SPECIAL
PUMPS & SYSTEMS
SECTION

Instrumentation, Controls & Monitoring

Photo courtesy of Mission Communications

SCADA Monitoring Maximizes Pump System Performance

The system tracks pump efficiency so repairs can be anticipated with timely, accurate and reliable information.

By Lauryn Colquitt, Mission Communications

Manually managing a water system can be difficult, especially with population growth and limited resources. Saving time and money are common challenges for utilities. Water system management was an ongoing concern for the city of Eureka, Mo., located approximately 28 miles southwest of St. Louis. Because Eureka lacked an effective monitoring system, valuable resources were being diverted to maintain an aging system challenged by a growing population. Monitoring system activity offers insight into the daily operations of components throughout a water system.

David Scott, the water department superintendent for Eureka, is responsible for directing daily operations, compiling reports/information on water supply condition and supervising system capacity. Scott evaluated many SCADA monitoring systems to find one that could reduce manual tasks, streamline daily operations and compile reports for the Missouri Department of Natural Resources (MDNR). The MDNR is the governing body that oversees all public water systems in Missouri.

The Eureka water department draws water from four groundwater wells with a production capacity of 4.6 million gallons per day. Maximum water storage capacity is 2.8 million gallons with an average daily use of 1.5 million gallons. Prior to choosing a SCADA system, tank levels depended on simple floats located within each tank connected to the well pumps. Their system lacked basic alarm functions and monitoring capabilities. Insufficient data were available to verify

Above: An RTU monitors the pressure, level and flow at a booster station.

the condition of tanks and wells. Incomplete information was taxing on the equipment and water department resources. Daily site inspections were required to verify that the equipment was operating as intended.

"We didn't know if the well pumps were actually sending water to the tanks," Scott said. "We had to assume that the floats were working properly. The lack of data was the problem. It was a guessing game. We needed something with validity."

Suction/discharge pressure and pumps are monitored by the Eureka water department.

REQUIREMENTS FOR A SOLUTION

The city of Eureka compiled a list of requirements for the new SCADA system. The ability to turn the wells on and off based on the tank level was essential. Pump data was needed for alarming and monitoring. Pressure zones required Scott's team to maintain optimal suction and discharge pressure at each booster station based on the elevation. Since suction and discharge pressure lines are vital components for the delivery of water to the community, pressure needed to be tracked throughout the system—specifically at the booster stations. A way to record and measure water quality variables such as chlorine residual, pH and water temperature for trending purposes was also required. Scott needed this information to file compliance reports for the MDNR and ensure safe drinking water to the community.

"Aside from our list of requirements, we had to consider costs. We are given an annual budget and in order to stay within that budget a custom SCADA system was not an option," Scott said. "We compared our needs with the costs of each system. Ultimately, our decision was based on value."

SATISFYING THE NEEDS WITH MANAGED SCADA

Scott reviewed several cost-effective SCADA systems. While the system costs were comparable, a managed SCADA system proved to be the most suitable system. Standard remote terminal units (RTUs) paired with a tank and well control option fulfilled Eureka's requirements.

With a managed SCADA system, Eureka can remotely monitor and control pumps in real time, obtain data for system analysis and receive immediate alarms. Each booster station and well site is equipped with an RTU. The well sites are wired to output relays for pump control. Commands are automatically generated to turn the pumps on or off based on the tank pressure. The built-in pump alternator feature automatically rotates the pumps to allow the wells to recharge and minimize turbidity.

Booster stations are needed at each tank to ensure the delivery of water to the community.

MAXIMIZING PUMP PERFORMANCE

Eureka minimizes service interruptions by monitoring the operation of critical pumps and equipment. The managed SCADA system tracks pump efficiency so repairs can be anticipated with timely, accurate and reliable information. Trending information such as pump starts/stops and pump runtimes is used to prevent pump damage.

Notifications are sent when pump anomalies occur. This gives personnel ample time to tend to the station before the pump becomes irreparable.

"We had an incident in which two pumps turned on when only one pump should have turned on. After some investigation, we found that the impeller was broken off," Scott explained. "The shaft was completely detached so it wasn't producing any water, but the motor was still running. Sometimes you have to know the system to know how many pumps should be running, but luckily the SCADA system caught it and sent us an alert. That was a tremendous help."

David Scott accesses the SCADA system to view trending data at each station.

DATA STREAMLINES DECISION MAKING

Eureka personnel were also able to manage their time better with the SCADA system. Scott and his team used the mobile Web portal—optimized for smartphones and tablets—to evaluate the severity of an alarm or alert generated by the SCADA system. They log onto the Web portal with a smartphone, tablet or laptop; look at the alarm or alert; and determine if it needs immediate attention or if it can be resolved later.

In the past, personnel manually calculated the pounds in the tank during site inspections to determine the tank level. Now, pressure transducers are used with onboard analog inputs to send real-time tank levels and can be observed using the Web portal.

"Being able to access the tank levels over the Web is especially helpful in the summer when the water usage is much higher than in the winter," Scott said. "In the summer months, we had to climb each tank twice per day to check the levels. Now, we can look at the levels on our smartphones."

Manual tasks have been reduced with reports for chlorine residual, pH and temperature. Water quality variables are measured and recorded on the Web portal. Trending information can be downloaded for reports and used in conjunction with other data sets. Alarms can also be applied to these variables.

"The SCADA system has definitely reduced operations and maintenance costs. We continue to do site inspections every day, but we don't devote as many resources to inspections as we did in the past," Scott said. "Site visits were reduced by 45 minutes and overtime on the weekends was eliminated. The data is reliable and easily accessible. Daily operations run much smoother."

A SCADA system is a valuable way for water utilities to efficiently monitor and control their systems. The timely receipt of alarms and notifications from a SCADA system drastically reduces the potential for station failure. Most utilities can save a significant amount of time and money. **P&S**

Mark Hug, maintenance technician for the city of Eureka water department, conducts routine maintenance on the SCADA RTU.

Lauryn Colquitt is the marketing coordinator for Mission Communications, a managed SCADA provider. She can be reached at laurync@123mc.com or 877-993-1911.

Mission SCADA Works Right Out Of The Box, But Won't Box You In

Mission managed SCADA systems are designed to get you up and running in hours, not days. Our packages start at around $1,000 with a maintenance fee of less than $1 a day. Mission strives for ease in doing business. Give us a try – no bureaucratic red tape, no huge commitment. If you like it, buy it. If not, send it back. It's that simple.

Mission flexibility allows you to expand your system as you are ready and on your terms. Mix and match any of our products one at a time or all at once, the choice is yours. Maximize the life of your pumps and valves with reports tailored to your system. That is why you will find Mission SCADA monitoring over 15,000 pumps throughout the U.S. and Canada.

In Sewer Level Alarm

Lift Station

Tank and Well Control

(877) 993-1911 MISSION COMMUNICATIONS **www.123mc.com**

Advanced Monitoring • Low Cost • Managed SCADA