

Leak Detection and the Struggles of Hard-to-Find Leaks



Having operable valves is essential to help make water system operations efficient. KRWA Tech Tony Kimmi uses a listening device on a valve to verify that it is completely closed.

I have been a Technical Assistant for Kansas Rural Water Association for just a few months more than eight years now. My position with KRWA is to be a field tech with an emphasis on performing meter testing, leak detection, as well as many other aspects of troubleshooting water system issues.

My main focus has been to reduce water loss for rural water districts, cities, and sometimes, private individuals with the request of operators of the water system. On two occasions, the city of Topeka has requested help on new line installations when contractors could not get the pipeline to hold pressure tests.

Leak detection can be an extremely difficult challenge. The first instinct by too many people is to go “leak-hunting”. In rural water districts, the first step is to test water

meters to confirm the master meter or meters are recording accurately. This is determined by performing a meter test using KRWA test meters which are certified for accuracy. The tests often involve attaching a fire hose to a test port after the master meter to KRWA's test meter. Larger meters, typically 6-inch and larger, are tested at the flow rate that is typical for the system. The results of the system's meter(s) and KRWA's meter are compared and a report is issued to the city or RWD.

Beyond meter testing, the next step is to determine if the residential meters are registering within accuracy. This is accomplished by removing random meters for testing. A cross section of units should be involved including those with low usages, high usage, newer and older. KRWA tests the customer meters with the Association's smaller test

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meter. Many system personnel often have the opinion that if the meters have registered one million gallons or if the meters are ten years old that they are not accurate. That's not necessarily correct thinking. Typically, the quality of the water or having any sand in the system are bigger influences on meter accuracy than the gallons on the meter register or the age of the meter.

If the sampling of meters test out within reasonable accuracy, then it may be appropriate to conduct a "water loss survey". A water loss survey involves closing valves for a short period of time, then opening them slowly to listen if there is a large or small amount of water required to fill the line. When the valve is opened slowly and the waterline fills quickly there is obviously no leak, or perhaps only a small leak. If a substantial amount of time is required to bring the closed line back to the system pressure or if the valve that is partially opened continues to emit sounds of water filling the line, then there is likely a large leak beyond that point.

Walking Lines

The next step is to "walk the lines". Walking the lines is time consuming but it is critical that all portions of the line are walked out. Some people think that just driving the water lines they can find the leak. In many cases water lines are in areas that are not accessible by vehicle. In my experience, it is necessary to walk out all the water lines to find the possible leak.

Installing area meters is a great asset, particularly in rural water districts. Area meters are installed on portions of lines to monitor gallons per minute going to the consumers in the area. System personnel can close valves along the lines and monitor where there

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KRWA Tech Tony Kimmi and Effingham Operator, James Ellis listen to a service meter with leak detection equipment after a repair was made.

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can be a possible leak. If a valve is closed and the meter still shows a large usage, then there could be a possible leak from the valve to the meter. If the meter slows in usage then the possible leak is after the valve that was closed. KRWA has helped many large water districts establish a plan to subdivide the system for better water usage monitoring. A nice feature is to also install bypass lines around critical valve locations and to install a meter in the bypass line to easily determine the rate of flow beyond that point.

The installation of area metering can be a significant investment. But the cost is an investment that can pay off big benefits to help operators be much more proactive on detecting and locating water loss.

Leak detection in cities and towns is somewhat easier than in rural water districts. In cities, KRWA use sub-surface leak detection equipment. This involves a sonic device to listen to all the meters in town to hear a possible leak. The leak detector captures the sounds of the water spraying out of the leak, whether it is PVC, cast iron, ductile iron, or whatever the water line is made of. The sonic equipment can be placed on any appurtenance. A rain drop on a fire hydrant resembles a sonic bomb when listening to a hydrant.

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If the sound of a leak is detected by listening to the meters, valves or hydrants, then the next step is to “ground microphone” the main or the service line to further pinpoint the area of the leak. In my experience, the ground microphone works fairly well when on concrete or asphalt. It is difficult to hear a leak in grassy areas or even on bare ground.

If your water system has interest in having master meters or some customer meters tested, or if you want to discuss any other aspect of monitoring or addressing unaccounted for water, I hope you will give KRWA a call. You may reach me directly by email at tony@krwa.net or call my cell at 913-370-0097. Last, I hope readers will attend the annual conference and exhibition, March 27 – 29 at Century II in Wichita. There will be many exhibitors there to show metering technology and other services. You won't find another conference and expo in the Midwest like it.

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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