

PUMP-PAK™ solution provides precise control in process intensive environment

Water/Wastewater
Mandarin Advanced WWTP



UNITED STATES

The situation

To meet the demands of rapid growth, the city of Mandarin, Florida, has instituted a multi-stage wastewater treatment plant. When Schneider Automation was contracted to provide controls for the new multimillion dollar facility, construction was underway and buildings were already being erected.



The Mandarin WWTP consists of two unique recycling systems, each with sludge tanks that must be recycled to maintain a certain chemical composition. To accomplish this, a process variable had to be established and a control system put in place to drive the pumps and keep the flow rate steady.

The objective

Because construction was well under way, accurate documentation and specification for the system was difficult to obtain. Schneider Automation responded to the difficult request of supplying a control system architecture. Facility objectives were as follows:

- Packaged software for a standard load share application
- Interface PUMP-PAK™ solution to master SCADA system
- Intelligent status and fault monitoring to assist maintenance



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Key features of the control system include:

- Operator selectable start/stop points for all pumps
- Operator selectable staging sequence of all pumps
- Automatic alternation of the staging sequence
- System Demand and Pacing Signal displays
- System status and fault monitoring

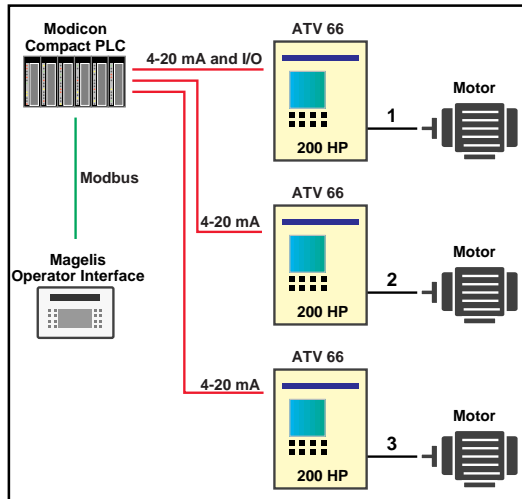


Figure 1. Internal Recycle System

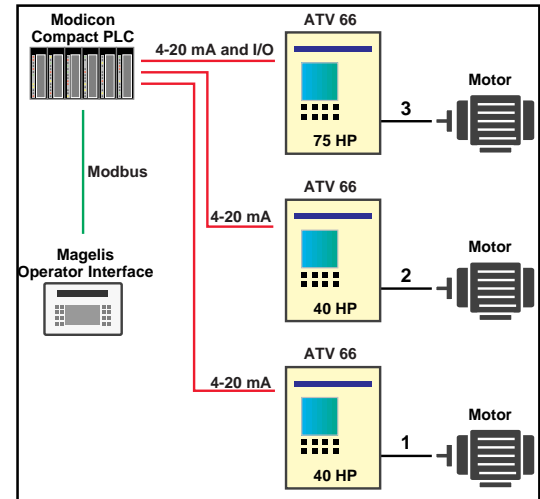


Figure 2. Return Sludge System

The solution

Within one week of the original commissioning date, Schneider Automation provided a complete reevaluation of functional specification, and hardware and software to meet the customer's needs. What was first perceived as two identical systems turned into two similar but functionally different pumping applications.

To meet application requirements, a MODICON Compact PLC communicates via MODBUS interface to a MAGELIS operator interface terminal. The three ALTIVAR 66 variable frequency drives controlling the raw water pumps are controlled by various logic and analog inputs derived from the PLC.

The flexibility of PUMP-PAK™ pre-engineered solution software allowed easy and cost-efficient implementation of a special configuration, requested by the customer, that goes beyond the standard load-share software.

Figure 2 illustrates the Return Sludge System, as follows: Pump 1 runs at variable speed until reaching capacity, then PUMP 2 runs at variable speed until reaching its capacity, while load sharing with Pump 1. If more flow is needed, Pump 3 runs at variable speed while Pumps 1 and 2 shut down. If even more flow is needed, Pump 1 runs at full speed with Pump 3, while the final option, for maximum flow, Pump 2 runs at full speed with Pumps 1 and 3.

Customer benefits

Because of Schneider Automation's total commitment to customer service and satisfaction, the Mandarin Advanced WWTP received a complete, pre-engineered solution to fit a facility already under construction. Several benefits were recognized:

- Plug-n-play type hardware and software reduced set-up and programming time
- Low maintenance costs due to fault and status logistics
- Simplicity of integration allows for rapid expansion options



*Return Sludge System
75 HP pump*