

Text Tiaan Bauman
Project Engineer
Tshwane Wastewater Consultants
JV Midrand
tbauman@g5.co.za



Hennie van Jaarsveld
Golder Associates Africa
hvanjaarsveld@golder.co.za



New fines residue deposit facility for Venetia Mine

IN EARLY 2003 De Beers appointed Golder Associates Africa (Pty) Ltd to investigate the feasibility of a new fines residue deposit (FRD) facility in augmentation of the existing one at the Venetia Mine operations. Venetia, situated in the heart of the Limpopo Valley, approximately 30 km northeast of Alldays, is one of De Beers' most valuable mines.

In April 2003 Golder started with a trade-off study and the site selection process. This process was completed in July 2003, followed by Class II and Class III estimates. The project went for board approval in May 2004 and construction started in June 2004.

The new FRD facility was to accommodate the planned ramp-up of the mining operation's production. The existing facility's capacity was limited to handle the planned ramp-up of production in the mining operation as the predicted annual rate of rise would have been too high and would endanger the stability of the dam.

The selected site for the new facility is situated adjacent to the existing with a waste rock dump forming the eastern wall. On the northern and western side of the new facility, three koppies – together with the newly constructed earth walls, which

filled the valleys between the koppies – form the border of the new facility.

With the selection process something of the past and construction in full swing, it was down to business. Construction equipment was operating up and down the site constructing the starter walls of the new FRD as well as the new high density polyethelene (HDPE) lined return water dam (RWD), pump station and pipelines. A new 1 200 m long seepage cut-off drain and numerous monitoring boreholes were constructed downstream of the new walls. The cut-off drain, boreholes and stripping and stockpiling of topsoil was some of the requirements of the environmental impact assessment (EIA). The cut-off drain and boreholes were constructed to monitor any seepage and limit any possible impact on the environment downstream of the new facility.

A few challenges of the project were getting equipment in and out of the security controlled area of the mine, safety and restrictions in terms of working hours. Relocation of game to the adjacent game farm and of baobab trees from within the footprint of the new FRD facility were environmental challenges that had to be negotiated. Keeping the fast-track project on schedule as the production ramp-up

process was about to start was a challenge on its own.

The project was successfully completed in a record time of nine months with commissioning starting in May 2005. Depositioning onto the new facility started with cycloning onto the newly constructed drains for only a few hours per day. This process continued and production increased until full production reached in early 2006. Commissioning of the fully automated return water pump station was successfully completed during this period with help from Venetia Mine's electrical/electronic division.

In conclusion, obtaining input from the contractor during the Class III estimating stage helped the project being completed successfully in the said period of time and within budget. ■

STATISTICS

- Footprint of new FRD facility – 172 ha
- Footprint of new RWD – 18 ha
- Volume of earthworks – 1 250 000 m³
- Volume of topsoil stripped and stockpiled – 410 000 m³
- Volume of concrete poured – 6 250 m³
- Capacity of new facility – 84 million tonnes
- Estimated life expectancy – 20 years
- Capacity of new return water dam – 290 000 m³
- Total length of pipes laid – 20 km
- Total project cost – R95,5 million

PROJECT INVOLVEMENT

- **Clients** De Beers (Venetia Mine Operations)
- **Consultants** Golder Associates Africa (Pty) Ltd
- **Electrical sub-consultant** D J J Conradie & Partners cc
- **Quantity surveyors** CES Cost Engineering (Pty) Ltd
- **Contractor** Fraser Alexander Construction (Pty) Ltd
- **Operating contractor** Fraser Alexander Tailings (Pty) Ltd in conjunction with Venetia Mine



Source:

http://www.saice.org.za/downloads/monthly_publications/2007/CivilEngAug2007/#/0