A BNP Publication

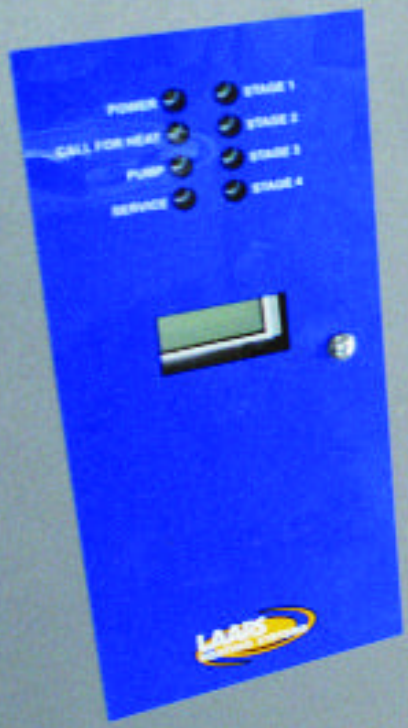
www.PMmag.com

January 2004/Volume 21, Number 11

PM

Plumbing & Mechanical

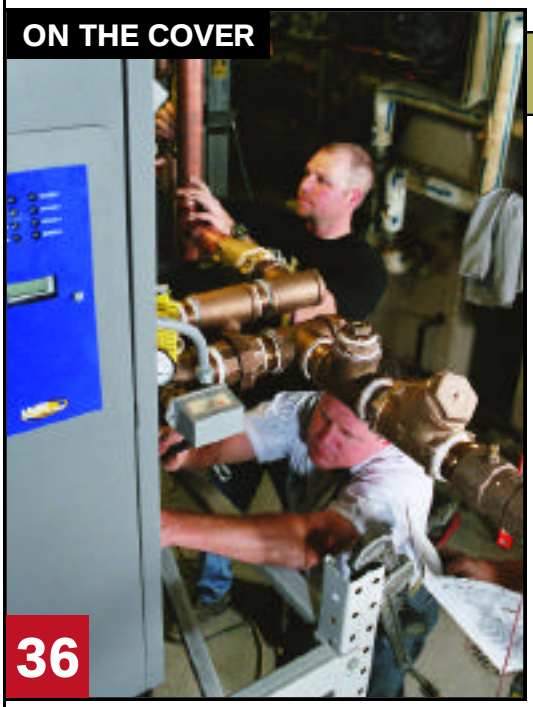
- 2004 Manufacturers Spotlights
- Tankless Water Heaters



HIGH PERFORMANCE HYDRONICS

January 2004 CONTENTS

ON THE COVER



36

40

44

News & Features

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HIGH PERFORMANCE
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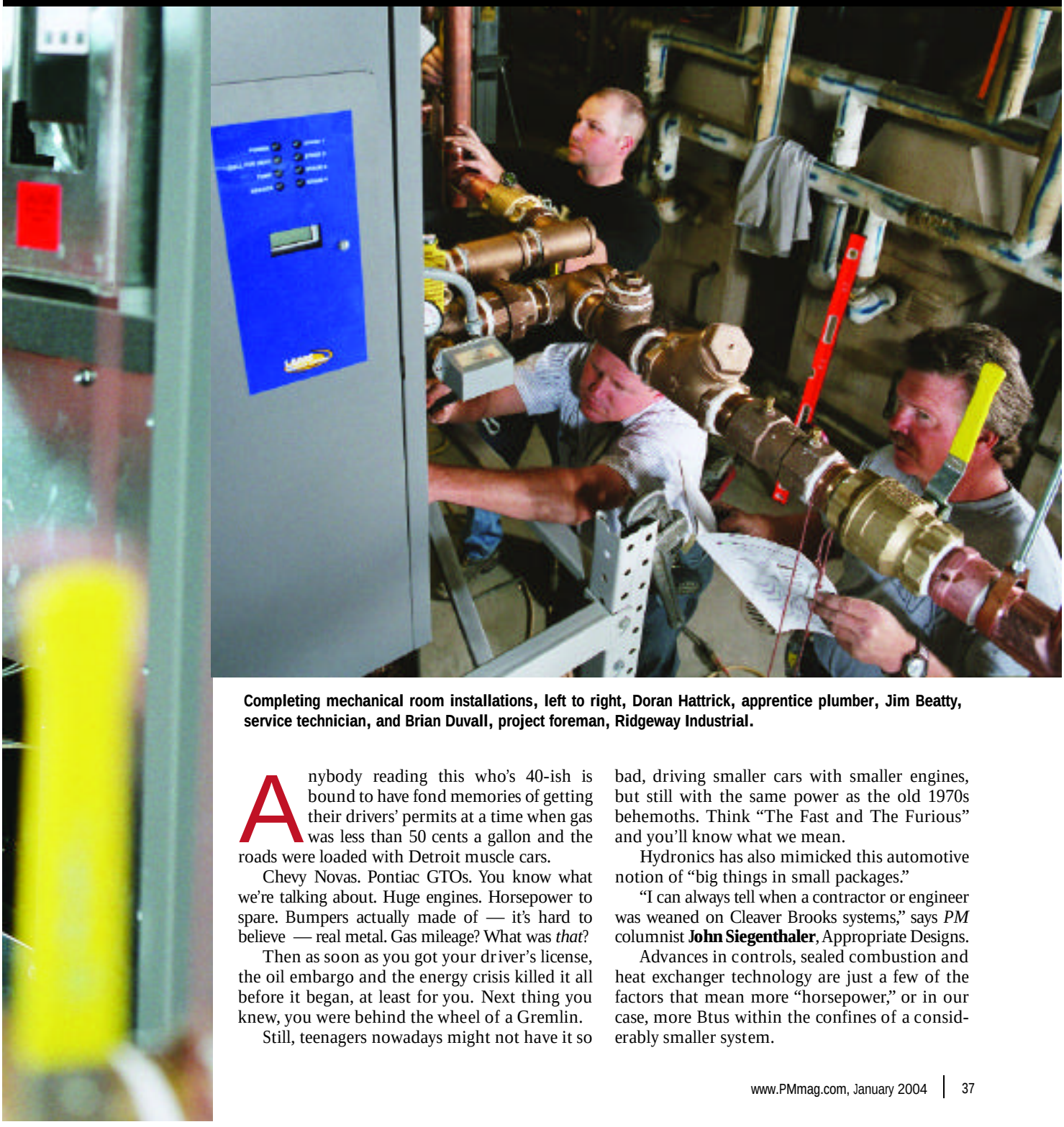
Jim Beatty, Ridgeway Industrial service technician, prepares the boiler/water heater unit for startup.

HYDRONICS HYDRONICS HYDRONICS

BY STEVE SMITH



Completing mechanical room installations, left to right, Doran Hattrick, apprentice plumber, Jim Beatty, service technician, and Brian Duvall, project foreman, Ridgeway Industrial.

Anybody reading this who's 40-ish is bound to have fond memories of getting their drivers' permits at a time when gas was less than 50 cents a gallon and the roads were loaded with Detroit muscle cars.

Chevy Novas. Pontiac GTOs. You know what we're talking about. Huge engines. Horsepower to spare. Bumpers actually made of — it's hard to believe — real metal. Gas mileage? What was *that*?

Then as soon as you got your driver's license, the oil embargo and the energy crisis killed it all before it began, at least for you. Next thing you knew, you were behind the wheel of a Gremlin.

Still, teenagers nowadays might not have it so bad, driving smaller cars with smaller engines, but still with the same power as the old 1970s behemoths. Think "The Fast and The Furious" and you'll know what we mean.

Hydronics has also mimicked this automotive notion of "big things in small packages."

"I can always tell when a contractor or engineer was weaned on Cleaver Brooks systems," says *PM* columnist **John Siegenthaler**, Appropriate Designs.

Advances in controls, sealed combustion and heat exchanger technology are just a few of the factors that mean more "horsepower," or in our case, more Btus within the confines of a considerably smaller system.

HIGH PERFORMANCE HYDRONICS

Joe Stagg, Columbia Hydronics, a local rep agency, checks a pressure gauge.

ENERGY EFFICIENCY FOR THE FUTURE

By replacing the Student Union's boilers with newer, more efficient equipment, Boise State University is taking an important step in improving its overall campus operations. In May 2003, the university announced the formation of an energy-performance-contracting partnership with Siemens Energy Services & Solutions. This follows already successful efforts by the university to reduce energy bills by $250,000 annually through avoided consumption.

"We are really making a concerted effort to manage the taxpayers' funds responsibly," says Einar Norton, P.E., the university's engineer. "We have taken some major steps and have achieved some really fantastic results. The performance contract will be the next logical step in continuing to conserve energy and now replace our older equipment."

At press time, Siemens expected to complete a comprehensive energy audit by the end of last month. Besides, the heating systems, improvements would also focus on lighting, trash compacting, windows and utility information-management software.

"Cars and boilers are certainly a lot 'smarter' than they used to be," Siegenthaler adds, "giving their owners better performance, better economy and much more accurate information about how they are operating."

In this case, it's a matter of thinking *inside* the box rather than outside.

An example of this can be seen in a recent project led by contractor **Joe Paige**, Ridgeway Industrial Inc., Meridian, Idaho, for Boise State University.

More than just a central gathering place for the university's student population, the Student Union is also a major asset to the surrounding metropolitan community. Comprising two stories and 185,000 sq. ft., the facility offers 15 meeting rooms, two divisible ballrooms, a proscenium theater, five retail dining establishments with seating for 350, and a game center with six bowling lanes, billiards tables and video games.

"We operate much like a private hotel," says **Einar Norton**, the campus mechanical engineer. Approximately 6,500 people travel through the Student Union every day. And more than 10,000 meetings and events are held here each year, and 350,000 people attend those events.

The ability to meet peak demand for domestic hot water was a growing concern for Norton and the facility's staff. At 35 years old, the four existing boilers that used to heat water had reached the end of their useful life. Flue gas condensate acids were corroding flue pipes, and operating efficiency hovered in the range of 65 to 70 percent. Patching up the system no longer was an option.

Tight Quarters: Installation of the new boilers would not be a simple drop-in replacement. Because of the constant activity at the Student Union, downtime would have to be kept to a minimum, and the new boilers would need to be installed prior to removal of the existing systems. The major challenge here was finding boilers with a footprint small enough to fit into the existing space.

"Back in the '60s and '70s, big buildings were built around boilers and chillers," Paige says. "It's nearly impossible to get new equipment into these rooms."

While most every major boiler manufacturer makes so-called "through-the-door" boilers, in this case, Paige installed two Pennant fan-assisted, sealed combustion boilers from Laars Heating Systems.

At 40 inches tall, 30 inches deep and 58 inches wide, the units were small enough to fit through the existing doorway, and they were rack-mounted and stacked to further save floor space, making a full rack height of 95 inches.

A pump installed on the side of the boiler added about a foot to the unit's width. Another key attribute of the rack setup is that the water heaters can be serviced without being pulled down.

According to Paige, the units are designed to maintain a specific water velocity for a specific water type, i.e., for normal, hard and soft water. The manufacturer designates the pump based on specific applications and conditions.

"The pumps used are sized for the head loss through the heater, plus 30 feet of full-sized piping, the same size as the heater outlet with, typically, five to six fittings," Paige explains.

Once the flow rate and head loss are set, the boilers deliver a consistent temperature rise through the heat exchanger. With normal water conditions,each of the boilers requires 68 gallons of water per minute at 3.6 feet of head pressure. The unit delivers a 25-degree F temperature rise through the boiler.

At a combined 2 million Btus (1 million Btus per unit), the boilers provided additional capacity for a building expansion that is planned for within the next five years.

Tight Deadlines, Too: Space limitations were not the only challenging factor for Paige and his crew for this project. Seamless installation also played a large role.

Because the complex is such a busy facility that's integral to the operation of the campus, having the facility shut down with its water shut off put a significant strain on everything and everybody.

At the very least, the full switch-over to the new system was scheduled for the 2003 Memorial Day weekend. Hot-water supply was to be turned off Sunday afternoon, and everything had to be up and running Monday morning.

Considerable pre-fab was completed at Ridgeway's facilities. In other preliminary work, ramps were constructed over the stairwells in order to more easily slide the boilers down to the mechanical room. The crew ended up having to replace a waterline valve, but even that was planned for just in case so all the equipment was there.

"Everything worked out so well that even our guys got some time off for the holiday," Paige says. *PM*