

A REVIEW OF THE BOND SYSTEM IN FIJI

Helena McLeod

Resource Economist, SOPAC/MRD

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1.0 OBJECTIVE AND NECESSITY OF A BOND

Fiji has had first-hand experience of the environmental risk and financial demand that an inadequately rehabilitated mine can leave as the responsibility of the government. Although a bond existed for the Mount Kasi Gold Mine, Vanua Levu, it was not large enough to rehabilitate the mine to a safe and stable land use. The situation at present is that no money exists in government to make the abandoned mine area safe. Similar experiences of environmental pollution and costs to the local communities have been experienced with old and abandoned artisanal mines in Fiji.

Bonds also exist for the Tuvatu Prospect and for the Toko Tailings Dam although not for the majority of the Emperor Gold Mines. Exploration licences also require the posting of a performance bond, however the exact purpose of these bonds is not clearly defined.

Mining development is an inherently destructive process with often significant degradation of the environment. This can be minimised during the course of operations with responsible environmental management. Until recently at mine closure it was common for mine sites to be left by the operator with little or no rehabilitation. However, corporate and societal awareness about the costs that environmental damage and risks can cause financially, as well as the danger to human life, has meant that rehabilitation of mine sites to an acceptable level is the rapid trend.

The table in Appendix 1, taken from A Clark et al.,¹ illustrates the scope of environmental impacts that can occur through mining and the scale of their likely impact. Estimates of the potential cost of environmental impact, mitigation or prevention for medium- to large-scale mining activities are also given. As can be seen, the costs range from less than \$250 000 to over \$50 million. These costs often fall on the community surrounding the mine area or down stream of the mine. Effects may include loss of fish life in waterways, contamination and loss of agricultural land and health effects. Without proper rehabilitation throughout the mine life and at mine closure, the costs to the community and country from environmental and social damage may outweigh the benefits derived from mining. This is a major reason why full rehabilitation to a safe and acceptable land use is essential, and security bonds are one way to elicit this outcome.

2.0 THEORETICAL BASIS

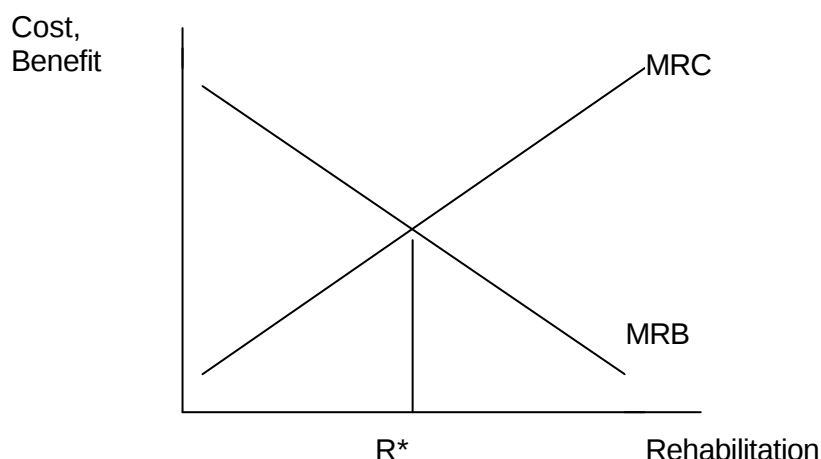
The objective of the private operator is to maximise profits. Once the mine is exhausted, rehabilitation of the mine site is a cost to the operator and does not provide any direct benefits to the firm. This is the difference between what society sees the optimal level of rehabilitation to be and what the firm considers is appropriate. Landowners whose land the mine is located on, communities living around the mine site and even the wider society may be affected by the mine if it is not rehabilitated, through a host of risks and impacts. These include unsightliness of unrehabilitated areas, risk of water and ground pollution, land subsidence and other features of an abandoned mine site. The government must therefore try to find the socially optimal level of rehabilitation and introduce mechanisms for the firm to reach this level.

The socially optimal level of rehabilitation is where the marginal cost of rehabilitation equals the marginal benefit of rehabilitation to society. The simple diagram shows a representation of varying levels of rehabilitation of a mine site. As the amount of rehabilitation increases the marginal cost of doing an extra unit also increases. For example full rehabilitation of an open cut pit to the pre-mine land form of fertile agricultural land would be phenomenally expensive (and

¹ Allen L Clark and Duangjai Intarapavich, Mining and Environment: Land Reclamation Policies and Options for South-East Asia' – ESCAP and the Pacific UN Conference on Trade and Development, Mineral Resources Assessment, Development and Management Series, Volume 2

even technologically impossible) whereas the initial activities in the rehabilitation of the mine such as removing buildings would be relatively inexpensive.

Likewise the benefits gained from carrying out the extra unit of rehabilitation might well fall as more rehabilitation is undertaken. Therefore the optimum level of rehabilitation R^* is where the marginal cost and marginal benefit of an extra unit of rehabilitation is equal.



It is a difficult procedure to discover what this optimal level is. As the cost of rehabilitation varies according to geographic location, whether the mine is open pit or underground, type of mining process, amount of ore mined, climate and a host of other factors, it is not possible to use a simple formula to accurately estimate the cost of rehabilitation. Likewise the marginal benefit of rehabilitation is not uniform and may depend on the number of people living in the locality, the pre-mine land use and preference of society.

The government can try and force the operator to meet the estimated R^* by different approaches.

A command and control approach to rehabilitation can be used. This would entail specifying which rehabilitation activity the company should undertake at every stage of the mine life.

This has a number of disadvantages if the efficient level of rehabilitation is to be undertaken including:

- ❖ Huge amounts of information – the regulator would need to know the MRC of the firm and the MRB, so the optimum level R^* could be found. This would require an enormous amount of time and expense to discover.
- ❖ Asymmetric information – the regulator needs to work out the marginal cost of the specific operator to rehabilitate the land. The operator is likely to have more information about this than the regulator and the information might well need to be sought from the firm. The operator has an incentive to over estimate the MRC to persuade the regulator to set a lower rehabilitation requirement.
- ❖ Regulatory capture – this is where the regulator or government department monitoring and settling the level of rehabilitation makes concessions to the operator rather than choosing the efficient uninfluenced level
- ❖ Minimum necessary compliance – where the operator will rehabilitate to the minimum level which may be below the optimum level if R^* has been underestimated.

The government could also choose to give financial incentives to encourage the operator to undertake rehabilitation. This has the obvious disadvantage of costing the government money, and may significantly reduce the financial benefits the mine brings to the country. Subsidies to rehabilitation also often result in resource misallocation.

The alternative method of reaching the optimum R^* is to use a market-based mechanism such as charges and of which a security bond is a hybrid. Market mechanisms have certain advantages over command and control. They encourage static efficiency where each operator will choose the level of ongoing rehabilitation and mine closure rehabilitation that equates its marginal cost of rehabilitation to the marginal cost of not undertaking that level of rehabilitation, therefore each heterogeneous firm reaches its own equilibrium.

Dynamic efficiency is also encouraged as firms have an incentive to discover more effective technologies that reduce damage through mining and also reduce rehabilitation cost.

Reclamation bonds can have the dual property that they provide insurance for the government against cases where rehabilitation is not completed to the level decided to be socially optimal. They also encourage ongoing rehabilitation. For a bond to work efficiently the following must occur:

- ❖ The bond amount is equal to the cost of reclamation by a third party in the worst-case scenario;
- ❖ Re-evaluation of the bond amount is ongoing and the bond is reduced as reclamation is undertaken and the final reclamation cost falls.

Performance bonds are economically efficient as they internalise the cost of environmental damage. This is because the size of the bond is dependent on the estimated costs of rehabilitation at the worst-case scenario. Prior to mining, the operator must submit a mine closure plan and also an environmental management plan. It is largely on these that the size of the bond is calculated. The operator has an incentive to reduce environmental impacts during the course of the mine and to maintain ongoing rehabilitation as this will then lead to a smaller bond being required up-front and also through the bond-size review process.

When deciding to grant a Mining Lease the government should undertake a cost-benefit analysis of the mine project. This weighs up the benefits to the country, which include direct and secondary employment, foreign exchange earnings, technology transfers and tax revenue, against the costs of mining to the country. The costs include environmental damage. If the mine site is not fully rehabilitated, significant long-term costs may be borne by the country, which may mean a net loss to the country from the mine. Through the implementation of a reclamation bond these future costs can be largely avoided, and the government can be secure in the knowledge that it is weighing up the relevant costs and benefits of the mine when deciding whether to grant a Mining Lease.

3.0 USE OF BONDS IN FIJI

3.1 Performance Bonds for Exploration Tenements

There is at present a performance bond on exploration tenements, which is set at 20% of exploration budget committed in the work programme per licence. This system has been operational since 1998 and was calculated by the Mineral Resources Department. The percentage was chosen to balance objectives; firstly to act as insurance for the government in the case of rehabilitation work or work programme obligations left unfulfilled, and secondly to remain unburdensome to exploration companies.

3.2 Review of Size

There have been two cases where rehabilitation has been left uncompleted. In both cases the bond amount was large enough to cover rehabilitation. Some commented that the bond may be excessive and companies have complained that this is the case.

A recent example of the use of a reclamation bond was at the Namosi Prospect. The advanced prospect had a bond posted by Placer for F\$100 000. Through work undertaken at the site a creek became diverted and this led to substantial soil erosion and loss of vegetation and garden produce. The compensation payment calculated was \$21 525, and this was paid to the landowners to cover rehabilitation of the land as well as compensate for damages caused to them.

It may be the case that this is an underestimate. New proposals for calculating compensation amounts are likely to produce estimates greater than this.

3.3 Other Bonds in Existence

In recent years there has been a systematic effort on the part of the Fiji Mineral Resources Department to require bonds to provide some cover for mining developments. In addition to performance bonds on exploration licences the following bonds and their amounts exist:

Mine/ Development Site	Bond Size (F\$)
Toko Dam	50 000
Mt Kasi	150 000
Emperor Pipeline to dam	20 000
Namosi Prospect [advanced prospect (Placer)]	100 000
Tuvatu Prospect (advanced prospect)	20 000

3.4 Form of Payment

The bond can be paid with either cash or a banker's guarantee. It is placed in a trust fund account at the National Bank. No interest is earned on the account.

3.5 The Ideal Bond

A bond scheme should ideally have the following qualities. It should:

- Provide the government with funds to fully cover the cost of paying a third party to undertake rehabilitation work should the operator not fulfil these obligations;
- Encourage firms to undertake ongoing rehabilitation work, by reviewing the size of the bond regularly. It should also base the bond value on the mine closure/rehabilitation plan, which should encourage the company to minimise environmental damage throughout the mine life by investment in environmentally friendly technologies and mine management, as this therefore reduces the bond amount.
- Ensure that the cost of estimating the size of the bond is commensurate with the size of capital outlay and potential cost of rehabilitation for the licence being bonded.
- Be administratively fairly easy for the Mineral Resources Department to operate.

4.0 INTERNATIONAL REVIEW OF SECURITY DEPOSIT SYSTEMS

Performance or reclamation bond schemes are already widely used in a number of states and countries around the world. There follows a review of countries which have more advanced bond systems with useful lessons to learn from them. These countries are the United States, Canada, Australia, Indonesia and Malaysia.

4.1 The United States of America (USA)

Types of Performance Bond and Fees

The use of reclamation bonds in the mining sector in the USA is very well developed. Five principal regulatory provisions are contained in the Surface Mining Law (Surface Mining Control and Reclamation Act of 1977) which form the basis of protection and management of the environment in the coal-mining sector. This law supersedes all state law if the latter is less stringent. One of these provisions is the requirement of a performance bond.

Major provisions covering performance bonds include the following:

- ❖ The amount of bond for each permit area is determined by the Regulatory Authority (RA).
- ❖ The amount of bond should reflect the probable difficulty of reclamation giving consideration to such factors as topography, geology, hydrology, and revegetation.
- ❖ The amount of bond is based on but not limited to the applicant's estimated reclamation cost.
- ❖ The amount of bond shall be sufficient to ensure the completion of the reclamation plan if the work has to be performed by the RA in the event of forfeiture.
- ❖ The minimum bond amount for any permitted area is \$10 000.
- ❖ Bond amounts may be periodically adjusted to account for changes in the mining plan, post-mining land use, or any other circumstance which may increase or decrease the cost of reclamation.

In addition, under the Abandoned Mine Land Reclamation Program a fee is charged on all active coal-mining projects at the rate of 35 cents per ton of surface-mined coal, 15 cents per ton for coal mined underground and 10 cents per ton of lignite mined. These fees are deposited in the US Treasury's interest-bearing Abandoned Mine Reclamation Fund and used for reclamation of inadequately rehabilitated mines and other emergency and assistance mine-sector projects.

Only coal mines are covered by this national law. Reclamation bonds for non-coal mines existing within areas under the jurisdiction of the federal government are dependent on the estimated cost of reclamation. Individual states have the power to set their own reclamation legislation with respect to non-coal mining.

In some states a mine closure bond is required to cover the risk of environmental damage after the closure of the mine. Additional bonds also exist for hazardous or chemical waste. The US Superfund also relates to the mining sector where hazardous industries are taxed and the fund is used to cope with major environmental disasters. The money comes mainly from taxes on the chemical and petroleum industries. The Trust Fund is used primarily when those companies or people responsible for contamination at Superfund sites cannot be found, or cannot perform or pay for the cleanup work.

In the US the bond is not fully released until all performance standards have been met and full reclamation of the site, including permanent revegetation, has been determined to be successful. This means that the final bond remaining will not be released until 5 years after reclamation in the

East and MidWest and after 10 years in the West. However, the bond can be partially released at various phases of reclamation such as backfilling, regrading, etc., are completed.

Size of Bond

There are different methods of calculating the level of bond; these are fixed rate per area, fixed rate per quantity of material mined and an amount calculated on a case-by-case basis taking into account each reclamation activity predicted. The former two methods use a simple formula, however actual costs of reclamation vary with climate, geographic location, incline, amount of material mined, process of mining and many other factors. The simple formulae will therefore tend to lack accuracy and may have no relationship to the actual cost of rehabilitating the site. For instance, it is estimated that the reclamation costs of a coal mine to satisfy the PL 95-87 standard in the eastern states of the United States were \$10.33 per ton, while mines in the mid-continent and the western states cost \$3.87 per ton and \$0.81 per ton respectively, at constant 1978 prices (see Allen L Clark and Duangjai Intarapavich, Mining and the Environment: Land Reclamation Policies and Options for South-East Asia).

The US Department of the Interior Office of Surface Mining Reclamation and Enforcement (OSMRE) is the body responsible for calculating the bond amount for coal mines. They have produced a detailed 'Handbook for Calculation of Reclamation Bond Amounts'. The handbook outlines the following four-step procedure for calculating the bond amount:

1. Determine the Maximum Reclamation Requirements
2. Estimate Direct Reclamation Costs
 - ❖ Structure Removal and Demolition
 - ❖ Earthmoving
 - ❖ Revegetation
 - ❖ Other Reclamation Costs
3. Estimate Indirect Reclamation Costs
 - ❖ Mobilisation and Demobilisation
 - ❖ Contingencies
 - ❖ Redesign Costs
 - ❖ Profit and Overhead
 - ❖ Contract Management Fee
4. Calculate the Total Bond Amount

The calculation relies heavily on a detailed mine-reclamation plan being provided by the operator, and cost estimates for each of the reclamation activities are required.

The bond also incorporates a contingency amount to account for uncertainties and unexpected natural events. The percentage will be based on the following table of direct costs:

Total Direct Costs (US\$)	Contingency (%)
0 – 500 000	10
500 000 – 5 million	7
5 million – 50 million	4
Greater than 50 million	2

The rates are based on various guidebook sources as well as experience with large and small earthmoving and construction projects.

Bond Pooling Scheme

The imposition of large up-front payments such as security bonds can be argued to be a major burden for small- and medium-scale mines. To overcome this argument, yet still provide insurance for the government against inadequate reclamation, some states in America have introduced a 'Bond Pooling' scheme. A combination of percentage of the reclamation fee paid up-front and annual fees is used for mines with estimated reclamation costs below \$50 000.

4.2 Canada

In Canada there is also widespread use of security bonds. Only the Northwest Territories and Yukon are administered by the federal agency; the rest of Canada is administered at the provincial level. Virtually all states in the country use security bonds as a mechanism to enforce rehabilitation. In the Northwest Territories and Yukon the posting of a security bond may be required as a condition of a long-term land lease for mineral development. Regulation 13(3) of the Northern Inland Waters Act (NIWA) states that the Board may determine the amount of the security provided that it does not exceed \$100 000 or 10 % of the estimated capital cost of the work, whichever is greater. The method of bond calculation estimates the actual costs of a detailed itemisation of reclamation activities as with the US model for coal mining.

The type of security may take the form of:

1. a promissory note guaranteed by a chartered bank in Canada, payable to the Receiver General;
2. a certified cheque drawn on a chartered bank in Canada, payable to the Receiver General;
3. a performance bond issued by a surety approved by the Treasury Board for the purpose of Government Contract Regulations;
4. any combination of the securities described in 1,2,3.

In the New Brunswick province the simple formula is \$1500 per hectare for Crown land to be disturbed and \$3000 per hectare for private land. In addition, a minimum level of damage security of \$10 000 per lease must be deposited. However, this bond is limited to cost of reclamation of surface and doesn't include the long-term management of acid generating wastes.

4.3 Australia

All Australian states have a requirement to elicit a security deposit by the leaseholder against possible failure to rehabilitate or meet the environmental requirements. There are however significant differences between states as to how the bond amount is calculated, the periodic review of securities and the degree of risk assumed by the government. The Australian and New Zealand Minerals and Energy Council were required to examine the rehabilitation bond system as part of the Ecologically Sustainable Development Strategy adopted by Australian governments in 1992. They proposed that there should be a common security-deposit system for Australia.

The following principles and procedures were laid down as the basis for the national security deposit system.

Multiple Tenements

It was suggested that where a company has a large number of operations in a single state, a single security bond be lodged that can be applied to any of these operations. This is particularly appropriate in the case of exploration titles.

Size

The size of the bond should be based on the amount it would cost for the government to rehabilitate the mine site and should be reviewed periodically, taking into account the amount of work required in the next phase of mining and rehabilitation already undertaken.

New Operator

A new titleholder is not required to rehabilitate an already derelict mine site. However, a new operator taking over an existing mine also takes on the responsibility of current rehabilitation.

Incentive

The security is an incentive for progressive rehabilitation as well as security for the government.

Bond as a Prerequisite

If a company cannot afford the lodgement of a security bond it should not be granted a licence, as it means there is an unacceptable risk to the government.

Existing Mines

For existing mines the immediate imposition of a security bond may be financially odorous. Therefore incremental introduction of the security is recommended at a level which encourages progressive rehabilitation. However, extensions to existing mines are required to meet with the full bond amount.

Payment

Payment should not be by cash but by way of an unconditional performance bond, fully guaranteed by a bank or other acceptable financial institution.

Full Rehabilitation

The full bond amount can be returned to the company when the following requirements have been met:

- ❖ the mine area is in a stable and appropriate land form, with no continuing negative impacts on the local environment or public safety;
- ❖ all environmental regulations have been complied with;
- ❖ in the case of a revegetated site, it has a self-sustaining and an appropriate floral community; and
- ❖ ongoing maintenance requirements should be no more than for surrounding areas of land subject to equivalent land uses.

4.4 Malaysia

A major review of the fiscal and regulatory system for the mineral sector was undertaken in 1989. From this process provisions were established requiring large-scale mining projects to submit detailed plans for mine rehabilitation. These would include cost estimations of each rehabilitation activity and a detailed timetable of progressive and final rehabilitation. A Mine Rehabilitation Fund would be established where the operator would make annual payments to the fund to be based on the cost estimates of rehabilitation in the reclamation plan.

For a small mine a Common Rehabilitation Fund would be established where lessees pay annual fees, and part of the fund may also be contributed from central government.

4.5 Indonesia

In Indonesia a reclamation guarantee is required for all mining companies in the operational stage. It is required before the issue of a permit to mine or exploit the mineral is granted. The guarantee can be paid in the form of a banker's or accounting guarantee and is based on the estimated cost of rehabilitation in accordance with the Annual Plan of Environmental Management submitted by the company. The bond amount is revised every 5 years.

Size of bond

The size of bond is based on the cost of a third party rehabilitating the mine site. The cost components are as follows.

Direct Costs which include:

1. Cost for demolition of mining facilities (buildings, roads, emplacements) except as differently stated
2. Cost for attaining the landuse which consists of:
 - ❖ Rent for heavy and mechanical equipment
 - ❖ Land refilling for closed mine
 - ❖ Land surface management
 - ❖ Spreading of fertilised soil
 - ❖ Erosion control and water management
3. Revegetation costs consist of:
 - ❖ Land quality analysis
 - ❖ Fertilising
 - ❖ Seed supply
 - ❖ Planting
 - ❖ Plant cultivation
4. Cost for preventing or handling acid mine water
5. Cost for civil works according to post-mining land use

Indirect costs to include:

- ❖ Cost for heavy equipment mobilisation and demobilisation
- ❖ Cost for reclamation planning
- ❖ Administration cost and contractor's margin for reclamation
- ❖ Implementation

As with the Canadian Northern Territories and Yukon and the US calculation of bonds for the coal sector, bonds in Indonesia are calculated using detailed estimated cost of reclamation activities laid down by the company in rehabilitation plans at the beginning of operations.

5.0 FINANCIAL ASSURANCE²

A security bond for reclamation or environmental damage can be paid in a variety of forms. Financial assurance broadly defined is the guarantee that funds will be available at a future date to pay for a specific purpose. A large number of financial-assurance instruments are available with different qualities and defects. These are now discussed further, drawing on experience from Canada and the USA where the use of financial assurance is well developed.

5.1 Financial Assurance – the Way it Works

Depending on the type of instrument used and the application of it, financial assurance can work in the following main ways:

1. Financial assurance reduces financial risk to the public purse, as financial assurance guarantees that funds will be available for a specific purpose at a defined future date. This reduces the risk that the government will have to draw on its own funds to rehabilitate the mine site should the company fail to do so for one reason or another.

The public purse will still carry risk of incurring some financial expenses in such a situation if the size of amount guaranteed in the financial-assurance instrument is less than the amount of liability. This will depend on the accuracy of the initial estimate and the type of financial-assurance instrument chosen.
2. Financial assurance creates incentives for companies to fulfil their environmental obligations without government stepping in. Financial assurance can be implemented in such a way that the cost of the equivalent bond amount is the amount it would cost for a third party to rehabilitate the mine site. This will encourage firms to undertake ongoing rehabilitation themselves, as this will reduce the initial estimation of the bond size. Self rehabilitation is also likely to be lower than the cost of a third party being contracted by the government to undertake mine site rehabilitation. This will also encourage final rehabilitation to be undertaken by the company rather than pay for government to do it.
3. Financial insurance creates incentives for companies to reduce environmental risks. There is an incentive for companies to reduce the likelihood of damage and introduce more environmentally friendly technologies and mine management. Again this will reduce the size of the initial bond required.
4. Some financial-assurance instruments can create extra third-party incentives to reduce environmental risks. In these types of interest, third parties take on the risk in return for premiums. The amount of the premiums will be reduced if the company can show that it will take steps to reduce the risk or magnitude of damage.

² The following discussion on financial insurance draws heavily on work carried out by Apogee, Hagler Bailly with D.R Anderson Associates for the Canadian Council of Ministers of the Environment entitled 'Experiences in the Use of Financial Assurance Instruments'.

5.2 The Various Instruments

A large number of financial instruments exist. There follows a brief description of a selection of these.

Cash Deposit: Deposits of cash, cheques, term deposits, certificates of deposit and other cash equivalents.

Deposit of Other Assets: Deposits of assets, exclusive of more cash and cash equivalents, such as stocks, bearer bonds, property, accounts receivable, etc.

Security in Escrow: Deposits of cash, real estate or other securities deposited with a neutral third party who promises to return the deposit to the company on completion of a specified objective or to the government if this is uncompleted.

Trust Fund: A trust holding of a payment or series of payments from a company, plus the returns on that investment. Disbursements are used solely for stated purposes.

Letter of Credit: A document issued by a financial institution, and arranged for by the company, that allows the designated government authority to withdraw, over a specified time period, funds up to a stated amount.

Surety Bond: A contract between the company and a qualified financial institution (the surety) assuring the government that if the company defaults on their obligations the surety company will fulfil the company's obligations.

Third-Party Insurance: A contract between a company and an insurance company which stipulates that the financial institution will indemnify the company against liability from an unknown or contingent event in return for risk-based premiums. The contract may name the government as a primary or conditional beneficiary.

Pledge of Assets: A legal contract allowing the government to place a lien (legal claim) on the specific assets of a company if the company fails to meet its obligations.

Self Assurance: Well-financed companies may back up their obligations by the strength of their balance sheets and income statements, promising that costs will be funded through cash and the conversion of company assets when needed.

Corporate Guarantee: A guarantee between a company and another corporate entity (usually a parent company) stipulating that the external obligations of the company will be met by the other corporate entity.

5.3 Qualities of Financial-Assurance Instruments

Government Criteria

Liquidity: If a mining site requires rehabilitating, or if environmental degradation caused by mining development requires remedial action, and it is left to government to use the financial assurance, immediate access to the funds will be required. Some forms of instrument will be highly liquid, such as cash; others may take long amounts of time to convert into a form that can be used to pay for rehabilitation.

Certainty of Value: The date at which rehabilitation and other work may need to be undertaken is often far into the future from the date financial assurance is pledged. Government desires that the assurance pledged will maintain its value. If it doesn't then the funds available may not be enough to cover the rehabilitation work. Government may then either have to pay out of its own money or leave needed work incomplete.

Continuity: Governments prefer financial-assurance instruments that remain current or can be easily renewed.

Cost and Ease of Administration: Government would like to minimise the cost it incurs in initiating, safeguarding, releasing and seizing the financial assurance. The government wants to avoid instruments that require special expertise to administer or considerable effort to monitor.

Third-Party Incentives: As described above, some financial assurance instruments can create extra third-party incentives to reduce environmental risks. In these types of interest, third parties take on the risk in return for premiums. The amount of the premiums will be reduced if the company can show that they will take steps to reduce the risk or magnitude of damage.

5.4 Company Criteria

Direct Costs: Companies will wish to minimise direct costs including transaction costs and premium payments.

Opportunity Cost: This refers to what the funds allocated to the financial-assurance instruments could otherwise have been used for. Of particular concern is when the instrument reduces the internal pool of capital or ability to obtain outside credit, thus disabling the company from undertaking other productive ventures.

Cost and Ease of Administration: The company will be keen to avoid instruments that impose high administrative costs for lodging, safeguarding, monitoring, releasing or realizing the funds.

Reasonable Return: Where liquid funds are provided as financial assurance, industry would like to ensure that the funds are invested so as to provide the highest possible return on the investment without incurring undue investment risk.

5.5 Comparison of Financial-Assurance Instruments

Each instrument differs in the extent to which it meets the government and industry criteria. The list below ranks a number of financial-assurance instruments covered in this paper. For a more detailed discussion of these instruments and basis for this ranking refer to 'Experiences in the Use of Financial Assurance Instruments'³.

The financial-assurance instruments listed are ranked in the order of effectiveness with the most effective at the top:

highest rank	Third Party Insurance		
	Letters of Credit		Corporate Guarantee
	Surety Bonds		
	Cash Deposits	Trust Funds	Captive Insurance
	Self Assurance		
	Securities in Escrow		
	Other Deposits		
lowest rank	Pledge of Assets		

³ As above, written by Apogee, Hagler Bailly with D.R Anderson Associates.

The instrument to score highest is third party insurance. This has a number of advantages including the following:

- The size of the up-front payment is reduced as only the premium has to be paid, which is likely to be far lower than the overall size of rehabilitation work valued. There is therefore a smaller impact on the balance sheet of the company.
- In the event that the company does not complete the specific tasks in the agreement, the insurance company will pay. The insurer will have substantial funds available for such times. So liquidity and certainty of value will be high.
- The insurer creates the incentive for the operator to undertake ongoing rehabilitation and minimise environmental impacts. The operator can see that this premium will be reduced if the risk to the insurer is less.
- As the insurer pools risk across many operators, the sum of premiums may well be less than the overall final estimation of rehabilitation costs. This introduces an element of efficiency into the use of scarce financial resources.

If an insurance market exists for mine decommissioning or for finite damage, then this is a very attractive instrument.

5.6 Letters of Credit

A letter of credit typically works by a third party guaranteeing that a certain amount of funds will be available for a specific purpose. The operator will be expected to pay a premium, and the letter of credit is usually secured by a claim being put on the company's assets of 50-100% depending on the size of the company. This may/will be seized if the company fails to meet its obligations.

One advantage of this instrument is that the credit issuer takes the responsibility of ascertaining the credit worthiness of the operator, rather than the regulator needing to undertake this aspect. It will continually monitor the company and will renew the letter of credit only if the credit worthiness is adequate.

In the event that the letter of credit is not renewed, the regulator will receive the specified funds and the environmental liability. The regulator will then have to find another form of financial-assurance instrument to cover the liability. This is the weak aspect of the instrument.

Experience in Canada has found a high degree of satisfaction with letters of credit. In the Ontario Ministry of Northern Development and Mines, 60% of instruments posted with them are letters of credit; this is 83% by value. Here it is estimated that annual charges are between 1 and 3% of the level of credit.

5.7 Corporate Guarantee

With corporate guarantees a corporation separate from the company requesting cover guarantees to fulfil the company's obligations should the company be unable to meet them. It is often a parent company and therefore has access to greater funds.

The company will make payments to the corporation to cover the risk that the corporation is assuming on its behalf.

The regulator must monitor the financial statements of the corporate entity to ensure that it is capable of meeting the obligations. This is an ongoing process and will require some financial expertise.

5.8 Surety Bonds

Surety Bonds are contracts between a company and a qualified financial institution (the surety). The contract guarantees to the government that specific obligations of the company will be fulfilled up to a maximum amount or of a defined amount over a defined time period.

Surety bonds can be structured to adjust for inflation and therefore need not be renewed annually like letters of credit.

Alongside letters of credit, cash deposits and insurance, surety bonds are one of the most common forms of financial assurance in Canada.

5.9 Cash Deposits

Cash refers to cash, cheques, term deposits, certificates of deposit and other cash equivalents that are highly liquid and have a fixed cash value. They can be in the form of one-off payments or a series of payments.

Cash payments by companies can be held by governments in consolidated revenue funds, in suspense accounts, or trust deposit accounts that facilitate tracking of the funds. They should ensure they are kept separate for specified purposes. Companies will be concerned whether interest accrues on the account, whether it is paid to the company or to the account, and how the interest earned compares with other investment options.

Although cash payment gives the government the strongest certainty of value and greatest liquidity, it places a heavy burden on companies. Up-front cash payments directly affect the balance sheet and opportunity cost is high.

5.10 Trust Fund

The fund should be managed for the purpose of paying for specific actions to be taken. The principal should earn interest and follow a well-defined investment plan. Funds can be from a single payment by the company or a series of smaller ones. The drawback of funds based on a series of payments is that the amount required to meet the company's obligations is often underestimated.

Trust funds are allowed to be used for site decommissioning and post-closure maintenance of mines under US regulations. However few companies have chosen trust funds as the financial-assurance instrument. This may be because hard financial assets have to be set aside, and when obligations can run into hundreds of millions of dollars this can clearly have a large opportunity cost to the company.

5.11 Financial Assurance – Recommendations and Considerations

It is recommended that, where possible, the instruments of Third-Party Insurance, Letters of Credit, Corporate Guarantee, Surety Bonds, Cash Deposits and to a lesser extent Trust Funds be used as financial-assurance instruments underlying reclamation bonds. These provide the best guarantees to government that the final reclamation work will be able to be met. It is recommended that Self Assurance, Other Deposits and Pledge of Assets not be considered as these do not give the government certainty of value, and are costly and cumbersome for the government to administer.

Tax deductibility: In some countries certain instruments are tax deductible. This would mean that the cost of financial assurance could be set against tax, effectively reducing the amount that is paid in financial obligations. It can be used as a subsidy to companies to voluntarily underwrite their reclamation/environmental obligations. Or if certain instruments are preferred, these can be made tax deductible to bias companies in favour of them.

The principle of user or polluter pays can be applied to the question of who should pay for reclamation work. If a tax deduction is applied to financial-assurance instruments it is a form of joint responsibility. The government will be reducing the revenue generated from the operation and paying for part of the rehabilitation in this way. If the government feels this is fair, then tax deductibility can be considered.

Small Operators: Many of the financial assurance instruments recommended here, including Third-Party Insurance, Letters of Credit and Surety Bonds, will required higher premiums to be paid by companies that the Government considers high risk. This may include companies where there is no history of good environmental management to refer to, such as new companies; it may also include small companies where there is a small financial asset base. It may be the case that such companies do carry a higher risk as there are lesser resources to draw upon. However, it is desirable to have enough types of instrument that smaller companies are not barred from entering the industry.

It is worth noting that although a small company may have fewer resources, this does not mean that the level of degradation or mine reclamation work required will be proportionately small. If a small company wishes to undertake an operation that may have high environmental risks or rehabilitation costs associated with it, it should not be allowed to proceed. The risk is too great.

The regulator can help small companies in ways other than taking on their risk, for instance by providing information on insurance, or other financial instrument firms that will give small companies a fair premium. This may be a large help to small operators who at present rely on cash to fulfil their bonding requirements.

6.0 CONCLUSION

The use of bonds and financial assurance is becoming commonplace in the mining sector in countries around the world. Fiji, although having a bond system in place, has through experience discovered that it is crucial to have a bond large enough to cover the cost of rehabilitation by a third party if the government and people are to have insurance in the event of poor environmental practices in mining. Theoretically there are very good reasons to adopt a bond or financial assurance system as insurance and also to encourage high environmental standards.

Natural resources and the environment are important in Fiji, economically, socially and culturally. A key necessity for sustainable development in the mineral sector, and ensuring a safe environment for this generation and the future, is good environmental management. Bonds and financial assurance are a well-tested tool for encouraging environmental compliance and as insurance should mining operations unexpectedly go wrong. These should be and are being used in conjunction with other environmental planning tools.

This paper also suggests a ranking of financial-assurance mechanisms which is recommended that Mineral Resources Department adopt. This should ensure that the level of funds available to rehabilitate a mine site does not lose value over time and that the funds are accessible by Government.

Finally, this paper includes an outline of the elements that an ideal bond system should take and will hopefully provide information that a future bond system could be based on.