



SGM Environmental

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PROJECT CASE STUDY: Cover Column Trials and Design for Heap Leach Pad Rehabilitation

SGM Environmental Pty Limited (SGME) did the construction and monitoring of column cover trials (the trials) to determine the optimum cover thickness for the rehabilitation of a heap leach pad (HLP)

Site description: The mine is underlain by two pastoral leases; prior to mining, the area was used as unimproved pasture for grazing. Ore has been mined from two open pits by conventional drill and blast / load and haul techniques and crushed prior to stacking on the HLP. The ore is irrigated with a dilute solution of sodium cyanide to extract gold which is absorbed onto activated carbon before being smelted to produce dore bars.

The problem: After the HLP is rehabilitated it will extend beyond the perimeter of the underdrainage and may pose some limited environmental risk from either acid mine drainage (AMD) or residual liquor, which may contain sodium cyanide, that remains in the ore pore space after rehabilitation. The potential environmental risk can be managed by controlling rainfall infiltration into the HLP after rehabilitation limiting the transport of residual pore liquor and AMD to the receiving environment. The mine's strategy is to optimise cover design via modelling and monitoring of the trials to minimise the overall risk of AMD.

What SGME did: The trials were completed in three stages including: sensor calibration, construction and applying artificial rainfall to measure the maximum water balance ie the maximum amount of seepage if the column trials become near-saturated. The results of the trials were then used to develop a one-dimensional model in SVFlux (the model) to predict the future performance of the covers under dry, average and wet conditions.

The primary outcome of the trials and subsequent modelling was to show evidence and gain agreement on the cover thickness. The secondary outcome of the trials was to determine if there is a difference between a soil cover and a cover that contains various combinations of soil and waste rock.

The trials and semi calibrated model demonstrated that a 0.5 metre cover consisting of either soil or soil in combination with waste rock is appropriate for the rehabilitation of the HLP.

