

# Valuing the environment

Level 2 BBEE environment consulting specialist **Knight Piésold** is looking to consolidate its business in order to continue growing in 2017 – with a strategic focus on its geotechnical capability, says mining technical director **ANDREW COPELAND**.

**“T**his will entail expanding into pit slope stability and rock mechanics, a service that is offered by our overseas offices, but not locally. Our name is synonymous within the water fraternity for the design of large dams and hydro-power schemes, all of which involve extensive geotechnical investigations for foundations, grouting, tunnels, underground chambers and construction materials. Knight Piésold has excellent local skills in these areas and open pit geotechnics is therefore a logical extension to the current services offered to the mining and dam industries,” Copeland continues.

Another major focus area for the company in 2017 is tailings storage facilities (TSFs) which to date have been designed to depend on penstock towers to decant supernatant and storm water. This technology, the company believes, poses a number of risks including the potential failure of towers and outfall pipes for a

tailings load >20 m; and also that newly designed TSF’s will have barrier systems that tower/pipes have to pass through.

Consequently, Knight Piésold will focus on promoting syphon and/or barge systems wherever possible to eliminate these risks. “We are also the only company that has designed and installed a syphon system, one of which has been operating for over 15 years, and a second that is currently being installed.”

In line with its focus on delivering de-risked TSFs, the company notes it fully supports the latest amendment to Regulation 632 regarding the Planning and Management of Residue Stockpiles and Residue Deposits (National Environment Management: Waste Act, Act No. 59 of 2008), which requires that the design of a barrier system for a new mineral residue facility can now follow a risk-based approach. “The new regulation will ensure the environment is protected from any hazardous seepage from residue facilities.”

“The previous regulation was somewhat prescriptive on the class and design of the barrier system whereas a risk-based approach allows other factors to be considered such as site selection and the residue characteristics, to determine the most cost-effective solution. The approach will however require more detailed specialist geochemistry, hydrogeology and geotechnical studies to support alternative designs and to assess the risks to the satisfaction of the regulators,” Copeland points out.

With more and more TSFs being designed with barrier systems, the reliance on under-drains becomes more critical to stability. A TSF with a geosynthetic or clay lined barrier system has an inherently weak foundation layer. If the drains do not function properly, the liquefaction potential of the tailings and foundation materials increases. “While the mining industry is struggling to bring down the rate of TSF failures, the impact of these design changes on the operation of TSFs has not been fully appreciated, and future failures may occur if these are not carefully monitored. We have the experience and reputation to ensure designs adequately cater for these implications.”

In addition to the initiatives stated above, Knight Piésold will be working with clients to streamline their operations and any new designs, but this will not compromise on design standards, such as:

- steepening of side slopes which will reduce stability;
- provision and protection of under-drains to achieve low phreatic levels;
- strict compliance of not storing water on TSFs, unless designed to hold water;
- ensuring that proper monitoring systems are in place, in particular in-situ instrumentation; and
- promoting construction supervision to ensure designs are built correctly.

“In this way Knight Piésold will remain in business for another 95 years, leading the way in the fields of mine residue, geotechnical investigations and environmental assessments,” Copeland concludes. **MRA**



Lining of TSF's



Syphon pipe

