



## How to Make your SCADA System Pay for Itself

***Iredell Water Corporation reduces operating costs by using SCADA to increase efficiency***

By Danny Sloan and Christopher Little



*Iredell Water Corporation is responsible for supplying drinking water to over 8,700 customers in the Western Piedmont area of North Carolina. For years, the utility considered implementing a supervisory control and data acquisition (SCADA) system to oversee the remote telemetry units (RTUs) at its remote tanks and wells. Each time, the high cost of these products prevented them from proceeding. In 2006, a systems integrator recommended an HMI software product that supported their existing RTUs and had a price point that was within their budget. Once installed, they were immediately struck by the amount of information that SCADA could provide them. In this article, Danny Sloan, of Iredell Water, discusses how they are using this information to help pay for the new system through increased reliability and reduced operating costs.*

### **Iredell Water Corporation**

Based in Statesville, North Carolina, Iredell Water Corporation owns and operates thirty-one wells, nine elevated water tanks, and one ground storage tank. In 2008, the utility had an average water consumption of over 1.8 million gallons per day (mgd). Danny Sloan has worked for Iredell Water for over twelve years. He is currently an Operator Responsible in Charge (ORC) and holds A-Distribution, A-Well, and Cross Connection Control water certifications. "About ten years ago, we only had Control MicroSystems SCADAPack RTUs at two tanks and AutoCon RTUs at two tanks. We couldn't get any information at our office. If we wanted to get any levels we would have to literally drive by the tank and look at the target. We had an alarm calling system at one tank to tell us if we were low or high."

In 2000, they installed an RTU at the main office that used phone lines to call the RTUs in the field and log their tank levels. "Everything is on phone lines because our tanks and well sites are at such different elevations that it would be too hard for us to use radios." Although this eliminated the need to leave the office to get simple water levels, the unit's small two-line display made it difficult to use the logged data for any meaningful system optimization.

### **Switching to a SCADA System**

Iredell Water had considered adopting a SCADA system for years but the high upfront cost was always an issue. "We wanted a system that could grow with our needs. We wanted to access the system anytime; day or night, at the office, at home or even on vacation."

After they had studied several SCADA/HMI software products that they felt were too expensive, one of their integrators suggested VTScada software from Trihedral Engineering Limited. "We heard about VTScada from Bill Ward of Gopher Utility Services, who installs and programs our RTUs. When we looked at the price we couldn't pass it up."

The original SCADA system was completed in October 2006. "Bill did the first design. It was pretty simple. Just a picture of a tank and the tank level and that was basically it. About six months later, Trihedral offered a training course for developers in Asheboro, North Carolina. It helped me tremendously to understand how a SCADA system works. Since then, I've done a lot of different things like rebuild all the pages and set up new alarms." Sloan also began incorporating more of their remote tank and well sites into the SCADA system. "When Bill installs and programs a new RTU he gives me the bit tags so I can add them into VTScada. Bill and I have a good working relationship."

"When we got the Alarm Dialer package, I configured it myself. I even set up our WAP server so we can all get access to the system using our Blackberry phones. The savings created by being able to do this kind of configuration myself are tremendous. The system very quickly paid for itself."

The VTScada application now performs supervisory control and data acquisition for seven elevated tanks, one ground storage tank, eight wells, and two interconnections with other water systems. VTScada calls three tank sites directly via a dial-up modem. The SCADAPack connected to VTScada in the office calls the remaining tanks.

RTUs at four of the tank sites use leased dedicated phone lines to call Automation Direct Koyo RTUs spread over eight well sites. VTScada uses the tank RTUs to relay set points and jog on/jog off controls to the pumps at the well sites. In turn, RTUs at the well sites send pump status and run time information back to VTScada the same way. "It takes about five minutes for a full cycle to call all tank sites."

Their existing Antx DiaLog Elite Alarm dialer paged operators when a tank was overflowing. "We could only receive high and low tank level alarms at four of the six tanks we had on SCADA. When we added another tank in 2007 we needed to add a new card slot to the dialer. That would have cost as much as the VTS Alarm Dialer." This optional component is integrated into VTScada and therefore required no additional integration to install. "The configuration was fast and easy. That made the decision easy. Now we are able to have alarm notifications by alpha pager, e-mail, and telephone."

"That was really big for us because it allowed us to put alarms on everything. Now we can get high and low readings, see when a pump is not starting, find out if a site is not communicating. I've got so many alarms now it's not funny. What used to take us three or four days now takes less than ten minutes."

## Using SCADA to Maximize Efficiencies

"We simply didn't realize how much information we were not getting back until we were able to see it. There were even things we didn't know we wanted to know until we started using the system. That still happens to this day. Ninety-eight percent of our water supply comes from our own wells, so the information our SCADA system gives is a very valuable tool, especially with the drought our area has been experiencing the past few years."

**More Efficient Scheduling** – "We never realized how much we would use the graphing and reporting tools. Every week, we use the reports that VTScada generates to identify periods of high demand on our tanks. We can see how tanks in certain pressure zones are working together and then adjust the wells that are run by a clock pumping schedule to meet the high demand and be off when the tanks seem to be full. We can also see how often each tank turns water over (how often the tank is letting water out and filling back up) which helps with water quality." Daily reports are also used to reduce unnecessary wear and tear on pumping infrastructure. "You might have a pump that is running more than it should to make up for another that you didn't know was down."

**Increased System Reliability** - "Recently, we added an RTU to a tank that is supplied solely by water from a neighboring city. It is fed by an eight inch water meter through an altitude valve. During the weekend before we installed the RTU, the pilot valve stuck open and overflowed the tank until we discovered it on Tuesday. That was over 4 million gallons of water wasted at a cost of around \$10,000. If the RTU had been up and running a week earlier, the alarm dialer would have notified us and we could have stopped the overflow in less than thirty minutes. That would have saved enough money to pay for the new RTU and all the sensors and other new valve control equipment."

**Remote System Access Anywhere, Anytime** - Before 2008, operators could only access the system from the primary SCADA server in the main office or by using VNC to access the server from their desktop computers at home. "In 2008 we added a WAP Server that allowed us to access the system anywhere from our Blackberry Phones."

"Before, if a thunderstorm came through, we would have to go to every well the following morning and make sure that the power was on and that nothing had been destroyed by lightning. Now we just have to log on to see if everything is alright. That alone could take you all day where as now it just takes five minutes. That is a huge savings."

"I set up the WAP server myself with help from Trihedral's technical support team. They have been a huge help. If I call up there and ask them a question, they will either answer it right away or get back to me that same day."

## The Future

As Iredell Water continues to work towards having RTU's at all their tanks and wells, Danny Sloan looks for new ways to use that additional SCADA information to create savings for the utility and good value for their customers. "For example, we plan to add chlorine and groundwater level monitoring to the SCADA system."

"I try to do something with it once a week just to keep the skills fresh in my mind. I enjoy doing this stuff."

