rein them in and they will start to come back out of the stars. Acronyms and abbreviations can be confusing if you don't work out of a book. My best advice would be to find out what they mean and learn them, but don't get frustrated if you don't know one. They stand for something. Just find out, or better yet, ask what that something is.



There is always the possibility that you know more than the instructor. I have never been in that situation myself. In this situation you don't need to ask any questions but maybe there was something that you struggled with early on and remember the question that you asked that helped you understand the subject better. Just remember, there is someone that had the same question but maybe they are scared to ask. This is the perfect opportunity to help them out.

Last but not least, let's talk about board meetings. If you keep the board informed, in detail, about your job, hopefully you will have their attention. When they learn more about your job and all that it consists of, that is when you need to speak up and ask the question that helps with the grocery bill or other concerns you may have.

Be safe out there!



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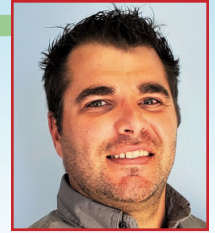
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What is GIS Mapping, and How Can it Help Me?

Brandon Deckor, GIS Mapping Specialist



“What is GIS Mapping?” “How can it improve my system?” As MRWA’s GIS Mapping Specialist, those are the top two questions I get daily either in person, on the phone, or by email. My number one matter of fact answer is, “It is the future of your system!”



Geographic Information System (GIS) is the future of visual maps in your water or sewer system. If you’ve noticed, the future of paper maps is slowly dwindling. They are becoming more difficult to get printed and, for the most part, are generically black and white with no true definition. Paper maps are what we have used for years, just riding around on the dash of our work trucks, or tucked behind the seat. We would write and draw on them until everything was one big blur in hopes that the operators of the future could use them with problems and improvements. Now let us take a journey into my world, the digital world, and bring your water and sewer systems to life.

GIS Mapping is one big digital database that can be shared with each member of your utility to have a real-life view and up-to-date information that helps identify different parts of your system. To name just a few things GIS mapping can help with; you can store photos and notes for your yearly I & I records, keep inventory of leaks and parts replacement, and complete your Lead Service Line Inventory on your meters. When you GIS map an object in your system, you are creating a physical point of location for that object on a digital map. That point will have latitude and longitude coordinates if available and can also have the true elevation of the object.



The availability and accessibility of these maps is what makes them truly incredible. You can access a GIS map from a computer, tablet, or cell phone. With that being said, we all carry cell phones around with us 24/7, so we can access these maps in real time in the field. Most updated GIS software will use the GPS function and walk us straight to the valve, meter, manhole, or whatever object we are looking for. That ability is extremely useful in inclement weather, or if your town has a natural disaster, or if you are brand new to the system with no knowledge of it and are confused about where to start.

Some other ways besides those already mentioned for which I’ve seen systems use their mapping:

- Flush report inventory inside their digital database for DNR Inspections
- Tracking smoke testing sites for problem areas needing repair
- Utilizing the measuring and elevation tools for project planning without having to go to the field
- Sharing maps with residents/customers to give them a visual view of potential projects, road closures, and other situations that may affect their everyday lives and commutes

GIS is taking over the digital world. Not only in the water and sewer industry but with everything in the world. Don’t get left behind, stay up to date and let MRWA help. For more information or to schedule your system to be mapped, you may contact me by email at bdecker@moruralwater.org, or by phone at (573) 789-7661.



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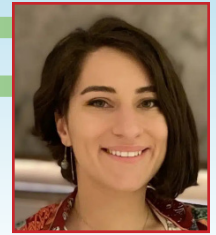
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Protecting Water Quality: The Problem with Pharmaceuticals

Hanz Atia, MPH, Product Stewardship Institute



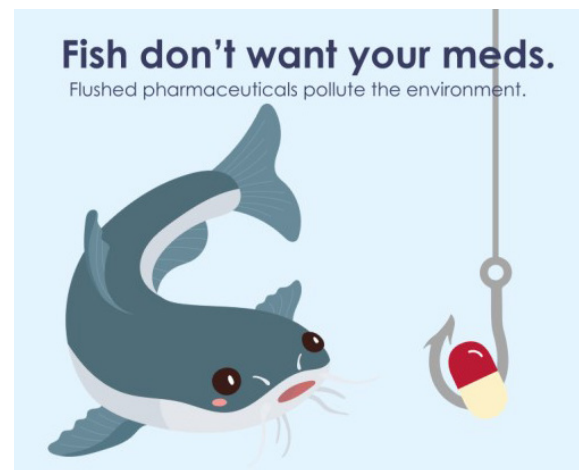
Missouri, known for its scenic beauty and abundant water resources, faces an ongoing challenge when it comes to water pollution – the improper disposal of pharmaceuticals. The Environmental Protection Agency (EPA) reports medications flushed down the toilet generate as much as 2,300 tons of hazardous waste annually. This waste can contaminate drinking water sources, disrupt aquatic ecosystems, and damage septic systems in homes. Pharmaceutical Take-back Programs are a promising solution to this issue. Pharmaceutical take-back provide safe disposal options for the public that can help reduce the amount of medications introduced to waterways, protecting the environment as well as septic systems.

Water Pollution in Missouri

Missouri is home to diverse ecosystems, therefore it is essential to safeguard the state's water bodies from contamination. Water pollution in the state arises from various sources, including industrial discharges, agricultural runoff, and improperly disposed medications. Medications that are flushed or disposed in trash pose a particularly subtle but significant threat. When people discard unused or expired medications down the drain or toilet, active pharmaceutical ingredients (APIs) enter the wastewater system, leading to the contamination of rivers, lakes, and groundwater.

APIs in the water supply have detrimental effects on aquatic life, impacting fish, frogs, and other organisms. For example, damselflies are vital to freshwater ecosystems as pollinators, pest control for mosquitos, and an important food source for fish and amphibians. When exposed to antihistamines (e.g., Zyrtec, Claritin, Allegra) even at low concentrations, damselfly larvae become less active and more susceptible to death from predators. Studies of fish have found that exposure to common medicines like Prozac, aspirin, ibuprofen, and antihistamines can alter important activities like feeding habits, predator response, and caring for young. These behavioral changes lower population levels, posing ecological risks throughout the food chain.

Pharmaceuticals can also make their way into drinking water supplies, posing potential health risks to humans. A growing body of evidence suggests that low-dose mixtures of pharmaceuticals in water have negative effects on our endocrine and immune systems. Therefore, the issue of proper medication disposal is crucial for the well-being of both the environment and our communities.



Septic Systems and Pharmaceutical Disposal

Many Missourians rely on septic systems for wastewater management, particularly in rural areas. When pharmaceuticals are flushed down the toilet or sink, they can adversely affect septic systems. These systems rely on beneficial bacteria to break down organic waste. The introduction of APIs can disrupt the balance of these bacterial colonies, leading to septic system failures.

(continued on page 44)

Nearly \$1.2B Settlement Win for Water Systems Against Manufacturers of PFAS

The National Rural Water Association (NRWA) is thrilled to announce a \$1.185B settlement has been reached in litigation against the manufacturers of perfluorooctanoic acid and perfluoro octane sulfonate (PFAS), including DuPont, Chemours, and Corteva. Napoli Shkolnik Law Firm, NRWA's official partner, was a key player in the settlement that was announced on June 2, which will help water systems affected by PFAS. It's still not too late to sign up.



Contact:
Sam Wade
Former NRWA CEO
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NRWA has created the [PFAS Cost Recovery Program](#) to help systems with PFAS treatment costs. If your system has already signed up for the program, Napoli will be in contact with you with next steps, which may involve more testing. If your system has not registered for the program, we encourage you to [contact Napoli Shkolnik PLLC](#) to represent your system as a trusted attorney who will fight for compensation to overcome the financial impacts of PFAS. NRWA has retained the firm to represent the Association and our members.



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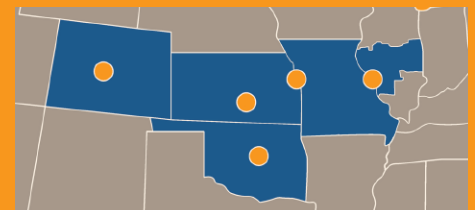
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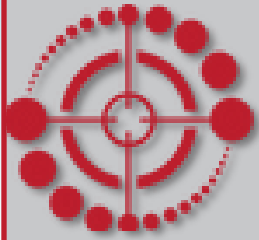
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Improving Wastewater Remediation with Oxynova

Parker Rothweiler, Business Development, Agranco Corp USA



In the world of wastewater management, industry professionals face a constant battle against various environmental and regulatory challenges. Key among these are the reduction of ammonia, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), and pathogens in wastewater. These parameters are critical indicators of water quality and have far-reaching implications for both environmental health and regulatory compliance. As both rural and urban populations grow, as wastewater treatment infrastructures age, and as environmental regulations become more strict, the need for efficient, reliable wastewater treatment solutions has never been more pressing.

The Oxynova Solution

This is where Oxynova, a groundbreaking product, comes into play. Oxynova is not just any treatment solution; it is a meticulously formulated blend of beneficial bacteria, live active yeast, and enzymes designed to tackle the challenges of wastewater treatment head on. Oxynova has had impressive success when applied into oxidation ditches and wastewater ponds that store livestock or municipal waste.



The science behind Oxynova's effectiveness lies in its unique, powder composition. The beneficial bacteria in Oxynova play a crucial role in biodegrading organic matter, thereby reducing BOD and COD levels. These bacteria are also nitrifying and denitrifying bacteria, meaning they are able to reduce the concentration of ammonia, nitrites, and nitrates. The active yeast component contributes to balancing microbial communities in the water, enhancing the overall treatment process. The enzymes in Oxynova accelerate chemical reactions necessary for breaking down pollutants, further aiding in the reduction of TSS and ammonia.

Oxynova's multi-faceted approach to wastewater treatment not only improves water quality but also enhances the operational efficiency of treatment plants. By reducing sludge volume and minimizing odor, Oxynova creates a more manageable and pleasant working environment, which is a significant benefit for wastewater treatment facilities and their surrounding areas.

In a recently completed case study, Oxynova was applied into an oxidation pond for one of the largest swine producers in Mexico. The highlights of this case study were the reduction of COD in the pond by 77%, reduction of TSS by 93%, and reduction of E.coli by 85% in just 45 days of treatment.

Agranco Corp USA: The Visionaries Behind Oxynova

Agranco Corp USA, the creator of Oxynova, is a testament to innovative and responsible entrepreneurship. Founded in 2001 and rejuvenated in 2017 by a visionary second generation, Agranco has established itself as a leader in the field. With its corporate office in Miami, Florida and an operations center in Belle, Missouri, this family-owned and operated company is strategically positioned to serve a wide range of clients.

Agranco's commitment to sustainability is evident in every aspect of its operations. Oxynova is a prime example of this commitment, embodying the company's ethos of making a positive impact on the environment. As a USDA-biobased product, manufactured in the United States, Oxynova aligns with Agranco's dedication to environmental responsibility and sustainable practices.

Professionals interested in advancing their wastewater treatment processes are encouraged to explore the benefits of Oxynova. Contact Agranco Corp USA (inquiry@agrancousa.com) for more information and join the movement toward a more efficient, effective and sustainable future in wastewater management.

(continued from page 39)

Failing septic systems not only pose environmental risks but also financial burdens for homeowners who must repair or replace them. Pharmaceutical take-back programs can help alleviate this problem by providing a safe and responsible way to dispose of unused medications, reducing the likelihood of septic system damage.

Water Treatment Plants and the Burden of Pharmaceuticals

Missouri's water treatment plants play a vital role in purifying water for millions of residents. However, the presence of pharmaceuticals in the water supply adds complexity to the treatment process. Conventional water treatment methods are not always effective at removing pharmaceutical residues, which can persist in treated water and ultimately end up in our taps.

The persistence of pharmaceuticals in the water supply requires advanced treatment methods, which increase the operational costs of water treatment plants. These costs, in turn, may lead to increased water bills for residents. Additionally, the potential health risks associated with consuming water contaminated with pharmaceuticals underline the need for action.

Pharmaceutical Take-Back Programs as a Solution

Since 2019, the Missouri Product Stewardship Council's Pharmaceutical Workgroup has promoted safe, responsible medication disposal in the state. The workgroup has conducted outreach and education campaigns, helped to increase available take-back locations and services, and created an interactive map to help Missourians find safe disposal locations near them. By showing proper medication disposal can be convenient and easy, the group is helping to increase proper disposal of leftover medications, thereby protecting Missouri's waterways.

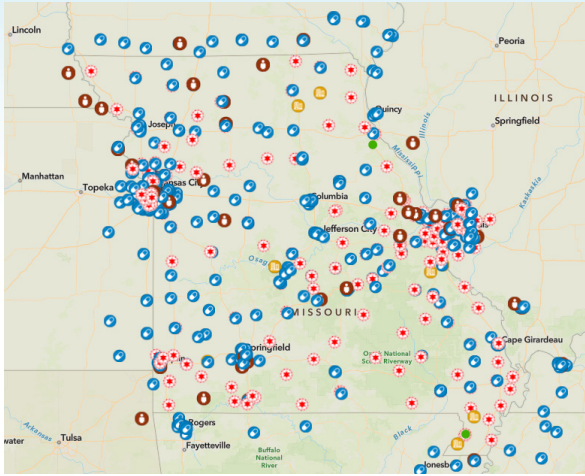
Pharmaceutical take-back programs provide a simple yet effective solution to the problem of pharmaceutical waste disposal. These programs encourage individuals to return their unused or expired medications to designated collection points, such as pharmacies, police stations, or dedicated drop-off locations. The collected pharmaceuticals are then safely combusted, preventing them from entering the water supply or harming the environment.

Benefits of Pharmaceutical Take-Back Programs

- **Environmental Protection:** Safe medication disposal programs prevent contamination of water bodies, preserve aquatic ecosystems, and safeguard drinking water sources from APIs.
- **Septic System Preservation:** Proper medication disposal reduces the risk of septic system damage, saving homeowners from expensive repairs and protecting rural environments.
- **Reduced Strain on Water Treatment Plants:** Pharmaceutical take-back programs alleviate the burden on water treatment plants, leading to cost savings for utilities and potentially lower water bills for residents.
- **Public Awareness, Education, and Behavior Change:** These programs also raise awareness about the environmental impact of pharmaceutical waste, educate the public about responsible disposal practices, and help change the way individuals dispose of medication.

How to Participate in Pharmaceutical Take-Back Programs

Getting involved in pharmaceutical take-back programs is easy and accessible for all Missourians. Here are some steps to consider:



- 1. Locate a Take-back Site:** Many pharmacies, hospitals, and law enforcement agencies in Missouri have take-back kiosks and host take-back events for unused medications. Visit: <https://missouripsc.org/initiatives/pharmaceuticals/> to find a take-back site near you.
- 2. Prepare Medications:** Gather your unused or expired medications *in their original containers or sealed bag*. Remove or blackout personal information on the labels if desired.
- 3. Drop Off Medications:** Visit the designated take-back site and deposit your medications in the provided receptacle. Ensure you follow any specific instructions provided by the collection site.

Conclusion

Water pollution in Missouri poses a significant threat to the state’s natural beauty and public health. To combat this issue, the implementation of pharmaceutical take-back programs is a step in the right direction. These programs provide a simple, effective, and environmentally responsible way to dispose of unused or expired medications, protect septic systems, and alleviate the burden on water treatment plants. Missourians can actively participate in these programs, contributing to a cleaner, healthier, and more sustainable future for the state.

About the Missouri Product Stewardship Council (MO PSC):

The Missouri Product Stewardship Council’s Pharmaceuticals Workgroup is a coalition of stakeholders working to improve access to safe medication disposal locations across the state. The workgroup promotes proper disposal locations through regular outreach campaigns aimed towards educating the public on the importance of proper disposal and maintains a map of all medication take-back locations in the state. If you would like to learn more or join the workgroup, visit: <https://missouripsc.org/initiatives/pharmaceuticals/> or reach out to Hanz Atia at hanz@productstewardship.us




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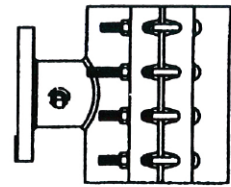
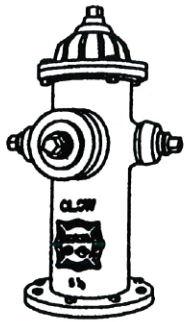
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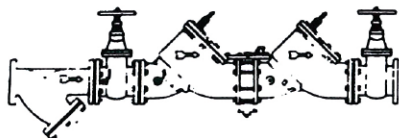


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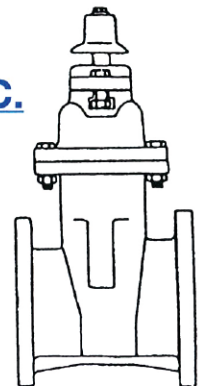
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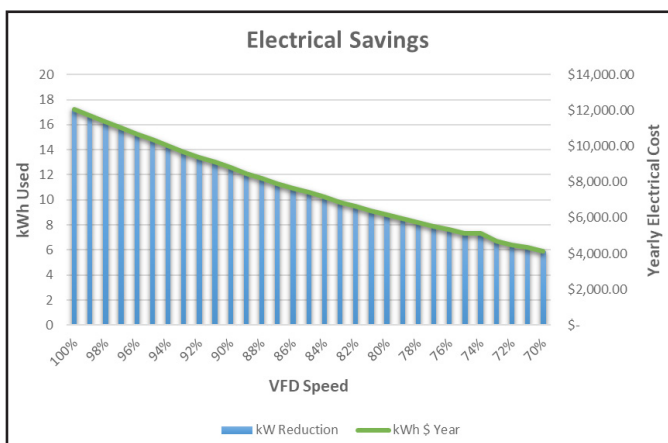


As managers and operators of wastewater systems, we are continuously looking for additional money to maintain operations and improve the level of service we provide for our customers. To achieve this, it has always been preferable to minimize the financial impact on our customers if possible. One of the underutilized areas to increase the amount of money in the budget is through saving money on the system's electrical expenses. Outside of payroll, this is likely to be the system's greatest expense. Aeration is usually the largest consumer of electricity. Here we will be looking at using Variable Frequency Drives (VFDs) to tap some of the electrical savings of your wastewater treatment facility.

Benefits of Using VFDs on Aerator Blowers:

1. Energy Efficiency:

Traditional fixed-speed blowers operate continuously at full speed, leading to over-aeration during low-demand periods. VFDs, on the other hand, allow precise control of blower speed, matching it to the actual oxygen demand. This reduces energy consumption, resulting in substantial cost savings.



2. Process Optimization:

VFDs play a crucial role in optimizing biological treatment processes by fine-tuning aeration rates. Biological treatments, like activated sludge systems, require precise control of oxygen levels for microorganism growth. VFDs offer real-time adjustment of aeration rates, enhancing treatment efficiency and water quality.

3. Extended Equipment Life:

Aeration blowers are vital in wastewater treatment and need reliable operation. VFDs contribute to prolonging blower life by enabling gradual startup and shutdown. Traditional blowers experience abrupt starts and stops, causing mechanical stress. VFDs allow for soft starts and stops, reducing wear and tear, and extending blower lifespan, saving on replacements and downtime.

4. Reduced Maintenance Costs:

VFDs can significantly reduce maintenance costs. Traditional blowers starting at full speed generate mechanical stress and require more frequent maintenance. VFDs, with their soft start capabilities, reduce mechanical strain, leading to less frequent maintenance and repairs. This not only saves costs but minimizes disruptions to the treatment process.

5. Flexibility and Adaptability:

Wastewater treatment plants face variations in flow rates and treatment demands. VFDs provide unparalleled flexibility, allowing operators to adjust blower speed in real-time to meet varying treatment needs. This adaptability is especially valuable during peak flow periods or seasonal variations in wastewater characteristics.

Limitations of Using VFDs on Aerator Blowers:

1. Initial Investment:

The initial cost of purchasing and installing VFDs can be a significant barrier for smaller wastewater treatment plants with limited budgets. The long-term cost savings might justify this investment, but it can still be challenging.

2. Harmonics and Electrical Disturbances:

The introduction of VFDs can lead to harmonics (unwanted frequencies) and electrical disturbances that disrupt other equipment's operation. Proper filtering and power quality measures are necessary to mitigate these issues.



3. Maintenance Complexity:

While VFDs reduce maintenance for aerator blowers, they require their own maintenance, including tasks like checking connections, inspecting cooling systems, and performing software updates. Proper knowledge and training are essential for effective maintenance.

4. Compatibility and Sizing:

Choosing the right size of VFDs is critical. Inadequate sizing can lead to issues like motor overheating or inadequate control. Compatibility with existing electrical systems and control infrastructure must also be carefully considered.

5. Complexity of Operation:

Operating VFDs can be complex and may require specialized knowledge. Skilled operators who understand programming, configuring, and maintaining VFDs are essential for their effective operation.

Regular Maintenance of VFDs on Aerator Blowers:

Maintenance of VFDs is crucial to ensure their reliability and continued benefits. Key maintenance tasks include:

1. Visual Inspection:

Regular visual inspections are essential to detect signs of wear, loose connections, or overheating. Ensuring proper ventilation and cooling is vital to prevent overheating and component failure.

2. Software Updates:

VFDs require periodic software updates to enhance performance and reliability. Keeping the software up to date ensures the system benefits from the latest technological advancements.

3. Cleaning:

Keeping the VFD enclosure clean, both internally and externally, is crucial. Dust and debris can impede cooling, leading to overheating and potential damage to components.

4. Calibration:

Periodic calibration of VFD settings ensures accurate control over blower speed. Adjusting parameters like acceleration and deceleration rates optimizes performance.

5. Backup Configuration:

Regularly backing up VFD configuration settings is a precautionary measure to ensure a quick recovery in case of VFD failure or replacement.

Monitoring and Control of VFDs on Aerator Blowers:

Efficient monitoring and control of VFDs are crucial for optimizing their performance. Various strategies and technologies can be employed:

1. SCADA Systems:

Supervisory Control and Data Acquisition (SCADA) systems are essential for real-time monitoring and control of VFDs and other plant components. Operators can access information about VFD parameters, allowing them to make informed decisions based on current conditions.

2. Remote Monitoring:

Some VFDs offer remote monitoring capabilities, enabling operators to access and control VFDs from a central location. This is particularly valuable for large or geographically dispersed wastewater treatment facilities.

3. Alarms and Alerts:

Configuring VFDs to generate alarms for abnormal conditions is essential for proactive maintenance. VFDs can be programmed to trigger alarms for events like overcurrent or overheating, allowing maintenance personnel to respond promptly.

4. Data Logging:

Many VFDs offer data logging features, allowing for the recording and storage of operational data. This data is valuable for tracking VFD performance over time, identifying trends or anomalies, and informing maintenance decisions.

5. Integration:

Seamless integration of VFDs into the wastewater treatment plant's control system is crucial. This integration allows VFDs to respond to signals and commands from other parts of the plant, optimizing aeration processes and contributing to efficient wastewater treatment.

If your system is considering integrating VFDs into your treatment scheme and would like more information, feel free to contact me by phone at (573) 220-7320 or email at mbertschinger@moruralwater.org.



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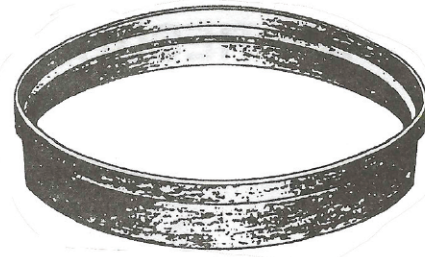
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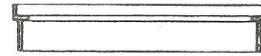
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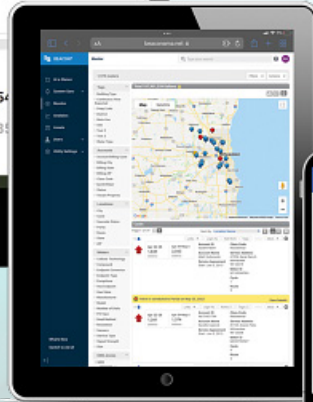
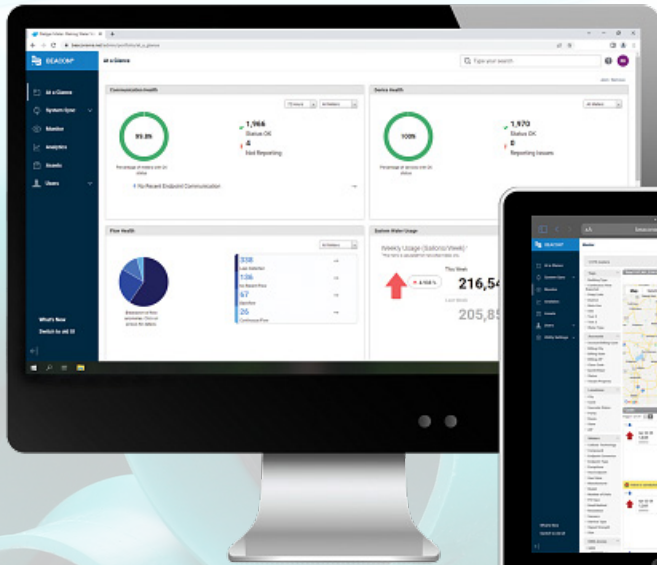
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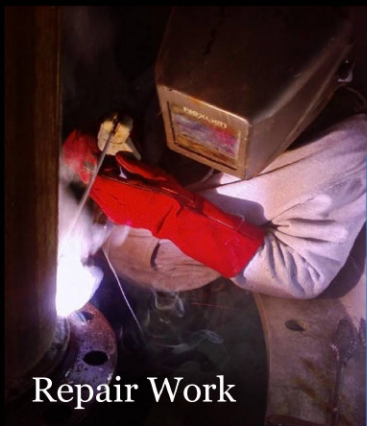
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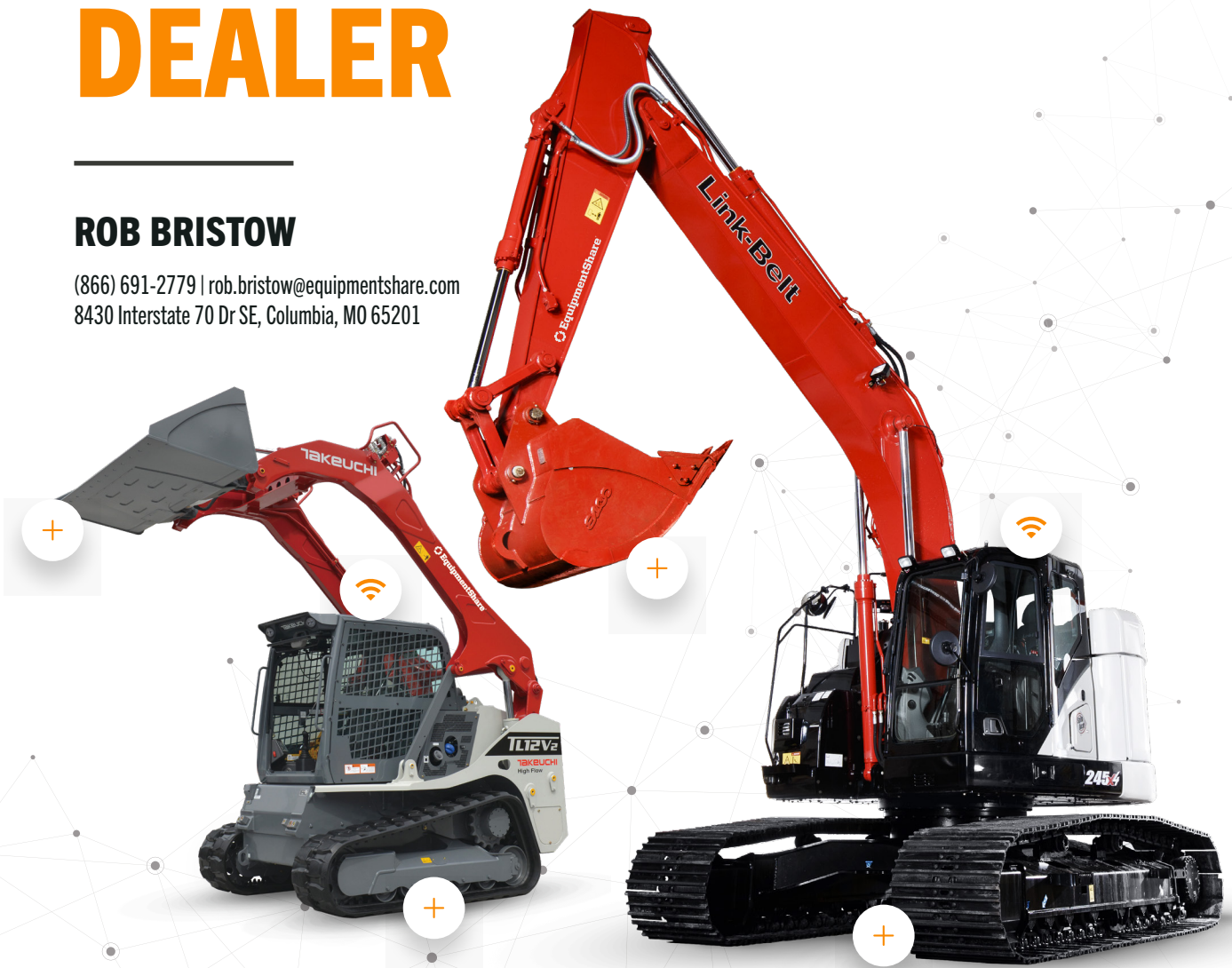


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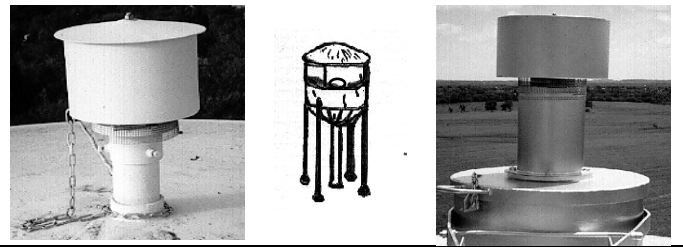
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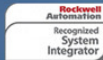
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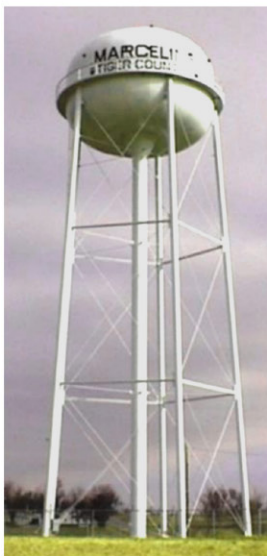
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MRWA Calendar of Events

January



15 Martin Luther King Jr. Day
Holiday MRWA Office CLOSED

February



1 First Day of Black History Month
6 - 8 National Rural Water Rally Washington, D.C.
14 Valentine's Day
19 Presidents' Day Holiday MRWA Office CLOSED

March



1 First Day of Women's History Month
10 Daylight Saving Time begins
12 - 14 MRWA Annual Conference St. Charles Convention Center
17 St. Patrick's Day
29 Good Friday Holiday MRWA Office CLOSED

April



15 TAX DAY
24 Show-Me Rural Water Rally Jefferson City

May



1 First Day of Asian American/
Pacific Islander Heritage Month
5 Cinco de Mayo
12 Mother's Day
27 Memorial Day MRWA Office CLOSED

June



3 - 6 NRWA In-Service Training Grand Rapids, MI
16 Father's Day
19 Juneteenth MRWA Office CLOSED

July



4 Independence Day
Holiday MRWA Office CLOSED



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INTERIM CONSTRUCTION NOTES
SERIES 2022

The aforementioned Notes were issued to provide interim funding for Missouri municipal projects being funded through the United States Department of Agriculture, Rural Development.

**CONGRATULATIONS TO THE FOLLOWING
PROGRAM PARTICIPANTS**

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Campbell	Cassville	Windsor
Clarkton	Fayette	Holts Summit
Jonesburg	Perry	Missouri City
Monroe City	Oronogo	Thayer
Van Buren	Versailles	Winfield

DISTRICTS

C-PWSD No. 1 of Clark County	PWSD No. 4 of Stoddard County
C-PWSD No. 1 of Cooper County	PWSD No. 3 of Laclede County
PWSD No. 4 of Wayne and Butler Counties	PWSD No. 1 of Oregon County

Great Northwest Wholesale Water Commission

MISSOURI PUBLIC UTILITIES COMMISSION

John Sullivan, Public Water Supply District No. 3 of Howell County, Missouri, Chairman
Tammie Winter, Consolidated Public Water Supply District No. 2 of Lafayette, Johnson and Saline Counties, Missouri, Vice-Chairman
Janet Sears, Consolidated Public Water Supply District No. 1 of Boone County, Missouri, Commissioner
Brian Bender, Public Water Supply District No. 1 of Macon County, Missouri, Commissioner
Nancy Riechmann, C-PWSD No. 2 of Monroe County, Missouri, Commissioner
Crystal Cooper, Missouri Rural Water Association, Secretary

The Missouri Rural Water Association is the administrator of the Missouri Public Utilities Commission Interim Loan Program.

MISSOURI RURAL WATER BOARD OF DIRECTORS

David Waller, Board President
Roger Barker, Director
Tammie Winter, Director
Janet Sears, Director
Kathy Voyles, Director
Melinda Piper, Director
Paul Michael Shaw, Director

The undersigned assisted in the structuring and managing of the underwriting:

Gilmore & Bell, PC, Note Counsel
Raymond James, Municipal Advisor
Rubin & Hays, Underwriters Counsel
Regions Bank, Trustee and Escrow Agent
Causey, Demgen & Moore, CPA, Verification Agent

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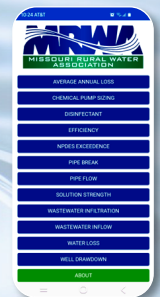
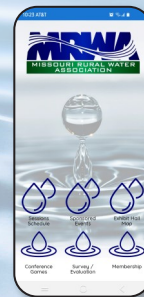
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