United Water owns and operates a water system in Harrisburg, PA serving approximately 37,000 customers. As part of the utility’s efforts to reduce water loss, the company proactively conducts leak surveys of the system. United Water knew it had at least one leak on a section of polyvinyl chloride (PVC) water line in Hummelstown, PA. Having determined that a leak existed, United Water was interested in locating and fixing the leak. Because finding leaks on PVC pipe is difficult using acoustic leak detection technologies, the utility looked for an alternate solution.

“Since sound does not propagate readily on plastic pipes it can be difficult to identify and locate leaks through acoustic correlation technologies. Moreover, plastics have “memory” so a leak may be missed or masked from acoustic leak detection measures because the “break” may be “open” or “closed” depending on the water system hydraulics at the time of the leak survey. So a leak may literally be “screaming” today and “quiet” tomorrow”, says Paul Meschino, P.E., Senior Vice President for Utility Service Group.

Having heard about a unique tracer gas technology using helium for locating leaks in water pipes from Utility Service Company, United Water was willing to give the technology a try. Consequently, Utility Service Company conducted a leak detection survey using its patented helium leak detection technology on a 1000-foot section of 8-inch diameter PVC water main in United Water’s Harrisburg water system.

The helium leak detection technology has been used on thousands of miles of pipes ranging in size from very small to large diameter transmission mains. The technology can also be used in very low pressure pipes and where distances between listening points make it difficult to employ acoustic leak detection technologies. It is the preferred method for detecting leaks in plastic pipes.

As part of the leak detection survey, helium gas meeting NSF Standard 60 for Drinking Water Treatment Chemicals is injected into the water supply upstream of the area to be surveyed. The helium marked water escapes from the water lines through cracks, breaks, or loose connections. Once the leaking water reaches the surrounding soil, since helium is 4x lighter than air, helium...
separates from the water and quickly finds its way to the surface above the pipelines. An elevated level of helium measured above the pipes is indicative of a leak. “We detect and pinpoint leaks very accurately in water lines in a single step. This avoids the complications, measurements, return trips, and precise knowledge of the pipe specification data required to correlate leaks with traditional acoustic leak detection technologies. Further, our technology is very effective in finding leaks on plastic pipes and in challenging environments”, says Paul Meschino.

The results of the survey using helium gas indicated a very small main line leak on the 8inch PVC line and a larger water leak on a service line. From recording the water flowing into the water zone before and after the leak repairs through a meter within the zone, a leak on the ¾ inch service line was estimated at about 2 gpm.

Steve Metzler, P.E., Senior Project Engineer, United Water had this to say about the technology, “I was interested in seeing the simplicity and effectiveness of the helium leak detection technology. Finding and pinpointing leaks on plastic pipes can be extremely difficult. This technology offers another tool in reducing non-revenue water from water piping systems.”