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Creating enduring value

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PROJECT CASE STUDY: Cover Column Trials to Explore Potential Cover Options for a Tailing's Storage Facility

SGM Environmental was responsible for the construction, monitoring and reporting of the cover column trials for a tailings storage facility (TSF).

Site description: The mine comprises five underground mines which produce copper, silver, gold, lead and zinc in Cobar, New South Wales. During operation, deposition of the tailings from the central spine results in a concave landform that grades from 8% at the crest of the beach to 1% at the toe. A conceptual cover design had previously been prepared that incorporates a reduced permeability layer (RPL) overlain by a capillary break (CB) overlain by 0.2 metres of topsoil.

The problem: The company wished to take a step back from the proposed highly engineered conceptual cover and explore the potential to install a less complicated cover based on regional experience at other mines (ie a mono-layer of growth media without an RPL or CB).

What SGME did: The project consisted of a number of elements including the identification of alternative covers which would progress to cover column trials. A review of the tailings and potential cover materials incorporating geochemistry, groundwater, surface water, soil quality and cover requirements was done. An environmental risk assessment for the cover system was also done to define the basis of design and to guide objectives selection. A preliminary (uncalibrated) model was subsequently developed in SVFlux to find / test alternative cover options that could progress to the cover column trials.

The cover column trials were instrumented with volumetric water content and matric suction sensors which were calibrated prior to installation. Following construction of the cover column trials, they were subjected to 16 artificial rainfall events over seven months to measure a maximum water balance. A semi-calibrated model was developed using the maximum water balance to predict how the cover options would perform if constructed on the TSF.

The outcome of the project was the identification of alternative cover options that would likely limit seepage.