



## THE PATH OF LEAST RESISTANCE

Jonathon Barnes | Circuit Rider

It is no surprise that every system has leaks that range anywhere from minor to major. Depending on your system size and your production ability, some of the minor to moderate leaks are not high priority as compared to either major leaks or other priorities. The ability to keep your storage tanks at peak volume during these leak losses is key, and the investigation to locating these leaks starts with looking and listening.

The path the water takes as we all know is the path of least resistance. Looking for water leaks is not an exact science. Some operators may find leaks just from looking around at snow melt and some may find them coming right out of the road or ground. However, depending on your leak severity, system pressure, the ground material, the pipe material, pipe size, pipe depth, and compactness of the material around the pipe, they may never show themselves. It is just as important to know the details of the surrounding areas. If there are sewer pipes or storm drains near, there is always the chance of the leak finding its easiest path through the gravel or sand surrounding these collectors or their pipes if infiltration is a possibility. These can serve as great places to take samples and test for chlorine residual, or if you have fluoride in your system. The fluoride is a telltale that the leak has made its way into the collector, and you are at least in the right area since fluoride does not lose residual throughout your system. Do not exclude the water lines themselves either as they also may be the culprit of the leak not surfacing and traveling down the surrounding pipe material to a whole other area. Like driving down the highway looking for the next off ramp that is not cluttered with forty vehicles. It is looking for that next ramp with no wait to continue its journey, which could be quite a distance further.

Listening to the hydrants in the system can tell you a lot, although it also depends on the same material characteristics. After listening to the hydrants and you have pinpointed the loudest ones you start locating the lines. It is easy to get in the habit of "knowing" where the line is located... "It's right here. I remember", but it's important to look at the most up-to-date map and then locate the line, valves, and shutoffs accurately. Accuracy matters, because in order to listen and pinpoint a leak you need to be over top of the pipe or very close. If you are off more than a few feet, it is very possible the leak will never be heard or pinpointed. Listening to valves and shutoffs in the surrounding area of the noisy hydrant is also a great plan. This can narrow your search area down, as

louder valves or shutoffs can place you closer to the leak itself or be the culprit.

There are several different sounds to listen for. Three main sounds are 1: pipe resonance and vibration from orifice pressure reduction. 2: Water impaction on the surrounding soil. 3: Water circulation and flow in the surrounding soil cavity. Resonance or pipe vibration is often the loudest or most intense leak noise, sounding like a "whoosh" or a "hiss." Water impaction and circulation are often weaker, and often they may only be heard when you are right over the leak itself. Impacting directly on the soil will sound like "beating" or rapid "thumping" sounds. While circulation into the soil and around the pipe may sound like a "babbling" brook or stream. If the cavity is larger, then you may not hear these second and third sounds at all. Pressures over 50 psi will aide in the detection of most leaks as the intensity and loudness increases with greater psi.

With that being said, I have come across many "ghost" noises that sound like the "whoosh" or the "hiss" sounds that make it difficult to say, "right here". These "ghost" sounds can lead to costly dry holes and continued water loss, but at the same time eliminate that hole as the culprit. Being able to differentiate between these noises will come with time spent listening. Making sure you have accurate information available and locating the line itself is key to finding leaks even if they do surface. The path of least resistance is always directly under where the water is surfacing but that DOES NOT mean that is where the leak is located. Thorough investigation into all the affecting factors plays a role in pinpointing a leak. If your system has not budgeted for some updated leak detection equipment, I would highly recommend doing so. Technology is great and there are many types of listening equipment available. Many of which have come into a reasonable price range. Do your system a favor and invest in a tool that will save you time, money, and water loss. And remember, it takes time spent listening to learn what you are hearing, to ensure...**Quality on Tap!** 💧💧

