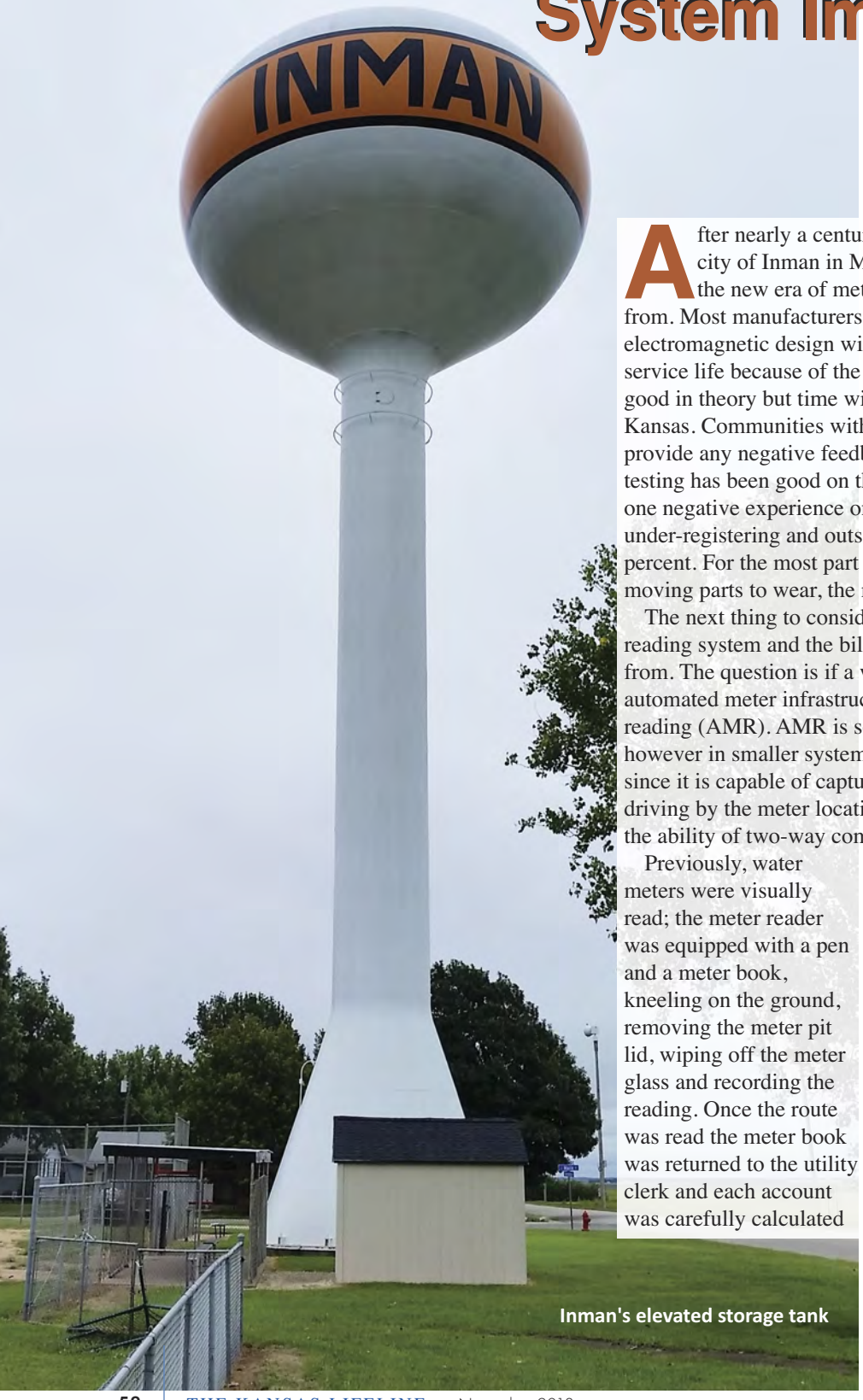
By Jon Steele, Technical Assistant

Inman Installs Automated Meter Reading as Another Water System Improvement



Inman's elevated storage tank

After nearly a century of using mechanical water meters the city of Inman in McPherson County decided to upgrade to the new era of metering. There are many brands to choose from. Most manufacturers are now providing the ultrasonic or electromagnetic design with no moving parts, claiming longer service life because of the lack of moving parts. It certainly sounds good in theory but time will tell how well these meters perform in Kansas. Communities with this type of meter in service have yet to provide any negative feedback. My experience so far with field-testing has been good on the residential meters. However I did have one negative experience on a two-inch ultrasonic; it was actually under-registering and outside of the industry standards by several percent. For the most part it stands to reason that if there are no moving parts to wear, the meter should maintain accuracy.

The next thing to consider when upgrading would be the type of reading system and the billing system and there are many to choose from. The question is if a water system wants to go all the way to automated meter infrastructure (AMI) or just automated meter reading (AMR). AMR is somewhat limiting compared to AMI, however in smaller systems AMR is probably all that is needed since it is capable of capturing all of the meter readings by simply driving by the meter locations. AMI has more capability since it has the ability of two-way communication.

Previously, water meters were visually read; the meter reader was equipped with a pen and a meter book, kneeling on the ground, removing the meter pit lid, wiping off the meter glass and recording the reading. Once the route was read the meter book was returned to the utility clerk and each account was carefully calculated

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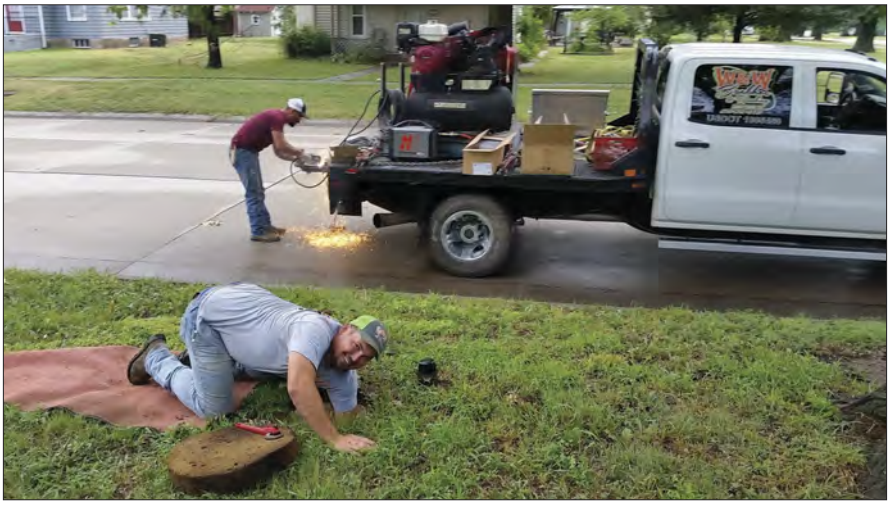
by hand using a calculator and finally a bill was generated and printed and mailed. Computerized utility billing made its debut in Kansas in the early 1980s.

Today, many water systems have upgraded metering systems so that someone simply drives down the street to collect all the readings via a remote reading technology. The data is then downloaded to the billing software which in turn prints out the bill. This reduces time and effort of a process that otherwise seems mundane to most water system employees. Now with an AMI system like the fixed base or the phone read system, no one even needs to drive the route as meter readings are transmitted to the billing department or to a cloud storage system that can be directly downloaded to the billing system.

After Inman City Superintendent Danny Parr presented the meter replacement program to the city council, it was clearly decided to make the upgrade to the new AMR drive-by system. One of the key deciding factors was that it was time for the meters to be replaced anyway due to age and high usage. Other contributing factors included potential time saved reading meters, having greater accuracy with no meter reading errors, and no more wintertime, estimated meter readings. Danny commented that there may be some revenue increase however that was not a deciding factor since the city's water loss is relatively low in the ten percent range. He estimates that more than fifty hours required to read the meters and subsequent office time for billing was required each month.

After careful consideration of several AMR systems the city of Inman selected the Kamstrup Drive-by system. It was purchased from D C & B Supply in Pratt, Kansas. The system uses a smart phone or tablet type device to capture the readings while driving down the street. The meters are the ultrasonic type with high accuracy even at very low flow rates down to .015 gpm on the residential style meter. They are capable of measuring reverse flow in case of being installed backwards; small and large leakage problems are tamper-resistant and the meters record the data for up to 460 days. Customer usage patterns can also be graphed and printed for the customer if there is a billing dispute. AMI systems also now allow the customers access to their own account and usage information or can even notify them of possible leakage and high usage patterns. Another feature is the meter's ability to measure water temperature. This allows operators to monitor temperature remotely if the system had the full AMI system. This could be useful to detect freeze conditions or perhaps water with long resident time within the distribution system. Higher temperatures could possibly be linked with



Shane Spencer installs a new meter while Josh Blackburn uses a plasma cutter to cut the hole in the cast iron lid for the antenna. The meter installation was completed by W & W Backhoe and Trenching, Mound Valley, Kansas.

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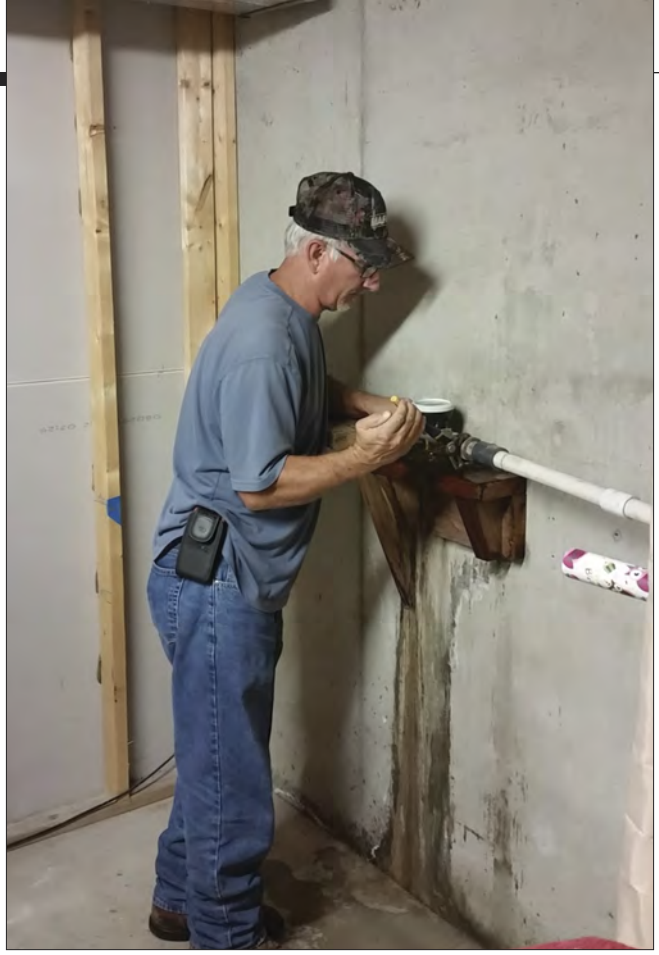
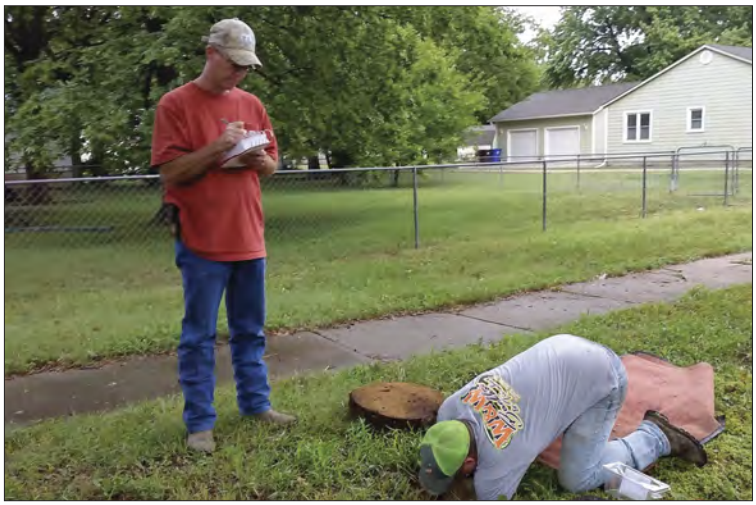


City Superintendent Danny Parr installs a new meter in a basement.



City employee Rod Berger records reading from the old meter and serial number of the new meter.

long resident times and help identify areas of concern for possible low chlorine residuals.

After resolving a few minor issues, all 594 meters were installed in about ten days. One issue that was encountered was a laying length issue on the two-inch meters of which the city has a few. Kamstrup previously did not make a 10-inch lay length, however the company is now manufacturing one. There was also a leak issue on the one-inch meters if tightened as one would with the old style meters. Due to the meter inlet design the rubber gasket can compress inside of the inlet flange creating a leak when the meter is pressurized. The solution was to install a fiber washer against the meter surface followed by a rubber gasket against the meter nut.

Danny shared an interesting note about the new system shortly after it was installed. The meter at the school was test-read after two days of installation; it showed 65,000 gallons of usage. This was several times in excess of normal usage. The maintenance staff did believe there was a leak in the school system. Danny was beginning to question if there was a problem with the newly installed meter. However after further investigation, it was determined that a continuous flowing toilet caused the excessive usage.

Any water system considering AMR or AMI should carefully conduct a return on investment analysis.

Inman has always been a well-managed system and the new meter technology is just one more example of good management and planning by the city council and staff. I have previously written about Inman having direction and good system management concepts in place to properly plan for the future. One such example I like to site and I have told this story many times using it for an example to other communities is the improvement project they made a few years ago when they were able to pay $1 million of system upgrades from their capital improvement fund reserves. Not many small public water systems can do that.

Any water system considering AMR or AMI should carefully conduct a return on investment analysis. There are significant expenses of implementing something new. That should be compared to the potential for increased revenue and cost savings.

Kansas Rural Water Association provides for both large meter and residential meter testing – and at no charge. If your system is experiencing higher water losses or just want to approach meter accuracy with some factual information vs. thinking that the meters are old and so they need to be replaced, give us a call and we'll pull a sampling so that the governing body and staff can make more informed decisions on potential purchase of new meters.

Jon Steele has been employed by KRWA as a Circuit Rider since 1995. Jon is certified as a water and wastewater operator. He has more than twenty-five years experience in public works, construction and industrial arts.