LONG-TERM LIABILITIES, FINANCIAL ASSURANCE AND POTENTIAL OPPORTUNITIES

Dirk J.A. van Zyl
Director, Mining Life-Cycle Center
Mackay School of Mines
University of Nevada, Reno
Reno, NV 89557
Tel (775) 784-7039
Fax (775) 784-1833
dvanzyl@mines.unr.edu

1. INTRODUCTION

Many mining districts have long histories of operating mines. When looking at these operations it is often difficult to conceive of the mining activities ever ending and the community having to rely on a different economic base. Furthermore, it is important to understand that the environmental changes brought by mining will have to be addressed to mitigate long-term impacts. This situation can be found all over the world and is not applicable to only developing or developed countries.

After closure of the mine there are often long-term environmental liabilities that remain. Governments, communities and mining companies are all concerned about these long-term liabilities associated with mine closure.

Liabilities associated with unplanned closures resulting from bankruptcies during operations are of concern to all the stakeholders. While financial assurance is in place in many countries to guard against this liability, the same approach is now also taken for post-closure liabilities, i.e. a part of the financial assurance in place during operations is maintained after closure to protect against long-term liabilities. Potential opportunities to limit these post-closure liabilities and simultaneously provide new economic opportunities for communities are being implemented by many mining companies and communities.

This paper presents the issues associated with mine closure liabilities and financial assurance, and also explores some of the potential opportunities explored and implemented by mining companies to reduce long-term liabilities. It also provides some insights in the lessons learned from these issues. An underlying assumption in all these matters is that the mining activity is economically viable and that there is a stable governance and regulatory regime.

In this presentation closure is defined as all the activities associated with the end of a mine life, including plant decommissioning, re-contouring and reclamation, and installation of treatment or other processes for long-term care.

2. CONVENTIONAL VIEW OF LONG-TERM LIABILITIES IN MINES

The long-term liabilities at mines following closure are conventionally viewed in environmental terms. The following is a useful classification of these environmental liabilities:

- Physical stability:
  - Potential failures of waste disposal facilities and open pit mines;
  - Long-term erosion of mine waste facilities;
- Chemical stability:
  - Poor quality leachate or run-off (acid drainage or other) from waste disposal facilities;
  - Mine pit water quality;
  - Poor quality in underground mines that drains from adits an/or impacts the regional groundwater quality;
- Land use
  - Long-term ownership and control of mined lands;
  - Safe access to mined lands; and,
  - Productivity of mined lands.

The conventional view of long-term liabilities at mines usually does not include the affected communities and their economic and other considerations. Many mining companies now realize that it is very important to give high priority to these issues.

3. CONVENTIONAL VIEW OF MINE CLOSURE PLANNING AND IMPLEMENTATION

The process for mine closure and financial assurance that is commonly followed for new mines is as follows:

- Closure plan is developed as part of the initial mine permitting process (it is assumed that the environmental impact assessment is part of this process);
- Establish a value for financial assurance based on this closure plan;
- Regularly update the closure plan and financial assurance during operations;
- Develop final closure plan at least two years before mine closure; and,
- Implement closure plan at the end of operations.

Similar approaches are followed to develop and implement closure plans for existing mines. However, not all countries have financial assurance regulations in place for ongoing operations at this time.

In this conventional view of mine closure the technical activities related to securing the physical and chemical stability of a site are the primary focus. The site is typically defined as the mine property (leased or owned) and the environmental decommissioning activities will rarely extend beyond the boundaries.

Many technological advances have been made to accomplish an environmentally sound closure. These include risk assessment methodologies, cap and cover technologies to limit infiltration and provide for a vegetative cover on waste facilities, treatment technologies for acid drainage and other poor quality leachate, etc.

These activities are very important to limit the long-term environmental liabilities associated with a mine site. However, they do not address all the considerations for sustainable development.

4. FINANCIAL ASSURANCE

Miller (1998) presents a comprehensive review of financial assurance in various regulatory regimes and the common instruments in use. He defines financial surety instruments as "guarantees issued by a bonding company, an insurance company, a bank, or another financial institution (the issuer is called the "surety") which agrees to hold itself liable for the acts or failures of a third party". It is indicated that: "today, the most common use of environmental surety instruments is to guarantee environmental performance after closure[1] (through the funding of mine site reclamation or rehabilitation)". It is recommended that the reader unfamiliar with financial surety issues and instruments carefully review the document by Miller (1998).

Based on the definition above, financial assurance will be defined for this paper as: an amount of money available to a government entity for reclamation of the mine in the case when the mine owner is not available to perform the work, (e.g. bankruptcy) during operations or any time during closure. The financial assurance can be provided by financial surety instruments or cash deposited in a bank. Miller (1998) presents a very thorough review of the different types of financial surety instrument, however, it is important to realize that the governmental policy and local financial markets may determine the type of instrument available for a specific location.

Another important concept is that of closure fund accruals by mining companies. It is common to base this accrual on a unit production basis, e.g. $ per ounce of gold produced. The total amount of the accrual is estimated from the environmental closure cost plus other liabilities at a specific mine, e.g. land holdings, personnel cost associated with the end of operations, etc. Financial auditors perform annual reviews to determine the adequacy of these closure funds.

Figure 1 provides a schematic summary of the relative amounts associated with financial assurance and closure cost accrual. Note the following:

- Conceptually financial assurance is in place during the total life of the mine and will only be released (in part or in total) after the regulatory agencies have established that reclamation has been completed to their satisfaction. It must be

[1] Note that Miller (1998) defines "closure" as the end of mining operations and not as broad as it has been defined above for this paper.

noted that the financial assurance may not be a fixed number but may vary as environmental issues develop at a mine;

- Closure cost accrual takes place over the life of the mine based on a planned mine life, this is also not necessarily a straight line function as shown on Figure 1; and,
- Financial assurance is not available to a mining operation to perform the reclamation work at the end of the mine life. It may be released shortly after the work has been done but the mining company must be a going concern in order to perform or contract some entity to perform the required activities.

5. MINING FINANCIAL RISK MODEL

A mining financial risk model is introduced next to explore the potential opportunities for interactions that can impact the financial commitments of a mining operation. Different instruments and approaches cover the potential economic liabilities at mining operations. This can be illustrated by the schematic in Figure 2. The "probability of occurrence" of an event is plotted against the cost ($). A number of regions on this plot can be identified:

- Low probability of occurrence, high cost events, e.g. failures of tailings containment or other facilities. These costs are typically covered by insurance policies that the mining operation has in place;
- Reclamation cost. This is estimated from the closure plan and is typically covered by the financial assurance; it can be assumed that the probability of this event is unity as this amount of money will be expended at the end of the operations;
- Actual closure cost. This is the actual cost of closure to the company including the reclamation cost, personnel related issues, etc. and is higher than only the environmental reclamation cost; and,
- Remaining risk. This is the cost not covered by insurance, financial assurance or closure fund accruals. These may not be high-risk events and may be related to smaller spills and other events of environmental consequence off-site during operations. In this range the mining operation is essentially "self-insured", i.e. it can clean up the smaller spills and other occurrences. It is important to note that the magnitude of the remaining cost for such events is determined by the mine's social license to operate. The trust that the communities (including the local, regional and regulatory communities) have in the operation (and often in the mining industry) is reflected by this amount. In the case of low societal trust it is possible that the financial assurance amount will be established so high that it exceeds the actual closure cost and therefore effectively reduces the perceived remaining risk of the operation.

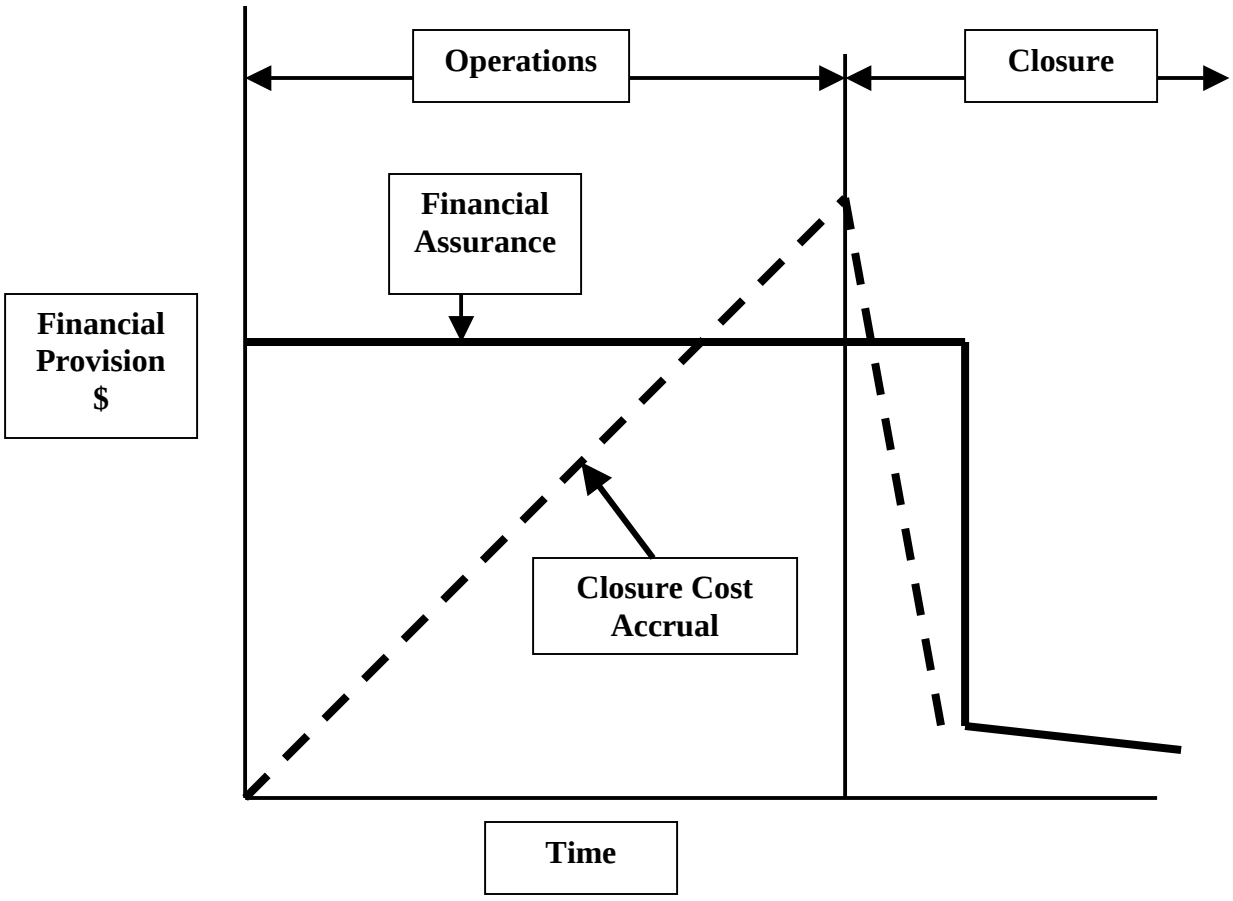

Figure 1. Schematic of Financial Assurance and Closure Cost Accrual

This financial risk model indicates that there are opportunities to work with the local, regional, regulatory and other communities to establish trust during operations that will be reflected in reduced long-term costs at the time of, and following, closure**.**

6. TOWARDS A MORE COMPREHENSIVE VIEW OF MINE CLOSURE

In order to move beyond the conventional view of mine closure and thereby create the atmosphere for potential opportunities, a number of activities or "attitudes" are required:

- Similar to mine development, closure is a dynamic process. Technical decisions, community involvement and financial realities change all the time. It is therefore important to maintain flexibility in the development of closure concepts and their implementation;
- Mine closure reaches beyond the fence and the gate of a mine. It should include the issues of the greater community, such as land use zoning and planning, and the longer-term view of the community's plans and hopes for the future. It should consider local and regional issues;
- Closure goes beyond moving dirt and planting grass. It may include long-term water treatment and other ongoing activities; and,
- The community must be engaged in the planning and business of the mine before and during operations to provide meaningful contribution to closure planning and implementation.

It is important to develop a holistic view of mine closure for each site taking into account the environmental/technical issues, the economic conditions and the community (local and regional) issues. In short it has to contribute to sustainable development. In the light of this, it is clear that mine closure announcements with immediate affect are very destructive and do not help the community towards a sustainable economic future. A longer time frame is required to include the community's economic needs and aspirations in the closure planning of a mine.

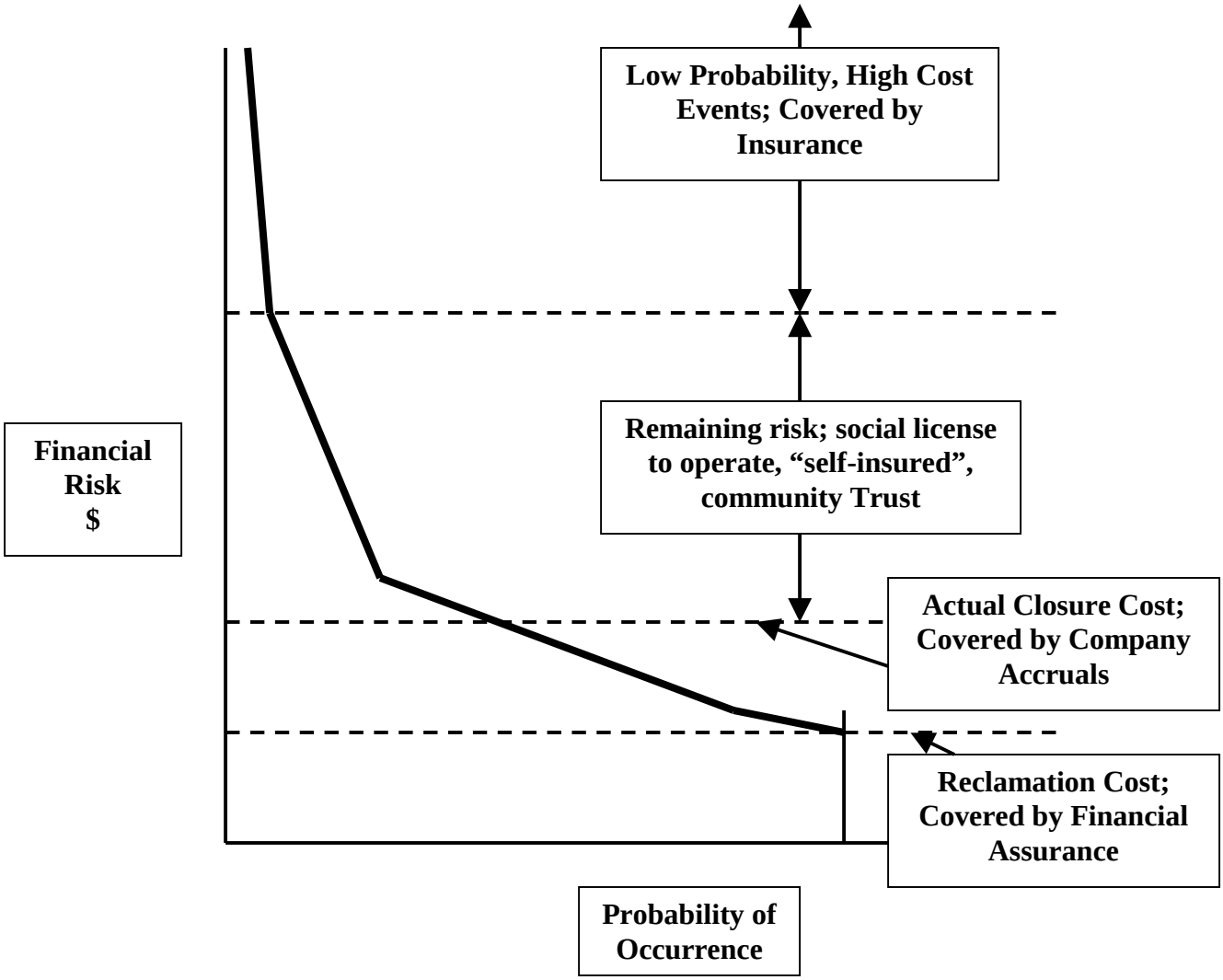

Figure 2. Mining Financial Risk Model

7. IMPORTANT LESSONS FROM THE US

There is a major concern that the present move in the US is towards closing mines instead of opening new mines and thereby creating new opportunities. The mining industry may be facing a decline in the number and scale of operations. While the reasons for this are very complex and cannot be assigned to one specific issue, there are important lessons to learn from this experience.

In many countries in Africa, South America and other parts of the world, mining industries are being developed for the first time. Mining companies and communities have a great opportunity to work together in these countries to develop a more open and positive view of mining and its contribution towards sustainable development.

Some of the lessons that can be learned from the US include:

- Regulatory flexibility is important to allow community involvement. The US regulatory process is prescriptive and very restrictive. A restrictive regulatory regime does not allow for community involvement without causing regulatory and other stresses;
- Public hearings associated with the regulatory process (e.g. Environmental Impact Statements) do not lead to successful public and community involvement in projects;
- Potential environmental liabilities resulting from Superfund and other punitive legislation do not establish an open atmosphere for discussion and problem solving; and,
- The industry has had opportunities over the last three decades to act and take leadership in being transparent in its actions and to work closely with local and regional communities, but has not always chosen to do so.

It is the author's opinion that countries are ill advised to adopt US regulatory regimes without considering the important cultural and other limitations associated with them.

8. POTENTIAL OPPORTUNITIES

The mining industry and communities around the world are learning new approaches to mine closure that provide opportunities for everyone concerned. Communities may have long-term economic benefits while the overall closure cost to mining companies may be less, or at least, better spent. Some of potential opportunities with mine closure, both in planning and implementation, include:

- In the design of new mines, involve architects and land use planners so that the facilities could be of significant use to the community following closure, if the community has an interest in the future use of the facilities;

- Develop related industries, if possible, to contribute to long-term economic development of the region, e.g. help develop limestone deposits and processing facilities that can supply lime during the mining operations and for other economic purposes after closure;
- Long-term water treatment at a site. Do not discharge the treated water into the streams if the local communities can use it for other purposes. The treated water is often the cleanest water in the area. The communities can also run these treatment plants as entrepreneurial activities after the mine is closed;
- Incorporate members of the community in the management team of the mine to be part of the closure planning. They will be familiar with the facilities and can then take over the operations and maintenance of any permanent facilities at the mine following closure; and,
- Partnering with the community. Provide capital for business start-ups and commercial development and work with the communities to make these economically viable endeavors. The community can then purchase the ownership part held by the mining company.

It is important that everybody practices patience in the process of finding the best approach to a holistic closure at a site. While it may be possible for a mining operation (or its consultant) to develop a mine closure plan in a short period of time, it takes a long time to develop a closure plan with meaningful participation of the community. In most cases the closure plan can only be successful if the community participates. This is another case where patience is truly a virtue.

9. EXAMPLES

There are many examples of alternative mine closure approaches that are being developed or implemented in many parts of the world. This section describes a few examples.

Refugio

Kinross Gold operates the Refugio Mine in the Andes in Northern Chile. In developing their closure plans it became clear that the military would be very interested in the mine facilities for a long-term base in this remote part of Chile. In addition, further discussions with the authorities led to the plans to establish a wild life refuge in the area.

Pierina

Minera Barrick Misquichilca´s (MBM) Pierina mine is located in Northern Central Peru and surrounded by 11 different communities, some with individual property title but the majority being cooperatives. There are formal social development agreements with either a community or an agricultural cooperative.

Community development projects are being implemented during operations to allow ongoing community involvement. It is expected that this will be very important in planning for closure and the long-term sustainable development of the area.

Community social development began with a needs analysis performed by an NGO (PRISMA). This resulted in June 1999 in a workshop on Health and Hygiene run by the Ministry of Health and one on Education run by the Ministry of Education. At this time, a recommendation was made for MBM to carry out both social and economic development studies. The social development study was presented in June 2000 and three reports on potential agricultural and livestock economic development were received in July 2000.

It was recommended that social development should focus on 3 areas:

- Health;
- Hygiene; and,
- Education.

Economic development is possible by commercialization of:

- Selling surplus resulting from improvements in yield from better quality seed (seed potatoes) or stock (pigs, cuy);
- Products from the high Andes in new markets (maca); and,
- Selling simple furniture or forged work.

To date, since construction began in 1997, MBM has carried out 109 projects in 11 communities. Some of these were carried out as mitigation of erosion damage caused during construction and early operations. In projects requiring specific experience and expertise in social or economic development MBM has been assisted by technical specialists from the NGO´s, Cordillera Negra & PRISMA.

Social development projects completed include:

- Improvement in potable water supply;
- Provision of toilet facilities;
- Construction of laundry facilities;
- Donation of school supplies; and,
- Donation of materials for improvements in school or community facilities.

Economic development projects completed include:

- Construction of piggery and donation of stock;
- Donation of “yangay” seed potatoes;
- Construction of cuy breeding facilities; and,

- Training in “maca” cultivation; Maca is a traditional Andean plant noted for improving fertility in humans and animals.

A plan for the remaining mine production years 2001-2008 is being drawn up for confirmation with the Ministry of Energy and Mines of Peru in December 2000 that includes refinements to the social development plan. These community projects are extremely important in empowering the communities in their decision making towards sustainable development. It is expected that these efforts will all contribute significantly at the time of mine closure.

10. CONCLUSIONS

Conventional mine closure planning emphasizes environmental issues such as reclamation and pollution control. Community involvement has typically not been a major part of mine closure. There are clear economic reasons to involve the communities in the planning and development of a mine as well as the planning for closure. This is where the real opportunities exist for reducing the long-term liabilities associated with mine closure.

ACKNOWLEDGMENTS

The author expresses his appreciation to Barrick Gold Corporation for the support in preparing and presenting this paper.

11. REFERENCES

Miller, C. G. (1998) Use of Financial Surety for Environmental Purposes, ICME Limited Edition Publications (available from www.icme.com), 54 pp.