OPTIMISING WASTE WATER TREATMENT BY IMPROVING THE CONTROL OF SEQUENCE BATCH REACTORS

"Simplicity is the prerequisite for reliability" - *Edsger W. Dijkstra*

Industry	Sector	Segment
Utilities	Water & Sewerage	Waste Water

Project

The client is a water and sewerage utility responsible for managing over $2bn worth of assets. The client had identified an issue with the Sequence Batch Reactor (SBR) decanter control at one of their wastewater sites. The process involved filling an SBR, aerating the liquid waste, allow it to settle and then separating the solids from the liquid by decanting.

For effective decanting, the weir level needed to be maintained at or just below the liquid level in the SBR tank. The weir is raised and lowered by an actuator at a rate slow enough that solid waste does not go over the weir. The speed of the actuators was controlled by Variable Speed Drives (VSD), but these drives were not reliable.

The client planned to address the reliability issues by replacing the VSDs with Rotork actuators to control the rate of weir travel by using step control rather than variable speed.

Cromarty Automation was engaged to install the new actuators and develop control code to provide the run/pause control.

Solution

The project required the installation of two new actuators and modification of the existing site PLC code. Main works included:

- Installing new Rotork actuators on the SBR's.
- Decommissioning and removal of the redundant VSDs.
- Installation of new power and communication cables.
- Installation of new cable tray to protect the cables.
- Adding new I/O cards to the PLC rack for the run/pause control.
- Modifying the existing PLC code to operate the decanter movement in steps instead of variable speed.
- Commissioning of the system.

Outcome

The new solution was successfully installed and commissioned, resulting not only in significant improvement of the operation of the SBR's but also improved the quality of the decanted effluent. The operators also now had the ability for powered local manual control in addition to a hand wheel. The client's overall project goal of improved reliability was achieved.