

The Challenges of Locating Water Leaks

Leak detection itself can be difficult, but there are many factors that can compound the challenges of locating a leak using sonic detection equipment.

Other KRWA staff members and I use ultrasonic leak detectors as one of the tools to locate leakage on pipelines. The equipment consists of a control module with a meter that registers sound. It has headphones to help hear the leak. It comes with a magnetic base, which can be attached to any metallic pipe to listen for a leak. It has contact rods that are used to reach into a meter pit or valve riser to listen to the meter or valve. The ground plate is used to listen directly above the water line, to possibly hear a leak and narrow down the location.

As the name implies, an ultrasonic leak detectors detect the ultrasonic sound of a leak. Typically, a leak from a pipeline will make a hissing sound. Smaller leaks also emit sound, however the frequency is too high to be heard without specialized equipment.

An ultrasonic leak detector allows for the ultrasonic hissing sound to be heard. That in turn helps the person using the detected to pinpoint the source of the sound. If the leak is turbulent, there will be enough sound to be detected ultrasonically.

Some leaks can be heard from several feet away, therefore access to the leak is not always necessary. High pressure is not necessary. Ultrasonics can detect pinhole leaks with as low as 1 psi. However, the more pressure behind the leak, the easier it will be to locate.

Ultrasonic leak detectors are very sensitive to sound. Manufacturers of the equipment suggest that a good ultrasonic leak detector can detect the sound of a blinking human eye.

Each of the three attachments to the leak detection equipment have great advantages, but there are also many factors that can make leak detection difficult.

One of the situations that a person needs to watch for when trying to identify a leak is overhead powerlines. In some situations power lines can cause the leak detector to pick up noise to indicate a possible leak. There are six selectable filters to use to eliminate the electrical noise. They are split into three low side filters and three high side filters.

When listening inside buildings, anything that emits noise can cause a person to assume that a pipeline may be leaking. In pump houses, all of the pumps need to be shut off. The exhaust fans need to be turned off; sometimes even the lights have to be turned off if the ballasts are chattering.

It is very difficult to try to detect leakage from pipelines in grassy area. It's often impossible. The grass holds the ground plate up off the ground because there is no contact with the soil, the potential noise from a pipeline leak is not discernible. Also the rustle of wind affects the leak detector.

Even insects can cause a problem with leak detection equipment. One experience I had was when I put the headphones on, I heard a buzzing noise. After two or three seconds of wondering what it was I suddenly realized what

it was! A bee stung me on the ear. Evidently it had landed on the headphones when I had them off for a short time. So after that, I always check the headphones before putting them on.

Locatable waterlines are a huge plus. This ensures the leak detector can be placed directly above the pipeline which helps pinpoint the

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location of the leak. It is almost impossible to listen for a leak if the location of the pipeline is not known.

I've come to learn that cast iron and copper pipes resolute a lot more noise than PVC. PVC does not transmit noise as well as on pipes made of metal.

A major factor in listening for the leaks is highway and street traffic. Traffic is the biggest obstruction when conducting a water loss survey. The noise of tires on the highway can be heard for many city blocks through a sonic leak detector. Especially with high traffic areas, large truck traffic really makes it difficult if not impossible to hear waterline leakage.

Not only is the noise a factor with traffic, it can be very dangerous. It is best if the street can be shut down, or at least cone off the lane of where the waterline is located. I always like to have at least two guys with me when listening in traffic. It is difficult to watch the noise meter and watch for traffic at the same time – especially when wearing headphones.

One last noise factor I want to explain is animals, particularly dogs. A dog barking can be picked up in the headphones, sometimes many blocks away. As everyone knows dogs can be very protective of their property. With some dogs its almost a constant sound of barking in the headphones.

A drop of rain hitting a fire hydrant can resemble a sonic bomb in the headset on the leak detection equipment.

A drop of rain hitting a fire hydrant can resemble a sonic bomb in the headset on the leak detection equipment. The equipment is very sensitive.

So to summarize, there are many situations that can make it difficult to listen for possible leaks. In a quiet setting the subsurface leak detector is a very valuable tool and one that KRWA has used with much success.

If your community or rural water district has excess water loss, one of the possible contributors may be leaking pipes. But that's not where to begin the survey. A logical approach would be to test the master meters, check for overflow from storage tanks, then test a sampling of residential meters, verify the accuracy of data entry and operating of the billing program. Then as a last resort, it's time to focus on listening for potential leaks on pipelines. That is, unless there's an assurance that a pipeline is leaking.

Give KRWA a call or send an email to me at Tony@krwa.net for any help in addressing high unaccounted for water loss.

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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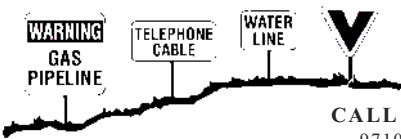
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