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Case Study # 407

Pumping Up Safety, Efficiency and A Smarter Design

Progress Energy upgrades its pump technology and turns on the power of savings.



The Opportunity

The Progress Energy's Lee Plant, located in Goldsboro, N.C., originally enlisted nine vertical sump pumps within the plant as yard drain pumps – pumps that have motors that are located above the pump and a line shaft that extends down into the length of the sump – whereas the pump is actually at the bottom of the sump. The pumps were enlisted to remove excess water that accumulates from rainfall and storm drains, equipment wash down and general water overflow — all of which are pumped to a retention settlement basin.

As a result of pump age, maintenance of these pumps became increasingly more expensive. Plant management began to question the long-term feasibility of efficiently maintaining

the pumps and their ability to continue to meet the plant's operational expectations. "We were having reliability problems with our vertical line sump pumps," said Ed Davis, a senior work management specialist with Progress Energy. "In fact, we were rebuilding the pumps on a regular basis."

Opportunity Knocking

To address potential solutions to this challenge, Davis consulted Bill Lynch of Tencarva Machinery Company, an employee-owned company that specializes in rotating equipment and wastewater pumps for industries such as the power-generating segment. With a team of more than 50 engineers and a customer support staff of over 75, Tencarva brings the collective expertise found in its 20 branches, spanning seven states, to each customer engagement.

As part of the initial engagement, Tencarva came to the power plant and evaluated the current technology being enlisted, the overall design and the future needs of the plant. As part of this initial assessment, the application, in terms of horsepower requirements, was matched with available technology to yield the greatest impact.

As a result of that conversation, the team strategically made the decision to move away from the traditional vertical line sump pumps to more effective self-priming, centrifugal pumps. With the new technology, Progress Energy was able to capitalize on the unique design of the pump, placing the pump totally above ground at the top of the pump station with only a suction line submerged below grade level.

When Progress Energy learned about the opportunity to install new, more efficient and easier-to-maintain pump technology for less than they could rebuild their current pumps, the decision was simple. In the end, Gorman-Rupp's Super-T technology was chosen. The team installed a series of pumps, in various sizes, including 4", 6" and 8" pumps. "When we compared the price of the new equipment to the cost of the existing maintenance program, we felt justified in investing in new motor skids and controls as well," said Davis.



To test the performance and effectiveness of the equipment prior to making the decision to invest in a complete overhaul, the energy leader chose to install a two of the new Gorman-Rupp Super-T pumps on a trial basis. To begin the assessment, Progress Energy ordered two of the new pumps and installed them over the course of approximately 18 months. Tencarva estimates that the normal installation time of pulling old technology out and installing new technology, including making the appropriate piping and electrical modifications to be roughly two weeks for two to three men. “We wanted to make sure our investment was sound and that we had time to observe the pumps closely,” Davis said.

Since that initial test period, Progress Energy has replaced nine of the vertical pumps with Super-T Series technology – seven of which are performing the yard drain functions previously held by the VLS pumps. “Tencarva did an excellent job of matching the new equipment to our existing structure,” said Davis. “The switchover was completed simply and efficiently.”

Build Tough — for a Tough Environment

In the end, Progress Energy has benefited from the above-grade feature of the self-priming pump – making routine maintenance more routine than ever. During a tri-weekly route, Progress Energy’s plant maintenance team checks the technology carefully, giving each pump a once over every Monday, Wednesday and Friday. During this normal rotation, the team lubricates and inspects the pumps, in accordance with their instruction manual, to ensure their investment continues to deliver the yields it has afforded them to date. As a result, problems have been minimal since installation.

“These are industrial wastewater pumps. Clearly, they’ll move fairly large solids — which the Lee Plant, honestly, doesn’t have a whole lot of need for,” said Lynch. “But Progress does have small abrasive solids like dirt, fly ash and some corrosive compounds, and these pumps are built to handle those, too.”

Further, within the plant, some of the pumps are located in a coal pile runoff area, and in below-grade sumps, where pump failure could result in electrical damage to the plant’s facility. “Historically we’ve seen the value of having our impellers and pumps above the water line,” said Davis. “Today, there’s nothing in that sump but the suction line. Everything is above grade.



With traditional vertical-line sump pump designs, the pumps remain housed in tight, confined spaces. Therefore, when a team member needed to enter the area for maintenance, a series of confined space entry procedures had to be followed to secure personnel safety. Otherwise, an overhead crane was required to remove the pump from the area, which was a lengthy process – often an all-day procedure.

Pumping in the Results

“Every 12 to 18 months, we had to rebuild a pump at each pump station,” said Davis. “We’ve operated these pumps for three years now, and we have only performed normal preventive maintenance on them.”

In fact, over the initial three-year period, Tencarva reports that Progress Energy has experienced only minor challenges with pump maintenance issues. “With nine units, you were going into one of them at least once a year and that adds up,” said Lynch. “As a result of the new pumps, the only problem you had with the new pumps was an air release valve that leaked and was replaced. The plant will soon need to replace three or four of the remaining pumps — but the key is that when they wear out, they don’t plan to rebuild them. They plan to match up the pump size and replace the VLS pumps with the self-priming technology. I think that track record speaks for itself.”

By virtue of the pump design, each pump has what is referred to as a V-belt drive. In as much, the company is able to simply change the drive and change the speed of the pump, which in turn will change the capacity of the pump or its capability – another feature that was not previously offered with the existing vertical line sump pump. “If the plant was expanding, if the sumps were required to service a larger

area, if there were some kind of an environmental work with their waste treatment, or for regulatory reasons they needed to pump to a different site, all of these scenarios could increase the amount of the discharge pressure or discharge head that particular lift station or sump station would need. In that case, they could easily change the rating or change the demand on that particular equipment without making a new investment,” said Lynch.

About Tencarva

Tencarva began in 1978 as an employee-owned company and is dedicated to the principles of superior customer service, integrity, and hard work. Having grown to more than 50 sales engineers plus a support staff of over 75, Tencarva now operates 20 branches in Tennessee, North Carolina, South Carolina, Virginia, Maryland, Mississippi, and Arkansas. Many branches include warehouses with pump and compressor assembly and repair facilities as well as custom fabrication capabilities.

About The Gorman-Rupp Company

The Gorman-Rupp Company is a leading manufacturer of pumps and pumping systems for the municipal, water, wastewater, sewage, industrial, construction, petroleum, fire and OEM markets. Pumps include self-priming centrifugal, centrifugal, submersible, trash, priming assist, rotary gear and air-driven diaphragm pumps. In addition, The Gorman-Rupp Company manufactures a complete line of packaged lift stations and booster stations, which include pumps, motors, controls, piping, accessories and enclosures. The company prides itself on manufacturing and delivering the right pump for the job.