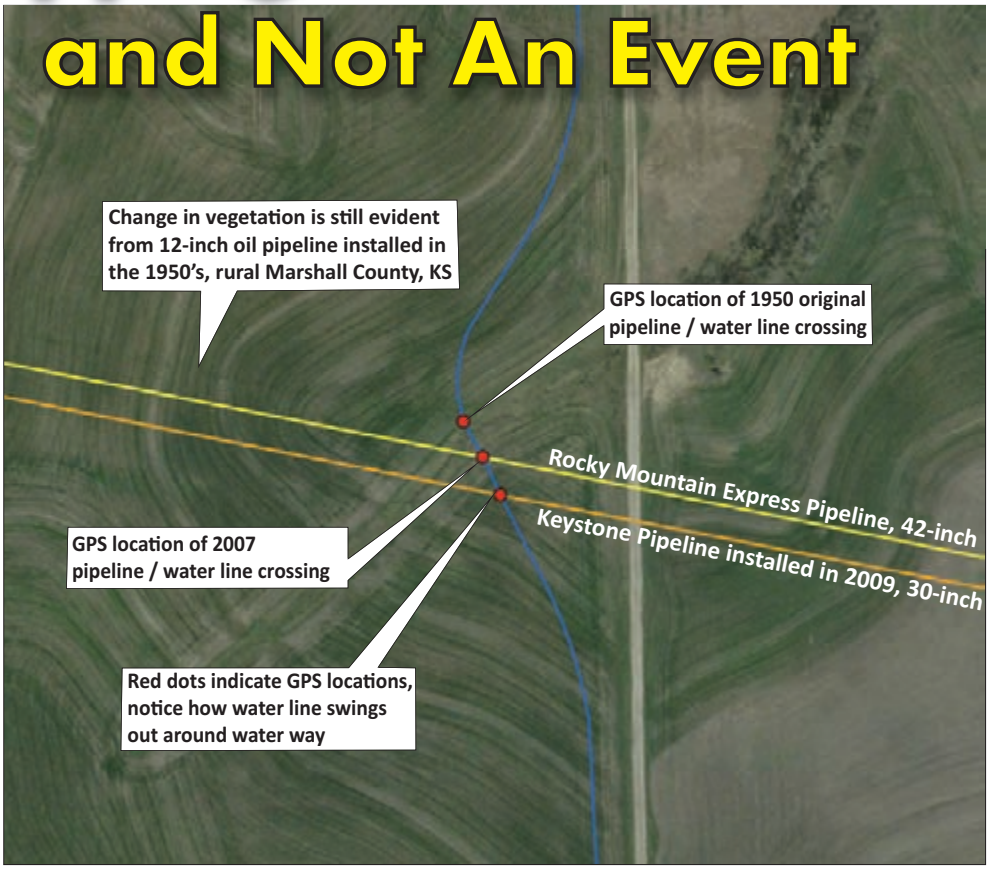
By Mark Thomas, GPS Mapping Tech

GPS Mapping is a Process and Not An Event



Many Kansas rural water districts and cities with PVC pipeline installed before July 1, 2008, will have great difficulty in complying with the new state law that requires utility infrastructure to be locatable to within a two-foot tolerance. Numerous systems constructed three to five decades ago installed water lines angling across sections of property in order to reduce construction costs. "As-built" maps are typically not reliable in many systems, even under the best of conditions, much less on diagonal shortcuts. Measurements may or may not have been taken to locate the line, and the original operator of the system is likely retired or deceased. Many people say, "We'll find it when it leaks!" They can only hope they are not involved because not all water leaks come to the surface, and a mud puddle can't be found unless people have an idea where to look. Original As-Built maps provided by engineers do a decent job of showing which side of the road a water line runs, and which section the water line angles across, but as far as helping an operator mark it within two feet, those maps leave a lot to be desired.

Tracer wire or GPS technology are now required to be used with any new-construction by any public utilities. Tracer wire technology has been around for many years, and works great for accurate water line locating. However, tracer wire is only as good as the installation and materials.

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Tracer wire has additional negative aspects and it also has positive aspects, but in my opinion, the negatives by far outweigh the positives. Early installations had the connection wires inside valve risers. Many of those connections have been severed with valve wrenches. Recently on a new system in Kansas, the installation of tracer wire went up to five (5) miles without a connection point. Risers placed in fence rows are farmed over or destroyed by livestock. Critters such as field rats and gophers like to work their way into fresh new trenches and sometimes chew on the wires. Tracer wire has to really be evaluated longer term when considering its value.

GPS technology has been available since the 1970's with the military being the primary user. In the last ten years, we've seen greater accuracies with GPS, and it has become more available for civilian purposes such as travel, freight tracking, land surveying, etc.

After four years of deliberation, the deviation from the military standard was removed from GPS on May 1, 2000 by President Bill Clinton. The intent and effect was that GPS would become much more useful for civilian use.

GPS is now widely appreciated in rural America in a variety of applications in agriculture and farm machinery operation. Utility mapping via GPS continues to evolve with improved technologies and procedures. It is however, somewhat baffling to me personally why there remains such confusion and skeptism as to how GPS technology can be used to benefit water and wastewater and other utilities. This confusion is due in large measure to a lack of knowledge about GPS mapping. That in turn is keeping rural America's water utility mapping from progressing past where it was years ago. On numerous occasions when I've collected data for newly constructed waterlines, the operator will say, "I sure wish the rest of the system could have been collected." Unfortunately, most RWDs were constructed well before the availability of GPS. The point that I'm trying to make is that the technology is here today, and mapping methods from 30 years ago are still way too prevalent in rural America. A simple question: Why are new projects not required to employ GPS technology?

As I commented earlier, I believe a lack of knowledge or confusion has hindered the growth of GPS mapping. There have been instances where a few RWD board members or city council members thought that my GPS unit could "find" all their water lines when I arrived at their project. Well, needless to say, when I told them that I could not GPS a water line unless they already knew where it was, they thought it was a waste of their time and money. Just a few weeks ago, I was collecting a new half-mile long line replacement, and was greeted by the property owner when I finished up at his house. As always, I hear the "what the heck are you doing?" Upon explanation, I hear the usual "why are you GPSing a brand new line, you need to be GPSing all the old ones?" Well, any new additions constructed this summer are not going to be considered "new" as soon as the fresh trench disappears, or the farm ground is tilled this fall. GPS mapping a 30-year-old water district is not an event; it's a process which needs to be ongoing.

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Just making the decision to do it seems to be a big hurdle for many RWDs and smaller towns. There is often a debate whether the city or RWD should purchase their own GPS unit, or hire an outside source to provide the service. KRWA does not discourage RWDs and cities from purchasing their own equipment, but we've seen our share of systems do this and then end up with not much – and in cases – nothing accomplished with that equipment. This is either due to having difficulties learning how to use the equipment and software, or just flat not having the time to go out and work on mapping.

GPS mapping is complicated

In KRWA's ten years of working with GPS mapping, it has become evident that the best way to approach this is by going out and collecting everything in the system that the current or experienced operators, board and council members know about. This includes: locations of meters, valves, hydrants, cleanouts, towers, boosters, and any line points that are known. Line locations can be collected by finding road crossing signs, old trench line depressions, or lines that have locate wire can be traced and collected at the same time. If a system chooses to hire KRWA to perform this work, we can do as much work as we are asked to do, meaning we can collect the data and give it to the system and be done, or we can incorporate the data into ArcView mapping software and create new maps with this data. Any water lines with unknown locations can be drawn in via the person with the best guess. As crude as that may sound, that is the only viable option until a more precise location of the line is made. Then, collect the points and incorporate those into the existing mapping project. In my opinion, RWDs should have a GPS unit for these occasions. By spending the time working and/or training with KRWA collecting the entire district, he or she can focus solely on collecting new additions and leaks. It takes at least a $6,000 plotter to produce higher quality maps, not to mention the thousands of dollars for software and the extreme learning curve that is required for any system to do it all in house. KRWA staff are often challenged with changes in the technology and working with GPS is what three of us do full time. We help each other with technical challenges. It is unreasonable for any local system to undertake that task. If they do, then I have to ask what work is presently being done that doesn't need to be done as GPS mapping is exceedingly time consuming and tedious.

That is also what I mean when I comment that GPS mapping is a process and not an event. When new gas/oil pipelines or fiber-optic lines come through an area, water lines are likely to be broken. Having a local GPS unit handy allows the operators or others to collect the exact locations. Marking these locations will save time and money in the future. These 30 year-old water lines do get exposed numerous times throughout the years, and it has become evident that GPS technology does work better than measurements jotted in here and there on old paper maps.

KRWA is more than pleased to help you evaluate your options on improving your mapping products. Give us a call at 785.336.3760 or email me at mark@krwa.net and I'll be pleased to schedule a meeting with your board or council to discuss the challenges and expected outcomes with you.

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