



Bankers' perspective of mining project finance

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Synopsis

Since the dismal performance of the Rand Mines management was called to account by its shareholders in 1994, the waves of change have continued to ripple across the South African mining industry. The number of listings on the gold board of the Johannesburg Stock Exchange, that once numbered 40 or 50-odd, have now dwindled to no more than a handful as unprecedented restructuring has taken place. The redefining of the industry has not been limited to the gold sector, but across the base metal, coal, diamond, platinum and industrial mineral sectors as well.

At the same time the Mining Houses began to reconsider their funding strategies. Originally established in the early part of the century to ensure the long-term sustainability of their group mining operations by providing substantial financial muscle and technical support, the Mining Houses were faced with a rapidly changing political environment, which proved to be a critical catalyst in giving momentum to the change. Furthermore, the significant development costs and increasing risk profile for new projects, coupled with pressure from shareholders demanding respectable returns, opened the door to opportunities for banks to begin providing external debt by the way of project finance. However, the provision of long-term debt to the South African mining industry had generally not been common since mining companies had financed new projects with equity, or with the cash flows from existing operations.

Those banks that had the appetite for exposure to the perceived high risks of the mining sector rapidly built up specialist resource banking divisions capable of addressing the increasing demands of the industry. The application of project finance, the principles of which were developed in the 1970s specifically for infrastructure projects and privatization, is now commonly applied in the financing of greenfield and brownfield mining projects.

This paper outlines the approach that lending banks would typically adopt when arranging or providing mining project finance, their usual areas of concern and the way in which the finance is structured to mitigate the many inherent risks.

Introduction

For more than a century the South African minerals industry, supported to a large extent by gold, diamonds, platinum and coal mining, has made an important contribution to the national economy. Furthermore, it has provided the impetus for the development of an extensive and efficient physical infrastructure and has also contributed to the

establishment of the country's secondary industries. The mining industry is a well-established and resourceful sector of the economy and has a high degree of technical expertise, and the ability to mobilize capital for new development.

Notwithstanding this, lending to the industry has historically been viewed as a risky activity, and consequently the domestic banks generally restricted lending to short-term facilities only. Although changes in the industry started before 1994, the country's first democratic elections heralded the acceleration of the most far-reaching restructuring of the industry since it was established in the 1800s. Other factors that contributed to the change included declining productivity, profitability and resources depletion, particularly gold, which in turn encouraged many companies to look outside of South Africa for low cost mineral reserves and growth opportunities.

The period since 1994 has also seen the emergence of a strong junior mining sector that has been assisted by the slow, but gradual slackening of the tight hold over mineral rights by the majors. These smaller companies in particular need support from the investment community, but have different financing requirements and business circumstances to those of the larger companies. Another important development has been the focus on downstream mineral beneficiation where significant value-added improvements to raw materials have provided additional benefits to the economy.

In line with the restructuring of the industry has come the change in the financing strategies adopted by the mining companies. The all-exclusive equity funding approach has given way to an increasing emphasis on the

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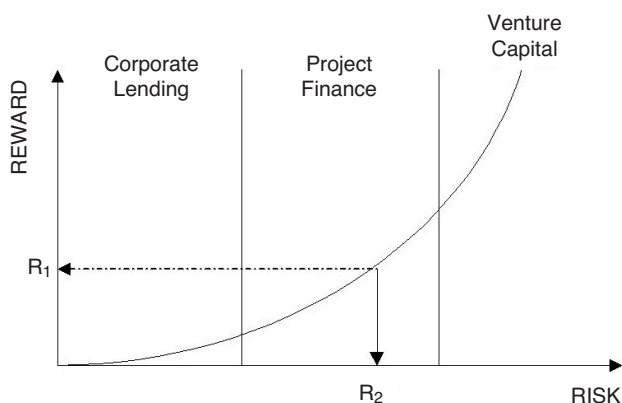
maximization of debt funding. The magnitude of the capex requirements for the development of new mines are substantial, to the extent that even the majors now seek to raise project finance rather than use the cash flows from existing operations. The maximization of external debt has a two-fold benefit in that the project sponsors free-up cash resources for use on alternative investments, and secondly the effect of gearing provides improved shareholder returns.

From an external perspective the demand from investment markets looking to place equity into robust projects has been instrumental in fuelling the growth in the junior and mid-size sector, whilst the increasing availability of debt has become more and more attractive to the majors seeking to share risk. Apart from vanilla loans and non- (or limited) recourse project finance, there has been an exponential development in the utilization of derivative-based financing in the gold industry. Derivatives range from common gold loans, put and call options and simple forward sales, to complex exotic options such as caps and collars, knock-ins and knock-outs, etc.

To stay abreast of the changing demands of the markets, South Africa's domestic banks have had to develop in-house capabilities in order to address the requirements of the mining industry. At the beginning of the decade it was unlikely that any local bank had the means to assess mining projects and hence structure non-recourse project finance, taking into account the inherent risk profile of a typical mining operation. In contrast, all the major banks now have the capability in some form or other, and some even have the ability to compete favourably with major foreign banks that participate in the resource banking business.

Types of finance

The availability of finance for mining projects is generally dependent on the economic robustness of a project, the requirements of the sponsor and the overall risk profile of the individual project or corporate entity. The finance will be classified either as a Corporate Loan, Project Finance or Venture Capital; and is characterized by the risk-reward relationship as indicated in Figure 1 below.



R_1 : The limit beyond which increased returns do not compensate for the risk assumed by the lenders of debt
 R_2 : Maximum risk appetite acceptable to lenders

Figure 1—Categories of finance in the Risk-Reward relationship

A normal corporate loan is provided with full recourse against a project sponsor's balance sheet. In other words, the specific project is not 'ring-fenced' from the rest of the company so in the event that the project is not financially successful, the lenders will have the right to recover funds from the company as a whole. The credit approval for funding of the nature is generally easier to secure for companies that have strong balance sheets (and are not highly geared), since they tend to be bigger companies with greater diversity because of their exposure to multiple commodities over a number of different operations in different locations. Multiple revenue streams provide companies with an inherent barrier against economic pressures since exposure to more than one commodity helps in smoothing the revenues that individually are notoriously volatile, because of the cyclical nature of most commodity markets.

Venture capital is really the domain of shareholders equity and very few lenders are willing to consider providing funding for projects that fall into this category. This is often because the risks are too high for banks to only earn a 'debt return' and that such risks need to be borne by shareholders who stand to gain in any upside potential.

Project finance has rapidly become the most important form of funding for sponsors of mining projects, and funding packages are normally uniquely structured to suit the particular characteristics of a specific project.

Project finance is a funding mechanism that relies on a future stream of cash flow from a project as the main source of repayment, and uses the project's assets, contracts, rights and interests as security for the loan. Project finance loans are not reflected on a company's balance sheet, and since these projects are normally isolated or 'ring-fenced' from the ongoing business of the sponsors, they usually do not impinge on the organization's debt capacity.

In order to determine the certainty of the project cash flows, a detailed due diligence exercise must be undertaken to identify the risks that could potentially impact on the robustness of these cash flows. One of the main attractions of project finance is the ability to allocate the risks to the project participants (lender, contractor, technology providers, etc.) to avoid the sponsor sitting with all of these problems.

Securing credit approval for this type of loan is considerably more difficult. The credit process is more complex because of the necessity of taking every risk issue and mitigating all of them satisfactorily. The understanding and allocation of risk is one of the underlying fundamentals in project finance and is one of the main reasons why the process is time consuming and arduous.

The involvement of specialist consultants, legal advisors and other professional experts along with the significant amount of investigative work required, and risk that is assumed by the banks, are the main reasons why project finance is more expensive than a corporate loan.

The mine development cycle

The ability of a mining project to attract finance is often dependent on where it lies in the development cycle. The closer it is to the exploration stage the more likely it is that it will have to be funded with equity—the likelihood of it

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securing debt will increase the further it moves through the cycle towards development. Table 1 below summarizes the typical methods of financing mining projects at the various phases of development from early exploration to project completion when it is deemed by the bankers to be technically complete.

Clearly equity is the common capital basis of projects regardless of how advanced they might be—even the most economically robust projects will never be fully funded with debt finance. In fact, the majority of projects will have a debt:equity ratio in the range of 30:70 to 60:40. Equity is usually sourced from private investors or through stock exchange listings and rights issues, or generated within the business.

Venture capital is essentially equity that is provided in the form of a speculative investment. It is not normally intended to be permanent capital but injected into a company for a definitive period during which the investor would be looking for a substantial move in the share price before exiting the investment.

Quasi-equity is debt that is structured in such a way that it appears to be equity, and usually takes the form of convertible debt that can be converted to ordinary equity should its value increase due to movements in the share price. Quasi-equity is normally subordinated to senior debt (in return for the option of converting it into equity), and has the effect of reducing the level of gearing as it is reflected as equity.

The risk profile of a potential project is at its peak in the early stages and decreases with progression through the development phases. The risks at the early stages, usually up to the point where a pre-feasibility study ('PFS') has been completed, are normally beyond what typical commercial banks would be willing to expose themselves to. Selected banks however, have the appetite for this level of risk and where the PFS indicates a very strong project, they are prepared to provide funding for completion of the Bankable Feasibility Study ('BFS'). This is normally with the intention of securing the right to arrange the finance for the development of the project.

Development phase	Type of funding	Source of funding
Prospecting	Equity	Shareholders
Initial Exploration	Equity	Shareholders
Advanced Exploration	Equity/ Venture Capital	Shareholders Specialized Resource Funds
Pre-Feasibility Study	Equity/ Venture Capital/ Quasi-Equity	Shareholders, Specialized Resource Funds, Selected Banks
Bankable Feasibility Study	Equity/ Quasi-Equity/ debt (with recourse)	Shareholders, Selected Banks, Commercial Banks
Construction	Equity/debt (limited recourse)	Shareholders, Selected Banks
Post-Commissioning (completion)	Equity/debt (non-recourse)	Shareholders, Selected Banks

Most commercial banks seldom consider providing mining project finance until a BFS has been completed and audited by independent technical experts. At this point banks generally provide finance in the way of corporate loans (full recourse) or project finance (limited or non-recourse). Factors that determine whether loans are structured with or without recourse are discussed in the section on Financial Structuring.

The bankable feasibility study

The main focus of attention of potential providers of finance to a project is undoubtedly on the BFS. This substantial document represents the data and facts gathered during the exhaustive investigations into the viability of a project, often conducted over many years, and can be defined as follows:

'It is a detailed presentation of the technical, financial and legal aspects of a viable project, on which the Bank will perform its due diligence exercise.'

Such a document is considered 'bankable' when the content is sufficiently detailed and supported by underlying data so as to enable a potential lender to make a judgement on whether or not it would consider providing finance based on the risk-reward relationship. It follows therefore that a completed BFS will not necessarily achieve the objective of securing the full funding required to develop a project.

The purpose of any lenders' due diligence exercise can be broadly categorized under the following:

- To identify and mitigate the risks
- To develop the appropriate funding and legal structure, and
- To determine the risk-reward relationship in order to correctly price the debt.

Although projects by their very nature have their own uniqueness, the content and format of a BFS is generally much the same—and so too is the process of due diligence by a bank. Each element of the project must be investigated in detail to identify areas of risk against which they will then apply a rigorous scenario analysis. From the investors' point of view, be they equity participants or providers of debt, the major risk issues fall into the following groupings:

- Orebody risk
- Technology risk
- Operational risk
- Market risk
- Infrastructure risk
- Political risk
- Construction risk
- Environmental risk.

Banker's approach to risk mitigation

Orebody risks

Without doubt this is the single most important characteristic of any resource project and is often an area where insufficient investigation is carried out by potential lenders. In almost all projects that progress to operating mines the final economics of the orebody that materialize are seldom in line with those anticipated in the BFS. Sometimes they are

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better, but more often than not they fail to meet expectations. The over-valuation of the orebody is the single most common cause for the failure, or under performance of a mining project.

The orebody is the only real asset in a mining project and the only one that will generate revenue. If this asset fails to live up to its expected potential there is a danger that neither the lenders will be repaid nor the shareholders will receive an adequate return. It is for this reason that few banks will have the appetite to become involved in projects which are not financially robust under a stiff sensitivity analysis.

From a bankers' perspective the risk of a mis-interpreted orebody is of major concern—this emanates from the fact that every single mineral deposit is unique, and although may be quite similar, always have their own particular subtleties. The geological model of the orebody and the classification and quantum of the various reserves, the metallurgical properties and physical structure are all aspects that will be intensely scrutinized.

To gain comfort potential lenders will want to see that extensive exploration programmes have been undertaken and the results have been vetted by appropriate independent parties, and finally that they have been audited by credible consulting engineers. Furthermore, banks like to see orebodies that have inherent uniformity rather than those with widely swinging variations in grade and value, and projects that have at least some previous known exploitation—this as an extreme would be the development of a mine contiguous to an existing operation or on an analogous deposit.

As an added level of comfort, banks often place an emphasis on project sponsors that have a proven track record in operating and managing mines that are similar to one under consideration. This is mainly because the experience gained previously is usually of benefit when problems arise in the future, and they do! The track record of a project sponsor may be the difference between a successful and unsuccessful finance raising exercise.

Technology risks

The scope of technology risk can be extremely wide, but generally will fall into three categories; beneficiation, mining risk and equipment selection.

Beneficiation risk is without doubt the highest risk element in mining projects after those factors related to the mineral reserves. The banks are typically looking for proven technology as a means of satisfying themselves that recovery and cost efficiencies will materialize. The use of an existing technology, but through a new application, is normally acceptable provided that sufficient testwork has given positive results. Lenders will often have a better attitude towards projects that incorporate simple cold hydrometallurgical processes than they will towards projects with complex, high temperature, pyrometallurgical processes. Regardless of the processes employed, lenders will typically seek to shift the risk away from themselves or the project sponsors by securing Process Guarantees from the providers of a particular technology. This will ensure that should the process not initially produce the expected results, the technology provider will be 'locked-in' until such time as the problems have been overcome, at their own expense rather

than at that of the lenders' or project sponsor. Another approach to mitigate against technology risk is to increase the severity of the completion tests. Again it will keep the onus on the technology provider to ensure that expected results are achieved before the lenders will release them from any obligations.

Another area of risk related to technology is the impact that new technology will have on a project once it is completed and has been operating for a number of years. Invariably new technology will provide cost-saving benefits which means that new projects that are developed will come into production lower down the cost curve. Although the cost structure of the existing project does not change it effectively moves up the cost curve by virtue of the new project being positioned further down the curve.

Banks will want to get a sense of how long a particular technology lifecycle is likely to be to have some comfort that a project will not suddenly become an uncompetitive white elephant one or two years after completion. This is why banks are always stressing the desire to see projects that are low-cost producers, so they have the ability to remain competitive as newer and more efficient projects come on-stream.

Mining risk generally centres around the selection of appropriate mining methods relative to the characteristics of a particular orebody, whether it be an open pit mine or a deep level gold mine. Once a new operation has been started up it is often very difficult and costly to change methods, layouts and designs if things go wrong. By way of an example, consider the implications of a mine designed around a block caving method which fails to cave. Significant upfront costs would have been spent in the pre-development and preparation of the cave, which would be offset against the low future mining costs once the cave had been initiated. Unless it was a particularly high grade orebody, it would probably not be viable to sink additional investment in order to switch to another mining method, once it is realized that a cave is not going to be successful.

During the due diligence exercise banks will identify mining related risks that are of concern and investigate them to the extent that they become satisfied that they pose no serious risk. Outside specialist consultants may be called upon to give an independent opinion if it assists in giving the banks a greater degree of comfort.

With regard to equipment selection, this is often an area of risk that can be under-estimated by potential lenders. The selection of appropriate equipment for specific applications has a number of important implications in all areas of a mining operation. Lenders would like to see the use of equipment that has a proven track record, and provided by suppliers that offer good technical support and reliable after-sales service. This is particularly critical for projects that have isolated locations and may be seriously affected when, for example, they are waiting for spare parts or a technician to come from the other side of the world. Simplicity, reliability and a good measure of equipment commonality are the key issues which become more important with increasing remoteness.

Operational risk

Any projects, be they mining or not, will have some degree of operational risk that will vary according to the influence of a

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wide range of factors, that may be internal or external to the project. Examples would be general operational difficulties or poor management (internal) to inflation and commodity price fluctuations (external). Operational risk is at a peak when a project is at an early stage and invariably suffers from 'teething problems' as it goes through the ramp-up phase to full capacity. Projects are particularly vulnerable at this stage as the debt burden is at a maximum and delays in production build-up will affect cash flows to the extent that it can very quickly put a project in jeopardy. Banks will look to the project sponsor to ensure that this demanding period is bridged by providing financial support if necessary. This in essence is the major reason why bankers have more comfort in dealing with sponsors that have substantial financial muscle or sponsors that have provided a significant portion of equity into a new project. In this situation it is unlikely that they will let their investments be liquidated or be taken over by the lenders, and would rather inject additional capital to get the project through the start-up phase. The problem with smaller companies is that they often do not have the resources to call upon when faced with this situation and will end up losing their project to the banks, or predators, or the sponsor company itself will end up bankrupt trying to save the project. The banks are loathe to sink additional funding into projects at the start-up phase, which may sometimes be their only avenue to recovering what they have already sunk in. Detailed financial and scenario analyses are conducted to test the robustness of a project to avoid getting involved in those that may be prone to start-up problems. Factors such as increasing inflation, falling commodity prices and fluctuating exchange rates are some of the many that will be tested in the analyses.

Correct financial structuring is an important aspect in mitigating against start-up risk. Banks invariably want to see stand-by facilities that can be drawn on for cost overruns or unexpected operational difficulties during the commissioning and ramp-up phase.

Issues such as poor management can be avoided by ensuring that key staff appointed to a project have the appropriate backgrounds and experience. The project sponsor itself should ideally be a company that has a proven track record or has the necessary resource base to call upon should management or strategic changes be required. The quality of the management or operator of a project is critical to the lenders as even the most profitable operations can be derailed by poor management and control.

Unexpected events, such as a furnace burning through or major equipment failure, must be covered by appropriate insurance protection. It is normally a requirement by any bank that specific insurance cover is maintained during the period that any debt is outstanding—events of *force majeure* are also taken into consideration.

Market risk

Market risk in a broad sense is the potential risk of a project failing to sell its commodities into the market, at the actual prices that are forecasted in the budget. Every commodity has unique market dynamics that are influenced by supply and demand forces, price volatility, announcements of new capacity coming on-stream, or capacity being taken off-stream and so on. In some markets these dynamics are fairly

simple, such as in coal, but others are extremely complex as has been experienced in recent times in the cobalt market.

Market cyclicity is a major concern to most banks and the development timing of new projects is often critical, such that they ideally need to come into production when market fundamentals are strong. This will ensure that good commodity prices should be achieved resulting in early cash flows being robust and sustainable over the start-up period. The exact opposite is true of projects that are commissioned at a cyclic low; cashflows are weak because of low commodity prices and coupled with start-up problems can result in early project failure, especially if there is questionable financial support from the sponsor.

The requirements by bankers to mitigate these risks are fairly common practice, particularly for projects that produce commodities that can be forward sold a number of years into the future—gold being the obvious example. Long-term offtake contracts and purpose designed hedging programmes are almost mandatory requirements for project finance. Substantial offtake contracts ensure that the majority of a project's production has a locked-in buyer, and the hedging contracts will provide certainty in the revenue stream. For commodities that have no forward, or limited forward markets, the volume of guaranteed offtake becomes more important. Since fixed prices will not be acceptable to the offtaker in these markets, the prices normally float relative to a benchmark, such as the relevant London Metals Exchange price. Regardless of this, projects that have costs that fall in the lower end of the industry cost curve will have a better chance of success in raising development capital. The theoretical 'cushion' afforded by being a low cost producer is vital when the markets are tough, which will knock out the high cost producers long before the low cost producers run into financial difficulties.

Many commodities markets are based on US dollar denominated pricing mechanisms, and currency risk management may be an additional area of risk. In South Africa, where the rand/dollar exchange rate is on a continuously weakening trend, local mineral producers have a natural hedge for dollar priced commodities, especially where working costs are all based on local currency. In countries where this is not the case, the risk of currency exposure needs to be carefully considered.

Other risks which are difficult to anticipate or quantify in terms of the future impact on a project, include those such as the development of new technology or substitute products. New technology may allow new entrants or other existing operations to reduce costs significantly and hence move down the cost curve. Again, as previously discussed, this has the relative effect of moving other projects up the cost curve, without their unit costs actually having increased.

Infrastructure risk

The issue of infrastructure risk is of particular importance to projects that are remotely located, or situated in countries with poorly developed infrastructure in general. Many African countries suffer from this problem. The lack of reliable infrastructure can impact on a project on two fronts; the reliable delivery of water and power suppliers can result in major operational disruptions or the lack of maintenance on road and rail links, harbour facilities and communication

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networks can cause major delays in the timeous delivery of products, that in turn affect a project's cash flow. This is of great concern in projects that produce bulk commodities rather than those that do not.

Banks therefore will have a greater appetite for financing low volume, high value, commodity projects (gold, diamonds, etc.) rather than high volume, low value, commodity projects such as iron ore and coal. Bankers, where necessary, will want to see a detailed assessment of the basic infrastructure identifying a number of alternative routes for the transport of supplies to the mine site, and transport of the production out to the market or harbours. Logistical problems are often a stumbling block in many African countries.

Political or sovereign risk

This again is particular to certain geographic areas, and in Africa, projects almost without exception, will only be financeable in countries in which political risk insurance is available. Even in countries where cover is available there is no guarantee that finance will be forthcoming. Many events or acts can clearly be identified as political interference and hence are insurable. However, there are many others that are essentially economic factors that impact negatively on projects that although have been precipitated by political acts, are insurable under a typical political risk insurance policy. As an example, a significant increase in the government import tariff on fuel may push a project into a loss-making operation—if it closes down it would be deemed to have failed for economic reasons, even though the situation was brought about by an act of government.

With legal frameworks and legislation differing from country to country it is normal for lenders to make use of legal specialists to ensure that loan documentation is drafted so that it will have the necessary force and effect for the specific country. Normally a legal practice in the project country is used to assist in the clarification of legal issues or ensuring that documentation fits within the law.

Listed below are some of the more common forms of political risk.

- ▶ Nationalization: ownership of project assets transfer to the state, with or without market related compensation; *insurable*
- ▶ Expropriation: project assets are taken away from the owners, normally without compensation; *insurable*
- ▶ Profit repatriation: profits are held back by a foreign government and thus preventing them from being repatriated to the owner's native land; *insurable*
- ▶ Lack of forex: US dollar proceeds (or other hard currency) due to project owners are not available for repatriation; *insurable* even though it may be an economic problem
- ▶ Security of tenure: mineral rights or titles are summarily revoked or terminated without due cause; *insurable*
- ▶ Changes in legislation: can range from changes in mining or tax law to changes in fiscal policy; *may be insurable* under certain circumstances
- ▶ Changes in economic environment: may vary widely from devaluation of currency, to increase in tax rates, royalties, etc. which are normally applicable to a whole country and not focused on specific industries or

particular projects; *not insurable*.

Apart from securing general political risk insurance ('PRI') there are other specific mechanisms that can be put into place that will help reduce the impact of political risk. Virtually all minerals produced in African countries (except SA) are exported and are paid for in hard currency. Lenders to projects will typically set up offshore accounts that will receive the proceeds of the sales from where debt repayments are serviced before any revenue flows back into the host country. This will circumvent the problem of lack of foreign currency or the government blocking the outflow of funds.

Lenders will gain a substantial level of comfort if institutions such as the World Bank or multilateral agencies are involved in the funding of a project. Since these agencies are very powerful in their own right, they are often the main source of aid funds in poor countries which are also those that are politically unstable. It would be foolish of a host government to prevent payments to the project lenders especially if one of them is the World Bank—the implications of this are obvious.

Construction risk

The major concern for banks in relation to construction is the potential for cost overruns. Statistics vary, but a commonly quoted figure indicates that fewer than 20% of all projects are completed within budget and on time. The reasons for the over expenditure are too numerous to list but more often than not result from under estimating costs, delays in construction and start-up problems. Despite extensive testwork and design, it is often only during the construction and ramp-up phases that serious operating and technical problems emerge. If these issues cannot be resolved rapidly, the cost overrun and higher than expected operating costs will put an immediate financial strain on the project, to the extent that premature abandonment can occur.

Given the severity of these possibilities lenders will normally require a completion guarantee from the project sponsors that will effectively guarantee the obligations of the project until it has reached completion. The definition of 'completion' will vary significantly depending on the complexity of the project, but will often be set against designed production rates, levels of recovery, product quality and operating costs. Typically, lenders will want to see these operating parameters achieved continuously over a period of time, say one to three months.

Another important aspect essential to ensure that bank finance will be available is the selection of reputable contractors. The capability and experience of the contractors are critical in the delivering of the project on time and within budget, and that its operating performance targets are achieved. Bankers like to see a lump sum, fixed time contract, so that the contractors will have to bear cost overruns. However, the extent of a contractor's liabilities is normally restricted to liquidated damages which are capped, and therefore realistically do not offer project sponsors and lenders' a great degree of comfort. With large projects typically being more complex they are seldom developed on a lump sum basis and are normally done on a turnkey or EPCM contract. In any event, the sponsor's guarantee is normally the means of ensuring that sufficient additional capital will be available to cover overruns.

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Banks will want an early warning if a cost overrun is likely to materialize, and therefore have drawdown covenants on any facilities. These typically will prevent drawdown should expenditure at each stage not be matched by construction progress, according to the development programme. This is discussed in more detail under the section on Financial Structuring-Construction.

Environmental risk

There is often a misconception that environmental issues are only related to surface damage caused by mining operations, such as water pollution and destruction of natural vegetation. Environmental risk is a much broader discipline and covers issues such as land ownership, health, tailings disposal, water recycling and social and cultural implications.

In North America and Australia environmental concerns are an extremely sensitive topic to most mining companies, with exhaustive legislative requirements having to be met before authority to develop a mine, or even do exploration, is obtained. There are numerous examples of projects that have been delayed or even abandoned because of environmental obstacles.

Until recent years, the environmental requirements for projects in South Africa, or more particularly in the rest of Africa were less onerous. Environmental issues were addressed as part of the feasibility study, with little commitment on how reparations would be dealt with in future years. Revised legislation in many African countries has brought environmental requirements into line with most First World countries, but many are still lagging behind.

From a banker's perspective, the approach to environmental issues is often a function of internal policy of a sponsor company rather than the legislative requirements of the country in which a project may be located. Many companies (again, particularly those from North America), have set their own standards far stiffer than they are required to conform with by law. There is an increasing trend to meet the guidelines set by the World Bank, which obviously provides bankers with a great deal of comfort. The minimum requirement would be at least to conform to the legislation in the country where the project is located.

Although many forms of insurance are available to cover environmental damage due to mining accidents or events of *force majeure*, banks are becoming increasingly aware that litigation against mining companies is becoming more common. The fact that they have provided funding to assist with the development of these mines may create the potential for the banks to assume some of the liability should a mining company be sued for environmental damage.

Drafting of legal documentation is extremely important to ensure that sponsors have met all legal requirements for a particular jurisdiction, and that they endeavour to continue to conform to all environmental legislation to maintain their permits, authorizations and mining licences.

Financial structures

A major part of the due diligence exercise will be the financial evaluation of the project which will eventually result in the determination of the optimum debt:equity ratio. Being directly related to the ability of the project to support debt,

this ratio is a clear indication as to the robustness of the project. The overall outcome of the due diligence exercise will influence the structure of any project financing package made available and under what terms and conditions.

Project finance loans are usually long term, 7 to 10 years, but the terms and conditions are generally applicable to one or more of the following three distinct phases: the construction phase, the completion phase and the post-completion phase.

Construction phase

This phase is defined as being from the first drawdown, when all conditions precedent to the funding have been satisfied, to the point at which the project is 'financially complete'—that is when it is physically complete and commissioning can commence. During this phase there is normally full recourse to the project sponsor, and should the loan facility have been fully drawn and the project not have reached financial completion, the shareholders will usually be required to fund any further costs to reach this point.

As previously mentioned, the banks will monitor project construction carefully and will allow drawdowns to take place when particular milestones have been achieved. Expenditure will be compared with construction progress and a 'cost-to-completion' check will be conducted. This test is to determine whether the unutilized portion of the project loan (and available equity) is sufficient to complete the project construction. If it is not, then the shareholders will be required to inject additional equity, to allow further drawdowns to take place and to ensure that the overall debt:equity ratio remains within the specific parameters.

It is normal in project finance to capitalize interest during the construction phase, with debt servicing only commencing after the project becomes cash flow positive.

Completion phase

This phase begins with financial completion and ends with the project having passed the 'completion test'. It is in essence the period when the project goes through the commissioning phase of the project, and although is the shortest of the three defined phases, is the one where technical and financial problems are most likely to lead to project failure. As the completed project ramps-up to full production, technological and operational problems will become evident. It is in this phase where the sponsors' completion guarantee, or contractors' bonds are called on. If the funding arrangements have not been properly structured, the lenders could find themselves having to put in more debt; this is certainly not what lenders would like since it is increasing their exposure on a project which is clearly in difficulty. Having said that, some banks offer standby facilities designed especially to be utilized should cost overruns materialize—these facilities carry a much higher risk profile and hence are usually punitively expensive—but they could save a project from failure.

Post-completion phase

This phase covers the period from when the completion test has been achieved and conversion to non-recourse finance has taken place, to the point when the loan is fully repaid. This is the longest phase and typically lasts from 5 to 7 years, but may be as long as 20.

Bankers' perspective of mining project financing

The structuring of the financing facilities are the most important for this phase, not only because of its duration, but also because the sponsor's guarantee falls away on conversion. There is normally a grace period after which repayments on the loan are made according to a pre-determined schedule, based on the predicted cash flow of the project.

Typically cash from the mineral sales will flow into an escrow account (offshore or onshore as the case may be), which may be controlled by the lenders. Operating costs of the projects are met from this account before the debt service repayments are made. Excess cash will then flow back to project sponsors or alternatively may be offset against outstanding debt.

The most common arrangement is to have a debt service reserve account ('DSRA'), from which the actual debt repayments are made. This account will always be 'fully funded' with sufficient cash to meet the next 6-12 months of debt obligations, and is continually topped-up as debt repayments are made. This will ensure that debt repayments are not missed should there be a temporary dip in the cash flow as is common in the early stages of a new project.

Excess cash in the escrow account may be allowed to flow back to the sponsor, but generally must be kept in the company and may not be paid out as dividends, for obvious reasons. This cash may be paid out when the cash flow cover for outstanding debt reaches a certain ratio, but often dividends are not payable whilst there is outstanding debt under the project loan.

Banks may require additional protection by insisting on an Operating and Maintenance Account. This account is funded by cash flow after the DSRA is fully funded, and is specifically put in place to provide a cash source to be drawn against should operating or maintenance costs increase sharply during the early stage of the project—as is common whilst teething problems are being ironed out.

The general financial state of a project is monitored by means of various cash flow ratios in relation to outstanding debt. It is normally a prerequisite for a project company to secure permission from the project bankers, if they wish to raise additional debt. This is mainly to ensure that further debt does not prejudice the project financiers and put the project under an undue debt burden.

Conclusions

It may appear at first that the bankers' perspective of the mining industry is ultra-conservative and that they are unwilling to share in any of the risk attached to a mining project, and that they keep unnecessary high levels of cash tied up in the project. However, with non-recourse project finance the lenders do not have recourse to the balance sheet of the project sponsors, and since there is only one asset that will generate the cash flow to repay the debt, they must be absolutely sure that it will be successfully brought to account. The major risks have been outlined briefly in this paper, but what has not been discussed are the unknown and intangible risks that will only emerge when the banks' funding has been sunk and the project hopefully starts producing. The banks do not share in the significant upside potential that is inherent in most mining projects and therefore cannot realistically be expected to take on more risk than is concomitant with a debt return, rather than an equity return.

Having said all of that, there is considerable competition in the market-place amongst the banks to secure the roles of arranging and/or participating in the funding for new mining projects. The ever-increasing understanding of the mining business by the banks, and the growing track record of successful non-recourse-financed mining projects, has ensured that the availability of this type of finance has increased exponentially in recent years. ♦

Local design and manufacture of process equipment spares*

Previously imported polyurethane rotors and stators are now available to the minerals processing and mining industries.

These are part of a local manufacturing programme embarked on by Profpro on behalf of Finnish mining company, Outokumpu.

The moulds have been designed locally to Outokumpu's stringent specifications. The stators and rotors are used in flotation processes to beneficiate the valuables from ores.

'We have invested a substantial amount of money and a great deal of time and have been working solidly on this project since October 1999,' says designer, Marius Kotze of Profpro. It will be a worthwhile exercise, not only from a rapid turnaround point of view, but, also in terms of cost savings, which will benefit the mining industry.'

'The cost savings are twofold in that superior polyurethane is used in the local manufacture. It has been proved that between 40% and 80% better wear life is achieved and tests have confirmed this will reduce R/ton costs significantly,' says Kotze.

The units are being manufactured in conjunction with polyurethane specialists, Allthane Technologies International, in Carltonville.

The intricate and highly specialized moulds were manufactured by Reppod Engineering and the larger units were machined by Anicic Heavy Engineering, one of the few machine shops with the capability of machining components of this size to the extremely tight tolerances necessary for this operation. ♦