

Distributed Processing System Overcomes Lift Station Head Pressure Problems Using RF Control of Remote RTUs



The Challenge

On the outskirts of South Carolina's capital city, Richland County Public Works operates a forced main wastewater system consisting of 18 lift stations feeding into a central wastewater treatment plant. The forced main system requires lift station coordination to assure that the system head pressure is not too high for the individual lift station pumps to overcome. Periods of great rainfall complicate the problems, creating overflow conditions of the wet wells at the lift stations.

Richland County knew the only way to solve the problem was to automate the individual lift stations into one system that could control the operation of the individual

pumps based on overall system conditions and not just local requirements. A request for proposals was prepared and an Opto 22 RTU-based solution was chosen as the preferred system.

The Opto 22 Solution

The Opto 22 solution consists of a G4LC32ISA controller installed in a PC at the operations center. That controller is connected to multiple M4RTUs, located at each of the 18 lift stations, the fresh water wells, and the wastewater treatment plant.

The connected sites are located across the county, and are connected by RF modems using narrow band

communications. The RF communications are managed at the central site by Cyrano software running on the G4LC32ISA controller using the controller's serial port connected to the RF modem network.

Individual M4RTUs at each site are also networked back to the central site using RF modems connected to serial ports. The central site controller polls the remote RTUs and adjusts the programs running in each RTU, based on overall system requirements.

Each site can in turn create an alarm at the central site based on inputs from float switches, pump motor loads, and discharge header pressure. The central site PC runs Opto 22's MMI software, which talks to the G4LC32ISA controller plugged into the bus of the computer. The MMI software provides the interface to the operators in a graphical format, making it easy for them to operate the system and troubleshoot problems.

In addition to controlling the system, the G4LC32ISA controller is also connected via dial-up modem to an alphanumeric paging system that can initiate a page, with a detailed message, to the technician on call. The technician can determine from the message whether the alarm requires immediate attention. If the alarm requires attention, the technician can then use a laptop computer and connect to the central site PC using remote communications software to get more information on the condition. Many times the technicians can fix the problem without even leaving their house!



Benefits

The seamless link between the Cyrano flowcharting program and the Windows-based MMI were crucial to developing a system that would meet the county's needs.

The robust communications capabilities of Opto 22's flowchart programming language made it possible to accomplish the RF modem and paging system interfaces without having to write special software code.