

# New Carrier Ethernet Network Improves Utilities' Communication

By Gary Sanders

Sun Prairie Utilities is a locally owned and operated municipal utility offering electric, water and telecom services to more than 13,500 customers throughout Sun Prairie, WI. The water division of the company includes a water distribution facility made up of 10 sites – three water towers, three ground reservoirs and four well houses. The telecom division offers fiber optic Internet and wide area network connectivity, providing area businesses and organizations with a variety of Internet, voice, high-speed data and video services.

Since 1999, Sun Prairie Utilities' water division has been leasing legacy phone lines via a local telephone carrier as the communications infrastructure for its existing Supervisory Control and Data Acquisition (SCADA) system. With this approach came high cost, added complexity and often interruptions in the connections, which are essential for monitoring and controlling the water facilities remotely. In fact, due to the inconsistent remote connections, an operator needed to visit each water site daily to take readings and record data, taking up staff time and eliminating many of the benefits of a SCADA system.

To address these issues, last year Sun Prairie's telecom division upgraded its municipal fiber optic network with Carrier Ethernet Service Delivery (CESD) platforms from Ciena Corp. This upgrade enabled greater bandwidth capacity, reliability and traffic management to the network. Sun Prairie also deployed new SCADA software and connected its water facilities to the fiber optic network. To do this, the utility deployed Ciena's CESD switches at its water towers, reservoirs and well houses.

Sun Prairie is using SCADA controls from Altronex Control systems as well

as Wonderware's SCADA software to automate its processes, the most significant improvement of the new implementation. Unlike the previous system that required manual readings every day, water operators are now able to take readings remotely and also monitor chlorine/fluoride levels, check whether pumps are running and open or close specific valves, among many other tasks.

The previous remote terminal units (RTUs) continued to fail and therefore a number of communication errors would occur. Because the previous lines were copper and subject to a variety of outside factors including moisture and temperature, they were less reliable than the fiber network now being used. By using less expensive and easily configurable Programmable Logic Controllers (PLCs), Sun Prairie is saving on cost while also obtaining a more updated and powerful solution.

The new system has been designed to maximize reliability. There are currently two master SCADA units in the system – one in the water supervisor's office as well as one in a shared accessible location for water facility operators. Additionally, Ciena's CESD platforms connect from the water facility sites to redundant fiber rings so connections are not lost even if one fiber is cut.

The system now has the ability to monitor from within. Specifically, the management feature set of the CESD platforms has enabled more robust monitoring to address any connectivity or network performance issues. If there is any degradation in network performance, the water facilities operator on call is notified and can quickly isolate and address it – even remotely logging in to the SCADA system from home via their laptops.



Sun Prairie Utilities Water Operations Supervisor David Anderson takes advantage of the new SCADA system to manage operations from his office.

Since 9/11, U.S. Homeland Security has upped its security requirements for critical infrastructure, including electric and water distribution facilities. While not mandated now, there is the possibility that the government or Sun Prairie Utilities itself will need to install security cameras at every water site to provide additional security as well as visual back-up that SCADA system commands have been implemented. Such video cameras require significant bandwidth, which Sun Prairie is well prepared for with its Gigabit Ethernet connections.

Because of the successful new SCADA implementation in its water distribution facilities, Sun Prairie has also deployed the same SCADA software for its electric distribution facilities. However, the utility's four electric substations are still connected to the SCADA system via legacy telephone lines. Based on the success of the water division, the utility plans to implement the same SCADA communications infrastructure for those stations in 2011. **WW**

*About the Author: Gary Sanders is Telecommunications Manager at Sun Prairie Utilities. He has managed the fiber optic and wireless network operations at Sun Prairie Utilities for eight years.*

# ciena

1201 Winterson Road • Linthicum, MD 21090 USA • +1.800.921.1144 • [www.ciena.com](http://www.ciena.com)

Reprinted with revisions to format, from the August 2010 edition of **WATERWORLD**  
Copyright 2010 by PennWell Corporation