IN THE FLOW

By Marc Pons

SCADA system helps manage clean water supplies across a region

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ARTICLE SUMMARY

Challenge: Serving more than 60 communities via nine drinking water plants, the Super-Rimiez Plant in Nice, France, needed an economical and reliable way to monitor its vast system.

Solution: A network of 27 SCADA terminals was set up to monitor the plants.

Conclusion: Engineers and plant operators save time and money by monitoring with the SCADA systems, which open up real-time connectivity between the sites.

Veolia Water's Super-Rimiez Plant opened in 1972 to provide drinking water for residents in and around the French principality of Nice, where it is located. The system has been upgraded several times in terms of capacity and technology, including a complete renovation in 1998 and a system upgrade in 2007. This evolution has kept it at the forefront of potable water production sites in Europe, with nine production centers and a capacity of 460,000 cu meters (16.4 million cu ft) per day. The center provides water to more than 60 communities via nine drinking water plants and 3,400 km (2,113 miles) of pipes.

Drinking Water's Journey

The drinking water makes its way from the canal to the faucet by means of a complex, four-step process. First, the water is withdrawn from underground aquifers or from surface water bodies. Water is pumped from wells, and protection areas are set up to prevent the pollution of water sources. The water then is treated to make it drinkable. The water undergoes several types of treatment, including coarse and fine screening, flocculation and settling, filtration, ozonation and chlorination. Once this processing is complete, the treated drinking water is piped through closed-pipe systems and stored in reservoirs that usually are located on high ground, such as underground basins on hilltops and water towers. Distributing the water to customers is a complex process. Water is piped to its ultimate destination through a complex system of conduits equipped with gates and regulation devices. At the helm of navigating all of these processes sits the main plant, Super-Rimiez, which uses PcVue SCADA for all of its process monitoring and control on site, as well as for all the remote facilities that are located upstream and downstream.

Site Supervision

Upstream water is collected from the conduits that route the water from its source, secondary processing plants and monitoring stations. PcVue monitors and collects data from the local and remote sites, such as the processing plants and monitoring stations.

Downstream, the architecture encompasses the drinking water distribution network for the city of Nice, the second largest French city, on the Mediterranean coast. The drinking water distribution network serves a population of 348,721 within its administrative limits, as well as the urban area of Nice, bringing the total population served more than 955,000. The network, however, has extended as far as Italy and occasionally the water network of the principality of Monaco.

SCADA Solution

The telemonitoring and control network comprises 27 SCADA terminals, which collect and process approximately 40,000 variables from some 400 programmable logic controllers and remote telemetry units. The engineering development team configured 1,800 SCADA animated displays, otherwise known as mimics. The engineers configure using object-oriented technology to save time by allowing the engineer to assign specific data points to objects and save them to a library for reuse.

The engineering development team at the plant found the SCADA's graphical interface to be user-friendly when developing the mimic displays and 600-plus objects in the system. The developers and engineers were able to configure screens much more quickly than with traditional SCADA packages, thereby substantially reducing the costs and time to deploy their application.

In terms of the communication backbone, transmission control protocol/Internet protocol (TCP/IP) is employed to provide connectivity throughout the plant, including its 23 SCADA terminals. TCP/IP is the communication used for handling any automatic cutover to backup services if needed, as well as the communications to deliver automatic or manual restoration to the main service. The networks use a virtual private network and asymmetric digital subscriber line plus satellite link for the main connections, and general packet radio service for transmission of time-stamped data and the like via a secure file server.

The network serves some 450 telesurveillance sites, such as reservoirs and plants. It can deliver an average of 8,000 remote commands and acknowledge and supervise 7,000 alarms per month. The remote communications span 89,500 miles and deliver an average remote response time of 360 milliseconds. In addition to processing and archiving remote data transmissions, these facilities are equipped to maintain the software remotely and conduct telediagnostics. Furthermore, the facilities are outfitted to have real-time connectivity between the sites.

Energy Initiative

More recently, the metropolitan authority of Nice Côte d'Azur wanted to make its water services self-sufficient in terms of energy. In response, it looked at reclaiming the potential energy from a waterfall to produce electricity.

Having established that the area of Alpes-Maritimes is highly energy dependent and adhering to its initiatives to reduce greenhouse gas emissions, the metropolitan authority is evaluating Veolia Water's proposed installation of four microturbines for the water supply system in order to convert potential energy into useful electrical energy.

The untreated water is brought down from a mountain via a canal using ample hydraulic capacity and the main water production plant (Super-Rimiez), located on the hills of the town 280 meters (918 ft) above sea level. The advantage of distributing the city's drinking water by means of a gravity system is that, as a consequence, there is high pressure (up to 17 bars) when the water enters the water supply system. This pressure can be recovered and converted into electrical energy.

This solution for producing renewable energy should make it possible to recover more than 12 GWh of electricity a year—approximately the average annual consumption of more than 3,000 French families. WWD

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