

Upgrade delivers spare parts

Marvin Coker
Bachelor Controls Inc.

Golden Triangle Energy Cooperative (GTEC) in Craig, MO processes 20,000 bushels of corn into approximately 55,000 gallons of ethanol daily. Operations began in 2001 and, shortly after construction was complete and plant operations were stable, GTEC proactively sought to maximize the efficiency and uptime of its processes.

GTEC was enjoying steady uptime and consistently out-producing its 14 MMgy (million gallons per year) nameplate by 5 MMgy to 6 MMgy. But the installed control system hardware had been deemed obsolete by the manufacturer, and replacement parts were becoming difficult to find. Some parts could only be sent in for refurbishment or repair, which required a two- or three-week turnaround. In desperation, GTEC even began to search online auction sites to ensure sufficient backups for the most critical components.

With the control system risk mounting and thoughts of a plant expansion in the works, GTEC contracted with Bachelor Controls Inc. (BCI) in 2006 to retrofit and upgrade the obsolete control system. To avoid the problems that plagued the original system, the new system requirements included ensuring that parts and technical support — including training — were readily available, and that a pool of skilled talent existed to maintain and support the system.

After weighing upgrade options, BCI chose to integrate Rockwell Automation's Process Automation System (PAS). Utilizing the Allen-Bradley ControlLogix Programmable Automation Controller (PAC) and I/O system — along with Rockwell Software's RSVIEW Supervisory Edition graphical interface — this system features an open architecture with maximum flexibility for future expansions, plus offered abundant training and maintenance support resources.

GTEC general manager Roger Hill said, "We knew the magnitude of this project would be like a heart transplant for our facility, and we relied on Bachelor Controls to guide us in

making the most effective decisions for our control system needs. The complexity of the project required a great deal of planning and project management to ensure a final, successful project."

Selecting established product lines from Rockwell Automation ensured that all installed parts were readily available from reliable distributors located near GTEC, and that both hardware and software technical support were available long into the future.

Project planning saves the day(s)

To contain installation costs and minimize plant disruption, BCI designed the system to retain all field wiring and field devices. Waldinger Corp., a mechanical, electrical and sheet metal contractor operating primarily in the U.S. Midwest and Southeast, was contracted to perform the electrical work and would become an indispensable member of the project team.

BCI Project Manager Adam Hinton said that BCI follows a structured project methodology that stresses communication, documentation, and an on-site factory acceptance test. "This drives consistent, quality performance, and also ensured that we would maintain the project's aggressive implementation schedule," said Hinton.

Shutting the plant down to complete the work was unavoidable; however, BCI minimized the

ONLINE

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BCI Project Manager Adam Hinton checks on the system in the GTEC control room. For more photos, see this article under www.control.com/archives. Source: Bachelor Controls

costs and impact to the plant with a two-phased implementation plan with each phase taking place during an already-scheduled plant shutdown.

GTEC Plant Manager Charlie Martin recalled, "Bachelor Controls clearly understood the tremendous amount of detail that was going to be required.... When it came time to execute, they were poised and ready to go."

Conversion two-step

The first phase installed the new control system infrastructure and implemented the new control schema on a small portion of the plant. This "pilot phase" validated the implementation plan and tested device-control software modules under load. It was completed inside the normal three- to four-day outage window. According to GTEC Operations Manager Shaun O'Riley, The pilot phase "allowed us to adapt to the changes and get comfortable with the new system before converting the rest of the plant."

The second phase, the major implementation phase, was done during the next major cleaning outage. BCI specialists and their Waldinger counterparts showed up prepared for the task well aware of the enormous risk: The existing control system consisted of a local DCS controller with associated I/O and six remote I/O enclosures. More than 800 I/O points were spread over four buildings containing dust and gaseous classified explosive areas. The logic consisted of sequencing, batching, reporting, and standard interlocking of devices.

Because this was a retrofit project, the logic was developed based on a text extraction from the existing control system, coupled with the project team's general working knowledge of the operation of an alcohol plant. The reverse engineering process was complicated by an unfamiliarity with components of the obsolete control system, incomplete documentation, and meager technical support resources.

The team took a mere four days to complete the major implementation phase. When the fifth day arrived, normal restart procedures were implemented by existing staff using the new control system, and the plant was back in full production before the end of the day.

With the improved efficiency, GTEC

can now focus on production and processing issues. Hill said, "We take great comfort in knowing our control system is designed to meet our specific needs, with replacement parts available locally."

Marvin Coker is a senior project engineer for Bachelor Controls Inc., a Control Engineering System Integrator of the Year,

based in Sabetha, KS. Mr. Coker has more than 20 years' experience, including providing architecture design and support for food and fuel-grade alcohol production systems, batching and continuous process systems, and data collection and management solutions. Reach Coker at mcoker@bachelor-controls.com or call (785) 284-3482.

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