

Introduction of wireless data collection and analysis improves leak detection and water supply efficiency

Radio Solution brings real-time monitoring benefits for water supplier

In the year 2000 Eastern Austria's largest Water distribution company, the WLVNB in Eisenstadt, started to build a network of Adcon stations for leak detection. Initially planned for 70 RTUs it meanwhile comprises of over 250. Here is why!

A summary of the current situation:

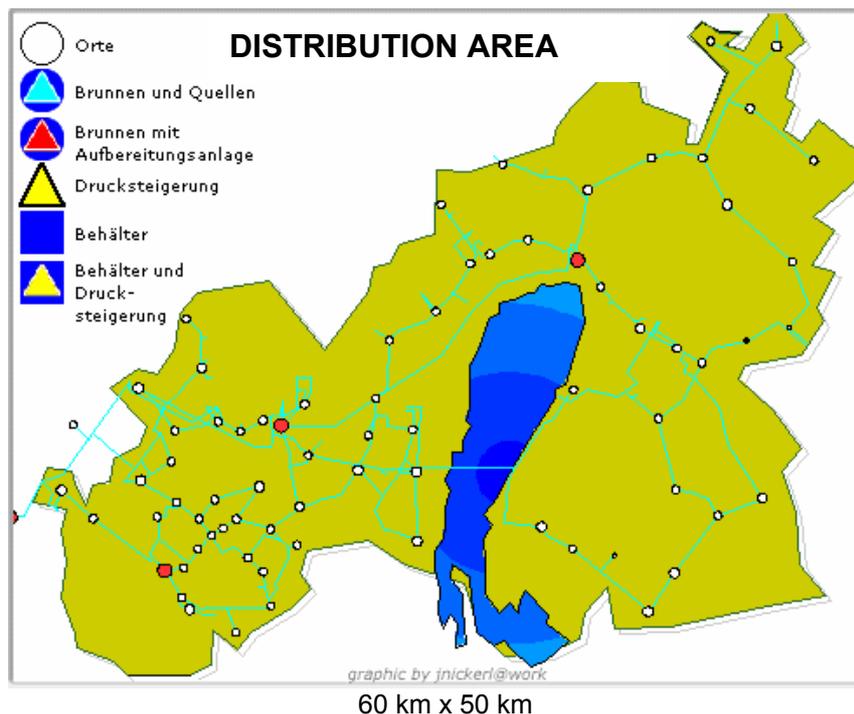
Number of RTUs in the network:	260
Number of A850 Telemetry Gateways:	2
Length of pipeline monitored:	1700 km
Area covered with RTU network:	2000 km ²
Inhabitants served:	130.000
Annual production:	13,9mio m ³
Data retrieval interval:	15 minutes
Software used:	Adcon addVANTAGE Pro 5.4 Adcon addUPI XML protocol SCADA System by Heresch Werke
Average number of leaks found:	> 1 per month
Total water savings per year:	> 150.000 m ³ per year
Additional cost savings per year:	10.000 km driven by meter readers 2 thirds of meter readers inspection time!



The WLV association operates a 1700 kilometer network of pipelines that covers most of Northern Burgenland in Austria; an area of over 2000 square kilometres. It serves 65 communities with around 130,000 inhabitants; during the holiday months this can increase to more than 200,000. The economical operation of plants and the identification of any required maintenance to the

network was, in the past, achieved by the work of eight inspection teams. These teams would inspect every single transfer shaft and transfer meter once per month.

To reduce this time consuming work the WLVNB decided in 1999 to install a near-real-time, automatic meter reading system. Starting with 80 Adcon RTUs in the year 2000, the system has grown to well over 250 RTU's today that read major water meters and monitor processes in the distribution network.



Each of the remote radio metering stations comprises a solar powered, low power wireless data transmission unit. In the WLV application Adcon's A733 addWAVE and A723 addIT units are used. Each such RTU is connected to up to 4 mechanical water meters, mostly of Woltman-type by German manufacturers Hydrometer and Meineke, outputting pulses per consumption unit (usually measured in 1, 3 or 5m³ per pulse) via standard reed switches.

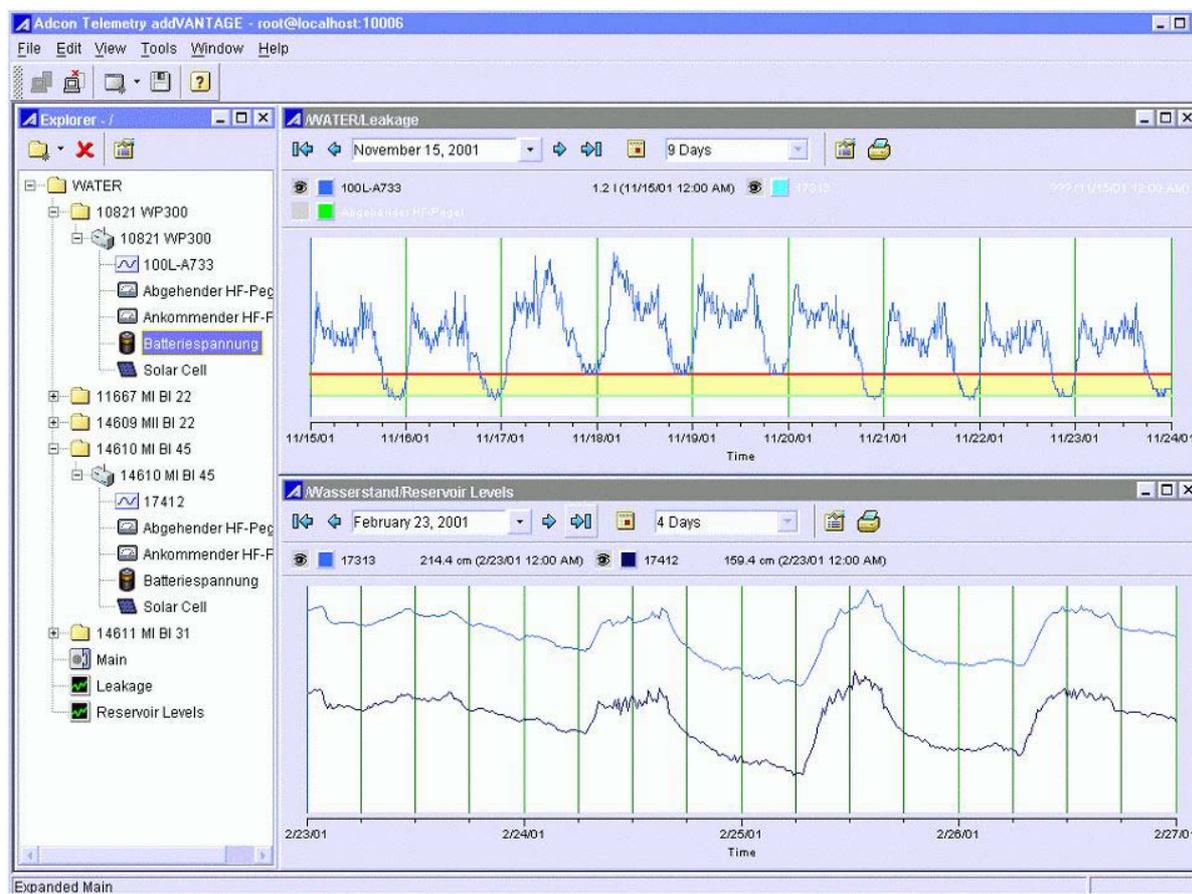
Two A850 Telemetry Gateways, located at the WLV headquarters in Eisenstadt, collect the data of each station every 15 minutes. The effective transmission range of each remote metering unit is approximately 20km. To achieve greater transmission distances, data from the furthest stations is relayed via other units to the Gateway which allows for large scale monitoring networks.

The immediate advantages of the new system are obvious: drastic reduction of water loss, no more undersupply in the area, a saving of two thirds of the working hours and more than 10,000 kilometres of mileage driven by inspectors per year. The ability to measure, collect and analyse data at any time, even from remote locations, brings significant benefits in terms of leak detection, consumption profiling and, perhaps most important, time, energy and money savings.

Pipe bursts can now be detected up to 95 per cent faster than in the past. On average more than one pipe burst per month is detected literally "over night" and thus a water loss of on average 8,000 m³ (per burst) can be avoided.

What counts even more are the many little leaks uncovered by the system. While pipe bursts are usually detected very fast – either by citizens alarming the supply company via mobile phone or by an immediate drop in pressure – it's the small leaks that are usually hard to find, but still cause tremendous losses. While a 1mm² leak in a 5bar supply pipe causes an annual loss of 511m³, this loss almost doubles in a 10bar pipe line. Since the hole gets bigger over

time so does the loss. At 5mm² this already amounts to a whopping 15.700m³ per year in a main 10-bar transportation pipe!



Typical consumption profile, showing night time low and a three-day leak.

Actual leak detection is done by consumption profiling. Since metering pulses are summed and stored in 15 minute intervals, an accurate consumption pattern for each section of the pipeline network can be derived from this. By closely observing the nighttime lows any unusual increase in consumption can immediately be detected and be acted upon. If consumption results in a parallel shift of the night time low a leak has occurred.

Since the year 2005 a few weather stations were added to the system, mostly for tourist information. Furthermore a few dozen manometer sensors now monitor the pressure in the pipeline system, not only to guarantee a uniform supply pressure, but also to detect and give warning of pressure blows that can cause enormous damage and severely disrupt supply.

Commenting on the implementation of Adcon Telemetry's remote radio metering system Wolfgang Thurner, General Manager of East-Austrian Water Distribution said: "The Adcon system helps us to detect leakages within a very short period of time, often on the next morning. This is an incredible improvement to prior practice and means a significant reduction in controlling efforts which enables us to manage precious staff resources much more efficiently."