

Future mine

Professor Andy Fourie* considers ensuring the viability of the mining industry through acceptable closure

The issue of acceptable mine closure is clearly one of the biggest concerns facing the mining industry at present. One only has to scan the sustainability reports of the larger mining companies to see the enormity of the problem that is being faced. Financial provisions for future mine closure documented in these reports are in excess of a billion dollars in some cases. It is likely that in certain instances the financial provision is too large (whereas in the past the provision has often been far too little), but the degree of uncertainty regarding what constitutes acceptable closure is still so large that one approach has been to adopt extremely conservative estimates of likely costs. In an industry in which costs are tightly controlled and driven ever downward, this approach is somewhat out of character and needs to change to ensure future profitability.

One of the main issues that need to be debated amongst everyone involved in mine closure issues, from regulators through to contractors, is what constitutes acceptable closure. In particular, there is a need to establish agreed and measurable criteria against which a mining company can be judged to decide whether a closure certificate is warranted. Such criteria need not be only technical, although measurable physical parameters do provide some degree of certainty in achieving a good quality final product. Criteria based on social and other grounds are also essential in directing closure activities.

In establishing acceptable closure criteria, inflexible regulations that take no account of the range of factors that make each mine site different are unlikely to succeed in making acceptable mine closure a reality. There are a range of issues that demand a rational and non-prescriptive approach. For example, the closure of a mineral sands mining operation will usually not have a major concern about the long-term hazard of groundwater contamination, simply because the tailings material is usually relatively benign. Contrast this with the closure of a uranium mine, where the potential for contamination from the tailings is a major long-term concern, and the need for flexibility is obvious. Other issues that should be allowed for in developing acceptable closure criteria are climatic conditions. For example, subaqueous storage of potentially acid generating tailings may be appropriate in a cool or temperate climate, but would not likely be a suitable solution in arid and semi arid regions such as most of the Australian, South African and South American mining regions. Another example is location – in particular the proximity to residential areas and other population centres.

The word legacy, when used in the context of mine closure, is invariably associated with negative connotations. For example, 'legacy mines' usually refer to those operations that have been abandoned and have a significant residual pollution potential. However, it is also possible to establish a positive legacy. By developing a number of case studies of closure projects that can be shown to have been done competently

and to have resulted in no ongoing threat to local communities or the adjacent environment, a company will secure its future licence to operate. There is nothing more convincing than a documented and independently audited track record. It is therefore in the interests of everyone working in the mine closure field to establish unambiguous, measurable indicators of mine closure success.

Start early

Addressing the problem of what constitutes acceptable closure cannot wait until closure is imminent. It requires a great deal of forward planning – more so perhaps than most other activities in a mining operation. Proposed designs for features such as waste rock dumps and tailings storage facilities should be tested and proven over a number of seasons to provide some degree of certainty that the proposed solution is viable. There are currently a number of sites undertaking field trials of a range of proposed cover designs, but relatively little sharing of information takes place. Rather than duplicating mistakes in the design of such cover trials, all potential users could benefit through more sharing of the results and interpretation of the results from such trials. Mine closure is one area in which the benefits of individual companies are inseparable from the interests of the industry as a whole. A poorly conceived and implemented closure strategy could result in major pollution or health impacts on an adjacent community and condemn the entire industry to criticism and scrutiny, no matter how unwarranted it may be.

The field of mine closure brings together professionals from a wide range of disciplines – more so perhaps than any other activity related to mining operations. To ensure successful outcomes of such collaborations, it is essential that we make progress towards the establishment of some agreed and measurable success criteria. The alternative is a continued waste of money on solutions that don't work and negative publicity that results in money having to be spent to redress the impacts of inappropriate solutions.

The Australian Centre for Geomechanics and the Centre for Land Rehabilitation (University of Western Australia) look forward to hosting Mine Closure 2006 in Perth, September 13 – 15. The seminar will provide a forum for legislators, mine owners and operators, consultants, service providers and researchers from throughout the world to exchange views on how best to ensure that the future closure of mine sites is achieved at minimum cost. This cost includes financial, social and environmental considerations.

Mine Closure 2006 invited speakers include: Owen Nichols (Australian Centre for Minerals Extension Research), Graham Cobby (Department of Industry and Resources, Western Australia), Gavin Murray (ANZ Banking Australia), Andrew Parsons (International Council of Mining and Metals), David Tongway (Australian National University), Ward Wilson (University of British Columbia), Ramanie Kunanayagam (Rio Tinto Australia) and Paul Dowd (Newmont Mining). *IM*



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For further information please visit www.mineclosure2006.org or contact the ACG via acg@acg.uwa.edu.au