

# T H E Tarheel Pipeline

NCRWA<sup>®</sup>

SPRING 2016

True Tales of  
Backflow & Cross  
Connection & NCRWA's  
New Asheboro Location

page 10

2016 NCRWA 39th  
Annual Conference  
& Exhibition Guide

page 13

Do's and Don'ts for a  
More Traceable Under-  
ground Utility System

page 27



## DO'S AND DON'TS FOR A MORE TRACEABLE UNDERGROUND UTILITY SYSTEM

By Brad Penley, Porter Associates

In the heels of the North Carolina General Assembly's, Article 8A, Underground Utility Safety and Damage Prevention Act that went in effect October 1, 2014; there have been some questions on how to provide a more locatable underground utility system. The statute provides that all facilities used for producing, storing, conveying, transmitting, or distributing communication, electricity, gas, petroleum products, hazardous liquids, water, steam, or sewage shall be electronically locatable. While much in the statute details the responsibilities of the excavator before excavation, little detail is given on how to provide for a locatable system from the onset of design and installation of the new utility.

When designing a water or sewer piping system how seriously is the design or specification of tracer wire taken? Unfortunately, all too often the tracer wire specification is vague and overlooked. Most water department specifications call out the fire hydrant specifications down to the threads on the riser, but tracer wire has been taken far too lightly with very broad specifications. Some water departments in parts of the country don't use tracer wire at all. Warning tape, detectable tape, bare copper, coated solid copper, copper clad steel, stainless steel, and stranded copper or stranded stainless steel are all products being used.

What are the right products to use? Wire is only a small piece of the puzzle. Proper installation and location to the pipe, termination of the wire and connecting the wire properly when spicing or connecting to a service are very important as well.



Many municipalities are writing too broad of a specification for tracer wire. An example would be "Install #12 solid copper wire with jacket". That's it... So the contractor runs to a local supply house and buys the least expensive wire, usually THHN. The nylon PVC coating on THHN will typically last around two years before it deteriorates and exposes the copper. THHN is not made for direct bury. Unprotected copper, over time will turn back to its original state or earth. The locate signal will no longer remain in the wire path, but instead will bleed off into the ground. Articles as long ago as 2003 warning of the improper use of THHN as a tracer wire has been written by

engineers and regulatory agencies. Look at your current specification; tighten it up to provide for a jacket suitable for direct bury on the wire, and do not allow THHN.



### What should be considered when writing a tracer wire specification?

- Wire Size or Gauge (AWG)
- Jacket Color
- Jacket/Coating type
- Wire Types - Copper Clad Steel or Copper
- Proper connections
- Placement of the wire in regards to pipe
- Termination method for wire, test stations and connections
- Specification for the proper wire for each use, be it open ditch/direct bury, pipe bursting and directional boring (it makes a difference)
- Inspection and Testing upon completion of a new system



**Some additional points of consideration:**

- The myth is the bigger the wire/heavier the gauge, the stronger the signal. Not true. Larger diameter is normally called out for strength, not signal carrying qualities. A common failure that happens during installation is breakage. Size for size high strength Copper Clad Steel (CCS) has twice the break load of solid copper. This allows smaller diameter wire to be used, usually resulting in cost savings.
- Color Coding is simple, follow the APWA uniform color code

APWA UNIFORM COLOR CODE		
	<b>RED</b>	[electric]
	<b>YELLOW</b>	[gas]
	<b>ORANGE</b>	[communication]
	<b>BLUE</b>	[potable water]
	<b>GREEN</b>	[sewer]
	<b>PURPLE</b>	[reclaimed water]

- Many different jackets or coatings are available. High Density Polyethylene (HDPE) or High Molecular Weight Polyethylene (HMWPE) are designed for direct burial. Nylon or THHN, is not.
- Solid Copper or Copper Clad Steel (CCS) work well and there's no need for stranded wire. High Strength Copper Clad Steel (CCS) was introduced to the market in 2004 for tracer wire and it has a 2X strength advantage over solid copper. Copper Clad Steel has equal conductivity to solid copper, but is usually less expensive.
- The best tracer wire in the ground, is only as good as it's connections. Proper connectors, which protect from moisture

and corrosion, are extremely important. Copperhead SnakeBite connectors and 3M DBR are two of the commonly used moisture displacement connectors. One should never twist the wires together and merely wrap with electrical tape. Corrosion will happen eventually and the locate signal will be lost to ground at the connection.

- The tracer wire should be placed in the same orientation to all installed pipe. Using a spacer, taping the tracer wire to the pipe every 8-10 feet in the three to six o'clock position or specifying fill between the pipe and tracer wire are all acceptable practices. Taping the wire to the pipe helps prevent damage to the wire during back filling or when digging around the pipe in the future. Installation of color coded warning tape one foot above pipe will enhance utility ID during excavation when repairs are needed. Once tape has been found. Hand digging should only be allowed
- The best tracer wire system is connected with electrical current characteristics in mind. Electricity will take the path of least path resistance and shortest path to ground. Good grounding and terminating of the wire will improve quality of signal. Using test stations to bring the tracer wire above ground for ease of terminating a signal is best. Grounding one or both ends of the wire or introducing a small anode may enhance signal strength.
- Different types of wire should be considered for different installation applications. Open ditch/direct bury does not require as strong a wire as directional drilling or pipe bursting. Consider

strength and coating type and thickness when specifying wire, making sure there will be no surprises after the project is completed or when locating is required.

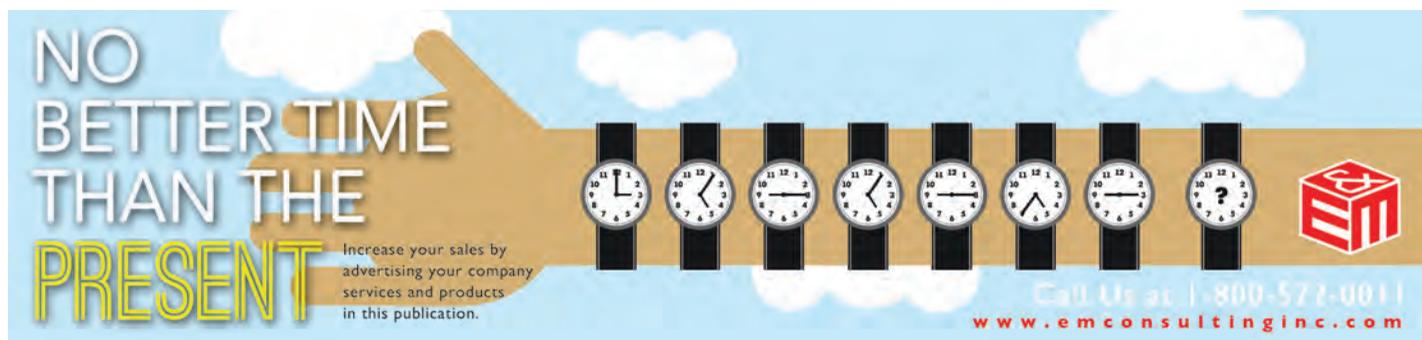
- Another very important step is to make sure the contractor or city inspector performs locate or conductivity test prior to signing off on the project. It is much easier to correct any issues promptly as opposed to months or years later when locate is required and the piping cannot be found.

Like your fire hydrant, curb stop, manhole, piping and other important components of your system, tracer wire should be taken just as seriously. It's ultimately an inexpensive insurance policy. Especially if you weigh the cost of repairs once a utility has been damaged due to not being able to locate. Write specifications to cover the entire tracer wire system. Not just wire, but connectors, test stations, and procedure as to how you want the components installed.

The Minnesota Rural Water Association recently adopted such an example specification and installation instructions along with drawings which can be viewed on their official website here: <http://www.mrwa.com/PDF/TracerWireSpecGuideFinalweb3.pdf>

*If you would like more information including example specifications, details, installation guides to provide a more traceable system, please contact:*

**Brad Penley**  
Porter Associates, Inc  
[brad@porterassociates.com](mailto:brad@porterassociates.com)  
704-202-6429



**NO BETTER TIME THAN THE PRESENT**

Increase your sales by advertising your company services and products in this publication.

Call Us at 1-800-577-0011  
[www.emconsultinginc.com](http://www.emconsultinginc.com)