Legacy Tailings Dam Closure with Bituminous Geomembrane Cover

M. Medina¹, R. J. Longey², J. Alexander³

¹ Geotechnical Engineer, GHD Pty Ltd, Hobart, Tasmania, Australia. mauricio.medina@ghd.com
² Technical Director, Tailings and Mine Rehabilitation, GHD Pty Ltd, Hobart, Tasmania, Australia. rob.longey@ghd.com
³ Environmental Superintendent, Capricorn Copper Pty Ltd, Mt Isa, Queensland jalexander@capricorncopper.com

Abstract

Capricorn Copper Pty Ltd (CCPL) are operating the Capricorn Copper Mine located at Gunpowder, Queensland. When operating under a Transitional Environmental Program (TEP) a number of conditions were required to be met including reducing the environmental harm of legacy mining operations of past operators. The decommissioned Old Tailings Storage Facility (Old TSF), has been a legacy source of contamination due to the existing capping not meeting modern cover criterion and allowing oxidisation and infiltration to the underlying acid forming tailings resulting in Acid and Metalliferous Drainage (AMD) seepage from the facility.

A cover design for the Old TSF and other mine waste storages onsite had been proposed by previous operators which required clay capping. Under the TEP cover design phase a review of cover materials identified a key site constraint for close of the sites 110ha of mine waste facilities was the lack of significant quantities of low permeability clay onsite.

The lack of available clay enabled the consideration of alternate lining materials for the Old TSF with a Bituminous Geomembrane Liner (BGM) being adopted as the preferred alternate. The BGM compared favourably with clay based materials on seepage analysis and enabled several benefits by negating the need for borrowing clay off site reducing the sites environmental footprint and saving time in construction. The BGM cover system on Old TSF’s 11Ha footprint is being monitored with the intent to use this as a case study to confirm performance expected enabling the cover design to be adopted on the remainder of the sites mine waste storages, which requiring capping.