

Implications of not Managing AMD Correctly

This fact sheet provides information to explorers and operators about the implications of not managing AMD correctly. Not understanding the AMD issue before the operation commences or not managing AMD well throughout the life of the project, can lead to significant financial, social and environmental problems for the company operating the site.

This fact sheet covers:

- Oxidation is difficult to stop once it has commenced;
- Causes of getting it wrong;
- Environment, financial and social impacts of not managing AMD correctly; and
- Loss of social license for the industry.

Environmental, financial and social impacts of not adequately understanding the AMD issues on site or not correctly implementing a AMD management plan can have significant effects on the operation, regional ecology and local communities. Not managing AMD can impose a significant financial burden on the company and make closure and relinquishment very difficult at the end of the mine life.

Misunderstanding AMD Management

Best practice AMD management begins during the exploration phase. It is well recognised that the earlier data collection and AMD assessment commences, the better the outcome as the mine operates. Companies committed to identifying, measuring and managing AMD ensure that systems and processes are in place so that AMD is managed through every stage of the operation.

Tasmanian geology is typically complex in heavily mineralised areas. Exploration companies are rarely concerned with the long-term environmental repercussions of mining sulfide-rich ores or focusing on the waste around the peripheries of the mineralisation. Often, the presence of AMD isn't investigated at all during exploration.

Understanding if AMD is present during the exploration phase, allows the project leaders to more accurately begin calculating project risks and costs.

It is generally the case that not enough test work is undertaken during the exploration and feasibility stages to have a statistically valid waste model. The waste model should be based on enough samples to provide an adequate level of confidence when using statistical principles like ANOVA. Failing to have enough sampling information in the waste model can lead to inadequate management of PAF, inappropriate dumping plans or taking too long to exclude oxygen.

These management issues cause the AMD reaction to commence, often requiring ongoing active treatment of acidic water.

Failing to Manage AMD

Failing to understand the AMD issue can lead to AMD mismanagement. Inadequate test work, particularly in the planning phase of an operation, can lead to inappropriate techniques being used to manage AMD on site. Failures early in an operation, can cascade into costly errors in PAF material control. Not understanding fundamental concepts like PAF lag time, climate, appropriate oxygen exclusion methods and waste dumping strategy can cause long-term, and often irreversible generation of AMD on a site.

The transfer of information from the AMD management plan into day-to-day operations is an important step in appropriate management of AMD. When information transfer does not occur, AMD is often not managed appropriately, causing long-term and often irreversible impacts around the site. Rio Tinto has a process in place to manage AMD on sites which includes ensuring that geologic information related to the distribution of PAF material is available for the mine planners who schedule material movement. This ensures the material is placed on the correct dump, which in turn has a plan in place to ensure that the PAF is covered before oxidation commences.

Some other major causes of AMD management failures are:

- AMD issues are not clearly defined during mine planning;
- Block model is not regularly updated with in-pit mapping and sampling;
- Operational staff are unaware of need to manage AMD;
- Oxidation commences before PAF reaches final storage (for example before dump capping);
- Poor quality of dump construction; and
- Poor tailings management.

The mining industry is continually reinvesting into research to better understand the AMD issue and how to manage it better. The reality is that once oxidation commences, managing AMD throughout the life of a project can cost many millions of dollars and make it difficult to close a site without committing funds for post-closure management costs for many hundreds of years.

Environment, Financial and Social Impacts

AMD leaves an environmental legacy if it is not managed appropriately. Management of AMD in the early stages of a project often doesn't occur, which in turn, means there is insufficient test work to build a waste model that appropriately estimates AMD and allows management measures to be planned with a high degree of confidence.

Failure to manage AMD appropriately throughout all stages of a project life causes impacts to not only the environment but to the financial security of the company, communities and workers. There is also a social cost in failing to manage AMD, which can leave local community's water resources and recreation sites contaminated, tourism affected and result in permanent changes to the local environment which the community may have been previously able to enjoy. The shifting dynamics of changes in communities when an operation unexpectedly closes also effects schools, local businesses and community organisations.

It is a regulatory requirement to undertake life of mine (LOM) planning for new prospects, including waste management, closure planning, long-term cost forecasting and progressive landform rehabilitation (DFAT, 2016a). There is an increased pressure from not only an environmental perspective to return the landform to the pre-mining land use, but a social and financial dimension as well. AMD management success invariably hinges on identifying and managing the issue before the mining company turns the first sod, until the mine is closed. Downstream water users and future land use options rely on appropriate management of the land for the duration of the mining company's tenure. For sites to be closed successfully, companies must take responsibility for AMD management throughout the life of mine process. It might be the case that once AMD management costs are added to a new prospect, it becomes financially unviable. It would be remiss to begin operating a prospect when AMD management costs cause it to be unviable. This kind of operation leads to poor social licence for the industry as a whole, leaves an environmental legacy and the burden of rehabilitation with the government, and ultimately the community.