

CASE STUDY

PROJECT

Instrumentation and monitoring of a store and release cover

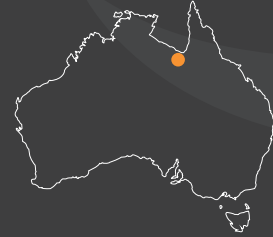
SECTOR

Sensor Cover and Monitoring

COMMODITY

Pb, Zn

LOCATION



ISO

9001:2015 | 14001:2015 | 45001:2018





SGME was engaged to use our expertise to quantify the performance of store-and-release covers in reducing seepage at an arid mine site.

Site description

The mine consists of two sites in the remote lower region of Queensland, Australia.

The problem

The mine constructed an enhanced store-and-release cover of alkaline waste rock in 2010. The purpose of the alkaline waste rock is to produce acid-neutralising capacity (carbonate) as infiltrating rainfall passes through the pores of the waste rock mulch. Percolation into the underlying potentially acid-forming (PAF) waste rock may result in neutralisation of acidity via interactions between the acid-neutralising pore water and PAF waste rock.

No performance monitoring of the cover had been considered prior to 2013. SGME installed instrumentation that enabled rate measurement of the percolation.

SGME solution

The work performed for our client involved the construction of a store-and-release cover (the cover) on the south waste rock dump. The purpose of the cover was to reduce seepage into PAF waste rock by maintaining a compacted reduced permeability layer at near-saturated conditions. The cover was overlaid with dolomite rock and soil-mulch to capture rainfall and allow for evaporation / transpiration.

Performance has now been monitored for 10 years by SGME with a focus on rainfall, seepage and evapotranspiration. Results have shown that seepage is about 6 % of total rainfall with most infiltration being stored within the cover and removed by evapotranspiration. A water balance was calculated for the cover using a numerical model which showed that actual evapotranspiration exceeded potential lateral flow plus evapotranspiration, indicating that water management is effective.

The study highlights the importance of vegetation in limiting seepage with the cover performance improving over time as vegetation has established.

SGME enhances cover and landform design through expertise in soil chemistry, physics, unsaturated soil mechanics and environmental engineering. Our innovative use of growth media amendments, revegetation strategies and engineering solutions improves cover and landform performance which reduces environmental risks and ensures long-term stability. We develop solutions that meet regulatory requirements and support sustainable practices by taking a holistic approach that considers safety, stability, sustainability, cost-effectiveness and capacity for post-mining land uses. SGME's commitment to continuous improvement through ongoing learning about technological advancements, regulatory changes and industry best practices ensures our designs remain innovative and sustainable; thereby delivering effective solutions for mine waste management that contribute to having enduring environmental protection and achieving responsible post-mining land uses.