PNG CHAMBER OF MINES AND PETROLEUM

DISCUSSION PAPER NO. 31

THE DEVELOPING MINERAL SECTOR: OPPORTUNITIES AND CHALLENGES

Editor
John Millett

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(Papers submitted at a joint I.N.A. and PNG Chamber of Mines and Petroleum Seminar held in Port Moresby on 14 July 1987)

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September 1987

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ISBN No. 9980-77-080-5

INTRODUCTION

Policies are never static but policy turbulence like any other is no inducement to investment and development. I.N.A. is pleased to offer these papers in pursuit of "dynamic stability" in mineral sector policy and development.

This publication complements the I.N.A.'s first study in the minerals sector "Mineral and Mining Policy in Papua New Guinea" by John Tilton, et al in October 1986. The I.N.A. is particularly pleased with this collaboration with the PNG Chamber of Mines and Petroleum, newly formed at this most exciting stage in the development of Papua New Guinea's substantial, though not unique, mineral heritage.

Three policy issues confront the mining sector: shifts in national government policy, conflict between national and provincial governments and relaxation in revenue stabilisation policies. This seminar attempted to provide insights and experience from a broad range of participants in order to inform these policy debates.

The current policy flux marks the (unsuccessful) end to the government's medium term development strategy (MTDS) review, begun in 1985. That review, with the experience of the twelve Ok Tedi negotiating years to draw on, sought to simplify government's role to that of resource owner and regulator. It showed that translating resource ownership into mining company share ownership was unnecessary for revenue purposes and led to government experiencing damaging role conflict. It endorsed the primacy in policy of national government revenues for the country as a whole - revenues that would then be used to implement its various programmes throughout the country according to its development priorities set from time to time. In economics terminology, this is the financial linkage. It nevertheless endorsed the direct local linkages - land compensation and some employment for the landowners and royalties for the provincial government.

Recent events associated with the Misima project exemplify the current policy confusion. Initially, in accordance with the MTDS review, government did not seek equity. Government has reversed its stance on equity. Government has also reversed its stand on infrastructure, now requiring a mining township to be built at Alotau (still some air distance from the mine) whereas before it had accepted the recommendation on both economic and social grounds of an environmental consultancy for "commuter" mining based on North Queensland.

Behind this confusion lies the responsible striving of leaders to maximise participation of the people in mining development. Now, the people want to participate in all sorts of economic activity, not only in mining. All of the government's policies in one way or another are designed to this end. In mining though what seems to be emerging is a political feeling that these policies are unsuitable or inadequate and a special "vehicle" will be required. One of our regrets in this seminar is that the specifics of the "vehicle" were not available for analysis and discussion.

At the end of the day minerals investment must march to the beat of the international drum. If national policies require it to march as well to another drum whose beat diverges excessively from the other, halting, broken progress is the likely result. This was the case in Ok Tedi. It seems with Misima it is still the case. Porgera, Lihir and others are to come. If they are to experience smoother development paths, the people and their governments have before them the challenge to reach understanding and acceptance of the limits as well as the opportunities in defining the scope of participation.

Since the seminar, Dr. James Guest, consultant with the Bank of Papua New Guinea has analysed the performance of the Mineral Resources Stabilisation Fund. He showed some of the deficiencies in its operations that presumably led to the legislative changes introduced in the 1987 budget. More particularly he has suggested an operating rule that would appear to make the fund more effective and at the same time remove the dangers inherent in the recent legislative changes. His suggestions are surely worthy of serious consideration given the demonstrated inability of many countries' governments, whose intentions would have been no less scrupulous than those that ours holds, to manage booms in the national interest under conditions of pure pragmatism.

Acknowledgements

I.N.A. thanks all those who participated, particularly those who presented papers and contributed to panel discussion. It was a particular pleasure to welcome our visitors from Western Australia, Sir Laurence Brodie-Hall and Dr. Odwyn Jones and their significant contributions are gratefully acknowledged.

John Millett
Port Moresby
October 1987

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SEMINAR - SUMMING-UP

Dr. Andrew Vickerman
Economic Advisor
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It is extremely difficult and daunting to attempt to sum up some eight hours of presentations, comment and discussion in only fifteen minutes. We have heard at least twelve detailed presentations of varying degrees of interest, length and provocation from a wide range of participants.

I do not want to try and summarise all of these presentations but will try and extract some themes from the discussions and also make some comments of my own which I have withheld up until now.

Firstly, let me refer to the degree of cooperation. This is reflected in the hosting of this seminar by the I.N.A. and Chamber of Mines as well as in the attendance from industry, government and university. It is also reflected in the presentations which have recognised the extent of common interest amongst those involved in, and concerned with, mineral development. It was also heartening to hear presenters not taking stock positions but often reflecting alternative and personal views. This was particularly good to see from those officials from government departments present today.

The Prime Minister of course also stressed the importance of cooperation in all aspects of the economic development of Papua New Guinea including mineral development. The importance of this cooperation has been emphasised by other speakers.

In the morning session we heard initially that there is no boom and that the price of gold is volatile. I became convinced of the latter point once I had heard different predictions from different speakers! When I told a friend that I would be attending the seminar today, he said: "Oh good! you can find out what's going to happen to Placer and Niugini Mining shares". I shall have to go back and report that I learnt that they may go up and may go down! - and it's all due to the Russians!

In the morning session, we also heard a stimulating and perhaps provocative piece from Dr. Odwyn Jones on the Western Australia experience and some possible lessons of this for Papua New Guinea. Some other participants have picked up on a number of points he raised but I would like to raise two possible contradictions in his argument.

Firstly, the State equity versus resource rent tax question. The view has tended to be taken here in Papua New Guinea that a high degree of State equity is not taken due to the existence of the additional profit tax. This involves less up-front cost while allowing the State to tap into the windfall profits. By foregoing equity and granting tax exemption, Western Australia would seem to be missing out on two sources of significant budgetary benefits. I would not see this example as either relevant or applicable to Papua New Guinea. The direct multiplier effects of mining are undoubtedly much lower in Papua New Guinea than in Western Australia.

Dr. Jones partly justified the tax exemption on the grounds of the risky nature of gold mining caused by the extreme price fluctuations. However, he did explain, at some length, the moves made by mining companies to reduce risk through forward selling, gold funding, etc. The extent to which companies can minimise the degree of risk through these measures would seem to weaken the argument for tax exemption.

However, I felt that the key message for Papua New Guinea from Dr. Jones' presentation was the need for a policy for small and medium-scale mining. Department of Minerals and Energy participants appeared to agree that this is needed and it should be given a high priority. As Bill Searson made clear early this morning, his Department has a key coordinating role to play given the number of government agencies actually or potentially involved in aspects of mineral development projects. This question of a clear policy framework also emerged with Arnold Vogel's piece and the comments on it from Tony Luteijn. While I did wonder, and fear on occasions, what Arnold would reveal next, it was clear that the procedure and approval system needs standardising, simplifying and putting out in handbook form for investors and explorers in the industry. A standard framework for different scale operations would undoubtedly speed the approval process. Development of such a simplified system may be an area for collaboration with the Chamber of Mines. The review of the Mining Act and the proposal to allow unincorporated joint ventures are important initiatives by the Department of Minerals and Energy in this direction.

Still on this issue of a stable policy framework, I was amused by Gary Robinson's distinction between "initiatives" and what he termed "ministerial initiatives". It reminded me of a remark made by Sir Humphrey in the "Yes Minister" television series, "Once you allow ministers to write draft reports, the next thing you know they'll be dictating government policy."

One of the minister's initiatives - and I shall incur John Bovard's wrath here by referring to a buzzword - the "Vehicle", was referred to a few times in discussion. It was unfortunate that the minister could not be here to discuss it. Until the idea is more firmly developed, and widely discussed, judgement will have to be withheld.

Morea Vele in an excellent presentation in the second session of the morning put everything back in its overall macroeconomic perspective, which had been lacking until that point.

This perspective introduced a key theme - the question of the beneficiaries of mining development and the distribution and use of returns.

The Prime Minister made the government's position on this very clear in his brief comments after lunch. The government intends utilising the revenue from the mineral sector to develop the rest of the economy. He emphasised that since the vast majority of the population is in the rural sector, it is there that development must take place and hence where expenditure must be directed.

The linkage is therefore indirect, acting through the government budget. Direct linkages, which are far less than in the Western Australian case, will be given a lower priority.

The objective is to maximise the government return through tax and/or equity; although the equity question is one on which there are disagreements both within government and outside.

Morea Vele stressed the role of the Mineral Resources Stabilisation Fund (MRSF) as one amongst a number of instruments available to government in the management of the economy. The changes to the MRSF Act, which apparently caused some concern, should be seen in this context. The MRSF Act has been changed to allow it to be used flexibly as an instrument alongside other fiscal and monetary instruments available to government.

Bill Searson started off this morning by telling us there is no boom and others picked up on this theme. Peter Slaughter warned of counting chickens before they are hatched and other cautioned against pre-empting the boom.

As Morea Vele made clear, the government is desperately resisting the inevitable temptation to pre-empt the boom and continues to impose firm budgetary discipline. He added that the government intends using revenue, if and when it comes, to reduce overseas debt and fund agricultural development.

However, Philip Kikala, in one of the best and clearest presentations, did make clear that people, especially in remote areas, do hope and expect benefits in advance. They see the early stages of development of mine prospects and expect their share of the benefits then. They do not expect to wait some years for medical facilities, as appears to have been the case with Ok Tedi. The concerns which Philip Kikala raised are legitimate and they must be both recognised and clearly addressed by both government and the mining industry.

John Bovard also picked up the benefits theme and the degree to which there is a mutuality of interests in making sure that a mine goes ahead. If it doesn't then no-one gets anything.

Beyond this basic agreement, and in order to consolidate it, considerable communication, concession and compromise is required. This has occurred in most instances to date although we shouldn't underestimate the difficulties and time involved, as the discussion of the Misima experience showed.

I should add that if there wasn't any belief that compromise will occur then we wouldn't even be here today arguing whether we will or will not have a boom. The considerable amount of exploration taking place in Papua New Guinea at present illustrates this belief in the ability to compromise.

Having heard Sam Polume's excellent paper and other comments on the problems of a "boom", I have decided to add the word to John Bovard's list of buzzwords which are actually far more complex concepts than they initially appear to be.

The session after lunch on local linkages, and by local was meant the immediate mine area and province as opposed to national linkages which the Prime Minister and Morea Vele were addressing and which occur through the Budget, was fascinating because of the diversity of experience and opinions expressed.

Paul Nerau summarised the experience of the Bougainville Development Corporation (BDC) - a highly successful, basically broad-based holding company, relatively free of political interference operating in a relatively developed province. BDC has undoubtedly benefited both employees, shareholders and the North Solomons Province. BDC will remain an important commercial force in both the North Solomons and the national economy.

The Ok Tedi experience is very different, operating in a remote, thinly populated, underdeveloped area where considerable mining company involvement has been required and where a holding company is not seen as a good idea. There was emphasis on continuing problems of accountability, financial control and management and the fear must remain that very few of the ventures established will be self-sustaining. The degree of involvement of company employees and expatriates clearly remains much greater in the Ok Tedi case.

We then had the presentation from the Enga perspective. A people eagerly awaiting the benefits, wanting them as soon as possible and concerned that they may be being kept in the dark. The Department of Minerals and Energy must eagerly follow up the Minister's initiative on business development and address these aspirations and interests. While satisfying them may be a problem, their legitimacy cannot be questioned.

These issues again relate to the theme of distribution of benefits. The national government will, and I believe <u>should</u>, maximise the <u>national</u> benefit through its tax-take. This will lead to a certain neglect, but not a <u>total</u> neglect, of local benefits. The excessive provision of local infrastructure, facilities and services will cut into profits and hence the government's tax-take. There is a clear trade-off here between the different interests and while pressure will always be there, and will no doubt increase, to maximise direct linkages and local ones in particular, the government should over the medium term continue to emphasise the national budgetary linkage.

I have already referred to Arnold Vogel's scorching blow-by-blow account of the ongoing Misima negotiations. I only hope that he and Toni Luteijn are working on the script for a television mini-series!

Sam Polume's discussion of the "Dutch disease", the problems it brings and the pitfalls to try and avoid was timely. He will need to repeat it often and loudly over the coming years. Papua New Guinea is fortunate that it now has someone who has researched this issue in such depth.

Late this afternoon we heard Sir Laurence Brodie-Hall's interesting discussion of the Western Australian experience in some detail. He also alerted us to the problems of overdependence on revenue derived, directly or indirectly, from resource booms.

Finally, let me summarise what was not said. The seminar could easily have been retitled: "Gold - To Boom or not to Boom". Oil was briefly mentioned this morning, copper got a token refernce, while other minerals were totally neglected.

Papua New Guinea's non-boom is very narrowly based. It consists almost totally of gold exploration dominated by a very small number of companies. But Papua New Guinea does have other minerals and it would have been worthwhile to have these discussed today. There was perhaps a preoccupation with the next few years as opposed to the longer-term scenario.

Other issues which I expected might be raised but were not concern matters such as land and the environment. I'm not sure whether to be pleased or disappointed that they were not addressed! The importance of political stability was also referred to only in passing.

Despite my complaint on the absence of discussion of other mineral commodities and the longer term picture, it has been an interesting day. I would like to thank, on behalf of all the participants, Sir Laurence Brodie-Hall and Dr. Odwyn Jones for their participation and the Institute of National Affairs - in the form of John and Jocelyn Millett - and the newly formed Chamber of Mines and its President Charles Cole, for organising the seminar.

FACTORS INFLUENCING THE DEVELOPMENT OF A NATIONAL GOLD MINING INDUSTRY - AN AUSTRALIAN PERSPECTIVE

Dr. L. O. Jones
Principal, Western Australian School of Mines

By next year Australia could be the second largest non-communist gold producer after South Africa. Present production is around 100 tonnes per annum and it is anticipated that by 1990 Australia will be producing around 140 tonnes per annum making gold Australia's second largest export earner. Gold exports have undergone a 25-fold growth in the last five years and contributed $1400 million to the Australian economy in 1986 compared to $55 million in 1981. Western Australia is the largest gold producer of the six states and the Northern Territory. There are 80 operating gold mines in Western Australia which are expected to produce about 1.7 million ounces of gold in 1987.

Western Australia is producing more gold today than at any time since 1910. However, the ore tonnage being mined now is about four times larger than was mined in 1910. In terms of the world goldmining industry, Western Australia has recorded the highest percentage increase in gold production of any major producer since 1980. Seven new gold mines commenced operations in 1984/85; this number increased by two during 1985/86 and a further 23 gold mines are expected to come on-stream in 1986/87.

The bulk of these mines are in previously abandoned mining areas and most are small to medium sized open-cut mines in oxidised lower grade haloes around the previously worked higher grade lode systems. Many of these new mines have a life of about 4-10 years and it is anticipated that additional and replacement production should continue to increase at least to the end of the decade.

If the gold price continues to be buoyant some of the open-cuts will eventually become underground mines thus prolonging their limited lives. In addition major expansions are planned for the well-established open-cuts at Telfer and Kalgoorlie. That apart, we have a new greenfields discovery at Boddington and it is anticipated that this mine will produce over 5000 kg. per annum making it the second largest producer in the state.

The situation in Western Australia is a far cry from the elephant country you have in Papua New Guinea where discoveries of massive proportions are being made. As I understand it, Bougainville produces 17 tonnes of gold per annum and Ok Tedi has the potential to produce at least 24 tonnes of gold per annum; not to mention the potential of the Porgera, Misima and Lihir deposits.

We all know of the speculative nature of the gold mining industry. Its success is determined by the gold price and international currency markets. Gold mining and exploration for gold deposits in Australia has historically been stimulated by its exemption from direct taxation. Add to this the fact that gold has never been subject to a state royalty in Western Australia then you'll see it has a very special niche in the Australian economy.

During the 1970's with major currencies no longer tied to gold its price increased dramatically and the need for the continuance of Commonwealth assistance was questioned and two major enquiries were held into the matter. Both recommended against the maintenance of the tax-exempt status of the gold mining industry. These recommendations were however not implemented.

In 1985 the present Labor Government instituted another inquiry into the tax-exempt status of the gold mining industry. The report of the Guttman Inquiry recommended the phased introduction of a gold tax. However, all sectors of the industry supported the newly formed Australian Goldmining Industry Council in its very effective publicity and lobbying campaign. Whilst the campaign started from Perth it soon spread to embrace the whole of Australia's gold mining industry. This campaign in 1986 ended in the government announcing it would not proceed with the tax. Although the council was formed primarily to fight the tax its members decided that it should continue to protect the interests of the industry - after all the tax could be introduced again after the election.

Some of the arguments advanced for the continuance of gold's tax-exempt status are -

- The gold mining industry is one of the few expanding mineral industries in the Australian economy. Much of its expansion was carried out on the assumption that existing income tax and royalty exemptions would be maintained. The result of doing away with this concession could be to halt and maybe reverse this expansionary trend. That apart, the gold mining industry is often at the peak of its performance when other sectors of the mineral industry are struggling.

- The volatility of the gold price presents the industry with a real problem e.g. between 1977-78 and 1981-82 the average monthly price of gold varied from just over $100/oz. to just below $600/oz.

  The absence of tax and royalties helps the industry achieve extra returns when the price is high to compensate for those times when operations earn low or negative returns.

- The industry provides much needed employment at a time of relatively high unemployment.

- The gold mining industry plays a significant role in opening up the remote regions of Australia and mining in these regions involves higher costs.

- Currently the gold mining industry generates about $1.8 billion in much needed foreign exchange which helps boost our export earnings and improve our balance of payments.

Of course there are arguments which can be advanced against the continuance of the tax exemption for gold. Some of these would go as follows:-

- When the concession was introduced in 1924 it was only intended as a short term measure to assist the industry during the depression.

- Assistance in the form of reductions in, or exemptions from, profit-based taxes or royalties cannot be said to expand output or help unprofitable mines - it only helps the profitable producers. Consequently the major proportion of the benefits accrue to those companies which are least in need of assistance.

- The "if one suffers - then everyone should suffer" syndrome. In other words the assistance given to the gold mining industry is not available to other sectors.

Financing gold development

The mineral supply process can be explained as a sequence of dependent and sequential events.

First, we have the primary exploration stage which involves the geological, geophysical and geochemical examination of selected areas which may lead to the discovery of a mineral deposit. Needless to say the risk at this stage is very high indeed and the so-called "seed capital" for this stage is usually wholly financed out of equity funds provided by investors or as part of an operating budget of a mining company. Whilst the total funds involved are, relatively speaking, modest the risk of losing the investment is very high indeed.

Having found mineralisation we enter the next stage - that of delineating the orebody, defining its structural geology, assessing the strength properties of the strata and the mineralogical nature of the deposit so that a mineral processing system can be designed to treat the ore. At this feasibility study stage the chances of the mine prospect becoming a producing mine are much better. Nevertheless the investment risk is still high. Venture capital for the feasibility studies and delineation drilling programme can be raised in a number of ways:-

- by seeking a joint ventureship with a larger company;
- by raising public funds through a float;
- by seeking private venture capital.

Having completed the final feasibility study and proved that the extraction and processing of the orebody is technically feasible and economically viable, debt financing can be considered for the mine development stage. As you can see the banks are not prepared to enter the fray until the risks are minimal.

Needless to say the outflow of funds during the first three stages (i.e. primary exploration, feasibility study and mine development stages) is considerable and no income is generated until we come to the fourth and final stage i.e. mine production.

Debt financing of gold mines and gold trading strategy

Gold production in Australia has increased dramatically over the past three years due to rising United States gold prices, the devaluation of the Australian dollar relative to the US dollar and the tax-exempt status of gold mines.

With present gold prices of $A600 an ounce and higher many gold mining companies enjoy cash operating margins of more than $300 an ounce. Consequently even small, medium cost mines employing 20 to 40 people and producing say 10,000 ounces of gold a year are capable of generating annual net profits of more than $3 million.

Whilst it appears that gold mines are making bonanza windfall profits it must be remembered that the gold price is notoriously volatile and until fairly recently was very close to the average unit cost of production for many of these same mines. Due to the historic volatility of the US dollar-dominated gold price, the Australian dollar, and the US dollar, gold producers have in recent years been seeking financial tools which ensure some degree of stabilisation and guarantee of the future gold price. Bullion dealers operating within international currency and metals markets have filled this need by designing and offering to gold producers a variety of new methods of financing mine development and trading. These new financial systems are flexible and can be customised to suit the individual needs and circumstances of the gold producer. They include forward selling, gold loans, gold bonds, options, futures contracts, and Eurobond funding.

Gold loans have been a popular source of debt finance for mine development in Australia. Under these loans a bullion dealer lends gold to the producer who sells the gold spot for cash. The most attractive feature of gold loans to the corporate borrower is the low borrowing cost of between 3 and 5 per cent per annum as against direct funding by a banker at an interest rate of between 17 and 20 per cent. A further advantage is that the company does not have to resort to equity-based financing which of course dilutes their shareholding and control of the company.

Gold loans relating to project finance applications were pioneered in Australia some six years ago. Indeed, since 1983, some 40 gold mines producing in excess of 16,000 ounces per annum have come on stream and many of them were financed by way of gold loans. The system was developed as a low interest, debt financing tool for the small to medium sized gold mining company.

Gold is generally regarded by bankers as a form of financial asset and consequently gold-based lending as introduced by bullion banks makes use of this financial asset for financing gold projects in Australia.

Gold loans as introduced for debt financing of small to medium size mine development use the project or, more specifically the gold in the ground, as the main form of security for the borrowing of gold. Consequently the lender must be assured that the proposed project is a worthwhile business venture. Gold loans are a form of forward selling since the borrowing company's gold is valued at the spot price when the loan is entered into. Most gold loan facilities have a term between two and five years following the commencement of drawdown. Redelivery of gold from the borrower to the lender usually starts within 90 days of commencement of gold production and takes place weekly, monthly or quarterly. Most bullion banks require a project-based borrower to enter into some price protection arrangement in order to ensure a satisfactory sales price for a portion of the gold produced by the borrower during the term of the loan. Generally bullion banks require that 25-40 per cent of gross gold production be hedged in one form or another, e.g. forward selling.

Whilst gold loans remain an attractive means of raising debt-based project finance, the buoyant state of the stock market in Australia offers emerging gold companies the alternative of raising capital by share placements and issues.

Gold dominated bonds have also recently been used to raise capital in North America and Australia. They allow producers to raise capital at nominal discount rates with an additional obligation by the gold producer to deliver, on demand, gold to the bond holder at a specified price and future date. More recently Eurobond funding has provided Australian producers of all sizes with a new market for raising low-cost finance and/or long-dated hedging of gold. The bonds have been issued in a number of currencies and the exercise price on the warrants has been denominated in either the US dollar or Swiss francs. The investor demand for gold-linked Eurobonds has come almost exclusively from Switzerland.

By these means gold mining, traditionally a "boom and bust" industry highly sensistive to fluctuating gold prices, can as never before weather the busts whilst continuing to enjoy the booms.

Let me now turn to the factors influencing the gold trading strategy of a gold producer.

In establishing a gold trading strategy one has to balance the company's need to remain viable on the one hand and its need to maximise profits on the other. There is always this conflict between the need for security and the need for reward.

In the gold mining business the basic problem is our inability to forecast the international gold price trends with any degree of accuracy. The price of gold is affected by a wide range of factors both economic and political. Some follow the laws of supply and demand whilst others defy economic sense. Some relevant facts are -

- Governments have large gold reserves and depending on the economic climate they may be sellers or buyers.

- Gold used in the production of bullion coins fluctuates with new issues. For example, the Australian nugget series of bullion coins launched on 23 April are already a significant competitor to the Canadian maple leaf and the United States eagle. More than 500,000 coins or 227,769 ounces were sold during the first seven weeks surpassing the target of 130,000 ounces. Total sales were $151 million.

- Gold is sought as a hedge against inflation and demand tends to rise when inflation levels are high.

- Gold is a hedge against the threat of a domestic devaluation in countries with weak currencies.

- Gold is sought as a hedge against political uncertainty and demand increases when political problems loom.

- Supply can be affected by events in major producing countries. Russia can be a significant buyer or seller of gold depending on the state of the grain harvest and price of oil.

- Some 75 per cent of the gold produced goes towards the manufacture of carat jewellery, coins, etc.

<u>Strategy for managing risk</u>

Like any other business there is a relationship between risk and reward in the gold mining industry. The higher the risk the greater is the potential for reward if things turn out right; on the other hand, if things do not work out according to our optimistic expectations the potential for disaster is greater. If we adopt a more conservative bullion dealing policy which guards against potential loss our potential gains will be reduced. In other words all forms of insurance or protection can only be bought at a price.

In order to secure their future most companies adopt a strategy based on dividing production into two segments. The first segment is treated as insurance and is based on a calculation of total production multiplied by operating costs per ounce with figures taken from the latest budget,

i.e.	I = A x B
where	I = total insured receipts
	A = average operating cost/oz.
	B = total projected output.

Thus for a mine producing 120,000 ounces of gold at an operating cost of $460 an ounce the insured receipts are $55 million, representing 78 per cent of production at current prices. The company's board of directors have to decide whether or not to cover 100 per cent of the operating costs. In a buoyant market with high shareholder expectation it may be that the board decides that only 50 per cent of production be treated as the insured segment. This insured segment is achieved by forward selling and/or taking out options.

A common strategy among Australian gold miners is to sell 50 per cent of production forward. This is equivalent to an each-way bet since half of the production is locked into a known price and the other half is exposed to speculative gains or losses. Most companies dispose of their speculative portion of sales on the spot market. The larger Australian gold producers such as Western Mining Corporation and Dallhold Resources Management sell their gold through their treasury whilst BHP sells its gold through its minerals division.

Whilst many producers have looked at the possibility of actively trading their gold through options, futures, etc. few of them have done so because of their fear it may jeopardise their tax-free status. Forward selling is arranged by contract in multiples of 400 ounces for periods of up to one year. The forward price is the spot price when the contract is entered into plus an interest component (contango). Needless to say, when prices are on a falling trend forward selling yields higher returns and vice versa. As far as spot sales are concerned the selling is best done at a time when it is judged that the combination of gold price and the US dollar/Australian dollar exchange rate will give the highest return.

Lessons to be learnt from the Australian gold mining industry

The Pacific Rim countries will undoubtedly become major gold producers, in world terms, within the next ten years and Papua New Guinea is in a particularly favourable situation.

Lihir has proven reserves of 11.7 million ounces; Bougainville has over 10 million ounces; Porgera 11.6 million ounces; Misima 2.7 million ounces. Compare these figures with Kidston which is currently Australia's largest producing mine with 2.3 million ounces of gold and annual production of 220,000 ounces. However many of Western Australia's deposits have less than 100,000 ounces of gold in the orebody.

The Western Australian government has always been supportive of its gold prospectors and small-scale operators. It developed in the early years of this century a number of State batteries in order to serve the special needs of the prospector and small-scale operator. The primary objective of these batteries was to enable the prospectors and small mine owners to prove their mines by working trials.

There are currently 13 batteries in Western Australia which treated a total of 24,000 tonnes in 1985/86. Currently 500-600 companies and prospectors produce gold in Western Australia.

First Lesson - look after your prospectors and small scale operators.

Bureaucratic procedures and control of mining tenements in Western Australia are relatively simple and effective and any disputes are referred to the Warden's court.

Apart from the fees and charges relating to registration of tenements no further financial penalty is imposed on prospectors and gold producers. In other words the Western Australian gold mining industry is tax and royalty exempt. This has had a lot to do with the recent upsurge in gold mining in Western Australia.

Second Lesson - Government policies and legislation should encourage prospectors and the smaller operators to explore and develop their tenements. There is much to be gained by providing the prospectors and small-scale operators with tax-free status. To follow on from what was said earlier, government-run batteries and custom milling facilities could assist prospectors and small-scale operators to develop their prospects.

Apart from providing the gold mining industry with tax and royalty free status the Western Australian government has never entered into equity participation in any gold mining operation and has consequently never become involved in management decisions.

Lesson Three - I would think it undesirable for the Papua New Guinean government to take up equity participation in any but the large-scale operations.

The gold mining industry in Western Australia has had a considerable impact on regional development. The employment of people, development of essential services and the wealth gold mining has brought and still brings to the economy of the state and nation through foreign exchange earnings has had much to do with the development of Australia and the standard of living of its people.

The multiplier effect of gold mining in Western Australia is 2.8 which is to say that for every 100 jobs in gold mining a further 180 jobs are created elsewhere.

As a major gold producer Western Australia has had its own mint for refining gold bullion since the early days of gold mining. Of course this is an important facility since only refined gold bars produced by refiners and assayers on the "good delivery list" can be traded on the London Gold Market. Western Australia is about to expand its minting facilities with an enlarged new mint near Perth's international airport and a new mint and carbon stripping plant at Kalgoorlie. These facilities will enable us to produce high quality refined gold bars, minted coins and medallions and will be the precursor to the development of a jewellery industry.

Lesson Four - To foster the development of the gold mining industry is to foster regional development, the creation of jobs, the generation of foreign exchange and the improvement of people's standard of living.

Finally, let me turn to the subject of education. If a nation's mining industry is to flourish facilities must exist whereby field assistants, survey assistants, miners and plant operators can be trained on the one hand and management staff at junior, middle and professional levels can be educated and trained on the other.

Lesson Five - If a nation's mineral resource is to be exploited in the interest of its people then mining industry employees should have the opportunity of achieving their full potential as contributors to the further development of that industry. This can only happen if a well structured and cohesive education and training system exists which includes the existence of -

- training centres;
- certificate and diploma course for junior and middle management staff;
- professional courses in exploration and mining geology, mine surveying, mining engineering and extractive metallurgy at a school of mines.

Ideally the education and training system should constitute a ladder plan so that each step taken by an individual employee to better himself leads on quite naturally to the next. Thus, able and motivated personnel can rightly aspire to reach the highest level of attainment. This requires the development of an integrated system involving the mining companies, technical colleges, and universities. Indeed I would strongly recommend that the Papua New Guinean government seriously consider the establishment of a school of mines within one of its universities. In Australia we currently have three schools of mines which embody applied geology, mining engineering and extractive metallurgy departments. These exist at the Curtin University of Technology in Western Australia; the University of New South Wales in Sydney and the South Australian Institute of Technology in Adelaide.

In conclusion let me say that countries with a prospective gold mining industry have the means by which they can strengthen their economies and improve the standards of living of their people. However, to reap the maximum benefits from gold mining, governments need to be sensitive to the vagaries of the international market place and provide the industry with special support and encouragement.

MAJOR POLICY INITIATIVES TO PROMOTE MINERAL AND PETROLEUM ACTIVITIES IN PAPUA NEW GUINEA

Gary Robinson
Assistant Secretary
Minerals and Energy Policy Division
Department of Minerals and Energy

It is now obvious that Papua New Guinea is on the brink of a resource development boom. The already identified developable commercial mineral prospects at Misima, Lihir, Porgera, Hidden Valley, Wild Dog, etc. and the large oil find at lagifu in the Southern Highlands confirm the resource potential of Papua New Guinea. The heightened exploration programmes in both sectors hold the promise of new finds. In all likelihood, next year at this time we will be able to add to this list of commercial deposits.

However, there is a lot of hard work ahead for both the industry and the government before these hopes become reality. The timing of this conference is appropriate since, although much work is behind us, in terms of realising the developments at Bougainville and Ok Tedi and encouraging the high degree of industry interest we see today, there is much work ahead. In many ways, it appears to me Papua New Guinea is entering a new era that will see a number of developments over the next 10 years that will have a large impact on all levels of Papua New Guinean society. It is in the industry's interests, and the government's responsibility to ensure, that the country's resources are developed and developed correctly. That is, developed so that industry is rewarded for the risks and capital invested, and Papua New Guinea benefits from the wealth (e.g. higher standard of living) and the opportunities the developments create.

The Department of Minerals and Energy's dual objective is to promote mineral exploration and development while realising the greatest benefit to Papua New Guinea. Obviously, a necessary condition for the department to pursue this objective is a rich resource endowment. This is not sufficient however, since expert knowledge and a great deal of financial resources are required to find and develop the indigenous resources. Hence, an attractive and suitable investment climate must be promoted to attract the necessary offshore capital. Secondly, the department, in conjunction with other departments such as Finance and Planning, Justice, Trade and Industry, Environment and Conservation are responsible for securing the greatest net benefit to Papua New Guineans. I take the existing developments at Bougainville and Ok Tedi and the high level of exploration activity as proof that the present policies are at least close to the mark. Rather than spend time discussing the existing framework, I would like to focus on the policy initiatives supported by the department in an effort to improve the existing framework. I have divided the policy initiatives into two broad categories; administrative and fiscal.

Administrative policy initiatives

There are a number of initiatives that the department is pursuing to adapt itself to the present high level of activity and speed its reaction to industry needs and requests.

First, the department has reorganised into three technical areas of responsibility which are intended to better serve the industry's needs for information, to speed up the licensing process, to coordinate the industry/government decision-making process, and to provide a focus for longer term policy formulation. The department is headed by the Secretary, Mr. Bill Searson.

The largest group is the Geological Survey consisting of 126 positions and headed by Greg Anderson. The Survey has a broad range of technical responsibilities which include geotechnical investigations for major developments and promotion and monitoring of mineral and petroleum exploration programmes. The minerals division and the petroleum division in particular were established to foster private exploration by providing geological maps and carrying out exploration activities to gather the latest information in areas that have been largely ignored by industry due to a lack of data. The two divisions also closely monitor the work commitments of companies holding prospecting authorities and petroleum prospecting licences.

Mines is the second largest function with 62 positions and headed by Lamech Palaso, First Assistant Secretary for Mines. The department's inspection and mine safety responsibilities are here as well as the minerals prospecting and administration branch. This branch administers mineral exploration licences and contains the mining wardens. The newly created small-scale mining division was set up to promote small developments for the benefit of rural areas.

The third major group is Policy and Coordination made up of 32 positions and headed by Dave Evesson. One of the primary responsibilities of this function is to promote policies that insure Papua New Guinea remains an attractive place for minerals and petroleum investors and to coordinate government input in order to speed passage of a prospect through feasibility to development. I am the assistant secretary for the minerals and energy policy division and Arnold Vogel, who will speak later is assistant secretary for project coordination.

The department's new organisation is intended to promote as much as practicable the efficient implementation of the department's objectives. Internally, we will continually review our performance and adjust our organisation to more efficiently and effectively carry out our mandate.

A second major administrative initiative is an internal review of the Mining Act. We recognise that the existing legislation can be much improved. The review is geared to developing new legislation that will achieve the following considerations -

- It must be modernised to address the issues and needs of today's industry and government policies.

- The legislation must be as simple and easily understood as possible while being comprehensive.

- The legislation must be internally consistent. Present legislation contains inconsistencies between the regulations and the Act.

- The legislation must address the particular requirements of small and medium-scale mines.

- It must provide a more streamlined administrative framework.

After completing this internal review, we expect to provide industry with the opportunity to comment. Our approach may be through the newly-created Chamber of Mines. Following this review, we intend to submit the revised legislation to parliament in the first half of 1988.

Fiscal policy initiatives

With respect to fiscal policies, we are examining policy changes that will further enhance the investment climate of Papua New Guinea, and policies affecting the distribution of benefits.

Of course, central to the Papua New Guinean fiscal policy is the tax regime. The tax regime has evolved from that first developed for the Bougainville Copper Ltd. project and later the Ok Tedi development. Unlike the tax regime for these two projects, which are contained in their respective Acts, the present tax regime is contained in Division 10 of the Income Tax Act. The Misima project will be the first project to be taxed under this regime. I understand that a later speaker will be discussing in more detail the tax regime, and the additional profits tax (APT) in particular. I should only want to emphasise at a more general level, that the tax regime should be considered in its entirety and not as separate components. The very low royalty rate and generous depreciation rules are aimed at marginal projects that experience cash flow problems in the early years. The APT regime is intended to capture a greater share of the income benefits from very profitable developments. Overall, the tax regime is intended to have a neutral effect (as far as possible) on the investment decision and to efficiently capture the resource rent.

A fiscal measure under consideration intended to enhance Papua New Guinea's attractiveness is to allow the use of an unincorporated joint venture (UJV) to develop a mineral deposit. A UJV is a contractual arrangement which is very common in the oil industry, but less so in mining, except in Australia. Under existing legislation (Mining Act and Tax Act), only companies incorporated in Papua New Guinea whose income is derived solely from mining operations can hold a special mining lease. Given the UJV structure several companies could hold the special mining lease as tenants-in-common and develop the property whilst maintaining their corporate identities. With the appropriate adjustments to the Papua New Guinea Tax Act, permitting UJV will have no negative fiscal implications. From the industry's view, it would allow greater flexibility to arrange financing, optimise corporate structure, and capture home-country tax advantages. In this way investment in Papua New Guinea becomes cheaper from the parent company's perspective without sacrificing Papua New Guinea's tax revenues.

Several other policies under investigation focus on the distribution of project benefits; these include proposals for local business development, and providing Papua New Guineans with an opportunity for direct participation in mineral developments. It might be noted that these initiatives arise directly from the evolving awareness of the Papua New Guinean people and the changing understanding of the potential opportunities a resource development offers. As such, the people's wishes have been expressed through their elected representatives and the policies are being taken forward at the ministerial level with input from various departments, industry, and outside agencies such as the World Bank.

The industry recognises that local business development is an integral part of developing a mine in Papua New Guinea. The two existing mines at Panguna and Ok Tedi have encouraged the establishment of viable local business enterprises. The properties at a more advanced stage of pre-development such as Misima and Porgera also have local business organisations. It is recognised, however, that in some cases the discovery of a commercial deposit brings on a free-for-all as competing groups jockey for a larger share of the potential market. It is in many cases survival of the fittest which may quite unnecessarily be at the expense of the local landowner. The ministerial initiative on business development (as I interpret it) is first to help organise this process so that local landowners are not disadvantaged.

Secondly, a structure would be established to look after the longer term interests of the local people. This Development Foundation, for want of a better title, would be linked to commercially oriented operations but would have a broader aim of improving the social development of the local people. The foundation would promote the development of skills in commerce and community service and advise and train business groups in carrying out business activities. The foundation would also provide assistance over and above normal provisions from government resources in medicine, education and welfare.

The objective of the policy is a sound one. That is, to prepare the local people now, by equipping them with the infrastructure and skills, to sustain a similar quality of life in the post-mine era. In practice however, implementation is complex. It must be coordinated with the existing business development programmes as well as integrated with other government programmes if it is to be successful.

Lastly, a ministerial committee was established to report on the feasibility of transferring the government's equity holdings to a corporate vehicle. The vehicle in turn would provide equity shares to Papua New Guineans as and when they are capable of taking them up. The initiative was in response to the expressed wishes of the people who desire a more direct ownership in the mineral developments and an on-going participation in mining profits. The ministerial committee received advice from the industry and from government departments including the Department of Minerals and Energy. The committee faced a number of difficult choices in terms of achieving the long-term objective of satisfying the people's aspirations to participate in the development while not encouraging short-term speculation or diverting ownership to offshore investors, and not compromising the government's regulatory and taxation responsibilities. The ministerial committee is expected to draw up a final proposal and report to parliament sometime this year.

Conclusion

In closing, it is obvious that there is much work to be done to realise the potential of Papua New Guinea's resource wealth. At the policy level, the department is attempting to, on the one hand, maintain the attractive investment climate which is essential to promoting the developments, while, on the other hand, recognising the evolving aspirations of the people and their institutions. It might be noted that the two are not independent, since the people's attitudes towards development are greatly expanded and influenced by the experience of past development.

So what does this potential resource boom hold for Papua New Guinea. It could be a number of one-off developments that benefit a few leaving many disgruntled, with little long-term benefit in improved overall standards of living. Clearly this result would indicate a massive policy failure by the government and it would not be in the long-term interest of industry. The existing policy framework, the track record of Papua New Guinea and the policies we are initiating are aimed at avoiding this result by securing industry investment over the long-term, while realising a balance of tax revenue, and promoting opportunities for Papua New Guineans to move into positions where they can more fully participate in the developments. With a combination of hard work and cooperation among all parties concerned I feel that Papua New Guinea has a bright future.

MACROECONOMIC ASPECTS OF MINERAL SECTOR DEVELOPMENT IN PAPUA NEW GUINEA

Morea Vele
Deputy Secretary, Economic Policy Unit,
Department of Finance & Planning

I would like to begin by thanking both the I.N.A. and the PNG Chamber of Mines and Petroleum for the opportunity to participate in these discussions. The importance of the mineral sector is obvious to all of us present here this morning and I believe it is appropriate and timely that we are here today to address the questions relating to opportunities and challenges which are more than likely to arise in this sector over the next 10 years.

I should note, however, that my presence here is not altogether official and that the views I shall express are in large part my own and not necessarily the views of the Department of Finance and Planning.

My contribution will relate mainly to what I consider to be an erroneous assumption in the seminar papers that the stabilisation capability of the Mineral Resources Stabilisation Fund (MRSF) was destroyed in advance of a perceived boom. I will start with a brief overview of the macroeconomic policy framework, its objectives, and how these are likely to evolve in the near future. Then I will go on to outline how macroeconomic policy objectives relate to developments in the mineral sector through the operation of the MRSF. Finally, I will touch on the macroeconomic implications of a mineral boom.

Macroeconomic policy - a brief restatement

The development and operation of macroeconomic policy in Papua New Guinea has been the subject of wide discussion and documentation by many authors since the attainment of political independence in 1975. In this forum it is therefore neither appropriate nor desirable to comprehensively discuss the existing macroeconomic policy framework in its entirety. However, it is pertinent to restate the fundamental thrust of macroeconomic policy which directly affects or relates to resource development in the mineral sector.

To begin, the characteristics of an economy determine the appropriate macroeconomic policy. In our particular case, the Papua New Guinea economy is characterised by the following features:

- It is small and fragmented with a low population density.
- It is lacking in social and physical infrastructure.
- It is very open, with a high level of both exports and imports relative to total economic activity.
- It is a price-taker with no influence over the prices it receives for its exports or pays for its imports.
- It is dependent upon agriculture and mineral commodities for more than 90 per cent of all export receipts and is therefore subject to considerable fluctuations in export earnings.

- It is an economy in which the government plays a major role, with goods and services expenditure by government accounting for nearly 40 per cent of gross domestic product.

Macroeconomic policy since independence has been based on what has come to be widely known as the "hard kina strategy". Despite the name, the emphasis of this strategy has been on sound economic management rather than on the value of the kina itself. This strategy involves a combination of economic policies which are aimed at attaining both internal and external balances; and by doing so maintaining economic stability in the economy as a whole.

For instance, fiscal and monetary policies are targeted largely towards external balance in terms of the supply and demand for foreign exchange with the exchange rate operating, with minimum intervention as far as possible, to equate supply and demand. Similarly wages policy and, wherever feasible, exchange rate policy are targeted towards internal stability in terms of the labour market; although, with the system of minimum wages, the efficacy of these policies as instruments is relatively diminished.

Macroeconomic policy is therefore a package of policies which should all be consistent and mutually supportive. Thus, if government expenditures grew too fast (quite possible during a commodity boom), there would be a balance of payments crisis when the value of exports subsequently fell. Initially this could be overcome by increasing external borrowings but, not only would this create unacceptable debt-service burden for future generations, but also it is only sustainable in the short term. As borrowings increase relative to exports there would be pressure on the exchange rate and ultimately the country would be forced to take a cut in its standard of living through exchange rate depreciation.

The focus of the strategy is therefore simply sound economic management. One sign of sound economic management would be the continued existence of a freely convertible currency that maintained its external value (hence the name of the strategy). However, the effectiveness of the policies will be limited by two things -

- balance of payments and debt-service constraints; and
- the appropriateness of microeconomic policies throughout the entire economic system.

The effectiveness of macroeconomic policy is increased when all components operate in concert. For example, the exchange rate can do much more to support local production if the institutional real wage setting system is flexible than if it is rigid. The need for complementarity cannot be overstressed.

In short, macroeconomic policy has been used to create an environment of economic stability. This shows up through various measures of demand stabilisation, a stable fiscal regime, and a monetary policy which is supportive of fiscal policy.

However, Papua New Guinea's economic growth performance since independence has been less than satisfactory; but this does not mean that macroeconomic policy has been inappropriate. But it does show that macroeconomic policies, alone, are not the critical determinant of economic growth performance. Equally important are external events, such as movements in commodity prices, and microeconomic policies.

The government and the private sector (excluding mining) have not been investing enough to produce satisfactory growth. Reasons for low private sector investment include land difficulties, the multiplicity of regulations and the high cost of labour, while the unsatisfactory allocation of government expenditure is due to competing claims for such expenditure. In addition, much government investment has low rates of return and is spread over many years. Mineral sector development has been recognised as an important contributor to growth in general and government revenues in particular.

The development of major projects and the associated contribution to fiscal self-reliance was noted with the successful renegotiation of the Bougainville Copper Limited (BCL) Agreement. The government has since built on this policy in other major natural resource negotiations.

The objective of the government is to ensure as much as possible that foreign exchange transactions in the mineral sector do not create an adverse impact on macroeconomic management. The government recognises that mineral projects are by nature enclave developments and have little direct linkage to the rest of the economy. Therefore the government established the MRSF to accumulate receipts from the mineral sector and to redistribute the same resources to the rest of the economy through the national budget. The MRSF was originally based on a resource-rent concept and was designed not only to even out fluctuations in the national budget every year but, at the same time, it (MRSF) attempts to spread the benefits derived from non-renewable resources over a longer period of time.

The mineral sector in Papua New Guinea is large and because it accounts for a significant share of total domestic output, transactions within the sector can seriously affect the overall balance of payments and production in other sectors of the economy. Furthermore, the government attempts to prevent short term speculation against the domestic currency to maintain stability in the external value of the kina. At the same time the government would be concerned to limit net foreign currency remittances to its foreign exchange earnings so that international reserves are not unduly drained.

In dealing with prospective mineral investors the government does appreciate the normal investor's concern of ensuring that funds earned within Papua New Guinea are -

- convertible at a non-discriminatory rate of exchange;
- remittable to the overseas parent company or shareholder as desired; and
- subject to a minimum of foreign exchange risk.

The revised BCL Agreement with the state has now established the general framework for future dealings with potential investors and appears to have served both parties well with the state enjoying a better tax regime and with BCL continuing to operate.

Stabilisation policy and the MRSF

(1) Establishment of the Fund

The MRSF was established under the Mineral Resources Stabilisation Fund Act 1974-75. The original Act, passed in December 1974, provided for all income tax (including additional profits tax), dividend withholding tax, dividends on government equity and royalties from companies operating on special mining leases to be paid into the MRSF rather than directly into the Consolidated Revenue Fund.

The MRSF Act was amended in October 1975 to exclude royalties from the revenue flowing into the Fund. In introducing the amendment bill into the national parliament, the Minister for Finance explained that the exclusion of royalties simplified the administration of an agreement between the national government and the North Solomons Provincial Government, under which the national government undertook to make royalties from the Bougainville mine available to the North Solomons Province.

The MRSF Act was amended again in February 1983 to remove restrictions which prevented the MRSF board of management from lowering metal price forecasts when metal prices fall very sharply. This was necessary to ensure that excessive fund payments are not made during periods of severe international economic recession.

With the passage of the 1987 national budget, the MRSF Act was further amended to achieve two requirements which were to extend the coverage of the Fund, and to introduce more flexibility in the use of money in the Fund. The first amendment was essentially technical. Since the Act was established the legal developments have meant that the MRSF does not cover petroleum revenues. In addition, there are some activities which are not mining or oil development, but are entirely associated with these industries. Examples are the operations of the North Fly Highway Development Company and of any future oil pipeline companies. The MRSF Act has now been amended to explicitly ensure that petroleum revenues and revenues from specified companies associated with mining or petroleum are now covered.

The second amendment addresses the operation of the Fund. At present the Act specifies that the board must determine the maximum level of sustainable drawdown over the next five years, given expected payments into the MRSF. This smooths the effects of expected fluctuations in revenues. In addition, drawdowns can only increase by a limited extent from year to year in order to avoid the situation that could arise if expectations of an increase in revenues turn out to have been excessively optimistic. There is a need for great caution by decision makers especially when favourable expectations of revenue flows into the Fund can lead to an unreasonable boom in expenditure on goods and services which cannot be sustained in the event that prospects then deteriorate dramatically. Such year to year swings in expenditure would be detrimental to growth and development.

Despite the desirability of present provisions to instil prudence by ensuring that appropriate expenditure levels be sustainable given revenue swings, these same provisions also prevent good management of the nation's overall financial position. This means that available resources in MRSF cannot be used to reduce our debts or to avoid incurring more debt which boils down to poor financial management. The amended Act retains the present provision that the board must consider the maximum level of drawdown that it expects can be sustained over the next five years. Furthermore, it allows for a broader perspective in considering the overall financial position over the medium term instead of looking only at the assets in the MRSF.

At present, Bougainville Copper Limited and Ok Tedi Mining Limited are the only companies whose incomes fall within the ambit of the Act, although Ok Tedi will not be contributing to the MRSF in the immediate future. The Fund is managed by a board comprising the Secretary for Finance and Planning (previously the Secretary for Finance and the Director of the National Planning Office), as chairman and the Secretary for the Department of Minerals and Energy.

(2) Objectives of the Fund

The prices of mineral commodities, particularly copper, gold and silver, are notoriously unstable. As a result, the profitability of mining operations fluctuates widely, as do government revenues derived from taxes on these profits. With an additional profits tax system, such as has been adopted for the mining industry in Papua New Guinea, this variability is even more pronounced.

The MRSF was set up to even out the flow of revenues from the mining industry into the national budget, by the accumulation of reserves in years in which revenues are relatively high, and the use of reserves in years in which revenues are low. This approach is now an integral component of the government's overall economic stabilisation policy.

Implications of a resource boom

With the current mineral projects in the pipeline and the possibility of more in the future and the prospect of a feasible oil development, Papua New Guinea is more than likely to experience a resource boom. A resource boom in Papua New Guinea would be indeed a favourable phenomenom and the question is basically one of managing that boom. The above discussion on the MRSF and recent changes in the MRSF Act call for absolute prudence in decision making by appropriate authorities in the event of a resource boom.

Planning and budgeting in Papua New Guinea has historically been focused on government expenditure decisions. Essentially, the constraints identified earlier on the government's ability to manage the economy remain paramount. A resource boom, if not carefully managed, would see government expenditure reaching high levels which would not be sustainable once the boom receded. Given the country's high propensity to import, this would result in balance of payments problems. Demand would be boosted in the economy creating inflationary problems domestically. Given current and past economic environments of limited resources and restraint, it would be imperative to exercise prudence particularly in the absence of legal restraint in the MRSF Act.

In terms of future planning, the prospect of a resource boom is under consideration and planners in the Department of Finance and Planning have held in-house discussions to consider policy options and create general awareness of such a possibility and its implications. We are currently facing problems of resource availability with rather limited capacity for increased borrowings, dramatic decline in Australian aid and an adverse impact of depressed commodity prices. For some of us the perceived resource boom is some time off and we would rather have it now.

Initially the proceeds from the boom will assist with debt service payments and will fill in the gap created by falling Australian aid. After that it will be largely a management question as to how these additional resources are channelled into sustainable economic growth and development of the economy.

At present, with declining resources, the focus of government expenditure planning is shifting to improving its quality rather than increasing its volume. This I believe is timely and will assist with better planning of even greater resources once the boom is realised.

INVESTING IN PAPUA NEW GUINEA - A GOLD MINER'S PERSPECTIVE

P. J. Slaughter
Managing Director
Highlands Gold Limited

I would like to thank the Institute of National Affairs for inviting me to participate in this seminar. Being a relatively recent arrival in Papua New Guinea I feel somewhat impertinent in addressing many of the issues with which so many of you have been personally grappling for many years. At the same time, though, I represent a company with some 25 years' experience in the country and with a firm intention to make a longer term commitment.

In addressing you today I thought it might be worthwhile, therefore, to focus on why it is that a company like MIM Holdings - and now Highlands Gold - would look to Papua New Guinea as a major long-term investment prospect.

This seminar, bringing together as it does, many of the participants in Papua New Guinean policy making is an opportunity to speak seriously about these matters which are so important for the people and economy of Papua New Guinea. In doing so, I am conscious that I, like others here today, represent organisations which, notwithstanding their long association with Papua New Guinea, are still perceived as something of outsiders. I am conscious, too, that there is a need to learn of each other's motivations and aspirations and plans for the years ahead.

This is an excellent opportunity to continue that process by bringing such issues into the open, addressing them and, hopefully, building upon the fundamentally sound relationships which have been established over many years between those involved in resource exploration and development and the people of Papua New Guinea. Those relationships are fundamentally sound because the Papua New Guinean people, through their government, are providing opportunities for mining companies with due recognition that we do contribute something. But more, all parties can consummate a deal feeling comfortable that everyone has gained and that there is something for everyone to work toward.

In this regard, I was particularly heartened by the remarks of Prime Minister Wingti in Sydney on 1 June in his address to the Australia-Papua New Guinea Business Co-operation Committee. His realistic assessment of the important role of foreign investment, including Australian official grants; his recognition of the contribution of mineral development in fulfilling the aspirations of his countrymen; and, his sensitivity to the commercial environment in which resource development occurs, all reinforced these perceptions.

This presupposes some important common philosophical commitments about which I would like to say something further before going on to review more closely the events which have generated such interest in Papua New Guinea's resources, particularly gold.

Pursuit of profitable new gold ventures by producers and financiers has primarily focused on locations with which they had grown familiar and in which they felt comfortable. South Africa, traditionally a supplier of pre-eminent importance, has fallen from favour. Sites in Canada and the United States have been the most sought after even by those with global operating and investing perspectives. Australia, with its historically prominent role as a gold producer, has also become an increasingly attractive location.

Among Australian companies and those foreign companies which have been involved in the region, Papua New Guinea has for some time been of interest for similar reasons, but now, as word spreads, many more are also recognising the commercial potential of Papua New Guinea's resources.

In mining, the quality of a resource largely determines its profitability. In this sense, mining differs distinctly from manufacturing and service provision insofar as it must accept this environmental factor unquestioningly as a constraint on the way it goes about development and, therefore, also on its costs.

High quality deposits, when they are combined with quantitatively significant deposits, make for good mines and good managers. Papua New Guinea is fortunate, but not unique, in having a number of gold resources which seem to be significant in terms of quantity. Although the refractory nature of some of them is an offsetting factor, many, by our traditional standards, are also of above average quality.

We are seeking to contribute our undoubted technical expertise to convert them into marketable and, therefore, valuable commodities. Our incentive is unambiguously and unashamedly the potential to earn a profit. At the same time, the people of Papua New Guinea know that they have potentially valuable resources within their jurisdiction and are seeking, as efficiently and productively as possible, to use those resources to boost their incomes and enhance their general welfare. The aspirations of both parties, taken collectively, need not be inimical to one another. Indeed, all benefit by each contributing something, despite the somewhat different motivations.

The nature of the benefits to Papua New Guinea need not be recounted here in detail. We should, however, briefly remind ourselves of the following -

- Employment and income earning options will become more diverse, interesting and plentiful.

- Existing technical and commercial skills will be enhanced and new ones fostered as the complexity of a modern mining company stretches the limits of all our knowledge.

- A more sophisticated capital market will emerge as more companies establish themselves, improving Papua New Guinea's international standing within the world's financial community. This should do much to help to reduce the cost and improve the availability of much needed developmental finance for other activities.

- A capacity to earn from a regular production stream will reduce dependence on aid flows which are often too subject to the vagaries of others' budgetary processes.

Nevertheless, we would be foolish not to admit that there can be some anxiety attached to this process, not least over the possibility that, in admitting outside capital, there may be some perceived loss of sovereignty.

This was a major international issue in the 1960s and 1970s as a number of mostly smaller countries gained their political independence, often under fairly trying, even violent, circumstances, only to find that they were not sufficiently independent for their own liking, economically. One has to admit, too, that some companies unnecessarily aggravated an already tense relationship by only reluctantly restraining some quasi-colonialist tendencies which surfaced in their dealings with these newly independent nations.

The World Bank in its 1978 Annual Report spoke of a divergence between these countries and potential investors -

> "The views of developing countries and private foreign investors on how to exploit mineral resources have tended, in recent years to diverge rather than come together. Developing countries that possess reserves of minerals have shown increasing dissatisfaction with the 'enclave' arrangements that were typical in the past. Their claims for a greater voice in decisions concerning the exploitation of mineral resources and for a more balanced sharing of the economic and social benefits to be derived from mining ventures are coming to be generally recognized. But foreign mining companies and investors have hesitated to commit large funds to mining ventures located in countries that appear politically unstable or where there is a serious risk that the terms of investment agreements may be changed by the host government. Uncertainty on this score is perhaps the main reason why mineral investment, particularly equity investment, during the last two decades has taken place largely in developed countries."

Happily, that situation is now not generally so marked. More particularly, we are able to say, in the context of investing in Papua New Guinea, that one of the reasons we have been attracted here is our underlying confidence that such anxieties, even should they temporarily emerge, will not be translated into policies which will be detrimental to resource development.

I have only recently moved here to take charge of a company with important pre-production interests. It is clear, though, to any observer of recent Papua New Guinean history that this new nation and its leaders have been subjected to a period of uniquely rapid change. Few other groups of people have had to make so rapidly the transition from a typical village environment to an urban one more open to foreign values and traditions. No other group of people has had to do this while guiding a fledgling nation through its formative years.

From what I have seen, it will be a nation conscious of its cultural background. A nation conscious of its traditions and the need to respect diversity. A nation, too, that believes in the importance of property rights, and ideas of contract and obligation which go with them, as an essential ingredient of an orderly society.

Those of us attempting to manage large-scale investments can feel comfortable in such circumstances. However hard we might negotiate, however difficult it might be to reach agreement, a successful commercial environment requires that an agreement be respected. This is something about which we have reason to be confident when dealing with the Papua New Guinean government.

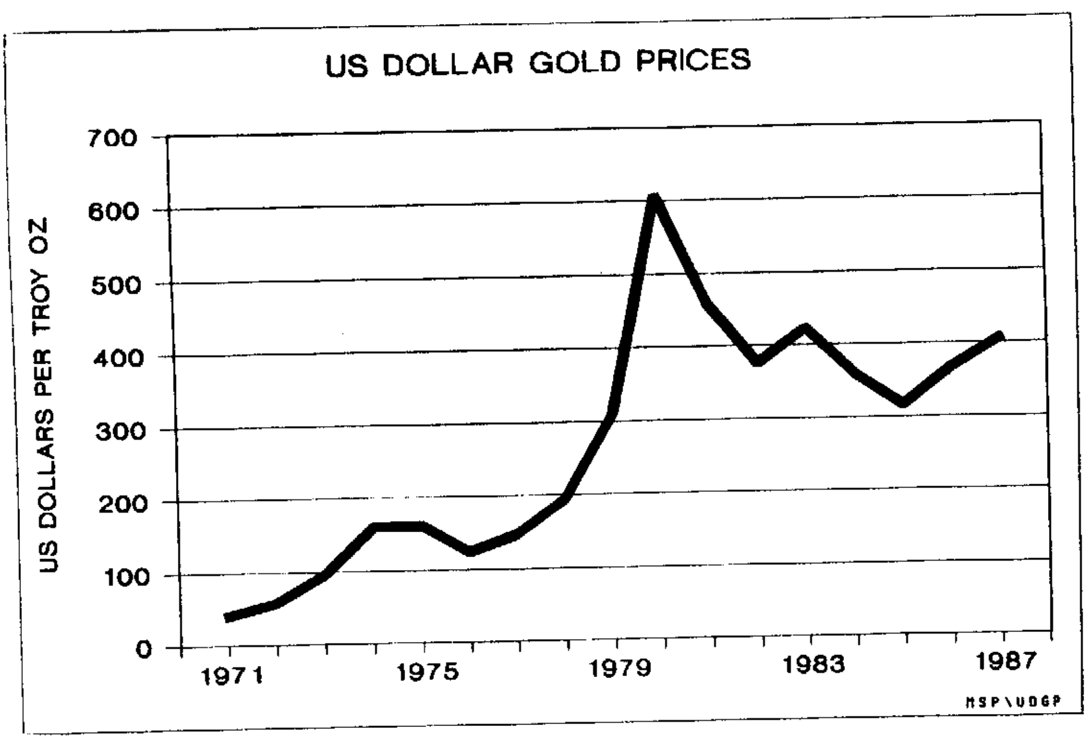
Many of our investments depend on detailed feasibility studies conducted over many years showing a sufficiently attractive prospect for large sums - often hundreds of million of kina - to be allocated, again over many years, before revenues are generated. Justification of that sort of commitment, over that time horizon, is dependent upon being able to have reasonable confidence in the environment in which the investment is to be made. We have gone through that process and we can say "Here is an environment sympathetic to commercial activity."

The magnitude of the commitments by major resource companies to operating projects as well as some in the planning stages is testimony to the strength of Papua New Guinea in this regard. Of course, one has to acknowledge also that it is testimony to certain things happening in the gold market which, should they persist, will allow Papua New Guinea to reap handsome benefits from its natural endowments. The interest of Australian, Canadian and U.S. mining companies - the major participants here - has been spurred by their perceptions of a return from stronger gold prices.

I deliberately use the plural since the days of "the" gold price are largely in the past. The price you observe today depends very much upon the currency in which it is measured.

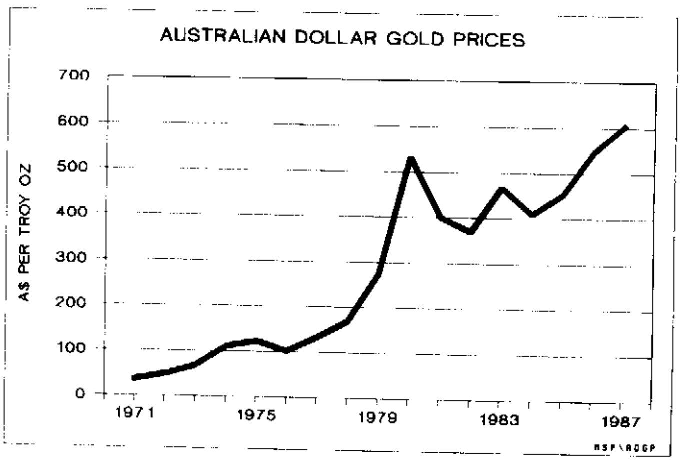
Traditionally measured in U.S. dollars, that price has tended to decline from its peak in 1980, but has firmed since 1985. It remains, though, well below the average reached in 1980.

U.S. Dollar Gold Prices

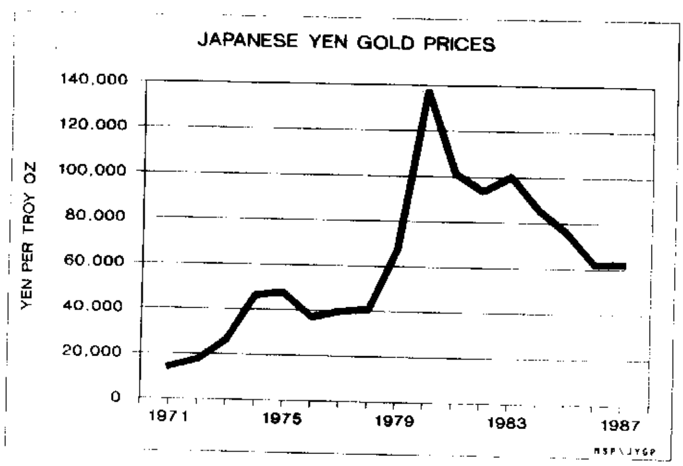


On the other hand, the Australian dollar price began rising in 1984 and has now surpassed the 1980 average. In yen, though, there has been no noticeable recovery, although it appears a bottom may have been reached. The yen price is consistent with the price performance measured in a range of international currencies which have generally appreciated against the U.S. dollar in the last two years. In Kina, gold prices have also shown a definite recovery.

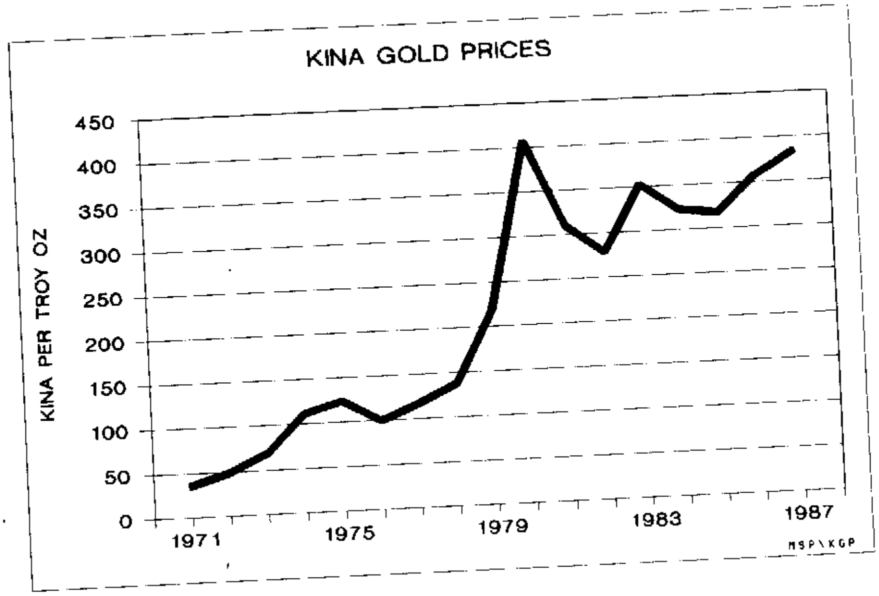
Australian Dollar Gold Prices



Japanese Yen Gold Prices



Kina Gold Prices



As something of a generalisation, although one which excludes the United States, it could be said that those countries which tend to be producers are facing a rising price while those that tend to be consumers have been facing falling or steady prices.

Is it any surprise then that Australian mine output has risen from 580,000 ounces in 1981 to 2.4 million ounces in 1986 and, prospectively, to 3.2 million ounces by next year, to possibly even overtake the United States within a few years as the Western world's second largest producer after South Africa? I think not. Nor should we be surprised, on the demand side, that Japanese use of gold in the electronics industry rose from 29 million ounces to 44 million ounces last year, or that it chose to use 6 1/2 million ounces in official coinage in 1986 or that it has accounted for 84 per cent of the increase in total Western world consumption of gold in jewellery since 1982.

Inevitably, other factors have also been involved in these trends, but price has been of fundamental importance. Of the other relevant factors, four others worth mentioning have also been influential in recent times on the supply side.

Firstly, new laboratory analytical procedures and more sophisticated exploration methods have made identifying prospective gold deposits - notably smaller deposits - very much easier and less expensive than was the case previously.

Secondly, processing techniques have changed as have the types of ore being processed. Lower grade ores, including tailings dumps, are now able to be economically treated as carbon-in-pulp technology and heap leaching - both requiring relatively small capital outlays - have become efficient and accepted recovery methods.

Thirdly, the availability of finance for small-scale mining ventures, particularly in stable political environments such as North America and Australia, has also increased sharply. Often using sophisticated futures and option market tools, largely deregulated and highly competitive financial service companies have been enthusiastic supporters of this sector of the mining industry.

This is connected with the fourth factor: both banks and larger non-ferrous base metal mining companies have seen returns from metals like copper, lead, zinc and even silver slip badly. Both have turned either in financing or in exploration to precious metals and, more particularly, gold.

Financiers, explorers and miners alike have been attracted by the opportunity of producing at costs substantially below the current market price. In Australia and North America, typical breakeven costs are in the US$100-300 per ounce range. In Australia, the tendency is toward the lower end. The U.S. sits in the middle and in Canada, costs tend to be slightly higher. But wherever producers sit within this range, they presently are comfortably below market prices. The lure of these margins, particularly at a time when other forms of greenfield mining are only minimally attractive, will ensure that exploration and mine development continue. The rate of increase might taper off, but output is likely to continue to grow, even if U.S. dollar prices increase no further.

Underpinning the recent rise in price and, therefore, this activity, is a widely accepted view of the role of gold in our commercial life, a role which marks it out as more than simply another investment medium suitable for short-term profit making, although that is certainly an element.

Gold is a strange commodity. Its properties, not least its seductive lustre, are often more mystical than industrial. Arguably, the world's industry would not be significantly worse off if it did not exist. It is, though, an accepted store of value of such long standing that it is one of history's longest serving media of exchange.

It is now almost inconceivable that it could be superseded, as some economists had thought and urged, by such artificial concoctions as the IMF's Special Drawing Rights or some other cocktail of national currencies. Even now that our monetary systems have long since departed entirely from a gold standard, there are still those who argue for its restoration and central banks still prudently retain their gold holdings as a substantial proportion of their external reserves.

Gold reserves at end 1986

	Million ounces
Industrial countries	785.7
Other European	35.8
Africa	13.9
Asia	37.8
Middle East	37.7
Western Hemisphere	32.4

Source: International Monetary Fund

According to International Monetary Fund statistics, member countries held nearly 950 million ounces of gold in reserves at the end of 1986. That is, nearly twenty-five times mine production in that year. Over 80 per cent of these holdings were by the 20 major industrial countries, but the balance was widely held among the developing countries of Asia, the Middle East, the Western Hemisphere, the rest of Europe, and, to a lesser extent, Africa.

As a proportion of total reserves, valued at the official price of SDR35/troy ounce, these holdings accounted for between 3.2 and 12.6 per cent of total reserves. However, valued at market prices prevailing at the end of 1986, gold accounted for between 23 and 54 per cent of countries' foreign reserve assets.

Relative importance of gold reserves

	Valued at SDR35/oz	Valued at market
	per cent	
Industrial countries	11.5	54.3
Other European	12.6	55.9
Africa	7.2	40.7
Asia	3.2	23.3
Middle East	3.5	25.3
Western Hemisphere	4.3	29.9

Source: International Monetary Fund

Notwithstanding substantially higher prices than the US$35 an ounce at which they would have been accumulated, official holders have been loathe to run down their reserves. Thus, even at this level, among groups who would seek to have it officially demonetised, the lure of gold is seemingly undiminished. Gold is a real asset which appears not to lose its value over long periods.

A dollar (US) invested in gold in 1960 would, by the end of 1986, have been nominally worth about $10.40. The same dollar invested in the stock market would have been worth $4.40. We would have been somewhat better off had it been invested at the medium term bond rate, rather than in shares, since it would have appreciated to $6.60. But metals generally and non-fuel commodities to a lesser extent would have proved inferior investments: the initial dollar would have roughly only doubled its nominal value. Adjusted for inflation over the time, though, only gold and bonds provided a real benefit. Gold, however, is ahead by a margin of nearly 3 to 1.

Value in 1986 of US$1 invested since 1960

	Nominal $	Real $
Gold	10.43	5.98
Shares	9.40	-0.05
Bonds	6.58	2.13
Metals	1.94	-2.51
Commodities*	2.33	-2.12

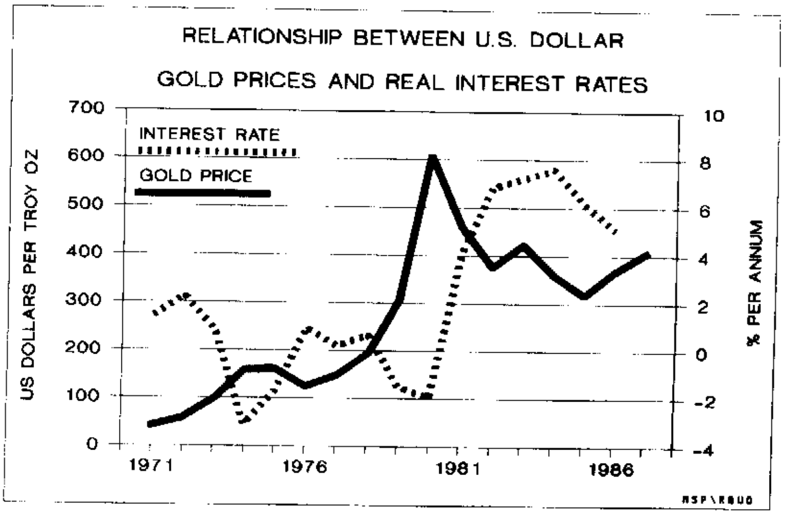
* Non-fuel

Source: International Monetary Fund

Over shorter periods of time, the relationship can be variable, depending on economic circumstances. Low inflation relative to interest rates seems to sap the strength of the gold market. In recent history, all the most significant accelerations in gold price movements, including the current one, have been associated with some easing in real interest rates. That is, gold prices tended to rise faster in circumstances in which inflation began to outstrip nominal interest rates.

Consequently, measured over a shorter span of more recent years, characterised by relatively low growth, falling inflation and relatively tight monetary policies, gold has been outperformed by bonds and, more recently, stocks as well.

Relationship between U.S. Dollar Gold Prices and Real Interest Rates



Stock and bond markets, as means of maintaining the value of money, however, both have limitations. In the former case, it is difficult, although decreasingly so, for all but the largest institutions to hold and manage a representative sample of the market. In any case, the performance of individual stocks is affected by the performance of individual management teams and their strategic decisions. Similarly, the bond market is to a large degree in the hands of governments' fiscal and monetary policies. For those seeking a haven from the vicissitudes of human control, gold is an attractive long-term alternative.

Albeit psychologically based, there seems to be plenty of reason why demand for gold will continue to be strong when people seek the solidity of a store of value which cannot be tampered with by inappropriate government policies or wrongheaded business strategies.

Of course, supporting such attractiveness as a store of value is its relative scarcity. There have generally been few substantial continuing sources of gold. Periods of rapid short-term supply growth, such as occurred when the South American mines were discovered by the Spanish, or during the U.S. gold rush of the 1840s or the Australian gold rush of the 1850s were followed by periods of inflation as gold's purchasing power was eroded. Otherwise, as these sources diminished in importance, a steadier, lower level of supply always eventuated. The question for those of us seeking to develop gold resources today is whether or not the increased supplies which are now foreshadowed will tend to erode that scarcity value, in the shorter term. After all, in Papua New Guinea alone we can foresee additional output of between two and three million ounces a year by the early 1990s from Porgera, Lihir, Misima, Hidden Valley, Sinberi and others. They come in addition to the 1.3 million ounces already being produced each year at Ok Tedi and Bougainville.

I have already referred to the likely overall growth in Australian output. There, the mines are typically of a smaller scale. Some twenty, each producing over 30,000 ounces a year, are expected to commence production this year or within the next two years. These will push production up by another 1.2 million ounces. There will be many more smaller operations.

In Canada, significant new mine production this or next year will add 730,000 ounces. There will also be another million ounces produced at major new developments in the United States. Overall, mine output is thought to have increased by 1.7 million ounces in 1986. A further 3.6 million ounce rise is expected in 1987. South Africa, which had undisputed dominance of Western world gold supply, will produce under one-half total Western supplies this year for the first time in nearly 35 years.

Will there come a time, though, when new gold mines will not be attractive? The answer is "probably yes". Why? Because even for gold, the constraints of basic economics will apply. Miners will persist in developing mines with lower grades until their costs begin to equate with the market price, at which point the incentive will be eliminated and the financiers and others will turn elsewhere. How long that process takes will depend on a range of factors of which rising costs are simply one.

I have constructed a simple gold price "scorecard". As you will see, twelve major influences on gold prices are listed. In each case, an indication is given as to whether, on balance, the particular factor is likely to be more supportive of the price ("bullish") than detrimental ("bearish") to it.

Gold price scorecard

Influences	Bullish	Bearish
U.S. dollar	X	
Interest rates	X	?
Demand growth	X	
Inflation	X	
South Africa	X	
Energy prices	X	
Debt crisis	X	
Middle East tension	X	
Base-metal prices	X	
Economic growth		X
Supply growth		X
Eastern bloc sales		X

There is scope for judgement, but the preponderant mood seems constructive for relatively strong gold prices at the current time. Supply growth, Eastern bloc sales and the likelihood of slowing economic growth are the only factors detracting from the state of the market. There is a possibility, too, that interest rates may also rise, but the magnitude of this may not be sufficient to be significant, particularly since any rise seems likely to be accompanied by a resurgence of inflation. Yet there is inevitably an element of uncertainty in this prognosis.

Not so long ago the strong U.S. dollar, falling inflation and energy prices and relatively high real interest rates all made for a more "bearish" reading. The turnaround in those factors has done much to stimulate investor interest and pull prices up. Should these or other factors swing back, the overall tenor of the market would again change quickly with adverse consequences for exploration activity and some new, higher cost ventures. Given the gap between current prices and costs, however, prices could fall by up to 30 per cent before any significant proportion of current output would feel pressured. In one respect, this offers a safety margin to most recently opened or proposed mining ventures. In another, it is a worry since it implies that prices could move quickly, being largely unconstrained in that movement by higher cost producers cutting back on supply.

The often precarious nature of our business environment needs to be acknowledged in this way lest there be any complacency induced by the margins which are currently available to us. There is reason to believe they will continue. But they are largely beyond our control.

It is consequently true, notwithstanding the magnitude and quality of Papua New Guinea's resource endowments, that their rate of development will be highly dependent on externally imposed financial circumstances which will loom large in anyone's assessment of whether to proceed, irrespective of whether that person is a Papua New Guinean resident, a foreign resident or an official of an international bank or a multilateral banking agency.

It is generally true of mineral development that new mines are dependent for their success on a window of opportunity which is provided by "good" prices prevailing at critical times. The speed with which prices may change makes the much more slowly adjusting mine financially vulnerable.

Bougainville Copper came on stream in 1972 and was able to take advantage of the relatively strong prices that existed in the 1970s: a few years earlier, at best, its opening would have been postponed; a decade later, almost certainly, development would not have occurred. Similarly, the plan to mine Ok Tedi copper has been the subject of some controversy, in part, because of the difficulty of operating within recent, originally unanticipated, copper prices.

Copper is appropriately illustrative of the risks. A boom commodity of the 1970s became the metal no-one wanted to know about in the 1980s. High prices caused an acceleration in development which ultimately undermined the very conditions through which it had initially been fostered. That, in essence, is the risk: whether, by the time our mines are operating, the price will still be sufficiently high for the Papua New Guinean government to realise its expectations and for investors to receive a reasonable return.

We are all understandably excited by the activity in which the gold industry is now engulfed and by the anticipated returns; but we must all recognise that we are together embarking upon risky ventures in natural resource development.

This, we should also be aware, has some important implications for national policymaking since it adds a significant element of uncertainty to longer-term government planning; an uncertainty with which it is difficult to cope and which can become, understandably, frustrating. It often tempts governments to press their claims for the same absolute return on which plans had been based, no matter what the price outcome.

Unfortunately, as my Australian experience draws me to conclude, the heightened expectations generated by anticipation prompt far too many demands for a sharing of the wealth before it is produced. That is particularly so in economies like those of Australia and Papua New Guinea which have relatively narrow economic bases dependent on volatile international markets.

Locking-in benefits which anticipate future bounty is ultimately destructive. Companies and the government should be wary of overstating the likelihood of the benefits which could possibly, but not assuredly, eventuate. The caution to avoid counting one's chickens before they are hatched is a simple but appropriate admonition. Nevertheless, companies are prepared to commit large sums of money to Papua New Guinea to participate in the development of the country's resources. We do it conscious of the risks, chastened by experience, but hopeful of the benefits.

Our presence here in Papua New Guinea is a demonstration of our continuing confidence in -

- Papua New Guinea's geological conditions;
- our ability to work with the people of this country; and
- our perception of the sensitivity of the government, as well as the people of Papua New Guinea, to the pressures with which we have to deal in an international commodity market.

There will, along the way, be some differences, but they will be over common problems. How these problems are addressed can often be as important as the specific outcome. Underlying the process, though, should be an acceptance that -

- the value of Papua New Guinea's resources will depend on how much markets beyond our control are prepared to pay;
- profitability is necessary;
- companies will provide palpable, meanaingful benefits in exchange for their earnings.

THE PRINCIPAL TASK IS MINING - THE INCENTIVES AND THE CONSTRAINTS IN POLICY AND PRACTICE

John Bovard
Director, Giant Resources Ltd.

The title of this speech was in fact chosen for me but I am more than happy to speak on the topic in a very general way and perhaps be more specific in the Papua New Guinean context given the audience here today.

I have been involved in mining projects in Papua New Guinea for the past 18 years. This involvement included the full range from construction on site to project management, negotiation with the Papua New Guinean government as part of the Kennecott Team during the Ok Tedi days and managing the Ok Tedi project for the Papua New Guinean government. You can see therefore that I have experienced the mining industry in Papua New Guinea from both sides of the fence. Possibly the use of the word "fence" is an unfortunate one as it suggests a division between all of the parties concerned with mining and I believe that this should not be the case.

I would like to start this discussion with a definition of mining.

To me, mining is the art and I stress the word "art", of extracting minerals - generally from the ground - and turning them into money. Money unfortunately is the simplest and the most direct, quantitative measurement of the success or otherwise of a mining project. Clearly, all of the parties who are interested in seeing a mine go ahead have other objectives but if a project does not make money, then I would put it to you that it cannot meet the other objectives simply because there is no money available to implement them. Much in all as money can be a distasteful subject and there are many people who think that it is politically obscene to talk about profits, unless a mining project turns a profit it will fail and hence cannot provide the various benefits that people are hoping for.

The benefits will include such things as the creation of jobs and skills (and this is especially important in Papua New Guinea where the creation of new jobs and new skills seems to be vital), the creation of additional wealth for the government and private sector, the creation of social infrastructure in areas which sometimes are very remote and where there is little existing social infrastructure, and lastly the spin-off economic benefits whereby a new mine can lift the general economic level of activity within a country.

One fact that is usually overlooked when considering mining companies - be they multinational or local - is that they almost all consist of a large number of small shareholders i.e. very ordinary people. These people wish to invest their money with a reasonable minimum risk and to earn a profit on their capital and their risk. The image of mining companies as monolithic mega-monsters forgets who are the true owners. I understand that a share market is being considered in Papua New Guinea and any move to involve citizens in investment and ownership of their natural resources should be applauded.

It can be seen then that private industry, the government and the community in general should all have a common unifying objective, that is that a particular mine should go ahead. Obviously there will be some "disbenefits" arising from a mine and sometimes for particular interest groups these outweigh the perceived benefits. Specifically here I believe that the community will have environmental concerns and also concerns as to the potential for social disruption, and I would like to talk about both of those things later in this speech.

The principle that all parties concerned with a mining project will have some common and some different objectives and will place different importance on those objectives is the first and most important step in establishing the vital communications to minimise and eventually resolve any disputes. I would go so far as to say that at some point in any negotiations or discussions all parties should write down their objectives for each other.

Mining is a very difficult art or science (depending on whether you went to a particular university and how large your ego is), and a number of mining projects have failed to even reach the construction stage, or have been constructed and have cost so much over budget that they never made any money; or have gone successfully through the construction phase and into mining and still lost money.

The first group of problems that a mine faces are the technical ones. Sometimes the mining itself proves to be far more expensive or physically difficult than originally planned. This is more common in underground mining and as yet there are no significant underground mines in Papua New Guinea. Open-pit mining tends to be somewhat more predictable and it would be rare for a project to fail because the open-pit costs and difficulties were not correctly estimated. More commonly however, metallurgical problems can cause a mine to close if, indeed, they permit it to open in the first place. There is a very very complex science (and also an art) in extracting minerals from their host rock and in spite of all the testing and calculations that are done it does happen that projects go out of business because of unforeseen metallurgical difficulties. I should stress that modern technology in this area is improving at a great rate and such failures are becoming, thankfully, rarer all the time.

Many mines require enormous supporting infrastructure, be it roads or towns or wharves or whatever. This is partly because mines tend to be found now in remote areas where existing infrastructure is fairly limited. In a country such as Papua New Guinea where the terrain is extremely rugged, it is likely that any new mine will require very significant infrastructure investment which will not only be very costly but will be one of the areas most likely to overrun in cost. There are many examples of mines where the infrastructure cost has "blown out" way beyond the original estimates and has resulted in an otherwise attractive mine becoming uneconomic. Once the capital cost has been sunk there is no way of recovering the investment. Building a mine in the bush is nothing like building a factory in the town and I would respectfully suggest that this degree of complexity, physical difficulty and interwoven risk is not fully recognised by economists, tax specialists and policy planners in governments generally.

Environmental issues can be significant although it is now usual for them to be solved during the design process as a normal inter-active part of that process. There is a lingering image of mining companies wishing to "rip, rape and desecrate", but while this is a popular image the reality seems to be that mining companies which, after all, are staffed by ordinary people (and again perhaps the popular image does not agree with this) will have approximately the same set of values as the community at large. While there is no doubt that the changed approach of mining companies to the environment has resulted from the significant external pressures in the last 10 to 15 years, it is also important to note that community attitudes have changed at the same time and the corporate attitude of the mining companies closely parallels that of the community in which it resides.

On the question of environmental impact and social impact there needs to be some measure of compromise. Clearly, there cannot be an investment in any form of physical development without there being some costs, including change to the physical and social environment. The important thing is to maintain communication so that the community, the government and the mining company understand each other's objectives and concerns so that a reasonable and effective compromise can be reached.

As the economic and environmental questions grow more complex there is a tendency to summarise them into over-simplicity by the use of "buzz-words" such as "non-renewable resource", "user pays", etc. These are useful concepts but like all one-line over-simplifications it is important to realise that trite phrases should not be regarded as logically valid just because of their simplicity. The time for this talk is (fortunately) limited or otherwise I would talk at length about "non-renewable resources". Suffice to say that if people wish to add even one simple extra dimension to discussion on that subject they should read an early novel by Aldous Huxley which from memory was simply called "Island".

The most significant problem that any mine faces is that of marketing. Mines traditionally have very long lead times from the decision to invest to the actual production of saleable metal in product, and an even longer time before sufficient sales are made to at least repay the initial investment. Mineral prices are historically very cyclical with the cycle time between low and high prices often being shorter than the time taken to develop a mine. In other words, it is possible to commence construction of a mine during a time of high prices and have a very low price when the mine comes into production. There are some economists who believe that the cyclical fluctuations arise because of the very long lead times whereby supply and demand get out of phase. When finally a new major mine is brought into production in response to high prices the resulting over-supply forces prices down again. Those mines that do come into production during times of high prices, either through clever marketing and forecasting skills or, more likely, simply through a matter of sheer luck, are regarded by the public and governments as a "windfall bonanza". Those people who are making this assessment tend to overlook all of those mines which have been "windfall disasters".

It is important when viewing the mining industry to take a broad number of properties into account and to take a long-term view of the overall profitability. Returns on funds invested are often quite low overall and are only propped up by the rare mine that is significantly profitable. This is a very important point when considering concepts such as sliding tax scales which increases with the degree of profitability of a particular mining property. In my opinion, while there is no doubt that this is a sound economic theory, to be formally correct it should recognise the average of all of the mining properties in order that it does not skim off the high values while ignoring the lows. This averaging needs to be worldwide, crossing country boundaries as well as company limits in order to be technically valid.

After technical and marketing risks there are those of the sovereign environment. The characteristics of the particular country in which any investment is being made must be considered. This is more important in a mining investment than probably any other because of the long lead time required to develop a mine and pay back the investment and hence the much longer period of time in which country circumstances can change. Also the mining investment is all sunk into the ground and once committed is irretrievable.

The first consideration is the overall political stability of any country. We are not talking particularly of Papua New Guinea nor of Australia at this time, but rather of the general framework in which mining companies must look at the governments and the rate of change of those governments in any particular country. Clearly, when we were talking earlier of the fact that some mines make money while others lose, the only way that a mining company will survive in the long-term is by having a number of properties spread both geographically, and preferably also, over a number of different commodities. Like it or not, this leads to multinational corporations. It is very difficult for a corporation to find the spread of different mines especially in different commodities all in the one country. I personally believe that whatever may have been the case 20 years ago, multinational corporations these days do not mine in different countries in order to effect sophisticated transfer pricing arrangements to minimise tax or in order to manipulate labour costs; but rather it is the circumstances of endeavouring to spread the risk that finds them with investments in a number of countries.

Outside of the question of the stability of the government itself is the stability of the legislative framework in which the mine must act. If there is a history of legislation remaining fairly constant and the rate of change being quite small, then clearly the investors have more confidence that they will be able to build and operate a mine and recover their capital (and hopefully a reasonable profit!) before there are significant changes to the laws under which they operate.

The facility of doing business in a country is a very significant factor: firstly, because bureaucratic delays or poor communications, etc. can significantly increase the construction and development time which, in turn, increases interest and holding charges and also increases the overall time at which the investment is at risk; secondly, because of the human factor where eventually the frustration of endeavouring to work through a mire of paperwork can lead to a difficulty in holding good people on the job. People are after all vital to the success of any project and by that I do not just mean the key expatriates who might come to any particular country but every person who works on the project. There are significant differences between countries in simple matters such as clearance of goods through customs, obtaining of statutory permits to undertake work and indeed in what would appear to be relatively simple things such as obtaining work permits. I understand, and here I am quoting from personal experience, that work permits can indeed be a sensitive issue in Papua New Guinea.

Last but not least, and while again raising the absolute importance of the best staff possible, is the question of personal security and the quality of life that the project staff and their families enjoy. Mining projects both during construction and operations require fairly large sacrifices on the part of the staff and their families in travelling to remote locations, often being separated from families and working exceptionally long hours. Where there is a degree of hardship or, worse, where there is the risk of physical danger, then mining companies find it difficult to attract good people and again find it much more difficult to establish a successful project. I am not singling out Papua New Guinea or Australia or any other country at this point; but I would suggest that, for instance, if one were looking at an investment, say, in Colombia in South America, it would have to be a significantly better project than one in most other countries in the world in order for investors to even give it a second thought.

So far I have painted a picture that somewhat gloomily describes all the problems of developing and operating a new mine. Let me stress again that these are very real problems. Major projects of the difficulty and complexity that we are talking about have been so stressful as to kill project managers and while that sounds melodramatic I personally have witnessed this happen. These are far more difficult tasks than merely establishing a factory in a new country, or in your own country, or merely undertaking some other commercial activity such as establishing a farming property or a high-rise building. I believe that mining and petro-chemical projects are among the most complex and challenging in the world. However, obviously they are worth doing, because some of them will make money and again I use "money" as a criteria to measure whether they are successful or not because if the money is not available then the benefits do not flow. If the project is designed in such a way and if the original framework of government legislation and regulation is set up so as to minimise the impact, while at the same time achieving the objectives of the community, of the government and of the mining company, then mines are a very worthwhile achievement.

There are no magic solutions to all the problems, at least none that I am aware of, and I would be very happy if the audience could offer solutions. Basically mines take a lot of hard work, a lot of guts and enterprise and a lot of cooperation between all of the parties involved. This last point is the one that perhaps I want to stress when we have an audience here that consists of people representing all levels of government, representing the community and representing the mining industry. What is essential is that a much wider understanding is required in the community and in the government of the problems facing the mining industry; an awareness that what may appear to be exorbitant profits are not usually so, and a recognition of the risks that are associated with mining projects.

Conversely, the mining companies need to understand the fears in the community and the government of the impacts that a poorly designed and planned project may have, and of the potential for the project to fail leaving the community to pick up the pieces. What we are talking about here then is communication and I believe that the seminar today is an example of one of the steps necessary to effect this communication. Recently in Papua New Guinea a Chamber of Mines and Petroleum was formed and this step is to be applauded. I believe this is a vital forum for the government, the community and the mining companies to communicate backwards and forwards.

It should not be seen solely as a pressure group, a little "closed door club" of company executives who get together and plot and scheme as to how to manipulate the public image, or how to pressurise the government. It should be a central focusing point. Papua New Guinea is a large country; people are busy and they travel a lot; it is difficult to maintain the necessary level of communications and it is my belief that the Chamber will serve as a vital focus for the interchange of information.

I appreciate the chance to address this meeting. I think it is vital to the economy of Papua New Guinea that mining goes ahead and that the mines are successful and by successful I mean (1) that they make money and (2) that they then subsequently fulfil all those secondary objectives; they create jobs, they create wealth for the government and the private sector, they create and expand social infrastructure and generally boost the economy and level of business activity in the country.

Let us keep the communication going and let us endeavour to have all of the parties understand the wishes and objectives of the other.

THE DEVELOPING MINERAL SECTOR - OPPORTUNITIES AND CHALLENGES BOUGAINVILLE DEVELOPMENT CORPORATION EXPERIENCE

Paul Nerau
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The concept

In the days when Papua New Guinea was still in the cradle of Australian colonial administration and just barely able to discern its ultimate political destiny, business acumen by Papua New Guineans was something for the 21st century! "You must learn to crawl before you can walk" it was often said, against our national wish to be independent.

The independence that was foremost in our minds was often political independence or political autonomy. Any other aspect of independence was thought to be dependent on political independence or we merely assumed that it would come to pass or be obtained on achieving political autonomy. Consequently, all the energies of most nationals were spent on campaigning to advance the course of political independence.

During this same decade (1964-1974) Bougainville and Bougainvilleans were going through what one might call a double crisis - the cry for Papua New Guinea's independence and their move to secede from the conceived but yet to be born entity - Papua New Guinea. This double crisis was really a reflection of a people wanting to become much more than just politically independent. It was a reflection of that inner urge or yearning to take control over one's total destiny. Bougainvilleans wanted to take control over their political as well as their economic destiny. They could see, though hazily, that their sought-after political independence would be no more than a farce if their economy was in the hands of strong external interests.

The intrusion of this giant monster which seemed at first sight to have little respect for our ancestral hunting grounds and taboos (the basis of our social fabric) could not but lead the thinking of the people and their leaders along these lines.

Independence was going to be paper independence - a mere ceremonial gesture. The realities would be totally different past the flag raising ceremony unless steps were taken to participate meaningfully (in whatever way possible) in what was no doubt going to be big business generating little business opportunities.

A development corporation

The concept of a development corporation was adopted as the vehicle whereby the aspirations of Bougainvilleans might best be realised. The development corporation concept which has now become a reality in Bougainville Development Corporation (BDC) was the "brain child" of its present chairman, Mr. Leo Hannett, together with other notable Bougainvillean leaders like Mr. Aloysius Noga. Since its inception in 1974, BDC has become a noticeable fact in the commercial life of the North Solomons Province and, indeed, that of Papua New Guinea.*

* Editor's Note: Investment Corporation of Papua New Guinea a statutory body was established in 1972 to provide a way for Papua New Guineans to participate in the share ownership of foreign companies in Papua New Guinea.

Now in its thirteenth year of operation, BDC maintains its aggression while pursuing the original objective, laid down in 1974 -

> To enable Bougainvilleans to share in the wealth generated by the presence of the copper mine on the island.

As will be recalled, the level of business activity on the island at the time of CRA's appearance on the shores of Bougainville was very low, practically nil, except for some small retailing and plantation activities by the churches, (especially the Catholic Church) and Australian-based multinational corporations, like the Burns Philp Company. It was therefore not an easy task to expect that Bougainvilleans would automatically jump to the opportunities arising from the mining activities. What was, however, more obvious was that foreigners would once again take advantage of the situation and cream the linkage benefits. The local people would be left standing flat-footed again.

The economic scene in Bougainville was one where the natives were either subsistence farmers or subsistence wage labourers. It was not possible to expect that these simple village farmers would move easily to provide the service back-up required by the mine. On the next level you had the plantation owner who was also somewhat immobile and therefore not able to provide the services in question, not to mention of course, the probable lack of know-how to be able to do so. Smaller businessmen and smaller companies were also hard pressed or unable to penetrate due to their lack of finance and management expertise.

The gap was, therefore, filled most immediately by externally based companies and/or by divisions of the mother company (CRA). This gap was by far the most challenging and the most lucrative compared to all the sectors previously talked about or alluded to.

BDC was founded to try and penetrate this sector and thereby harness some of the wealth and benefits for the people of the province - who are the majority of shareholders in the Corporation. To this day, Bougainville Development Corporation can be said to have successfully achieved this.

Indeed, BDC can boast of being one of the biggest contractors to Bougainville Copper Limited. Activities carried out on a contractual basis include: laundry services, messing and catering services, steel fabrication and industrial polyurethane coating; earlier on a contract to service the Bougainville Copper Limited aircraft; and, more recently, a lime processing plant which partially supplies the needs of Bougainville Copper Limited.

The objective to have Bougainvillean people not living in the immediate vicinity of the mine share in the benefits from the wealth of the mine has been achieved through shareholding in the Corporation and the payment of handsome dividends on a consistent basis over the last twelve years.

The next objective of the Corporation was to undertake other viable economic projects which would help the people of the province and which would otherwise not be undertaken due to the marginal returns experienced by such projects. Bougainville Air Services is a case in point.

Another objective within the Corporation's strategy is to be involved in agricultural development and other export-oriented activities. Thus, BDC was involved in the provision of infrastructure for a cocoa depot in Buin town and in a joint venture purchase of Sabah Plantation at Tinputz, North Bougainville. Interestingly, both these ventures were tripartite arrangements between BDC, ANGCO, and the respective landowners. BDC's approach in this area has been one of caution as the investment return often compares unfavourably with those from Bougainville Development Corporation's existing operations. Nevertheless, agricultural development remains one of the Corporation's long-term priority areas.

Activities of the Corporation and its group of companies

As has been noted Bougainville Development is now in its thirteenth year of operation. In its very short life the Corporation has been extremely aggressive and has moved into numerous business activities most of which have now outgrown their modest beginnings. The principal activities of the group's companies to date are as follows -

- Airline operations. The Corporation's North Solomons Air Services Pty. Ltd., operates three Britton Norman Islanders on charter and regular passenger transport work in the North Solomons. In addition, its subsidiary, Heli-Bougainville Pty. Ltd., operates a "permanent" contracted service to Bougainville Copper Limited and other clients. Heli-Bougainville has a fleet of two Bell 206-B Jet Ranger helicopters.

- Catering operations. BDC through its subsidiary company, Panguna Catering Services Pty. Ltd., and in joint venture with SHRM (South Pacific) Pty. Ltd., holds a contract from Bougainville Copper Limited to supply catering and camp management services for the company's employees. To give some indication as to the size of this undertaking, the joint venture prepares and serves approximately 10,000 meals per day for 365 days of the year. This operation employs between 450 and 500 people depending on current contractual workload.

- Commercial laundry operations. Through Bougainville Laundry Pty. Ltd., BDC holds the laundry contract to meet all Bougainville Copper Limited's laundry requirements.

- Hardware and timber supply operations. What began as a joint venture between BDC and Bowmans (Bowmans Bodeco) is now a fully-owned subsidiary of BDC, known simply as Bodeco. Bodeco supplies timber and a wide range of building supplies to companies and individuals in the North Solomons Province. It also supplies to companies and individuals alike, very competitively priced pre-cut houses. It is currently building some 33 pre-cut houses, in addition to one custom house, two trade stores, one church and one chicken house at Jaba for Bougainville Copper Limited under a contract worth K384,253.

  Also located at Bodeco is one of BDC's newest joint venture operations - Kakara Furniture - which is a joint venture with a Sydney-based furniture manufacturer, Post and Rail Furniture. This venture commenced production in January 1987 with the introduction of a new and exciting product range which is fast proving to be acceptable in any market as it is made to very high standards from Papua New Guinean hardwoods.

- Property rental division. This sector of the company's operations is responsible for activities associated with property rental in the town of Arawa. Many of these rental properties are used to support BDC's new activities as they come on stream. The Corporation is well aware of the lack of physical infrastructure within the town of Arawa, and has therefore, in advance, built infrastructure to enable Corporation expansion as and when it becomes necessary.

- Welding and steel fabrication. Island Steel, a joint venture between BDC and Hornibrook Construction Pty. Ltd., owns and operates a large engineering workshop in Arawa whose major activity is the maintenance and rebuilding of Bougainville Copper Limited's heavy equipment and structural engineering works.

- Polyurethane and fibreglass manufacturing. Through its subsidiary Wear Resistant Materials (PNG) Pty. Ltd, Bougainville Development Corporation is involved in anti-corrosion and wear resistant materials, a manufacturing and maintenance process geared towards the protection of heavy duty industrial equipment employed by Bougainville Copper Limited, e.g. electrical shovel buckets and the ball mill casings.

  The company also builds fibreglass boats for use by local fisherman and by others for recreational purposes.

- Manufacture, conversion and distribution of paper products. BDC is also involved in a joint venture with Caxton Paper Manufacturers of New Zealand in the subsidiary, Niugini Paper Corporation Pty. Ltd. based in Port Moresby. This company produces and distributes toilet tissues throughout the country, and holds the franchise for the distribution of other products, such as, paper hand towels, facial tissues, paper plates and paper cups. This subsidiary is receiving some very stiff competition from comparatively cheaper (on the shelf, that is) and cheap substitute imports from South-East Asia.

- Shipping. In 1985 the Corporation acquired equity in the Refrigerated Express Lines Australasia Pty. Ltd. (R.E.L.A.). As part of its initial plans to diversify shareholding in the shipping line, BDC offered PSA Savings and Loans Society Ltd. 20 per cent of the equity, which PSA accepted. We are very happy with our partnership in this area.

- Limestone mining. Through its subsidiary, Bougainville Limestone Mining Pty. Ltd., BDC has moved into mining. This operation is a joint venture scheme between the major buyer of the company's lime product, Bougainville Copper Limited, the landowners of Manetai, the management company, David Mitchell Estate Ltd. of Australia and Bougainville Development Corporation. Although this operation experienced some start-up problems in 1985, there are indications that the company can expect much improved prospects for the future.

Apart from these principal activities, Corporation is also involved in other minor, but nevertheless important, activities. Some of these are -

- automotive repairs and autoport service;
- printing service;

- travel service - Bougainville Development has recently taken over the two travel service companies; PNG Travel and Coral Sea Travel, formerly owned and run by the Papua New Guinea Banking Corporation;

- Laluai hydro-scheme - the project is dormant at this stage.

Diversification

As one can see from the foregoing, the beginnings of Bougainville Development Corporation and therefore the principal areas of its activities have been firmly linked to the service requirements of Bougainville Copper Limited. Such activities will no doubt continue to figure significantly in the corporate life of Bougainville Development Corporation.

However, like many other commercial entities, the Corporation likes to pursue an aggressive and forward-looking investment portfolio while maintaining a sense of careful, commercial appraisal and approach to any proposal. It is our firm conviction that Bougainville Development Corporation must follow the path of diversification if it is to continue to prosper and assist in the long-term development of the North Solomons Province and the country as a whole. In the near future the Corporation will be looking at some such investment proposals which it hopes will materialise this sort of thinking.

Education and training

The concept and practice of education, manpower planning and training have been upheld by BDC always. BDC values, and has received and continues to receive value from, its educated national workforce most of whom, it is proud to claim, it has helped to train. Among this national workforce are some of its top and middle level management executives and technicians.

Since 1976 when the education assistance began, 24 students have been sponsored through Papua New Guinea's tertiary institutions. In monetary terms, a total expenditure in excess of K73,667 has been incurred by the Corporation in educational sponsorships. In addition, since 1982 BDC has assisted the North Solomons University Centre through an annual contribution of K25,000.

Some lessons

Our experience through BDC seems to suggest a number of lessons for the future which may be of interest to others.

It can confidently be said that, in general, the objectives of the Corporation have been achieved. BDC has been able to share in the profits and wealth generated by the copper mine and to redistribute the benefits (both monetary and other economic and social benefits) to a wider circle of Bougainvilleans and Papua New Guineans. In particular, groups away from the actual mine operations in Kieta, Arawa and Panguna towns have been able to receive such benefits via the Corporation's activities.

Of course, BDC's road to success has not altogether been trouble-free. The Corporation has had its share of problems, especially in the early days. Naturally, being an economic arm of the provincial government, it was assumed by some provincial politicians and sadly by some national politicians as well, that BDC should come completely under their influence. The chairman, Mr. Leo Hannet, however, stood firm throughout this period and shielded the Corporation from undue political interference.

Undue political interference seems to be the order of the day in Papua New Guinea especially where development corporations are concerned. Little wonder then, that many development corporations are facing problems of survival. Corporations, as commercial entities, already have enough stress just keeping pace with the competitive market environment. To ensure survival this must be their primary preoccupation. If, on top of that, they face undue political interference, then business will certainly not yield the expected returns.

In this particular area, BDC is rather fortunate to have a strong chairman and a strong board that knows its primary corporate responsibility. There was a period when Mr. Leo Hannett was premier of the province (1980-1984) and during this particular period the Corporation enjoyed a cordial and complementary co-existence with the political masters, thus allowing the Corporation to prosper further.

It is of utmost importance that a development corporation, like any other commercial entity, has a stable political climate if it is to grow and achieve the objectives set for it.

The second most important variable that has significantly contributed to BDC's record of success has been the quality of its management. The Corporation has had a well-qualified management team which has remained fairly stable over the life of the Corporation. The Corporation has therefore been able to mix capital and management expertise so that a realistic, pragmatic and commercial approach can be taken to the participation by local people in the economic and business opportunities offered on Bougainville.

Management approach is fairly sophisticated. The Corporation's accounting systems, for instance, are computerised enabling profit and loss statements and balance sheets for each operation to be reviewed on a monthly basis. This means any problem area is pinpointed early and remedial action taken.

The Corporation has always been aware that it must develop local expertise and management. Since 1975, it has had an extensive localisation and training scheme. The continuing implementation of this scheme has seen the localisation of most senior middle level management positions previously held by non-national or contract employees.

Having said all that, I would like to go back and reiterate what I said earlier. It cannot be emphasised enough that a stable and cooperative political environment is paramount to the success of a provincial development corporation that is premised on commercial and business principles. And further it is the role of a provincial government in conjunction with the national government to create this stable political climate.

Finally, I believe that, there is no secret formula for success except hard work, dedication and good management.

DEVELOPING LINKAGES - THE OK TEDI EXPERIENCE

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In order to fully understand the Ok Tedi Project and its connections with external agencies it is necessary to understand the physical, social, economic and political environment from which it evolved. Some background information on the project is presented here to place the rest of the paper in its proper context. Obviously this paper is limited in its presentation of these details.

Ok Tedi Mining Limited (OTML) produces gold bullion and, more recently, copper concentrates for sale on the world market. The Ok Tedi Project is located in the extreme north-west of the Western Province on the southern slopes of the Star Mountains. The minesite and the town of Tabubil are set in mountainous tropical rain-forest which has one of the wettest climates on earth, that is about eight to nine meters of rainfall per annum. The project area is isolated from any road system other than the road which connects the mine to the Kiunga River port. Tabubil is normally reached via a two and a half hour flight from Port Moresby or by ship which takes approximately four days to Kiunga and then by road from Kiunga to Tabubil a distance of 140 kilometres.

An agreement between the Independent State of Papua New Guinea and the Dampier Mining Company Limited, a subsidiary of BHP, was signed on 22 March 1976. This document is called the Ok Tedi Agreement and along with subsequent supplemental agreements embodies the terms and conditions under which the company develops and operates. A feasibility study was commenced in October 1976 and in February 1981 the Ok Tedi Mining Limited consortium was formed.

Construction work on the project commenced in 1982 under project managers Bechtel Morrison & Knudsen (BMKI). The project came in well over budget having had many alterations to the scope of work and having suffered through drought in 1982 when supplies were unable to be shipped up the Fly River and construction difficulties caused by incessant rains threatened the viability of the project.

Gold production commenced in May 1984. Stage II and III construction for the production of copper concentrates is well underway. Stage II copper production commenced in April 1987 and the first shipment of bulk copper concentrates is scheduled to be trans-shipped across the floating port facility into ocean carriers and then to overseas markets at the end of July 1987. At the completion of Stage III the mine is expected to be milling in excess of 60,000 tonnes of copper ore per day.

Tabubil has come from being a plateau upon which the village of Wangbin was situated, with a population of approximately 80 people, to being a town where at present, approximately 5,000 people of various nationalities co-exist and where supermarkets, banks, clubs and other facilities provide a modern community with most of its daily needs. These figures do not include squatters who are camped around the project.

Before and after the Ok Tedi Agreement was signed expectations ran high from both the local and national points of view regarding employment opportunities, business development ventures, education and vocational training. The project is huge by any stretch of the imagination and at times it has been a difficult project to run with. However, OTML's primary assistance to the State, aside from the project's development of gold and copper facilities and the normal gains from taxes, duties and levies is the linkages that have been created through OTML's presence in all of its forms as described below.

Existing linkages

Before I discuss Ok Tedi's experience I must say that the term linkages is a new one for me, so before proceeding further I decided to define what that term meant to me. Without the benefit of any learned counsel I deduced it means any connection created by the efforts of the Ok Tedi Project that provides assistance, either directly or indirectly, to the development of Papua New Guinea either locally or at the national level. When this is given some thought, linkages ultimately means improving the lot of the common every-day man, woman or child in Papua New Guinea.

"How is the lot of the every-day person improved?" The answer is quite clear. It is achieved at this stage of Papua New Guinea's development by improving the basic necessities of life. That is, by improving or providing adequate nutrition, medical services, water, sewerage, power, education services, roads and communication systems. How this is to be achieved is the challenge faced by everyone concerned with the development of Papua New Guinea.

OTML has created through the Ok Tedi Agreement many important linkages. Some of these being:-

- past and present training and localisation schemes
- employment of Papua New Guinean citizens during the past and current construction programmes
- employment of Papua New Guinean citizens working on the day-to-day operation of the project
- employment of Papua New Guinean citizens working for local business development companies created by OTML's Business Development Department. (It should be noted that these local companies employ more local labour from the project area than does the company.)
- additional employment of Papua New Guinean citizens through the expansion in some cases of Papua New Guinean companies servicing OTML's requirements for goods and materials of many descriptions
- new infrastructure such as the Kiunga to Tabubil and Tabubil to Folomian road; the Kiunga River port and the water, sewerage and power facilities constructed at Tabubil and Kiunga
- provision of necessary basic services allowing religious institutions to focus their activities in the Ok Tedi area - OTML has assisted with material and other donations

- availability of modern day consumables such as food, clothing, newspapers and books sold via the new town facilities
- day-to-day contact with Tabubil expatriate groups such as the YWCA, Lions Club and other groups interested in transferring new skills and assistance to the local population
- most importantly medical services introduced to the project area; these services are currently expanding with a new agreement recently signed that will enable the company to treat local villagers not only around the immediate area of Tabubil but at more remote locations.

Life expectancy in the project area would be a reliable bench mark to gauge the effect that the Ok Tedi project has had on local populations.

All of the above are forces of social and economic change, hence linkages for the development of the indigenous population in the project area and for the enrichment of Papua New Guinea as a whole.

From the beginning of the project OTML developed linkages with various groups including businesses, religious institutions, government departments and private individuals. For example the affairs of the company are intimately monitored by the State which has a co-ordinator whose job is to ensure that the company adheres to the terms of the agreements and who also assists with the day-to-day inter-relationships between government departments and the company. All of the above linkages have in some way or another affected the project's evolution and ultimately the nation's development from time to time.

The linkages described above exist for the most part due to the basic requirements necessary to operate the gold and copper process plants. However, this is not true of the OTML Business Development Group since it is obviously a deliberate, conscious attempt to form new linkages within the local and wider community. It is therefore worth emphasising the experience and problems that the company has had in this area.

OTML legal responsibility for business development

Under the Ok Tedi Agreement OTML has a legal responsibility to "promote, support, encourage and lend assistance to Papua New Guineans desirous of establishing enterprises and business......". It also goes on to say that "OTML will make maximum use of Papua New Guinean subcontractors where services are available at competitive prices and comparable standards with those obtainable in or outside of Papua New Guinea". There are many other additional sub-clauses that specify how OTML is to assist business development.

The Agreement emphasises that preferential treatment shall be given to landowners or people originating from the project area.

Ok Tedi created a business development group comprising 10 people at Tabubil in 1982 following the guidelines set out under the Ok Tedi Agreement.

Since the commencement of the OTML Business Development Group OTML has been involved in the setting up of many business groups with over 100 businesses started as a result of the group's activities. Today there are about 13 surviving business groups with many small directly controlled businesses replacing the umbrella companies which were initially created.

Problems experienced by OTML business development

The company has of course an inbuilt conflict of interest. It has the legal and moral obligation to pursue the business development proposals it formulates and at the same time the company has an obligation to maximise its profit for the shareholders. There is of course a strong element of self-interest on the company's part since a contented local political environment is to the company's advantage. By promoting local involvement in the project OTML has, I believe, tried to balance out these conflicts to the best of its ability albeit not without dissention from various groups.

Many of the local businesses that were created initially have not stood the test of time. Businesses fail in the project area for the same reasons that businesses fail all over the world, that is through lack of proper management. Over a period of several years it has become apparent that, even with expatriate assistance, businesses have failed due to poor or non-existent planning, budgeting, forward marketing or business development activities and financial record-keeping.

There is much evidence to indicate that, in many cases, there have been no receipts or records kept of major transactions, and inefficient equipment and poor procedures have resulted in under-utilisation of equipment and sub-optimisation of resources. In addition, there has clearly been a lack of negotiating skills and contract document preparation expertise.

OTML's experience is that umbrella companies are not successful in the project area because the local people do not always have direct involvement with the day-to-day performance of the company or its subsidiaries. Umbrella companies are difficult to control since they are necessarily independent of OTML, therefore the management of the umbrella companies are able to manipulate, if they wish, the funds and shareholdings of the company and its subsidiaries.

Currently OTML has a direct involvement with the management of some of these companies. The companies are, for the most part, successful and it is becoming increasingly obvious that not only is OTML promoting business development but it has become a manager of companies. This is not the business that OTML really wishes to pursue and, in the future, it seems that there may be a good argument for the provision of a company that can provide business management expertise in all of its forms to existing companies and let OTML Business Development Department proceed with defining other business opportunities and the giving of advice.

In order to protect local investors and itself, OTML attempted to write clauses into local company contracts which gave OTML the right to audit the books of local companies to ensure that it (OTML) was receiving a reasonable price from the local businesses and that the local people were receiving a reasonable return on their investment. This policy was pursued because local businesses did not in many cases put work out to tender and manipulated funds and shareholdings without informing OTML. Local businesses in some cases objected to OTML's request claiming that OTML had a conflict of interest. However, the clauses were eventually inserted into local contracts and OTML has from time to time seen fit to utilise them.

Outside political pressures have been imposed on OTML from time to time in order to have certain companies considered for work. These pressures have sometimes been justified but generally the problems have been caused by a lack of understanding of OTML's agreement with the State. Many Papua New Guinean companies assumed that OTML is obligated to award contracts to Papua New Guinean companies even if their prices are higher than those which can be obtained overseas.

Other major problems experienced by local and other business interests resulted from high expectations - gearing up to provide support to the OTML construction works only to find that the company's construction schedule had changed. Betting on future contracts can be a risky financial proposition.

It is also pertinent to add that the company (OTML) is also at risk due to many varied market and political forces and has in the past made changes as was deemed necessary for its viability.

Another problem faced by Ok Tedi and local businesses was the question of what was a fair contract price for goods and services. Traditionally this information is well established and can be found in any case by putting work out to tender. With OTML being isolated it was difficult for OTML and doubly difficult for new businesses to decide what a fair price was for any given contract. Certainly any tenders received from either local companies or overseas companies had a large risk factor built into them in order to compensate for their lack of knowledge. With little or no experience local businesses were in some cases gambling their investors' (mostly banks) money. OTML itself was in many cases a sitting duck for the more astute Papua New Guinean and overseas business houses for much the same reason.

Government linkage

The government has created linkages in the project area for the benefit of the local population through its insistence that certain facilities be constructed. These requirements were incorporated into the Ok Tedi Agreements. Examples of such facilities are:

training and localisation schemes
government buildings
town facilities such as recreational areas
education facilities such as schools
public works workshop
Taboubil hospital
minimum road construction standards.

Obviously most of the above facilities are necessary for the successful operation of the company but many facilities such as power generation, water, sewerage and government buildings have been and will be handed over to the government according to an agreed schedule at no cost to the government.

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It has been perceived by many casual observers that the government has not provided the project area with the basic services as defined earlier in the paper. However, it can be seen that this is not the case and that the government has, through the medium of the Ok Tedi Agreements, made provision for the development of the project area.

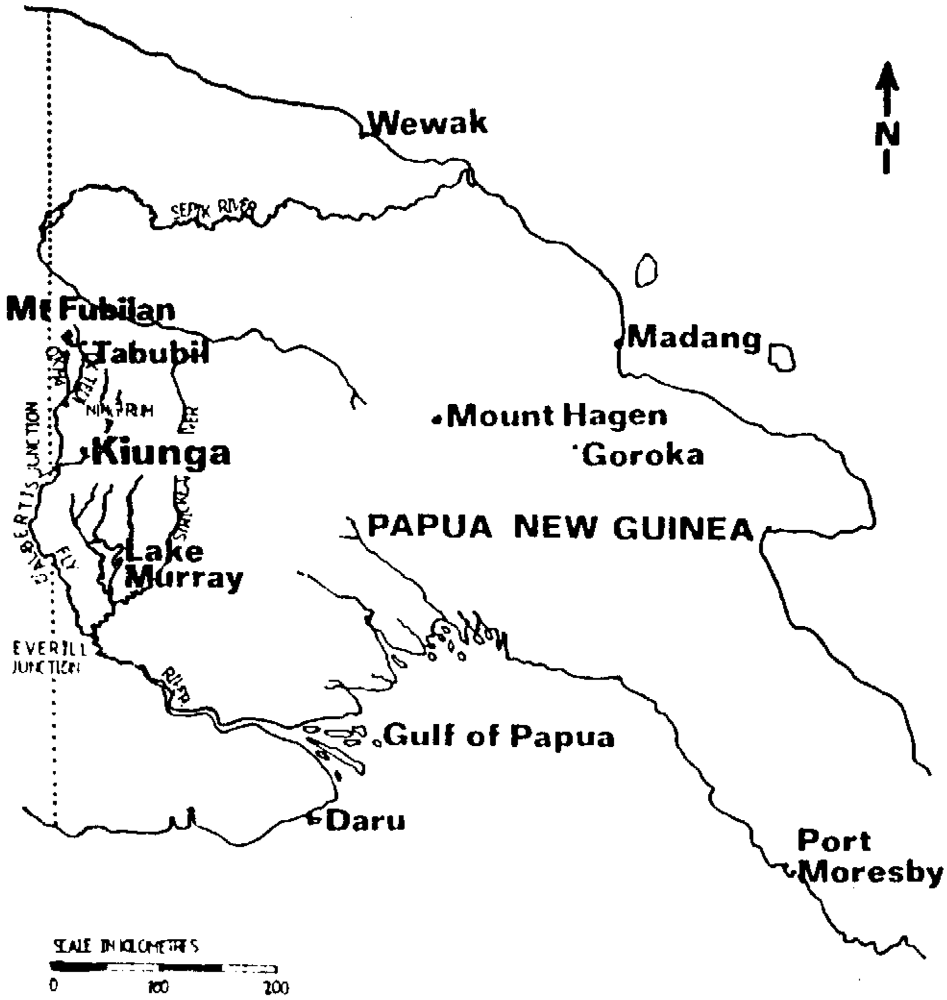
Conclusion

The Ok Tedi experience in the development of linkages for local business development has been difficult for all of those concerned. However, as with any new experience, lessons have to be learned and the results utilised. OTML has learned those lessons well and is now putting the experience gained into practice.

The lesson appears to be that umbrella companies do not work well, if at all, where management expertise is found wanting and that successful local businesses are those that have direct involvement by the investors. It is interesting to note that the local businesses are now aware of their lack of management skills since they are all insisting upon expatriate management supervisors. This is their choice and they will when the time comes take charge of their own businesses and futures.

The writer perceives that however much new mining companies may object to providing basic infrastructure facilities, the Papua New Guinean government does not have the resources to provide these facilities for itself. Therefore government policies which insist that new mining ventures provide such facilities, is I believe, in the best interests of Papua New Guinea. This comment has to be considered in the light of reality, and one of the realities is that the government has to tailor its requirements to the economic viability of new ventures. It has been Ok Tedi's experience that the government does recognise such realities and has been willing to renegotiate former agreement commitments when the project's viability was in question.

It is apparent that while the Papua New Guinean workforce has made remarkable progress since independence in the realms of eduction and business management, there are insufficient Papua New Guinean citizens with the necessary expertise and experience to fill the positions created by the expanding private sector and the government's localisation policy. This problem will increase as the expansion of the private sector is fueled by the demands of new mining developments such as Placer Pacific's Misima and Pogera developments. Therefore, it appears that the rate at which effective development of new Papua New Guinean businesses can proceed is controlled to a large extent by the availability of management expertise.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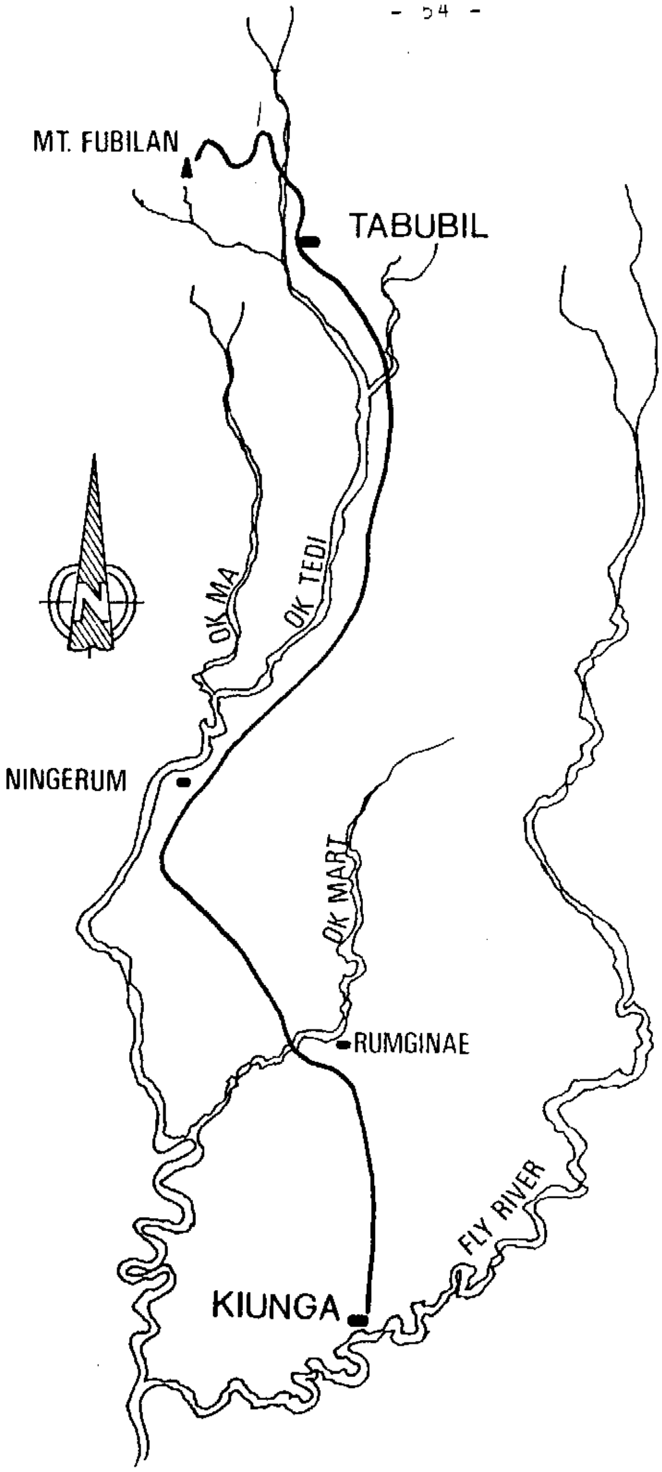
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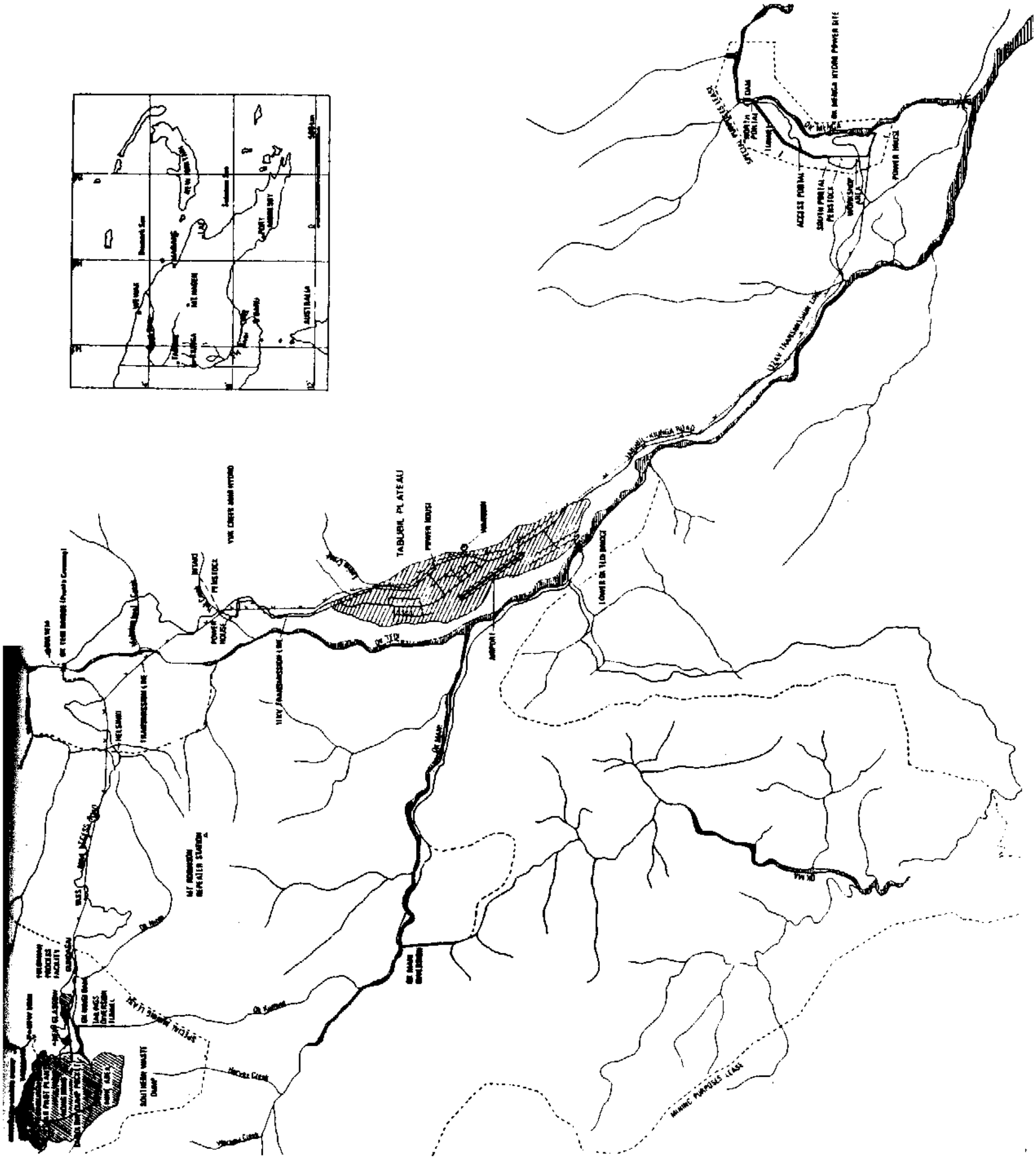
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AUSTRALIA

DEVELOPING THE MINERAL SECTOR - OPPORTUNITIES AND CHALLENGES PROVINCIAL GOVERNMENT PERSPECTIVE

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It is indeed a privilege for me today to be one of the guest speakers during this important occasion; discussing the theme "Developing the Mineral Sector: Opportunities and Challenges". I must add also that this speech is the first one of its kind containing the views of the Enga Provincial Government and presented in my capacity as official delegate from the province.

I do not plan to give you a long speech because in your program for today, I have only been given ten minutes in which to present provincial government views (especially that of the Enga Provincial Government in relation to the major Porgera gold project).

National mineral policy

The national government's mineral policy recognises the fact that mineral rights are by law vested in the state and it is national government's responsibility to ensure that exploitation of mineral (and/or other natural resources) resources is carried out in such a manner as to maximise the benefits to the country as a whole.

To ensure this, development strategies adopted by the Department of Minerals and Energy encourage the private sector to invest in mineral exploration and development, with the prime objectives of increasing gross domestic product, higher incomes and increased employment.

Considering the nature of Papua New Guinea's own financial constraints and the requirement to develop its rich natural resources, policies to encourage and support foreign investors is obviously the only alternative. However, considering the embryonic state of the country's skills, the rise of the modern computer system and the general dominance of the economy by foreign interests, does the country fully understand all aspects of foreign investor operations?

Questions about foreign investor operations

There is a need to seriously assess the impact of large-scale investments on the process of change and development, paying particular attention to the claim that foreign investment is a necessary and desirable vehicle for development in a developing country, particularly at the provincial level.

In view of the downward trend in Papua New Guinea's economic performance, its inability to raise internal capital and the consequent need to develop its natural resources, the main attraction of direct foreign investment is that technology, financial capital, managerial and marketing skills, etc. all come together in one "package" supplying the scarce factors vital to the development of Papua New Guinea.

While these factors are important, the nature of the "package" makes it extremely difficult, if not impossible, for ordinary Papua New Guineans, or the policy makers, to know the real costs of the various factors supplied, or to specify the "appropriateness" of the goods being produced and the techniques of production utilized.

There is no empirical information available on the operations of large foreign investors concerning their impact on economic growth and develolpment. Even with the availability of empirical information answers would not be provided to these most pressing problems.

Foreign investment is a key feature of Papua New Guinea's capitalist system and as such it should be fully understood and encouraged - but as part of a wider system. We are asking the wrong questions if we merely attempt to assess whether the costs of a foreign investor's activities are in some way greater than or less than the benefits, in a narrow or project sense.

Considering its long-term development requirement Papua New Guinea has an inevitable desire to invite external capital. But do we have the mechanisms to analyse foreign investors and their activities, not only in the mineral sector, but in other sectors as well?

I may be wrong but these mechanisms appear to be non-existent. Encouragement of foreign investors and development should go hand in hand. If this ability to analyse foreign investor activities in relation to development is lacking then this is a major obstacle and a challenge for Papua New Guinea in the years to come.

Provincial government perspective

From here I would like to switch your attention to the concerns raised at the provincial level focusing on the proposed development of the Porgera gold project.

Enga Province is one of the most disadvantaged provinces in Papua New Guinea. It was a district in the Western Highlands Province until the early 1970s when it attained political autonomy.

Constraints to development are the province's weak road network, its underdeveloped social services, and the rapid increase in population (a rate that is above the national average). The foundations for economic development are non-existent. These factors deter foreign investors. While it continues to maintain the recurrent budget the national government fails to support development initiatives in sectors with potential. Therefore the only hope of alleviating these constraints remains in the Porgera development.

In an effort to divert sufficient resources back into the province from the proceeds of the Porgera development, the Enga Provincial Government and the people of Enga have sought the national government's and the developer's consideration of several things. However, their expectations have suffered a setback by a statement in a newsletter issued by Placer and I quote -

> "It is important to note that the negotiations are run by the (national) government, and the company does not organise them nor say what part the local people or the people of the Province or the Provincial Government takes in these negotiations. If you have questions about the negotiations you should talk to the people from the National Government".
> (Placer Newsletter 1, Page 4, 1986).

From the initial stages when Porgera was known to be economically viable, the people of Porgera/Enga and the Enga Provincial Government supported the Placer Company in order to speed up development in the province, and in so doing, a close relationship was formed. Although the attitude of the company is well understood there remains a lack of consultation and directive as to how and where the Enga Provincial Government can be part of the project development and this leads to uncertainty in our dealings over the mine.

The province acknowledges the fact that under section 247 of the constitution it is the state that issues contracts. However, this does restrict the Enga Provincial Government's direct involvement in a matter of direct concern to the province. Despite this, the people of Enga still perceive the development of Porgera as the most important step forward in removing major contraints it has encountered to date.

Because the people would be affected by such a major enclave and capital intensive project, it is important that the interests of the people be integrated into all stages of the Porgera Development Plan.

To date, neither the Enga people nor the Enga Provincial Government has the experience to participate in economic development associated with the mine; but the costs associated with delaying start-up of certain economic activities in advance of Porgera development appear to be great.

Although the Placer Company has supported Ipili Porgera Investments (a private company 100 per cent owned by the landowners on whose land the Porgera mine sits) in its activities the Enga people are not in any way prepared for participation in a meaningful way. The local people do not yet have sufficient expertise to be involved in the type of business activities required to support the mine and no suitable commercial entity exists through which the local people could effectively participate in the service industries that do exist.

The fact is that the people of Enga are only involved in commercial activities slightly above the subsistence level. These include involvement in small trade stores, small-scale trucking operations and the operation of passenger motor vehicles. Thus, the gap between the highly capital intensive company and the level at which Engans could participate in the provincial economy appears to be wide. Possibilities for involvement by Engans would appear to be as employees of either the company's own subsidiaries or employees of capitalists from outside the province under contract to Porgera Development.

It is therefore in the best interests of the Enga people and the province to ask whether it is appropriate to establish a vehicle designed to boost commercial development at the national level or whether it would be wiser to establish it at the provincial level? Looking at the experience of other provinces with major resource developments one feels that establishment should be at the provincial level.

Communication channels must be active to attain the resources required for starting such ventures and to ensure some of the Enga Provincial Government's demands (such as rejection of fly in/fly out, a mining town, southern route to Porgera from Laiagam district, etc.) are in line with the national government's and developer's plans. However, the provincial government's requests about early consultation and tightening of linkage between concerned parties have been ignored. The national government never bothered to reveal their plans to the Enga Provincial Government and gave no assurances about its form of assistance.

Encouragement to provincial governments by giving them financial and manpower resources to set up their own business would be supportive. But encouragement of policies to promote GDP first with the expectation that benefits would later trickle down to the people would be but a day-dream in a highly capitalist oriented economy such as ours.

Summary

I have suggested that a mechanism be set up to screen foreign investor activities and that there is a need to tighten the linkages between interested parties with a view to assisting an economically weak province such as Enga to actively participate in the development process - not only in the mineral sector but other sectors as well.

THE MISIMA PROJECT
FEASIBILITY, AGREEMENT AND APPROVALS

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In May 1985, Placer (PNG) Pty. Limited and CRA Exploration Pty. Limited (at that time the equal partners in the Misima prospect) announced they were starting a final Feasibility Study for a gold and silver mine at Misima, in the Milne Bay Province of Papua New Guinea. The Feasibility Study would take eight months to complete, followed by two months for review and approval by the government. The target date for start of construction was therefore March 1986, ten months after the start of the Feasibility Study.

At the time of this paper (July 1987), it is now 26 months since the start of the Misima Feasibility Study and construction has not started yet.

At face value the Misima project looked straight forward and the target of ten months seemed realistic. Why then has it taken 26 months? This is the question which this paper will address and in doing so perhaps expose potential pitfalls for future projects.

To do this we will look at the nature of the project itself, the process of interaction between the developer and the State, and the "background" events which contributed towards the 16-month delay in start of construction.

The project

The Misima prospect is located on Misima Island, Milne Bay Province, about 250 kilometers south-east of the eastern most point of the Papua New Guinean mainland and about 600 kilometers south-east of Port Moresby.

The Misima deposit is epithermal in origin, with deeply oxidized ores containing a mining reserve of 56 million tonnes grading 1.38 g/t gold and 20 g/t silver. The area is not geothermally active.

The development proposal is for an open pit mine, approximately 2 kilometers long by 0.5 kilometers wide, with a 10 year mine life.

The overall strip ratio is 1.3 to 1. Approximately 50 per cent is hard waste rock, which will be disposed in conventional waste rock dumps near the pit. The other 50 per cent is soft waste, unsafe for land storage, and will be hauled by truck and dumped into the ocean. Due to a steep ocean floor, this material will not accumulate, but slide down the sub-marine slope.

The plant will mill 15,000 tonnes per day. The metallurgy is a conventional grinding, cyanide leach and CIP plant, similar to Placer's Kidston plant in Queensland.

The tailings from the plant will be thickened to remove most of the cyanide which will be recycled. The final thickener underflow will be mixed with sea water to dilute residual cyanide to acceptable levels and then gravitated down a pipe running into the sea and discharging at a depth of about 75 meters. At this depth, temperature and density effects ensure that the tailings do not drift up to the surface. They spread out and eventually settle on the ocean floor.

The mine will employ 290 citizens and 75 non-citizens at year 6 after initial training and localisation has occurred. Misima employees will live in their own villages and will commute to work daily by bus on an upgraded road system.

An ocean port capable of handling 3,500 DWT vessels will be constructed adjacent to the plant site for the delivery of equipment and supplies. Power for the project will be diesel-generated.

Approximately 50 kilometers of roads on the island will be upgraded by the project. The project will construct a permanent telephone link to Misima by extending the Post and Telecommunication Corporation's terrestial UHF system. Lines will be available for the public.

Gold production will average 200,000 ounces per year. Silver production will average two million ounces per year.

The mining company will be Misima Mines Pty. Limited.

The process

As the legislated owner of the resource, the State of Papua New Guinea requires its approval of the developer's "Proposal for Development" before a Special Mining Lease (SML) is issued. The Proposal for Development essentially comprises the Feasibility Study, the Environmental Plan and other required studies (e.g. Training and Localisation Study), which may not be in the developer's Feasibility Study. (The SML is the "licence" needed by the developer to build and operate a mine.)

The State looks at the Proposal for Development with a view to allowing a development which will optimise resource utilisation and maximise profit (and hence tax revenues) provided the proposal is at the same time environmentally and socially responsible. "Social responsibility" in the Papua New Guinean context is more far-reaching and onerous than in most developed countries. In Papua New Guinea it includes, for example, identification of traditional land ownership and compensation negotiation, promotion of local business development, and staff training and localisation. In addition, it is policy that the developer builds all the infrastructure required for the project, or required as a direct result of the project. This infrastructure needs to be consistent with designs and standards established by the relevant government agencies.

As a result of all this, a considerable amount of interaction between the developer and the State is necessary during the Feasibility Study and subsequently in the review and approvals stage.

For the Misima project, Placer in consultation with the Department of Minerals and Energy proposed a new process for the interaction between the developer and the State during the Feasibility Study stage. The process involves the developer submitting concept reports to, and consulting with, relevant government departments where necessary during the Feasibility Study, so that the developer gets provisional approval of his concepts as he progresses with the Feasibility Study. This consultation is coordinated by the Department of Minerals and Energy project coordinator. The alternative of presenting a completed Feasibility Study "out of the blue" to the government runs the risk of being rejected because some concepts are unacceptable. This could mean a time-consuming and costly revision of the Feasibility Study.

This process was successfully adopted for the Misima project. As a result there were no Feasibility Study critical path delays resulting from concept discussions and approvals by government departments or statutory bodies.

The expected "difficult" topics such as land ownership, environmental issues, social issues and local business development were addressed by Placer well before the start of the final Feasibility study. By addressing these long lead time issues early, and by doing it themselves rather than waiting for government assistance, Placer removed these from the critical path of the Feasibility Study. This is a valuable lesson for other developers of similar large projects.

Another way in which the time for the Feasibility Study stage was reduced was by conducting the Feasibility Study and the Mining Development Agreement negotiations simultaneously. Previously, in the case of Ok Tedi, the Mining Development Agreement preceded the Feasibility Study. In the Ok Tedi case, the Mining Development Agreement included the Company's and the State's undertakings during the Feasibility Study stage. It has become clear that this is not necessary. There is no reason why the developer would want to omit any part of the requirements of the Proposal for Development, because the Proposal for Development simply would not be approved if it were not complete.

Specific clauses of the Mining Development Agreement, particularly those relating to division of responsibilities on infrastructure and services, were negotiated and finalised after the concepts had been approved by the relevant government agencies. In this way, the Mining Development Agreement took shape as the Feasibility Study took shape.

In summary, the process of interaction between Placer and government agencies during the Feasibility Study was relatively smooth and did not cause critical path delays. To understand what has caused the delay in start of construction, we need to look at the timing of actual events. These are presented in Figure 1.

The events

Figure 1 sets out events during the 26-month period since the start of the Feasibility Study in May 1985. The rows of the table are the dates of the events. The columns of the table separate simultaneous events.

The table shows that the target date for completion of the Feasibility Study was January 1986. However, it was finally submitted to the government in February 1987. This 13-month delay can be attributed to the marginal economics of the project and the very difficult task Placer had in revising concepts and the mining plan to optimise the economics. The final plan increases cashflows in the early years by a combination of stockpiling lower grade material and a high milling rate of 15,000 tonnes per day.

At the time of this writing, five months have passed since the State received the Feasibility Study. Final approvals have not been given yet. The Equity Agreement column of Figure 1, shows a series of events which led to this delay in getting final approvals.

In early 1985 the Somare government had decided not to take equity in the Misima project. In November 1985 the Somare government was replaced by the Wingti government in a vote of no confidence. The new Wingti government initially did not change this decision. In mid-1986 Placer Pacific Limited floated on the Sydney Stock Exchange. A number of prominent Papua New Guineans made large profits overnight. This certainly contributed to the revived idea that returns to State equity in mining prospects could be very attractive. At the same time the Minister for Minerals and Energy promoted the idea that share ownership in Papua New Guinean mines should be made available to ordinary citizens. These concepts were announced by the Minister for Minerals and Energy in early 1987. The plan was to establish a government-controlled corporate "vehicle" which would take equity in Papua New Guinean mining companies. In turn the "vehicle" would float shares to Papua New Guinean citizens as well as overseas buyers. With this objective in mind, the Minister for Minerals and Energy instructed the State negotiating team to negotiate for an equity share of up to 20 per cent in the Misima project.

It was decided to negotiate an option agreement for four reasons. Firstly, it was undecided what level of equity Cabinet would want. Secondly, the government budget had no provision to purchase equity. An option would give time to arrange the financing. Thirdly, by delaying the purchase, it could coincide better with the establishment of the "vehicle" and a Papua New Guinean stock exchange. Fourthly, by exercising the option later, the State could minimise some risk in its participation in the project.

In April 1987, the Equity Option Agreement was complete. In the meantime the Mining Development Agreement had been completed and the Environment Plan had been approved by the Minister for Environment and Conservation. Placer was then ready to commit to the project, so formally submitted their Proposal for Development together with the Agreements to the National Executive Council for approval. At the National Executive Council meeting, the Equity Option Agreement was rejected.

Policy dictates that the State buys equity in mining projects at cost of actual exploration plus construction. However, the Option Agreement incorporated a variable premium above actual costs in lieu of an upfront option payment. This premium was unacceptable to Cabinet. Instead they instructed the State negotiating team to draw up a new Equity Agreement for a 20 per cent share to be purchased right away. This was done and completed by June 1987. Final approval is still awaited.*

Summary

The marginal economics of the Misima project has caused Placer to spend 13 months longer than anticipated on the Feasibility Study. Subsequent to that, it has taken over five months to finalise an Equity Agreement for the State's intended 20 per cent share in the project. Had the equity participation decision by the State been made earlier, the Equity Agreement would have been part of the Mining Development Agreement, and would have avoided approximately three months of delay (to July 1987).

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*Editor's Note: On 5 October 1987 government announced that the previously approved "fly-in, fly-out" strategy was not in accord with policy.

FIGURE 1

MDA = MINING DEVELOPMENT AGREEMENT
PA = PROSPECTING AUTHORITY
FS = FEASIBILITY STUDY
P for D = PROPOSAL FOR DEVELOPMENT
EA = EQUITY AGREEMENT
SML = SPECIAL MINING LEASE
EP = ENVIRONMENTAL PLAN
T & L = TRAINING & LOCALISATION
NEC = NATIONAL EXECUTIVE COUNCIL
MMPL = MISIMA MINES PTY. LTD.
PPL = PLACER PACIFIC LTD.
FA = FINANCING APPROVAL
BPNG = BANK OF PAPUA NEW GUINEA
NIDA = NATIONAL INVESTMENT AND DEVELOPMENT AUTHORITY

DATE	MO	MDA	PA & LEASES	FS & P FOR D	EA	EP & FA
MAY 85	0			START FS		
NOV 85	6				WINGTI GOVT	
JAN 86	8	START MDA		TARGET FS COMPLETE		
MAR 86	10			TARGET CONST START		
AUG 86	15		SML APPLIC.		PPL SHARE FLOAT	
SEP 86	16			FS COMPLETE (12,300 TPD)		
FEB 87	21			REVISED FS (15,000 TPD)	"VEHICLE" ANNOUNCED	EP SUBMITTED
MAR 87	22	MDA COMPLETE	MMPL FORMED	T & L STUDY	STATE WANTS EQ OPTION	
APL 87	23	NIDA APPLIC		P FOR D SUBMITTED	EQ OPTION COMPLETE	EP APPROVED
MAY 87	24		PA TRANSFER		STATE WANTS 20% UPFRONT	
JUN 87	25	NEC OKAYS MDA	NEC OKAYS S M L	NEC OKAYS P FOR D	EA COMPLETE	FA TO BPNG
JUL 87	26	NIDA APPROVAL?			EA APPROVAL?	FA APPROVAL?

RENTS AND BOOMING SECTOR EFFECTS

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Developing countries have moved to the negotiation of mining agreements not only to ensure that their development objectives are not overridden but also to obtain as much of the resource rent accruing to a given project as possible. Developing countries are generally dissatisfied with the distribution of benefits from mineral development. The division of the resources rents is complicated when foreign investors have a total or dominant share in a mine. In the past foreign investors were able not only to earn a "normal" profit, but also to appropriate the bulk of any resource rents. This led to extreme tension between host country and investors, usually culminating in nationalisation of the resources.

Developing countries, however, have to take into account that traditionally resource rents were needed to finance exploration and to cover project and sovereign risks. Mining investors therefore argue that they have to continue to benefit from rents to cover these costs and risks otherwise future mineral development would be curtailed. Investors are also aware that excessive claims may lead to nationalisation of mining. Given these constraints, investors and host countries consider their bargaining positions very carefully. By reducing uncertainty in government policy, host countries can strengthen their bargaining positions so that attention focuses on the risks associated with a particular project. Investors will accept some risk provided they receive reasonable compensation for those risks.

Mineral tax regime must give adequate recognition to investors' attitudes towards risks. As Gillis suggests, any resource tax system which recognises investors' attitudes towards risk can "serve to increase significantly host country returns at high levels of investment in exploration and development by mineral enterprises" (Gillis, 1981 : 19).

Mineral resource taxation is now seen as important in generating revenue in mineral exporting countries. The taxation policies vary between and within countries, and even at project level. Differences also exist in taxation on hard minerals and petroleum (soft minerals).

Mineral taxation in Indonesia

Indonesia is one of the many developing countries that vests ownership of mineral resources in the state. Mineral resource development includes copper, coal and tin mining, but petroleum is of greatest importance. Petroleum production contributes about a quarter of GDP and just over two-thirds of government internal revenue. Both hard mineral and petroleum production have contributed significantly to Indonesia's economic growth (Emerson, 1984 : 31).

Indonesia was one of the first developing countries to attempt to appropriate economic rents, doing so through production-sharing fiscal arrangements. In production-sharing arrangements the state-owned corporations share total output with the foreign companies which operate the mines. Production-sharing is more prevalent in petroleum than in hard minerals.

The Indonesian government has traditionally been reluctant to accept direct foreign investment in mineral resource development and has instead operated on contracts which maintain its role as mine owners in mining agreements. The Indonesian government considers that production-sharing gives it a greater say in mineral resource development in the country than other forms of resource taxation. A state-owned corporation (P.N. Pertamina) was established and granted all mining rights.

Mineral taxation policies in Indonesia include company tax, royalty, equity participation, production-sharing, income tax, depreciation allowances, progressive profits tax and investment allowances. Company tax policy is the same for the hard minerals and petroleum sectors, at 35 per cent in the first ten years of mining and 45 per cent thereafter. Royalty rates vary between 1.6 to 10 per cent depending on the type of mineral and mineral content.

A maximum of 50 per cent local equity is allowed in the hard minerals sector while in the petroleum sector this is 51 per cent. In the petroleum sector, production-sharing arrangements range from 50:50 to 65:35 before tax, and 85:15 after tax, in favour of the state. Income tax rates range from 35 to 37 per cent in both sectors, and accelerated depreciation is allowed for in the first four years of mining operations. In addition, tax holidays of, up to three years are options for mining companies.

A windfall profits tax which was common in earlier contracts was abolished in 1982 and was replaced by a 15 per cent progressive profits tax. A 10 per cent dividend withholding tax also applies in Indonesia. Another significant feature of the Indonesian tax regime is the investment allowance which allows for up to 20 per cent of total investment to be deducted from taxable income in both the hard minerals and petroleum sectors.

There is the suggestion that there would be "considerable advantages in moving to general stable rules involving the (resource rent tax) RRT.... Establishing these arrangements in general mining legislation would have the advantage of improving their perceived stability and consequently, their expected long-term revenue yield" (Emerson, 1984 : 38).

Mineral taxation in Australia

In the Australian context, when the Labor Government was elected in March 1983 major reforms in the mining taxation system were proposed. In July 1984, the Labor Government applied an RRT without traditional royalties to new petroleum developments off-shoire (Emerson, 1984 : 79). Off-shore petroleum developments are within the jurisdiction of the Commonwealth government, whereas on-shore developments are under the jurisdiction of the State government. In spite of the support for the RRT proposal by the Labor Government, there was strong opposition by the mining sector to this form of tax.

Emerson describes the fiscal arrangements for mining in Australia as highly unstable and non-neutral on exploration, investment and production decisions. "The very great instability in the Australian fiscal arrangements stems from an inappropriate choice of tax bases and rates and from conflict between the Commonwealth and State governments" (Emerson, 1984 : 85).

It is obvious that Emerson and others prefer an RRT-based fiscal regime. "Substantial revenue and efficiency gains could be anticipated from replacing all special taxes on the mining industries in Australia with a taxation system incorporating the RRT" (Emerson, 1984 : 86).

It is obvious from the literature that the application of the RRT in Australia is hampered by the competition between the Commonwealth and State governments in the area of mining taxation. Closer co-operation between these two tiers of government, and a shift towards RRT principles would likely increase revenues to the government from the mineral sector. Another important stumbling-block is the fact that there is strong opposition to the RRT by the private mining companies. The RRT is to capture the additional profits from mining due to high prices of minerals or lower operating costs due to technological change. The additional profits due to these exceptional circumstances would otherwise totally accrue to the mining firms. This is the principal reason for the opposition to the application of the RRT by private mining companies. Mining companies' connections to other business sectors in Australia have made it difficult to apply the RRT.

Mineral taxation in Papua New Guinea

Papua New Guinea was initially heavily dependent on agricultural exports which are highly susceptible to fluctuating prices. The early 1970s saw the emergence of the growing importance of minerals in government revenues; mineral taxation was introduced with the principal aims of stabilising government revenues and capturing mineral rents but at the same time accommodating investors' profitability objectives. The effects of the mineral taxation policies in Papua New Guinea have thus become an important policy issue. The concern of the governments of Papua New Guinea with the stability of public expenditures also led to the establishment of the Mineral Resources Stabilisation Fund (MRSF) to absorb fluctuations in revenue from mining.

Since the application of the additional profits tax (APT) or the RRT in conjunction with the company tax in the mining sector in Papua New Guinea, there has been a debate about the policy implications of this resource tax. It focuses on the effects of the RRT on foreign investment in mining. The original proponents of the RRT (Garnaut and Clunies Ross, 1975) argue that it is a neutral tax; that is, it should not affect investment as it is a tax on super-normal profits.

The mining taxation in Papua New Guinea has been the subject of numerous articles and a number of books, some of which are listed in this study. A number of studies have also compared Papua New Guinea's fiscal regimes in the mineral sector with that of other countries; these include Garnaut and Clunies Ross (1983), Emerson (1984) and Wilson (1984) among many others. In these comparisons, one thing stands out most : that the RRT or the APT which characterises Papua New Guinea's fiscal regimes since 1975 is the best fiscal regime devised so far for collecting mineral rent.

An important advantage of the RRT system is that it is based on revealed profitability, and the chracteristics of adjusting automatically to take a greater proportion of profits if this is in excess of the threshhold rate of return. As Palmer suggests:

"... the superiority of the RRT over the available alternatives under conditions of uncertainty arises from the fact that it does not depend on ex ante forecasts of expected tax liability but responds automatically and progressively to a wide range of outcomes; by more efficient risk sharing it maximizes expected rent charges consistent with a decision to invest; and it is more neutral than equal-yield alternatives with respect to investment (or reinvestment) decisions" (Palmer, 1980 : 258).

The effects of a booming sector

The rents from a booming sector such as minerals add to the availability of financial resources within an economy. However, these additional rents may have other effects on the economy. Economists have used the term the "Dutch Disease" to refer to the negative effects of a booming sector following the discovery of natural gas in the Netherlands in the early 1970s. Since then literature on the effects of a booming sector is experiencing a boom. The following discussion highlights the likely effects of a booming sector based on recent literature on the subject.

Following Corden (1982), we present a brief analysis of the effects of a booming sector using three sectors: the Boom Sector (BS), the Lagging Sector (LS) and the Non-tradeable Sector (NS). The first two sectors produce tradeables at world prices, and both could also produce importables and exportables. Labour is mobile between the three sectors; wage and rents are flexible within them. A boom in BS would raise the aggregate incomes of factors employed in that sector. Assuming some income from the extra income in BS is spent, this is likely to lead to extra spending on NS such that the price of non-tradeables relative to tradeables must rise. The net effect is that it draws resources out of BS and LS into NS, at the same time shifting demand away from NS towards BS and LS. Accordingly, Corden is led to suggest that labour will move from LS to NS with a subsequent fall of output in LS. If Lagging Sector happens to be the manufacturing sector, this will induce some degree of deindustrialisation. Rents of the specific factor in LS will fall, whereas the wage will rise in terms of tradeables and fall in terms of non-tradeables, (Corden 1982 : 7)

If the marginal product of labour rises in the Booming Sector as a result of the boom, the demand for labour in that sector rises leading to movement of labour out of the Lagging Sector and out of the Non-tradeable Sector.

A sectoral boom has other effects. The first of these is the spending effects. Incomes and public revenues are spent on other goods and services. The second effect is the resource movement effect. In general, resource movement takes place to meet the demand for labour, capital and other factors of production induced by the Booming Sector, and by the sectors stimulated by the spending effects.

Booming mineral sectors have a major impact on the non-tradeable service sector, mainly on public services in most LDCs, through the spending and resource effects. The adoption of the principle that mineral resources belong to the nation rather than to the individual results in a large part of the rents from natural resource booms accruing to the state through royalties, taxes and returns to equity.

The effects of booming sectors also lead to other problems. A boom in exports, if not offset by other policies, may result in appreciation of the exchange rate, which makes imports cheap in relation to domestically produced goods. This discourages domestic production and other traditional agricultural exports are similarly discouraged. This trend creates an overall bias against agriculture.

Booming sectors tend to encourage inflation by bidding up factor incomes and through spending pressures on non-tradeables. In general, resource-rich countries experience bouts of inflation, and in some of these countries inflation is endemic.

Indonesia

Given the brief discussion on the effects of a boom, we look at the Indonesian government experience of the petroleum boom from 1973 to 1978. Indonesia's experiences of a booming sector effects are closely linked to the international oil price shocks of 1973/74 and 1978/79.

The petroleum boom in Indonesia was accompanied by a rapid rate of spending in the public sector. Growth of the domestic money supply also grew at a rate in excess of the rate of growth of real GDP. Because Indonesia's exchange rate was fixed relative to the US dollar, there was high inflation during the period 1974 to 1978. The resulting inflation led to a decline in the ratio of traded goods to non-traded goods and services. The inflation induced by the monetary expansion during this period was therefore concentrated in the prices of non-tradeables. By late 1978 the Indonesian government "judged the resulting rate of absorption to be excessive and devalued the Indonesia Rupiah" (Warr, 1986 : 32).

Australia

As in many mineral-rich countries, the boom in the mineral sector in Australia has had a significant impact on its economy. "It has stimulated economic growth, earned export income, attracted labour and capital, encouraged development of infrastructure, and assisted in expanding and diversifying the economy" (Doran, 1984 : 78).

Australia experienced two resource "booms", the first due to a major boom in iron ore and bauxite/alumina mining and exports in the period 1968-1974, and the second due to coal and uranium production in the period 1978-1982. The source of the boom lay not only in the discovery of mineral deposits but also in technological change, demand factors, price changes and regulatory controls.

The basic structural effects in the Australian economy were "characterized as one with a substantial resource-movement effect" (Forsyth, 1986 : 263). This effect was induced by investment in the mining sector originating from overseas. There was a substantial resource pull on the rest of the economy. The effect on the non-tradeables sector was ambiguous.

In the early 1970s, Australia had a current account surplus. This is unusual for a country which is normally a capital importer. With the second boom (1978-82), there was a rise in real exchange rates, and since then there has been a depreciation. As Forsyth suggests -

> "The two booms were imposed on an economy undergoing gradual structural shifts. Services have been growing and agriculture and manufacturing declining.... The growth of mineral output in 1968-74 seems to have had little effect on services output, but to have taken place at the expense of the tradeable sectors. These changes are, however small" (Forsyth, 1986 : 165).

Conclusion

Papua New Guinea is a resource-rich developing country. When new mining ventures come into production in the 1990s, the booming sector effects that have been described above must be given careful consideration.

If inadequate policy attention is given to the booming sector effects, there could be misallocation of resources through an appreciating currency. Increased investment in the booming sector could also lead to the decline of non-booming activities. A relative abundance of financial resources due to the mineral boom could well lead to a lowering of fiscal and spending discipline by the government.

The negative effects of a booming sector are inevitable. The extent to which the positive effects of a boom outweigh the negative effects is very much an economic policy invention. To this extent, this paper is merely highlighting some possible effects of a booming sector due to increased rents in that sector.

It is also inevitable that economic growth at all levels of development has to face many frictions. Economic policy can create or even aggravate such frictions, or it can utilise the additional resources from the booming sector to stimulate growth.

Conclusion

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MANAGING RESOURCE BOOMS, A WESTERN AUSTRALIAN PERSPECTIVE

Sir Laurence Brodie-Hall, C.M.G.,
Chairman, Board of Management, Western Australian School of Mines

A resource boom, for the purpose of this discussion, may be considered as a situation in which a combination of circumstances favourable to very rapid development of natural resource production occurs in a country, or a state or region of that country. Broadly the required circumstances to trigger a boom are, favourable market conditions with reasonable prospects of future stability for one or more commodities, the identification of actual or potential substantial reserves of the resource commodities, and a stable political and economic climate for investment in exploration and development.

The political, social, and economic effects of a resource boom impact very widely, and to different levels of intensity on the various involved bodies in any state which is host to such an event, and it is therefore very appropriate to look at the ramifications of managing a boom.

In a free enterprise society there are many bodies and groups who become involved in various aspects of managing the events associated with a boom, but the ultimate responsibility must come back to the government of the host state, as it is charged with the task of administering the global affairs of the state for the general benefit of its people.

In the following discussion considerable emphasis will be placed on the role of the government in this management function, but the major part played by development companies and service and supply industries, and the role of other bodies will also be outlined. The topic is a very broad one with far ranging implications, and a brief exposition such as this will necessarily be confined largely to identifying problems and commenting on developments, rather than offering solutions.

In the course of this paper the focus will be on current and in some respects earlier developments in Western Australia, although occasional reference will be made to resource projects elsewhere in Australia, and discussion will be confined essentially to mineral resources other than petroleum and natural gas.

Western Australia is no stranger to mineral resource booms, indeed the early development of the state was driven by the major gold discoveries of three decades 1890 to 1920. This was followed by a long period of slow growth in an economy based on agriculture and pastoral activity, (relieved by a resurgence in gold mining activity in the thirties) until the sleeping giant began to waken in the sixties. The economy of the state was given tremendous impetus by a sustained mining boom involving several commodities, but chiefly iron ore and alumina over the last two decades, during which time there occured the well publicised nickel boom of the early seventies, a "boom within a boom". However there has developed over the last three years in Western Australia an upsurge of activity in gold mining which in its sustained rate of growth appears set to eclipse all previous performances in resource development. Much of what follows in the discussion will therefore relate to aspects of this current gold mining boom with references, where appropriate, to earlier experiences and to other states and the Commonwealth.

The approach taken is to describe the impact on each body affected or involved, with an outline of the structure and operation of the body where appropriate.

Government bodies

Department of Mines. This body in Western Australia is responsible for the administration of all aspects of the mining and petroleum industry in the state, and this "one-stop shop" approach is preferred by the industry. In respect of metalliferous mining the department administers the industry via the Mining Act, which covers the "business" aspects, and the Mining Regulations Act which covers safe practice in mining operations. Some contact with other statutory bodies is obviously required and these are identified in this section.

The divisions directly involved in mining activities are listed and their functions described, with brief comment on measures taken to assist in coping with resource booms.

Geological Survey Division (GSWA). The survey provides a comprehensive reference bank of data for the state which is accessible to the industry and the public generally and greatly facilitates mineral resource search.

There is a state geological map (1 : 2,500,000), and the whole state is mapped on 1 : 250,000 scale. Mapping is proceeding on 1 : 100,000 scale, concentrating initially on selected areas of mineral interest. Extensive hydrogeological investigation work has been undertaken in Western Australia as the state overall is one of the driest regions in the world. Much of the gold mining activity is in arid or semi-arid regions.

Mining Registration Division. The principal task of this division is to administer the provisions of the Mining Act which governs access to land for exploration and mining development and mineral extraction purposes. The importance of having provisions to ensure that prospecting and mining can be carried out under clear and concise conditions which will assist and accelerate the discovery and extraction of the mineral wealth of the state cannot be overemphasised.

The present Mining Act was proclaimed in 1978 and although amended since in detail, was a vast improvement on the previous Act which had been in place since 1904. The 39 different types of titles provided for were reduced to three, prospecting licences, exploration licences, and mining leases, with two additional provisions, ancillary general purpose lease and miscellaneous licence, these last to provide for associated works and services. No provisions for mineral rights to owners of land survived after 1904.

The system of wardens' courts throughout the state has been maintained as they provide a conveniently decentralised system of administering mining justice. In the case of exploration licences and mining leases, the warden has authority to recommend granting or refusal, but the final authority rests with the minister.

It is essential to have in place a competent registration system and a reliable survey and mapping control system; the latter function for the state mining industry is controlled by a division of the department. The registration system must have the capacity to handle with expedition the volume of applications including the judicial functions of the wardens' court system.

Computer functions. In respect of these first two divisions in particular, increasing use is being made of computer based systems for management and control purposes, and information compiling, collation and retrieval. The department in Western Australia could not have been able to cope with the demands on its resources to provide an adequate service to the industry without the implementation of these key starter systems.

The geological survey have WAMEX (West Australian Mining Exploration System) in operation, which to date incorporates over 75 per cent of the open file exploration data accumulated in the state, and will soon incorporate all of it. The information is made available to the Bureau of Mineral Resources in Canberra to update their records. A similar system (WAPEX) will be maintained by the petroleum division.

Mining registration operate TENDEX (a tenement index) which includes comprehensive and readily accessed information on all types of mineral tenement holdings in the state. This system is widely used by the industry, the public, and departmental staff, and may be accessed by terminals in the regional mining centres as well as in Perth. There are currently some 25,000 "active" tenements on file, and 23,000 dormant ones. Enquiries which have averaged 300 per week have recently been peaking at 500 per week.

A further system of records management (RMS) has been implemented to log the status and keep track of the movement of 150,000 active files of which over 90,000 relate to tenements. This employs sophisticated bar-cade technology together with hand held micro-computers to enable tracking of files to be carried accurately, rapidly and regularly.

Use is also made of computer services by the mining engineering division which has a system for recording and collating details of monitoring of dust and other atmospheric contaminants (CONTAM), and a recently established accident data collection and analysis system (AXSTAT).

Mining Engineering Division. This division administers the provisions of the relevant mine safety legislation, provides advice to government and where necessary to the industry, and controls the environmental aspects of both current operations and rehabilitation. The proliferation of mining operations has palced very heavy demands on the capacity of the division's inspectorate to maintain the desired level of monitoring of operations in terms of health and safety requirements. This concern is heightened by the inevitable influx of persons without a depth of previous mining experience into the work force, the great expansion in the use of contractors with large fleets of heavy mobile equipment, and the need to cater for a large number of new applications for certification for various levels of statutory responsibility.

It has been necessary to restructure the division to meet the greatly increased demand for its services. An example of the increase in the use of hazardous materials is the fact that consumption of cyanide for the gold industry this year is expected to exceed 30,000 tonnes.

Government Chemical Laboratories. Considerably increased demands are placed on services in the industrial hygiene area, and in metallurgical and mineralogical laboratories, as well as assistance on inspections provided to the mining engineering division.

Explosives and Dangerous Goods. This division is concerned with the bulk storate and bulk transport and handling of hazardous materials throughout the state. Excluding liquid fuels used in the Perth metropolitan area, the great bulk of material subject to the control of this division is used in the mining industry.

Royalties and Statistics Branch. This group is responsible for the assessment and collection of royalties, and for the maintenance of all essential and relevant statistics on the industry. A review has been conducted of the state's royalty provisions, and a report, yet to be released, has been prepared.

State Batteries Division. This division has maintained a series of small batteries throughout the various goldfields in the state principally to provide gold recovery facilities for the prospector and small operator. This function has been handed over to a development corporation, and operations will be subject to rationalisation and upgrading of technology.

Department of Resource Development (DRD). This department has a number of objectives which are not solely related to mining and mineral processing, but the bulk of the development in the state in the past three decades has been in mineral resources. The major tasks for this group are:

- advice to government on mineral and energy resource development policy;
- identification and promotion of new investment opportunities in the resource area;
- negotiating on behalf of the government acceptable bases for the development of resource projects;
- implementing agreements between developers and the government.

Subsidiary goals are the investigation and promotion of downstream processing opportunities, promotion of local industry participation and promotion of infrastructure-sharing by resource industries. There is also some involvement in the large-scale environmental issues related to major resource development.

There may seem to be potential administrative advantages in combining this department with the Mines Department, but there are no significant savings in terms of staffing in doing so, and the DRD deals with a considerable body of industry other than mining. Moreover it is considered preferable to divorce the body which is responsible for regulation and control of the mining industry from that which is promoting the development of individual companies or sectors of it, to avoid any potential conflict of interest, or perceived lack of impartiality in dealings.

The DRD normally become involved in the major individual or regional mining development projects, particularly where substantial infrastructure is involved or where the project will have a significant social or environmental impact on urban or closely settled rural areas or impact on other industries in the area. Examples are the major iron ore and alumina projects and the Argyle diamond mining project.

Individual agreement acts are set up for these projects, which may contain provisions additional to those in existing acts regulating the industry or may provide for exemptions from some requirements and conditions. Many of the major developments are in remote areas and infrastructure costs are high. Away from the metropolitan and south-west corner of the state the water supply is all from ground water sources, apart from the pipeline to the eastern goldfields. Western Australia is highly centralised with 70 per cent of the population in Perth and the great majority in the south-west region. The iron ore development in the Pilbara has generated direct employment for 10,000 and supports a regional population of 50,000. Much of the very rapid development now taking place in the gold industry does not require any involvement from DRD.

Environmental departments. There are two government bodies with an involvement here -

- The Environmental Protection Agency (EPA);
- Conservation and Land Management (CALM).

The EPA have the task of monitoring and advising on all environmental (and social) impacts of all developments within the state. The Department of Mines refer projects of any significance, usually at the Notice of Intent stage, to the EPA for recommendations. Ultimate decisions are made by the respective ministers. Reference to CALM is required where projects are proposed on land under this department's jurisdiction, or when activities will impact on it. The department is concerned with forests, reserves, national parks, wildlife, etc.

Much of the activity of the current gold boom is taking place in the more remote and arid areas, but there has been and continues to be enough activity to impose a considerable work load on these departments. It is necessary to ensure that undue delays in project development due to protracted environmental review procedures are avoided. The project protagonists can assist in this by adequate preparation of submissions and are only able to do so if the requirements are previously known.

Corporate Affairs. This department has as one of its tasks, the checking and approval of prospectuses for company floats on the stock exchange and the volume of work increases greatly in the event of a gold mining boom such as the state is now experiencing. Many floats are obviously of a prospective nature and corporate affairs have to go to some pains to check the validity of claims made in these documents. Assistance is sought from the geological survey and mining engineering divisions of the Department of Mines in respect of some of the information.

It is necessary to maintain a high level of integrity in reporting on the prospectivity of projects subject to such floats, to protect the individual investor who is being asked to support the proposed development.

These are the government bodies most directly involved, although the mining developments obviously impact on the services of many others.

The private sector

Preliminary. The impact here is very widespread and it will be possible to touch only briefly on some aspects of the involvement of such bodies in managing a resource boom.

The larger mining companies and groups are normally best placed to take an early position on exploration and development when the boom situation arises, due to the resources which they are able to marshall or to concentrate in a particular area. This is in contrast to the smaller company or to the new float, which will have to recruit staff and engage consultants and contractors.

It is worth noting that the bulk of the gold operations to date are open cuts, often set up on limited reserves offering a project life of up to six years and the practice is generally to engage a contract group to carry out the actual mining operations. This avoids a very heavy outlay in plant and equipment to be written off over a relatively short term.

The activity level has created an unprecedented demand for geologists, operating and consulting mining engineers and metallurgists, assay and analysis laboratory services, mining contractors, and contract exploration drillers. The result has been to push salaries and prices up and the industry competes for these scarce resources. The prices of land and houses and house rentals in Kalgoorlie for example have reached extraordinarily high levels.

The Mines Regulation Act provisions require adequate qualifications and certain minimum levels of satisfactory work experience for the various appointments to positions of statutory responsibility in the industry. This is presenting difficulties to companies wishing to staff new operations, and competition for competent managers and technical/professional staff is very strong.

The services of laboratories providing industrial hygiene monitoring and analysis, as well as mineralogical work and assaying, is also very much in demand. Contract services are spreading rapidly in this field.

The competence of such laboratories has to be established by an appropriate authority. The Government Chemical Laboratory (GCL)is such an authority. The GCL itself can not cope with even a fraction of the current demand from industry.

Industry organisations

It is essential for effective coordination of the mining industry with governments, other industry bodies and the public, that the industry forms organisations and supports them. The Chamber of Mines of Western Australia is such a body and performs a very effective role in representing the industry in the state.

National bodies such as the Australian Mining Industry Council (AMIC) and Association of Mining and Exploration Companies (AMEC) are essential to coordinate and further the industries' requirements and are linked to and supported by the Chamber.

Such bodies represent powerful and influential lobby groups to ensure that the industry is being adequately served by the appropriate government departments and is not disadvantaged by unreasonable constraints in the market place.

Tertiary education institutions and technical education

The cyclic pattern of the mining and minerals industry in Australia, due to external economic circumstances has had a very adverse impact on the tertiary institutions and technical education establishments in the country. These bodies are grappling with the task of coping with a widely fluctuating demand from an increasingly technical industry, while drawing from a declining technical base in secondary eduction. Considerable effort is being devoted to rectify this situation.

Summary

The present circumstances are somewhat unusual in that, due to the nature of both the market and the gold occurrences a very rapid acceleration has been possible. In 1986 some 19 new gold operations commenced and during 1987, a further 30 will come into production.

The operations are almost all open cut, and located in areas previously worked for gold. Unlike iron ore, coal and other high-bulk, low-unit value commodities, gold is readily taken to the final product stage on site, incurs insignificant product freight costs and is readily sold with minimal realisation charge.

The fact that gold production is currently tax free in Australia has contributed in large measure to the present upsurge, which is of tremendous benefit to the state and to Australia.

A final word of caution. Governments, in contemplating the benefits which derive from resource development, and they are very great, should resist the temptation to "kill the goose that lays the golden eggs". It is all too easy to become addicted to easy revenue as did the Australian federal government with oil revenue and the governments of Queensland and New South Wales with freight imposts and other charges on the coal mining industry, which are now at the time of declining markets likely to lead to the demise of some sections of the industry. Policy decisions on these matters should be made with the best and most impartial of technical and economic advice for the long term good of the state.

The foregoing indicates that there is an extraordinary range of melchanisms available to government, which may be applied as constraints or activators, to enable it to control the rate at which a resource boom develops, and to guide its direction.

To recapitulate, these mechanisms include -

- the provision of comprehensive exploration data and other preliminary resource potential evaluation;
- the issue (or withholding or withdrawal) of various tenements, with associated conditions;
- environmental conditions and contraints;
- infrastructure requirements with policies ranging from limitations to assistance;
- authorisation for water resource usage;
- controls on associated land use and land disturbance conditions;
- the establishment of agreement acts for orderly development of major resource projects;

- controls on reserves and national parks;
- corporate affairs monitoring of investment floats and other aspects of commercial development.

At a national level there may also exist marketing or export constraints but these are only likely to be applied to scarce or strategic resources rather than potential boom commodities.

Governments seeking to promote development do not exercise these controls capriciously as this adds a further degree of uncertainty to an already high investment risk industry. Rather the mechanisms are seen as tools for rational management.

APPENDIX 1

INSTITUTE OF NATIONAL AFFAIRS - PNG CHAMBERS OF MINES SEMINAR

THE DEVELOPING MINERAL SECTOR
OPPORTUNITIES AND CHALLENGES

Tuesday 14 July 1987, 8.00 a.m. - 5.00 p.m.
Kambuingi Room, Port Moresby Travelodge Hotel

PROGRAMME

SESSION 1: **8.00 - 9.30 a.m.** INTERNATIONAL SETTING - SUPPLY DEMAND & PRICE OUTLOOK
Chairman: W. Searson

Petroleum J. Stewart, BP (PNG) Pty. Ltd.

Gold P. Winn, New Guinea Goldfields Ltd.

Discussion Panel: R. Schutz, Industry
K. Ai, Government
Bank of PNG

Questions and discussion from the floor (15 minutes)

9.00 - 9.30 KEYNOTE ADDRESS
Dr. Odwyn Jones, Dean, School of Mines, Kalgoorlie, Western Australia

9.30 - 9.50 COFFEE

SESSION 2: **9.50 - 12 noon** **OPPORTUNITIES AND CHALLENGES**
Chairman: Roger Brandt

"Micro-economic Aspects of Mineral Sector Development"
G. Robinson, Assistant Secretary, Minerals & Energy Policy Division, Policy Coordination, Department of Minerals & Energy

"Macro-economic Aspects of Mineral Sector Development"
M. Vele, Deputy Secretary, Economic Policy, Department of Finance & Planning

"Investing in Papua New Guinea : A Gold Miner's Perspective"
P. Slaughter, Managing Director, Highlands Gold Limited

"The Principal Task is Mining : Incentives & Constraints in Policy and Practice" - J. Bovard, Director, Giant Resources

Discussion Panel: K. Ai, Government
M. McLeod, PNG Chamber of Mines
O. Jones, Kalgoorlie School of Mines

Questions and discussion from the floor (35 minutes)

12.00 - 1.00 LUNCH

SESSION 2 CONTD. : 1.00 - 3.00 **OPPORTUNITIES AND CHALLENGES**
Chairman: Charles Cole

Developing Linkages:

"Bougainville Development Corporation Experience"
P. Nerau, Managing Director, Bougainville Development Corporation

"Ok Tedi Mining Ltd. Experience"
T. Underwood, Resident Engineer, Ok Tedi Mining Ltd.

"Provincial Government Perspective"
P. Kikala, First Assistant Secretary, Policy & Planning, Department of Enga

Questions and discussion from the floor (30 minutes)

"Misima: The Beginning of the Post-Ok Tedi Era"
A. Vogel, Assistant Secretary, Project Coordination, Department of Minerals & Energy

3.00 - 3.20 COFFEE

SESSION 3: 3.20 - 5.00 **MANAGING RESOURCE BOOMS**
Chairman: John Millett

"Some Experience from Abroad"
Dr. S. Polume, University of Papua New Guinea

"An Australian Perspective"
Sir Laurence Brodie-Hall,
Chairman, Board of Management, Kalgoorlie School of Mines

Discussion Panel: Bank of PNG
K. Ai, Government
C. Cole, Industry

Questions and discussion from the floor (30 minutes)

FINAL SUMMING UP: Dr. Andrew Vickerman,
Prime Minister's Department

LIST OF I.N.A. PUBLICATIONS

Discussion Papers: (K10 each)

"Foreign Investment Policy", (ISBN 9980-77-004-X)
John Wylie, plus Seminar Proceedings, (155 pps), August 1977 (Out of print).
"The Structure and Adequacy of Financial Institutions in Papua New Guinea", (ISBN 9980-77-005-8), Allan Brown, plus Seminar Proceedings, (106 pps) January 1978 (Out of print).
"Price Surveillance - A Policy Appraisal", (ISBN 9980-77-006-6), Terry Pitt (96 pps) August 1979 (Out of print).
"Tax Policy in Papua New Guinea", (ISBN 9980-77-007-4), Professor Robert Neild (80 pps) January 1980.
"Problems of Tax Reform", (ISBN 9980-77-008-2), Professor Russell Mathews (39 pps) July 1980.
"Land Policy and Economic Development in Papua New Guinea", (ISBN 9980-77-009-0), Professor Jack Knetsch and Professor Michael Trebilcock (137 pps) May 1981.
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W. Clifford, L. Morauta, B. Stuart, (ISBN 9980-77-001-5 & ISBN 9980-77-002-3) (263 pps), September 1984
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