CVRD TURNS TO MARKET

Brazil's Cia Vale Do Rio Doce (CVRD) is planning to raise $US200 million through a European commercial paper programme to be launched next week. According to a report in London's *Financial Times* the move represents the first approach of a Brazilian state enterprise to the market since the onset of the Latin American debt crisis in 1982. CVRD requires the outside funding to help service several major minerals projects because local real interest rates are steep — at the same time the company is thought to be keen to test the water for possible further issues.

CVRD is expecting to pay around 0.75% above London Inter-Bank Offered Rate (Libor) levels. The operation will be co-ordinated by J P Morgan while Fuji Bank will guarantee the paper. Maturities will vary from a minimum of 30 days but CVRD guarantees that the paper can be rolled over for a maximum of two years. The banks will back the issue with cash tied up in the compulsory trade lines opened to Brazil as part of its $115,000 million foreign debt restructuring package.

In terms of its operations, the country's largest mining company relies heavily on iron ore exports as the principal source of foreign exchange income. Last year sales rose by 8% to a record 92.3 Mt of iron ore and pellets. Direct exports climbed by a similar amount to 62.7 Mt for a foreign exchange realization of around $1,188 million. The Carajás operation in Pará State alone expanded output by 15% to 28 Mt.

Meanwhile, more modest contributions came from sales of manganese (a record 456,000 t), gold and titaniferous minerals. However, the pulp business drew in more than 8% of total export revenue at $178 million and ocean transport brought in $188 million. Substantial capital will be pumped into these sectors as well as into upgrading port facilities and rail transportation.

Bauxite and aluminium projects are becoming increasingly important to CVRD, sales by the sector accounting for 25% of total foreign exchange revenue of $2,109 million in 1988. The equity share of output from the Alumínio Brasileiro SA (Albrás) and Valesul Alumínio SA facilities was 80,900 t and 50,700 t respectively last year. The former is scheduled to lift capacity to 320,000 t/y by mid-1991 on completion of Phase II of an on-going programme. This work is projected to cost $625 million (70% backed by funding from Brazil's National Social & Economic Development Bank) — spending of $717.5 million was incurred during the first phase taking output to 170,400 t in 1988.

An extra $500 million has been earmarked for restarting and completing expansion of the Alumina do Norte do Brasil SA (Alunorte) alumina project at Barcarena near Belém to lift capacity to 1.1 Mt/y by 1994 (*MJ*, March 31, p.89). Similarly, 46%-owned Mineração Rio do Norte (MRN) is expending some $100 million this year to permit a 30% increase in capacity to around 8.5 Mt/y of bauxite at the Trombetas mine in the Amazon region. Last year, the associate produced a record 5.9 Mt of bauxite and had sales of 6.2 Mt.

CVRD itself has indicated it is to form a separate joint venture with Cia Paraibuna de Metais, the country's second largest zinc producer, to mine refractory grade bauxite. The new company, Mineração Vera Cruz, will be 49%-owned by CVRD and is expected to produce 100,000 t/y of bauxite. In addition, CVRD is preparing a feasibility study on establishing a new bauxite operation at Jabuti in the Paragominas region of Pará State to supply the domestic market with an extra 1 Mt/y of alumina. Reserves total 850 Mt of ore, providing a valuable new source of feed for the domestic industry which has to supplement shortfalls of alumina with imports from Surinam and Australia.

Private sector partners may be invited to take up an interest in the project and CVRD is also looking at its options on a variety of other key projects — including development of two kaolinite discoveries in Pará State (*MJ*, July 21, p.57) and exploitation of the Salobo copper deposits near Carajás.

Mine development at Salobo is due to commence next year and the completed operation is expected to yield approximately 85,000 t/y of copper, 3,000 kg/y of gold and almost 13,000 kg/y of silver from 1994. Capital costs are estimated at $425 million of which $80 million has been spent to date, half coming from the National Social & Economic Development Bank as part of a deal to earn rights to one-third of sales proceeds. CVRD is said to be willing to enter into partnership with a company that would export copper concentrate despite the country's heavy reliance on importing the metal. This apparent paradox reflects a desire to maintain trading links with Chile, Brazil's major supplier of copper (*MJ*, April 14, p.296). □

SHARE PRICES AND EXCHANGE RATES

STOCK*	Sept 20	Sept 13
Alcan Aluminium ($C)C	27.62	27.75
Alcoa ($)NY	74.25	74.87
Alusuisse (FrS)S	1451.00	1442.00
AMAX Inc. ($)NY	26.62	27.25
American Barrick ($C)C	26.51	25.98
Anglo American Coal ($)L	18.84	18.91
Anglo American Corp. ($)L	24.34	24.76
Anglo American Gold ($)L	74.18	73.51
Anglovaal ($)L	109.12	108.42
ASA Ltd ($)NY	43.25	41.37
Ashton ($A)A	1.55	1.54
Asarco Inc. ($)NY	34.37	34.37
Barlow Rand ($)L	10.72	11.12
Battle Mt Gold ($)NY	15.12	14.25
British Petroleum (£)L	3.15	3.25
Broken Hill Pty. ($A)A	9.84	9.84
Charter Cons. (£)L	5.53	5.59
Cleveland-Cliffs ($)NY	31.25	32.25
Comalco ($A)A	4.32	4.40
Cominco Ltd ($C)C	29.00	30.12
Cons. Gold Fields (£)L	14.80	14.80
Corona Corp. ($C)C	8.26	8.24
CRA ($A)A	11.70	11.70
Cyprus Minerals ($)NY	31.00	31.00
De Beers Cons. ($)L	14.76	15.02
Denison Mines ($C)C	4.85	4.80
Echo Bay Mines ($C)C	18.37	18.12
English China Clays (£)L	4.70	4.72
ERA ($A)A	2.20	2.30
Falconbridge Ltd ($C)C	36.12	36.75
Freeport McMoRan ($)NY	32.87	34.25
Free State Cons. ($)L	7.94	8.16
Gencor ($)L	25.51	24.35
GFSA ($)L	21.20	21.64
Hemlo Gold ($C)C	14.75	14.59
Homestake ($)NY	15.75	14.75
Impala ($)L	12.62	12.79
Inco Ltd ($C)C	38.87	39.62
JCI ($)L	185.26	184.08
Kerr-McGee Corp. ($)NY	49.00	49.37
Kidston Gold Mines ($A)L	2.31	2.29
LAC Minerals ($C)C	11.12	10.87
Lonrho (£)L	2.82	2.94
MA Hanna ($)NY	27.75	28.00
Magma Copper ($)NY	6.75	6.75
Malaysia Mining ($M)L	3.38	3.31
Metallgesellschaft (DM)G	473.00	467.00
MIM Holdings ($A)A	2.57	2.49
Minorco (£)L	9.91	10.25
Newmont Mining ($)NY	39.50	39.62
Noranda Inc. ($C)C	25.62	25.37
Northgate ($C)L	6.51	6.50
Phelps Dodge ($)NY	66.00	77.00
Placer Dome ($C)C	18.37	17.75
Preussag (DM)G	332.50	309.00
Rand Mines ($)L	24.13	24.76
Renison ($A)L	8.59	8.80
Reynolds Metals ($)NY	56.50	57.50
Rio Algom Ltd ($C)C	25.58	26.22
RTZ Corp. (£)L	5.67	5.73
Royal Dutch Shell (£)L	37.81	43.87
Rustenburg Plat. ($)L	16.49	16.57
Teck Corp. ($C)C	23.87	23.12
Western Mining ($A)A	6.34	6.54

*Market location: A = Australia, C = Canada, G = Germany, L = London, NY = New York, S = Switzerland

Currency exchange rates on Sept 21

Value of	£	$(US)
$(US)	1.57	—
$(Australian)	2.03	1.29
$(Canadian)	1.86	1.18
$(Malaysian)	4.23	2.69
Franc (French)	10.36	6.60
Franc (Swiss)	2.66	1.69
Kroner (Swedish)	10.38	6.61
Deutschmark	3.07	1.96
Yen	229.00	145.86
Rand (S.A.) (Commercial)	4.42	2.82
Rand (S.A.) (Financial)	6.35	4.04

Data by courtesy of The National Westminster Bank.

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FYI

No indication where this will come from underwater Tucurui?!!

RTZ used to have 5% in this project

File: Carajas
Brazil

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FYI

file: Brazil
Carajas

South May 9/89

A huge amount of energy is needed to smelt alumina – the oxide produced from bauxite – into aluminium, because of the high temperatures that have to be generated, so access to cheap energy supplies is crucial for low-cost production. Average costs in the Gulf are about a third of those in the US.

Experts predict that new capacity will be needed to supply world needs, which are increasing each year. "Continued growth in world consumption will lead to capacity working of smelters by 1990," say analysts at Roskill, the strategic metals experts. "Coupled with the closure of old smelters, it will lead to a substantial requirement for new smelter capacity during the early 1990s."

Canada, which has the advantage of cheap hydro-electricity, will be one of the few established producers to take a stake in this growth. Much will be provided by the Third World – the Gulf and Latin America. North America, Japan and Western Europe use about 80 per cent of the world aluminium output and were self-sufficient at the start of the 1980s, when this percentage was even higher. But the trend to greater reliance on imported material is now probably irreversible, says London-based analysts Shearson Lehman. ■
Robin Stainer

Brazil ups the stakes

With some of the world's largest reserves of bauxite and abundant cheap energy, Brazil is starting a second round of investment in the production of bauxite, alumina and aluminium, encouraged by high world prices and a continuing growth in demand. US$1.5-billion will be invested to boost primary aluminium exports, which last year reached 520,000 tonnes, earning Brazil US$1.5-billion.

Within the next four years, aluminium production will increase from 800,000 to 1.2-million tonnes, with virtually all extra output available for export as local demand remains static; Brazil will also have switched from being a big importer of alumina to having some surplus for export. Meanwhile bauxite production at the country's largest mine, Trombetas, in the Amazon, is being increased from 6-million to 9-million tonnes this year, some of which will be available for export despite increased internal demand.

The consortium-owned Mineraçao Rio do Norte company is installing a third processing unit at the Trombetas mine. It is taking advantage of the expansion to move its processing plant closer to the mine, so that waste products can be pumped back into the mine area instead of being tipped into a lake.

Much of the extra bauxite mined will be consumed by the Alunorte alumina mill near the city of Belem. The plant was originally planned to be constructed simultaneously with the adjoining Albras aluminium mill by the state-owned Vale do Rio Doce company and a consortium of Japanese companies. But it was only half completed by 1985 when the Japanese partners pulled out, concerned at alumina's low world price. With the price of alumina now soaring, CVRD has been putting together a financial package to enable Alunorte to be completed.

Until now Albras has imported alumina from Suriname, Venezuela and Jamaica. Last year it exported all its production of 150,000 tonnes, and the mill is in the process of increasing output to 345,000 tonnes, at a cost of US$620-million.

Not far from Alunorte, and using the same hydroelectricity source, is Alumar, a joint Shell Billiton/Alcoa mill near the city of São Luis. The mill's production of alumina is being increased from 245,000 to 380,000 tonnes and that of aluminium from 110,000 to 193,000 tonnes. Most of this extra production will be exported, while the bauxite will come from Trombetas.

The privately owned Brazilian Aluminium Company (CBA) is in the process of increasing its output from 150,000 tonnes of aluminium to 210,000 by 1991. Under a third phase, output will rise to 350,000 tonnes. The company has recently discovered a big reserve of bauxite in the south of Minas Gerais state and plans to build a new alumina mill there.

CBA has the lowest electricity costs of any of Brazil's aluminium producers, even though its mills are located in the industrialised southeast, far from the abundant hydroelectricity supplies of the Amazon region. This is because it is policy to generate at least half of its own electricity needs, while as much of production as possible is financed from its own resources, so avoiding debts.

Alcan and Alcoa also have plans to expand in the southeast; Alcan hopes to increase production by at least 100,000 tonnes.

The one concern in the industry is the pressure from environmentalists against plans to expand electricity production in the Amazon. The impact of large dams and the massive lakes they require is being increasingly questioned. ■
Patrick Knight in São Paulo

COFFEE

Grinding to a halt

It should become clear in September whether key coffee-trading nations are ready to restart negotiations on a new price-stabilisation agreement for the product, the mainstay of many developing countries. The omens, however, are not good.

After the collapse of the last round of talks on the International Coffee Agreement's future and the declaration of a free market (*South August*), Brazil signalled it might be unwilling to return to the negotiating table for several years. The "shock of freedom" created by the International Coffee Organisation's suspension of its quota regime (used to manage supplies and prices) was "healthy", said Brazil's chief coffee executive, Jorio Dauster.

Brazil, the world's biggest producer, whose participation in any future talks is essential, had "exhausted its negotiating possibilities," Dauster said. So too had the biggest consumer, the US – which found itself on the opposite side to Brazil in July – according to its chief negotiator, Jon Rosenbaum. Commodity pacts were an anachronism, he said.

The Colombian coffee negotiator, Nestor Osorio, says the US lacks the political will to participate in multilateral efforts to help developing countries, preferring instead bilateral co-operation with its favoured friends. In his view, the US is interested in cheap supplies of the top-quality arabica coffee that the free market has brought.

The abolition of export quotas has unleashed a price war, with countries using their stocks and all available production to grab market share. The average world price of coffee has slumped to a 14-year low at less than US80¢ per pound – a fifth of 1977's all-time peak. Brazil – one of the lowest-cost producers, with a break-even level of about US70¢ – fired the first shot.

The dissident producers, led by Mexico, Costa Rica and Peru, and backed by the US, export top-grade mild arabica coffee. Nothing would suit them better than an increased share, at the expense of cuts for Brazilian and African producers, in exchange for their support for continued export controls.

These dissidents are in no hurry to return to the negotiating table. They believe that now that buyers are free to pick and choose they will switch to the aromatic mild arabicas and shun the cheaper Brazilian and African grades, used mainly as fillers. And they are aware that export performance will be a key factor in determining market shares if quotas are brought back.

The ICA will be extended for two years from October without the clauses allowing quotas. These cannot be reactivated before the end of the two-year term, unless the extended ICA is replaced by a new one.

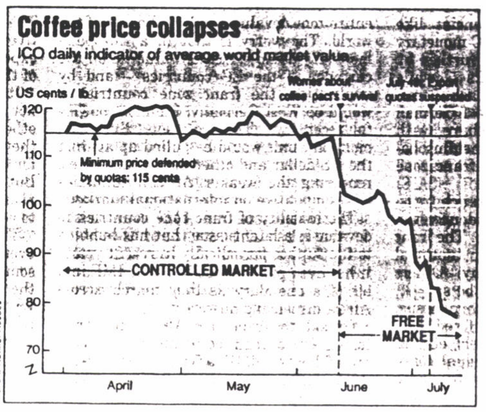
West German coffee negotiator Hugo Roerig reckons talks on a new agreement could begin as early as 1990. The European Community commissioner for coffee cooperation and development, Manuel Marin, says the Community is ready for new talks at any time. So, too, are most African countries, many of which fear they may even be squeezed out of production because of their high cost – especially the region's biggest producer, Côte d'Ivoire. Its break-even point is about US$1 per pound.

El Salvador and Nicaragua, former members of the group of dissidents, also want negotiations started quickly; they are less able to compete in a free market because protracted civil war has hit production and marketing.

But the key to any talks is held by the US and Brazil. Colombia, another big producer, made all the running to keep ICA quotas going – always careful, though, not to run foul of Brazil.

Brazil made it clear that it would veto any proposal that threatened to reduce its usual quota share of 31 per cent. If plans to expand output come to fruition it will be in an even stronger position.

Its 1990 crop could reach 40-million 60kg bags: this is double this year's level and equivalent to 40 per cent of global production. It may, however, want to wait for two good crops in a row to be sure that its position is unassailable. Frosts can strike at any time till mid-September, and a big freeze this year would upset everyone's calculations. ■
Robin Stainer



DT

The 79 km-long mining operation (effectively split into four mines) boasts two unusual features. The first is the velocity of the 35 ton Caterpillar 769 haul trucks, which supply the four crushing/screening/heavy media separation plants at speeds of up to 85 km/h (concentrates are subsequently taken to a single recovery plant at No. 4 plant in the south of the operation). The second feature is the unique 'Canute-like' defiance of the sea. A huge sea-wall of sand has pushed the high-water mark back 250 m, and mining has reached 20 m below sea level. The current area is expected to be exhausted within a year.

CDM is also looking further out to sea. In a joint venture with the Alexander Bay operation across the border, several boats are being used to research into recovering diamonds at depths of up to 90 m — although this area is also covered by the mining lease, which runs out in 2010. Curiously, expenditure on the project is split on the basis of how much time the boats spend in each company's waters. Moreover, CDM is limited to spending R16 million each year because of tax arrangements.

Less than 20% of De Beers' profit now derives from South Africa

Despite a seemingly comprehensive security operation (which elsewhere within the group now consists of 'stress indicator' tests), diamonds worth R9.2 million were recovered from smugglers last year, according to one company source. Even more worrying, 8,000 diamonds were apparently handed in by mine employees in 1985 but so far this year the 'pickups' have been negligible and no-one is suggesting that grades have slumped!

Although the on-shore diamond area has reserves of around ten years, CDM is busy developing two new areas (both within the lease area) at a cost of R215 million. Auchas, which lies alongside the Orange river some 30 km inland, is expected to begin producing 40,000 ct/y of large stones by July 1990. Further up the coast, the 250,000 ct/y Elizabeth Bay operation will begin recovering small stones from windblown deposits by March 1991. However, several gaunt trenches at Auchas, dug to a depth of 45 m ten years ago and then abandoned, are testimony to its marginal nature. De Beers' interest in both of these low-grade sites seems to have more than a little of the 'good neighbour' about it.

MINING JOURNAL

4/8/89

Brazil

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AMAZON CHALLENGE

Very few, countries in the world come even close to Brazil in terms of the quantity and diversity of the mineral resources they possess. In its 1988 annual summary the National Department of Mineral Production (DNPM) provides statistics on 47 mineral commodities with a total value last year in excess of $US8,400 million.

A giant country, Brazil's mineral deposits are frequently on a mega-scale. New discoveries during this decade, for example, have increased tin production six-fold and propelled Brazil into its current position as the world's leading producer. Over the same period, bauxite output has risen by a similar amount. New gold finds have occurred with monotonous regularity and last year alone, registered production soared by 56% to some 110 t, ranking Brazil fifth in world terms.

Brazil has long been a major producer of iron ore and manganese. It is the world's largest exporter of the former with shipments last year climbing 10% to 104 Mt and mine output climbing to 145 Mt. The new Carajás mine alone, which is based on high grade reserves in excess of 18,000 Mt, contributed 28 Mt and the operator, Companhia Vale do Rio Doce (CVRD) expects iron ore output this year to reach 32 Mt.

Most major mineral discoveries have been made in the vast Amazon region and consternation has grown at the environmental damage which has resulted from some operations: mercury poisoning of rivers by wild-cat gold miners; forest despoliation arising from alluvial tin mining; and, in the case of Carajás, the damage caused by downstream industries that have developed alongside the 900 km railway linking the mine site to the Atlantic seaboard. Because of their remote location and absence of nearby supplies of coking coal or natural gas the numerous pig-iron and ferro-alloy plants which have sprung up rely on charcoal as the main source of furnace fuel to reduce the ore. This had led to widespread and indiscriminate depredation of the rainforest.

As if the Carajás deposit was not sufficient, the Amazon region has now been found to possess an even more spectacular iron ore discovery. According to the Sao Paulo newspaper, *Gazeta Mercantil*, the DNPM estimates that a new discovery at Urucum near Corumba, close to the borders of Bolivia and Paraguay in Mato Grosso do Sul, contains in excess of 30,000 Mt of ore including 250 Mt of manganese ore — the latter equivalent to four times the manganese reserves at the Igarape Azul mine in Carajás.

Significantly, however, the proximity of Urucum to Bolivia opens up the possibility of utilizing natural gas from the Santa Cruz field, about 600 km distant. In the event of ferro-manganese or pig-iron plants being developed, this would present a much cleaner and environmentally more acceptable fuel than charcoal.

A small mining operation already exists and Urucum Mineraçao ships modest tonnages of iron and manganese to Argentine steel mills via the Paraguay river. Urucum Mineraçao is 46%-owned by CVRD, 46% by Metamat (a mining company owned by the Mato Grosso State Government), with the balance held by the Convap construction group of Minas Gerais.

The international focus on environmental issues, and the mounting concern about the despoliation of the Amazon rainforest — the E.E.C. is considering suspension of pig iron imports from Carajas — is placing increasing pressure on the Brazilian Government to curb such developments. However, at Urucum, Brazil might have a project in the Amazon which will boost mineral revenues whilst being environmentally acceptable — a rare combination these days.

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DT FYI → file: Brazil CARAJAS S. 2

avoidable". Despite payments by U.S.S.R. customers of well above the world market price, Hungarian subsidies to uranium mining have increased to some $US40 million annually, and the country's Minister of Industry, Mr Ferenc Horvath, has warned that they may double by the mid 1990s. The government is due to discuss the matter in September. The Mecsek mine is understood to have sufficient ore reserves for a further 30 years.

The long-term development of the Mecsek coalfield is also to be amended, according to the State Planning Office, because earlier plans for large-scale steel industry development in the area have been abandoned. It was originally calculated that the Mecsek mine would yield [illegible]00,000 t/y of coking coal, and $US48 million has already been invested.

ASIA

Kelian claims settled

A full settlement has been reached of the various disputes and court actions relating to the Kelian project in East Kalimantan, Indonesia. The respective beneficial interests in PT Kelian Equatorial Mining are now CRA Ltd 67.95%, Kalimantan Gold NL 22.05% and PT Buana Jaya Raya Jakarta Mining Co. 10%. CRA as operator is continuing work on a final feasibility study which is due for completion by the end of the year.

A pre-feasibility study on the Kelian project was based on a 12 year mine life at an annual production rate of 3 Mt yielding about 160,000 oz of gold. The study assumed a diluted grade of 1.9 g/t gold with 86% recovery. The recovery rate depends on separate treatment of the refractory and free milling components in the sulphide ore. The indicated operating cost was around $US175/oz of gold. An oxide ore resource of 3.5 Mt at 2.5 g/t gold is included in the overall resource of 39.8 Mt grading 2.0 g/t at a cut-off grade of 1.0 g/t.

South Korea invests in deep sea mining

South Korea is to invest $30 million in deep ocean mining by [illegible] to establish territorial [illegible] over a mining zone in the Pacific. Under U.N. regulations [illegible] is the minimum amount which must be spent before [illegible] territorial claim becomes [illegible]. The expenditure will be [illegible] between research ($3 million) and the building of an exploration ship ($27 million).

The claim area that South Korea wishes to acquire is a 75,000 km² region in the Clarion-Clipperton undersea mining zone southeast of Hawaii. Reserves are estimated at 100 Mt of manganese nodules, giving a potential annual production of 3 Mt of manganese, cobalt, nickel and copper combined. South Korea's import of these metals amounts to about $1,000 million/y.

Foreign miners in India?

Foreign companies will be invited to prospect for gold in India on much the same production-sharing terms already offered for oil exploration, reports the *Far Eastern Economic Review*. In exchange, the foreign prospectors will have to bear the full exploration risk. Applications are said to have been already received from Australian and Canadian gold mining firms. With its principal gold field, Kolar, nearly exhausted, India's gold output is now barely 1 t/y.

Carmen mill expansion

Atlas Consolidated Mining and Development Corp. of the Philippines, is planning to expand its copper operation in central Cebu Province at a cost of $65 million. Atlas will expand the ore handling capacity at its Carmen mill to 55,000 t/d from the current 44,000 t/d to help meet a planned increase in ore output to 80,000 t/d from 69,000 t/d. Mr Zoilo Castrillo, Atlas's vice president for finance, said the project would be financed in Toledo City, mainly through internally generated funds. The expansion is scheduled to be fully operational by 1991.

Atlas has an application pending with the Board of Investments for incentives for the expansion project. These could include a three-year income tax holiday and tax and duty-free imports of capital equipment.

Apart from the Carmen mill, Atlas also operates the Biga plant at its copper mine-site in Toledo in the central Philippines. Biga has a capacity of 25,500 t/d of ore. Atlas produced a total of 85,350 t of copper in 1988 against 81,000 t in 1987.

SOUTH AMERICA

Gold in Uruguay

The U.S. company Big Pony Gold Inc. of Salt Lake City, Utah, reports that preliminary exploration over a large tract of Archean greenstone terrain in southern Uruguay has located a number of gold occurrences. In the North Palacio area of its 160 km² Paso de Lugo property, mineralization has been encountered in rocks comprising metavolcanics, metasediments and quartz veins, and 12 rock samples collected within a 1,200 m × 600 m area have given average assays of 12.1 g/t. Systematic channel sampling and trenching is now underway.

Through its 100%-owned Uruguayan subsidiary Tormin SA, Big Pony holds prospecting permits covering 320 km² and stream sediment, soil and rock sampling has revealed a number of gold anomalies, all within 2-3 hours driving time of Montevideo.

Big Pony is, itself, 50%-owned by Gold Standard Inc., also at Salt Lake City. The latter, through exploration permits and applications, asserts that it has mineral rights to some 1,290 km² of land in Uruguay including some 300 km² held in joint venture with Bond International Gold.

Rio Chiquito reassessment for Mallon

Denver-based Mallon Resources Corp. will shortly suspend and reassess mining and recovery operations at its Rio Chiquito gold-silver mine in Costa Rica because it believes there are more resources at the mine than it originally thought. In addition, the recent decline in world gold prices also had an impact on its decision to suspend operations. Mallon intends to intensify exploration of the mine and seek additional financing and equipment during the shutdown period. The company is working with a major international bank on investment in the mine, but Central Bank approval is needed (*Mining Magazine*, December 1988, pp.466-469).

Escondida ahead of schedule

The president of Minera Escondida, Mr Robert Hickman, expects the giant copper project in northern Chile to begin production in April 1991, and to achieve 80% of the 320,000 t operating target within the first twelve months. BHP owns 57.5% of the project, with RTZ holding 30% and a Japanese consortium 10%.

Amazon ferromanganese plant

Norway's Elkem AS and Brazil's Prometal Productos Metalurgicos SA have entered into a joint venture agreement to build a 160,000 t/y ferromanganese plant in the eastern Amazon jungle. Elkem will earn a 40% stake in the $170 million project with an investment of $70 million. The remaining $100 million will be obtained through a combination of company funds, U.S. and European banks and government financing.

The plant is to be located at Maraba, an industrial town 400 km south of the Brazilian port of Belem. Manganese and iron ore will be supplied from the nearby Prometal and Carajas mines, respectively. Output is scheduled at 70,000 t/y high-carbon ferromanganese, 65,000 t/y silicomanganese and 25,000 t/y medium-carbon ferromanganese, the majority of which will be destined for export.

Prometal has already signed an agreement with Japan's Mitsui Toyo Denka to supply 30,000 t/y of manganese-based ferroalloys from the plant.

U.N. in Bolivia

The United Nations Development Programme is involved in a project to promote private investments in mining ventures in Bolivia by upgrading the technical capabilities of the Bolivian Geological Service (Geobol) and the Bolivian Mining Corp. (Comibol). The UNDP contribution for this project will be $1.15 million for international consultants, sub-contractors and equipment. It will be run by the UNDTCD and implemented by Geobol and Comibol.

This project forms part of the government's push to provide incentives and guarantees to attract investment in its resources.

NORTH AMERICA

Champagne debut

Bema Gold Corp. has announced completion of its heap leaching facility at the Champagne mine in Idaho. Full-scale mining has commenced and company president, Mr Clive Johnson, expects production this year to reach 17,500 oz of gold equivalent at a cost of less than $150/oz. Preproduction capital costs associated with the project have totalled just $2.0 million, and payback is expected within four development of the plant site area. Much of the heavy earthmoving equipment has been transported to the mine site. This includes a 50 t crane, blast hole drill, seven large bulldozers, six haul trucks, two front-end loaders and a 4 m^3 excavator. Further equipment awaits transport to the site. Work on the three camps for the construction workers is underway.

Mining development is progressing on a two-shift basis over six days a week following completion of ventilation arrangements. The underground development is taking place in the high grade Zone VII in Mount Waruwari. Power for the mine will be supplied by a 70 km line from a power station to be constructed at the Hides gas field near Tari in the Southern Highlands. This will be the first commercial use of a gas field in P.N.G. Negotiations for the gas supply are continuing with the BP/Oil Search joint venturers.

The Porgera partners are Placer (PNG) Pty Ltd as manager, Highlands Gold Properties Pty Ltd (part of MIM Holdings) and RGC (Papua New Guinea) Pty Ltd (wholly-owned by Renison Goldfields) with 30% each and the state of Papua New Guinea with 10%.

Mother Lode Go-Ahead

Gexa Gold Corp. has announced a start to the development of the Mother Lode gold mine located near Beatty, Nevada, following approval from the Bureau of Land Management in mid-July. The project is part of the U.S. Nevada Gold Search joint venture between Gexa, U.S. Precious Metals Inc. and N. A. Degerstrom Inc. Reached in November 1988, the agreement calls for N.A. Degerstrom to spend \$2.5 million to bring the deposit into production in order to earn a 20% interest in the venture as operating partner. Gexa and U.S. Precious Metals will then each hold a 40% interest in the venture.

Early stages of construction will include topsoil stockpiling and site preparation for the heap-leach pad, process plant and solution ponds as well as prestripping the orebody. Total construction should be completed within four months. The mine will produce at the rate of 2,300 t/d. Reserves were last reported as 1.45 Mt of oxide material averaging 1.7 g/t gold, and 3.0 Mt of sulphide material averaging 2.0 g/t gold. Initial production will come from the oxidized portion.

Chessy Framework

France's Bureau de Recherches Geologiques et Minieres (BRGM) has approved the establishment of the Societe Miniere de Chessy which will be held 49% by BRGM and 51% by its mining subsidiary, Coframines. Financing for the project, which will consist of an underground mine, mill and associated facilities, has been estimated at FF300 million. Coframines will remain a majority shareholder, although BRGM is pursuing contacts to sell its 49% share to one or several partners.

BRGM has carried out detailed exploration of the zinc-copper-barytepyrite deposit, including underground reconnaissance, and has completed a feasibility study. The company is 70% through a 5,000 m definition drilling programme, due to be completed in October. Mineable reserves are unchanged at 4.88 Mt grading 2.3% Cu and 8.7% Zn (*MJ*, October 21, 1988, p.317).

Silidor Project Approved

The partners in the Silidor gold project have decided to bring it into production following receipt of a positive feasibility study. The property is located 5 km west of Rouyn-Noranda in Quebec. Nova-Cogesco Resources Inc. holds a 20% interest in the venture, Cambior Inc. holds 25% and Noranda Exploration Co. Ltd, which will act as manager of the project, owns a 55% interest.

Production is scheduled to begin in January 1990 at an initial rate of 22,000 t/month of ore, and it is expected that full production, at a rate of 400,000 t/y, will be attained by January 1991. Ore reserves are estimated at 4.1 Mt of mineable ore with an average gold content of 6.1 g/t. Some \$C24.4 million has been spent on exploration work at the property. Underground exploration was completed at the end of March, having begun in July 1987, and consisted of shaft sinking to a depth of 560 m and 5,000 m of drift development on five levels. The estimated cost of bringing the deposit into production should not exceed a further \$C31.5 million. The ore extracted from the mine will be processed by each of the three co-owners, although Nova-Cogesco's share will be milled at Cambior's Vezina mill.

Titanium Sponge Plans for CVRD

Brazil's state-owned Companhia Vale do Rio Doce is planning to invest \$9 million to produce titanium sponge on an industrial scale. CVRD is benefiting from a technology transfer agreement with CTA, the space technology institute of the Air Force. In return, CTA will receive 1% royalties once the compound is produced on an industrial scale. The plant is expected to come on stream next year and should produce 15,000 t/y of sponge. The factory will be built in Greater Belo Horizonte, capital of Minas Gerais and not far from Araxa, where Brazil's largest titanium reserves are located.

At the beginning of this year, Du Pont's Brazilian subsidiary had signed an agreement to purchase anatase concentrates from CVRD for its own future titanium dioxide production (*MJ*, January 13, p.25).

Day Dawns

Invincible Gold NL and its joint venture partner have decided in principle to proceed with the Day Dawn gold project near Cue in Western Australia's Murchison Goldfield as a result of a positive feasibility study. Invincible has agreed to buy the 50% interest held by Little River Gold NL in the known resource to a depth of 65 m. The project will proceed to development as soon as formal approvals are obtained. It is expected that