When a water municipality needed to cost-effectively automate its manual tank monitoring and pump operations, it implemented an Allen-Bradley SLC 5/05 PLC at the main control room and a PowerFlex 40 drive at the pump house. To connect the two devices, the facility installed Rockwell Automation Encompass Product Partner FreeWave Technology’s FGR2-PE Ethernet wireless radios. The result is a reliable SCADA system that provides easy monitoring and control with real-time updates from the entire system. Here’s how the water district implemented the technology.

What the Municipality Needed

A small water municipality’s water tank must be kept full during peak usage times to keep up with increasing demands. The water tank is connected to a reservoir a mile and a half away via a pipeline. However, both tank monitoring and pump operations were performed manually, and the inefficiency and cost constraints dictated a change.

To complicate matters further, the main control room is in one part of town, the water reservoir is in another part of town, and the water district headquarters is on the outskirts of town about five miles away from everything else.

To keep up with demands, the water district needed a way to automate the entire process while keeping costs down to make the upgrade affordable.
To make this application work, the SCADA system deployed would need to be able to monitor the water level in the tank, the line pressure throughout the pipeline, and the flowrate when the pump is running. The system also needed to control the drive that runs the pump. Operators also needed a human-machine interface (HMI) at the water district headquarters that provides monitoring and control of the entire system.

Clearly, industrial wireless was required for this application. It must be reliable, flexible and cost-effective. It also had to be easy to deploy and to maintain.

**Components of a Reliable Wireless System**

The new automated system consists of several key components:

- An Allen-Bradley SLC 5/05 (www.rockwellautomation.com/go/tj500) programmable logic controller (PLC) at the main control room
- An Allen-Bradley PowerFlex 40 drive (www.rockwellautomation.com/go/tjp40) at the pump house
- FreeWave’s serial and serial I/O radios connecting them (FGR2-CE-U, FGR2-IO-IOE and FGR2-PE Ethernet radios)

The serial I/O radios also allow the master PLC to monitor the tank’s water level and the pressure and flowrates throughout the pipeline. Along with the serial network, the system has a pair of Ethernet radios used to connect the SLC 5/05 back to an Allen-Bradley PanelView™ Plus HMI terminal (www.rockwellautomation.com/go/tj10pp) at the water district headquarters.

At the SLC 5/05, an FGR2-CE-U serial radio is configured as a point-to-multipoint Master with two FGR2-IO-IOE serial I/O radios at both the water reservoir and tank.

At the reservoir, the FGR2-IO-IOE is used to connect the SLC 5/05 to the PowerFlex 40 drive, and to provide analog inputs so the SLC 5/05 can read water flowrates and pressure.

At the tank, the FGR2-IO-IOE simply is used as an I/O radio, again providing analog inputs to the SLC 5/05 for water flowrates, pressure and tank water level information.

With the SLC 5/05 connected to all the necessary I/O points and the PowerFlex drive, the next step was to connect the SLC 5/05 to the water district headquarters and the PanelView Plus. Because multiple FreeWave radio networks can coexist in the same location, a simple solution was to use FGR2-PE Ethernet radios.

Two of them link the Ethernet ports of the SLC 5/05 and PanelView Plus, providing seamless integration. This allows for easy monitoring and control with real-time updates of the entire system.

*The serial I/O radios allow the master PLC to monitor the tank’s water level and the pressure and flowrates.*

When a water district needed to automate its manual tank monitoring and pump operations to a SCADA system, it implemented an Allen-Bradley SLC 5/05 PLC at the main control room and a PowerFlex 40 drive at the pump house with Ethernet wireless radios connecting them.
Reliable Wireless Control

This application demonstrates the ease with which a cost-effective and reliable SCADA system can be built. The FGR2-IO-IOE is a flexible wireless I/O platform and a reliable serial radio, so it adds the ability to add I/O quickly and cost-effectively without having to add more radios. For the water district, its managers are happy to have a high quality, reliable and effective automated system.

The results mentioned above are specific to Freewave Technologies’ use of Rockwell Automation products and services in conjunction with other products. Specific results may vary for other customers.

FreeWave Technologies is the leading source for high performance licensed-free and licensed radios. We provide wireless data solutions deploying high speed Ethernet, serial and I/O radios for a wide range of industry and mission critical applications. The FreeWave Technologies I/O Series provides outstanding performance and versatility in wireless transmission of process-control signals. The FRG2-IOS provides long range, remote control and monitoring of tanks, lifting stations, pumps, flow meters, fluid levels, water sources, temperatures and pressures typical of the water/wastewater and oil and gas industries. Eliminating the need for signal wire connections at the master and thereby greatly reducing costs, the IO Series can deliver data from remote analog and digital sensors over a wireless link to a remote terminal unit (RTU) or programmable logic controller (PLC).