Sunrise Dam Gold Mine Improves its Thickener Performance

Sunrise Dam, which is 100% owned by AngloGold Ashanti, lies on the eastern shore of Lake Carey in the northern goldfields of Western Australia. It is situated some 770km north-east of Perth, 220km north/north-east of Kalgoorlie and 55km south of Laverton.

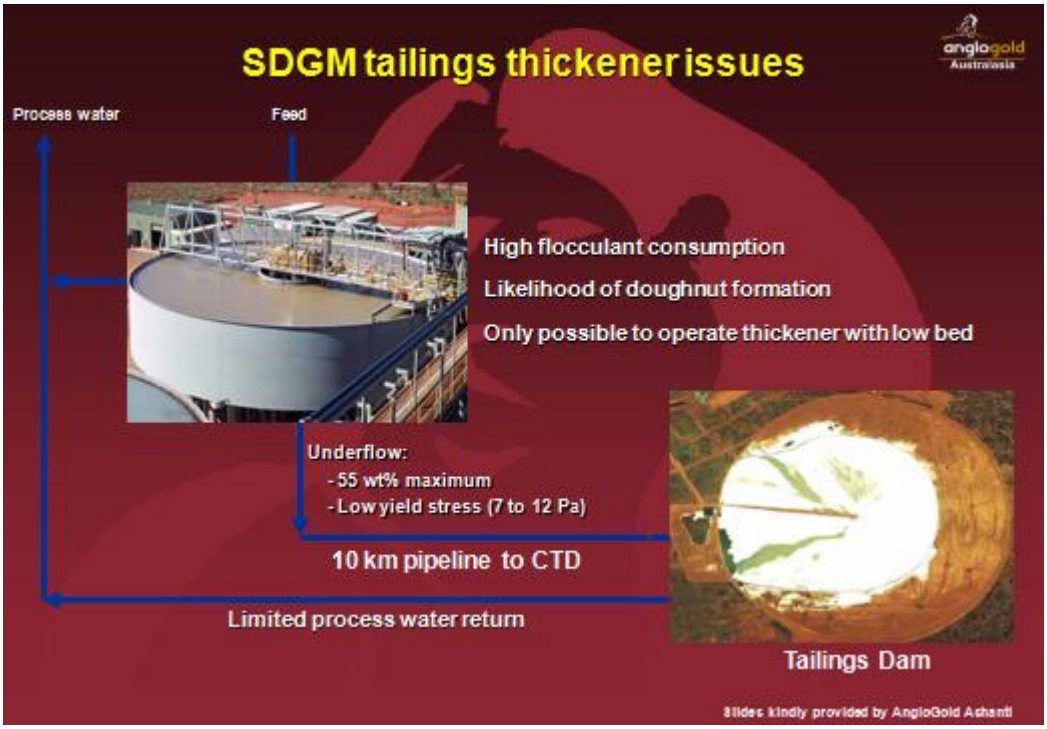
The mine comprises a large open pit, which began operations in 1995 and an underground mine which began production in 2003.

Ore is treated in a conventional gravity and carbon-in-leach (CIL) processing plant.

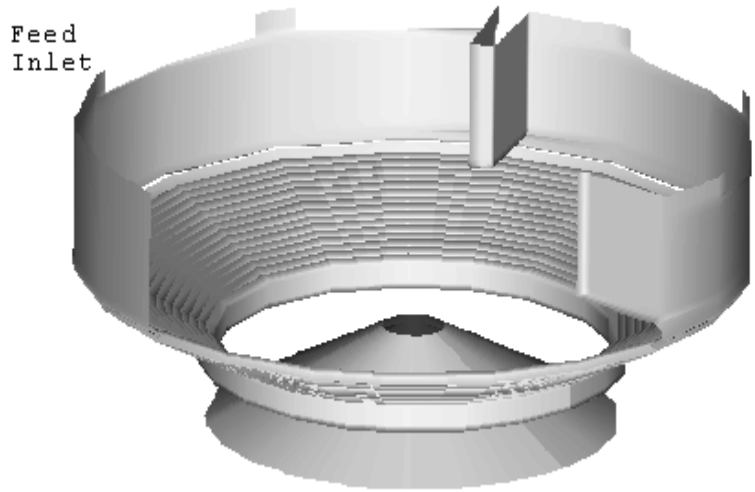
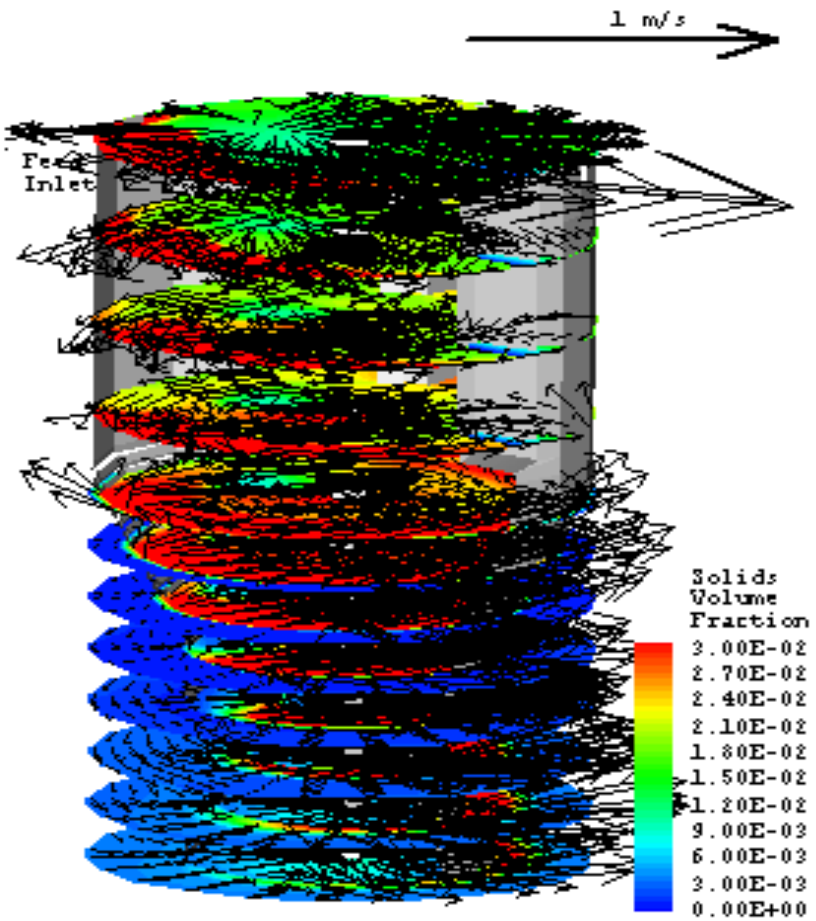
The tailings generated from the processing plant are thickened in a 24m diameter thickener and pumped to a Centrally Thickened Discharge Tailing Storage Facility (TSF), which covers approximately 320 hectares with a current holding capacity of 33 million tonnes.

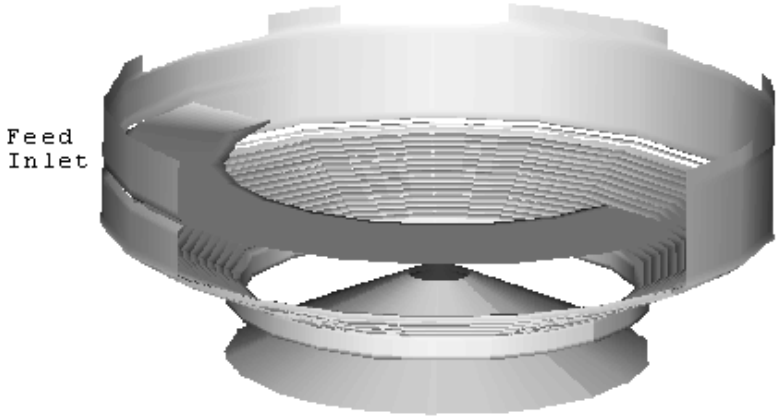
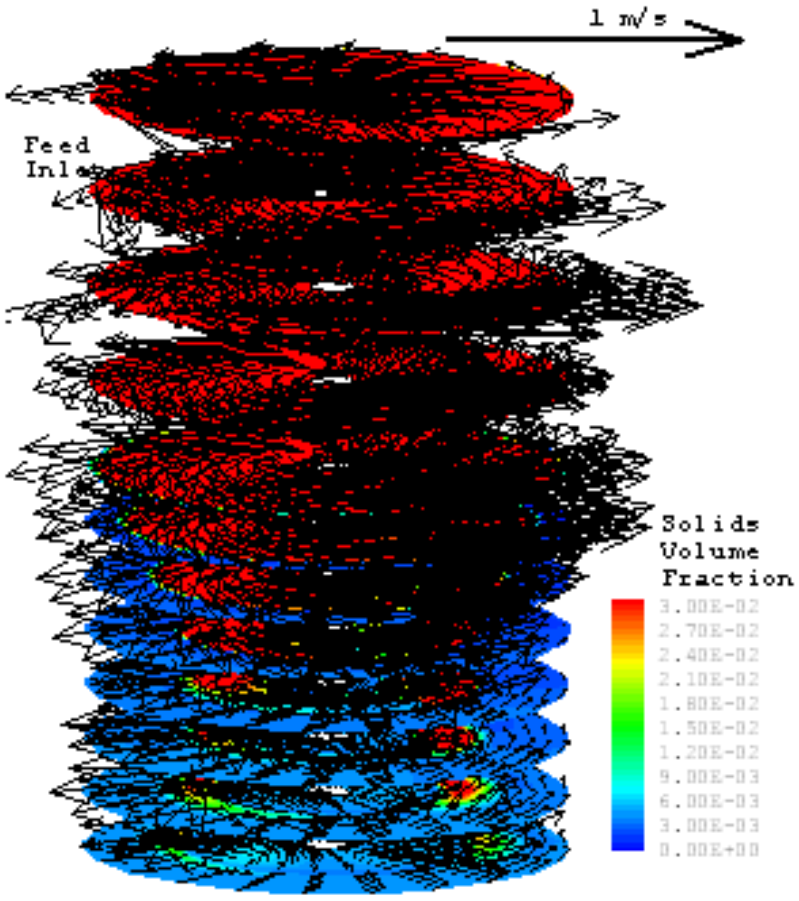
Problems with low yield stress and low solids content of the tailings was leading to premature filling of the TSF along with poor water recovery. A desire to improve its performance led Sunrise Dam to sponsor the project "AMIRA P266D Improving Thickener Technology", and to commission a study on the thickener.

Sunrise Dam has consented to make the outcomes publicly available.



The P266D project team used their CFD tools to investigate the flow patterns in the thickener feedwell and to evaluate modifications to the feedwell.

Feedwell Original Design Schematic and CFD outputs	
	The original design had a tangential entry, three baffles and an exit cone.
	The CFD showed asymmetric flow with poor mixing and jetting of the feed down and out of the feedwell.

Feedwell Design based on PB-CFD Simulations	
	Recommended to: Remove the baffles Install a half shelf The size and position of the shelf strongly influenced the feedwell performance
	The new design better utilised the feedwell volume, dispersing solids evenly in the upper section and with a uniform discharge into the thickener settling volume.

Optimal placement of the flocculant sparges ensured that the flocculant was well mixed with the incoming feed.

As shown here the modifications are not complex

Performance after the modifications

- Flocculant reduction of ~0.1kg per tonne achieved from better flocculation conditions
  - saving ~$100,000 per year
- Underflow density increased from 55% to 60 -66%
  - Greater water utilisation
  - Reduced cyanide to tailings
- CTD beach angles increased from zero to ~2°.
  - Significantly enhanced tailings storage capacity.

Extended time for new tailings area – significant savings.

To inquire about accessing the AMIRA P266 Improving Thickener Technology project, contact the project leader.

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