Wild Turkey Bourbon Preserves Quality with High-Tech Batch and Sequence Management from Rockwell Automation

Bachelor Controls implements PlantPAx process automation system for increased control and access to information

**Background**

In 1940, Thomas McCarthy, a hunter and distillery executive, brought a private supply of bourbon on his annual Wild Turkey hunt. His friends liked the spirit so much, that the next year they asked McCarthy to bring along that same “Wild Turkey” bourbon. McCarthy honored his friends’ request by turning their nickname into one of the world’s most popular brands of bourbon.

The bourbon McCarthy branded was originally created in 1855 using a mixture of corn, rye and malt barley. Using the same primarily manual process established long ago, Wild Turkey today produces 20 whiskey products out of its facility in Lawrenceburg, Ky.

In 2010, the Wild Turkey plant had reached capacity and the distiller knew it would need to expand the distillery into a highly automated facility in order to best meet production demands. By implementing a plantwide process automation solution from Rockwell Automation into its greenfield distillery, Wild Turkey not only increased production and delivered a more consistent product, but improved operator productivity, decreased waste and created a safer work environment for its operators.

**Solutions**

**PlantPAx Process Automation System**
- Provides process control with Allen-Bradley ControlLogix programmable automation controllers
- Seamlessly communicates between controllers with ControlNet and EtherNet/IP networks

**Production Intelligence**
- FactoryTalk View Site Edition software provides graphically rich displays for role-based control and information
- FactoryTalk AssetCentre software consolidates control system configuration, disaster recovery and change management
- FactoryTalk Historian software gathers and stores production data and provides rich analysis and reporting

**System Design and Delivery**
- Rockwell Automation Solutions Provider, Bachelor Controls, Inc. designed and delivered the solution

**Results**

**Maintained Product Quality**
- Implemented an automated control system to create a more consistent distillate, while maintaining product flavor and color profiles

**Met Implementation Timeline Goals**
- Designed and delivered the solution within a tight production timeline

**Optimized Production and Increased Capacity**
- Increased production capacity from 5 mm to 10 mm proof gallons per year
- Reduced waste through increased control
- Reduced amount of time manually controlling process, increasing operator productivity
Challenge

The Wild Turkey bourbon distillation process begins by grinding a mixture of corn and rye that is then cooked, cooled and combined with barley malt in order to convert all starch into fermentable sugars. This mixture is then funneled into fermenters, where Wild Turkey adds its own homemade yeast. After a few days, the new mixture, or mash, is ready to go through the still, a large copper silo-like structure. The fermented mash is pumped through the top of the still, while steam is pumped in from the bottom. When the steam meets the fermented mash, vaporized bourbon is produced. This vapor rises into a condenser, turning into liquid, while the solid grains float to the bottom and are later repurposed for cattle feed. After distillation, the bourbon flows into the cistern room where it is divided into new charred oak barrels and stored for six to 12 years of aging.

For generations, this distillation was manually controlled and relied on a hand-operated process to produce the same consistent bourbon distillate, batch after batch. Recently, the Wild Turkey plant discovered it had reached maximum capacity. Its ability to meet increasing production demands was hampered by an inability to effectively upgrade its current distillation facility.

Rather than shoehorning new equipment into the old plant, Wild Turkey chose to expand on the same site the company had distilled on for more than a century. Constructing a greenfield plant gave Wild Turkey the chance to reevaluate its current production. With its customers in mind, the distiller decided to implement a largely automated distilling process that would allow the company to exactly replicate the iconic Wild Turkey flavor in the new facility.

There are many inherent challenges when building an automated distillery for an established brand like Wild Turkey. First and foremost, the distiller needed to maintain the same flavor profile and appearance that its consumers had come to expect. Second, the company needed to meet aggressive construction goals in order to ensure delivery and fulfill customer orders. And finally, Wild Turkey needed a system that would enable its operators to optimize production.

“Years of success in the bourbon industry have shown that we have the taste part down,” said Jim Sanders, distillery production manager at Wild Turkey. “So the ultimate goal was to preserve that flavor while improving the process in an expanded facility, which meant arming our operators with tools that provide deeper insight into our distillation process.”
Solutions

Creating an expanded facility allowed Wild Turkey to custom build every process. To ensure that every machine, code and tag had a purpose, the distiller enlisted the help of Rockwell Automation and Bachelor Controls, Inc (BCI), a solution partner within the Rockwell Automation PartnerNetwork™ program. Together, Rockwell Automation and BCI assisted in the design and implementation of the new automated system.

“We didn’t want a partner who would simply put a boilerplate package over the top of our facility,” said Sanders, “Which is why we chose to work with Rockwell Automation. The company’s solid reputation, combined with BCI’s extensive experience in the alcohol industry, was the perfect match for our needs.”

The team at BCI, led by owner and president, Ray Bachelor, selected an open system for its process control. The Rockwell Automation PlantPAx™ process automation system allowed Wild Turkey to apply a production intelligence and control strategy across its entire operations.

“Wild Turkey knows how to make their product better than I ever will,” said Bachelor. “So BCI’s goal was to give the distillery the tools it needs to preserve the iconic flavor profile it’s known for – and we knew we could do that with the PlantPAx system.”

The PlantPAx system incorporated sequencing compliant with the ISA-88 set of standards and terminology for batch control through its Logix Batch and Sequence Manager. This functionality allows operators to configure recipes and formulas directly in the Allen-Bradley® ControlLogix® controller through FactoryTalk® View Site Edition software without requiring code changes to the system to help streamline the implementation of approved changes.

FactoryTalk Historian software gathers data tags directly from the controller for real-time, granular production data. It not only helps operators quickly locate and correct sources of inefficiency, it eases regulatory compliance by keeping an electronic history of the data transactions.

FactoryTalk AssetCentre software provides a centralized database for change management of the production process. The software helps Wild Turkey manage the distillation environment by providing secure access to the control system, tracking users’ actions, managing asset configuration files, configuring process instruments, and providing backup and recovery of operating asset configurations.

The system integrates all process operations, controls and motor controls through EtherNet/IP™ and DeviceNet™ wireless communication networks. EtherNet/IP provides computer networking that replaces conduits and wires for each I/O to help reduce wiring and installation costs, increase reliability, and enable point-to-point management and troubleshooting.

To help ease training and engage with the operators prior to the opening of the new facility, BCI simulated plant operations in the ControlLogix controllers, allowing operators to try out interfaces, play with face plates and see sequences run. By the time operators transitioned to the new facility, they were comfortable operating the system directly from the human-machine interface screens rather than by hand.
**Results**

Wild Turkey saw immediate results in the expanded facility’s automated process system. The plant is now capable of producing 10 mm proof gallons per year, up from five mm proof gallons per year at the old site.

The current control system now mirrors the actions carried out in the old facility to a 'T', so if an operator opened a valve and left it open for 15 minutes, the new system completes the exact command. This consistency means Wild Turkey is still producing the same quality product, but now in larger quantities.

Not only has the PlantPAx system allowed Wild Turkey to increase plant production, it has helped increase operator effectiveness as well. The highly automated process and intuitive visualization package providing real-time information help operators focus on the actual process rather than spend time opening and closing valves by hand and other manual tasks.

In addition to meeting the goals of increasing production and improving access to real-time process data, Wild Turkey is producing less waste in a safer work environment. The control system keeps an eye on every aspect of the operation so losses that the distiller might have seen in the past are no longer an issue. Operators spend less time in the field, going up and down stairs, and possibly missing something that might be occurring at another point in the process. With the PlantPAx process automation system, operators can view the entire distillation process on a screen. If an alarm sounds and an operator needs to take immediate action, they can do so with the click of a button.

“It’s been quite impressive to see how the time-honored traditions and state-of-the art automation products can co-exist so seamlessly and work together to produce the same great tasting bourbon Wild Turkey customers have been enjoying for over a century,” said Sanders.

The results mentioned above are specific to Wild Turkey’s use of Rockwell Automation products and services in conjunction with other products. Specific results may vary for other customers.

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**Batchelor Controls, Inc. has focused experience in the food and pharmaceutical industries. Specialties include process control, high-end batching systems, lot tracking, bar coding and robust recipe management. Additionally, BCI has a team of dedicated high-level language and database programmers to deliver Manufacturing Execution Systems (MES) solutions which integrate process control systems with Enterprise Resource Planning (ERP) systems, giving customers near-real-time information they can use to make critical business decisions.**

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