

Case Study: Utilities

Major Components:

- » Allen-Bradley
- » ControlLogix I/O Cards
- » Rockwell Automation Bulletin 1492 I/O Wiring and Conversion Components

PLC I/O Upgrade with Minimal Downtime

Business Need

PLC-5 equipment reaching the end of its life cycle impacts many existing systems with costly down time and support issues. In this case, a customer needed to keep a wastewater plant running 24/7, since it was one of only two plants supporting a large city while upgrades took place.

The client needed to replace the existing PLC I/O system (PLC 5 distributed I/O via RIO communication), with a current product line ControlLogix. The PLC was previously converted to a ControlLogix CPU. This new product would distribute the I/O via an Ethernet communication connection. Updated system drawings would facilitate troubleshooting by plant personnel. Minimal downtime was the most critical, if not difficult, part of the project. Extensive knowledge and familiarity with PLC-5 systems, the options for replacing them, and quickly identifying the customer's needs aided Huffman Engineering in timely completion of the upgrade.

Solution

Huffman Engineering provided system design, components, installation, and detailed documentation. The upgrade consisted of removing the existing PLC-5 I/O rack and cards and installing a conversion mounting assembly, conversion modules, cables, ControlLogix racks and ControlLogix I/O cards. Downtime periods were kept at a manageable level for the plant while upgrades occurred. To complete the job in a timely manner; Huffman Engineering needed to:

1. Prepare a detailed schedule to keep downtime minimal
2. Develop a list of required hardware. PLC hardware using the Rockwell Automation I/O wiring conversion system allowed the upgrade without removing field wires from existing PLC-5 I/O module swing arms that fit directly into new conversion modules. I/O conversion hardware cost resulted in savings in labor and downtime, reducing time from days to hours per panel.
3. Determine existing PLC-5 I/O hardware and match with components of a new ControlLogix I/O hardware
4. Design a set of I/O drawings for the system
5. Develop the required I/O mapping steps in the PLC software to match I/O change steps
6. Assemble as many components as possible ahead of actual installation
7. Execute the sequence and schedule conversion as carefully developed

"All people from Huffman Engineering, Inc. were qualified and very knowledgeable."

-Project Manager



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Two unique challenges that Huffman Engineering encountered were breaking down the upgrade into steps, and developing a plan around I/O card upgrades. Achieving the upgrade within allotted downtime intervals was the first challenge. Breaking the upgrade into steps and detailed scheduling aided Huffman Engineering in meeting the downtime window challenge by arranging 1 to 2 racks at a time instead of taking on the entire system.

I/O card upgrades that were not one-to-one in terms of I/O points per module presented a second challenge. New 16 point modules could be used instead of two 8 point modules or 32 point instead of two 16s. In one instance, Huffman Engineering had to physically move an original wiring from the PLC I/O card connectors to the new ControlLogix I/O card connectors.

Result

The control system is now made of dependable but easily supported components containing all new ControlLogix hardware, communicating over a fiber based Ethernet system, ultimately reducing the risk of extended downtime. The system can be easily expanded and modified using the new Ethernet network and devices available. Plant personnel now have accurate, updated prints to help identify and locate problem equipment when necessary. Huffman Engineering has continuously been a proven provider of accurate, detailed, and timely project work at facilities.



This job is one of many that will need to be completed in water/wastewater industry. With older systems becoming obsolete, upgrades will be necessary. Rockwell Automation has a cost effective and efficient system for converting the installed base of PLC-5s to ControlLogix platforms. Huffman Engineering can provide customers with the knowledge, expertise, and detailed documentation to successfully upgrade to the newer Rockwell system.