



# Case Study

May 2021

## Sustainability and social performance: Golden Cross

The Golden Cross gold mine at the base of the Coromandel Peninsula in Hauraki District is an example of a mine that opened and subsequently closed since the Resource Management Act was passed in 1991. It is among foremost sites in the world for environmental management of mine closure and post-closure.

### The operation

A combination of an open pit and an underground mine, Golden Cross produced 660,000 ounces of gold and 1.7 million ounces of silver between 1991 and 1998 for an 80/20 joint venture of Coeur d'Alene (since renamed Coeur Mining) and Todd Energy.

At its peak the mine employed 243 staff, with an additional 750 employed in service and support industries.

The operation was located on steeply sloping grazing land, and included a processing plant, a freshwater management system and water treatment plant. Instability in the tailings storage facility (TSF) required mine closure to manage the issue, with abundant resources left in the ground. The mine proceeded from closure to post-closure site management.

This is an example of the RMA system working as intended when it was enacted.



*Golden Cross at peak production in the early 1990s. The locations of the pit and the TSF are evident, while the freshwater treatment plant is located to the right of the image.*

## Environmental management

Groundwater and run off were a site management priority during and after mining, and still today at this high rainfall site.

The JV had established an underground drainage system to capture site water and channel contaminated water through a water treatment plant before discharge into the Waitekauri river. However, by 1998 there was clear evidence that the TSF was moving downslope.

To stabilise the engineered TSF and the water and process tailings contained within, the company drained and rerouted water away from the TSF structure and reconfigured the TSF as a wetland by planting native riparian vegetation and allowing water quality in the pond to gradually improve over time. This plan was always intended; the timing was brought forward. For more than a decade this site has been fit for stock to access, and it is frequented by waterfowl.

The company removed all buildings and infrastructure, recontoured the open pit, other disturbed ground and waste rock stacks, and returned the site to 60 ha of pasture, as the area was before mining started, and also planted 194 ha of pine forest under active management and due to mature in 2022-2025.



*Golden Cross today. The former TSF is visible at the top of the image, close to forested conservation land. The infrastructure at the bottom of the image is the water treatment plant and management system. At the top left, part of the recontoured open pit can be seen.*

## Compliance

Golden Cross today is under the management of two New Zealand-registered subsidiaries of Coeur Mining, which bought out Todd's interest in 2016.

The Waikato Regional Council says in relation to the 2019 calendar year: "The Golden Cross closed mine site is monitored annually for compliance by WRC. The most recent compliance assessment found a high level of compliance with consent requirements continues."

"From this data, I consider there to be no change in effects of the wastewater treatment plant discharge, stormwater discharges and the various mine seepages on the Waitekauri River quality from last year," says WRC principal advisor Sheryl Roa. "The untreated underground water continued to show stable concentrations of contaminants in the mine water. Manganese appears to still be trending down whereas the concentration of iron seems to be static, based on the graphs below potentially indicating that water treatment of the discharge should continue for a number of years yet."

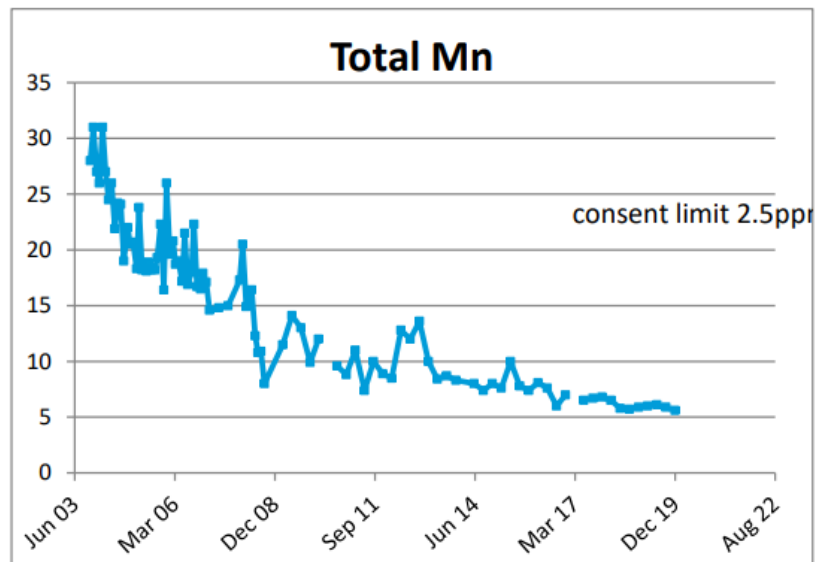
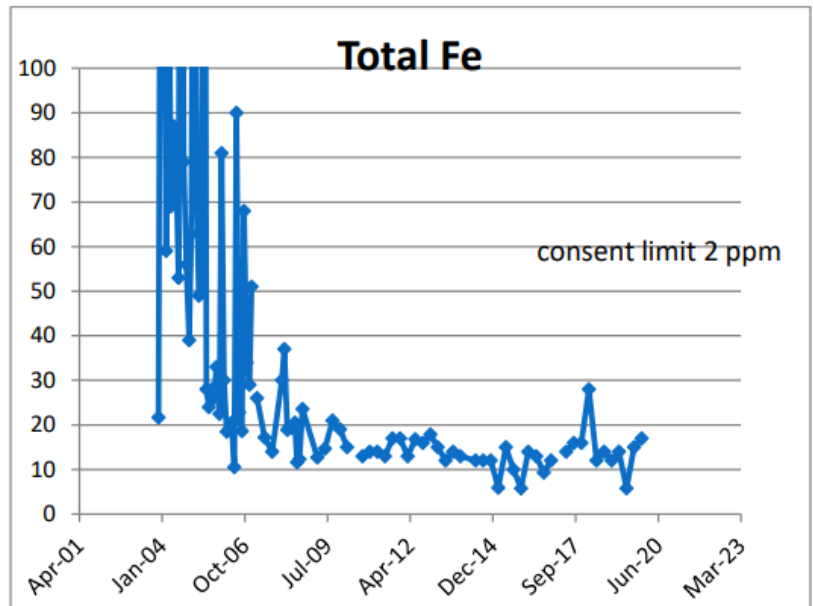
The WRC also states that Coeur Gold has been working continuously on stabilising the site since 1998, including monitoring the TSF, rehabilitation of the open pit, and treating mine water prior to discharge to the Waitekauri River.

Coeur anticipates that the water quality at Golden Cross will improve in coming years to the point where further water treatment will not be needed.

In 2013 a sinkhole developed to one side of the open pit footprint and was fenced as a public safety measure. This is not a non-compliance for the WRC however, the Council expects Coeur to remediate the sink hole once it has developed a practicable solution. Coeur is currently adaptively managing this site.

Other post-closure, care-and-maintenance activities include water quality monitoring, erosion control, vegetation monitoring, and geotechnical monitoring associated with the 1998 landslip.

Livestock are grazed and pasture managed on site under an agreement between Coeur and a local farmer. This includes a grazing plan and stock rotation, use of fertiliser, weed control, and maintaining fences.



**Case study sources:** Waikato Regional Council, Coeur Mining and OceanaGold Corporation.