

PLC System for Food & Beverage Application

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CASE STUDY**Challenge**

A Southeastern US poultry processor was experiencing a loss in production, downtime and frequent USDA violations due to upsets in their microbial control program.

Solution

EquipSolutions installed a PLC control system and custom algorithms to dramatically improve performance and provide control of their system, not only fixing problems but also gaining the client more business as a result.



“Introducing a PLC-based control system and a custom algorithm for this poultry processor’s flow-based chemical feed and monitoring system saved product, system downtime, and significantly reduced USDA violations.”

Anthony Glitto
EquipSolutions

Introduction

A properly designed, engineered and executed microbial control program is critical in the poultry processing industry. Real world budget and operational restrictions however challenge processors on a daily basis to meet mandated performance objectives.

This was the challenge facing a large poultry processor in the Southeast who found themselves struggling to keep up with monitoring their chemical feed systems operation, performance, and chemical inventories. They suffered from the loss of birds, downtime and all too frequent USDA violations.

Over the course of 90 days EquipSolutions assisted the processor gain control by eliminating the manual aspects of their microbiological treatment for foodborne pathogens (*Campylobacter* spp., and *Salmonella* spp.). The improved system reduced chemical usage, reduced water usage, eliminated downtime based on unscheduled tote changeouts, and significantly reduced USDA violations. As a direct result the facility was able to gain additional business based on the performance improvements.

SYSTEM AUDIT & PROCESS CHANGES

Working with the chemical supplier and plant process engineering, a system audit was conducted and a number of process changes were implemented. Chemical metering pumps, materials of construction, and valving were reviewed and optimized. City water pressure fluctuated and required regulation to provide consistent flow to plant intervention points. For safety considerations, a system interlock was established in the event of no flow or over pressurization.

The application involved the feeding of three chemicals; sulfuric acid, sodium hydroxide, and peracetic acid to a number of locations. pH levels needed to be monitored at each application point and the logic implemented to switch from flow-based to pH-based chemical feed.

CONTROL SYSTEM & ALGORITHM

EquipSolutions worked closely with plant personnel to identify key data, alarms and reporting including; flow/no-flow conditions, chemical concentrations confirmation, pump flows & pressures, daily chemical usage, and chemical tote levels. Shut down safety protocols were also established for each application point.

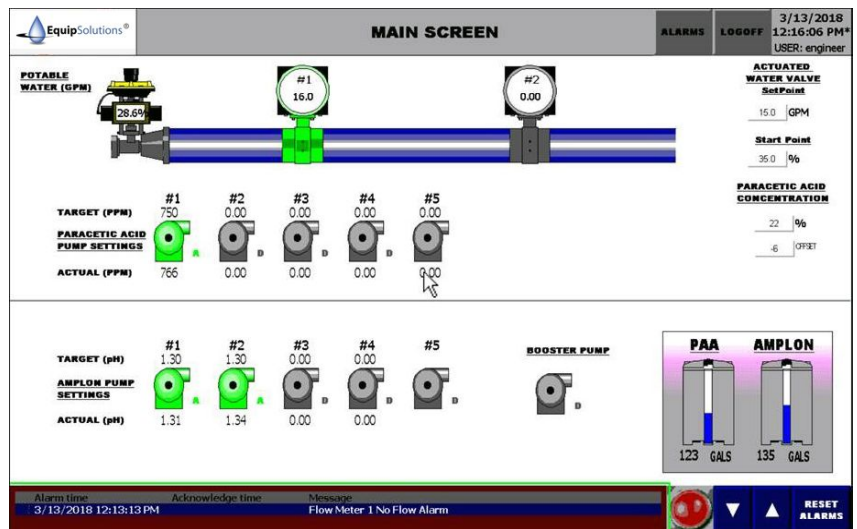
To manage the new system design requirements an Allen-Bradley PLC with PanelView® HMI was selected and programmed. Real-time data was integrated into the client's data acquisition system and protocol was developed for encrypted remote communications providing secure data transfer via VPN. The communications included comprehensive data logs, auto-reporting via email and text messages, and alarm notifications. Remote screen mirroring of the HMI, for real-time remote changes, was provided as well.

A control algorithm was developed based on water flow, chemical usage and chemical concentration. This enabled the calculation of actual ppm dosages and controlled the target setpoints for each application point.

RESULTS

By implementing the recommended process changes and installing the new PLC control system the client was able to save on daily chemical usage, reduce their water usage, eliminate downtime based on tote change outs, and significantly reduced USDA violations. Further, as a bonus the client has since been awarded additional business by improving their operational efficiency.

EquipSolutions provides the prompt delivery of basic equipment like parts, pumps, controllers and accessories of rapidly deployable standard systems and the resources to custom engineer and fabricate a solution for more complex applications.



PanelView® display of water flow, pump status and chemical inventory levels



Allen-Bradley® PLC cabinet