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An Evolving System

Getting the most power from your SCADA

By Ed Ritchie

Welcome to the new era of SCADA, and goodbye to the days of basic supervisory control and data acquisition. Today's SCADA systems are reaching into most every aspect of a utility's water distribution and treatment operations, for a

true enterprise-wide methodology. And most every stakeholder in the enterprise can benefit if the utility is ready to harness his or her SCADA system's power. All it takes is the time to investigate, and we've looked into some systems that demonstrate the many powerful features that can benefit your utility. So read on.

A powerful SCADA system has great tools for boosting operational efficiencies, detecting leaks (small and large), and, in the office, taming the dreaded paperwork monster, says Ray Imhof, operations manager for the water district at the Borough of Ridgway, PA. Ridgway's Ovation expert distributed control system, from Emerson Process Management, Pittsburgh PA, tracks their water through four phases: starting with the dam it's drawn from, through a treatment plant, onto a holding reservoir, and, finally, as it's distributed to residential and commercial customers. Actually, counting the water's return voyage

as wastewater, we can add two more post use stages of treatment and release.

“We monitor and control the entire distribution system from my office,” explains Imhof. “We have about 80 different points out in our system, and that includes water storage tanks and pump stations. We can set schedules for pump stations and valve controls and can actually open and close different valves with the SCADA system, but one of the biggest advantages in distribution is the fact that we are tracking flow and pressure, so we can upgrade our distribution line.”

As with most water districts using older infrastructures, leaks are a problem, but the SCADA system has helped. “Since we put this online, we have found many small leaks in the distribution system that would’ve never been discovered until they became major problems,” says Imhof. “We track the flow on our main, and if we see an elevated flow over 24 hours, we know there’s something going on that we need to investigate further to avoid a break. If we do get a break in our big, 12-inch main, the alarm system warns us before it causes serious damage underground.”

The system also helps avoid damage to pumps because Imhof monitors electrical supply voltages in pump buildings, and even the interior temperature of those buildings gets tracked. The extensive monitoring and controls are all part of an Ovation platform. “We started using Ovation back in 2004,” recalls Imhof, “and last year we did a complete evergreen, which is Emerson’s term for a complete overhaul of the system. We have all new machines, new servers, and software updates. We added a third server that is primarily used as a historian. The historian remembers everything; so at any given moment, we can pull data from any point that the historian is monitoring and get a complete description of the activities.”

Considering that there are 80 points to monitor on a 24/7 basis, the historian’s memory could be getting quite a workout. So what’s the advantage to logging all that data? “One advantage is in the preparation of Department of Environmental Protection reports,” says Imhof. “Their record requirements are extensive, and in the past we had to take readings off of the screens and transfer them to another computer. But the historian can generate whatever report we design, and we can see specific time frames. We also use it at the wastewater treatment plant where we control the entire plant’s operation, and the historian monitors the flow and effluent, and what’s been released into the river and other data.”

Those benefits have saved the district plenty of time, money, and hardware, adds Imhof, but don’t forget reductions in field maintenance. “Every day we used to have to go to each tank and visually check the tank with the site gauges,” says Imhof, “and we had to visit all of the pump stations daily. So we’ve reduced the time involved significantly, and also greatly improved our accountable water. It doesn’t require less manpower, because you still need good old-fashioned brains and people, but it makes the job 100% easier. It has saved us

“At any given moment, we can pull data from any point that the historian is monitoring and get a complete description of the activities.”

about 30% overall. For just myself, I save two hours every day because I don’t have to travel to field sites anymore.”

Less time in the field can leave more time to focus on improving plant operations and finding opportunities for boosting energy efficiency, according to Douglas Johnson, Director, Water Automation Solutions at Emerson Process Management. “If you have a good, robust SCADA system that covers the entire municipal authority and treatment plant, you can do advanced modeling for analysis of processes and pumping and save a lot of energy,” says Johnson. “In addition, there are other benefits such as reducing maintenance requirements, and, by looking at pump diagnostics information to spot pumps that might be having maintenance issues, you can roll all of this data into a model and study how to reduce energy and even avoid having a catastrophic pump failure.”

Johnson credits advances in remote telemetry unit (RTU) technology for much of the progress, and notes that though they began as data recorders, they now have navigational capabilities that allow for modeling pumping requirements and energy efficiency.

“Let’s say we have three pumps,” says Johnson. “How do I run them with the least energy? Do I run one pump at 100% and idle the other two, or run all three prompts at 30%? If you’re just looking at energy requirements, it’s a relatively easy model to build. And you can add other things such as constraints if a pump has certain problems. So you can limit its operations, and the maintenance plan can specify these restrictions and other important information. Then, there’s the option for contingency plans, so if you build a model to compensate for certain failures and run all its data points, you can have the system make the adjustments automatically or control it manually. You can expand beyond that with complex hydraulic models that involve a lot of different situations.” [WE](#)

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