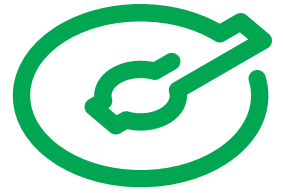


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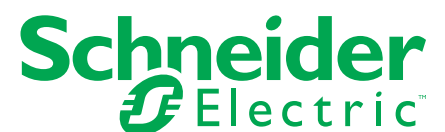
Monroe County Pure Waters

Monroe County, New York



How One Utility's SCADA
Has Evolved Beyond its
Original Mandate.

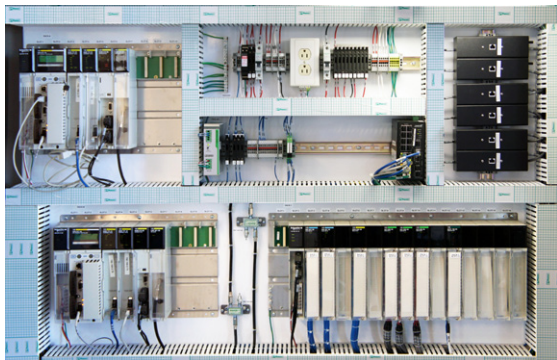
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- Curt McEntee,
VSG Enviromation



The Background

Water has played an important role in the development of Monroe County, New York. The county borders Lake Ontario and contains the city of Rochester with its port that dates back to the 1700s. In the early 1800s, the Erie Canal was routed through downtown Rochester and prosperity continued for Monroe County as the New York Central and other railroads were installed parallel to the canal.

Today, Monroe County's water resources are protected by Monroe County Pure Waters, consisting of associated collection systems and two wastewater facilities. These wastewater facilities are the 100 million gallon per day (MGD) Frank E. VanLare facility and the 25 MGD Northwest Quadrant facility. In addition, Monroe County Pure Waters manages 50 pump stations, 12 monitoring sites, and 30 deep tunnel sites that collect stormwater. The Frank E. VanLare facility is in the middle of a three-year project to change out its 60 mechanical aerators and go to diffused air, as the Northwest Quadrant facility continues to use mechanical aeration. Both facilities use centrifuges and thickeners before shipping sludge to a landfill.

The supervisory control and data acquisition (SCADA) system represents the heart of Monroe County Pure Water's collections and treatment operations. This system has grown from its original mandate and continues to evolve with the needs of these operations.

The Monroe County Pure Waters SCADA System Evolution

Like many other utilities, Monroe County's first experience with programmable logic controllers (PLCs) led to multiple platforms being installed. Their first Schneider Electric™ PLC — a Square D SY/MAX™ — was installed in 1984, prior to Schneider Electric acquiring Square D in 1991. Over time, Monroe County realized there were benefits to having a single programmable automation controller (PAC) platform. In addition to providing a single software architecture, having a single PAC platform can result in a unified network strategy for the future. Therefore, in the mid 1990s, Monroe County selected the Schneider Electric solution and started migrating all of their existing PLCs, including 20 at Frank E. VanLare, three at NorthWest Quadrant, 10 at deep tunnel sites, and 18 at pump stations, to the Modicon™ Quantum PAC.

“We decided to adopt the Modicon Quantum PAC because the ladder logic programs from the SY/MAX (PLC) could easily be moved to the Modicon programming software and would make life easy for us,” said Curt McEntee of VSG Enviromation, a division of Zeller, the County's selected control systems integrator.

The existing SCADA system was a mainframe-based system that was suspected to have several issues as viewed by the widespread year 2000 (Y2K) speculations. Monroe County could not risk a blind implementation of a new SCADA system; therefore, they followed a two-step approach.

In the first step, the County interviewed different SCADA providers about their Y2K readiness and ability to stand by their system. Schneider Electric and its Vijeo™ Citect SCADA system were able to assure the County of Y2K readiness without any hesitation.

The County was impressed with Vijeo Citect SCADA, but before committing to the solution on a full scale, they wanted to see it perform on a small scale-system. Thus, Monroe County Pure Waters decided to



> Figure 1: Picture of combined Collections and Plant Operations Facility

install it into a landfill they were managing at the time. “The landfill system was the perfect test bed for Vijeo Citect SCADA. It consisted of a central location with three remote pump stations. These pump stations were PLC-based and communicated via a radio network. From a control and automation viewpoint, this was a small-scale model of the countywide collection system,” stated McEntee.

“Vijeo Citect SCADA was selected for a variety of reasons including Y2K and its exceptional networking capability. At the time, we had multiple PLC platforms from a variety of manufacturers and connectivity was a key concern,” continues McEntee, “We also found that graphics and screen development were easy to set up.”

Following completion of both SCADA system pilots, the County’s path was set for their collection and plant operations, which, at that time, were on separate systems. Vijeo Citect SCADA was installed on the collection system in 1998 and the treatment plants in 1999. This new SCADA system provided a common database which enabled both groups to be combined into a single location.

While the SCADA system was being upgraded, the PLC systems were also going through a transformation. When the original PLCs were installed in the 1980s and 1990s, a variety of systems and manufacturers were utilized, many of which were set up as standalone processes.

“The original purpose of the system upgrade was to solve the Y2K challenge. However, during implementation it became apparent to everyone that we could network these systems together and there was a huge benefit. This led to the elimination of functional islands. We have not looked back since ... ” reflects McEntee.

Due to proven reliability, Monroe County Pure Waters began to favor the Schneider Electric PLC system. Eventually, the SY/MAX PLC reached its end-of-life as the Schneider Electric PLC offerings expanded through the acquisition of Modicon and its associated PLC/PAC lines. At this point, the County began replacing its SY/MAX PLCs with the more advanced Modicon Quantum PACs, which is an ongoing program.

Today, Monroe County’s automation system consists of a variety of Modicon Quantum, Premium, and M340 PACs, as well as Compact™ 984 and SY/MAX PLCs. The Vijeo Citect SCADA software system is currently running on a dozen shared I/O servers and also supports about six standalone isolated sites. With 10 dedicated display clients and 30 intranet clients, Monroe County Pure Waters is in the process of implementing Vijeo Historian software, a plant-wide tool that collects, stores, and delivers reporting data from the SCADA system and other databases. Monroe County is also working on upgrading everything to Ethernet. Currently, the radios and leased lines are Modbus-based, and the fiber optic is Ethernet-based.

The new SCADA system was able to enhance operations for both the treatment and collections teams. Therefore, Monroe County Pure Waters was able to identify that the main plants had sufficient capacity and the collections system was able to respond rapidly to changing conditions. Through this visibility, the County was able to close several small remote plants (1 MGD each) and convert them to pump stations. This eliminated several small-stream discharge points that led into the Genesee River.

SCADA Empowers Power Monitoring System

The investment that Monroe County has made in the SCADA and automation systems provided many benefits to the control and operation of the collection and treatment systems at Monroe County Pure Waters. Therefore, the County decided to further the benefits by adding power data to the system.

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Monroe County Pure Waters uses a Schneider Electric PowerLogic™ system to monitor its power usage, and the data is displayed on the Vijeo Citect SCADA interface. Monroe County Pure Water then compares the power usage against process parameters to give an indication of process efficiency.

The wastewater facility was just the beginning. The County realized that most of their facilities, including Monroe County Pure Waters, were utilizing the Schneider Electric PowerLogic power monitoring system. Furthermore, it came to light that the Vijeo Citect SCADA system extended across the entire county through their fiber network. Shortly following that realization, plans to utilize the SCADA system to monitor power at Monroe County facilities began to be considered.

Current State

Today, what was originally designed as a wastewater utility's replacement of a SCADA software from a non-Y2K compliant mainframe system has become much more. Vijeo Citect SCADA still monitors and controls the wastewater utility; however, it is also tied into the power monitoring systems of both treatment plants and a combination of 24 collection and tunnel sites. Future plans call for the extension of the SCADA system and power monitoring into each Pure Waters facility managed by the Monroe County Department of Environmental Services.

All of this data is being mapped into the SCADA system and Vijeo Historian software is being implemented to enhance the data trending and analysis of all of these interconnected facilities. Monroe County is well on its way to reaching the day when they will be able to map and track all power users across the entire Pure Waters network with the ability to identify system-wide savings.

To learn more about Schneider Electric solutions for the water/wastewater industry, please visit www.schneider-electric.us/sites/us/en/solutions/water-wastewater/water-wastewater.page.

To learn more about Monroe County Pure Waters, visit their website at www.monroecounty.gov/des-purewaters.php.

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