City of Shreveport, Louisiana

Louisiana city continues its tradition of leading-edge water treatment facilities by standardizing on CitectSCADA

THE CHALLENGE

Replace an obsolete SCADA system with disparate remote terminal units (RTU) and stand-alone HMI nodes with an integrated CitectSCADA system to access all control locations and RTUs.

THE SOLUTION

A CitectSCADA system was implemented at the T.L. Amiss Water Treatment Plant. Subsequently, the project was expanded to the other plants to create a single system that monitors the city's entire water and wastewater treatment facilities.

CONCLUSION

Using CitectSCADA, authorized users now access all control plant and RTU data from any screen. The integrated system simplified site monitoring and enabled the city to reduce training costs, easily integrate cost-effective security devices and link to other systems, such as CMMS and LIMS.

PROJECT OVERVIEW

The City of Shreveport has been a landmark for water treatment facilities for over 100 years. Construction on the McNeill Street Pumping Station, which ran on steam-driven pumps, began in 1887. Major additions were undertaken from 1899 to 1921, and the plant continued to operate until 1994 (although the steam pumps were retired in 1980). The McNeill plant is typical of waterworks from the early 1900s that were once common throughout the United States. Not only is the steam-powered machinery dating from the late 1800s still intact in its original historic location, but the two Worthington pumps are still operational – possibly the only ones still in existence – thanks to meticulous care and maintenance.

The McNeill plant is also an example of a commitment to state of the art water treatment technology. Walter filtration began at McNeill in 1890 when less than ten percent of the nation's water plants provided filtered water. It was also one of the first water treatment plants to implement chlorine to disinfect water in 1914, only one year after the first use of liquid chlorine. The McNeill Street Pumping Station's significance is notable: it is a National Historic Landmark, a Historic Water Landmark, a National Civil Engineering Landmark (one of only four in the country) and listed in the registry of National Historic Sites.

When the Thomas L. Amiss Water Treatment Plant that was built in 1929 needed updating, the City of Shreveport decided to keep the beautiful, historic building while providing the control center with the latest technology. Today, the T.L. Amiss Plant provides 90 million gallons of safe drinking water to over 70,000 Shreveport residents. Its CitectSCADA system is used to monitor the level indicators, flow meters and historical trends of a distribution system consisting of 1,049 miles of water mains, 11,400 water main valves and 6100 fire hydrants.

The City of Shreveport also operates two wastewater treatment plants: the Lucas Wastewater Treatment Plant and the North Regional Wastewater Treatment Plant.

CaseStudy

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Real-time Intelligence

By standardizing on an open architecture CitectSCADA system, the City of Shreveport can:

• Facilitate the implementation of cost-effective security systems

• Leverage existing fiber and radio infrastructure

• Reduce monthly operating expenses by allowing all sites to be accessible to authorized users from any location

• Streamline regulatory reporting and asset management by providing tools to connect SCADA data to MIS data

THE CHALLENGE

The City of Shreveport also operates two wastewater treatment plants: the Lucas Wastewater Treatment Plant and the North Regional Wastewater Treatment Plant. The ChallengeThe City of Shreveport needed to upgrade its Supervisory Control & Data Acquisition (SCADA) system used to monitor and control the collection, treatment and distribution of water and wastewater. Like many cities, Shreveport was faced with difficulties common to the water/wastewater treatment industry. The city was using multiple plant and RTU controllers, many of which were nonfunctional or obsolete. In addition, the existing RTUs were supplied by a defunct company, which made obtaining upgrades and support impossible.

The different SCADA platforms at each plant created maintenance difficulties as well. Each plant was isolated with no ability to exchange data between them. The various communication protocols and hardware configurations created intermittent connectivity problems and system lockups within the plants. Long communication delays and slow network response made it difficult for operators to detect equipment failures.

PROJECT RESULTS

Citect Platinum Integrator, Edison Automation, in close partnership with Citect Professional Services, was initially awarded a contract with

the city to install a CitectSCADA system at the T.L. Amiss Water Treatment Plant (WTP) to monitor and control the water treatment process, the water distribution system, and the wastewater collection system.

Each plant needed a user-friendly, reliable SCADA system with fast response times, consistent color schemes and well-documented design standards. The long-range goal to establish the same technical guidelines and specifications by standardizing on a CitectSCADA platform enabled the plants and remote sites to function as a single, consolidated system. Built on CitectSCADA's open architecture, the system would also easily permit future improvements in control and data management.

As a result of the project's success, the T.L. Amiss Water Treatment Plant became a prototype for defining the control system infrastructure standards for future upgrades at other plants. The CitectSCADA system was then expanded to both the Lucas Wastewater Plant and North Regional Wastewater Plant to complete the city-wide system.

Integrating Disparate Systems
One of the largest issues facing the City of Shreveport was the high number of disparate systems. Remedying this problem was fairly easy and inexpensive because all the drivers needed were already included in the CitectSCADA package. Reliability was also an important concern. System failure would result in inaccurate information and large overtime costs. The new CitectSCADA system has redundant CitectSCADA servers that act as immediate back ups in case of a failure. Each of the four sub-systems also has fully redundant CitectSCADA servers to ensure reliability and maximize on-stream time. A separate set of CitectSCADA servers maintain the communications to the collection system RTUs.

Using an Integrated CitectSCADA System to Reduce Costs and Increase Efficiency
Prior to implementing the CitectSCADA system, users had to either visit each site or access remote sites one at a time over the network.

This made monitoring all the sites very time-consuming and expensive. Furthermore, it might take long periods of time to detect a problem at one of the various sites.

By standardizing on a CitectSCADA platform for all its operations, users have the same look and feel wherever they log into the system. Moreover, users can now monitor multiple sites immediately from any site in the system – whether the operator logs in at Lucas, T.L. Amiss or a remote site. Since the same screens are used at each location, training costs and learning curves have been also been greatly reduced. The new web-based reporting system facilitates regulatory reporting by allowing reports to be viewed in a web browser independent of the SCADA systems.

Cost-Effective Security
Security is a top priority at Shreveport. Monitoring and controlling remote equipment and resources can be a very expensive and challenging undertaking. Customized,proprietary security systems are expensive and can be difficult to upgrade. Access control and intrusion detection were simplified by coordinating security devices with the CitectSCADA system. Inexpensive IP-based web cameras at all sites that provide video frames of remote locations are easily linked to the CitectSCADA system. Their photos are easily and rapidly transmitted across the network allowing operators to monitor all the sites from a single location. Not only does it reduce security costs, but it allows tighter control of the perimeter and remote sites by enabling operators to view multiple sites easily and quickly. Other intrusion detection devices were also incorporated to provide increased protection of the city's water sites.

Staying Committed to Leading-Edge Technology
By standardizing on an open architecture CitectSCADA system that enables all operations to work as a single system, the City of Shreveport is upholding its legacy as an innovative leader in municipal water treatment and protecting its IT investment long into the future.

Statistics & Results

CITY OF SHREVEPORT	
90 MGD water treatment plant	Consistent SCADA look and feel standard
100 MGD wastewater treatment plant	Consistent programming standards
17 MGD wastewaster treatment plant	Redundancy at the SCADA level and the intra-plant fiber network level
11 remote water distribution sites	Data archiving to both the Citect trend files and to SQL databases
116 wastewater collection sites	Pre-configured reports
Interplant connectivity via city-wide fiber	SCADA reporting tools
Ethernet radio-based connectivity to remote sites	View-only manager clients
Ability to link to other systems such as CMMS and LIMS	

Hardware Overview

The current hardware platforms include:

• Existing Motorola Intrac RTU's at the wastewater collection sites

• Steeplechase Visual Logic Controller running on Industrial Siemens and Exor PC's (for local plant control)

• Siemens S7 PLC's (for subsystem control)

• Sixnet RTU's at the water distribution sites

• Allen Bradley PLC's (for sub-system control)

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