The Tui Mine

Norpac Mining Ltd opened Tui Mine in 1967 to extract metals, including copper, lead and zinc. The mine prospered until unacceptable levels of mercury were found in the ore and the mine became uneconomic. In 1975, Norpac went into liquidation and Tui Mine was abandoned.

Left behind were waste rock and ore dumps, tailings and the ruins of the mine workings. These leach heavy metals from acid rock drainage into the Tui and Tunakohoia Streams. In addition, there is a risk the tailings mass will liquefy in an earthquake or fail in an extreme weather event and flow down the mountain.

The Tui Mine clean up aims to:
- contain the contaminants within a stable and secure location
- reduce the release of contaminants into the Tui and Tunakohoia streams thereby improving water quality
- ensure the site is safe and secure
- improve the ecological values of the site
- improve the aesthetics of the site
- address as far as practicable, within the limitations of the remediation project, the impacts of the Tui Mine on the taonga of Te Aroha Maunga (Mt Te Aroha) for iwi.

Who's involved
The clean up of Tui Mine is being managed by the Waikato Regional Council with financial assistance from the Ministry for the Environment (MfE). The clean up is governed by the Waikato Regional Council, MfE, the landowners (MPDC and DOC) and local iwi.

Timeline and funding
The project will be completed in two phases:
1. preparing the site and treating the underground mine workings,
2. remediating the tailings dam.

February 2010 Consents lodged.
September 2010 Consents granted.
October 2010 Phase 1 remediation work started.
Mid 2011 Underground works completed.
September 2011 Phase 2 remediation work started.
End 2013 Remediation work completed including 6 months maintenance period.
2014 - 2045 Ongoing monitoring and maintenance.

Ministry for the Environment – Phase One $5.5 million, Phase Two $15.2 million.
Waikato Regional Council - Phase Two $800k, approximately $2.2 million for project management, and costs associated with statutory obligations and environmental monitoring costs.
Matamata-Piako District Council - Phase Two $200k, ongoing monitoring and maintenance and costs associated with statutory obligations.
Department of Conservation - ongoing monitoring and maintenance costs.

These organisations are also contributing significant in-kind costs for project governance and support.

Te kei o te waka (Prow of the canoe)
Te Aroha Maunga is one of the most significant landscapes for the tribes and people of the Hauraki region. It forms the prow of the spiritual canoe.

Iwi representatives advise on cultural, spiritual and environmental values of significance to Maori. They also lead cultural and spiritual protocols and blessings necessary for the implementation of the project.
All staff and contractors working on site complete a cultural induction. Development of a cultural monitoring plan is underway.

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Environmental impact

Monitoring the Tui and Tunakohoia streams.
From time to time, the waters of the Tui and Tunakohoia Streams have run 'red'. The rusty colour is caused when oxidised iron particles in the adits, the entrances to the mine shafts, are disturbed. The iron mixes with the water draining from the adits, discolouring the water downstream.

You can be almost certain that any time you see rusty-coloured water, someone has gone into the mine entrances, or a flood or rockfall has gone through the adits.

A baseline assessment carried out in September 2009 included an assessment of the physical surrounds at four monitoring locations, water quality data (temperature, dissolved oxygen, pH and electrical conductivity) and sampling and analysis of aquatic animals such as insects, worms and snails to indicate the overall river health and water quality.

The findings

- High water quality in the Tui upstream of the mine and in the southern arm of the Tunakohoia, but a very different picture found downstream from the old mine site and tailings dam.
- The water in the Tui Stream and the northern arm of the Tunakohoia is polluted and unable to support even the hardiest of insects.
- After the remediation project is completed, water quality will gradually improve.
- The Waikato Regional Council will continue to monitor the water quality to gauge changes over time.

Phase 1 - treatment of old underground mine workings

The old underground mine workings discharge contaminated water into the Tunakohoia Stream.

The plan is to reduce the volume of water flowing from the mine and improve its quality by:
• building limestone chip bunds to reduce water acidity and contaminant loadings
• injecting an alkaline solution — limestone slurry — into the adits, discolouring the water downstream
• encouraging regrowth of native bush.

Treatment of waste rock stacks

Phase one works completed.
The waste rock stack at Champion level 4:
• covers an area equivalent to half a rugby field

Phase two works at end of 2012.
The waste rock stack at Champion level 5:
• covers an area equivalent to a quarter of a rugby field
• adds minimal contamination to the Tunakohoia Stream.

Treatment will include:
• recontouring and stabilising the waste pile to prevent ongoing erosion and allow for safe access into the level 5 mine portal
• rehabilitation of the waste pile with topsoil and native plants
• adding a layer of mulch with a mixture of native seeds to encourage regrowth of native bush.

After clean up

Phase two works at end of 2012.
The waste rock stack at Champion level 5:
• covers an area equivalent to a quarter of a rugby field
• adds minimal contamination to the Tunakohoia Stream.

Treatment will include:
• recontouring and stabilising the waste pile to prevent ongoing erosion and allow for safe access into the level 5 mine portal
• rehabilitation of the waste pile with topsoil and native plants
• adding a layer of mulch with a mixture of native seeds to encourage regrowth of native bush.

Phase 2

Stabilisation and rehabilitation of the tailings dam

The aim is to:
• reduce the leaching of potentially toxic metals into the Tui and Tunakohoia streams and improve water quality
• contain the tailings within a safe and geotechnically stable structure and avoid the need to remove hazardous material from the site.

On firm ground

The ground beneath the tailings dam could be potentially unstable in an earthquake.

The plan is to strengthen and stabilise the toe of the tailings and underlying soils with up to six rows of cement-stabilised soil columns that extend down to the bedrock.

Stabilising the tailings

- There are concerns the tailings mass could liquefy in an earthquake or fail in an extreme weather event. As a result of trials, it is planned to strengthen the bottom 5 m of the tailings by mixing the soil with lime and/or cement.
- A blended mix of tailings, waste rock and lime will then be layered and compacted on top of the stabilised bottom layer.
- A clay cap will be placed over the stabilised tailings to prevent rain water and air entering the mound. Top soil and low growing vegetation will be used to rehabilitate the site.
- The final product will be a stable, engineered landform. Landscaping of the site will be determined in consultation with the community.

Cross section of tailings dam after remediation.