



CASE STUDY

Mine Pit Lake Treatment, South Australia

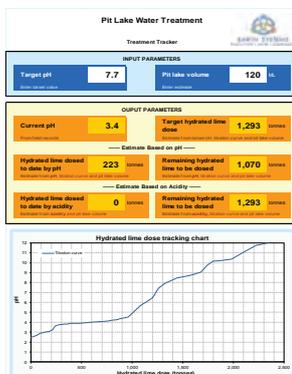
Earth Systems was engaged to undertake treatment of 120 ML of highly acidic pit water. The client intended to recommence mining operations in the pit but faced the multi-faceted challenge of treatment and discharge of the pit water. The level of difficulty of treatment and discharge process was increased by the physical inaccessibility to the pit lake itself.

Pit water characterised by Earth Systems showed acidity to be near 13,000 mg/L CaCO₃ and contained highly elevated concentrations of aluminium, iron, magnesium, manganese, copper and sulfate.

IDENTIFICATION OF TREATMENT PARAMETERS

Earth Systems implemented a comprehensive assessment program ranging from laboratory testwork to pilot scale titration testwork to determine the optimal reagent requirements, dose rate and assessed the response of highly acidic AMD water to neutralisation treatment.

An optimum target pH of 7.7 was determined for which aluminium, iron, copper, manganese and sulfate were all significantly decreased. In addition, the option of in-situ pit water treatment with hydrated lime was concluded to be the most cost-effective treatment strategy amongst other potential neutralisation reagents. The implementation of an in-situ treatment approach was a strategic decision to overcome site inaccessibility challenges in a cost-effective manner. It was estimated 1,300 tonnes of hydrated lime would be required to meet discharge standard.



TREATMENT SUPPORT

Earth Systems offered continued support during treatment undertaken by the client and tackled operational challenges, such as blockage of pipes and dispersion assemblies efficiently.

Precipitation of Iron (III) hydroxide from the mine waters began within a day, resulting in an incremental change in pH. Within two weeks, the iron had begun to fall out improving water clarity.

As a result of treatment supervised by Earth Systems, pit water was raised to a pH of 7.5 and toxic metals reduced to manageable levels. By applying expertise in water chemistry and technical solutions for AMD management Earth Systems allowed the client to deal with the problem and find beneficial use for the water on site.



Clogging of dosing line due to gypsum and iron hydroxide precipitation



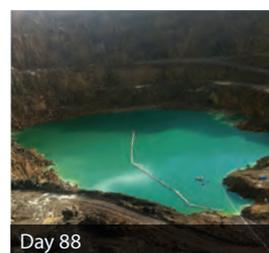
Precipitation of aluminium hydroxides



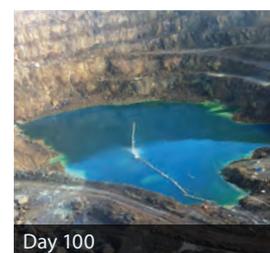
Day 1



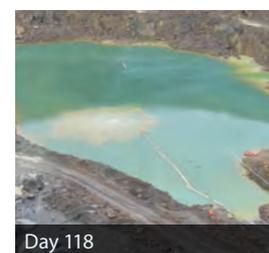
Day 2



Day 88



Day 100



Day 118

