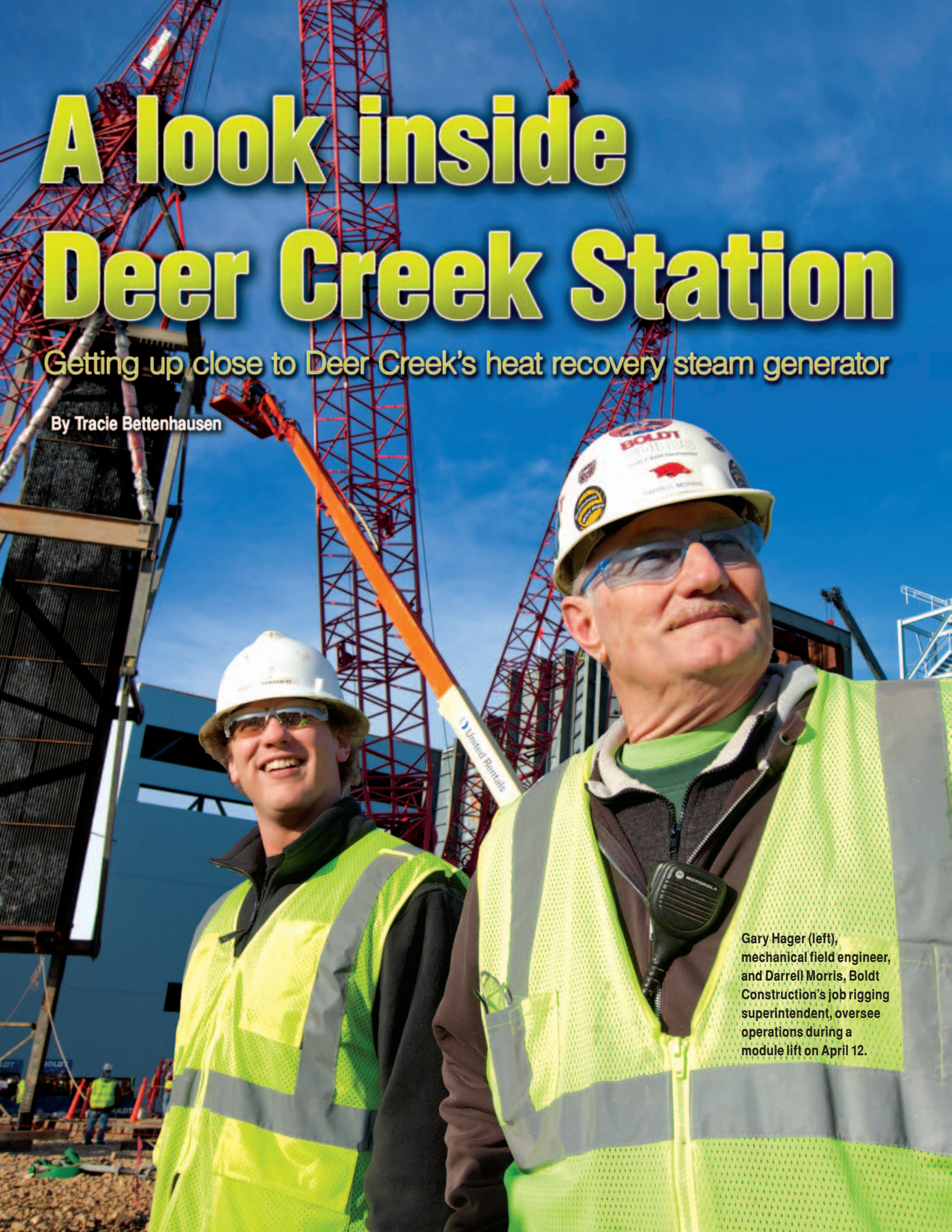


A look inside Deer Creek Station

Getting up close to Deer Creek's heat recovery steam generator

By Tracie Bettenhausen

A photograph of two construction workers at a power plant site. The worker on the left is Gary Hager, a mechanical field engineer, wearing a white hard hat, safety glasses, and a high-visibility yellow vest over a dark jacket. The worker on the right is Darrell Morris, Boldt Construction's job rigging superintendent, wearing a white hard hat with 'BOLDT' and 'MORRIS' logos, safety glasses, and a high-visibility yellow vest over a brown jacket. In the background, there are large red steel structures, a crane, and a blue sky. A 'United Rentals' logo is visible on a crane arm.

Gary Hager (left), mechanical field engineer, and Darrell Morris, Boldt Construction's job rigging superintendent, oversee operations during a module lift on April 12.



A close up look at the fins on the HRSG module tubes. Each tube is made of different material and each tube's fins are spaced differently, depending on its placement in the casing. The tubes closer to the turbine's exhaust need to withstand more heat than those farther away.

Sometimes when something is so big, you have to get up close to see the little things that make it work.

The heat recovery steam generator, or HRSG, is one of those pieces of equipment. The HRSG recovers heat from a hot gas stream, and uses it to heat water, for example. On the Deer Creek Station construction site, it has been a main point of focus throughout the late winter/early spring construction season. The Deer Creek Station is Basin Electric's 300-net megawatt combined-cycle power plant under construction in Brookings County, SD. It is scheduled to go into commercial operation in 2012.

From the outside, the HRSG looks like a big metal box. But if you get inside for a look before all the internal parts are in place, you'll see a tight formation of what looks like metal pipe cleaners. They're actually pipes or tubes, which work like boiler tubes. And the bristles? Fins, to help absorb heat.

Gary Hager, Basin Electric mechanical field engineer, says the fins give the tubes more surface area. "By adding surface area, it (the tube) can absorb more of the heat."

On some tubes, the fins are placed closely together; on others, they're farther apart. "The fins have different spacing, widths, and lengths on each module. Some of the tubes will have a densely packed set of fins where the other ones will be spaced apart," Hager says. "It's a lot of calculations involved with how they determine what the fin spacing is, the fin size, the number of fins, where to put the fins and also the fin material."

The heat for the HRSG will come from the Deer Creek Station's gas turbine. The GE 7FA gas turbine will exhaust heat at about

1,100 degrees Fahrenheit, which the HRSG will capture. As the heat is captured by the fins of the HRSG's tubes, it'll produce steam. The steam will flow to the power plant's steam turbine, which will turn a second generator. This is the process that makes the plant "combined-cycle."

“It makes it more effective and efficient rather than just a bare metal tube surface in this type of boiler.”

Gary Hager, Basin Electric

On April 2, the first of 14 HRSG modules was lifted and lowered into place in the HRSG casing. From the time the lift starts, the entire operation takes an hour and a half. Six operating engineers and about 15 boilermakers work together to lift the 70-foot long module from lying horizontally on a Goldhofer trailer, to fully vertical.

The operation requires three cranes. "All three of them are hooked onto the module at once," says Darrell Morris, Boldt Construction's job rigging superintendent. "We lift using all three cranes at once, and stand the module vertical. Two cranes hold the strongback vertically and then the main crane, the 2250 MAX-ER, pulls it out of the strongback and takes it over and sets it into the boiler."

As the three cranes work, their booms are only about 11 feet apart at one point. "The critical part is not getting one boom into another one. Then you lose the load. That's what you don't want to ever happen," Morris says.

Weather is also a factor. "Wind hurts you worse than anything. We shut it down at 28 miles per hour. In the spring of the year in South Dakota, 28 miles per hour is not much," Morris says.

From start to finish, it took about a day to lift and set each HRSG module. The final module was set into place on April 20.

See a video of the lift at <http://bit.ly/DeerCreekLift>.