



CASE STUDY

High-Density Sludge Treatment Plant Design

Earth Systems was commissioned by the South Australian Government to assess and improve the performance of existing water treatment plant at the Brukunga legacy mine site. The government was concerned that the current treatment system was unable to meet appropriate water quality standards during times of peak flow. Minimising costs associated with sludge handling and optimising reagent use were key performance criteria.

The existing water treatment system consisted of a low-density sludge (LDS) lime neutralisation plant to treat acid and metalliferous drainage (AMD) generated by waste material on-site. It was found that the capacity of the LDS treatment plant was frequently exceeded during high flow events confirming the need to modify the existing water treatment plant.

COST-EFFECTIVE WATER TREATMENT

Earth Systems determined that the most cost-effective approach to achieve the desired water quality targets, additional treatment capacity requirements and treatment sludge handling objectives was to incorporate a high-density sludge (HDS) circuit into the process design for the treatment plant. Extensive pilot- and full-scale test work was conducted to determine the appropriate process parameters for the proposed HDS plant.

Tests carried out by Earth Systems also indicated that the existing thickener / clarifier system had sufficient capacity to simultaneously deal with both the old and new treatment plants, saving a \$1.2M investment in a new thickener.

SOLID RESULTS

The HDS circuit has been in operation for over five years and is critical to the effective management of on-site water quality and discharge off-site. Sludge of 30–40 wt% solids is produced at the base of the clarifier, a vast improvement over the low-density sludge (2–4 wt% solids) entering the settling ponds prior to the plant upgrade (see across). This results in less frequent desludging of the settling pond, providing additional cost savings.

The process design provided by Earth Systems resulted in dramatic improvements in the downstream water quality and health of the receiving environment; an increased treatment capacity to cope with peak-flow periods, and an overall reduction in ongoing treatment costs.

