

Two Beneficial Tools to Detect Water Leaks in Rural Water Systems



KRWA has two of the Fuji Portaflow ultrasonic flow meters. This photo shows one of them in use on a small water line in a rural water district in an attempt to isolate a leak. This non-invasive meter measures the velocity of water with ultrasound to calculate volume flow.

Water system operators and managers know that to control unaccounted for water (UFW) requires continual efforts. Those efforts generally involve some repetition of logical steps to obtain accurate data that end up contributing to a public water system’s efficiency and financial well-being. KRWA has worked with public water systems for decades to help them reduce water loss. I would like to use this article to explain just two of the tools that systems can develop at little cost to help them better manage their distribution systems – and hopefully, control water loss.

Area meters

KRWA has long advocated that rural water districts install “area meters”. An “area meter” is the simple installation of a meter that can monitor a section of a water district pipeline system. Having area meters in place allows operators to read those meters and narrow down the area in which a potential leakage may be occurring.

The meter can be installed on a straight portion of water line to measure flow. A meter can also be installed on a “loop line” to assist in detecting leaks! On a looped line it is necessary that all valves be operable to close the loop line itself. This will force all the water that is being used to go through the area meter.

Area meters record water and the amount of flowing water that is received by a certain area of the system. With that information, operators can then record the amount of water that flowed through the meter and compare that to the cumulative

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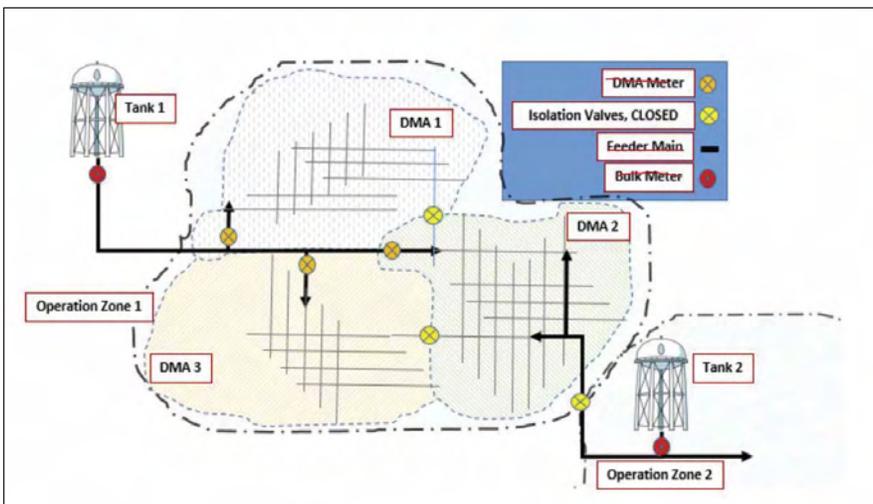
uses of all the customer meters beyond the area meter. This assists in determining the amount of water loss in a specific area of the local water district. This technique is a big help in narrowing down a potential water leak to a very specific area.

Some of the newer automated meter reading and reporting technologies are an incredible advantage to total the individual meters in subsections of a large rural system and compare that usage to the reading on the area master meter nearly instantaneously.

One important aspect of the area meters is that the downstream valves be operable and fully functional. This is very important to ensure that zero water passes through the valves. If water seeps through the valve, it will show flowing water on the meter and will not allow an operator to be able to determine accurate water loss in that section of the system.

Ultrasonic meters

Ultrasonic flow meters utilize sound waves to measure the rate of flow through a water line. Since ultrasonic



This illustration shows the basic concept of having “area meters” to sub-divide a large rural water system into areas as a way to help verify and track unaccounted for water.

signals can penetrate solid material the transducers can be mounted to the outside of a water line. This creates a non-invasive way to detect a water flow issue.

The ultrasonic flow meter will need to be programmed to the correct pipe sizing and inside diameter of the water line. This is a necessary step in order to accurately set the sensor spacing on the sensor bar of the device.

Ultrasonic meters are typically fairly operator-friendly. The only thing the operator needs to do is program the meter with the appropriate measurements such as the inside pipe diameter and the wall thickness of the water pipe. This leads to an accurate measurement of water flow.

In order to be effective to use the ultrasonic meter the operator must narrow down the area of concern and excavate to expose the water line. Once the line has been exposed the ultrasonic meter can be attached to the line. If no flow rate is detected it is to be assumed that the leak is occurring between the ultrasonic meter and the area meter. Then the operator can move halfway from where the line was exposed and the area meter. These steps are repeated until the leak is pinpointed. Depending on the distance between the line being exposed and the area meter, it is sometimes feasible to install a pit for future use of the ultrasonic meter.

Benefits of tandem area and ultrasonic meter usage

Having area meters in a large system, e.g., with 300 to 500 or more miles of pipeline is a tremendous advantage to help narrow down the area of the district that has a possible active leak. Once the area has been narrowed down the ultrasonic device can be used to further determine the location of the potential leak.

The benefit to both is that with the area meter there is no need to expose water line to assess the potential water loss. This will save time and costs and line exposure in the future. When the area meters are utilized efficiently, an operator can move efficiently to utilize an ultrasonic meter to determine water loss.

I would be pleased to work with any rural district or city on water loss issues. Contract KRWA or email me at Tony@krwa.net if anyone is interested in having a demonstration of the non-invasive meter.

Tony Kimmi has worked as a Tech Assistance for KRWA since October 2009. He has extensive experience in the operation of construction equipment. He has assisted in the construction of several rechlorination stations and ongoing monitoring of water quality issues. Tony enjoys providing assistance to public water systems.



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