MINING JOURNAL

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Glencore in PASAR bid

The Swiss-based metals group, Glencore International AG, formerly known primarily for its metals trading acumen but more recently for its growing involvement in upstream activities in the metals sector, has now set its sights on copper smelting. In Manila this Monday, it was revealed that Copper Smelting Investments Ltd (CSI) – 60%-owned by the Philippines' businessman and former Agriculture Secretary, Carlos Dominguez, and 40% by Glencore – has submitted the top bid for a controlling stake in Philippine Associated Smelting and Refining Corp. (PASAR).

PASAR is one of Asia's largest copper smelters and refiners. The facilities are located on Leyte Island and were brought into production 16 years ago at a cost (in 1984 dollars) of some US$300 million, with a capacity to produce 150,000 t/y of blister copper, subsequently increased to 172,000 t/y. The Philippines Government is seeking to sell a 37.72% stake in the facility. It currently owns 41.9%. The other shareholders comprise eight local mining companies collectively holding 21.78%, three Japanese companies (Marubeni Corp., Sumitomo Corp. and Itochu Corp.) with a combined holding of 31.23%, and the International Finance Corp., with 5.08%.

Under Philippines law, bidders for PASAR are required to be at least 60%-owned by Filipinos, and the offer for sale of a controlling stake in the smelter represents the first attempt at privatisation of a major state corporation by the government of President Joseph Estrada since his election to office 11 months ago.

The privatisation comes at a time when copper prices have been historically low and it is understood that the Glencore group bid was PP3.32 billion (US$85.47 million), far lower than the government had hoped. Other submissions included PP2.8 billion by Northern Cement Corp., PP2.36 billion by Asia Pacific Gypsum Products Inc., and PP2.5 billion submitted by a group identified with Philippines businessman Jose Alvarez. The Asset Privatisation Trust (APT), which set the terms *Continued on p.330*

The PASAR plant complex on Leyte Island. (Photograph courtesy of PASAR.)

Highland Valley decision

Cominco Ltd confirmed this Wednesday that the Highland Valley copper mine near Kamloops in British Columbia will definitely close, as scheduled, on May 15 (*MJ*, January 22, p.33). A partnership between Cominco (50%), Rio Algom Ltd (33.6%), Teck Corp. (11.4%) and Highmont Mining Co. (5%), Highland Valley Copper (HVC) is Canada's largest copper producer and employs a workforce of 1,046. There had been widespread expectations that the operation would be given a last minute reprieve but blasting in the pit has been halted and Cominco said that the closure decision was reached after the failure to secure a cost-cutting deal with the United Steelworkers of America, which represents about 1,000 employees at the mine.

Despite some recent strengthening, copper prices are not far off the 12-year lows posted at the start of the year when the closure plan was first announced, and are still some 15% lower than they were a year ago. HVC's losses, meanwhile, have continued to mount. In 1998, they amounted to C$8 million, including C$6 million in December alone, and amounted to C$10 million in the first quarter of 1999. HVC insists that the mine will not be reopened until it can be assured that rising costs will not force it to close down again in the next decade.

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Glencore in PASAR bid

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for the privatisation, opted not to set a floor price for the PASAR assets in order to encourage bids, and government officials have said that the process was deliberately made as transparent as possible in order to deflect possible charges of favouritism. The bid is still being evaluated by the APT, and its chairman, Renato Valdecantos, expects that the evaluation and formal acceptance of the winning bid will take about one week.

The Government Finance Secretary, Edgardo Espiritu, was philosophical about the bids offered. He said the government was "slightly disappointed", and in terms of expectations of present value, the government was short by about PP2 billion. However, he pointed out that PASAR has long been a loss maker for the government and that it is "really best to bite the bullet now" or perhaps risk not even recovering the PP3.2 billion at a later date. PASAR's contingent liabilities for the government are estimated at about PP7 billion, albeit spread over several years. Mr Espiritu expects that the winning bidder will have to spend at least US$300 million on upgrading the smelter, including around US$50 million on environmental provisions.

Commenting on behalf of CSI, its vice chairman, Jose Leviste, said there are plans to make PASAR more efficient by using the most modern cost-effective equipment and technology, and that Glencore's international network would be used to expand the market for PASAR's product. Most of its cathodes are exported to Asian customers for use in car manufacture and construction projects. Last year, the smelter produced around 150,000 t of cathodes, some way below capacity, but a substantial reduction in the workforce and a favourable exchange rate far outweighed the decline in world copper prices and smelting and refining charges, and enabled PASAR to record a net profit in 1998 of US$18.2 million compared with a net loss of US$251 million in 1997 (*MJ*, April 30, p.322). Quarterly output dipped in the first three months of 1999 to 37,000 t but full-year output is forecast, nevertheless, to rise modestly, to some 156,000 t

When the smelter was commissioned in 1983, the project drew controversy because of the government's insistence that Philippines copper producers, some of whom were equity participants in the project, allocate at least 30% of their concentrate output to the smelter, even though treatment charges were expected to be significantly higher than in Japan where most Philippines concentrates were treated. Previous plans to privatise PASAR have been hampered by the company's substantial yen-denominated loans.

LEADING INDICATORS

Share Indices	May 5	Change on week (%)	High-Low (%)	Year's Max/Min
FT Ordinary	4,023	–2.4	92	4,123-2,913
US Dow Jones	10,955	1.0	100	10,955-7,742
FT Gold Mines	1,061	7.6	62	1,278-702
Australian All Mining	666	8.7	92	679-520
South African Gold	1,006	4.7	42	1,311-780
Toronto Met/Min	3,811	2.3	78	4,148-2,596
Nikkei Dow	n/a	n/a	n/a	16,942-13,071
Hang Seng	13,586	3.4	100	13,586-6,859
James Capel Indices (100 on 1/1/89 except*)	**May 5**			
Global Base Metal	152	2.6	100	152-93
Global Diversified Mining	152	4.1	100	152-94
Global Gold Ex S Africa	83	8.6	70	95-56
Global Gold	72	7.6	64	84-51
Global Mining	121	3.6	100	121-78
Smaller Mining Companies	51	4.9	57	60-40
†North American Base Metal	202	0.7	100	202-122
North American Gold	96	9.4	71	108-64
Latin American Mining*	196	10.9	70	229-120
Latin American (Ex CVRD)*	138	1.5	62	167-90
†Other Metals/Minerals	128	–1.5	88	133-91
†Global Coal Mining	185	2.4	100	185-116
Commodity Prices	**May 5**			
Gold (London)	$287.05	1.8	36	$300-279.65
Copper (LME)	$1,557.50	1.8	42	$1,823.50-1,361
Aluminium (U.S. prod.)	61.50c	0.0	50	68-55
Brent Blend (dated)	$16.53	1.0	100	$16.55-9.44

*100 on 1.1.90
†Rebased by Mining Journal

Cogema investment helps partner

The French state-owned uranium producer Cogema, through its Canadian subsidiary, is to buy a package of selected interests in Canadian uranium mining assets from Cameco Corp. The price is approximately C$243 million, subject to closing adjustments, from which Cameco will book a C$63 million pre-tax profit. The proceeds will be used to repay debt. The chief executive of Cameco, Bernard Michel, describes the deal as allowing "the company immediately to monetise a portion of the 483 Mlb U_3O_8 reserves and resources at McArthur River".

Cogema will acquire: an additional 14% in the McArthur River project, raising its interest to 30.2%, with the balance of 69.8% held by Cameco; a 16.7% interest in the Key Lake mine (where McArthur River ore is due to start treatment from late this year), leaving Cameco with 83.3%; and 20% in the Midwest project, to raise its interest to 76%, reducing Cameco's interest to nil. The Midwest acquisition is subject to the other owners not exercising pre-emptive rights. The whole transaction is also subject to regulatory approval, and will be backdated to take effect from January 1, 1999.

The Cigar Lake project continues to be held 50.0% by Cameco and 37.1% by Cogema, and the Rabbit Lake mine, where a portion of its ore is planned to be treated, continues to be wholly owned by Cameco.

The deal partly mirrors Cameco's own purchase almost exactly a year ago of the North American assets of another European uranium producer with which it was in partnership, Uranerzbergbau-GmbH of Germany, for C$483 million (*MJ*, April 24, 1998, p.325). However, late last year, Cameco announced a programme of production cuts in response to low prices, but also in preparation for the switch in production to the McArthur River and Cigar Lake projects (*MJ*, November 27, p.422). □

Highland Valley decision

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However, a Cominco spokesman, Doug Horswill, has said that the mine could be reopened if the union delivers enough wage

ANNUAL REVIEW SUPPLEMENTS

This week's *Mining Journal* includes the first of a 13-part series of Annual Review Supplements. These publications will also be bound together, with additional material, at the end of October as a single-volume reference work. *Mining Annual Review (MAR)*, and mailed to all *Mining Journal* subscribers.

The bound *MAR* will be presented in two parts, comprising six regional supplements and seven commodity supplements. The latter supplements constitute *Metals & Minerals Annual Review*, previously published as a separate volume.

The technical sections, which hitherto have appeared in *MAR* (Mineral Exploration, Surface and Underground Mining, Mineral and Coal Processing, and Extractive Metallurgy) will instead be appearing in a special (July) Annual Review issue of *Mining Magazine*, giving them an even broader circulation than in the past.

	Scheduled publication
Metal Markets	May 7
North America	May 21
Precious Metals	May 28
Major Metals	June 11
Europe	June 18
Africa	July 2
Asia/Australasia	July 16
Steel	August 6
Speciality Metals	August 13
C & S America	August 27
Industrial Minerals	September 10
Energy	September 24
CIS	October 1

Note to Advertisers: This year's new format presents a major opportunity, with supplement advertisements appearing in the bound volume at no additional charge. There will also be a limited amount of additional advertising space in the bound *MAR*. Bookings for the various supplements should be received at least three weeks before the publication dates listed above, and by September 13 for the bound reference volume.

concessions, and if the British Columbia Hydro and Power Authority agrees to reduce power costs, a key element of the mine's expenditure.

The mine contains sufficient reserves to last for at least a further ten years at current mining rates, and in 1998 it produced 162,400 t of copper and 1,000 t of molybdenum in concentrates, plus 30 t of silver and 200 kg of gold. The operation had a copper production cost of US$0.68/lb (including exchange rates, concentrate treatment costs and refining charges). On the London Metal Exchange, where copper stocks now stand at a record high of almost 748,000 t, three-months copper is currently trading at close to US$0.72/lb. At its low point in January, the price touched US$0.65/lb.

At London-based Bloomsbury Minerals Economics, analyst Peter Hollands estimates that the removal of HVC's copper from the market, plus around 100,000 t of copper production capacity already shed during the first quarter of 1999, goes halfway to reducing the market surplus. Further substantial production cuts are needed if the market is to move into balance and BHP said this week that it will decide by the end of May on the future of its US copper mines. They have a combined capacity to produce 190,000 t/y and the high-cost Robinson mine, in particular, is regarded by many as a likely candidate for closure. □

Mozambique DRI project progresses

A major iron and steel project in Mozambique worth an estimated US$2.5 billion moved one step closer last week when the Mozambican Government and the US oil and gas company Enron signed a framework agreement on the principles regulating the use of natural gas from the Pande field in southern Mozambique. The gas is to be used exclusively in the Maputo Iron and Steel Project (MISP), and the agreement was signed by John Kachamila, Mozambique's Mineral Resources and Energy Minister, Issufo Abdullah, the chairman of the state-owned National Hydrocarbons Co. (ENH), and Anthony Way, a senior director of Enron International.

Under the original heads of agreement signed by the government and Enron in November 1995, Enron undertook to find a market for the Pande gas and MISP was the result – a 3.6 Mt/y plant producing steel from the direct reduction of iron, using cheap energy from Pande and magnetite imported from South Africa as feed. Enron and ENH hold the gas concession area and will construct the pipeline to Maputo, and Enron and the Industrial Development Corp. of South Africa will each put up 50% of the equity in MISP. However, the bulk of the funding for building the steel plant will have to come from bank loans.

Around 5,000 people could be employed in constructing the plant and the pipeline, and on the transport system that will be needed to bring the feed material from South Africa. It is envisaged that this will be derived from Palabora Mining Co.'s copper operations at Phalaborwa where there is an estimated 200 Mt of stockpiled magnetite, and from state-owned Foskor's phosphate operations, also at Phalaborwa, where there is a further 70 Mt and where fresh magnetite waste is accumulating at the rate of about 7 Mt/y.

At Phalaborwa, the project would require a new preparation plant to extract copper, phosphate and sulphur, with the remaining magnetite pumped in slurry form to Maputo via a pipeline. The direct route would be 94 km but would necessitate traversing the Kruger National Park, with the 37 cm-diameter pipeline being buried 1.5 m below the ground. There has been environmental resistance to this proposal but the alternative route, around the park, would require a pipeline with a total length of some 370 km (*MJ*, July 25, 1997, p.63). Moving the magnetite by rail has also been considered but the costs would be much higher. □

Giant legacy

In July 1991, following unanimous approval from shareholders, Royal Oak Resources Ltd, Giant Yellowknife Mines Ltd, Pamour Inc., Pamorex Minerals Inc. and Akaitcho Yellowknife Gold Mines Ltd were amalgamated to form Royal Oak Mines Inc. The combined operations at Timmins, Ontario and at Yellowknife in the Northwest Territories were producing around 200,000 oz/y of gold, placing Royal Oak Mines amongst the medium-sized North American gold producers. Subsequently other Canadian properties were acquired, including Hopebrook in Newfoundland, and production advanced towards 400,000 oz/y.

Under the leadership of Margaret Witte, Royal Oak's president and chief executive, the company enjoyed some profitable years but its mines are high-cost, low-grade marginal operations vulnerable to the steadily deteriorating gold price. Latterly this, plus some injudicious hedging, and a major commitment to the development of the Kemess copper-gold project in British Columbia saw the company's debts mount. By February this year, these had risen to some C$600 million and Royal Oak filed for bankruptcy protection in the Ontario Court of Justice (*MJ*, February 19, p.126). The company is now in receivership and last month Ms Witte resigned.

Against this background, alarm bells are ringing in Canada about who bears the onus for major environmental problems at Royal Oak's Giant mine at Yellowknife. It has been producing gold continuously for almost 50 years from both underground and open pit, although the open-pit operation was closed down in 1990. The ore is refractory and characterised by a high arsenic content (in arsenopyrite), hence gold has been recovered by flotation followed by roasting and cyanide leaching.

Roasting capacity is 200 t/d and electrostatic precipitators collect the arsenic fumes and dust given off during the process. There is also a Dracco baghouse to collect the fine-grained arsenic condensate precipitated from the roaster gas. These arsenic-rich residues are impounded in 15 enclosed chambers underground, and some 230,000 t of such waste are estimated to have accumulated since the 1950s. There is mounting concern about the possible contamination of groundwater flowing into the Great Slave Lake, and the federal government has confirmed that there is leakage of groundwater into at least two of the chambers. This water is being pumped to the surface and treated but this is seen as only a short-term solution.

If the Royal Oak receivership leads to the abandonment of the Giant mine, a question-mark hangs over who has responsibility for long-term clean-up costs, variously estimated at C$100-250 million. A spokesman for Canada's Department of Indian Affairs and Northern Development (DIAND) was quoted recently in the Toronto daily, *The Globe and Mail*, as saying that the federal government does not intend to take the lead in the environmental clean-up, regarding it as a private-sector responsibility. However, subsequently, DIAND Minister Jane Stewart said that the government might play a role, and confirmed that it has spent around C$750,000 on R&D and is budgeting a further C$300,000. The University of British Columbia and the Canadian Centre for Mineral and Energy Technology are studying ways of recovering gold from the arsenic dust and making the arsenic insoluble.

Speaking to reporters in Ottawa last month, Ms Stewart said she expected the private sector to come up with a solution, and Royal Oak's former chief, Ms Witte, has also expressed confidence. One option could be the installation of an autoclave to process the waste. With Royal Oak insolvent, and despite the government's circumspection, it would seem that Canadian taxpayers look set to foot the bill, whatever long-term solution is eventually devised. □

Exploration

Mauritanian diamond partnership

A partnership has been formed between Canada's Dia Met Minerals Ltd and Australia's Ashton Mining Ltd to explore for and develop diamond deposits in Mauritania. A joint press release notes that the joint venture will work in an area underlain by the Archaean Reguibat shield, and will cover around 214,000 km² of diamond exploration permits, with a further 20,000 km² under application. Ashton has been active in Mauritania since 1995. It has identified kimberlite indicator minerals in the Reguibat shield area, and has flown geophysical surveys over prospective areas.

Under the terms of the agreement, Dia Met will commit to spending at least US$2.5 million on exploration before March 31, 2000, and may acquire up to 49% of Ashton's equity in the project by spending up to US$10 million by March 2003. Some of the tenements involved are subject to a 10% interest held by the Mauritanian Government. Ashton will be the operator of the joint venture, but whilst Dia Met is solely responsible for funding the exploration and development, it will retain the controlling vote.

Kanegele results

Canada's Pangea Goldfields Inc. has received results from reverse-circulation (RC) drilling at the Kanegele gold property in Tanzania. The seven-hole, 1,180 m, RC programme was completed as a follow-up to rotary air-blast drilling completed last year, which indicated three zones of gold mineralisation. Better results from the RC drilling are as follows:

Hole	Interval (m)	Au (g/t)
KRC-48	18-118	1.27
incl	58-76	2.76
KRC-49	59-69	1.23
KRD-50	21-120	0.67

The mineralisation intercepted is associated with carbonate alteration and shear zones. Another mineralised zone at Kanegele is characterised by several closely-spaced lenses of disseminated mineralisation within a shear corridor cutting across banded iron formations. The 24 km³ Kanegele property is a 70:30 joint venture between Pangea and Explorations Minières du Nord of Montreal. Pangea is the operator of the joint venture, but Minières du Nord has the right to increase its interest to 50%.

Rubicon farms out Red Lake East

Vancouver-based Rubicon Minerals Corp. and Royal Roads Corp. have agreed a deal under the terms of which Royal Roads can earn a 51% interest in part of Rubicon's Red Lake East gold property in Ontario. The property comprises 116 claims, about 10% of Rubicon's total land holdings in the area (*MJ*, April 30, p.312), and is located about 6 km from the Campbell (Placer Dome) and Red Lake (Goldcorp Inc.) mines. Rubicon reports that the property is underlain by a major regional fold closure at one apex of the Red Lake greenstone belt.

Royal Roads can earn its interest by spending C$400,000 before April 30, 2002, and issuing a total of 100,000 shares to Rubicon over a three-year period. Royal Roads can earn a further 9% interest by spending an additional C$400,000 on the property, and by issuing a further 100,000 shares to Rubicon. Royal Roads is currently formulating an exploration programme for this summer.

Ghanaian discovery confirmed for Dominion

A gold discovery at the Homasi and Akrokeri concessions late last year (*MJ*, December 4, 1998, p.450) has been confirmed by Dominion Mining Ltd's 100% subsidiary, Shea Gold Ltd. Shea conducted a 16-hole reverse-circulation (RC) drilling programme at the properties, designed to infill the initial 4 km-long mineralised zone delineated by wide-spaced drilling investigating a geochemical anomaly. The company has reassayed the original 4 m samples as 1 m resamples, and reports that the grades indicated generally confirm previous results. Better results from the infill drilling are as follows:

Hole	Interval (m)	Au (g/t)
99HMRC71	40-54	7.31
99HMRC75	20-46	4.03
99HMRC85	40-56	3.13
99HMRC91	50-72	1.72

The drilling covered the central 2.2 km, with more detailed drilling within a 600 m-long zone. The majority of the drilling has been in the oxide zone, but Dominion reports that a limited amount of deep drilling indicates that gold mineralisation is associated with pyrite and arsenopyrite within sheared metasediments. Dominion has also conducted a drilling programme on the Akrokeri concession, and reports that assay results indicate similar gold grades and mineralised widths to those at Homasi.

Dominion has the right to earn a 51% interest in Akrokeri from Birim Goldfields Inc., by spending US$500,000 over two years, and a further 49% interest by paying Birim US$1.5 million, and granting a 1% net smelter return on gold production.

Quaterra options Abitibi Extension

Vancouver-based Quaterra Resources Inc. has been granted the right to earn a 50% interest in Eastmain Resources Inc.'s polymetallic Abitibi Extension property in northern Ontario. Quaterra reports that the Abitibi Extension property is underlain by an unexplored western extension of the Abitibi greenstone belt, mined for many years for copper and zinc. In 1997, Eastmain acquired data from 25,000 line-kilometres of airborne magnetic and 3,775 line-kilometres of airborne electromagnetic geophysical surveys flown by BHP, after the latter initiated a regional exploration programme in 1995. Quaterra reports that the surveys identified over 50 high-priority conductors, within favourable geological settings.

Quaterra can earn its interest by spending C$1.53 million over a four-year period, and issuing 300,000 shares to Eastmain, or the cash equivalent of C$0.15/share. Quaterra must spend at least C$300,000, with Eastmain acting as the project operator. The companies have started a C$450,000 exploration programme comprising ground geophysical surveys to confirm location, strength and orientation of the electromagnetic targets.

Freeport upgrades garnet sands

Canada's Freeport Resources Inc. (FRI) has resampled the beach sands found at its Hutton property in Labrador. The company reported results of earlier tests this year (*MJ*, January 22, p.37) and, in order to evaluate the mineralogy of the discovery at the Kanga East claims, FRI made a representative composite from three samples spread across the Beach South area of the tenement. The sample, which amounted to about 25 kg, indicates a high proportion of combined heavy minerals (over 91% by weight), with almandine garnet comprising the majority at around 79% by weight. The balance comprises titanium minerals: 5% ilmenite; 7% haematite/ilmenite and 1% rutile. FRI reports that the composition of the almandine garnet is 28.6% Fe_2O_3, 21.5% Al_2O_3, 8.06% MgO and 4.9% CaO, comparable to the composition of the garnets in beach sands from Australia and India. The company's report earlier this year put the grades of garnet at Beach South at 55%.

Aguas Teñidas results – Correction

In the article last week referring to Navan Resources' latest results at its Aguas Teñidas polymetallic property in Spain (*MJ*, April 30, p.312), a revised resource estimate for the deposit was reported of 2.52 Mt. This should have referred to a re-evaluation of the first 220 m of strike. Navan's original estimate for the deposit, at a 5% zinc cut-off grade, indicated that the full 1,400 m of strike contained 9.65 Mt averaging 11.8% zinc equivalent. The recent underground infill drilling over 220 m of strike indicates, therefore, not only that the deposit could be larger than anticipated previously, but also that the grade – 12.6% zinc equivalent over 220 m – could be higher. We apologise for misleading readers. If the metal values indicated by the drilling prove consistent throughout the whole length of the orebody, Navan considers that the contained zinc metal would be double its original estimates of around 770,000 t.

Peruvian option for Inca Pacific

Vancouver-based Inca Pacific Resources Inc. (IPR) and Minsur SA have agreed for IPR to have the right to earn a 51% interest in Minsur's Santo Domingo tin prospect in southern Peru. Santo Domingo is located 20 km west of Minsur's San Rafael tin mine, where reserves are currently 13 Mt at 5% Sn. IPR reports that copper-tin mineralisation at Santo Domingo is associated with veins within a similar geological package as exists at San Rafael, where granitic porphyry bodies intrude shales and siltstones.

IPR intends to commence an orientation study of Santo Domingo, including hydrothermal alteration analysis, and geochemical and geophysical investigation. IPR may earn its interest by spending US$2 million over a three-year period, and Minsur has a back-in right to 60% interest in return for preparing a bankable feasibility study within two years of IPR earning its interest.

Dioro to raise exploration cash

Australia's Dioro Exploration NL reports that subscriptions have been received for A$1.2 million of the A$1.6 million placement of shares proposed by the company. The money raised will be used to fund exploration activities for the 1999 field season, concentrating on the King George River diamond tenements in the Kimberley region of Western Australia, where the company found diamondiferous kimberlite early this year (*MJ*, January 1/8, p.5), and recently-acquired Ellendale diamond leases.

BHP axes exploration jobs

In its continued attempt to counter the effects of low commodity prices, BHP is to close its San Francisco office, cutting 250 jobs, according to Bloombergs. The company will reduce "significantly" its exploration budget, currently at US$100 million, down from US$132 million in the previous year (*MJ*, November 27, 1998, p.427). Staffing levels will also be cut in a restructuring of the Minerals Discovery programme, after a review of exploration projects. The Discovery programme will now have three hub offices and around six field offices. BHP will try to fund future exploration activity by forming partnerships and alliances, and using "other innovative ways".

Development

SPCC starts Ilo expansion

Charles Smith, the newly-elected president and chief executive of Southern Peru Copper Corp. (SPCC), says that work on the US$875 million expansion at the company's Ilo copper smelter has begun. The two-phase programme, designed to reduce disruptions to production, will keep existing reverberatory furnaces at the smelter in operation while a new Outokumpu flash furnace and associated equipment are installed. The existing furnaces will not be shut down until the installation is completed, scheduled for 2003, and the new furnace is operating at target levels.

Outokumpu flash converters will also be installed, during which time existing converters will also continue to operate. The new equipment will allow Ilo to operate whilst ensuring sulphur emissions are kept to levels similar to other large-scale smelters.

Chavez inaugurates Las Cristinas development

Placer Dome Inc. reports that the President of Venezuela, Hugo Chavez, officially inaugurated the start of construction at Las Cristinas gold mine on May 3. The President was accompanied by ministers, members of Congress, ambassadors and representatives of the joint venture partners, Placer Dome and Corporación Venezolana de Guayana (CVG). The commencement of construction was announced about a month ago (*MJ*, April 2, p.237), and the US$575 million project is expected to take about two years to construct, during which time up to 3,000 people will be employed.

Placer Dome is providing project financing, and Placer Dome Technical Services Ltd is manager of the construction. Las Cristinas has estimated proven and probable reserves of 11.7 Moz of gold and is expected to produce 530,000 oz/y on average over the first ten years of operation.

Rapu Rapu resource estimate

TVI Pacific Inc. reports that Lafayette Mining NL, head of a group of companies earning a 75% interest in TVI's Rapu Rapu polymetallic property in the Philippines, has received a resource estimate from its independent consultant, Micromine Pty Ltd. Lafayette, operator of the joint venture, reports that Micromine estimates that an indicated and inferred resource of 4 Mt at a grade of 3 g/t Au, 37.4 g/t Ag, 1.46% Cu and 2.33% zinc exists at the main Ungay Malobago deposit at Rapu Rapu. Micromine has also conducted a pit optimisation study of Ungay Malobago, and determined that 3.8 Mt of the resource is economically mineable by open-pit operation. A scoping study of the extraction process, conducted by Signet Engineering Pty Ltd, indicates that the ore is amenable to conventional flotation processing, producing separate copper and zinc concentrates, with the gold and silver reporting to the copper concentrate.

A prefeasibility study, to be commenced immediately by Lafayette, is expected to be completed by September. TVI Pacific reports that the resource remains open to the west, and in places, to the north and south. A 7,000 m drilling programme is planned to define the resource further, to test extensions, and to collect metallurgical samples.

Lynas drops Whim Creek

Lynas Gold NL has decided not to continue with its purchase of the Whim Creek copper project in Western Australia from fellow Australian company Straits Resources Ltd. The companies had agreed the deal late last year (*MJ*, December 18, 1998, p.489), but Lynas' decision "follows a generally weaker copper price and a strengthening Australian dollar since the agreement with Straits".

Straits Resources will now start discussions with other interested parties and, although it still intends to sell the property, the sale may be delayed if offers received are not satisfactory to Straits.

Aquarius' Marikana resource estimate

Australia's Aquarius Platinum Ltd has released a resource estimate, based on 45 diamond drill-holes for its Marikana platinum property in South Africa. The deposit contains an estimated 19 Mt averaging 4.4 g/t of combined Pt, Pd, Rh and Au, comprising 14.66 Mt in the indicated, and 4.4 Mt in the inferred categories. Marikana is located around 100 km from Johannesburg, and Aquarius believes that the property has the potential to become its second platinum producer, after the 45%-owned Kroondal platinum project is commissioned in August. The two projects are co-operative ventures with Impala Platinum Holdings Ltd (*MJ*, March 26, p.229). Aquarius will now advance Marikana rapidly with help from Impala.

Bulgaria struggles to find KTZM buyer

The deadline for acceptance of bids for a stake in Bulgaria's KTZM lead-zinc smelter has been extended from May 4 to May 17. KTZM is the largest lead-zinc smelter in the country, but the prospect of owning between 51% and 80% of the state's ownership of it does not seem to have attracted much interest. Roumen Radev, the deputy chairman of the sale agent Expandia Finance-Bulgaria, says that "so far, no bids have been submitted". The smelter is estimated to produce 40,000 t/y of lead and 55,000 t/y of zinc.

An 18.5% stake in the smelter is to be sold to employees, and about 1% will be withheld to compensate pre-communism owners for the appropriation of the land upon which KTZM is built.

Bank buys gold refinery stake

Germany's Commerzbank AG has acquired a 35% stake in the Swiss gold refinery Argos-Heraeus SA, one of the world's largest. The purchase cost US$6.6 million, and was bought from WC Heraeus GmbH. Heraeus spokesman Ralf Schrank says that Commerzbank is the first bank outside Switzerland to participate in the precious metals market from the refining stage to the sale of products and derivatives.

Commerzbank intends to expand its involvement in the gold business, and is considering purchases in Europe, Asia, and North and South America.

Halmahera resource increased

Weda Bay Minerals Inc. reports that the indicated and inferred resource estimate at the joint venture Halmahera lateritic nickel-cobalt project on the Indonesian island of Halmahera has been raised to 117 Mt (dry) at 1.36% Ni and 0.12% Co. The resource includes an indicated category of 60 Mt at 1.51% Ni and 0.09% Co. The estimates are based on cut-off grades of 1% Ni and 0.1% Co, and have involved the classification of five different types of laterite present, according to mineral content, and the allocation of different dry densities to each. Indicated resource figures use data from drill-holes at 200 m x 100 m spacing, and inferred resources are estimated using wider (nominally 500 m) spacing.

Weda Bay is continuing to explore in the area of the known mineralisation, and reports good results from the Santa Monica prospect, located less than 10 km from the proposed treatment plant site, near Cape Ulie. A drilling programme is currently in progress, designed to test the thickness and grade of the laterite profile at Santa Monica. Metallurgical testwork is being carried out on samples from the Big Kahuna prospect. HSBC James Capel Canada Inc. has been appointed as financial adviser to Weda Bay. Weda Bay owns 90% of the Halmahera project, and PT Aneka Tambang owns 10%.

Longannet future secure

The future of Mining (Scotland) Ltd's Longannet coal mine in Scotland has been secured, after management finalised a financial package to enable production to begin at its new Kincardine coal reserves in October this year. The company signed a five-year supply deal with

Scottish Power last year (*MJ*, May 15, 1998, p.383), but the chairman of Mining (Scotland)'s subsidiary, Scottish Coal (Deep Mine) Ltd, which operates the Longannet mine, explains that the company had experienced geological difficulties in the reserves currently being worked at Longannet, resulting in short-term cash-flow problems which threatened the mine's future. Bridging finance was necessary to overcome the problems. The Secretary of State for Scotland, Donald Dewar, was personally involved with securing the funding. The people of Scotland were scheduled to vote for a Scottish Parliament on May 6.

Production

Andina expansion

The inauguration took place last weekend of the US$370 million expansion at the Andina division of Chile's state-owned copper company, Codelco. According to Andina's general manager, Carlos Rubilar, the division's 110,000 t/y expansion to 250,000 t/y of copper in concentrates has reduced costs by some US$0.06-0.07/lb, with a further 4-5 c/lb shaved off costs as a result of an overall optimisation in operations. After paying treatment and refining charges, Andina's total costs to produce cathodes are currently around US$0.59-0.60/lb. Without the expansion and other improvements, the costs to produce cathodes for Andina would be nearer US$0.70/lb. Codelco, as a whole, had cash costs of US$0.45/lb last year, (*MJ*, April 9, p.268).

The Andina expansion has included underground improvements, a new primary crusher, the installation of a semi-autogenous mill, a new flotation plant and a 43 km-long high tension power line. The division produced 163,998 t of copper in concentrates in 1998 and the full expanded capacity of 250,000 t/y is expected to be reached in 2000.

San Manuel closure begins

The planned 45-day shutdown of BHP's San Manuel copper smelter in Arizona began on schedule on May 1. The company reports that in conjunction with the smelter work the adjacent 320,000 t/y refinery will also be closed from around May 18 . The work on the smelter is expected to cost US$54 million, and is designed to improve efficiency rather than increase capacity. A new 40,000 t concentrator storage building will be built in which concentrate produced by the mill will be held until the smelter is back on line. A spokesman for BHP said that the large inventories of copper in terminal warehouses meant that the impact of the shutdown is "not a big issue".

Goldfields output down

Goldfields Ltd of Australia has attributed lower-than-expected output at Porgera in Papua New Guinea in the March quarter to transition in mining between stages at the open pit. The transition has been exacerbated by delays in the pre-stripping of the next stage. Porgera produced 115,301 oz of gold, compared with 208,800 oz in the same period of 1998.

The company also experienced a drop in output compared with the previous year's March quarter at Paddington in Western Australia, where heavy rainfall affected operations. This limited gold production to 31,917 oz compared with 51,331 oz in the same period last year. The cash cost of production increased as a direct result of the drawdown of run-of-mine stockpiles during the quarter, caused by the constraint of normal mining conditions by the rainfall

Huludao restarts smelter

The Chinese zinc smelter, Huludao Zinc Industry Co. Ltd, resumed operation of one of its two smelters on May 5, after a closure of about one month. The 130,000 t/y facility was shut down in April (*MJ*, April 16, p.280), for its annual maintenance period.

The company does not expect the closure to affect scheduled output for the year, estimated at around 250,000-280,000 t of zinc for the combined output of the two smelters.

Gold output record in Georgia

Bolnisi Gold NL reports that the 50%-owned Quartzite Project in Madneuli, Georgia, produced a record 7,559 oz of gold in the March quarter, despite a major power failure in the national Georgian supply. The project's expansion is now well-advanced, according to Bolnisi, and on completion, the operation will be capable of processing 2 Mt/y of ore and producing about 90,000 oz/y of gold. The mine currently operates at about 1.1 Mt/y.

Commissioning of the complete 2 Mt/y crushing plant will commence in July this year, and is scheduled to be largely complete by the end of August.

Pasminco increases output

Pasminco reports that group zinc and lead production (finished metal) increased in the March quarter by 7% compared with the same period in the previous nine months, and 2% compared with the previous nine months. These results do not take into account the contributions made by the newly-acquired operations at Clarksville and Gordonsville, which were part of the company's takeover of Savage Resources earlier this year (*MJ*, February 5, p.88). If the US zinc operations are taken into account, total metal production was 17% higher compared with the previous March quarter, at 150,967 t of zinc and 64,395 t of lead.

BHP's preferred Moura bidder . . .

BHP has named Peabody Resources Ltd as the preferred bidder for its 80% share in the Moura coal mine in Queensland. Peabody was chosen on May 6 after examination of offers tendered by several interested parties. Moura is a surface mining operation, using dragline and highwall methods to produce 4 Mt/y of steaming and semi-soft coking coal. Coal and seam gas assets at Moura are also part of the proposed sale. Terms have not been disclosed, and the sale is subject to a number of conditions, including mining permit renewal and agreement with the state government on environmental issues.

. . . BHP cuts Australian coal jobs

In addition to its exploration job reductions, BHP has announced job losses at its BHP Coal Illawarra subsidiary. The company will reduce the workforce employed by a total of 250 positions at three mines across New South Wales: Eleura, Appin and West Cliff. The redundancies come as a result of a joint management-union review process, aimed, BHP reports, at securing the future of the mines.

Meeting

A special meeting, jointly hosted by the Southern Counties branch of the Institution of Mining and Metallurgy, and the South Eastern section of the Minerals Engineering Society, is being held at The Royal Geographical Society lecture theatre in Kensington Gore, London, on May 25, at 6.00 pm. Dr James Campbell, executive director of Anglo American plc, will present a paper entitled 'Mining into the millennium – the new Anglo American'.

Publications

Chuck's story

The biography of Charles (Chuck) Fipke, a driving force behind the discovery of diamonds in Canada, has been written by Vernon Frolick, and published by Raincoast Books of Vancouver. The book, though slightly breathless in style, conveys the sometimes less than luxurious living conditions and larger-than-life situations experienced by Mr Fipke, and all field geologists, as it follows his travels throughout the world in search of a number of commodities. Mr Fipke appears to have been more interested than some field geologists in the indigenous cultures to which the profession is privileged to be exposed on a daily basis, which is a positive message for any would-be geologists who might be inspired by the book.

The events leading to the drilling of the kimberlites which proved the existence of economic quantities of diamonds in Canada are handled well, and acknowledge contributions from others involved in the search. The book conveys the excitement felt by all geologists when searching for their goal, as well as the sense of adventure required to put oneself in the environment most likely to prove successful. 'Fire into Ice – Charles Fipke and the great diamond hunt'. US$21.95. Raincoast Books, 8860 Cambie St., Vancouver, BC, Canada V6P 6M9. WWW.raincoast.com

South Asian geology

The Geological Survey and Mines Bureau of Sri Lanka is distributing the Proceedings of the Second South Asia Geological Congress, held in Colombo, Sri Lanka, in January, 1995. The Proceedings details some of the more significant scientific results presented during the Congress, which the President of the Democratic Socialist Republic of Sri Lanka, Her Excellency Chandrika Bandaranaike Kumaratunga, in the foreword to the publication, expects will stimulate further research. 'Geology in South Asia II'. US$15 + p&p. Geological Map of Central and Western Sri Lanka, 1:250,000 scale, colour. US$10 + p&p. Sri Lankan Geological Survey and Mines Bureau, Senanayake Building, Galle Rd, Dehiwala, Colombo, Sri Lanka.

Indonesian Mining

Resource Information Unit (RIU), the publisher of the 'Register of Indonesian Gold', has this year enlarged the scope of mining covered to include other mineral commodities, such as copper, coal, tin and nickel, in the new 'Register of Indonesian Mining 1999'. The Register gives an overview of the whole of the mining industry, discussions by main commodities, and comment from the Government of Indonesia. It lists commodities alphabetically, divided into main island areas, within which projects and mines are sorted alphabetically. All companies believed active in Indonesia are listed in the companies section, with contact addresses, project/mine interests, stock exchange code and a brief comment. An organisations section lists important contacts within Indonesia. 'Register of Indonesian Mining 1999'. Resource Information Unit, 79 Hay St, Subiaco, Western Australia, 6008. Tel: (+61 8) 9382 3955. Fax: 9388 1025. E-mail riu@riu.com.au www.riu.com.au

BacTech/Mintek alliance advances

Following moves to commercialise their gold bio-oxidation technology (*MJ*, November 27, 1998, p.431) the BacTech/Mintek partnership has announced a memorandum of understanding (MoU) with the Mexican metals and mining giant Industrias Peñoles, to commercialise base-metal bioleach technology. Under the terms of the MoU, Peñoles will fund the initial development programme, including the construction of a pilot plant to demonstrate the applicability of the BacTech/Mintek bioleach technology for copper and subsequently for other base metals. The programme will also include the assessment of three novel bioreactor designs and technologies, and a feasibility study for the operation of a commercial treatment plant in Mexico.

BacTech and Mintek will have the exclusive rights to build and operate commercial processing plants using their bioleach technology in Mexico and five other Latin American countries. The agreement provides for geographic expansion elsewhere in Latin America, and later for other base metals. BacTech/Mintek retains sole rights for the rest of the world.

Ms Pat Speedie, Mintek, Private Bag X3015, Randburg 2125, South Africa. Tel: (+27 11) 709 4111. Fax: 709 4326.

Nordberg forms new division

Nordberg's mining group has formed a new division to focus on the development of advanced products and circuits for mineral size reduction in the mining and industrial minerals industries. According to the new division's president, Jeffery Leonard, the division will enable Nordberg to supply and support the entire comminution circuit and allow it rapidly to introduce advanced products for mineral size reduction and develop a deeper knowledge of customer processes.

Nordberg Group, PO Box 383, Milwaukee, WI 53201, US. Tel: (+1 414) 769 4300. Fax: 747 1766.

Ceramics reduce downtime

According to Multotec Wear Linings, the use of ceramic-lined pipes at Iscor's Sishen iron ore mine has achieved significant reductions in downtime by enhancing the service life of pipelines in its beneficiation plant. According to Gerhard Theron, a project leader at Sishen, in one area of the plant, ceramic-lined pipes are achieving ten times the normal service life, and in other sections he is expecting 30 times the usual service life.

The pipes, chutes, elbows and underpans have been provided with ceramic liners in areas of the plant where ferrosilicon is present. Multotec says the alumina ceramic liners offer exceptional wear and chemical resistance as well as mechanical and electrical insulation properties. It says that various specialised materials can be formed into almost any design and shape including intricate and machined components.

Noel Mills, Multotec Wear Linings (Pty) Ltd, PO Box 244, Kempton Park 1600, South Africa. Tel: (+27 11) 923 6000. Fax: 394 5099.

Greater co-operation and new Euclids

Hitachi and Euclid-Hitachi Heavy Equipment have unveiled plans for a continued partnership programme which will strengthen each company's position in mining into the 21st century. Hitachi Construction Machinery has already shown its commitment by securing an 80% holding in Euclid-Hitachi. The company's dedication to the rigid hauler business is further illustrated by its agreement to purchase the outstanding 20% of Euclid by October 2001 (*MJ*, October 9, 1998, p.279).

Hitachi offers a broad line of excavators with bucket capacities of 0.6 to 27.0 m^3. Hitachi invests annually approximately US$100 million worldwide in research and development. Euclid-Hitachi produces off-highway rigid haulers with payloads ranging from 29 to 254 t (the R280), manufactured in Guelph, Canada and Gliwice, Poland.

Euclid-Hitachi has introduced its new 'C' series of rigid haulers, offering up to 20% more productivity through higher working speeds and faster uphill speeds, shorter stopping distances and improved downhill retarding. The C series features Euclid's technologically advanced Accu-Trac suspension system with Neocon struts for better handling and control characteristics. This system employs technology that consistently allows haul road speeds 8 km/h higher than average, owing to positive stability, superior ride and exceptional handling. The struts are mounted between the kingpins and the frame, allowing for a wider front track. This improves stability, reduces the turning circle and provides a more comfortable ride. Neocon struts, it is claimed, "outperform competitive strut designs, providing superior isolation and absorption with greater controlled rebound. This results in reduced impact loading on the structural parts of the machine and greater operator comfort, yielding longer equipment life and increased productivity."

Euclid-Hitachi, 22221 St Clair Ave., Cleveland, OH 44117-2522, US. Tel: (+1 216) 383 3499. Fax: 383 3340. Web: www.euclid-hitachi.com

New DTH products from Driltech Mission

Sandvik's Driltech Mission launched the D560S topdrive rotary and down-the-hole (DTH) rig. It is equipped for drilling 152-250 mm holes to 45.7 m (single pass 8.6 m). There are eight power-module options rated at 389-559 kW, with air-compressor volumes ranging from 28.3 to 45.3 m^3/min at 0.68 MPa (rotary) and 2.38 MPa for DTH drilling. These are mounted in an in-line arrangement for ease of maintenance and efficient use of power. The heart of the rig is its hydraulic system. Load sensing and on-demand systems provide maximum performance when needed and maximum component life when not needed.

Driltech Mission claims that the D560S features the most powerful rotary head of any drill in its class, with speeds of 0-150 rev/min and up to 12,631 Nm of torque. Its angle drilling capability is 0-30°, with base locking system. The pipe loader is capable of handling 76 to 178 mm outside diameter drill pipe and features a unique carousel with bolt-in pockets.

The computer-designed 'Fab-box' frame has the top and bottom flange shapes contoured to incorporate levelling jacks, power package, pump, component and walkway mountings as an integral part, to maximise strength and minimise stress by eliminating heavy multipass step welds and stress risers. The vertical web plates form a box design to provide maximum resistance to bending and torsional stress.

The new Mission 6, 152 mm DTH hammer features the patented Mirror Impact Technology to transfer "the most hammer energy into rock breaking." Newly developed piston and drill-bit shapes optimise the drilling process. Driltech Mission claims this hammer has proven itself in blasthole drilling, offering faster penetration rates, highest productivity and lowest total drilling cost. It is much shorter and simpler than competitive 152 mm hammers, with fewer parts. No foot valve, make-up rings or moving air-control valve mean quicker service and less room for malfunction.

Driltech Mission, PO Box 338, Alachua, FL 32616-0338, US. Tel: (+1 904) 462 4100. Fax: 462 3247.

Hatch provides Yabulu engineering services

Ontario-based engineering, procurement, construction and project management specialist Hatch has become the preferred supplier of engineering services to Billiton's Yabulu nickel refinery near Townsville in Queensland, Australia.

In a move to improve Yabulu's nickel refinery operating performance, several engineering companies were invited to submit proposals to act as its engineering services partner. Hatch says it secured the contract as a result of its expertise in nickel process technology, global resource base, engineering methodologies and history of partnerships with clients in Canada and South Africa.

Under the agreement, Hatch personnel in Australia, Canada and South Africa will support a team of 50 based in Townsville, which will include Yabulu engineering staff.

Hatch, 2800 Speakman Drive, Sheridan Science and Technology Park, Mississauga, Ontario, Canada L5K 2R7. Tel: (+1 905) 855 7600. Fax: 855 8270. Web: www.hatch.ca

Wilfley restructures

The shaking-table specialist, Wilfley Mining Machinery, is now under new ownership and management. The new owners have restructured the company to focus on the manufacture of table decks. The manufacture of the other components is now outsourced. The company is now based on the site of the old Wheal Jane mine in Cornwall, where its engineers are working on "simple and innovative processing solutions for ores, residues, slags, dusts and the recycling of metals."

Wilfley Mining Machinery Co. Ltd, Wheal Jane Mine, Baldhu, Truro, Cornwall TR3 6EE, UK. Tel: (+44 1872) 561 163. Fax: 561 162. E-mail: mail@wilfley.co.uk

US coal: the urge to merge

Last year, coal-fired generation provided 56.3% of the total electricity produced by US utilities. This compared with 21% contributed by nuclear, 9.6% by gas, 9.5% by hydro and only 3.4% by oil. As pointed out by the Department of Energy, coal is the energy that powers America. Annual US production is running at just over one billion tonnes and there are at least a dozen individual mines each producing more than 10 Mt/y, with the largest single operation, the Black Thunder mine in Wyoming, producing in excess of 34 Mt/y.

In a lengthy report on the coal industry published recently by Merrill Lynch, emphasis is placed on the impact of merger and acquisition activity within the sector. Such activity, it says, has irrevocably changed the face of the coal industry but this is seen as no bad thing. A number of issues are driving mergers and acquisitions activity, not least the expiry of long-term coal supply contracts. Many of those companies selling their coal assets, it says, entered the coal sector 20 years ago when it was widely accepted that energy prices in general would increase indefinitely because of strong energy demand coupled with limited supply and reserves. Coal was favoured because it was seen as a long-lived energy asset with abundant reserves.

In the event, coal has proved to be just another oversupplied commodity with a declining selling price, and those market contracts which are expiring have little chance of renewal at prices anywhere near current levels. As a result, energy companies (many of them oil companies who turned to coal in the mistaken belief that its production and marketing presented challenges no different to the oil sector) are selling their coal assets at prices which seem 'fair'. This has been presenting mining companies with purchasing opportunities, and during the past 24 months Merrill Lynch calculates that total merger activity in the global coal sector has exceeded US$13 billion in value, the great majority of this activity involving US assets.

From weak to strong

Coal assets, it says, are moving from weak hands to strong hands as a result of mergers and acquisitions but the process needs to continue, Merrill Lynch says, in order that coal can achieve 'critical mass'. By increasing in size, both operationally and financially, the new larger coal companies are better able to influence their destiny, negotiating from a position of strength and no longer dependent on any one customer. A large company, moreover, in addition to realising economies of scale, can secure better terms and larger discounts on equipment and supplies.

At the operational level, the larger company has greater flexibility, and is less dependent on any one operation. From a financial standpoint, Merrill Lynch says that financing is easier and safer if there are multiple operations. However, it warns that the financial benefit accruing from mergers and acquisitions activity will only be realised if it has not been offset by an increase in risk through financial leverage.

US mergers and acquisitions over the past two years include: Arch Minerals' merger with Ashland Coal in July 1997 and its subsequent acquisition of Arco's assets (the two deals being worth around US$1.64 billion); Consol Energy Inc.'s acquisition, for US$500 million, of 44% of its outstanding shares from DuPont in September 1998 (which raises Rheinbraun's interest in Consolidated Energy to 94%, and leaves DuPont with 6%); Consolidated Energy's additional acquisition, for US$207 million, of Rochester & Pittsburgh Coal Co. last September; AEI Resources Inc.'s acquisition of Ziegler Coal Holding Co., for US$850 million, also last September, as well as the purchase of 22.5% of Bowie Resources Ltd from Mitsui, and significant assets from Cyprus Amax Coal; a number of acquisitions by A.T. Massey, including Elkay Mining Co. from Pittston Coal Co.; plus several purchases by Peabody Holding Co., and Kennecott Energy. Finally, Merrill Lynch notes that both Chevron and Cyprus Amax Minerals Co. are seeking to dispose of their coal assets.

The impact of consolidation on the leading US coal producers is readily evident. Twenty years ago, the market share of the top 15 producers was around 45%, by 1996 their share had increased to 62%, and in 1997 just ten producers accounted for 61% of output. The top five producers in 1997 were: Peabody Holdings (contributing 13.1% of output); Cyprus Amax Minerals Co. (7.5%); Kennecott Energy (7.2%); Consolidated Energy Inc. (6.7%); and ARCO Coal Co. (4.3%). This year, the top five producers in order of ranking are expected to be Peabody, Arch Coal, Kennecott Energy, Consolidated Energy and Cyprus Amax Minerals.

There are two main coal-mining regions in the US. In the eastern or Appalachian region, comprising operations in Pennsylvania, Maryland, Virginia, West Virginia, eastern Kentucky, Tennessee, Alabama and Ohio, the coal is mined by both surface and underground methods, and is characterised as bituminous with a low to medium sulphur content. Western coal is mined in Montana, Wyoming, Colorado, North Dakota, Arizona and New Mexico, principally through surface operations. More than 50% of western coal is sub-bituminous with a low sulphur content, and the majority is located in the Powder River Basin (PRB) of Wyoming and Montana. In 1998, eastern coal mines produced 417 Mt, 1.6% less than in 1997. Western coal output last year totalled 441 Mt, a 7.6% increase over 1997. In the ten years since 1998, western coal output has risen by 58% whereas eastern coal production has risen by only 2.4%.

Some coal is also mined in Illinois, Indiana and western Kentucky, from both surface and underground, and is characterised as high-sulphur bituminous coal. Production has fallen dramatically as a result of the 1990 Clean Air Act Amendments. Production was 149 Mt last year compared with 175 Mt in 1997.

Environmental haze

PRB coal has a low sulphur content but a low heat content, requiring utilities to burn up to three times more PRB coal than is required for the higher Btu bituminous coals from the eastern region and Illinois. PRB is competitive but Merrill Lynch believes that demand growth could slow after 2000 when the second phase of the US Clean Air Act Amendment is implemented. Regulations will be more stringent and utilities may decide to invest in flue-gas desulphurisation units, and turn to the more thermally efficient bituminous coals again.

Although coal is a cheap and bountiful resource for US electricity generation, there are a number of uncertainties concerning deregulation and environmental matters, and Merrill Lynch says that construction of coal-fired plant has greatly diminished compared with gas-generated electricity. At the current time, coal represents about 43% of existing generating capacity and gas about 19.3% but the planned additions are mainly for gas – coal represents only 11.7% of planned additions whereas gas represents nearer 76%.

However, Merrill Lynch says this should not necessarily be viewed as negative since the utility industry has an abundance of coal-fired capacity which has led to underutilisation of assets. Coal-fired generation, it argues, should continue to grow as utilities focus on better asset utilisation. Gas-fired plants are more flexible – they can be switched on and off according to demand – and much of the new gas-fired capacity will be used when electricity requirements exceed base load. As time passes and the issues regarding deregulation and the environment are clarified, Merrill Lynch believes that, ultimately, new coal-fired assets will be constructed.

Total US coal consumption in 1998 is estimated at 938 Mt, a 2.4% increase over the 1997 figure of 914 Mt, and comparing with 1998 production of 1,007 Mt. Coal exports for 1998 are estimated at 69 Mt versus imports of around 7.6 Mt. This year, coal exports could reduce to around 54 Mt as a result of expected lower prices, adverse exchange rate movements and slowing consumption in Asia. Conversely, US imports this year could post a 4.4% increase, to 8.6 Mt, as weakened currencies in Canada and Colombia allow producers there to become more competitive.

The global picture

World production of hard coal in 1997 totalled 3,775 Mt, and the US ranked second behind China. The latter produced 1,348 Mt and had a 35.7% share compared with 24% for the US. The other members of the 'big five' were India (8.2%), South Africa (5.8%) and Australia (5.5%). Metallurgical or coking coal comprised 549 Mt of world output, with China contributing 33.7%, Australia 15.3%, the US 13.6% and Russia 9.1%. Thermal or steam coal production totalled 3,225 Mt, with China (36.1%) and the US (25.9%) contributing almost 70% of the total. For the future, it is expected that low-cost producers such as Indonesia, Colombia and South Africa will increase their output.

World consumption in 1997 reached 3,777 Mt, the major consumers being China, the US, India, South Africa and Russia. China is by far the biggest consumer, accounting for more than 35% of the total. World coal exports in 1997 were 494 Mt, equivalent to 13% of production, and Australia, the US and South Africa were the leading suppliers, providing 59% of the total. Merrill Lynch expects that exports from Indonesia, Colombia and Venezuela will grow, primarily at the expense of exports by high-cost producers in Canada, the former Soviet Union and Poland. The industries in Canada, Colombia, Indonesia and Australia are all highly dependent on international coal demand because the majority of their production is exported.

Making the grade

The failure of a mining project to deliver expected returns on investment is often attributed to deficiencies in the original estimates of recoverable tonnage and grade. Another common cause of failure is attempting to mine at a rate greater than the resource will support. This can, in fact, be a cause of the failure to realise the reserve grade.

Excessive mill capacity forces the mine to reduce its cut-off grade, and hence its head grade, in order to produce the tonnes demanded. As readers familiar with Ken Lane's definitive textbook 'The Economic Definition of Ore' will know, as the cut-off grade moves downward from the 'treatment limiting' case (where either the ore-handling facilities or the concentrating plant restricts throughput) to the 'mine limiting' case (where the rate of mine development restricts throughput), the desired return on investment is the first item sacrificed in the calculation.

In practice, a 'hungry mill' forces the mine to chase tonnes, often by relaxing control of mining dilution. At best, anything that 'looks like ore' is sent for treatment. At worst, cross-tramming of waste into ore streams may be condoned.

Historically, a viable production rate for an underground mine was said to be approximately equivalent to a vertical advance of one level (usually 30 m) per year. Statistics collected by Australian Mining Consultants Pty Ltd (AMC) over the past 15 years show that this figure is now typically 50 vertical metres per year (vm/y) for small to medium underground mines, but generally remains 30-35 vm/y for mines of 2 Mt/y or more. For the smaller mines, 60 vm/y appears to be a practical upper limit. More ambitious mines generally suffer a collapse of production within 12-18 months when higher rates are attempted.

These limits do not reflect an inability to advance shafts or declines quickly. Rather, there is a limit to the pace of infrastructure development required for sustainable production. Individual areas within a mine may advance more quickly, particularly if predeveloped, but the mine average will still apply.

AMC finds that, for open pits, production rates are similarly constrained. For large pits a vertical advance of 30-35 vm/y is realistic, while small pits may achieve 50-60 vm/y, depending on the level of grade control and selectivity required. There are some instances of small pits being mined out in a few months at rates equivalent to 70 vm/y where grade control is straightforward, and large stripping operations in flanking waste can achieve similar rates. The limits on open-pit mining are matching equipment to the face length, the number of faces or floor area available and the turnaround time for grade control.

Surprisingly, the advance rates for open pits and underground mines seem largely independent of the geometry and attitude of the orebody.

The above figures provide a useful rule-of-thumb check on feasibility studies and public forecasts. AMC suggests that, in order to determine the sustainable mining rate, the total recoverable tonnes of ore per vertical metre in a deposit (based on the published ore reserve and a judgement about eventual conversion of resources) should be multiplied by 30-35 for multi-million tonnes per year mining rates, or by 50-60 for rates less than 1 Mt/y.

Where mines are in production already and the resource is partly mined out, it is the original (life-of-mine) reserve per vertical metre and not the remaining reserve per vertical metre which sets the rate. This is because the partly mined areas are already developed.

The missing information in most public reports is the extent of the vertical interval over which the resource and reserve occurs. This can quickly be calculated, of course, if the depth from surface to the top and bottom of the resource is published. As AMC's managing director Peter McCarthy suggests, it would be very helpful if mining companies were to publish this information routinely with their resource and reserve statements and projections of future production.

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Tin tactics

While positive sentiment is still evident on the London Metal Exchange, metal prices have now lost impetus. The most interesting development of the week was in the tin market. Since March, the number of unreported tin warrants has been steadily declining from over 90% of LME tin stocks to now less that 20%. As this has happened market tightness has eased and prices have slipped. This week, however, as the unreported warrant holdings fell a large position of 50-80% of reported tin warrants emerged. This, together with heavy turnover in tin options in the middle of last week (some 300 lots of May US$5,500/t calls and 800 lots of US$5,600/t calls were bought), has prompted dealers to speculate that the market is heading for a squeeze. Analysts note that buying options is an effective means of gaining leverage in a market as grantors of calls must acquire the underlying futures to hedge.

On the back of last week's option buying, the tin price moved from a low of around US$5,420/t to touch a nine-month high of US$5,670/t this week before subsequently retreating. Cash to three month prices moved from contango into a backwardation of around US$10-20/t on Wednesday.

LME copper failed to gain enough momentum to break the US$1,600/t resistance level and traded sideways for much of the week. It was a similar situation for aluminium, with the three-month price hovering around US$1,360/t and producer forward selling seen as the main obstacle to a retest of US$1,400/t. Zinc also failed to make progress. The lack of consumer interest in base metals during what is normally the busiest time of the year has prompted some dealers to question how well prices will hold up in the coming northern hemisphere summer, when demand traditionally drops off.

Aluminium price rise counterproductive?

Despite all the recent excitement in the aluminium market, mining and metal consultancy Brook Hunt notes that from a fundamental perspective little has altered in the market. In the first edition of its new weekly *Metal Markets* report Brook Hunt says that, while the announcements by Alcan and Alcoa of production cuts (*MJ*, March 26, p.214) may have been viewed by the market as the harbinger of further production cuts, thus far it will have been disappointed. Indeed, the consultancy notes that further cuts have been conspicuous by their absence and feels that a recent statement from Pechiney that it was "better to break even on a cash basis than spend cash to shut down plants" is indicative of the aluminium industry's attitude at present.

Brook Hunt estimates that without further cuts Western primary output will rise by 3.4% in 1999 to an all time high of 17.2 Mt. The lack of supply-side cutbacks it suspects, will be exacerbated by developments in the Former Soviet Union where last year's collapse of the rouble has had the effect of stymieing the recovery in domestic aluminium consumption and markedly improving the financial position of aluminium smelters. The net result could be that FSU production will expand for the fourth year running to around 3.3 Mt, and exports will rise.

Brook Hunt feels that on the demand side, the outlook is poor. It estimates that after contracting by 0.7% last year Western demand in 1999 will rise by just 1.9% in 1999 to total 18.9 Mt, with the bulk of the growth taking place in Asia.

As a result of the lack of production cutbacks and weak demand, the consultancy is forecasting a substantial surplus of 997,000 t for the aluminium market in 1999. The recent rally in prices may prove counterproductive in that it will have removed the incentive for producers to make the necessary adjustment to their output levels if they can hedge sell at higher levels.

Brook Hunt warns that in the absence of significantly improved fundamentals, the possibility remains that aluminium may not have reached its cyclical bottom, with the crunch likely to come in the third quarter when demand seasonally slows and stocks accumulate.

LME PRICES & STOCKS

Prices (a.m.) Tonne basis	May 6 Buyers	May 6 Sellers	April 29 Buyers	April 29 Sellers
COPPER *Grade A*				
Cash	$1,567	$1,567.5	$1,553	$1,554
Three months	$1,597	$1,598	$1,583	$1,584
TIN				
Cash	$5,630	$5,640	$5,595	$5,605
Three months	$5,620	$5,625	$5,590	$5,595
LEAD				
Cash	$542	$543	$535	$535.5
Three months	$548	$548.5	$541.5	$542
ZINC *Special high grade*				
Cash	$1,072.5	$1,073	$1,070.5	$1,071.5
Three months	$1,092.5	$1,093	$1,090	$1,091
ALUMINIUM *Higher grade*				
Cash	$1,342	$1,342.5	$1,320	$1,320.5
Three months	$1,367	$1,367.5	$1,343	$1,343.5
Alloy				
Cash	$1,235	$1,236	$1,195	$1,200
Three months	$1,249	$1,250	$1,218	$1,220
NICKEL				
Cash	$5,480	$5,485	$5,400	$5,410
Three months	$5,555	$5,560	$5,475	$5,480

LME warehouse stocks on May 5 and turnovers for the month of April

	Stocks (t)	Stocks (Apr. 28)	Turnovers (t)
COPPER	745,600	745,050	36,157,275
TIN	10,080	9,985	860,230
LEAD	105,025	105,000	7,740,200
ZINC *SHG*	315,275	318,525	15,254,175
ALUMINIUM *HG*	777,875	786,050	39,364,475
Alloy	63,300	63,640	863,580
NICKEL	59,592	60,186	2,540,472

London Metal Exchange official averages for April were:

	Cash	Three months	Settlement
COPPER *Grade A*	$1,465.51	$1,494.04	$1,466.00
TIN	$5,390.13	$5,383.63	$5,393.00
LEAD	$518.98	$522.63	$519.33
ZINC *Special high grade*	$1,018.60	$1,037.58	$1,019.00
ALUMINIUM *HG*	$1,278.20	$1,299.99	$1,278.55
Alloy	$1,161.38	$1,181.11	$1,162.45
NICKEL	$5,102.63	$5,181.88	$5,105.50

Chinese zinc concentrates surge

In its weekly report Macquarie Equities notes that, despite its robust fundamentals and being the only metal to register a supply deficit in 1998, the zinc price has failed to stage the widely anticipated price rally this year. According to Macquarie, the main reason behind the metal's failure to respond to its fundamental outlook can be attributed to China. The market belief that Chinese producers can rapidly raise output and exports has effectively capped the market and deterred consumers and speculators from pushing the price to a level that would trigger a Chinese response.

However, the latest information from Chinese customs indicates that the recent strengthening of LME metal prices, zinc included, has prompted a surge in Chinese exports of refined zinc. The customs figures show that in the first quarter of the year Chinese exports of refined zinc metal have risen by 12.2% and concentrate exports are up by a massive 263.3%. Macquarie notes that Chinese refined zinc exports in March alone totalled 59,890 t, the highest monthly total since October 1997, when exports peaked in the wake of a surge in LME zinc prices to over US$1,650/t.

The massive surge in Chinese exports of zinc concentrates has prompted the general manager of the Huludao zinc smelter to appeal to the government to take action against zinc concentrate exports – since the beginning of October 1997 export tariffs have been cut from 30% to 10%. Cuts in export tariffs together with delays in receiving letters of credit, production problems, and low treatment and refining charges have all contributed to slower purchases of zinc concentrates by Chinese smelters and may have been a contributing factor in the recent temporary closure of the Huludao smelter (this issue, p.336).

Mixed month for minor metals

The month of April saw mixed fortunes for the minor metals with some showing a little

improvement in price while others at least maintained their levels. But the general impression still remains that with summer approaching in the Northern Hemisphere there remains too much metal available in the market for there to be any sustained recovery.

Antimony prices drifted back down towards levels seen earlier in the year of around US$1,200/t. The weakness has been attributed to shipments of antimony from China made before the Lunar New Year. Smuggling was also believed to be continuing to make extremely cheap metal available to the market, with evidence of shipments from ports other than the three that are officially designated by the Chinese authorities, and some was even arriving via other countries such as Vietnam. The current situation in China regarding the new limitations on antimony exports remains unclear.

Meanwhile Kyrgyzstan's Kadamjia antimony factory announced the appointment of a UK-based agent for sales outside the CIS as it progresses in its attempt to restart production planned for later this year. Apparently concentrates have now been secured from Siberia, Tajikistan and Kazakhstan. Production at the plant stopped in December 1998 due to problems in obtaining these concentrates. In the US the market remained extremely thin with consumers in some cases holding back in expectation of even lower prices. The US Defense Logistics Agency (DLA) made no awards at its latest offering of metal at the end of March.

Bismuth showed rare strength among the minor metals particularly in the US where prices for small quantities reached as high as US$3.85/lb but elsewhere prices, generally for larger quantities, climbed only to the US$3.40-US$3.60/lb range. The relative strength in the US market is due to shortages of both the high grade material from Peru and a reduction in output from the Mexican producer Peñoles. The US tends to depend traditionally on these producers as opposed to the more freely available but lower quality Chinese metal. Output at Doe Run's La Oroya Metallurgical Complex in Peru has fallen due to changes in the feed it receives which could result in this year's output dropping to around 1997's figure of 815 t, compared with 832 t in 1998. Bismuth from La Oroya accounts for most of the world's 99.999% content metal. This higher grade material, however, only represents a small fraction of the 6,200 t of refined bismuth produced annually.

In Mexico, output has been reduced while modifications in the ventilation system at the plant in Torreon are being conducted. Regular customers' deliveries are being rescheduled with delays of around one month. The amount of production lost in April is unknown and the work was expected to be finished at the end of that month. As a result of these problems, the market may well have moved higher if it had not been for the Chinese, who having initially held back metal as the market moved up, returned with substantial offers around US$3.40/lb.

Cadmium prices slipped, with the only buying interest of note being from India. Both producers in Mexico fell behind with shipments, having sold heavily into the slight upturn during February. But with much of the buying even from India having been speculative there was no pressure on the market which eased to be either side of US$0.20/lb.

Chromium prices, particularly for aluminothermic, continued to firm as the market bounced back from near historical lows. Prices as high as US$5,200/t were reported for small sales as Russia's producer Kluchevsky halted production.

The recent slump in prices has put pressure on many producers, and Kluchevsky had suffered as aluminothermic prices plunged towards US$4,000 t earlier in the year. However, towards the end of the month, rumours circulated that new supplies of chromium oxide were being secured and output would resume during May or June.

Chinese material remained available for shipments at around US$5,000/t and, similarly, priced metal from other Russian producers was available.

Cobalt prices continued to slide, there being little spot demand evident in the market. High grade producers were offering aggressively down to US$15.00/lb with Zambian grade 99.60% around US$14.00/lb and Russian 99.30% close to US$12.00/lb. Some interest for spot material came from Japan, but the return of significant buying has not yet been seen, most major consumers over the past months having signed up to short and medium term contracts based on fixed and formula pricing.

The Swedish stockpile sale of 20 t of Falconbridge origin metal was understood to have gone at around US$14.30/lb to Glencore which continues to dominate the DLA disposals after being awarded a large quantity at the April solicitation, which was split between seven bidders at prices in the US$11.35-US$14.41/lb range.

The Cobalt Development Institute (CDI) has reported that in 1998 most producers increased production significantly. Production by CDI members rose to 26,308 t from 21,423 t in 1997. In addition, other cobalt availability including DLA sales, CIS exports and metal from Brazil, India, China and South Africa, rose to 7,114 t from 6,691 t, making a total of 33,422 t of refined cobalt available in 1998. This is up from 28,114 t in the previous year and continues the upward trend in production that started in 1993. Worldwide cobalt demand for 1998, excluding that in the CIS, was estimated at around 29,500 t, similar to 1997 levels. However, this figure does not take into consideration stock reductions during the year, so it could be on the low side.

Indium prices picked up a little, back to around US$200/kg, with reports of reduced output at two of China's main producers, the Huludao and Zhu Zhou zinc smelters. Huludao in particular was reported to have reduced output by around 50%, due to an acute shortage of zinc concentrates and lack of working capital, with part of its production having stopped in February during the Chinese New Year holidays. Other reports however, were that the shut down was only for annual maintenance and production would restart during May (this issue, p.336). Certainly, there was no shortage of offers from the many other producers of indium within China, and unless demand, particularly from Japan increases dramatically, prices are unlikely to rise very quickly.

Germanium prices remained stable with offers for dioxide, particularly from China, still close to US$800/kg. Sales of metal from the DLA continued, with a 250 kg disposal at the end of March at prices in the range of US$1,260-US$1,282/kg, and bids for the April offering were all within the same range.

LONDON PRICES

Metals		May 6
Aluminium	(US producer)	61.00-62.00 c/lb d/d
Antimony		$1,230-$1,280/t cif
Arsenic	(Rotterdam 99%)	$0.40-$0.55/lb
Bismuth	Bismuth	$3.40-$3.60/lb cif
Cadmium	(99.99%)	$0.18-$0.23/lb cif
..	(99.95%)	$0.16-$0.20/lb cif
Chrome	(UK 99%)	$9.00-$10.00/lb
Cobalt	(99.8%)	$15.50-$16.50/lb net
..	(99.3%)	$14.50-$15.00/lb net
Germanium		$790-$820/kg
Gold		£175.97 ($288.10)/oz
Indium		$190-$220/kg
Iridium	(J Matthey price)	$415/oz
Magnesium	(Norsk Hydro Euro. prod.)	€2.86/kg*
..	(US Free mkt, 99.8%)	$2,100-$2,700/t*
Manganese metal	(99.7%)	$1,080-$1,140/t
Mercury	(99.99%)	$130-$140/flask
Nickel		$2.49-$2.50/lb
Osmium		$400-$450/oz
Palladium	(J Matthey price)	$310.00/oz
..	(Free market)	$305.00-$310.00/oz
Platinum	(J Matthey price)	$355.00/oz
..	(Free market)	$353.00-$355.00/oz
Rhodium	(J Matthey price)	$860/oz
Ruthenium	(J Matthey price)	$40/oz
Selenium		$1.60-$2.00/lb cif
Silver		$5.39/oz
Tellurium	(UK lump & powder 99.95%)	$5.00-$7.00/lb net
Tin	(Kuala Lumpur)	RM20.90/kg

Ore & Oxides		May 6
Antimony	(60%)	$8.50-$9.00/t unit, cif nom*
Beryl	(10% BeO)	$75-$80/s ton unit BeO cif*
Chrome	(Transvaal, Friable 40%)	$63-$68/t, fob*
..	(Turkish, concs 48%)	$75-$85/t fob*
Columbite	(min. 65% comb. oxides)	$2.80-$3.20/lb cif*
Ilmenite	(54% TiO_2)	A$95-A$110/t fob
Lithium ores	(Petalite 4.2% Li_2O)	$250/t fob*
	(Spodumene>7.25% Li_2O)	$385-$395/t fob*
Manganese ore	(48-50% Mn, max. 0.1% P)	$1.81-$1.90/t unit fob*
Molybdenum oxide	(conc 55-57%)	$2.40-$2.70/lb
Rutile	(Aust. 95-97% TiO_2)	A$675-A$750/t fob (bulk)
Tantalum oxide	(60% cif N. Euro port)	$26-$32/lb
Uranium	(Nuexco unrestricted/restricted U_3O_8)	$8.50/$10.85/lb
Vanadium	(98% V_2O_5)	$1.80-$2.00/lb cif
Wolframite	(65%)	$40-$45/t unit
Zircon sand	(std 66-67% ZrO_2)	A$500-A$600/t fob (bulk)

** Source: Metal Bulletin*

Gold giants grow

Although there is some expectation that metals prices may pick up next year in response to general economic recovery around the world (*MJ*, April 23, p.299), gold remains a special case. Forthcoming official sales by the International Monetary Fund and the Swiss authorities may well be accounted for in the current price, but the threat of further central bank sales and producer forward selling into any price rallies seems likely to keep a cap on the price, at least in the medium term. Whatever their own views on the long-term outlook, producers are having to come to terms with the current trading range. Those with high-quality assets and the financial strength to develop them are boosting cash flow through higher output and lower unit costs.

Barrick Gold Corp. of Canada produced 1.0 Moz in the three months to March 31, 1999, 31% more than in the corresponding quarter of last year. Total cash operating costs (including royalties and production taxes) were 30% lower, at US$125/oz. The key factor in the improvement in both of these measures was the start of production last November at Pierina in Peru, which benefited from high initial grades to contribute 315,660 oz in the latest quarter, at a cash cost of US$39/oz (excluding royalties and production taxes).

Although the additional revenue derived from Barrick's extensive use of hedging remains important, it is worth noting that the reduction in overall unit cash operating costs was significantly larger than the fall of 3.8% in Barrick's realised gold price, to US$385/oz (compared with the 2.7% fall in the average spot price, to US$287/oz), thus widening the company's cash margin. The increased unit margin combined with the higher production to increase Barrick's operating cash flow by 56%, to US$210 million. This ability to generate cash allowed Barrick to continue its development programme during the quarter, and to increase its cash balance by US$138 million to US$554 million at the end of March. Long-term debt remained at US$500 million, leaving the company net debt-free.

Production growth and lower unit costs seldom come for free, but must be paid for in terms of cash for development and acquisition, or in terms of dilution to existing shareholders when acquisitions are made by issuing shares. Essentially, earnings take the former into account, through depreciation and amortisation. Barrick's earnings for the March quarter totalled US$87 million, a rise of 16% compared with the March quarter of 1998. Earnings per share, which take into account any dilution, were 15% higher, at US$0.23/share, as shares issued rose to 393 million.

Another of the gold mining industry's giants, **AngloGold Ltd** of South Africa, compares unfavourably with Barrick in terms of both cash costs, at US$209/oz for the March quarter of 1999, and realised gold price, at US$311/oz. Although this indicates a much narrower cash margin than Barrick's, AngloGold is closer to the Canadian company in terms of earnings. This is principally because the amortisation charges from its mainly mature operations are relatively smaller.

The South African company made attributable income (based on international accounting practice) of US$100.9 million in the March quarter. This includes a US$75.4 million reduction in AngloGold's deferred tax liability booked in the earnings statement as a one-off gain, following the reduction in the South African corporate tax rate (*MJ*, February 26, p.144), and a US$56.0 million write-down in the goodwill stemming from the premium of the Minorco gold purchase price over the book value of the assets (*MJ*, December 11, 1998, p.477). Ignoring these two items, AngloGold's attributable earnings were US$81.6 million, 7% less than in the preceding, December quarter of 1998.

AngloGold, which is also listed in New York, now reports its results in US dollars as well as South African rand, and uses international reporting standards, but persists in the South African practice of comparing each quarter's results with the preceding period. The effects now evident on production from seasonal holidays in South Africa, and the addition to company portfolios of foreign mines potentially affected by weather (such as the ex-Minorco operations), both present strong cases for South African companies to adopt this aspect of international reporting practice too.

AngloGold produced 1.7 Moz of gold in the March quarter, 8% more than in the December quarter, following the Minorco gold acquisition. Attributable production for the latest quarter excludes AngloGold's 21.5% interest in Driefontein Consolidated Ltd, the sale of which (*MJ*, February 26, p.141) was agreed by shareholders after the end of the quarter, but Driefontein is included in the financial results on an equity-accounted basis.

Cash flow from AngloGold's operations totalled US$130.8 million. The US$550 million Minorco gold acquisition was financed with debt, a combination of roughly US$50 million in assumed debt, US$350 million in a cash loan and US$150 million as a gold loan (*MJ*, April 16, p.286). Consequently, AngloGold's balance sheet shows long-term borrowings of US$744.9 million at the end of March, compared with US$121.5 million at the end of December. Another change to the balance sheet is the arrival of an entry for goodwill, totalling US$146.1 million at the end of the period, the balance of the Minorco gold premium. □

SHARE PRICES AND EXCHANGE RATES

Company	May 4 Local	Change on week %	Dollar	$ hi-lo
Alcan Aluminium (C$)	46.60	8.4	32.25	94
Alcoa ($)	61.63	10.5	61.63	100
Alusuisse (SF)	1855.00	3.1	1224.42	66
Anglo Amer. Corp. (R)	306.60	4.0	50.55	82
Anglo Amer. Gold (R)	422.00	5.3	69.58	100
Anglo Amer. Plat (R)	108.60	–8.7	17.91	70
Anglovaal Mining (R)	34.15	5.1	5.63	29
Asarco ($)	18.56	18.8	18.56	46
ASA ($)	19.19	5.5	19.19	41
Ashanti Goldfields (£)	5.63	12.2	9.06	68
Ashton (A$)	0.80	25.0	0.53	30
Barrick Gold (C$)	30.55	5.0	21.14	89
Battle Mt Gold ($)	2.75	–2.1	2.75	4
Broken Hill Pty (A$)	17.55	7.2	11.66	100
Cleveland-Cliffs ($)	39.06	8.9	39.06	26
Comalco (A$)	6.65	8.1	4.42	98
Cominco (C$)	23.90	3.0	16.54	100
Cyprus-Amax ($)	15.19	12.0	15.19	69
De Beers Centenary (R)	149.60	6.9	24.67	93
Delta Gold (A$)	2.33	4.9	1.55	52
Echo Bay Mines (C$)	2.54	3.7	1.76	8
English China Clays (£)	2.49	0.0	4.01	89
Falconbridge (C$)	21.00	9.9	14.53	99
Freeport Mc C&G ($)	16.38	21.9	16.38	81
Gencor (R)	16.65	3.4	2.75	99
GFSA (R)	11.80	1.7	1.95	n/m
Homestake ($)	9.44	6.3	9.44	22
Impala (R)	139.15	0.1	22.94	96
Inco (C$)	27.10	6.9	18.75	100
JCI Gold (R)	5.65	8.9	0.93	6
Kerr McGee ($)	44.50	12.7	44.50	40
Kidston Gold Mines (A$)	0.43	26.5	0.29	23
Lonmin plc (£)	0.51	–1.9	0.82	96
Metallgesellschaft (€)	18.15	1.1	19.15	54
MIM Holdings (A$)	0.94	19.0	0.62	100
Minorco (£)	15.38	5.8	24.75	100
Newmont Mining ($)	23.88	8.5	23.88	56
Noranda (C$)	19.55	2.9	13.53	n/m
Nord Resources ($)	0.56	0.0	0.56	0
North (A$)	3.32	9.9	2.21	60
Outokumpu (€)	11.40	9.6	12.03	62
Pasminco (A$)	1.78	17.1	1.18	100
Phelps Dodge ($)	65.25	7.7	65.25	92
Placer Dome (C$)	20.70	4.3	14.33	78
Reynolds Metals ($)	62.56	4.3	62.56	84
Rio Algom (C$)	19.50	5.7	13.49	41
Rio Tinto Ltd (A$)	25.95	2.0	17.24	100
Rio Tinto plc (£)	10.58	3.2	17.03	100
Teck (C$)	14.30	17.7	9.90	51
Trelleborg (SK)	80.50	2.5	10.81	47
WMC (A$)	7.02	16.8	4.66	100

Share prices and exchange rates, as at close of business on Tuesday. 100 in the high/low column indicates that the share is trading at a high in US$ terms, 0 that it is at a low. Figures are based on dollar prices over the past 52 weeks.

Currencies May 4

Value of	£	$(US)
$ (US)	1.61	–
$ (Australian)	2.42	1.51
$ (Canadian)	2.33	1.45
Ringgit (Malaysian) Fixed official rate	6.12	3.80
Franc (Swiss)	2.44	1.52
Krona (Swedish)	11.99	7.45
Yen	194.42	120.76
Rand (SA)	9.76	6.07
€ (Euro)	1.53	0.95

Markka (Finnish) ....€1=Mk5.94573
Franc (French)............€1=FF6.55957
Deutschmark ....€1=DM1.95583

Corporate restructuring takes in Randgold . . .

The various companies that comprise the Consolidated African Mines Ltd (CAM) group, part of the complex web of gold mining interests held by the Kebble family, last week issued a regulation cautionary announcement via the Johannesburg Stock Exchange, indicating that the restructuring to simplify the group long-awaited by investors may finally be under way.

The announcement warned shareholders that discussions are taking place between CAM, the main Kebble family vehicle; CAM's associates Randgold & Exploration Co. Ltd and JCI Gold Ltd; Randgold's London-listed subsidiary, Randgold Resources Ltd; JCI Gold's associates, Western Areas Ltd, Randfontein Estates Ltd and Free State Development and Investment Corp. Ltd (which holds mainly mineral rights); and Western Areas' subsidiary, Barnato Exploration Ltd (Barnex).

The chairman of CAM, Roger Kebble, speaking this Tuesday to analysts in Johannesburg and London on the release of the annual results of the Randgold group, conceded that the restructuring of the wider group has been dragging on (*MJ*, August 14, 1998, p.131), to the point that some have suggested that the management has been showing "touching faith in life everlasting". However, more seriously, Mr Kebble said that the time taken does reflect the complexity of the necessary transactions.

The companies have appointed Chase Manhattan Bank and Standard Bank as joint advisers with regard to the proposed restructuring, and further announcements are expected by the end of July. Details of the likely future structure are very limited, owing to the stock exchange restrictions in force under the cautionary announcement (pinning down the current structure is difficult enough, after all the changes either proposed or enacted in recent years). Mr Kebble did indicate that Randgold & Exploration is likely to cease to exist, having served its purpose of transforming the gold division of the old Rand Mines group, but its mineral rights not core to other group companies may be listed separately.

Mr Kebble noted that Randgold Resources, the offshore arm of the group, suffers like all high-growth mining companies from pressure on its balance sheet. He also said that its market rating has been depressed relative to those of its peers by the complex ownership structure. Both of these aspects are to be addressed in the restructuring.

Randgold Resources is currently developing the Syama gold mine in Mali, in a long-term programme to increase production and reduce costs (*MJ*, February 12, p.108), and last month announced the decision to develop a new mine nearby on the Morila deposit (*MJ*, April 16, p.273). Syama produced 50,712 oz in the quarter to March 31, 8% more than in the preceding three months, at a cash operating cost of US$257/oz. This included 19,184 oz at US$228/oz for the month of March. However, Randgold Resources made a net loss of US$34.2 million for the year to March 31, 1999, and suffered a net cash outflow (before capital expenditure) of US$31.8 million.

The chief executive of Randgold Resources, Mark Bristow, said that Syama is "approaching its forecast targets of 210,000 oz/y at US$210/oz", and the company expects that operating cash flow in the current financial year will more than cover exploration costs. Meanwhile, Morila, expected to cost just under US$100 million including working capital, will be funded entirely by project debt. N.M. Rothschild has been appointed to arrange and to syndicate this financing. A construction tender for Morila has been awarded to a joint venture between Batepro and MDM, and full production is expected by January 2001, if not before.

. . . and JCI Gold groups

As part of the restructuring, CAM and JCI Gold have also announced that their non-gold interests are to be sold to a new company, New Mining Corp. Ltd. Last week, Mr Kebble's son Brett, presenting the quarterly results of Western Areas and Randfontein, said that these interests include significant diamond assets and that New Mining Corp. will be the "black empowerment partner in the group". However, he confirmed that they do not include JCI Projects, which is responsible for such projects as the early-stage hot briquetted iron plant proposed at Beira in Mozambique (*MJ*, August 15, 1997, p.134). JCI Gold has previously indicated that although such projects are non-core, the strategy is to advance them in order to realise greater value when disposal does take place.

Mr (Brett) Kebble also revealed that the JCI Gold group is currently assessing an approach from a third party with respect to the Prestea gold project in Ghana, held through 87.5%-owned Barnex (*MJ*, August 28, 1998, p.157). Otherwise, Mr Kebble was similarly short on detail regarding the proposed restructuring. When quizzed on the apparent reversal of last year's decision to keep Randfontein and Western Areas as separate listings to offer investors more choice (*MJ*, June 19, 1998, p.482), which is implied in the forthcoming restructuring, he said that the group is responding to the market's preference for larger, merged companies. He added that keeping a relatively marginal company such as Randfontein separate has also become more difficult with the fall in the gold price.

Randfontein produced 214,060 oz of gold in the March quarter, virtually unchanged from the preceding, December period, at a cash operating cost of US$256/oz and a total cost of US$270/oz. These costs were slightly lower than the corresponding figure for the December quarter, owing to the weakness of the rand, but were higher in rand terms. Mr Kebble said that there is scope for reduction in Randfontein's costs.

Western Areas produced 91,662 oz in the March quarter, 9% less than in the preceding three months, at a cash cost of US$235/oz and a total cost of US$253/oz. Western Areas' costs were similarly lower in US dollars and higher in rand. However, the main feature of the company is the development of the giant South Deep project. Both the existing mine and South Deep became the subject of a 50:50 joint venture between Western Areas Ltd and Placer Dome Inc. of Canada from April 1 (*MJ*, April 2, p.252).

An optimisation study between the partners is now under way. The main South Deep shaft has reached a depth of 2,360 m, out of a total of about 3,000 m, and has entered the zone already destressed as planned by stoping from the existing mine. However, developments are less smooth on the investor side, as there was some indication from investors and analysts at the results presentation of significant disappointment regarding an expected special dividend out of the US$235 million cash payment made by Placer to enter the Western Areas joint venture. Mr Kebble admitted suggesting that such a dividend might be paid, but was adamant that this was not promised. He tried to assure those present that shareholders in Western Areas would be suitably rewarded in the group restructuring for the "loss of half of their future mine", but pleaded for patience as he could not yet give details. □

Canadian bank finances South African anthracite plans

AfriOre Ltd, based in Toronto, has completed the acquisition of the Springlake anthracite mine in KwaZulu-Natal Province, South Africa, from Kangra Group (Pty) Ltd for some R35 million. Financial backing is being provided by CIBC Capital Partners (CIBCCP), the investment banking arm of the Canadian Imperial Bank of Commerce, in the form of a cash advance of R25.125 million to pay the bulk of the purchase price. This entitles CIBCCP to a 50% interest in a joint venture formed by AfriOre with respect to Springlake. The R10 million balance of the purchase price remains owed by the joint

venture to Kangra in the form of a non-interest bearing, unsecured note, to be paid within five years (*MJ*, March 26, p.229).

Completion of the acquisition will enable AfriOre, the operator of the joint venture, to press ahead with its plans to combine several coal properties and to boost production. Springlake currently produces around 400,000 t/y of saleable anthracite for domestic and export markets. AfriOre assesses the installed mining and beneficiation capacity to be sufficient to expand production to 520,000 t/y of saleable material. Actual expansion would be subject to the expansion of the operation's markets.

AfriOre plans to commence the Springlake expansion by amalgamating the property with its adjacent 55%-owned Umgen and 100%-owned Dannhauser properties. The combination of the properties raises the joint venture's *in situ* proven and probable anthracite reserves to 38 Mt. AfriOre's due diligence review, carried out by independent technical and financial consultants including Steffen, Robertson & Kirsten, concluded that the combination is both "technically sound and economically robust". The company's market review indicates that, although the overall demand for anthracite may be diminishing, the project's low production costs should ensure its competitiveness and therefore its viability. □

Market news

The state-owned Chilean copper producer **Corporación Nacional del Cobre de Chile** (Codelco) has issued US$300 million in ten-year bonds through the New York market. The issue price was 217 basis points (100 bp = 1%) over US Treasury bonds. Last month, Codelco's president, Marcos Lima, indicated that the proceeds from such an issue would be used mainly to refinance existing debt (*MJ*, April 9, p.268). Codelco has been considering the bond issue for two years, but plans have been repeatedly upset by the loss of confidence among international investors for emerging markets. The company secured a US$300 million loan in the middle of last year to refinance its short-term debt.

■ The Canadian nickel producer **Inco Ltd**, one of several companies taking advantage of the recent return of investor interest in cyclical shares and consequent price strength, has secured arrangements to raise net proceeds of US$273 million through the issue of 15 million additional common shares. The company this week signed an agreement with RBC Dominion Securities and Credit Suisse First Boston for the two financial institutions to act as joint underwriters to the issue. The shares will be issued at US$19.00/share in the US and C$27.50/share in Canada. The proceeds will be used to pay existing bank debt (at floating interest rates), largely incurred to finance the development of the Goro nickel-cobalt project in New Caledonia (*MJ*, November 13, 1998, p.382), the expansion of PT Inco's facilities in Indonesia (*MJ*, March 26, p.229), and new mine development at Inco's Ontario division. The share issue is due to be completed on May 19.

■ Shares in **Metaleurop** rose to a high for 1999 of €6.05 at the end of last week, 72% higher than the level at the start of the year. Metaleurop produces lead, zinc and a range of speciality metals (*MJ*, January 1/8, p.13). Amidst the general strength of shares in the mining and metals sector, Metaleurop has been further boosted by speculation that the Swiss-based trading group **Glencore International AG** may increase its interest in the company from the current 24.4%. A two-year moratorium on sales of Metaleurop shares by its two largest shareholders, Glencore and **Preussag AG** of Germany, ended on April 2. Preussag has largely withdrawn from metals in recent years, moving into such diverse areas as the travel industry, and last year indicated that its 24.4% holding in Metaleurop is no longer a core asset (*MJ*, February 13, 1998, p.133). A slightly different view is taken by the London office of the French bank Paribas in a recent research report which,

while noting that Preussag is keen to sell its Metaleurop holding, speculates that Glencore may also be willing to part with its own Metaleurop shares. Paribas bases this view on the premise that Glencore's interest in the zinc and lead industries lies respectively with its existing holdings in Asturiana de Zinc of Spain and its plans to buy the Porto Vesme lead smelter in Italy (*MJ*, April 9, p.261).

■ Toronto-listed **Boliden Ltd** has been obliged to make a partial return to its Swedish roots. The company received approval at the end of last month from the Stockholm Stock Exchange to list its common shares in the form of Swedish Depositary Receipts on the exchange's 'A' list, where many of Sweden's blue-chip companies are listed, and trading started this Monday (May 3). Boliden's former parent, Trelleborg AB, gained shareholder approval on April 22 for plans to distribute its remaining 42.9% holding in Boliden to its shareholders (*MJ*, January 29, p.69), and Boliden sought the Swedish listing to allow the many Trelleborg shareholders based in Scandinavia to trade their Boliden shares easily.

■ The planned issue of C$150 million of exchangeable debentures in **Teck Corp**. has been completed. The debentures are exchangeable into shares in **Cominco Ltd**, backed by Teck's holding in that company. Under the arrangements, Teck planned to acquire between 1 million and 1.5 million additional shares in Cominco (*MJ*, April 23, p.304), and as it succeeded in achieving the upper end of this range, the debenture issue was similarly at the upper end of its range of C$125-150 million. Teck's acquisition of the 1.5 million further shares, at a cost of C$34 million, raises its interest in Cominco to 40.4%. The net proceeds of C$146 million from the debenture issue have raised Teck's cash resources to C$240 million. Teck's immediate spending commitments include the roughly C$219 million balance of its share of the equity funding of the Antamina project in Peru (*MJ*, April 30, p.321).

■ Toronto-listed **Goldcorp Inc**. has secured agreement for a syndicate of underwriters led by Griffiths McBurney & Partners and TD Securities to purchase 5 million units at C$10.00/unit for onward offering. The proceeds will be used mainly on Goldcorp's Red Lake gold mine in Ontario, which is undergoing a US$56 million redevelopment (*MJ*, June 26, 1998, p.490). Each of the units to be placed comprises one class 'A' subordinate voting share and half a share purchase warrant. One whole warrant entitles the holder to purchase one common share at C$20.00 at any time for ten years after the offering closes. The underwriters have been granted a 30-day option to purchase up to a further 1 million units, at the same price, to cover over-allotments. The agreement follows previous, unsuccessful attempts by Goldcorp to issue additional equity in recent weeks. The company also reports that it has now terminated negotiations to secure a US$60 million loan from three Canadian banks, and will pursue alternative means of financing the balance of the Red Lake capital requirement.

■ **Breakwater Resources Ltd** of Toronto has reached agreement with First Marathon Securities for the latter to lead an underwriting syndicate for the onward issue of 10.9 million common shares in Breakwater, at C$1.65/share. The gross proceeds of C$18 million will be assigned to boost working capital. The underwriters have the option to increase the size of the issue by an additional 1.4 million shares, at the same price, to raise a further C$2.3 million gross.

■ Toronto-based **High River Gold Mines Ltd** has made an agreement with Canaccord Capital Corp. for the latter to act as agent in the private placement of up to 3 million units in High River, at C$0.65/unit. Each unit comprises one common share in High River and half a share-purchase warrant. One whole warrant will entitle the holder to purchase one common share for C$0.75 at any time for up to 18 months from the closing date of the placement. Canaccord will receive a 5% commission, plus warrants equivalent to 10% of the placement total

with the same exchange terms as the investors' warrants. High River has an interest in the Buryatzoloto gold operation in Russia (*MJ*, March 5, p.158), and in the Taparko gold exploration project in Burkina Faso (*MJ*, April 2, p.241).

■ The South African High Court has approved the merger of **Gold Fields Ltd** (GFL) and **Driefontein Consolidated Ltd** (*MJ*, April 9, p.269). The merger, to be implemented on May 10 and backdated for accounting purposes to January 1, 1999, involves the acquisition of GFL by Driefontein. The new company will be renamed Gold Fields Ltd. The primary stock market listing remains Johannesburg, but the company will retain Driefontein's Level 11 American Depositary Receipt (ADR) listing on the US NASDAQ system, where trading in its ADRs is scheduled to start on May 10. The shares will also be traded in London, Paris and Switzerland, and in International Depositary Receipt form in Brussels. The new company will have a free float more than double the size of that of its predecessor.

■ **Nord Pacific Ltd**, based in Albuquerque, New Mexico, was delisted from the US NASDAQ system this Monday (May 3), because the closing bid price of its shares failed to maintain a level of more than US$1.00, a NASDAQ requirement. Nord remains listed in Toronto. □