



Treatment of acid drainage for process water at a tin mine, Australia

Earth Systems was contracted to treat 3.5 ML of acid water within a process dam at a tin mine in New South Wales, Australia. Operations at the site required additional water for process applications. In an effort to reduce process costs, eliminate acid-related corrosion and as part of their commitment to environmental sustainability, the Client decided to treat onsite contaminated water for reuse.

The original underground tin mining operations had ceased several years prior to its new owners seeking approval to recommence operations on the site. Initially tin was to be extracted from the alluvial deposits on site. Following this initial period, production was to be increased by reprocessing tailings left behind from the previous operations. The increased production would require significant extra process water.

A key site issue was that historical works at the mine had left large areas of uncapped sulfidic waste rock and exposed tailings. Run-off from these areas was effecting water quality in the process water dam making it unsuitable for use.

WATER QUALITY ASSESSMENT

Earth Systems assessed the suitability of supplementing process water with treated acid and metalliferous drainage (AMD) contained within the process water dam. Test work indicated that suitable quality process water could be produced from the treated AMD at an optimum treatment pH. The most cost effective method of treatment was determined to be in-situ treatment using a pre-mixed calcium hydroxide slurry.

CONTRACT TREATMENT

Dosing was conducted over a 3-day period to ensure that treatment did not disrupt mine site operations and was consistent with appropriate occupational health and safety procedures.

Treatment of the 3.5 ML process water dam resulted in the pH being raised from 2.06 to 8.8, with a reduction in acidity from 3380 to <2 mg CaCO₃ equiv. /L. Most elevated dissolved

metals initially present within the water body, including Fe, Al, Mn, Cu, As, Ni, Cr and Pb, were reduced to below detection. Dissolved sulfate concentrations within the dam were lowered by 40% during treatment.

Earth Systems successfully demonstrated that historical acid drainage could be cost effectively treated for use as process water, reducing the need to use valuable drinking water while simultaneously reducing environmental liability.



Process dam before treatment



Process dam after treatment