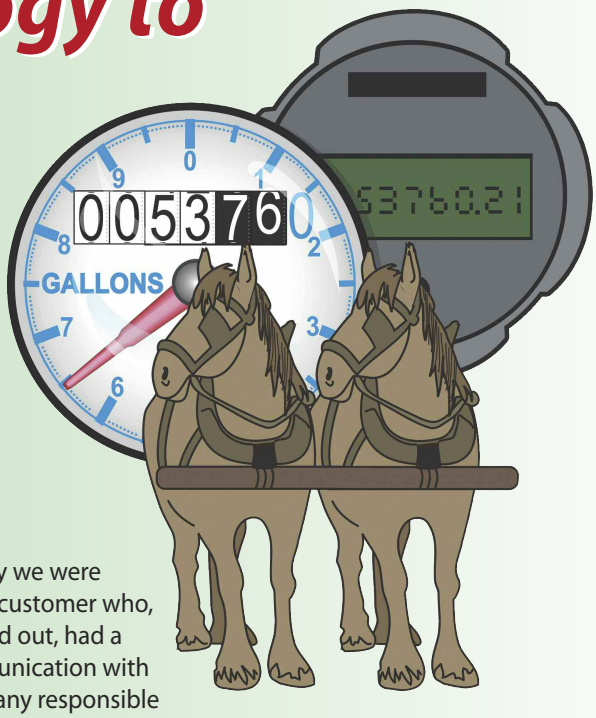
By Linda Windler, Thoroughbred Systems, Inc.

Computer Corner

Harnessing Technology to Work For You – Automating the Meter Reading Process



Through the years we have seen many water systems embrace a variety of new technologies. Sometimes the technologies affect those who work in the field and sometimes those who work in the office, and sometimes, as in the case of automated reading, both.

Automated reading can refer to everything from ventures like satellite reading on the high end to mobile phone reading, to radio read, to touch read, all the way down to using Windows tablets to type the readings into the computer while in the field. All but the last mentioned do not require a human to actually "eyeball" the reading. All of these end the need for the clerk in the office to transcribe readings from what is often a wrinkly, dirty, difficult to decipher, set of papers on a clip board or meter reading workbook.

The two choices that seem most common are Radio Read and Mobile Phone Read systems. Radio Read involves either a new meter or a retrofit meter that transmits a signal, most often set up to be picked up by a receiver mounted to a vehicle that is driven around the water system on meter reading day.

Mobile Phone reading works like a cell phone, sending readings using cellphone towers. The meters may commonly, automatically read once an hour or even more often, but the data may only be sent once a day. Of course, the reading for figuring the bills is collected only once a month, but, the frequent tracking of usage can help in determining if there is a leak problem, and depending on the usage and the time of day, what that problem may be.

Recently we were helping a customer who, as it turned out, had a miscommunication with the company responsible for setting them up for electronic read. Of course, both the meter folks and those running the water district thought they were on the same page, but, as we discovered while playing our part in the work to be done, there had been a failure to communicate. This water district traditionally read the meters by the thousands which is a common practice. As shown in the graphic, that means that they only read the black on white dials and ignore the rest. If a customer used 4,000 gallons then that customer's usage would read as "4". Meanwhile, their new meter reading system was setup, unknown to them, to collect the readings in the hundreds of gallons unit of measure. Using that same example meter graphic, that would mean that all the black on white dials were being read along with the first white on black dial, which, in this example, represents the hundred gallons point. Reporting on the readings this way would cause a customer with a usage of 4,000 gallons to show a hundred-gallon unit usage of 40.

When reading in thousands, like the first example where a usage of 4 means four thousand gallons, the translation to single gallons requires adding of three zeros. Translating a reading in a unit of hundreds requires adding two zeros to demonstrate the usage in the single gallons. When reading in

Graphics by Linda Windler.

the tens of gallons only one zero is added to display the usage by the single gallon.

One might ask... "If the readings were coming in from the electronic in the hundreds instead of the thousands, i.e. with an additional digit not being previously read, could they have changed their formulas and altered the earlier reading by adding one digit, a zero, in order to start figuring bills by the hundreds instead? Sure they could, but they did not wish to. Their customers had years of understanding that they were being charged in thousand-gallon increments and the system didn't wish to throw customers a curve.

So, if the district didn't want to change how they bill, what would it take to correct the misunderstanding? What would it take to make the system that had been set up contrary to the way they wanted things, to be as they desired? In some cases what the reading comes in at can be controlled by software and it is a fairly simple matter to change, while others require special programming at each meter so it is a much bigger deal if the meters have already been installed across the system. Hard or easy, no one wants to suddenly discover at reading time that their new automated reading system is not working as expected. It is certainly best to have everyone on the same page from the start.

Probably the most common miscommunication we see regarding what register meters are read in is a little different than the case discussed. Water system customers usually have no problem understanding the concept of a meter read in the single gallons; it is pretty self-explanatory. Most often customers also have no problem understanding the concept of reading and billing in thousands. After all, more often than not when the question is asked, "How much do you charge for water?" the answer comes back $5 per thousand gallons, or $7 per thousand, or $9, or whatever. Because of this thinking of "charging per thousand" mindset exists, when that same board member or staff is asked "What do you read the meters in? The thousands?" They will often say, without skipping a beat, "Yes, in thousands", even though, in truth, the readings may be done in the hundreds and therefore charged in the hundreds or the tens or even the single gallons.

It is not unusual to understand why they would answer in that way. Because almost always, people refer to the manner in which water is charged as being in the thousands even if in reality they are not charging $5 per thousand but, instead $0.50 per hundred, $.05 per ten or $.005 per single gallon.

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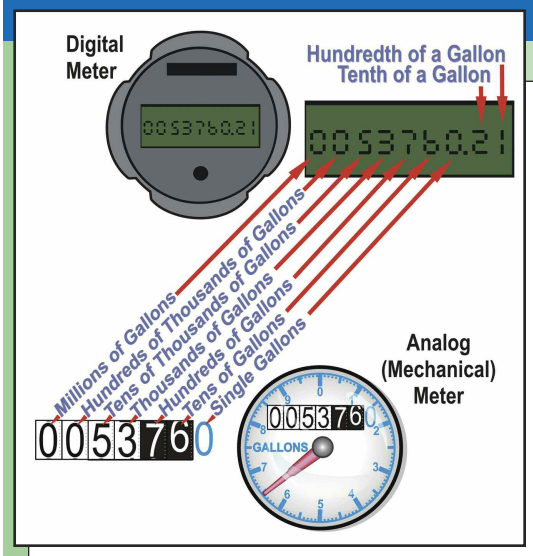
To illustrate this, I recently asked both a city clerk and an office manager for a rural water district if their systems read meters in thousands of gallons. They both answered "yes". Moments later, after connecting to their billing systems via the Internet, I saw that neither system read or charged in the thousands of gallons. One of systems actually was reading down to single gallons.

More often than not, a water utility moving to a method of automated meter reading also changes out meters, though sometimes existing meters can be retrofitted for electronic read. It is likely that the old meters being removed are mechanical and the new replacements are digital.

It is likely that whatever utility software one is using has built-in features for the process of meter switch outs. Hopefully a process that allows for the automatic figuring of the water used from the last billing until the meter was pulled and then the water used on the new meter from installation until meter reading time. If both of these usages are not taken into account then water could be given away uncharged.

Probably the biggest reason systems resist changing to one of the automated reading methods is the price tag. To be sure, a water system should do some serious analyzing of the benefits verses the cost. When set up correctly, automated metering may create an improved accuracy of usage reporting ensuring that customers are being charged what they should be charged and assisting in tracking water loss. This increased accuracy might well be particularly apparent in the case of self-



Analog Mechanical Meter

An analog, i.e., mechanical standard residential meter will have seven digits but only six of them will be moving dials while the last one, the one representing the single gallons, will be a painted on zero. So, for systems with mechanical meters that read down to the single gallons, every reading taken will always end in a "0".

Non mechanical, larger meters may also have more digits, going to the left all the way up to the tens of millions as on mechanical meters. To the right side of the meter, like the digital residential meters, may have a decimal followed by a digit representing the tenths of a gallon or two digits to the right of the decimal representing the tenths and the hundredths of a gallon. These fractions of a gallon are never used for the purpose of calculating a bill.

Larger meters like those used for schools or nursing homes, etc., should be read in the same register as the residential, but there are some differences in the larger meters. While mechanical residential meters will have a single gallon painted on zero, a system may also have larger mechanical meters that have a static "0" for both the single and tens of gallons position. Instead of seven digits total, they may have eight with the one to the far left representing not the millions but the tens of millions. This will most likely be true also of any master meters, i. e. water source meters which should also be reported in the same register as customer meters.

Understanding what register a water system reads its meters in is important for a number of reasons. Whether setting up a new electronic read system of setting up formulas for rates it is imperative that there is no miscommunication on this point.

Fortunately, it does not happen often, but on occasion I have seen where a water system has some customers set up to be read in the hundreds while other customers are set up to be read in the thousands. This makes for a real mess, including trying to account for water loss.

There are also times when a water system thinks they are reading all of the accounts in the same register, as should be the case, until someone comes along with a better understanding and demonstrates to them that there is a problem with one or more customers. That was the case with one town that was losing thousands of dollars on one customer. The customer was a nursing home. The way the customer was set up, every time this nursing home used one thousand gallons, the city was counting it as one hundred gallons and charging for only one hundred. Yikes! This had gone on for more than ten years which meant, besides loosing lots of money, they had always shown a large water loss that was not accounted for.

read systems, systems where customers read their own meters and submit a payment they have calculated for themselves.

In the case of water systems that have meter readers who cover the miles by truck and/or by foot, management may miss having those eyes examining what is going on from one end of the system to the other, especially noticing leaks.

Automation is a wonderful thing, but when handing off work to a machine just remember that there is no computer or mechanized device that has the capability to reason. We must make sure that we take steps to thoroughly understand the process and organize it in such a way that will result in accuracy. It is important that all parties involved communicate. That includes the field staff and office, the board and council members who make the decisions, and the vendors that supply the products and expertise needed. It's important to see the full picture at all times and never go along with blinders on simply following a set of steps and not paying attention to the result.

Harnessing up a team of horses correctly can make for a safe and jolly ride; failing to do so can be a catastrophe. Harness technology with knowledge and care and it can take you where you want to go making work more accurate, efficient and cost effective.

Watch for the continuation of Computer Corner in the next issue of *The Kansas Lifeline*. We will focus on what self-read water systems that are evaluating automated reading may want to consider.

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We've used Thoroughbred for years, even back when the customers read their own meters. We're really hi-tech these days with the latest version of Thoroughbred and Windows 10. I send traditional printed bills through the U.S. Mail to less than half of my customers now, 'cuz now we also have things like email notices & billing, automatic banking & Credit Card Pay. The program's like Burger King, it "Lets us have it our way", with queries and custom reports. There are tons of features that help with everything from water loss to keeping on top of delinquent accounts, rate code studies, work orders, mail merge letters, you name it, all for a low purchase price. Best of all, human beings answer the phone & help me for FREE! You'll love it, startup training can be in person in the water office or via the phone & Internet. And, there are **NO YEARLY FEES**, I get FREE tech support and FREE upgrades for five years. *Now, if they could just teach my computer to serve up a hot cup of coffee in the morning, IT WOULD BE PERFECT!!!!*