



Northparkes Mines Rio Tinto Floating Module

As part of its focus on water conservation, Rio Tinto has been investigating ways to improve water efficiency at its mine sites. One particular area of interest is the recovery and storage of tailings water before it is returned to processing facilities for reuse. The majority of water losses in this process result from evaporation and tailings entrainment.

Reducing the amount of water lost through evaporation dramatically increases the amount of water available for reuse, therefore reducing the demand for new water. Evaporation can be reduced by minimising the exposed water surface area to the sun and wind, reducing water temperature and minimising the exchange of water vapour with dry air. Existing methods of reducing evaporation such as floating balls, floating covers, chemical mono-layers and shade structures have drawbacks such as cost, complex installation, instability in extreme weather conditions and maintenance and transport difficulties.

Recognising the need for an alternative system to reduce evaporation, Rio Tinto funded a development program at its Northparkes Mines to investigate the potential for a floating module system. Initial research indicated that a module system could reduce evaporation by up to 75%.

As a result of further research and trials which included the construction of scale models and also wind tunnel tests, the 'Rio Tinto Floating Module' was developed. The module is a plastic, circular design with a diameter of 1.15 metres and a shallow domed top. This design has a number of advantages:

- The circular shape allows the modules to self pack on the water's surface, and therefore skilled operators are not required to deploy or maintain them; other hexagonal designs often get jammed and require operator maintenance
- When packed, air transfer still occurs between the modules, stopping anaerobic conditions developing and the possible build up of dangerous gases

- The modules can withstand high wind speeds without being blown away, and reduce wave action which increases the quality of water returning to the processing facility
- The modules can hold a vertical weight of up to 3kg, so they do not sink when large birds land on them or they are covered in snow
- The size and shape of the modules allows them to be stacked for easy transport and storage
- The plastic used to construct the modules has been built in ultraviolet resistance giving a lifespan of over 5 years, and is also recyclable.



Rio Tinto Floating Module

A demonstration trial has commenced at Northparkes Mines, a copper and gold mine located 27 km north-west of Parkes in Central West New South Wales. 10,000 floating modules were manufactured for the trial, and 2 x 500 m² dams were constructed at Northparkes – one covered with the floating modules, and the other being used as a control. The trial will run for around 12 months and will determine the performance of the modules including:

- Evaporation rates, water quality and wind stability
- Launch and retrieval procedures
- Maintenance requirements and operating costs.

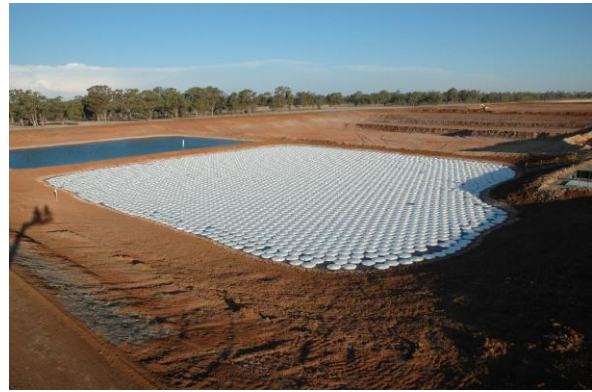
The trial will also give the opportunity to demonstrate the floating module to other groups in the community.

Rio Tinto owns the patent on the module design, but a number of manufacturing companies have expressed an interest in purchasing the design for commercial production.

The development of the Rio Tinto Floating Module is an example of how innovative technology developed by the mining industry can be applied across a number of different sites and industries.



Water level monitoring



Floating modules in trial dam, with control dam in background

References and more information

Northparkes Mines Environmental Department,
www.northparkes.com.au

Takos J., Vagias N., Shaw R., Coghill M., & Easman W. (2006) *Rio Tinto Floating Module*, Proceedings of the AusIMM Water in Mining Conference, October 2006

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