



Baldor Products Improve Reliability of Critical Fuel Enhancement System at Great River Energy's Coal Creek Station

Great River Energy is owned by 28 electric distribution cooperatives throughout Minnesota, making it the second largest power producer in the state.



Failing gearboxes on conveyors feeding dried coal into the furnace threatened the reliability of the system. In 2009, the plant's maintenance team installed size 168 Baldor•Dodge® Quantis® right-angle helical bevel gear drives. The team reports these units have performed without fail and only require regularly scheduled maintenance.

Coal burns; water doesn't. That is the founding principle behind DryFinishing™, an innovative technology developed by Great River Energy and partners to reduce the moisture and refine lignite coal. Lignite, a softer coal that naturally contains more water, is transformed through this unique process into a product with increased energy density that burns cleaner and improves overall power plant efficiency.

In 2009, after years of research and development, Great River Energy installed the DryFinishing system at

its Coal Creek Station power plant, located in Underwood, North Dakota. Today, 7.5 million tons of lignite per year is DryFined at Coal Creek Station, yielding more energy with less emissions.

But from the beginning, issues with failing gearboxes on coal conveyors in the new facility threatened the reliability of the system, a situation that needed to be remedied to ensure maximum uptime. Damian Meier, maintenance mechanic and coal drying specialist at Coal Creek Station, says

there were two different problems he and the rest of the team had to deal with.

"Initially we were having temperature problems with the gearboxes," explains Meier. "The duty cycle on this box was rated for the load they were carrying, but they were overheating. Another problem we had to deal with was twisting and breaking shafts."

First, the maintenance team tried installing a larger size of the same gearbox, in essence over-sizing the

gearbox to ensure it could more than handle the load. But that didn't solve all of the problems. And while failing gearboxes never prevented the plant from drying coal, Meier says they could have, and he and the rest of the maintenance team worried about it all of the time.

"This was a constant concern because it's our responsibility to keep the coal flowing," says Meier. "We understand that we need to always be up and running – that we can't afford to be shut down. We were under pressure to solve the problem and get this right."

Local Motion Industries Branch Manager Craig Taylor and Baldor's Dodge Mechanical Sales Engineer, Jeff Schall, both frequent visitors to the plant, were asked to come up with a solution. Les Dockter, the plant's welder mechanic and coal drying specialist, says these two went through everything on the conveyors to figure out what was needed.

"We get exceptional service from Craig and Jeff, and they have always been very helpful," says Dockter. "We're also familiar with Baldor's Dodge® brand of gearing, so when they proposed installing Dodge Quantis® gear reducers, we were open to the suggestion. They were both convinced that this was the solution, so we decided to install them."

Initially, four Quantis reducers were installed on coal conveyors feeding dried coal into the furnace, with each unit pulling 250 feet of conveyor. The next unit was installed on a 325-foot conveyor that feeds wet coal into two dryers. Since their installation in 2009, Meier says, they have not had one moment of concern.

"Since we installed these Quantis units, we have not had one problem – not one issue," says Meier. "They are easy to take care of, and really all we do is our regular preventive maintenance, like sampling oil and taking vibrations tests. We just don't have to do much with them."

Dockter calls the gear reducer exceptional and bases his opinion on the way the reducer performs in one of the hottest locations in the plant, close to where coal is delivered to the dryers. He says this area can be as hot as 100 degrees in the winter and can reach 120 degrees in the summer.

"In the past, the competitor's gearbox ran so hot that it was just not pulling the belt the way it should," explains Dockter. "We just knew that we would really burn through reducers in this

location. However, despite the heat, the Quantis unit maintains a constant operating temperature – it just runs great with no issues."

Based on the success with Quantis reducers, when the plant ordered a new transfer hopper, Dockter and Meier specified Baldor products on the equipment. The transfer hopper drops wet coal on the feed belts leading to the dryers. Meier says they changed systems so they could better control the flow of coal.



Designed for greater torque density in a compact housing, the Quantis RHB product features a helical-bevel-helical gear train that offers cost-effective, high- and low-speed solutions. Replacing failing gearboxes with the size 168 Quantis units has meant no unplanned downtime at the plant. The maintenance team responsible for keeping coal running reports that since installing the units, it has not had one moment of concern because the units run great with no issues.



Based on the success with Quantis reducers, plant officials specified Baldor equipment on a new coal transfer hopper. The OEM chose Baldor's Dodge MagnaGear reducer, a power-dense, heavy duty reducer well suited for a variety of high torque applications.

"We ordered this piece about a year after we installed the Quantis units," explains Meier. "We told the OEM that since the Dodge reducers were working so well for us, we would like a similar Dodge gearbox on these feeders. The equipment was delivered with four 100K MagnaGear™ reducers coupled with 20 HP Baldor•Reliance® motors."

Both Meier and Dockter report that since replacing problem reducers with Dodge gearing, they no longer worry about conveyors. Neither of them miss the stress involved in scrambling to repair gearboxes to keep coal flowing. Dockter says maximizing uptime is even more critical now, as additional plants will soon be relying on Coal Creek Station to supply them dry coal.

"Since we installed these Quantis units, we have not had one problem – not one issue."

Damian Meier,
maintenance mechanic
and coal drying specialist,
Coal Creek Station

"Installing the Dodge gearboxes has taken the pressure off of us," says Dockter. "These products are giving us the reliability that we need; plus, they don't require a lot of attention. We really appreciate the great service we get from Craig and Jeff in helping us be successful."



A total of four MagnaGear reducers coupled with Baldor•Reliance motors power the transfer hopper that drops wet coal on the feed belts leading to the dryers. Maintenance team members say the new system allows them to better control the flow of the coal.