Looking Forward: A Letter from Ohio Rural Water Association’s new Executive Director

Optimization and the O & M Manual

Installing Tracer Wire for Non-Detectable Materials

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Hello Neighbors,

WOW! Before I get started, I hope that the first nine months of this year have been enjoyable for you, your family, and your friends. In addition, from a business standpoint hopefully your utilities have experienced growth and financial security. From the Ohio Rural Water Association standpoint, change has definitely been the word.

First, after 25 years of service Kevin Strang has retired. Thank you, Kevin, for all those years of faithful service. Next, I was elected President replacing our previous President, Dusty Parker, after his many years of service. One of the last great things the two of them accomplished was the acquisition of the property and buildings adjacent to our existing office which will allow us to have hands on training among other things. Another thing that it has permitted us to accomplish is we now have all of our equipment under one roof. The monthly cost to store the equipment has now been reduced since we are storing the equipment on our own property. Thank you to both Kevin and Dusty for your leadership in acquiring this land and property.

I would like to thank the Board for their confidence in electing me as President. I consider it an honor and I am humbled to be able to serve you. I will, to the best of my ability, make you proud to be a member of Ohio Rural Water Association.

For those who attended our National Rural Water Association Annual Conference in Reno, the future has some very exciting times and programs. For me, the two most important new programs are the “Apprenticeship Program” and “ESRI” program that allows you to do digital mapping with your smart phone. Call our new Executive Director Joseph Pheil and myself for details.

Lastly, I would be very remiss not to mention our Affinity Programs. I challenge each of you to find out what they are and what they can do for your Utility. To whet your appetite, do you offer your water and/or waste water customer insurance against a leak? This insurance is a win for both your customer and you, resulting in more satisfied customers. Another program permits you to reach your customers using web-based broadcasts in a timely manner for a boil alert no matter how many you must reach. Contact us for details. More information to come as we move along.

I would like to wish you all a happy, healthily and financially rewarding end of your year.

Sincerely,

Tom Reese
OHRWA President

LOOKING FORWARD:
A Letter from Ohio Rural Water Association’s new Executive Director.

This September, I officially took over as Ohio Rural Water Association’s Executive Director. I was very humbled by the Board of Directors’ decision to put their trust in me, and continue to be humbled every day by the hard work and dedication of our staff and sponsors. It is through their support, and the leadership of the Board of Directors, that I am confident about the future prosperity of the Ohio Rural Water Association.

As we move forward, I hope to provide and improve upon the level of service our members have grown to expect - in training, technical assistance, and legislative advocacy. I will work with my staff to develop training that will help support the needs of Ohio’s operators as we move into a more technologically advanced industry. I will hire, support, and encourage our staff to continually improve upon the technical assistance they offer, and secure the resources necessary to make that possible. I will also work to improve our relationships with like-minded organizations, and seek out collaboration opportunities that will strengthen our association and benefit our members, while working to safeguard against undue legislative burdens to Ohio’s rural water systems.

As an organization, our commitment lies foremost with the water operators that work day in and day out to provide Ohioans with safe and affordable drinking water, and the wastewater operators that diligently help to protect Ohio’s natural waterways. I am honored to have a place among these tireless civil servants and I will strive to make them proud to be a member of the Ohio Rural Water Association.

Joseph Pheil
ORWA Executive Director
One of the most often overlooked optimization tools is proper process documentation. The most critical document is a complete operations and maintenance manual. It should include standard operating procedures for all aspects of your operation. Those fortunate enough to be around when the plant was constructed may have been given an operations manual, but those coming in later many have never had the opportunity to enjoy some not-so-interesting reading!

The operations often change without any documentation or changes to the O & M Manual, or operations may only be stored in the operator’s mind. Process performance will always be improved by documenting that knowledge. The document will provide a starting point for a more detailed process optimization. Putting together an O & M Manual can feel like an impossible task, especially to small systems that tend to need it the most. It is not impossible! Your O & M Manual doesn’t have to be
overwhelming task. A document like this is really never “complete” because it changes as each change is made in the operation of your utility.

SO, where do you start?

Let’s go old school – get a 3-ring binder, paper, divider sheets and handful of pens or pencils. Explain to everyone that they are all to cooperate with the “Editor in Chief” and provide input. You will need to enlist experts in each area.

Discuss a basic idea of what you want. Jump right in and get started; don’t let the group get bogged down with formatting and thinking outside the realm of their responsibilities. You can always refine the document or methods later. Just getting some basics started and moving forward will provide a fluid path to pulling this together.

Develop a process flow chart. Include everything under your “Source to the Tap.” Don’t ignore your distribution system. Water quality is often affected by the way the distribution system reacts to an operator’s action. Get everyone involved. You may find a chance to improve your process that has been overlooked.

Assembling the Data:

Using your flow diagram, assemble all documentation available. You may only have one or two pieces of equipment. If that is the case, obtain the necessary manuals; place them on a table in the order of your flow diagram. If any of the material is not in a binder, place them in one so everything is secure and located in one place. Note: Break equipment manuals down into separate pages so you have room to include notes inserted between the pages if necessary. It may be best to photo copy the manuals so there are extra copies available.

Have each operator document everything they know about each process. It may be helpful to have them work in teams. Don’t forget your suppliers – they too can provide you with additional information and documentation.

Organizing your information:

1. Process Overview - Describe the overall treatment process. Use flow diagrams, location and system maps, plant location, tank locations. This section should be quite detailed.

2. Unit Process Sections
   a. Overview – A brief description of the unit processes and how it relates to the whole process.
   b. Controls and Monitoring – Include all means of monitoring and controlling operation.
   c. Procedures – Detailed standard operating procedures and safety procedures.
   d. Troubleshooting – Outline areas that an operator should investigate if a problem occurs.
   e. Maintenance – This needs to be as detailed as possible. Identifying maintenance procedures.
   f. Valves and Controls – Provide a detailed list of all operational valves and their use.

Make several copies of your O & M Manual; place them in several locations. Tailor your document to fit your processes and have your employees update it regularly.
The Clean Water Act (CWA) and Safe Drinking Water Act (SDWA) are two of the United States’ premier pieces of federal legislation regarding the protection of our nation's water supplies. The Clean Water Act focuses on the prevention of pollution and responsible stewardship of all surface waters, including those used to supply the drinking water of public water systems. In turn, the Safe Drinking Water Act supports a similar goal, but is geared toward the management of groundwater protection and clean drinking water as a whole. Ohio, along with all of the other states, is regulated under these two laws. The Ohio Environmental Protection Agency, using programs and regulations put in place under the framework of the CWA in particular, devotes a large amount of time and resources to monitoring Ohio’s surface drinking waters. This ensures that they meet the standard level of quality appropriate for their “beneficial use.” Beneficial use is a term that indicates some kind of need or service that a surface water source has the potential to fulfill. After a water source is indicated as having a potential beneficial use, set water quality standards are referenced to determine whether or not the given source is in good enough condition to actually provide for that beneficial use.

Surface water is, by its nature, more vulnerable to contamination. Sampling for beneficial use standards assists Ohio’s decision-makers in making sure all of Ohio’s vulnerable surface drinking water sources stay clean and useable. As stated above, surface waters are given beneficial use designations under the CWA that indicate needs and services a water source can provide. For example, is the water source being used for recreation? Is it a drinking water source? Is it a home for aquatic life and other biological entities?
There are multiple potential beneficial use designations that are able to be applied. One of the most important designations that Ohio can give to a water source is that of a “public drinking water supply.” This label is used on waters within 500 yards of an active public drinking water supply intake and publicly owned lakes. If the water source fails to meet acceptable quality standards, it is considered impaired.

There are many contaminant types that can cause a surface water drinking source to be considered impaired, depending on their amounts. By focusing efforts and resources on drinking water sources first, Ohio EPA is using a tiered approach to detect contaminants quickly in these important water bodies. Agency workers will keep samples and comprehensive records of both pre-treated and treated water in a public water system. By comparing the quality of both of these samples, it can be determined if the drinking water source is meeting acceptable standards for beneficial use. Amounts of nitrates, pesticides, cryptosporidium, and other contaminants are measured for. If these amounts exceed acceptable levels and cannot be adequately treated for using standard treatment methods, the water source may require increased monitoring or remediation efforts. This could include the development of a Total Maximum Daily Load (TMDL) analysis.

Utilizing the beneficial use designations, standards, and procedures, employees at the Ohio EPA are able to more effectively decide which course of action to take in managing water supplies. This helps in protecting public health and serving the drinking water needs of all of Ohio’s communities, especially those reliant on surface water. By continuing to care for these surface water sources and maintain their health, the beneficial use system for public drinking water is an effective tool that can be used to ensure that Ohio’s citizens have access to plentiful and clean water for many years to come.
Understanding INFLOW and INFILTRATION

By Shawn Dobson

INFILTRATION
Infiltration is groundwater that is influenced by the surface that enters sewer pipes (catch basins, manholes) though holes, breaks, joint failure and other openings. Infiltration quantities often exhibit seasonal variation in response to groundwater levels. Storm events can trigger a rise in groundwater levels and increase infiltration flows. The highest infiltration flows are observed following significant storm events or prolonged periods of perception.

INFLOW
Inflow is surface water that enters the wastewater system from yard, roof and footer drains, cross-connections with storm drains, downspouts, and through holes in manhole covers. Inflow occurs as a result of storm events such as rain fall, snowfall, springs, or snow melt that contributes to excessive sewer flows. Peak flow can occur during heavy storm events when storm sewer are surcharged, resulting in hydraulic backups and local ponding.

Now that we understand the meaning of Infiltration and Inflow and the costs associated with processing the added clean water from inflow and infiltration are eventually passed back to the customer in the form of rate increases. By reducing inflow and infiltration capital and operating costs can be lowered. Minimizing I&I can increase the lifetime-capacity of a treatment facility and a wastewater collection system. The pumps that are involved with wastewater plants operate 24 hours a day seven days a week, however they must work harder as the sewer system’s water level load increases. This puts an unneeded strain on the pumps and shortens the life expectancy of this valuable equipment.
Non-detectable materials are now being used in underground utilities with more frequency than ever. With all the convenience that comes along with these types of materials, the one downside is they become a time consuming and laborious job to locate if proper steps are not followed during installation. Mapping with detailed information is a great thing to have but more often than not, they become lost or never existed to begin with. Blueprints are not a reliable source because change orders are very common and then don’t match up with what was actually installed. The system rarely receives the final as built maps. With the use of tracing wire, utility personnel can always locate underground utilities using a line locator with ease and great accuracy. This saves time and unnecessary damage to the area of concern. Tracer wire implementation has never had any type of standards and many attempts by Utilities have produced less than desirable results. The extra cost during construction deters many Utilities from implementing tracer wire, but doing so will pay for itself many times over in the long run. Added below is information on standard tracer wire installation.

**MATERIALS**

**General**
All trace wire and trace wire products shall be domestically manufactured in the U.S.A. All trace wire shall have HDPE insulation intended for direct bury, color coated per APWA standard for the specific utility being marked.

**Trace wire**
- Open Trench - Trace wire shall be #12 AWG Copper Clad Steel, High Strength with minimum 450 lb. break load, with minimum 30 mil HDPE insulation thickness.
- Directional Drilling/Boring - Trace wire shall be #12 AWG Copper Clad Steel, Extra High Strength with minimum 1,150 lb. break load, with minimum 30 mil HDPE insulation thickness.
- Trace wire – Pipe Bursting/Slip Lining - Trace wire shall be 7 x 7 Stranded Copper Clad Steel, Extreme Strength with 4,700 lb. break load, with minimum 50 mil HDPE insulation thickness.
Connectors

- All mainline trace wires must be interconnected in intersections, at mainline tees and mainline crosses. At tees, the three wires shall be joined using a single 3-way lockable connector. At crosses, the four wires shall be joined using a 4-way connector. Use of two 3-way connectors with a short jumper wire between them is an acceptable alternative.
- Direct bury wire connectors – shall include 3-way lockable connectors and mainline to lateral lug connectors specifically manufactured for use in underground trace wire installation. Connectors shall be dielectric silicon filled to seal out moisture and corrosion, and shall be installed in a manner so as to prevent any uninsulated wire exposure.
- Non locking friction fit, twist on or taped connectors are prohibited.

Termination/Access

- All trace wire termination points must utilize an approved trace wire access box (above ground access box or grade level/in-ground access box as applicable), specifically manufactured for this purpose.
- All grade level/in-ground access boxes shall be appropriately identified with “sewer” or “water” cast into the cap and be color coded.
- A minimum of 2 ft. of excess/slack wire is required in all trace wire access boxes after meeting final elevation.
- All trace wire access boxes must include a manually interruptible conductive/connective link between the terminal(s) for the trace wire connection and the terminal for the grounding anode wire connection.
- Grounding anode wire shall be connected to the identified (or bottom) terminal on all access boxes.

This Standard specification was prepared by Joe Rubbelke (joe.rubbelke@gmail.com), Jeff Dale (jeff.dale@mrwa.com) and Frank Stuemke (frank.stuemke@mrwa.com), and is a work-in-progress, intended for redistribution, modification and immediate use by any municipality (March 2014). The end user must accept all liabilities and hold harmless the contributors of this information.

Sewer/Water Utility - Trace Wire Specification

- Service Laterals on public property - Trace wire must terminate at an approved grade level/in-ground trace wire access box, located at the edge of the road right-of-way, and out of the roadway.
- Service Laterals on private property - Trace wire must terminate at an approved above-ground trace wire access box, affixed to the building exterior directly above where the utility enters the building, at an elevation not greater than 5 vertical feet above finished grade, or terminate at an approved grade level/in-ground trace wire access box, located within 2 linear feet of the building being served by the utility.
- Hydrants – Trace wire must terminate at an approved above-ground trace wire access box, properly affixed to the hydrant grade flange. (Affixing with tape or plastic ties shall not be acceptable.)
- Long-runs, in excess of 500 linear feet without service laterals or hydrants - Trace wire access must be provided utilizing an approved grade level/in-ground trace wire access box, located at the edge of 1. Wire shown away from pipe for clarity. Wire shall be installed immediately adjacent to the water service pipe with tape or plastic ties at 5’ intervals.
Grounding

- Trace wire must be properly grounded at all dead ends/stubs.
- Grounding of trace wire shall be achieved by use of a drive-in magnesium grounding anode rod with a minimum of 20 ft of #14 red HDPE insulated copper clad steel wire connected to anode (minimum 0.5 lb) specifically manufactured for this purpose, and buried at the same elevation as the utility.
- When grounding the trace wire at dead ends/stubs, the grounding anode shall be installed in a direction 180 degrees opposite of the trace wire, at the maximum possible distance.
- When grounding the trace wire in areas where the trace wire is continuous and neither the mainline trace wire or the grounding anode wire will be terminated at/above grade, install grounding anode directly beneath and in-line with the trace wire. Do not coil excess wire from grounding anode. In this installation method, the grounding anode wire shall be trimmed to an appropriate length before connecting to trace wire with a mainline to lateral lug connector.
- Where the anode wire will be connected to a trace wire access box, a minimum of 2 ft. of excess/slack wire is required after meeting final elevation.

Installation

General

- Trace wire installation shall be performed in such a manner that allows proper access for connection of line tracing equipment, proper locating of wire without loss or deterioration of low frequency (512 Hz) signal for distances in excess of 1,000 linear feet, and without distortion of signal caused by multiple wires being installed in close proximity to one another.
- Trace wire systems must be installed as a single continuous wire, except where using approved connectors. No looping or coiling of wire is allowed.

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Sewer/Water Utility - Trace Wire Specification

- Any damage occurring during installation of the trace wire must be immediately repaired by removing the damaged wire, and installing a new section of wire with approved connectors. Taping and/or spray coating shall not be allowed.
- Trace wire shall be installed at the bottom half of the pipe and secured (taped/tied) at 5' intervals.
• Trace wire must be properly grounded as specified.
• Trace wire on all service laterals/stubs must terminate at an approved trace wire access box located directly above the utility, at the edge of the road right-of-way, but out of the roadway. (See Trace wire Termination/Access)
• At all mainline dead-ends, trace wire shall go to ground using an approved connection to a drive-in magnesium grounding anode rod, buried at the same depth as the trace wire. (See Grounding)
• Mainline trace wire shall not be connected to existing conductive pipes. Treat as a mainline dead-end, ground using an approved waterproof connection to a grounding anode buried at the same depth as the trace wire.
• All service lateral trace wires shall be a single wire, connected to the mainline trace wire using a mainline to lateral lug connector, installed without cutting/splicing the mainline trace wire.
• In occurrences where an existing trace wire is encountered on an existing utility that is being extended or tied into, the new trace wire and existing trace wire shall be connected using approved splice connectors, and shall be properly grounded at the splice location as specified.

Sanitary Sewer System
• A mainline trace wire must be installed, with all service lateral trace wires properly connected to the mainline trace wire, to ensure full tracing/locating capabilities from a single connection point.
• Lay mainline trace wire continuously, by-passing around the outside of manholes/structures on the North or East side.
• Trace wire on all sanitary service laterals must terminate at an approved trace wire access box color coded green and located directly above the service lateral at the edge of road right of way.

Water System
• A mainline trace wire must be installed, with all service lateral trace wires properly connected to the mainline trace wire, to ensure full tracing/locating capabilities from a single connection point.
• Lay mainline trace wire continuously, by-passing around the outside of valves and fittings on the North or East side.
• Trace wire on all water service laterals must terminate at an approved trace wire access box color coded blue and located directly above the service lateral at the edge of road right of way.
• Above-ground tracer wire access boxes will be installed on all fire hydrants.
• All conductive and non-conductive service lines shall include tracer wire.

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SEWER/WATER UTILITY - TRACE WIRE SPECIFICATION

Storm Sewer System
This section shall be included at the discretion of the facility owner.

- If the storm sewer system includes service laterals for connection of private drains and tile lines, it shall be specified the same as a sanitary sewer application.
- Lay mainline trace wire continuously, by-passing around the outside of manholes/structure on the North or East side.

Prohibited Products and Methods
The following products and methods shall not be allowed or acceptable

- Uninsulated trace wire
- Trace wire insulations other than HDPE
- Trace wires not domestically manufactured
- Non locking, friction fit, twist on or taped connectors
- Brass or copper ground rods
- Wire connections utilizing taping or spray-on waterproofing
- Looped wire or continuous wire installations, that has multiple wires laid side-by-side or in close proximity to one another
- Trace wire wrapped around the corresponding utility
- Brass fittings with trace wire connection lugs
- Wire terminations within the roadway, i.e. in valve boxes, cleanouts, manholes, etc.
- Connecting trace wire to existing conductive utilities

Testing
All new trace wire installations shall be located using typical low frequency (512Hz) line tracing equipment, witnessed by the contractor, engineer and facility owner as applicable, prior to acceptance of ownership. This verification shall be performed upon completion of rough grading and again prior to final acceptance of the project. Continuity testing in lieu of actual line tracing shall not be accepted.

SEWER/WATER UTILITY - TRACE WIRE SPECIFICATION

Products
The following products have been deemed acceptable and appropriate. These products are a guide only to help you choose the correct applications for your tracer wire project.

- Copper clad Steel (CCS) trace wire
  - Open Trench – Copperhead #12 High Strength part # 1230-HS
  - Directional Drilling/Boring-Copperhead Extra High Strength part # 1245*EHS
  - Pipe Bursting/Slip Lining –Copperhead Solo Shot Extreme Strength 7x7 Stranded part # PBX-50

- Connectors
  - Copperhead 3-way locking connector part # LSC1230*
  - Dry Conn 3-way Direct Bury Lug: Copperhead Part # 3WB-01

- Termination/Access
  - Non-Roadway access boxes applications: Trace wire access boxes Grade level Copperhead adjustable lite duty Part # LD14*TP
  - Concrete/Driveway access box applications: Trace wire access boxes Grade level Copperhead Part # CD14*TP 14”
  - Fire hydrant trace wire access box applications: Above ground two terminal with 1” conduit.

- Grounding
  - Drive in Magnesium Anode: Copperhead Part # ANO-1005 (1.5lb)

MANUFACTURE PRODUCT OPTIONS

The information provided by Copperhead Industries gives you product options to help you choose the correct wire – termination/access points – connectors and grounding products. Other manufactures provide these products; this information is only a guide.
The National Rural Water Association's annual WaterPro Conference was held in Reno Nevada this year from September 18th through the 20th. It took place at the Grand Sierra Resort, and brought together Rural Water Associations, water industry vendors, governmental representatives, and other water industry enthusiasts from across the country to share best practices and discuss challenges. Ohio had one of the largest delegations with Ohio Rural Water Associations members from water systems across the state. There were over 30 different classes, demonstration labs, and Q&A sessions. The exhibit hall was packed with the industry’s most influential vendors proudly displaying their products and services.

The second annual Are You Smarter Then a Circuit Rider? contest included eight contestants chosen from across the country. The winner was Tom Anthony from Michigan, and the runner up was Johnny Spencer from North Carolina. The WaterPAC raffle, designed to raise money for NRWA's national legislative objectives raffled off dozens of items donated by state associations. The raffle included a variety of items from Canadian Rye Whiskey to $2,000 cash. Ohio Rural Water contributed a Zoomba robot vacuum and a Kindle Fire tablet. Bill Neal, an ORWA Board Member won a GoPro and accessories. Combined, the raffle raised over $28,000. National Rural Water Association also presented awards of excellence during the final day's Award Ceremony. The nominations were made by the state associations, then rated and determined by the NRWA Awards Committee.

Next year’s WaterPro conference will be held in Fort Worth, Texas from September 17th through the 19th. If you’ve never attended a WaterPro Conference, 2018 might just be the year for you. Grab your spurs and cowboy hat, and we’ll see you in Fort Worth.
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