

# Utilities

Middle East

ESSENTIAL INSIGHTS FOR MIDDLE EAST WATER, GAS AND ELECTRICITY PROFESSIONALS

October 2007 • Vol 1, Issue 7

## LEAK DETECTION

Pinpoint the spot where the pipe has burst

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# Plugging the gap

Modern technology can let utilities know when their network is losing water – before their customers phone up and tell them first

Utilities invest considerable sums of money in their water and wastewater networks – so it is probably worth spending a little more to ensure they operate efficiently. As the vital importance of water conservation grows ever more apparent, large amounts (of water and money) can be saved simply through rapid detection of leaks on a water network's pipelines.

In the past a utility may have been reliant on visible signs of leakage before any action could be taken (something of little use in the case of minor leaks). But today, technology can alert them when a leak occurs – or even before it happens at all.

"The water industry has been slow to take advantage of information technology, but it is catching up quickly," said David Fortune, director of Wallingford Software, in a paper given earlier this year. "In many parts of the world, water managers now depend entirely on IT to manage their water supply and wastewater services. IT has become a core part of the business.

"Underground infrastructure, including water distribution networks, sewers and storm drains, are amongst the most valuable assets of a city or country. Yet they are also inaccessible and difficult to maintain, and are generally neglected. When these networks go wrong, they can disrupt the lives of many people and cause considerable financial loss."

It has gradually been accepted that it is no longer feasible to simply construct pipelines, bury them underground and hope for the best

a result, the concept of infrastructure asset management, an area heavily dependent on ICT, is growing in importance.

## LOCAL LOSSES

Water loss due to leakages is a bigger problem than people may think. The IRIN News website reports that pipelines leak some 50% of Lebanon's water supply, while leakages are thought to account for some 30% of Saudi Arabia's very high per capita water consumption. Else-

"With the value of water being comparable to that of crude oil, any leakage can have significant financial consequences."

Keith Joseph

– that they will continue to do their job without any problems. Water networks need to be managed and maintained around the clock and, as

where in the Middle East, the issue of water leakage may also appear to be a very serious one in light of the region's shortages – and of course



there is also evaporation to consider. In international terms, however, much of the Middle East compares favourably, and the problem of water losses on the network is not as grave as in other parts of the world.

Heidi Cooney, marketing manager at UK-based Sensornet, estimates that "60% is lost along the way from source to end-destination for Europe and America." The favourable situation over here could be due to the fact that the local infrastructure in the fast-developing Middle East is relatively new and not in dire need of refurbishment.

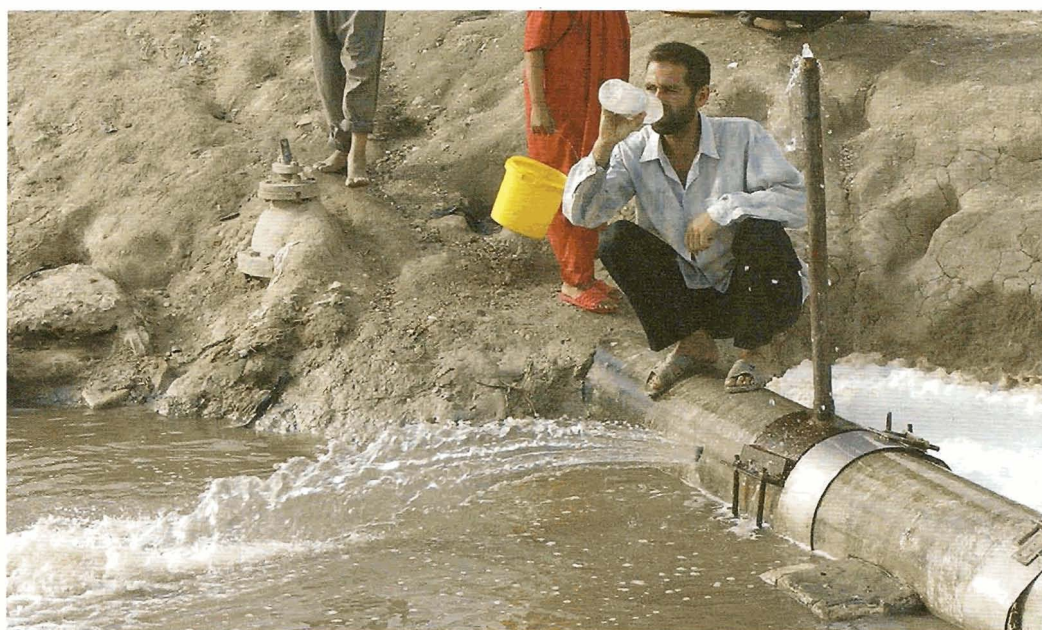
"With regard to water leakage in the Middle East, this is of major concern and of significant importance to those companies involved in the transportation of water," says Keith Joseph, customer care manager at Atmos International. "With the value of water being comparable to that of crude oil, any leakage can have significant financial consequences. As a result, we are seeing an increased demand in requirements for software-based leak detection systems in this general area of the world."

Gary Wong, global water industry executive at performance management software firm OSIsoft, suggests water leaks range from 20% to more than 50% in the Middle East, and are similar to leakage rates found in North America. "The Middle East is a market that we'd like to further develop as there is great opportunity and benefit to the region to manage leakage considering the scarcity and cost of drinking water in the region," he says.

### DETECTION STRATEGY

But how proactive have the utilities been so far in efforts to keep their network leak-free and save water? "Too often utilities lack a water leakage management strategy, if any kind of strategy at all," says Wong. "Utilities are reactive to the issue in general and few can back-up their 'estimated' water loss with actual facts and figures."

An exception is the UK, which Wong points out represents a good, proactive example of leakage man-



With new technology, the days when customers are the first to spot a leak could be coming to an end.

agement through industry regulator OFWAT. "Pressure management and DMAs (district metered areas) are used to prevent leaks and detection is typically done by using acoustic listening devices, leak noise correlators and tethered hydrophone systems," he says.

losses at various locations. Although this method works to a certain extent, especially in the case of large leaks in which there is a considerable loss of pressure in the pipeline, it is more difficult to identify smaller leaks which, over time, can cause significant losses."

oil and gas, have sought to close the gap left by conventional technology by increasing equipment sensitivity or by integrating the instrumentation with special software – or both.

The result means leaks can not only be detected, but even avoided in the first place. Of his PI system, Wong says: "OSIsoft's software platform allows a utility to collect data from all control systems and instrumentation, which is the key to water leakage prevention and detection. Without the data, a utility can only guess at the amount of leakage and would not be able to detect long run leaks that are not visible."

"Utilities need to be able to collect and analyse data before any optimisation or leakage reduction can be accomplished and measured. Based on the constant stream of data collected from water meters, our PI system can conduct real-time water balances to alert operators of possible leaks or anomalies in the entire water distribution network. It can reconcile the entire water distribution system in real-time."

Of course, as Cooney points out, "Typically water leaks don't happen quickly – they appear over a period of time." Modern systems therefore take on more of a predictive maintenance role. "It is almost like an

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As far as technology is concerned, Joseph suggests that the water sector is lagging behind in terms of what is available for leak detection elsewhere. "Traditionally, the instrumentation available on water transmission and distribution systems has been significantly less than that available on oil or gas pipelines," he says. "This has caused significant problems for many software vendors which rely on accurate, timely data in order to model the pipeline inventory."

"Conventional methods of leak detection rely mainly on the expertise of operators to identify leaks within the system based on pressure

As Wong points out, "It is easy for utilities to detect mains that burst because they are visible, but it is the leaks that cannot be seen that cause a majority of the total water lost."

"Leaks that are not visible in the water distribution system can go undetected for months and even years. We have a customer who uses PI (OSIsoft's enterprise data system) to detect leaks in real-time and in the past. It could easily take weeks to months to detect that same leak."

### SOFTWARE SOLUTION

Companies providing leak detection solutions, often with considerable experience in similar applications in



early warning system," she says. "It makes sure your infrastructure is as robust as it should be."

"A software-based leak detection system will assist the operators of the pipeline to quickly and accurately identify potential and actual leaks and put into place measures to reduce the losses," adds Joseph.

"In an attempt to overcome some of the telemetry issues which generally face these systems, Atmos has developed a package which can provide leak detection analysis based on data received on an hourly basis, performing analysis runs of the hourly data within minutes to determine the status of the pipeline.

"However, with regard to the systems being installed in the Middle East, a higher degree of instrumentation and telemetry is also being installed along with the actual pipeline infrastructure, which enables more standard software techniques to be implemented." Joseph says the accuracy and reliability of Atmos' water leak detection is now comparable to that of its oil-based software which has been proven at hundreds of live leak trials around the world.

Sensornet, off the back of substantial experience in dam monitoring in northern Europe, has also been able to develop equipment fit for detection of even very minor leakages. "The difficulty with water is that its temperature is very close to the ambient air temperature, so you need very sensitive technology to be able to pick up any leaks. That is where our technology is very useful," says Cooney of Sensornet's Digital Pipeline Leak Detection system. "We have very sensitive technology. We can measure millilitres down to minutes. Obviously, if you have a more serious leakage, we can measure that even quicker."

#### LEAK LOCATION

On a vast network, however, the mere knowledge that a leak has occurred is of little use if you are unable to say precisely where it has occurred. But today's integrated systems are able to solve this problem too.

"We can detect the exact location," says Cooney, "— that is the main difference. There are various other means of knowing how much leakage you are losing along the line but we can detect exactly where it happens. That is more interesting, especially over long-distances, and that is where a lot of costs come into play — when people know there is a leakage but they don't know where.

"Our technology is actually distributed over the full length of the pipeline. That means we have what we call a sensing cable the whole way along the pipeline and essentially you leave no area unmonitored.

"You are measuring the whole way along the pipeline, pretty much down to the nearest metre if you are measuring up to 30 km. You have measuring points the whole way down the line, not just discreet measuring points where you think things might be happening."

#### REGIONAL PRESENCE

Cooney claims to be receiving interest from the Middle East, especially in long-distance water pipelines. "The awareness is definitely growing, especially as water as a resource is becoming more valuable. Water is the next oil and gas," she says.

One problem is that companies offering water leak detection systems tend not to be based in the Middle East. "We are looking for some software, but unfortunately I do not know if they are available in Dubai," says Talib Abdulkareem Julfar, director of the drainage and irrigation department at Dubai Municipality.

While all the companies contacted for this feature were indeed based overseas, the benefits of water leak detection have become much more apparent here in the last couple of years, and its profile as a solution is growing.

It has played a big role in the oil and gas sector to date, as companies wince at the thought of missing out on revenue, but growing respect for water in an arid region means leak detectors will surely start to give water more prominence in their regional business sectors. **Utilities**

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