



Custom-designed gland water service system for Grootegeluk

Pretoria based engineering firm, Thuthukani Engineering was contracted by Exxaro to supply a gland water service system for their largest coalmine, Grootegeluk near Lephalale in the Waterberg District of the Limpopo province.

Grootegeluk has the world's largest beneficiation complex where 8 000 t/h of run-of-mine coal is upgraded in ten different plants. To ensure long-term longevity and availability of the GG7 and GG8 mega-plant at Grootegeluk, Thuthukani Engineering deployed a turnkey, fully automated and centralised gland service water system.

The GG7 and GG8 plant at Grootegeluk play a crucial role in the provision of coal, supplying directly to the Medupi Power Station. The plant comprises ten modules running 44 slurry pumps in total. "There were challenges with low availability and reliability of the pumps due to lack of a suitable gland service water system. Low availability of the plant impacts on increased maintenance costs, lost production tonnages and there are issues with higher risks of slurry pump failure," says Tshifhiwa Ndouvhada, technical director at Thuthukani Engineering.

Thuthukani Engineering was tasked with the design, manufacture, installation and commissioning of the gland service water system.

Says Ndouvhada: "Thuthukani Engineering was contracted to design the whole system and we proposed a centralised system where you would have a tank with two supply pumps – one being operational and one on standby. Further to this, we also automated the whole system – complete with a PLC and SCADA system."

A slurry pump has its own delivery pressure and the pressure and the flow rate need to be constantly maintained as gland seal water prevents the water inside the pump from leaking out of the pump to maintain balance on the seal. The challenge is that in this type of system there is a pump, tank, filters, and regulator valves. In this instance, the system is supplying 44 pumps, each with a different flow rate requirement. Thus there was a need for a fully integrated system that employs numerous different control and measurement instruments that communicate with the automation PLC.

According to Ndouvhada, automation of the system played a very important role in ensuring that the system was feasible as well

as in ensuring success on a project of this magnitude. Typically, gland water service systems are installed for up six slurry pumps, not 44. "It is a very complex system because water is being supplied to different kinds of pumps that require different gland supply pressure and flow rate and need to be monitored on a continuous basis," Ndouvhada explains.

"Connection to the PLC and the SCADA system allows each pump and seal to be monitored from the plant central control room where there is live monitoring of pressure flow to all the pumps in the system in the plant." He says that additional benefits for Exxaro include the fact that they will be able to determine and predict failures before they lose a pump and that they are now able to carry out scheduled maintenance on the gland water service system and the pumps, which will result in less downtime overall.

Ndouvhada explains that from the PLC, the operator can view pressure and flow on each pump in the system. According to Thuthukani Engineering's design, the pumps are set for automatic shutdown when pressure is lost,

to protect the pump. "If not protected there are two issues that can arise – you can lose the shaft or water will leak into the pump. The water flowing through the system contains a mixture of end coal product elements and waste. When water enters the system, it can disrupt the balance of this mixture, which would result in waste in the coal. This is what makes pressure control so important."

Thuthukani Engineering will be providing support to Exxaro on the new system for the next year, although, says Ndouvhada, they believe the system to be both reliable and easy to maintain. Looking further ahead, Thuthukani Engineering took steps to ensure that the system will never lack support. "We selected equipment and components from high quality suppliers. All of the OEs that we chose to work with on this project have a background in the mining industry and a large local presence in South Africa – therefore technical support and stock availability will always be sufficient," says Ndouvhada.

He went on to say that these systems will now become part of Thuthukani Engineering's overall offering. "What we are offering is a total engineering solution that helps a client mitigate the risk of low plant availability and reduced maintenance costs. Our approach is different – we took on the challenge to provide a highly automated, turnkey solution for a larger system comprising 44 pumps, with the whole system having over a hundred electrical automation instruments built into the system."

Ndouvhada concludes by saying that their system has applications wherever there is a dense medium separation plant (DMS) cir-

cuit, and the abovementioned challenges are present. "This will be one of our focus areas in the future. We are now ready to assist any client with a wet processing plant in dealing with high maintenance costs incurred due to gland water service failure."

Specialists in mining engineering solutions

Founded in 2008, Thuthukani Engineering Solutions is a South Africa-based firm of consulting engineers specialising in innovative engineering solutions for the mining and resource industries. The company offers a complete range of mining engineering solutions including feasibility studies, turnkey design and drafting and the supply and installation of a wide range of mining infrastructure.

"We have a proven track record of completed projects involving above- and underground infrastructure, ground handling infrastructure, shaft infrastructure, hoisting infrastructure, gland service water systems, and electric vehicle platform implementation and integration," says Ndouvhada.

These services are delivered by specialist divisions: Thuthukani Engineering, Thuthukani Consulting and Thuthukani Technologies. "We directly employ a team of skilled engineers with competencies in civil, structural, mechanical, automation and instrumentation engineering. Our management team and staff believe in a 'do it right from the start' management style and is supported by our experienced and focused team who endeavour to provide customised solutions and the highest levels of quality and efficiency to our clients," he adds. □



The gland service water pump system for Grootegeluk is a centralised system supporting 44 pumps, from a single tank with two supply pumps, one operational and one on standby.



To ensure long-term longevity and availability of the GG7 and GG8 mega-plant at Grootegeluk, Thuthukani Engineering has deployed a turnkey, fully automated and centralised gland service water system.

Through-port knife-gate valves for abrasive, scaling applications

The ARVALV range is manufactured, stocked, and serviced by AR Controls, a leading importer and manufacturer of a comprehensive range of internationally recognised valves and instrumentation designed to isolate and control the flow of erosive and corrosive media in niche markets across Africa, Australia, Europe, North America and South America. The company also boasts the largest product inventory of any similar company in Africa.

"The fact that we are a leader in the African valve industry means that we can back-up our ARVALV range with dependable service, in addition to offering competitive pricing and good lead times," AR Controls director, Julien van Niekerk, comments.

A design feature of the ARVALV range is that, unlike traditional push-through knife-gate valves, the partially energised seats remain in their natural state when the gate is retracted. This is due to the unique through-port gate, which makes permanent contact with the seats, even when fully open.

"Slurry knife-gate valves utilising fully-energised



sleeves that need to expand sufficiently to form a seal with the gate retracted, are prone to premature wear due to entrapped solids, which damage the seat the next time the gate is closed," AR Controls' mechanical engineer, Sune Huyser, explains. This problem is eliminated by featuring a through-port gate, which not only results in an extended service life, but increases plant availability as well.

The ARVALV range has been tried, tested, and proven to deliver superior performance in the following: dewatering slurries (such as ferrosilicon); cyclone suction/feed applications; dense media separation; concentrate transfer; booster and TSF tailings; pump isolation applications; wet and dry hopper applications; pulp and paper feedstock; and pulp and paper liquor applications.

From concentric, double offset and triple offset butterfly valves to general and severe-service ball valves, non-return valves, linear knife-gate valve products, and associated actuation and controls, AR Controls offers complete turnkey solutions for the African mining industry. □