

Over the last few years there has been a number of tailings dam failures around the world. The most recent was a catastrophic failure in Brazil. In this *Update* we explain why there is no 'tailings dam' in Waihi, and why such events are not possible here.

WHO CHECKS what we are doing?

From site selection to construction, monitoring and independent peer reviews by recognised experts, the construction of Waihi's tailings impoundments has been closely followed and reported on. There is strong regulatory involvement from Waikato Regional Council and Hauraki District Council through the consent conditions.

Construction and operation

As the impoundments are raised, each level must meet strict performance criteria relating to material type, construction, depth and compaction. Different types of waste rock are placed in specific locations before the embankment is capped with clay and topsoil. As the embankment is constructed, drainage systems and monitoring bores are incorporated into the design.

Over time the tails settle and consolidate. Drilling in one of our tailings impoundments has shown that the tails have already consolidated to become a firm mud.

The consent conditions stipulate the requirements for the reporting of data to the appropriate regulatory authorities. The design engineer prepares an annual inspection report to confirm that the embankments are in a safe and stable condition. An independent peer review panel, consisting of experts in the fields of geotechnical engineering, geochemistry, hydrogeology and rehabilitation, also carry out inspections on a regular basis. They review data and reports, and they then provide reports to the regulatory agencies.

Closure

When the tailings impoundments are finally closed they will be partially capped leaving a wetland/small lake on the top. A variety of land uses is possible for the remaining area.

Tailings dam? Tailings impoundment? What's the difference?

Tailings, or tails, is the finely ground rock left over after precious metals like gold and

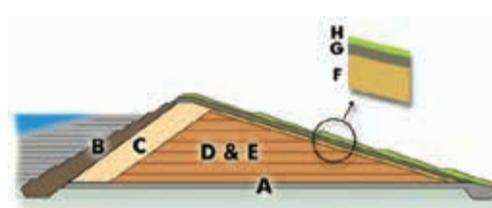
silver have been extracted. The crushed rock can be as fine as talcum powder.

A tailings dam is just that. It is a dam built out of tailings. The crushed rock is formed into a bund and allowed to dry. Wet tailings in the form of a muddy slurry are pumped in behind the bund, which is gradually raised to provide more capacity. A tails dam is not built all at once, it is constructed gradually, and unlike a water dam it cannot later be drained.

This design is comparatively cheap. There are

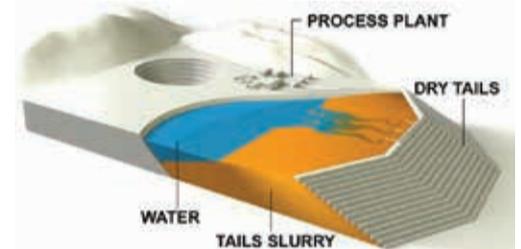
no building materials other than tailings which are already a waste product, and it requires the least amount of work to construct. 'Upstream' tailings dams are common in many parts of the world, and are also regarded by some engineers as the most likely to fail. It is this design which is causing problems overseas.

In comparison, the tailings from the Waihi mines are stored in tailings impoundments. There is a big difference. Waihi's tailings impoundments are carefully engineered rock structures made up of several separate layers, and designed to the same specifications as a water-retaining structure. You can see from the two diagrams how different the Waihi tailings impoundments are from a tailings dam.



WAIHI TAILINGS IMPOUNDMENT

- A. Thick base under blanket at least 1.5m
- B. Upstream structural shoulder, controls seepage and contributes to strength
- C. Additional upstream structure
- D. Waste rock from different sources



OVERSEAS TAILINGS DAM

- E. Sub compartments of Zone D contain wettest or softest rock
- F. Structural fill
- G. Outer seal and capping layer
- H. Final rehabilitation layer

LONG TERM

When mining is completed the Martha Trust will take over responsibility for the tailings impoundments. The company will fund the trust to allow it to carry out its functions. The sum provided will generate annual interest sufficient to allow the trust to manage, monitor and maintain the site.



Above left: Topsoil being spread on the top of the tailings impoundment. The area to the right has just been fertilized with lime.

Above right: Cattle grazing on the Waihi tailings embankment. Some sections of the tailings embankment have been planted in native trees and shrubs.

Right: When completed the top of the tailings impoundment could become a wetland and wildlife habitat.



On the web: www.waihigold.co.nz/mining/waste-rock-and-tailings/