Mine Closure 2006 — Andy Fourie and Mark Tibbett (eds)
© 2006 Australian Centre for Geomechanics, Perth, ISBN 0-9756756-6-4
https://papers.acg.uwa.edu.au/p/605_Kunanayagam/

Sustainable Mine Closure — Issues and Lessons Learnt

R. Kunanayagam *Rio Tinto Ltd, Australia*

1 BACKGROUND

Two tests of the long term sustainability of a mining operation are its environmental and social legacies. Even fifteen years ago most mine closure plans dealt primarily with the engineering aspects of site decommissioning and the technical aspects of environmental remediation. However, due to increasing standards and a commitment to sustainability made by a number of leading mining companies, the industry is fast adopting an integrated approach (social, environmental, engineering and financial) to closure. This approach defines the closure legacy of the mine and frames the entire planning process of the mine cycle. Accordingly, this paper looks at examples of recent mine closures in developing countries in order to identify the main issues facing companies at closure. It examines some key lessons learned from these experiences and, in particular, the social and human relations aspects of closure.

2 WHY DOES MINE CLOSURE MATTER?

A World Bank article on mine closure reports that, over the next decade, at least 25 major mines are scheduled to close in developing countries. The legacy of these mine closures will influence the current global dialogue on the costs and benefits of mining – and determine whether it is a viable industry for the twenty first century (World Bank and International Finance Corporation, 2002). Much of the global debate about the benefits and drawbacks of mining revolves around the definition of responsible mining. Today, a mining operation's performance is judged not just in terms of what happens during the production phase - people also want to know about the long-term environmental impacts and whether the resulting economic and social consequences will benefit mining-affected communities after mining has ceased.

A legacy of abandoned or orphaned sites around the world has harmed the mining industry. Bill Biggs (2000) points out that 'abandoned sites are not only a source of ongoing pollution and potential public danger, but their very existence is a source of embarrassment to the industry'. It is now established, at least among the leading mining companies, that there is no walk-away solution to closure.

Regulatory requirements in many developed countries increasingly require some form of financial assurance on the part of the company to guarantee performance during and after mine life. In the United States, for instance, non-government organisations (NGOs) are lobbying state governments to increase bonds to cover ongoing environmental impacts.

Closure matters to:

- Mining Companies because:
    - Adequate financial provision has to be made for both closure and post-closure activities.
    - The potential liabilities (environmental and social) and ensuing reputation risk for a company can be huge.
    - A company's contribution and legacy of sustainable development can only be judged post-closure.
- Governments because:
    - The environmental, financial and social risks associated with abandoned and orphaned mines.
    - Government may have to pay clean up costs and deal with social unrest/community dislocation if closure is not undertaken properly.

- Communities because:
    - The threat of economic and social collapse if the transition to closure is not managed properly.
    - The increased environmental risks arising from inadequate closure planning.

3 WHAT IS INVOLVED?

A World Bank article states that an initial mine closure plan is best developed before mining starts. The key reasons for this are: that the plan can influence the initial choice of key technology and waste disposal methods; it assures rehabilitation considerations are built into operational planning, thereby reducing closure costs; it makes it easier for sites to choose between options such as the 'fly in fly out' or the company town model, and it allows better planning of township location and other social infrastructure that will outlive the mine (World Bank and IFC 2002).

The Rio Tinto closure standards, currently under development, state that all new operations must submit a closure plan as part of the final investment approval process. All current sites need to have detailed closure plans that are updated and reviewed on a regular basis. The International Financial Corporation approval process for funding new mines now requires companies to submit a closure plan as part of their project approval process.

A good closure plan takes an integrated approach to closure planning. Mining Minerals and Sustainable Development (MMSD) in its mine closure working paper states that 'planning for closure involves integrating the closure design for the entire mine area, identifying the timing of the planning process, considering the issues which relate to specific disposal methods and post mine economic and community activities, as well as financial provisions' (van Zyl et al., 2002). In order to arrive at a detailed and meaningful closure plan, closure issues need to be scoped accurately and thoroughly. Issues identified in the Social and Environmental Impact Assessment (SEIA) should be analysed for their implications for closure. This would involve scoping potential closure issues during the feasibility stages of the project as part of the SEIA process.

4 HOW DO WE GET THERE?

A key lesson from sites currently addressing closure issues is the need to focus on closure issues early in the project. Closure should be a priority throughout operational life and there should be an agreed procedure whereby any planned or unplanned changes during the mine's operations automatically triggers a review of the closure planning process. Given that closure impacts on all aspects of mining and decisions on closure often involve trade offs between different options, closure is best addressed through a multidisciplinary team that integrates social, environmental, financial and engineering issues. One way to ensure this is to appoint champions from each discipline and to have a senior manager responsible for coordinating the entire closure process. For example, the Rossing uranium mine in Namibia has established a management organisation around the concepts of sustainable development and closure.

5 ISSUES FOR CONSIDERATION – DEVELOPED VERSUS DEVELOPING COUNTRIES

There are significant differences in approach, scoping and resources between countries where closure is regulated through existing legislation and in countries where closure regulations are absent. For example, in Indonesia, Brazil, South Africa and Namibia mine closure legislation is largely in its embryonic stage and a State's requirements must sometimes be negotiated before finalising the closure plans[1]. Such States are still finding their way in terms of requirements and procedures.

[1] The reason for these countries been highlighted is because the author has specifically worked in these countries. This does not preclude the fact that there may be other countries whose closure legislation is still largely embryonic or is yet to be developed.

5.1 Case Study Examples

The following case studies illustrate some specific examples of closure. Each case study focuses on a different set of issues, but some generic lessons can be extrapolated from them.

5.1.1 Indonesia

Kelian Equatorial Mining is a gold mine in a remote part of Indonesia. The mine was initially scheduled to close in 2004. Prior to closure, management established a formal consultative forum, Mine Closure Steering Committee (MCSC), which met on a quarterly basis for two consecutive years to weigh various closure options. The MCSC was a response to the dynamic social and institutional changes that swept across Indonesia in the late 1990s, when the fall of President Suharto triggered political reforms and increased regional autonomy.

The MCSC was made up of representatives of key stakeholder groups from central, regional and local government; local communities, traditional authorities and company representatives. The aim was to resolve key social and environmental issues through an agreed institutional framework using a manifestly accountable and transparent process.

Members were bound by a charter, jointly developed and agreed to by all representative stakeholders, aimed at facilitating responsible closure. The MCSC had four working groups, made up of representatives from the stakeholder groups. These working groups were technical groups, which, like the MCSC itself, met on a quarterly basis. Their task was to explore and then select the most viable closure option for consideration by the MCSC.

The key outcomes of this process were as follows:

- In the absence of official regulations, environmental and social standards for mine closure were agreed. Examples include: agreement on the post–closure water quality and discharge standards for dams, river and pit discharges; agreement on rehabilitation standards, performance indicators and monitoring criteria; agreement on social mitigation programmes and their relevant performance indicators.
- Confirmation that the Contract of Works has primacy over other agreements, as stipulated by Law No: 22/1999 on decentralisation and regional government. This is of special importance in the current Indonesian climate of decentralisation, where the newly formed regional government has challenged the validity of the mining agreements between companies and the central government.
- Identification of appropriate authorities and transitional provisions for company assets and community programmes, including the establishment of a community development foundation.
- Establishment of environmental trust funds for maintenance and contingency funds.

Key characteristics of the MCSC Charter:

- Clear objectives.
- Decision making rules based on consensus.
- Clear definition of criteria for options.
- Mechanisms for dispute resolution.
- Full transparency.

Lessons learnt:

- In the absence of clear regulations, a rules based forum, such as the MCSC, provides for post-closure standards supported by the government and the community.
- Accountability – Joint criteria agreed by the MCSC, prevent personal interests from superseding decisions taken.

- Responsibility – clear definition of roles and responsibilities to which members are held accountable.
- Transparency – transparent decisions reduce opportunities to rescind decisions.
- Legitimacy vs representation – although current community representatives may be legitimate they are not necessarily representative of the whole community.
- Resolution of issues requires commitment and resources.
- Use of independent mediators and facilitators is critical.
- Such a process is needed at the start of a mine.

The intensity of such a process depends on the complexity and history of the project. Kelian Equatorial Mining saw this forum as an investment for sustainable mine closure. As the Managing Director of Kelian, Charles Lenegan, said during the Business Partnership for Development review of this process:

> *We could have done it ourselves and we could have told people what we were doing, and we could have then tried to persuade them to buy in. We could have tried to do it bilaterally with our various stakeholders, but there is too much conflict and competition between the various stakeholders. The most important thing in what I've just described is the buy-in, and we would not have got it! So my conclusion would be that I don't think there was another way that it would work. The only way you get buy-in is to involve the people and you have to do it in a forum* (Hamann, 2002).

5.1.2 Brazil

Mineração Serra de Fortaleza was preparing to close ten years earlier than was originally intended[2]. From the beginning, the company adopted a policy that the primary benefit for the community would be employment creation. The main closure impact would be felt in the neighbouring town of Fortaleza. Thirty per cent of the economically active population of Fortaleza were employed by the mine either directly or through contracts. The closure was, therefore, going to affect employment, indirect income, and revenue to the local municipality from local taxes.

In order to reduce the impact on local incomes, the company helped to establish a collaborative economic and social development agency (ADESFORT) under a partnership mandate. A central feature of this agency is the mine's partnership with SEBRAE, a leading Brazilian development NGO. ADESFORT has 45 members, most of whom are drawn from the local area. SEBRAE has made a long term commitment to the partnership, to which it contributes both money and people.

The primary objectives of these partnerships are to catalyse opportunities for local businesses, strengthen existing non-mining economic activities, provide the local community with agriculture skills and training to develop the agriculture base of the local community in a profitable way. The overall aim is to enable the local community to manage the transition to closure.

Key factors that have contributed to the viability of the partnership:

- Company playing a lead role during the initial stages in driving the partnership.
- The company providing security to the partnership in its early stages, through substantial funding and by committing funding for a minimum of three years after closure. This encouraged SEBRAE and other players, such as a regional micro credit bank and a regional training institute, to contribute their services.
- By partnering with agencies with expertise in areas such as micro enterprise, agriculture training etc. the company could provide those skills and services, which it did not, itself, possess.

[2] In early January 2004 Rio Tinto announced that it had agreed to sell its 100% interest in the nickel mining company Mineração Serra de Fortaleza Ltda to Votorantim Metais, a Brazilian-controlled mining company. The case study discusses the closure planning process of MSF when the mine was still owned by Rio Tinto.

- By cementing a partnership with a large, well established national NGO (SEBRAE) and a regional micro credit bank, the company is building sustainable local capacity before phasing itself out.

Other external factors that have contributed to the feasibility of micro-enterprise activities and an economic diversification strategy include:

- The semi-industrial nature of the local region, which already possesses the necessary infrastructure, such as a good road network, electricity and telecommunications.
- The existence of experienced regional organisations and NGOs with the relevant expertise.

5.1.2.1 Lessons for Improvement

Developing alternative income generating activities, economic diversification and alternative employment opportunities began in 2003. This capacity takes time to develop and experience from other countries shows that sustainable results can only be expected within a ten year time frame. Therefore, in order to make a sustainable transition to closure, it is best that such work begins during the early stages of the mine's operations.

5.1.3 Namibia

Rossing Uranium Mining has been operating in Namibia for the past 27 years. It is a significant contributor to the Namibian economy, with Rossing currently accounting for 10.2% of Namibia's exports and 1.9% of GDP. The mine is currently investigating an expansion. If, however, expansion is not feasible, the mine will have to close within five years.

The Rossing mine is historically, politically and economically significant to the country. The average length of service of its employees is approximately fourteen years and many employees have spent their entire careers working for the mine. The transition to closure, both at an employee, local and national level, requires long term planning and ground tested measures.

The mine faces a number of closure challenges. What will become of the town, originally built by the company, but now under Government supervision? What is the best way to communicate with the various stakeholders?

In 1992 the management and ownership of the company town, Arandis, was transferred from the mine to the government. In 1994 Arandis was declared an independent town with an elected local authority and full time staff. Although the administration and the ownership of Arandis have been taken over by the government, the company recognised that it would need to work with the government and facilitate the building of sufficient economic and administrative capacity to ensure the sustainability of the town. The company has, therefore, made certain structural changes. These include giving the Rossing Foundation a more regional emphasis, with especial concern for the town of Arandis. Previously, the Rossing Foundation had a nation-wide focus.

The company developed a communication programme with stakeholders. An exhibition targeted three towns where the mine was perceived to have impacts. It spent three days in each town and 30 of Rossing's senior employees were available to talk to stakeholders.

The Rossing mine followed up all questions, either verbally or in writing. A professional communications company designed materials and literature for the communication programme, but the programme was wholly managed and delivered by the mine. While specific stakeholders were targeted and invited to the open house sessions, advertisements in the local newspapers invited all interested parties to attend.

Lessons learnt:

- Communication programme based on taking information out to stakeholders.
- Introducing possible closure as an alternative to expansion.
- Two way process – provided opportunity for comprehensive communication between external parties and company personnel.

- Provided opportunities for the less vocal.
- Helps to identify the 'right' stakeholder representatives to include in a more formal follow-on consultation process.
- Management recognising it cannot outsource communication.
- Open and transparent.

6 CONCLUSION

'It's not over when its over' – the title of a World Bank/International Finance Corporation paper on mine closure in many ways encapsulates the conundrum around mine closure, that closure is not an end result in itself (World Bank and International Finance Corporation 2002). Given the need for sustainability after mine production, many officials engaged in mine closure work have queried if 'closure' is the right word.

Stopping production and decommissioning the mine is often only a phase or a step in a closure process. The transitional arrangements for closure and post-closure monitoring and maintaining arrangements can, in certain cases, continue for many years. For example, the Flambeau mine in Wisconsin and the Ridgeway mine in North Carolina have respectively committed to 40 and 30 years of post-closure monitoring.

Richard Jackson, in his insightful introduction to the Mining Journal's publication of a World Bank and Metal Mining Agency of Japan's results of a workshop on mine closure, writes that:

> *'Fuller answers need to be found for a number of questions relating to post-closure monitoring including: What is the most appropriate strategy (and from whose viewpoint) for setting limits to a mining company's responsibility for post-closure impacts? Should this be tied, as some environmental rehabilitation bonds are, to activities undertaken during a mine's life? What agency should take over responsibility once the preceding time period had expired'* (Jackson, 2002).

Options and opportunities at closure can vary significantly. Some mining areas are urbanised, industrialised or semi-industrialised. Others are remote and under-developed areas, whose inhabitants have a subsistence economy. A post-closure plan must include a good land management plan. The criteria for subsequent land use needs to be agreed through consultation where communities are given the opportunity to express their views freely and at length. In the absence of government regulations, standards for closure must be agreed with relevant government agencies. Some general lessons for more effective closure planning are:

- Start mine closure planning as early as possible.
- Closure cannot be achieved by any single agency – define roles and responsibilities of all relevant agencies and institutions and have a strategy for remaining engaged with them.
- Consult with communities throughout mine life – different models for consultation depending on the site and issues. No one size fits all.
- Adapt measures that discourage dependency.
- Establish post-closure institutional arrangements as soon as possible - capacity takes many years to build.
- A good land management strategy must be included.
- State agency requirements need to be clarified.

REFERENCES

Biggs, B. (2000) Developing a national strategic framework on mine closure. In T. Khanna (ed) Mine closure and sustainable development: Results of the Workshop organised by the World Bank Group Mining Department and Metal Mining Association of Japan. Mining Journal Books Ltd, London, pp. 139-143.

Hamann, R. (2002) Tri-Sector Partnerships for Managing Social Issues in the Extractive Industries – Kelian Equatorial Mining, Indonesia – A partnership approach to closure – A case study, September 2002. Natural Resources Cluster, Business Partnership for Development, London, 36 p.

Jackson, R. (2000) Mine Closure: An Introduction. In T. Khanna (ed). Mine closure and sustainable development: Results of the Workshop organised by the World Bank Group Mining Department and Metal Mining Association of Japan. Mining Journal Books Ltd, London, pp. 3-13.

Mining, Minerals and Sustainable Development (2002) Breaking new ground. Earthscan Publications Ltd, London and Sterling, VA.

van Zyl, D., Sassoon, M., Fleury, A. and Kyeyune, S. (2002) Mining for the Future – Appendix B Mine Closure Working Paper. Mining, Metals and Sustainable Development.

World Bank and International Financial Corporation (2002) It's not over when it's over: Mine closure around the world. http:/www.worldbank.org/mining or http:/www.ifc.org/mining.