

# New approach optimizes replacement of old plant control systems

Plant control systems consolidate the physical assets of water and wastewater treatment facilities. When these systems go down, the entire plant is affected. Preventative strategies are impossible with integrated control systems, as they rarely show warning signs prior to failure.

As such, all municipalities should establish a regimented replacement schedule for all integrated processor based control systems, based on a 15 - 20 year lifecycle. The challenge with control systems is that they completely engulf the process of every water or wastewater facility and cannot be taken off line, without impacting process delivery, quality, and operations.

The key to upgrading legacy systems is to provide an unwavering operational acceptance, through a completely seamless control transfer utilizing a *Parallel Control System* (PCS) approach. The distinct feature of the PCS approach is the co-existence of both the legacy and the new control system. This enables the integration team to present a “real-time” side-by-side comparison of each control system during the upgrade.

The installation process involves each control panel. The new control system is temporarily mounted beside the old controller. This is done so that during com-

missioning, two distinct programmable logic controllers (PLCs) are installed on the common Input/Output (I/O) set within each control panel. The new PLC is then connected to its own SCADA interface, human machine interface (HMI) and/or a thin-client SCADA node, depending on project configurations.

Application loads are then developed for each PLC and each respective sub-process by referring to the adjacent legacy control. During the application development, the integration team leverages system integration advancements in technologies and seeks to refine sub-processes. This is accomplished by referring to the legacy control functionality and utilizing the experience and familiarity of the operators.

Co-existence of legacy and new control allows for a unique perspective from plant operations. An operator and the systems integration team can refer to the new control interface side-by-side with the legacy control system interface. Each system can be switched, seamlessly, between control and supervisory roles, and vice versa. Under PCS installations, if an operator cannot easily find something within the new control interface, they can utilize the legacy system as a fall-back option. Then, the integration team can make adjustments during

the commissioning process.

Once the systems are established, commissioning perspectives can shift towards using any technological advances. This provides an opportunity to streamline existing processes that may have been inappropriately controlled through the legacy control system. These improvements can positively impact plant efficiencies, reduce chemical and power costs, while improving plant performance. Also, there will be opportunities in advancements in communications. For example, leveraging internet communications through secure Virtual Private Network/Wide Area Network configurations makes data on all municipal infrastructure available anywhere, and in real time, to central control, maintenance management and data acquisition systems.

The Parallel Control System approach has proven that the ease and comfort of being able to re-establish the legacy systems during commissioning, is key to establishing operator confidence about removing those systems, once the new system is established.

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Filter control panel depicting the legacy and new PLC controllers on the same I/O set.



Filter control panel post-commissioning, in which, the new controller and HMI interface panel have replaced the legacy system highlighting a much “cleaner” installation.