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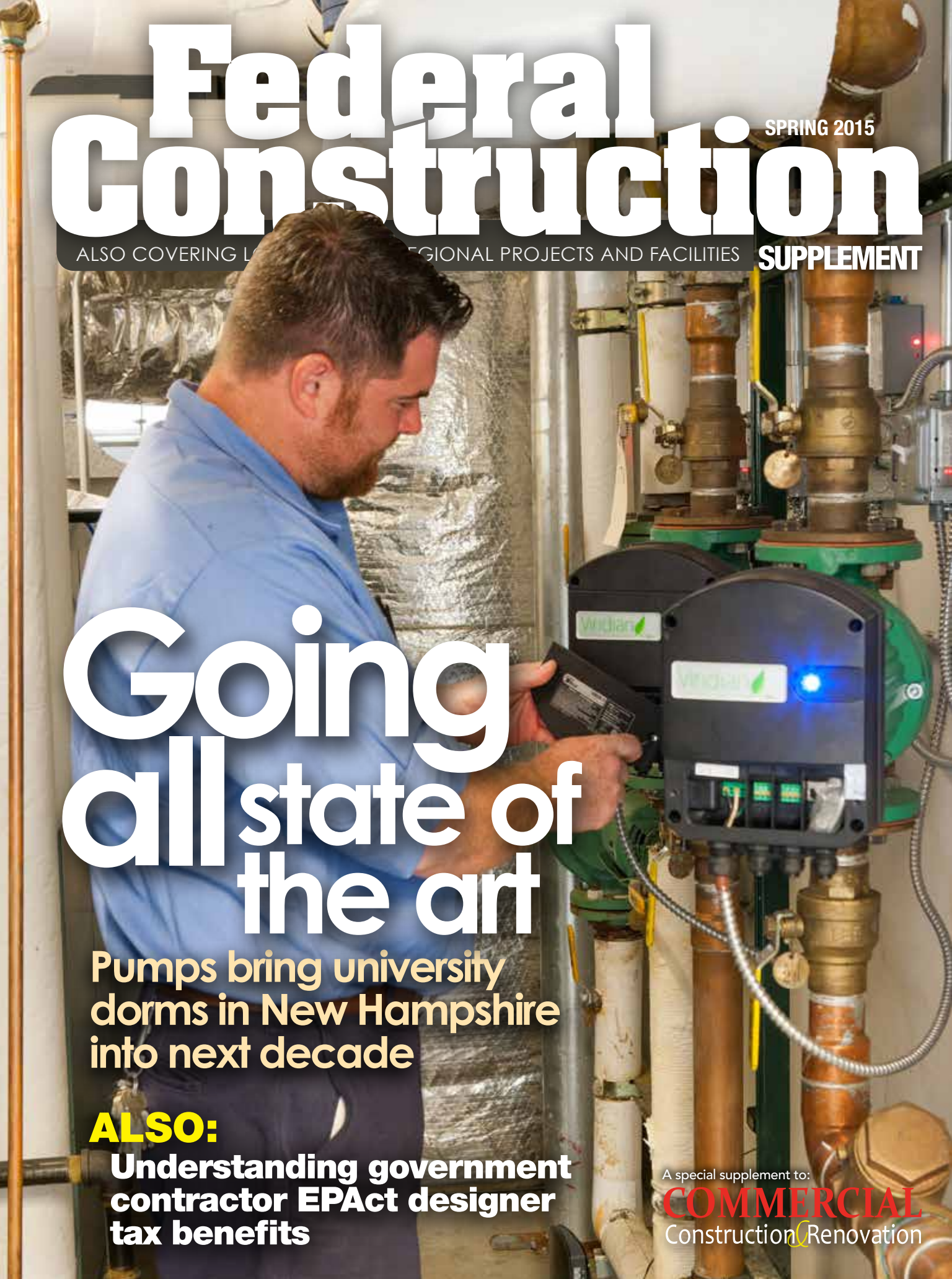

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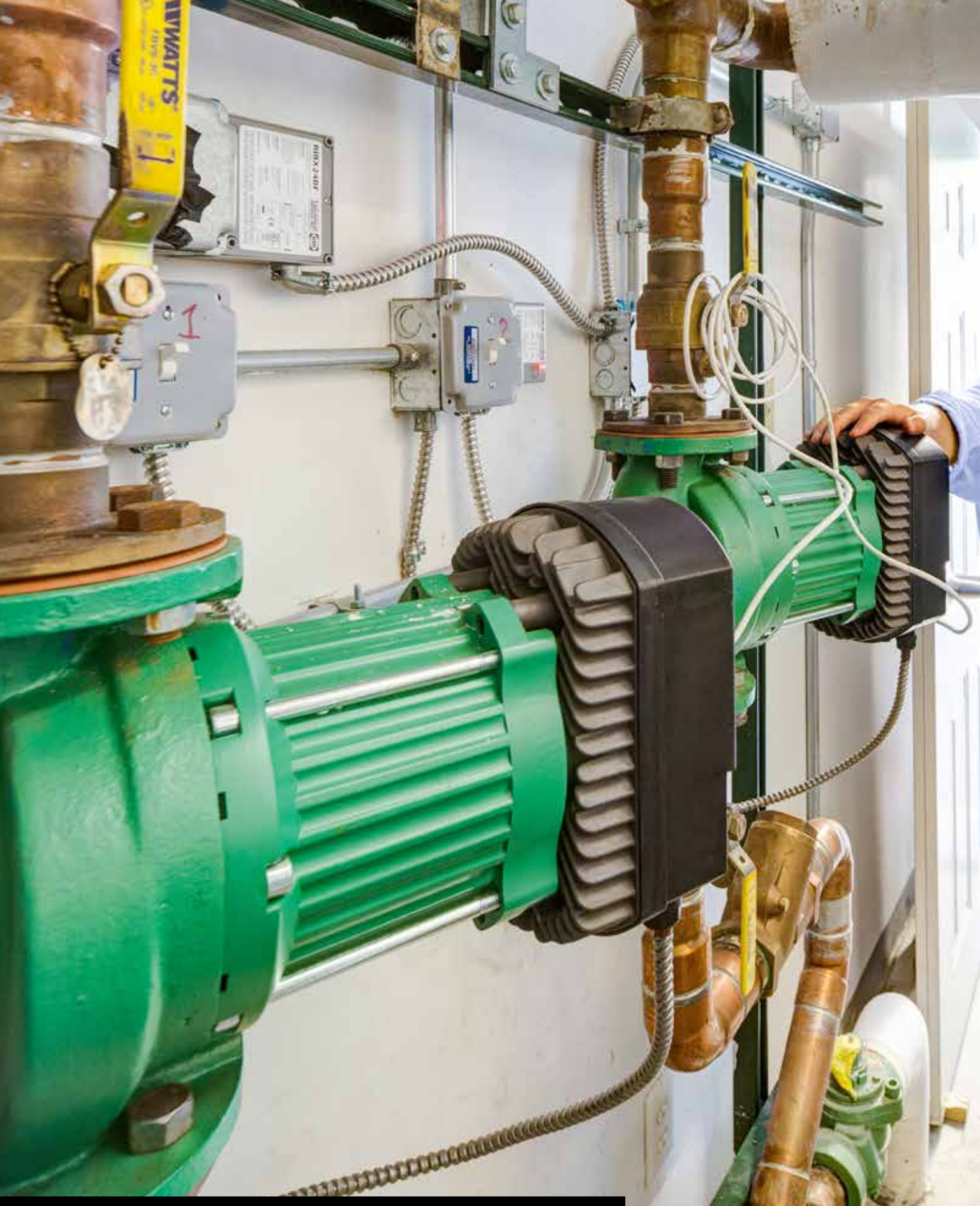
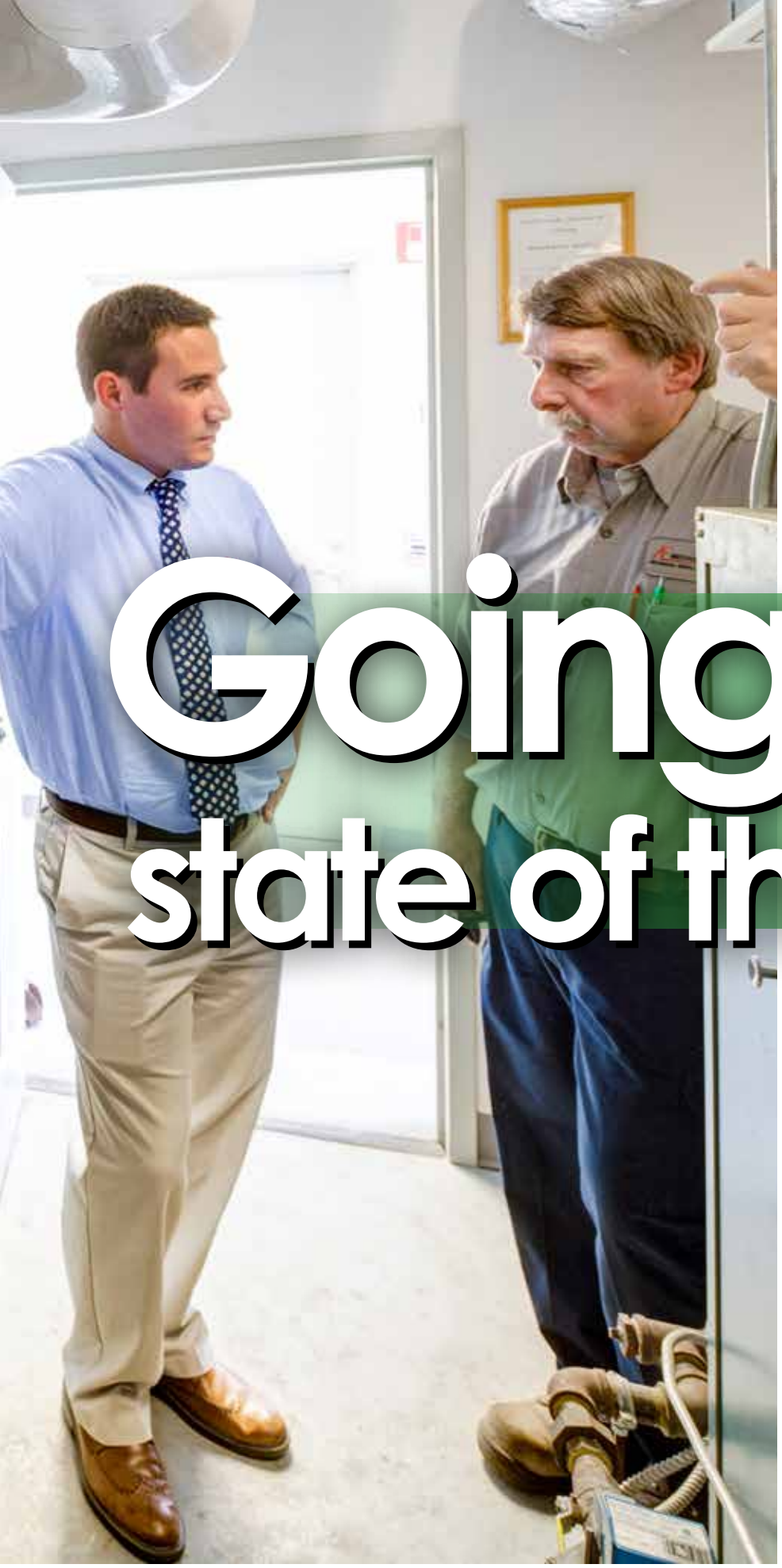


Mike Hanson, distributed product sales at Emerson Swan, and Adam St. Germain, discusses pump setup with AE Mechanical's Dan Daley, lead technician.



Pumps bring university dorms in New Hampshire into next decade

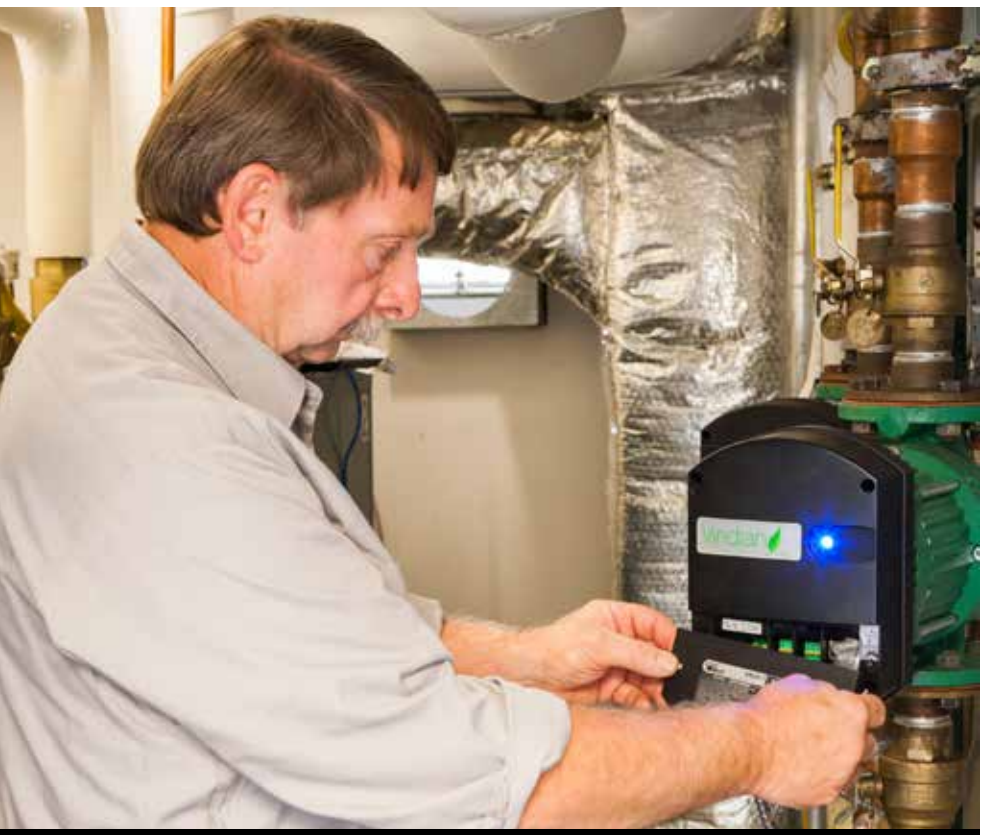
By Dan Vastyan

Going all state of the art

Southern New Hampshire University (SNHU) in Manchester isn't a huge school by most standards. But, with a 300-acre wooded campus, more than 100 undergraduate degree programs and state-of-the-art facilities, the school offers as much as many of the larger schools, and more than some. And as for quality of life: They've cornered the market.

The school's 2006 dormitories were retrofitted with new pumps for more efficient operation.

Complaints of over- or under-heated rooms now are a thing of the past, and zone valve maintenance has decreased dramatically.



Dan Daley, lead technician at AE Mechanical, in the building's mechanical room.

Between 2000 and 2010, the United States saw full-time college enrollment rise by 45 percent. SNHU wasn't an exception. The school added two new dorms in 2006 to accommodate the influx of new knowledge seekers. Each three-story building comfortably houses 130 students. While the school built newer dorms in 2013, the 2006 buildings have been a favorite for years among students and maintenance personnel alike.

But there was one item university managers wanted to improve. At the time of construction, the technology allowing commercial hydronic circulators to accurately respond to system changes didn't exist as it does today.

So, eight years later, it was time for a change. Comfort, system longevity and most importantly, operating expenses can be dramatically improved with a simple change in the boiler room.

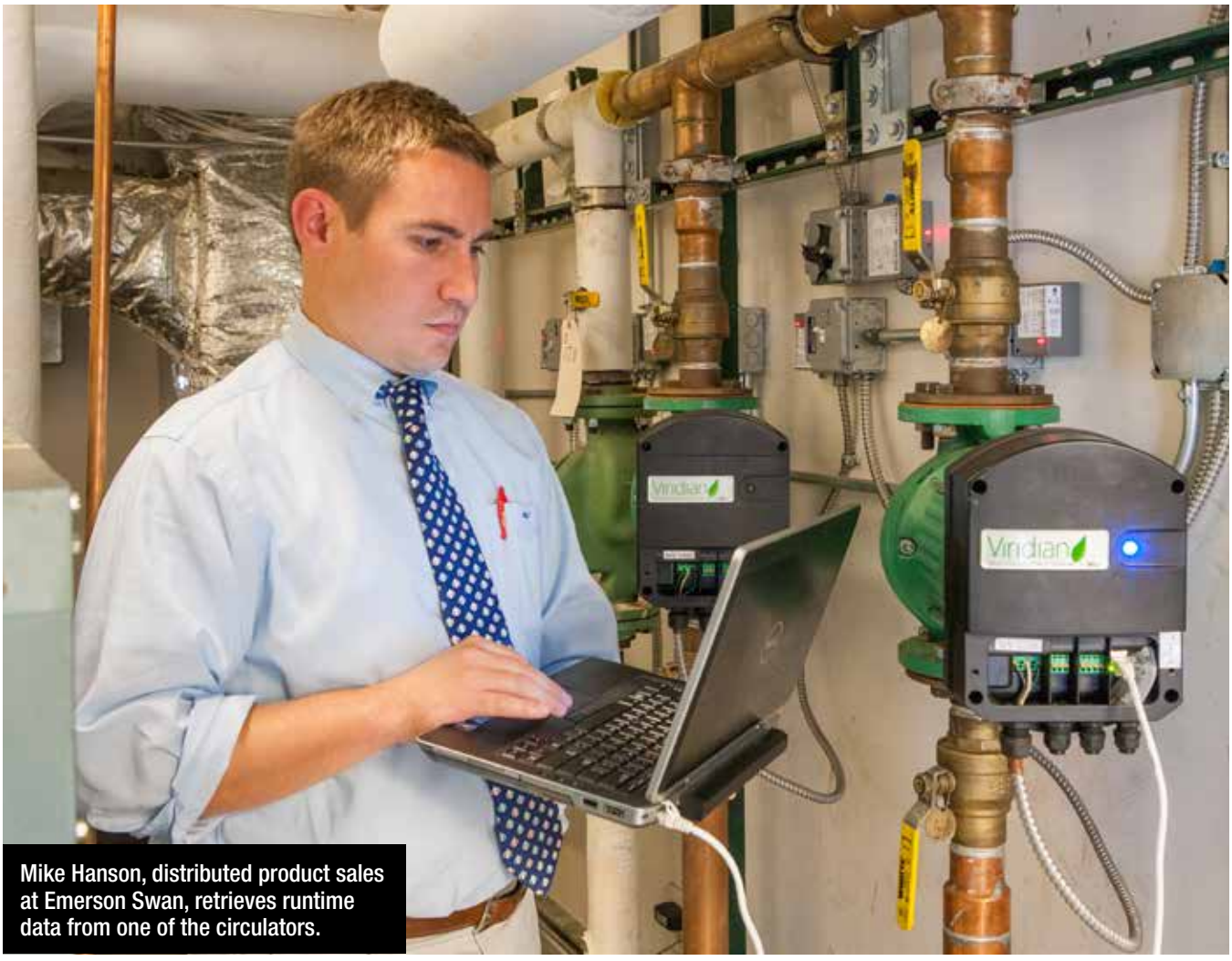
Quick upgrade

Two, 725 MBH Smith cast iron boilers connected to commercial fin-tube baseboard in dorm rooms, heats each of the 37,000-square-foot dorm buildings and hydronic coils inside air handlers for common areas. Reverse-return piping was used with 2-inch supply lines. Originally, a redundant pair of fixed-speed, in-line pumps was used to distribute heating fluid. Regardless of the call for heat – or lack of it – the "duty" pump ran continuously while the building was in heating mode.

"In 2011, we added an energy management system with outdoor reset, so that the pumps would shut off at 65-degree F outdoor ambient, even if the building was in heating mode," says Adam St. Germain, supervisor of the school's plumbing and heating department. "This at least kept the pumps from running if nobody actually shut the heating system down."

"It also meant the boilers could go into standby mode, as opposed to heating water circulated through the main," he says. "There's less heat loss along the mains when the water isn't moving."

The change was a step in the right direction. The pumps still ran one speed, whether one zone or all 35 were calling. It was most wasteful of energy when the building was at part-load, such as



Mike Hanson, distributed product sales at Emerson Swan, retrieves runtime data from one of the circulators.

during the shoulder seasons when the sun's energy on one side was sufficient to passively heat exposed areas, eliminating the call for heat.

Early in 2013, SNHU managers began their search for ways to further improve hydronic efficiency for the 2006 dorms. Armand Turcotte of The Granite Group Wholesalers knew of SNHU's desire to improve system energy efficiency and suggested that St. Germain take a look at the self-sensing Taco Viridian circulator.

Stepping up their game

After learning about the ECM-driven Viridian line, St. Germain examined the mechanical systems on campus with special attention to system pumps. He was eager to learn if the two dorm buildings finally could have a responsive and more efficient pumping system without the need for major renovations or addition of pressure sensors.

"We expected the pumps to be more complicated and harder to install," St. Germain says. "But that wasn't the case."

– Adam St. Germain, Supervisor, Southern New Hampshire University's Plumbing & Heating Department

St. Germain enlisted the help of Turcotte and Mike Hanson, distributed product sales, New Hampshire territory, for rep firm Emerson Swan, to review the original engineering diagrams. After comparing numbers with specifications of the new line of pumps, he decided to replace the four existing pumps with Viridian VR20s. The web-enabled Viridian line includes four different models, for pipe sizes from one-and-a-half to 3 inches.

The VR20 provides up to 240 GPM with a peak head pressure of 46 feet. While an ECM motor inherently means less energy expended to circulate system fluid, the real advantage to using the Viridians is the pump's ability to automatically sense and respond to load and pressure changes in the main loop.

"Think of controlling the speed of your car with the gas pedal versus using the brake pedal – that is the main difference between a constant speed pump compared to the Viridian."

– Steve Thompson, VP, Residential Product Management, Taco Inc.

The lack of existing pressure sensors throughout the building, or a control system to relay the message, made selecting the self-sensing, or sensor-less Viridian technology, an easy choice, modulating flow rates to precisely accommodate the variation in demand when a zone valve opens or closes. This self-sensing capability lends itself to retrofit applications where running control wires and installing pressure sensors would be invasive and cost prohibitive.

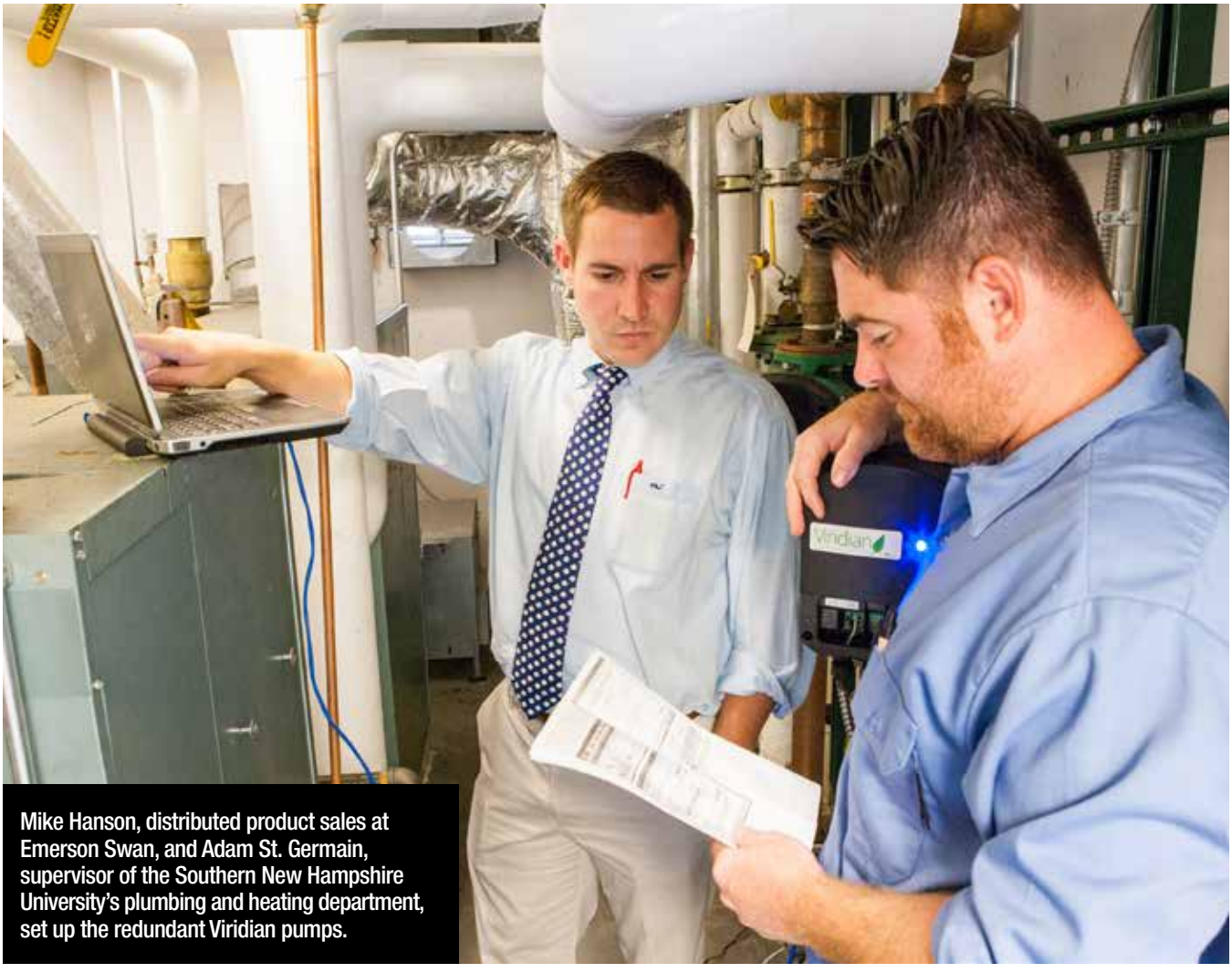
It also means that controllability is increased because the pressure at the zone valves is consistent. Complaints of over or under heated rooms now are a thing of the past, and zone valve maintenance has decreased dramatically.

"Think of controlling the speed of your car with the gas pedal versus using the brake pedal – that is the main difference between a constant speed pump compared to the Viridian," says Steve Thompson, VP of residential product management at Taco Inc.

No passing zone

"It was a relatively simple swap-out," St. Germain says. "It took our staff – with the help of AE Mechanical Inc. – two days to replace all four circulators. It would've gone faster if we wouldn't have added check valves as well."

Because the original, single-speed pumps were entirely manual in their operation, each one was isolated with a pair of ball valves. When maintenance crews wanted to switch the pumps from duty to standby mode, they would physically walk to the mechanical rooms, kill power to both pumps, and change the position of the ball valves before restoring power.



Mike Hanson, distributed product sales at Emerson Swan, and Adam St. Germain, supervisor of the Southern New Hampshire University's plumbing and heating department, set up the redundant Viridian pumps.

Because the Viridians can switch from "duty" to "stand-by" either automatically or by remote web-monitoring, the school's plumbing and heating staff needed a better way to restrict flow through the stand-by pump.

Without the check valves, water would have simply rushed around the header, instead of moving out into the building. Although it wasn't their initial function, the ball valves remain in place for service isolation.

"We expected the pumps to be more complicated and harder to install," St. Germain says. "But that wasn't the case. It was exciting to see the project come together and for the dorms to now have a much-needed solution. Comfort levels are higher and energy use is lower. Our mechanical staff won't waste any more time walking downstairs to start, stop and switch pump operation."

During the winter, Hanson visited the site to collect operation data from the four pumps. He found that, based on motor efficiencies and hours of operation, the Viridian pumps had cut the power consumption by more than half. In many cases, Viridian circulators can be adjusted to optimally meet system demand, resulting in an additional 30 percent reduction in electric use.

More importantly, and harder to quantify, student comfort, savings through increased heating efficiency, and reduced wear and tear on the pumps themselves all adds up to a smart move for SNHU, financially and environmentally. **CCR**

The dormitory's mechanical room features redundant Taco Viridian pumps.