



CASE STUDY

Treatment of Supernatant Water at a Remote Mine Tailings Facility, Australia.

During rehabilitation works at a decommissioned base-metal mine, elevated zinc was detected in supernatant waters within the Tailings Storage Facility (TSF). Earth Systems was commissioned by the state government department managing the site to undertake contract treatment to lower the total Zn concentrations to permit discharge in line with proposed rehabilitation works.

As part of managing a decommissioned base-metal mine site, the State Government of Victoria commenced a rehabilitation strategy with the aim of reinstating the site, as close as practicable, back to its previous landform, minimise environmental impacts from the site and maintain water quality downstream of the site.

It was identified that 160 ML of supernatant water in the TSF had total and dissolved zinc concentrations well above those permitted at the compliance point at a polishing pond spillway immediately downstream of the TFS. Treatment of the water body was required to lower Zn concentrations to allow successful rehabilitation of the site and to permit future discharges from the site if required.

ASSESSMENT OF TREATMENT REQUIREMENTS

Earth Systems recognised from past experience that the treatment of near pH-neutral, Zn-rich waters required more than an elevated pH target to achieve effective treatment.

A test program on samples of supernatant water was conducted to identify the best suited reagent to modify the pH to above 9.5 and to identify a suitable flocculant/coagulant and dose rate to remove the suspended Zn particulates.

TREATMENT PROGRAM

The TSF was treated using a two-step approach. A calcium hydroxide (hydrated lime) slurry was dosed to raise the pH to between 10.5 and 11 to facilitate metal precipitation. This was followed by flocculation to facilitate the settling of the precipitates and pH back correction to pH 8.5.

The hydrated lime was dispensed over a large area of the surface of the water body using the mobile Neutra-Mill *rapidTreat* system. Treatment was carefully monitored at

several sites around the TSF to minimise the risk of excess reagent addition. Acidified flocculant was then applied over the surface of the water body from dosing booms mounted to a small twin hulled boat.

Following treatment average total metal values within the supernatant water were dramatically reduced, with key metals within allowable limits for discharge.

