



CASE STUDY

Integrated In-Situ Water Treatment System

Earth Systems was engaged by a coal mining company to provide an assessment of mine void water quality, design and implement an integrated in-situ water treatment system to meet discharge standards.

The site includes a partially back-filled open cut, largely inundated underground workings, a number of detention basins and a 60 ML capacity dam. A geotechnical instability in the high wall of the open cut area resulted in large volumes of uncontrolled discharges of void water up to 10ML/day from the failure zones. Existing in-situ treatment efforts involved manual addition of hydrated lime powder to the dam at the inflow point that receives pumped mine void AMD affected water.

Earth Systems designed and commissioned a portable VMT (vertical mixer tank) treatment system to mix and dispense hydrated lime slurry. Batch treatment of mine void water with the VMT treatment system substantially reduced manual labour requirements, by permitting treatment of a volume of dam water, followed by controlled discharge.

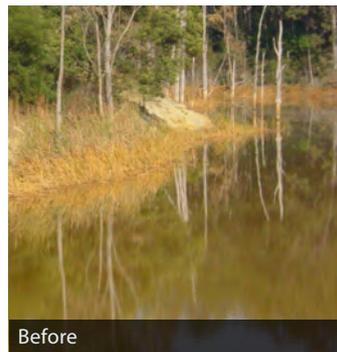
EFFECTIVE IN-SITU WATER TREATMENT

Earth Systems performed specialised water quality assessments and determined that the most cost-effective approach to achieve the desired water quality targets. Taking into account the dam capacity, pH values of 5.5 – 6.2 and acidity concentrations ranging from 100 – 200 mg/L CaCO₃ equivalent, it was determined that approx. 2.5 – 5.0 tonnes of dry powdered hydrated lime would be required per batch treatment and discharge.

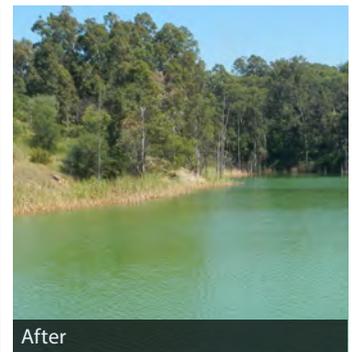
Extensive engineering design was conducted to determine the appropriate process parameters for the integrated VMT treatment system, including mixing ratios of the hydrated lime as well as the construction and positioning of an appropriate reagent dosing pipe system. The most effective method for dispensing the hydrated lime over the waterbody was determined using a floating perforated pipe system constructed from PVC that included a grit removal system.

ACHIEVING WATER QUALITY DISCHARGE STANDARDS

Utilising the treatment strategy and the commissioned VMT water treatment system developed by Earth Systems, the client was able to efficiently treat the AMD affected water and successfully meeting stipulated water quality guidelines for discharging offsite.



Before



After