

Bourbon Boom Drives Distillery Expansion

Historic Kentucky spirits manufacturer doubles production capacity with minimal increase in physical space.

Michelle Segrest, Contributing Editor

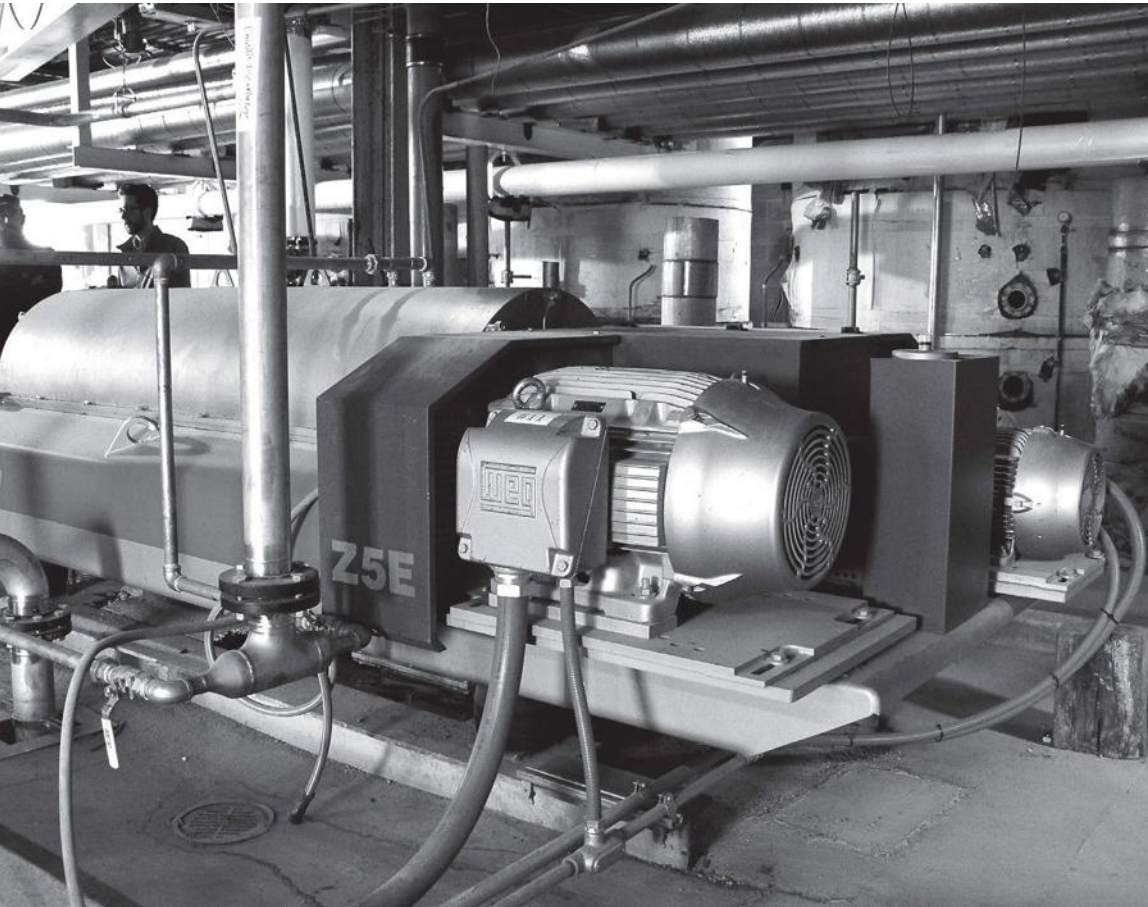
NESTLED ON THE SCENIC SALT RIVER in Lawrenceburg, KY, sits a unique distillery with Spanish mission-style architecture. Four Roses Distillery began producing bourbon on this site in 1910. Bottling and single-story rack warehousing are handled at a second facility at nearby Cox's Creek. Rich in tradition and history, Four Roses handcrafts 10 distinct bourbon recipes and is one of the largest bourbon manufacturers in Kentucky, a state that produces 95% of the world's supply.

Managers at the 130-yr.-old company decided, in 2015, to embark on a plant expansion that would double its yearly capacity from 4-million to 8-million proof gallons. The decision to expand was based on increasing and projected industry growth,

Top right. The Four Roses Distillery has produced bourbon from this site in Lawrenceburg, KY, since 1910. *All images: Michelle Segrest*

Right. The distillery handcrafts 10 distinct recipes and is one of the largest bourbon manufacturers in Kentucky.





For high-capacity, high-quality separation processes, Four Roses uses a Flottweg Separation Technology centrifuge.

but the plans included only a limited increase in square footage. Strategic space planning became an essential element.

“This effort will be worth the rewards in the long run,” said Dustin Goodlett, senior manager of distillery operations. “It would be easier for everyone to sit back and just operate at current capacity. But, in order to grow the brand and keep up with the industry, the expansion was necessary.”

Goodlett began working with Four Roses 12 years ago. “I knew back then that there was a bourbon uprising and we had plenty of room to grow,” he said. “This expansion represents tremendous strides for Four Roses to be a major player in the bourbon market. But jumping to double capacity is not



THE BOURBON INDUSTRY

Bourbon is big business in Kentucky. An \$8.5-billion signature industry, it generates 17,500 jobs with an annual payroll of \$800 million, according to the Kentucky Distiller’s Association’s (KDA), Frankfort (kybourbon.com), January 2017 report, *The Economic and Fiscal Impacts of the Distilling Industry in Kentucky*.

Spirits production and consumption pours more than \$825 million into federal, state, and local tax coffers every year, and more than \$1.1 billion in capital projects have been completed or are planned and underway from 2012 through 2020, including new distilleries and converting aging

warehouses to bottling facilities and tourism centers.

Kentucky’s iconic bourbon distilleries filled 1,886,821 barrels of amber nectar in 2016, breaking production records that go back to 1967, according to the report.

The state has the perfect natural mix of climate, conditions, and pure limestone-filtered water necessary for producing the world’s greatest bourbon. Bourbon, America’s only native spirit, must be made with a minimum of 51% corn, aged in charred new-oak barrels, stored at no more than 125 proof, and bottled no less than 80 proof.

According to the KDA report,

if the distilling industry in Kentucky continues to grow as it has in the past seven years, by 2020 employment should exceed 20,000, payroll \$1 billion, and output \$10 billion. State tax revenues from industry-related activities would approach \$200 million by 2020 and local tax revenues should approach \$42 million.

The number of distilleries grew from 19 in 2009, to 31 in 2013, to 52 in 2016. The major players in the distilling industry in Kentucky currently are Jim Beam, Brown-Forman, Diageo, Four Roses, Heaven Hill, Maker’s Mark, Sazerac, and Wild Turkey.

something that just happens overnight. It's a step-by-step process."

FOUR-STAGE EXPANSION

Four Roses is currently in the final stages of the expansion, scheduled to be completed in September 2018. The first phase involved adding a new maintenance shop, boiler, and grain-milling system.

Phase 2 began with installation of a new grain unloading area, updated foundation and structure for the fermentation room, a fermenting addition, then relocating the current beer still and installing a new still. It also included installing a new doubler and byproducts system. In this phase, the company additionally installed a new water-treatment system, cooker, chilled-water plant, and a byproducts dryer system.

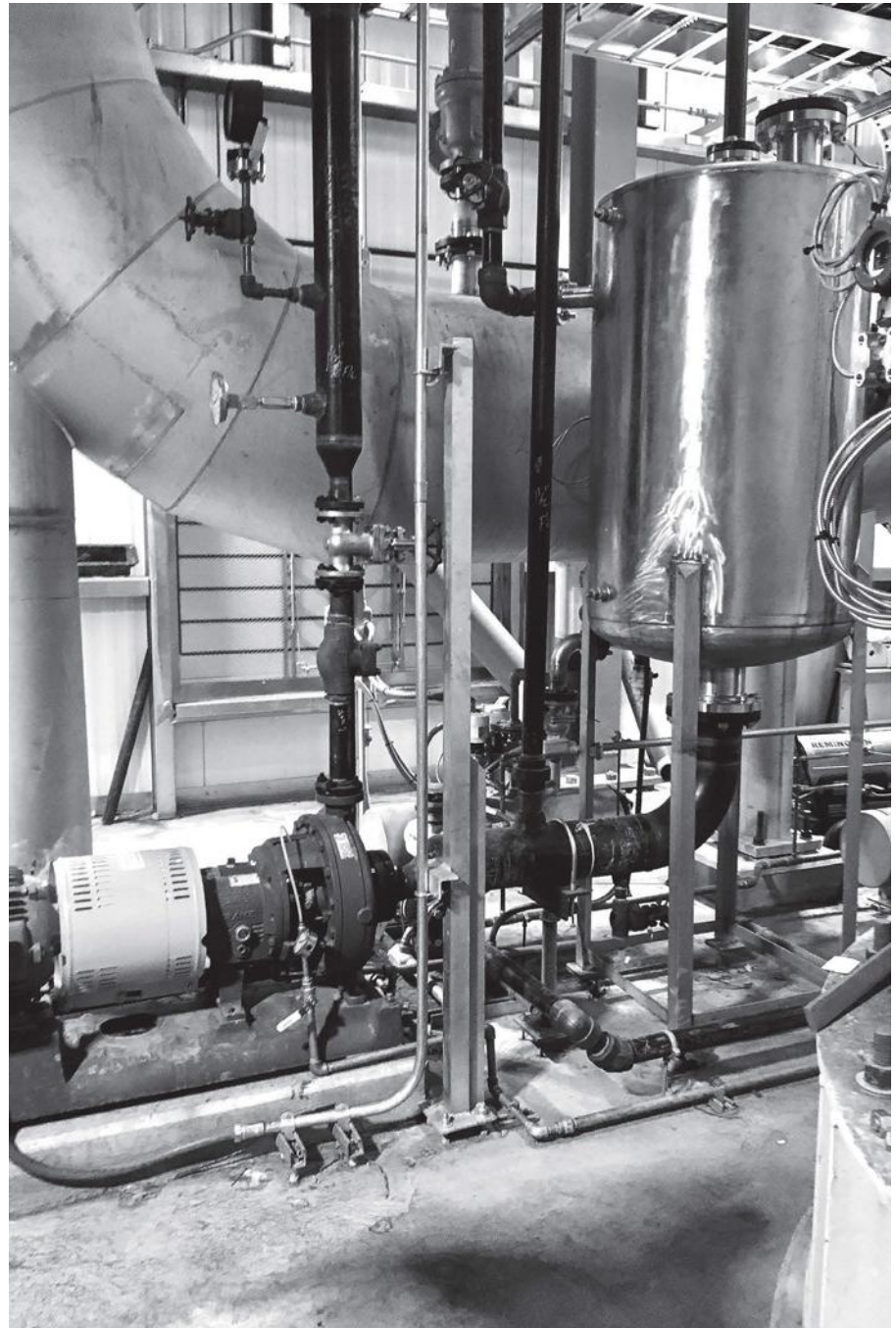
Phase 3, which will be completed in the first half of 2018, includes installation of the fermenters and getting them operational. Three new yeast tubs will be installed, along with the piping for the new cooker, still, and doubler. Since doubling capacity is the goal, another new cooker and beer still with doublers are part of the phase, along with more yeast tubs. An advanced-design separation centrifuge system will also be installed. The number of fermenters has been doubled and new cooling plant and byproduct processing area installed.

Phase 4 is the expansion of the Cox's Creek warehouse, on a separate site, to provide additional storage capacity. That phase will be completed in the second half of 2018.

To accomplish all of this, careful planning was crucial, Goodlett said. One key element is an annual summer shutdown that usually lasts six to eight weeks.

"We have scheduled downtime every summer for a couple months," he said. "It's obviously going to be challenging, but we will use this scheduled downtime wisely. This year, we added an extra month, so this will help us get all the preventive maintenance accomplished so we can have smooth operations when we move to doubled capacity."

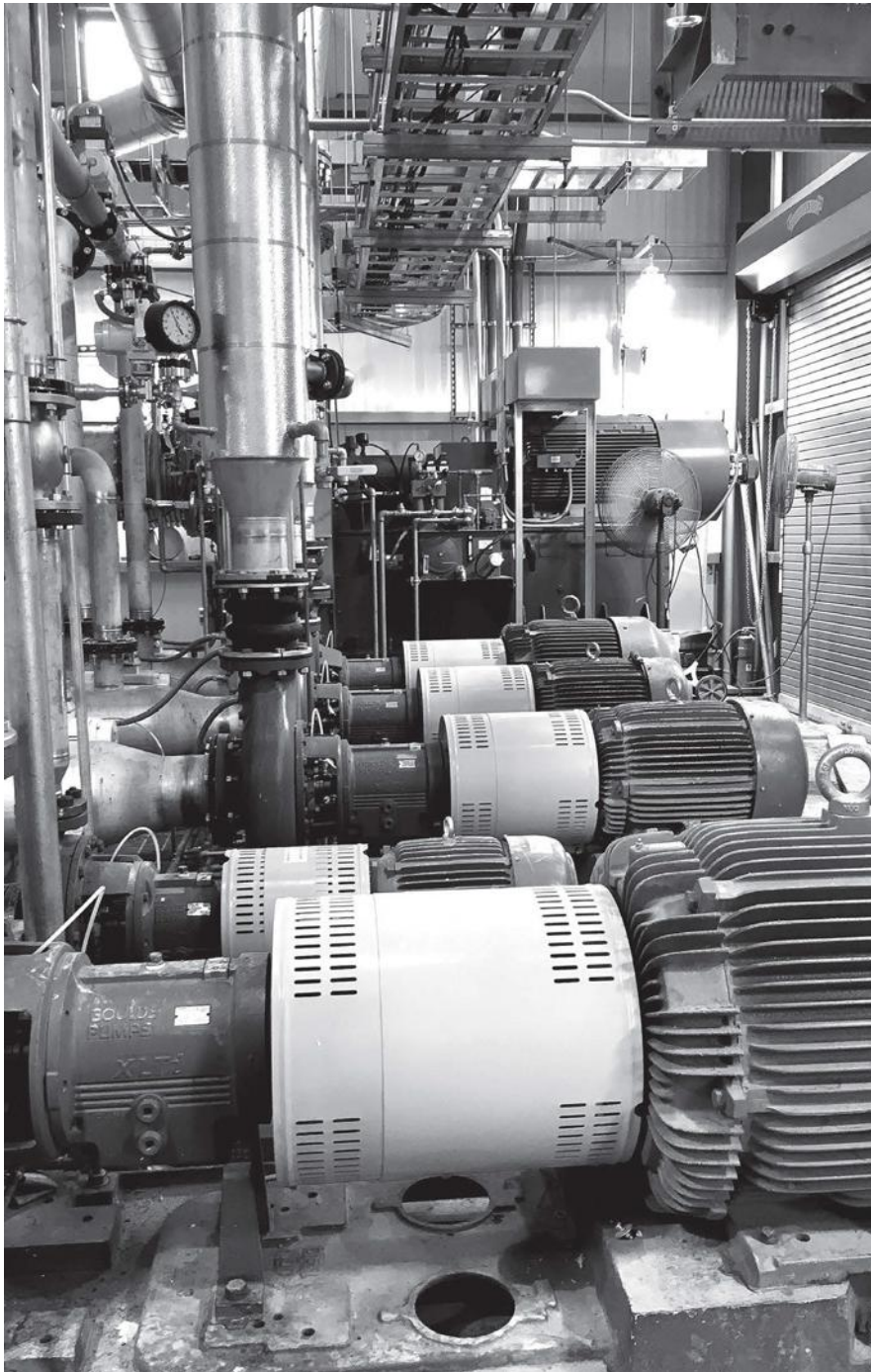
Four Roses worked with Louisville, KY, firms Vitok Engineering Inc. (vitok.com), and Joseph & Joseph Architects (josephandjoseph.net), to



help plan the expansion. The space planning was accomplished using CAD designs that helped simplify piping modifications required to fit all the new equipment into the existing distillery. "We are moving things around in order to make it work," Goodlett explained.

Reorganizing the existing plant, along with making the most of the space, made sense for the company, according to chief operating officer Ryan

In addition to implementing several electrical improvements, the distillery's automation level is increasing. When finished, the operation will be 80% to 90% automated.



Doubling capacity at Four Roses, with only a small increase in space, required collaboration with an engineering firm and an architect, along with reliance on CAD drawings, to modify piping and efficiently locate other assets.

Ashley. “Quality and consistency are paramount in our business,” Ashley stated. “In order to guarantee the same level of quality, we decided to expand our capacity within the existing plant rather than build a new plant and risk differences, real or perceived. As an example, in our fermentation building, this room houses open-top fermenters. Four Roses’ five proprietary yeasts strains have

been thriving in this building for decades. They are a living part of the walls, ceiling—the entire room’s character. To ensure we maintain the same microclimate, we are building around the existing fermenter building and opening its interior walls to allow the microclimate to migrate into all areas of the new fermentation building. This isn’t the only area where we have worked hard to maintain continuity. Every inch of the distillery has been carefully planned and executed.”

In addition, the expansion includes much advancement in the electrical footprint, as well as increased use of automation. “We are about 80% to 90% automated,” Goodlett said.

In addition to the summer shutdown, the plant has one scheduled down day each week to clean the equipment. “We try to do most of the preventive maintenance during the summer shutdown in order to keep the plant running efficiently.”

Goodlett explained how preparations are being made to ensure a smooth transition. “Keeping the focus more on the preventive side than the reactive side is our best avenue to keep operations running efficiently,” he said. “As we double our capacity, good communication between operations, maintenance, and management will also be critical.”

Some of the biggest challenges, Goodlett continued, are implementing the new equipment into the current operation, and learning how to operate the new equipment while also keeping general production flowing efficiently.

“We had training before we started the new systems,” he said. “The training has been ongoing, and we have been learning as we go on some of it. We are operating efficiently. We are learning the tricks that make it easier and safer.” **EP**

Michelle Segrest is president of Navigate Content Inc. and has been a professional journalist for 29 years. She specializes in creating content for the processing industries and has toured manufacturing facilities in 58 cities in six countries on three continents. If your facility has an interesting efficiency, maintenance, and/or reliability story to tell, please contact her at michelle@navigatecontent.com