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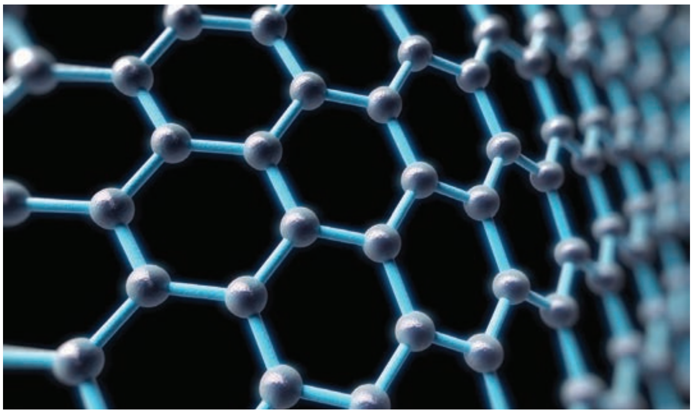
GRAPHENE

Disruption in the making

Michael Quinn



Andrew Forrest may have a tad too much on his mind right at present to be too concerned about what his former colleague Warwick Grigor is currently promoting, but if Grigor is right (and it is a big if), Twiggy and just about everyone else in the resources sector will definitely have cause for concern sometime in the future.

Grigor, who was with Forrest at investment firm Far East Capital back in the early 1990s (before Forrest chased the nickel laterite dream), has been pushing the new wonder material graphene for a while now, and he was at it again last week at RIU's Resources Round-up in Sydney, Australia.

According to Grigor's presentation, graphene is the basic building block of graphite, and a material that when used in

▶ *Continues on page 12*

COMPANIES

A very British coup

Richard Wachman

An attempted boardroom coup at Zimbabwe-focused miner Mwana Africa is being supported by three British former board directors, *Mining Journal* can reveal.

Ex-chairman Oliver Baring, a scion of the UK banking family that bears his name, and one time UK finance director Donald McAlister, are among shareholders who have called for an emergency general meeting slated for June 9.

The group believe a revamped board would help deliver better returns. *Mining Journal* understands the rebels want to sell off exploration and mining rights that Mwana owns in South Africa, Angola, Botswana, Zimbabwe and the Democratic Republic of the Congo as part of a strategy designed to realise more cash. Under the plan, the company would keep core operations in Zimbabwe, namely the Freda Rebecca gold mine and the Trojan nickel project.

Mwana controls Trojan via a majority holding in Bindura Nickel Corporation, quoted on the Zimbabwe exchange.

The dissenters are putting forward a resolution to replace four non-executive directors with their own nominees, who include another former chairman, Mark Wellesley-Wood, a British financier and senior mining executive of many years standing.

McAlister, whose previous jobs have spanned directorships at African groups Ridge Mining and Reunion, is currently a non executive at Tertiary Minerals.

Wellesley-Wood was forced off the Mwana board in 2013 after being in the chair for just six months. His departure came after disagreements over strategy, although the precise details weren't revealed at the time. He was a former head of global mining at British investment bank Kleinwort Benson and has been a chairman of DRDGold, as well as chief executive (CEO) of Metallon.

The British connection reaches further with the revolt being organised by Lancashire solicitor Barry Dearing, who described himself as "a shareholder activist". He said most of Mwana's shareholder base was made up of UK and Irish shareholders, with relatively small holdings.

Wellesley-Wood said he was not a shareholder, but had been asked to stand as one of the new non-executives. "They came to me rather than the other way round," he said.

He told *Mining Journal*: "I am able to support the share-holders' grievances. None of the company's assets have been consistent performers."

But Mwana's results have been steadily improving after a dire period in 2006-2009 when Freda Rebecca's operations all but stopped during political turmoil and hyperinflation in Zimbabwe, and Trojan was put on care and maintenance when nickel prices slumped.

Last year, the company's founder and CEO Kalaa Mpinga was able to report a net profit of more than US$50 million. He told *Mining Journal* in July the company could pay a maiden dividend in a couple of years.

Interim chairman Stuart Morris, who is one of the non-execs the rebels want to replace, told *Mining Journal* he was "disappointed" that Baring and McAlister were supporting the resolutions to change the make-up of the board. So far, no-one had called for the resignation of Mpinga.

Morris said he did not know what the rebels' agenda was about, but Wellesley-Wood appeared to "think he can do things better. [*But*] we have a nice portfolio of assets and our strategy is to hold onto as many of those assets as possible".

The row at Mwana is complicated by another dispute involving Chinese group CIMGC, which used to own 30% of the company, but has recently sold

▶ *Continues on page 6*

Comment

Surveys highlight corruption knowledge gap

There would have been some sheepish looks among attendees at a session organised by the Australia-Africa Mining Industry Group (AAMIG) in Perth, Western Australia, a week or so ago.

While the senior representative from accounting firm Deloitte asked to speak to the group went through results of the firm's 2015 Bribery and Corruption Survey, which, says AAMIG, "alarmingly showed" only 13% of participants considered their organisations had a comprehensive knowledge of Australian anti-corruption legislation and only 22% considered their organisations had indepth knowledge of anti-corruption legislation relevant to their offshore operations, there is evidence to suggest mining-specific numbers paint an even worse picture of awareness about the expanding web of anti-bribery 'traps' laid by governments and regulatory bodies.

Senior legal figures from Holman Fenwick Willan said in last year's *Mining Journal*'s Anti-corruption and Compliance Guide (www.mining-journal.com/focus/leaders-series/houston-we-may-have-a-problem) that in recent years there had been a "significant increase in the severity of anti-corruption laws and enforcement", with the UK Bribery Act 2010 being an example.

Tommy Helsby, a risk and compliance advisor with Kroll, said while the mining industry had largely avoided the high-profile corruption headlines that had blighted the oil and gas industry in the past decade, he detected underlying signs of increasing compliance activity in mining and suggested prosecutors might just have been too busy elsewhere.

"The mining industry is clearly vulnerable. Most of the circumstances that made the oil… sector the big target apply equally to mining," Helsby said. "Companies need to get exploration licences from governments – and some licences are better than others. Contracts may involve joint ventures with state-owned companies. Exploitation of discoveries requires more licences and permits from government agencies. Development usually means large capital investments, often using local contractors. Obtaining contracts, licences and permits is the key nexus for corruption."

Kroll's latest Anti-Bribery and Corruption Benchmarking Report indicates half of the nearly 250 participants in its survey, from a diverse range of international firms, expect bribery and corruption risks to grow in the coming year, primarily due to their companies expanding into new markets or engaging more third parties, with nearly a third more expecting risks to stay steady. Third-party relationships remained a "serious risk and a heavy burden on compliance programmes", but nearly all respondents said third-party training on anti-bribery and corruption was minimal or non-existent.

The latest survey suggested third-party due diligence was on the rise, though senior Kroll executive David Holley observed that "trying to conduct due diligence on a large number of third parties with whom you are doing business on a regular basis is like trying to change out the engine of a moving car".

The problem with 'facilitation payments' in Africa and other parts of the world is a particularly vexing one for AAMIG members, and no doubt the broader industry. Deloitte's survey indicated more than 70% of participants viewed facilitation payments as bribes, but over half acknowledged it was "impossible to do business in some countries without the use of facilitation payments". Participants were split 50-50 on whether facilitation payments should be prohibited.

AAMIG says overall results of the survey raise some "serious concern over the resource industry's lack of knowledge regarding anti-bribery and corruption laws and in particular, facilitation payments".

The group maintains its approach to the issue of facilitation payments is consistent with that of the OECD and its Convention on Combatting Bribery of Foreign Public Officials in International Business, and with the Australian government's response to latest OECD working group recommendations. But, says AAMIG, facilitation payments are likely to be a continuing feature of business activity in a number of developing countries, particularly where host governments do not have resources to fund key services essential for business to operate.

"We would all like to be able to conduct business in Africa without the need for facilitation payments," AAMIG.

But it was not going to happen overnight, nor in response to blanket legislative changes that didn't, and couldn't, take into consideration the different stages of development and challenges across the 54 countries on the African continent.

Richard Roberts, Editor-in-chief

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This week

Exploration

Highland Gold has disclosed Russian-compliant reserves (C1+C2 category) of 62.1t (1.99Moz) of gold at its Kekura project. The company said: "The ruling represents significant progress in mine development, facilitating the drafting of detailed project design according to Russian mining regulations. At a cut-off grade of 1g/t, open-pit mineable C1+C2 reserves at Kekura amount to 45.6t (1.47Moz) of gold with an average ore grade of 9.12g/t. An updated independent JORC-compliant resource/reserve estimation by an international consultancy is underway, and final results are expected in Q3 2015.

Sirius Minerals has published an update of results from independent studies undertaken in Brazil on tomato and potato crops at the University of Sao Paulo. Highlights from the trials showed polyhalite applied as a straight fertiliser improved tomato yield by 6% over the control and 15% as a blend component. It also showed tomato quality measured as Brix, pH and fruit firmness indicated improved taste and shelf life potential. Also, potatoes grown using a polyhalite blend achieved the same yield using 68% less product than the local commercial option. Chris Fraser, chief executive of Sirius, said: "Tomatoes and potatoes are two very large markets globally and these results further demonstrate that polyhalite provides the farmer with an economical option to lower input costs, increase yields and get an overall better quality product."

Canada-based gold explorer and developer **Roxgold** has disclosed additional results from exploration and infill drilling programmes at its Yaramoko project in the Houndé greenstone region of Burkina Faso. It said Bagassi South continued to return strong results. Following the release of data from a 2,400m, 10-hole programme, two diamond drill holes have extended the known limits of mineralisation by a further 30m along strike to about 230m, where the structure intersects a 20-30m wide dyke. Elsewhere, development infill was said to be nearing completion at the 55 Zone. Roxgold is rated outperform (speculative) by BMO Capital Markets. The company, listed in Toronto, is advancing Yaramoko's 55 Zone through construction and expects to start production in Q2 2016.

Barrick Gold has terminated its joint-venture agreement with **Coral Gold Resources** over the Gold Ridge property in Nevada in the US, as it looks to conserve cash and make good on its target of reducing debt by US$3 billion this year. Coral said Barrick had cited "budgetary constraints" for its exit. The gold major signed an agreement with Coral back in March last year to acquire up to 60% of the project in return for US$12 million of exploration expenditure over a five year period, which could rise to 75% with the preparation and delivery of a scoping study. Despite the pull out, Coral felt its project had good prospects.

PIC OF THE WEEK

Turning point… Trevali Mining announced mill commissioning at its 3,000t/d Caribou zinc mine in the Bathurst Mining Camp of New Brunswick, Canada, this week, following the start of underground mining at the brownfield operation in March. The company, which plans to produce 93Mlb, or 42,177t, of zinc a year from Caribou, anticipates shipping its first concentrate to Glencore as part of an offtake agreement in the next few months.

Development

Vancouver-based **Sabina Gold & Silver** has put out a feasibility study for its Back River project in Nunavut, Canada, which envisages building a C$695 million (US$570 million) mine producing 346,000oz/y of gold. Based on a gold price of US$1,200/oz, the project could generate a post-tax internal rate of return of 21.7% and a net present value (5% discount) of US$539 million, according to Sabina. The company highlighted low all-in-sustaining costs of US$671/oz for the life of mine with the majority of ore being extracted from the open pit at a strip ratio of 7.2:1. While Bruce McLeod, president and chief executive of the company, said he was pleased with the study, one of the company's contractors, JDS Energy & Mining, identified the potential for a smaller start-up project at Back River, which could involve capital expenditure in the US$300 million range and produce around 150,000-200,000oz/y of gold for over 10 years.

Development of the giant underground copper and gold mine Oyu Tolgoi in Mongolia is back on track following an agreement between owners **Rio Tinto** and the government in Ulan Bator. The project has been stalled for two years because of disagreements over foreign control, taxes and fees. The agreement addressed key outstanding shareholder issues and set out an agreed basis for funding of the underground project, estimated to cost US$5.4 billion. Rio said with a new pathway to development of the underground mine agreed, the focus now shifts to finalising the project finance, the feasibility study and securing all necessary permits so that development can proceed. Foreign investment in Mongolia has fallen sharply because of the dispute, which has made investors wary of further exposure to the nation, which borders China.

This week

Production

Richland Resources, formerly a tanzanite produce, has started producing sapphires at its Capricorn project in Queensland, Australia. The company closed the US$5.1 million sale of its Tanzanian business to Sky Associates Group Limited in March. The Capricorn mine is one of the largest of its kind in the southern hemisphere, capable of treating up to 200 loose cubic metres (LCM) per hour. A staggered ramp up to full-scale production will occur over the following months in order to test and optimise all mining circuits under production mining conditions. Richland expects its first sapphire sales in late June, to coincide with the Hong Kong Jewellery & Gem Fair.

Finance

Canada's **Almaden Minerals** has decided to spin out its early-stage gold exploration ventures into a separate company, as it looks to focus on its core Tuligtic property in Mexico. The new company, to be called Almadex Minerals, will hold a 100% interest in the El Cobre project in Mexico, 21 other exploration assets, a 2% net smelter royalty (NSR) on Tuligtic, 21 additional NSRs, equity holdings in several publicly-listed companies, 1,597oz of gold bullion and, around C$3 million in cash (US$2.5 million). The spin-off will be voted on by shareholders at Almaden's annual meeting on June 18.

Rubicon Minerals has been granted a US$50 million loan from the Canada Pension Plan Investment Board to develop its Phoenix gold project in Red Lake, Ontario. The loan would provide adequate working capital and flexibility to optimise the project during ramp-up to commercial production, Rubicon said. Phoenix is an underground gold mine that could produce 165,300oz/y of gold over a 13-year mine life, at average all-in-sustaining costs of US$870/oz. The loan facility has a five-year term and will mature on May 12, 2020. It bears an annual cash interest rate of 7.5%, compounded quarterly.

Vancouver-listed **B2Gold** has signed an agreement with a bank syndicate for a new US$350 million revolving credit facility (RCF), as it seeks to shore up its balance sheet in anticipation of building a new mine. B2Gold said the facility, coupled with anticipated operating cash flows from its mines, would provide it with adequate resources to both maintain its operations and fund construction at its recently acquired Fekola gold project in Mali.

Trade

Mining mogul Anil Agarwal has said India was at "an inflection point", with its metals and energy demand poised to explode as its GDP potentially doubled over the next decade. The chairman of London-listed **Vedanta Resources**, which earns the bulk of its income from Indian operations that span zinc, coal and oil, said in a statement: "Over the next few years, we are likely to see demand for all our commodities and commercial power increase substantially as the government of India's focus on its 'make in India' campaign and infrastructure investments start yielding results."

Acacia Mining has said it made a total contribution of more than US$675 million to the Tanzanian economy in 2014, representing about 2% of the country's gross domestic product. The gold miner said it purchased US$488 million of goods and services from local suppliers, representing 71% of Acacia's total spend on goods and services in 2014. Acacia's contribution to GDP included a direct contribution of US$190 million, and indirect and induced contributions of US$490 million. Additionally, Acacia made a total tax contribution of US$179 million. In total, Acacia's three Tanzanian gold mining operations support about 54,000 indigenous jobs.

People & appointments

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▼ New IFC mining head

Namrata Thapar has been appointed Global Head of Mining at the International Finance Corporation (IFC), succeeding **Tom Butler**. Namrata joined IFC in 1999 and has played a leadership role developing IFC's mining business with a focus on sustainability and development impact. Prior to this role, she was principal investment officer in the mining team and led multiple projects with clients ranging from major diversified companies to juniors, including both debt and equity investments. Namrata earned an MBA from Marymount University in Virginia and a BA Honours in economics from Sri Ram College of Commerce in New Delhi. She is based in Washington DC.

▼ Bacanora CEO

Bacanora Minerals, the Canadian and London-listed lithium and borates company focused on Mexico, has made **Peter Secker** its new chief executive. Secker, who replaces **Shane Shircliff**, has over 30 years' experience in developing, constructing and operating mines, and most recently with Toronto-listed Canada Lithium, has direct experience of working on lithium projects. Colin Orr-Ewing, non-executive chairman, said: "The Sonora lithium project sits at the core of our portfolio and, considering its size and high-grade nature, we are eager to progress our plan towards production and feel that Mr Secker has the skill set required."

▼ Orinoco team

Australia-listed Orinoco Gold has made a number of key management appointments as it gears up for first production at its Cascavel gold project in central Brazil by the end of this year. Former Iamgold chief geologist **Andrew Tunks** has been made general manager of operations, which will see him oversee development of Cascavel and installation and commissioning of the gravity gold circuit at a site near to the Sertão gold mine. **Noel O'Brien**, a highly experienced metallurgist who was previously managing director of the South African division of SNC-Lavalin, was made process consultant, while **Jim Porter** from JPMC Consulting was brought on as mining consultant to the project.

▼ Solgold's MD resigns

AIM-listed SolGold's managing director and chief executive (CEO) **Alan Martin** has resigned with executive director **Nicholas Mather** replacing him on an interim basis. Mather, who will be assisted by senior management and the board in this role, has previously acted as the company's CEO and holds around 11% of the company. He has recently been on site at Cascabel to overview SolGold's exploration activities and future plans, the company said. SolGold's management team will continue with the implementation of the project management aspects of the company, including exploration evaluation at Cascabel, tenure management, management of Ecuadorian subsidiary ENSA, and finance and administration without interruption. Mather will continue his role of executive responsibility for strategic planning, capital management and investor liaison, according to Solgold.

▼ Base changes

Australia and UK-listed Base Resources' chairman **Andrew King** and company secretary **Winton Willesee** have retired from the company as it moves into steady state production at its Kwale mineral sands mine in Kenya. King, who had been a director of the company prior to its listing in 2008, has been replaced by **Keith Spence** who was appointed to the board on February 20. This followed a more than 30 year career within the oil and gas industry where Spence worked at both Shell and Woodside. **Chadwick Poletti**, Base's group legal counsel, was made company secretary, replacing Willesee.

Lifting fortunes… Mexico silver producer Great Panther has taken an option on Peru multi-metal project

PERU

Great Panther Silver pounces on Coricancha

Paul Harris

Mexico precious metals producer Great Panther Silver (TSX: GPR) is to enter Peru having taken a two-year option on the Coricancha gold, silver and base metals mine in Peru's Central Polymetallic Belt, about 90km east of capital Lima.

The fully permitted and operational 600t/d underground mine was put on care and maintainence in August 2013 by owner Nyrstar due to the fall in metals prices.

But Robert Archer, Great Panther president and chief executive, believes the company can start a profitable operation.

"Nyrstar was using longhole stoping mining techniques and insufficeint working faces, which would have impacted grades and costs. It is a narrow-vein mine and we are quite used to this in Mexico where we use cut-and-fill techniques and have built up good knowledge of how to do this," he told *Mining Journal*.

Great Panther has a two-year option on Coricancha, which presents a near-term production opportunity without the need to make an immediate and significant financial commitment.

Great Panther made an initial payment of US$1.5 million on signing and will make a second US$1.5 million payment on the first anniversary of signing. It will make a final US$5 million payment if it decides to exercise the option. Under the agreement it will also spend US$5 million on exploration over the option period.

It will undertake surface and then underground drilling to focus on resource development of higher grade areas to prove up a more robust and larger measured and indicated resource, before deciding to exercise its option or not.

Coricancha contains an historical proven and probable reserve of 0.64Mt grading 4.35g/t of gold, 149.12g/t of silver, 0.32% copper, 1.77% lead and 2.6% zinc; and a measured and indicated resource of 0.89Mt at 5.04g/t of gold, 174.62g/t of silver, 0.42% copper, 1.97% lead and 3.11% zinc that represents 13.5Moz silver-equivalent and 21.96Moz silver-equivalent, respectively.

In addition to familiarity working in a narrow vein environment, Great Panther has spent the past couple of years successfully reducing production costs at its Guanajuato and San Ignacio operations in Mexico. "We have been cutting costs quite significantly and through 2015 our intent is to keep costs at this lower level," Archer said.

The company aims to have its San Ignacio mine, that began production in June 2014, operating at 450t/d by the end of the year, in addition to working through the permitting of its El Horcon property. "San Ignacio does not require more capital investment, but is an ongoing production ramp-up. We are permitting at El Horcon, but will not take a production decision until metal prices come up," Archer said.

SILVER

Sierra to spend up to US$40 million on expansion

Paul Harris

Sierra Metals will spend US$30-to-US$40 million expanding its operations in Peru and Mexico this year as it aims to produce up to 12.6Moz of silver-equivalent.

The bulk of production will come from its Yauricocha mine in Peru where it recently reported an 86% increase in resources. Yauricocha is a strong generator of cash flow and had a margin of 52.7% in 2014. The company expects production to rise from 2,500t/d to 3,000t/d towards the end of the second quarter of 2015, following development of underground tunnels and an internal shaft to access deeper un-mined areas.

"The Yauricocha resource update continues a four-year period of resource growth since we bought the mine in 2011," director of business development Michael McAllister said. "This, and the expansion will provide the company with the opportunity to significantly increase operating cash flows, strengthen our balance sheet and [*it*] situates us in a position for future growth."

Sierra has budgeted US$9 million for resource expansion drilling in 2015, to drill more than 75,000m to expand and upgrade reserves and resources at its mines. Over 16,000m are allocated at Yauricocha, 21,000m at Bolivar, 37,000m at Cusi and 4,000m at two projects in Mexico.

Sierra is also working to increase production at its two mines in Mexico. At Bolivar in Chihuahua, a second mill expansion is planned to be completed during the second half of the year to take production from 2,000t/d to 2,500t/d, with 21,000m to be drilled in 2015 to upgrade and expand resources and test several targets.

At its Cusi operation in Chihuahua, Sierra expects to double production to 600t/d during the second quarter. That may also include moving the mill closer to the mine site. Some 37,000m of drilling is planned for 2015 to drill out the orebody.

FINANCE

Private equity flops in Africa

Richard Wachman

Africa's mining sector has failed to attract private equity investment of any significance...will it ever change?

Private-equity investment in Africa's mining industries has hit a brick wall with experts warning there is almost no hope of any improvement in the next few years.

Mining Journal's enquiries have revealed that between 2007 and 2014, when private equity deals on the continent topped US$34 billion, only about 1% were accounted for by metals and mining, and only 3% by the 'energy' sector as a whole, which includes minerals as well as gas and oil.

The figures were derived from research published by the African private equity and venture capital association (AVCA) and from an exclusive interview with Dorothy Kelso, director of research at the organisation, conducted with *Mining Journal* this week.

The news comes ahead of an African Mining conference in London this June hosted by SNL Metals & Mining that will attempt to unravel why private equity is so weak on the continent.

A flyer for the SNL gathering has noted AVCA figures showing private-equity deals were valued at US$8.1 billion in 2014, against a peak of US$8.3 billion in 2007, but asks, "What does this mean for the metals and mining industry?".

The answer could be quite little, with Kelso telling *Mining Journal* she didn't think things would change in the short term and outlined some of the potential downside for private equity in African countries. She highlighted the risk of government intervention and the long lead time for new mining projects to become profitable compared with the short time horizons of private equity.

Kelso said: "It takes time to build up mining capacity, then a few more years to become profitable, PE (private equity) prefers to exit in five to seven years. This is not an area PE firms have gone into for the long haul."

Perhaps more serious were the obstacles thrown up by sovereign risk. She said: "There is the potential for government legislation at short notice that could change the investment dynamics. Mining is a fairly sensitive area in terms of government intervention."

Kelso also mentioned high energy costs and the difficulty in accessing indigenous energy infrastructure. "The high cost of running and keeping mines going at a time of low commodity prices, maybe they are not attractive investments, full stop," said Kelso.

She could not see any improvement in the near term, which she defined as the next couple of years.

Kelso said PE preferred sectors driven by the consumer, such as financial services, retail and fast moving consumer goods. Here, PE was attracted by rising living standards and the growing middle class, markets that arguably offered higher growth in relative terms.

But renewable energy and electricity infrastructure offered opportunities, said Kelso, who said she could envisage PE growing in areas to fill Africa's "infrastructure deficit", segments such as energy and transport.

She said: "Mining is yet to prove itself as a viable investment strategy for private equity firms. Minerals are an emotive issue, and there may be huge costs linked with clean up… restoring the landscape to what it was, and so on."

She cited the example of Sirius Minerals in North Yorkshire, UK, suggesting it had taken many years to get planning permission and was illustrative of the length of the time it could take projects to come to fruition. (PE is not renowned for its patience.)

The AVCA's African Private Equity Data Tracker showed that since 2007, 983 transactions have been completed with a total value of US$34.5 billion, "reflecting the improving environment for private equity in Africa".

AVCA said fundraising in Africa also showed no signs of slowing down, with over US$4.1 billion raised in 2014 and a total of US$22 billion raised since 2007 demonstrating increasing global investor appetite for

A very British coup

Continues from page 1

down to about 9%. CIMGC and Yat Hoi Ning, an associate of the Chinese and a non-executive, have presented a petition to the courts in London challenging the validity last year of the re-election of Morris and the appointment of two other non-executives.

Morris said he didn't know which way the Chinese would vote at the EGM, but sources in the City of London said the proposed new non-executives could be linked to CIMGC, and reflected a power struggle between elements of the Mwana board and the Chinese company. A recent Mwana statement said the proposed replacement directors were "believed to be associated with CIMGC".

There are two further resolutions to be put to investors at the EGM, one seeking to restrict the company entering acquisitions or disposals of major assets without prior disclosure of the details to shareholders, over and above the requirements of AIM rules.

A second urges the board, along with Hoi Ning, and CIMGC, to resolve their differences as set out in a petition, now the subject of a stay of legal proceedings.

The Mwana board has advised shareholders to reject "the attempt by the former chairman and associates to take control of the company". The board pointed to the rapid rate of development under its watch, as compared to the earlier period.

"Wellesley-Wood vacated the chairmanship at the unanimous request of his board colleagues who believed the company needed imaginative leadership to guide it through the process of restructuring and growing," the company said.

Mwana said it had quickly developed a programme of restoring and developing operations at Freda Rebecca and at Trojan. Nickel developments had included the pending re-start of BNC's nickel smelter. The restart was being financed in part through a US$20 million bond, "the first Zimbabwean bond with prescribed and liquid-asset status to be issued by a mining company. The bond attracted strong institutional support that reflects investor confidence in Mwana's existing management."

African exposure. But this largely excluded mining, although a small number of transactions were struck in mining support services.

The tracker revealed a shift in investment activity, with West Africa now receiving the highest share of PE investments by number, providing evidence of a gradual widening of investment activity outside South Africa.

West Africa's share of overall private-equity deals on the continent grew from 22% between 2007- 2010 to 25% between 2011-2014, while South Africa's share dropped from 28% to 24% in the same period.

The main sectors attracting African private-equity investments continue to be "Fast Moving Consumer Goods (FMCG), Financials and Industrials, which have accounted for around 60% of private-equity transactions by volume from 2007-2014".

But SNL has noted takeover activity in mining outside PE has remained strong in gold. SNL said the continent accounted for more than 14% of last year's US$8.48 billion in significant gold acquisitions (those worth over US$10 million). But Africa contributed only 2% of the US$13 billion in global base metals acquisitions.

That is perhaps astonishing given the massive reserves of minerals on the continent, from Cape Town to Cairo.

But the rebels claimed shareholders "have invested in excess of £200 million (US$300 million) to fund the company's operations and acquire assets since its inception. The company market value is about 10-15% of this investment. When a company performs so badly, shareholders should have the right to call board members to account".

It emerged on May 20 that Feng Hailang, founder and controlling shareholder of the Hailang Group, Mwana's copper joint-venture partner in Katanga in the DRC, had lifted his stake from 1.6% to more than 9% after buying shares from CIMGC.

CANADA

Agnico Eagle invests in Canadian juniors

Daniel Gleeson

Agnico Eagle Mines has shelled out just over C$17 million (US$14 million) to back two Canadian juniors, in a move increasing its exposure to South and Central American gold exploration.

The mid-tier gold miner invested C$15 million Belo Sun Mining shares, Belo Sun having recently published a feasibility study on development of a 205,000oz gold deposit in Para State, Brazil.

This study on the Volta Grande project envisaged an initial capital outlay of US$298 million, a post-tax net present value (NPV) of US$640 million, at a 5% discount rate and a gold price of $1,200/oz, and an internal rate of return of 26%.

Agnico Eagle now has a 17.4% stake in Belo Sun, which will give it the right to appoint a board member and participate in future fund raisings, it said.

The additional C$2.2 million was spent on shares in Pershimco Resources, as part of a previously announced private placement by the Canadian junior.

This purchase enabled Agnico Eagle to retain its 19.93% holding in the company, which holds the Cerro Quema gold project in Panama, a 78,546ozpa asset requiring US$117 million of capital expenditure, which provides an NPV (5% discount) of US$110 million after tax and royalties at a US$1,275/oz gold price, according to a prefeasibility study.

Sean Boyd, Agnico Eagle's CEO, said: "The new investment in Belo Sun and the purchase of additional common shares of Pershimco are in line with Agnico Eagle's proven strategy of making early investments in companies with quality exploration and development projects in favourable mining jurisdictions."

Agnico Eagle, which has operations in Canada, Finland and Mexico, explained these share purchases were for investment purposes only, dispelling the Canadian juniors' hopes of a possibly buy-out bid.

Despite this Michael Parkin of Desjardins Capital Markets saw the potential for these investments leading to an acquisition should exploration results prove encouraging and show potential for a sizeable operation.

"We believe Agnico would not be interested in anything that would produce less than 75,000-100,000oz of gold per annum. In our opinion, making an early investment allows the company to understand the projects in much better detail and also dissuades a peer from potentially making a bid," he said.

BRAZIL

Minas-Rio and the long game

Daniel Gleeson

The ramp-up is taking place. Seventeen (most likely 18, now) ships have docked, been filled with ore and departed. The slurry is moving as it should, 529km from the mine to the Açu port, and the filtration plant is turning the sludge into a readily saleable product. Seven years after completing the transaction to fully acquire Minas-Rio, it is no wonder Anglo American is pleased.

The asset, which it acquired for US$5.5 billion in two stages (includes the purchase of the Amapá asset), paid US$8.4 billion to construct, and wrote down by more than US$8.5 billion, is finally heading for cash flow.

Anglo might have shouted its achievements a little bit louder had these achievements not occurred in a bear patch for iron ore – a time when prices have halved in the space of a year and show no real signs of returning to former highs.

The asset was originally in the hands of MMX, one of a number of 'X' companies owned by visionary Brazilian entrepreneur Eike Batista. Minas-Rio was part of his grandiose plan to expand into iron ore from his oil and gas empire.

He intended to mine the ore and then export it from a new port facility in Rio de Janeiro state, which would also ship oil, iron ore, gas, steel and other industrial products.

Even though Batista, who has since been stripped of his billionaire status after several of his companies plummeted in value, has been unable to fulfil his part of the bargain Anglo has, somewhat belatedly, satisfied its end of the deal.

In this respect Brazil has much to thank the company for. While most of the oil Batista planned to extract from the Brazilian seabed never saw the light of day, the iron ore project he promoted has actually emerged into a mine and the port is, at least, shipping iron ore.

It is not fair to lump (excuse the pun) Minas-Rio in with all of the other iron ore operations struggling in this climate. This is a premium operation in more ways than simply the price it commands, something which became evident from *Mining Journal*'s recent visit to this part of eastern Brazil.

To construct the operation Anglo carried out 35.6M cubic metres of earthworks, the equivalent of 32 fully-filled Wembley Stadiums, poured 600,000m^3 of concrete, enough to fill two of Brazil's famous Maracana Stadiums, and used 19,000t, or three Eiffel Towers worth, of steel.

One of the key differentiators separating Minas-Rio from other iron ore operations is the transport mechanism. The slurry pipeline, which is the biggest in the world, is an outstanding technical, logistical and administrative triumph. Anglo had to negotiate with two states and 33 municipalities in order to get the licences to sink and operate this 26-29in (660-736mm) diameter pipeline.

As Craig Miller, chief financial officer of Anglo American Iron Ore Brazil, told *Mining Journal*, each municipality had a different permitting procedure and fiscal conditions and the company had to get them all to agree to a pact across the board.

The pipeline travels over varied terrain, meaning the slurry has to be propelled through the pipe at a pressure of up to 200bar in one stretch to get it over a mountain, before being slowed down at a valve station ready to exit at the filtration plant near to the port. This has given the company a cheap and environmentally-friendly way to

▶ *Continues on page 10*

Emerging from the shadows… Anglo American has a designated terminal at the Açu port for shipping iron ore

World news

Continues from page 9

move its ore. When fully ramped up, it will cost only US$2/t (wet) to transport its slurry, a very competitive price considering the distance involved.

"Pipelines are very challenging to build as it takes a long time to get access, but once it is operating, not only is it the most environmentally-friendly, it is also very competitive in terms of costs," Anglo American Iron Ore Brazil chief executive Paulo Castellari said during a presentation in Belo Horizonte, where the Brazil subsidiary is based.

Then there are the characteristics of the ore being mined, which is made up of a friable itabirite, semi-friable itabirite and itabirite situated in a banded iron formation with grade in the range of 25%-60% Fe. The friable material is softer than many ores being mined in Brazil and therefore requires less blasting (it was carrying out two blasts a week when *Mining Journal* visited). This, in addition to the low 0.5:1 ore-to-waste strip ratio, will bring down the cash operating costs to US$10-11/t (wet) at full speed.

The filtration plant also boasts a few firsts. According to Castellari, ceramic filters have been used in operations before, but not on this scale (Finland-based Outotec provided 12 of them). The operations team on site also said this was the first installation in a Brazilian iron ore operation.

This process is geared towards restoring the ore to its previous characteristics (prior to it becoming slurry). The filters are very energy efficient, accounting for an anticipated US$1/t (wet) cash cost at steady-state operation.

Targets

So far, the company has hit all of its recent targets. It delivered first ore on ship in the December quarter of 2014, produced 1.2Mt (wet) of iron ore in the March quarter and was on-course to produce at least 11Mt (wet) of ore for the full year at costs averaging around US$60/t (wet) FOB.

"Q1 was very good and, as in a typical ramp-up phase, there are areas that we are surprised with as they are working much better than we thought, and there are areas where we are showing challenges," Castellari said.

During the site visit all managers reported their respective sections were operating within expected tolerances. The pipeline, mine site and filtration plant, in particular, were outperforming, they said.

The 18 haul trucks, three shovels and three front-end loaders were moving about 4Mt of material a month, which will rise to 6Mt a month at full capacity.

From here the ore moves onto the beneficiation process, which is fairly conventional for an iron ore operation, albeit slightly more extensive. The dry process includes: primary, secondary and tertiary crushing; a round through the high pressure grinding roller; and, then onto screening. This prepares the feed for the wet section of the process.

Here, the material is milled again before it goes through a desliming process where the alumina content is reduced. It is then fed through the flotation circuit where the iron is separated from quartz elements. The material is re-ground, screened and then sent onto the thickening process. All of this takes place to ensure the integrity of the slurry pipeline, according to plant operations manager Nemer Saib.

At steady state operations, the beneficiation process accounts for just under 25% of the total cash cost of the operation (US$9/t wet), which is to be expected considering ore reserves at Minas-Rio average 34.4% Fe and the final product grades 67-68% Fe with low alumina, silica and phosphorus elements.

Hurdles

Despite the results achieved so far, there are still uncertainties hanging over the operation.

At full operation Minas-Rio will be processing and pumping a lot more slurry. When the

An optimisation could increase production at Minas-Rio to 29Mt/y

filtration plant manager was asked what the biggest challenge he had come across so far at the operation was, he singled out the consistency of the concentrate.

There are procedures in place to check all the critical levels at both ends of the pipeline, but it is a delicate matter, which buyers of the pellet feed will penalise with price deductions should they see fit.

Water shortages in Brazil have been well-documented over the past 18 months and Anglo American, which at the moment sources water from the nearby river, will more than likely have to take action in this regard. It has already put procedures in place to cope with potential water shortages for at least the next two to three years and, as the dry season kicks off, it will get the chance to test its strategy.

The wet season is a bit more of an unknown.

The filtration plant will help clear up any problems with moisture before getting to port, enabling Anglo American to continue producing a product with 8% moisture, thereby escaping the dreaded rainy months that hit iron ore miners in Sierra Leone, but there could be other impacts.

The port manager *Mining Journal* spoke with said that while the new port was working well, he was unsure how a rainy season would affect shipping operations in this part of Brazil. Will Anglo be able to ship all-year round during this season? Back in the March quarter of 2012, Vale had to declare *force majeure* on some shipments as its mines in the Iron Quadrangle of southeast Brazil were affected by heavy rains.

And then there is the port itself, which Anglo owns 50% of

through a joint venture with Brazil-based Prumo Logistics. While Anglo had shipped 17 cargoes of material up until the visit, none of the Capesize vessels were filled to capacity.

The first few shipments were all Panamax-sized vessels, due to the licencing procedure in Brazil, which had limited dredging of the seabed, Luiz Calfa, Anglo American Iron Ore Brazil's director of supply chain, said. It had dredged to 17.7m depth as of May 13, but needed to get to 20.5m to provide an operational depth of 18.5m and the right conditions for filling a 180,000 deadweight tonne Capesize vessel.

Mining Journal was there to witness the loading of the 18th shipment destined for China, which would carry 137,000t of iron ore, but, by January it was hopeful Capesize vessels would be leaving full to capacity.

Then there is the iron ore price, if anyone could forget. Already toeing a tight line between break-even and loss, if the price of the steel raw material were to fall further, or Anglo miss its cost estimates of US$60/t for 2015 and longer-term US$33-35/t (wet) FOB goal, then the future of the operation could be in jeopardy.

There will be a lot of potential suitors keeping an eye on these operations.

Castellari said the company had previously spoken of getting a partner in for the project to share risk, but was told it needed to prove the asset's credentials before they would consider an acquisition.

At the moment the company has a few things going for it in this respect.

Brazil might be one of the only countries in the world to see oil prices go up in the past year (it has Petrobras to thank for this), but less than 5% of its direct input costs are linked to oil, according to finance chief Miller.

Bunker costs have fallen, meaning the average freight cost from Brazil to China has dropped from around US$20/t to US$10-12/t currently, helping its bottom line. Miller also pointed out the company had hedged its energy inputs at "substantially lower prices than the prevailing price", which will benefit the company.

In addition, the company had managed to diversify its customer base outside of the normal Chinese base. It had sold cargoes to India, Europe and the Middle East, in addition to the biggest steel-producing nation in the world. Increased competition for its products can only be a good thing.

Factoring in all of this, a dry tonnage conversion of about US$4.80/t, the cheaper freight price of US$10-12/t and assuming Anglo hits all of its targets for the year, the company could potentially get its delivered China costs down to US$74.80-US$76.80/t CFR China in 2015.

According to an iron ore trading source, Anglo is getting a 15-20% premium on the standard 62% Fe price. Assuming the 62% Fe index averages US$$60/t in 2015, its sales price could come out at US$$69-72/t cfr China.

This still puts it in the red, but even in ramp-up mode Castellari was speaking of potential cost savings with early implementation of the "Anglo American operating model" and depreciation of the Brazilian real against the US dollar, potentially lowering the US$$33-35/t long-term cost estimate.

Returns

The burning question for shareholders is when will the money they invested come back their way?

They have had to endure huge write-downs, the sale of Anglo's 70% stake in the Amapá for significantly less than Anglo initially valued the asset, and the coming and, seemingly, going of the iron ore price boom.

Castellari was pushed to saying cash flow could be forthcoming next year when it hits the 26.5Mt/y (wet) capacity rate and Anglo, and its investors, will be hoping the iron ore price improves at the same time to transform this into 'free' cash flow.

At the same time, Castellari said an "optimisation" could increase the capacity to 29Mt/y, requiring the addition of two flotation cells and the tweaking of the jaw crusher specifications, which one would think would improve margins.

The thought of an expansion to 90Mt/y, as previously envisaged, has thankfully been put on the back burner.

"The reality is in the short-to-medium term we just need to meet our ramp-up rates, get our product in development to our customers to get the right premium and then start thinking about that," Castellari said.

"Also, look at what happens in the price environment. In the current scenario, I don't think it makes a lot of sense to put much more volume into the market."

And Miller followed this with the line all investors want to hear: "It is also the time to get some cash back to shareholders."

The idea of a 15% return on capital employed (ROCE), the metric which Anglo's own CEO Mark Cutifani has asked shareholder to measure the company by, does not look achievable any time soon, but if it is able to sustain a premium over time there is a faint possibility longer term. As Castellari remarked, the mine has a 45-year reserve life, so will be around for many years to come.

"We all know how much Anglo American has invested in Minas-Rio. You know because of delays and the iron ore price we have had to take write-downs. It's going to be difficult [*to get the returns*] because it is a very tough environment, but the most important thing… is we have a large deposit and a l arge resource. We have a good few years ahead of us. It will take time," Castellari said.

"We're in mining, this is a long-term game."

World news

AUSTRALIA

Aurelia looks to deepen Cobar roots

Michael Quinn

New Australian gold and base metal producer Aurelia Metals may have only just become a fully fledged miner in central New South Wales last month, but the company is adamant exploration remains very much at the fore. And if the analogies it makes between its discoveries and historical mines in the Cobar district have validity, that is not surprising.

The company's Hera and Nymagee deposits were compared by Aurelia managing director Rimas Kairaitis to the Peak gold and CSA copper mines, respectively, both of which are absolute quality deposits and have been quality operations for decades – CSA being first mined in the 1880s.

Speaking at the RIU Resources Round-up in Sydney this month, Kairaitis exuded some confidence on the exploration potential, saying discoveries in the region tended to evolve over time from small, shallow high-grade deposits into much larger deposits at depth.

Hera now… underground at the new Hera polymetallic mine in New South Wales

That is very much the hope at Hera and Nymagee.

"We think we are onto something very special at Nymagee North," Kairaitis said, while at the Hebe prospect at Hera, the sentiment was similar. "We've intersected the most intensely altered rocks we've ever seen at Hera. It really looks like something exciting there. If you wanted to drill a hole right next to a deposit we think it would look like that."

Another prospect said to be exciting Aurelia (and apparently set for testing in the medium term), is Pyramid.

On the mining front, Hera reached commercial production status last month. The underground mine has annual production of 39,000oz of gold, 7,800t of lead, 10,800t of zinc and 155,000oz of silver. On a gold equivalent basis that's put at about 55,000oz from dirt grading (also on a gold equivalent basis) 9g/t.

Kairaitis indicated a feasibility for Nymagee would be completed in the short term, with the contained copper resource at that project totalling nearly 100,000t and the mineralisation grading about 1.2% copper.

However, Kairaitis suggested the resource would be optimised into a smaller mineable reserve grading a likely 2.5-3% copper.

Funding for both mines has been provided by Glencore, which owns the iconic CSA mine up the road.

While it stands to reason Glencore's involvement is very much commercially-based on what Aurelia has already discovered, it is likely that an element of the backing recognises the exploration potential.

For retail shareholders, exploration is likely to be very much at the fore when it comes to significant positive changes in Aurelia's share price. It appears to be a situation that is well understood by Kairaitis and Aurelia's board.

"We want our shareholders to have access to the multiple that comes with exploration success," Kairaitis said.

Disruption in the making

▶ Continues from page 1

combination with other metals, can greatly improve those metal's efficiencies.

On Grigor's reading, graphene's properties are seemingly nearly endless, and hence potential applications are just about limitless.

And very disruptive for miners.

"Consider if you add graphene to aluminium, steel or copper, you greatly improve their performance," Grigor said.

"You can really reduce the amount of steel you need by 50% to achieve the same structural strength. If you can add graphene to concrete and increase the tensile strength by 40% [*and Grigor said tests were confirming this*], you won't need rebar in the concrete.

"If you can add a little graphene to copper you may find electric motors can use 80% less copper."

Zinc was another put on notice.

"It won't be long before graphene replaces zinc galvanisers," Grigor said.

And so it went on.

The bottom line for Grigor is greater efficiencies will lead to less growth in demand and at worst demand could fall away significantly for these metals.

"Graphene won't change things overnight, it will take many years for it to be fully commercialised, and for it to impact on the mining industry as we know it today, but it will be another issue mining companies will have to deal with," he said.

"It will reinforce the need to have high-grade deposits and a position in the lowest cost quartile."

Grigor conceded there had been a lot of claims about graphene, but even in conceding this he was able to further promote the material.

"There's never been a material talked about with more hyperbole than graphene… there's never been anything with more potential to change our industrial world than graphene… so the understandable reaction of anyone being introduced to graphene is one of scepticism," he said.

"This is not surprising.

"What is different with graphene is that it is being promoted by the scientific community more consistently and more vocally than the entrepreneurial businessman."

Present company excluded.

Regarding graphene supply, not all graphite is the same. "It seems the graphite needs to be crystalline, high grade, with low impurities," Grigor said. He suggested "run of the mill" graphite like that found in Mozambique needed to go through much more expensive processing.

If true, this is significant given claims by some that Mozambique and graphite is a potential development scenario akin to the Pilbara region in Western Australia and iron ore in the 1960s.

One company that is said to have the right sort of graphite is Talga Resources.

Grigor's Far East Capital was involved in a A$3.1 million (US$2.4 million) capital raising with Talga last year at a share price of about half current levels, while Australia's most successful prospector Mark Creasy bought shares in Talga at a fraction of that price in 2013.

Another company flagged by Grigor was MRL Corp, with its project in Sri Lanka.

All in all the RIU Sydney Resources Round-up performance by Grigor was solid.

As would be expected given it is his job to initiate and be involved with selling investment themes.

Will new investors and resource sector corporates take heed of Grigor's claims and warnings? As he put it, how can anything be so revolutionary, so disruptive, and yet, in his words, so tangible?

"That is the hurdle of perception facing the investor."

AUSTRALIA

The Nellie Melba of copper mines

Tim Treadgold

Great copper mines, like great sopranos, love a farewell performance and when the Mt Lyell mine in Australia's island state of Tasmania re-starts production next year it will have a record to rival the country's greatest soprano, the late Nellie Melba.

In 1893 when Nellie Melba was performing to packed houses in London and Paris, Mt Lyell started producing

Famous in the 19th century, Dame Nellie gave a series of farewell concerts that lasted into the 20th century.

Mt Lyell was also famous in the 19th and 20th centuries, but has outlived the singer by kicking on into the 21st, with another "performance" expected to keep the mine in production for at least an extra 10 years.

Where Nellie Melba gave her final (absolutely final) farewell performance at London's Covent Garden in 1930, the mine kicked on until low copper prices forced its closure in 1994, a production run lasting 101 years that included important "war service".

So important was Mt Lyell during the first and second world wars that its protection from foreign invasion was ordered despite its location in Tasmania's west, making it one of the world's most remote mines on one of the world's most storm-battered coasts.

Amusingly, and perfect for an episode of that classic British television comedy Dad's Army, the Australian Government dispatched six (yes, six) Lee Enfield .303 rifles in 1941 for the defence of a mine rated as critical for the war effort, supplying copper used in everything from ships to Spitfires.

Mt Lyell's defenders never fired a shot in anger and they kept the copper coming, initially as an asset of the Mount Lyell Mining and Railway Company, and later through a series of owners who struggled to overcome low prices, increasing mine depth, and stiff competition from the giant copper mines of South America.

In 1893, when Nellie Melba was performing to packed houses in London and Paris, Mt Lyell started producing

Today, the historic mine is an asset of the London-listed, Indian controlled company, Vedanta, through a subsidiary called Copper Mines of Tasmania (CMT).

Like all old mines, Mt Lyell has proved to be a handful, suffering a series of setbacks last year that included the deaths of three workers, forcing Vedanta to mothball operations while a major review of safety and future potential production was conducted.

The results of that review are positive and Vedanta stepped up its studies and last week announced that a final feasibility study would be conducted with the aim of re-starting copper production next year.

CMT site manager Jared DeRoss told *Mining Journal's* sister publication MiningNews. net that the studies had determined a new mining method and identified the orebodies in the greater Mt Lyell system to be mined.

Technical studies are continuing, but the plan is to start re-development work by the end of the year with first copper concentrate to follow about 12-months later.

When it closed last year, Mt Lyell was producing 2.5Mt/y of ore at a grade of about 1.25%, yielding more than 25,000t of copper in concentrate, plus useful gold and silver by-products. The mining method at the time of closure was sub-level caving at a level some 1,000m below the surface, with ore being crushed underground before hoisting to the surface and sent via a 1.2km overland conveyor to the concentrator.

Exports were via the port of Burnie on Tasmania's north coast, with most material destined for a copper smelter operator by Vedanta's subsidiary, Sterlite, at Tuticorin in southern India.

Details of the mining and process methods being planned for the latest re-generation of Mt Lyell by CMT have not been revealed, but significant changes are possible given tougher safety requirements and recent exploration success under the current workings and at surrounding targets.

Geologically complex, at least 22 orebodies have been identified in the Mt Lyell region, which is part of the Mount Read Volcanics, host to a number of base-metal mines.

The primary source of Mt Lyell's ore has historically been the Prince Lyell orebody, a disseminated pyrite and chalcopyrite.

DeRoss said the move up to a full feasibility study was good news for Mt Lyell but, at the same time "we don't want to understate the position".

"There is still much work to do on the commercial side and design of a safe, sustainable and viable operation and so there is still the potential for delays to our timetable," he said.

Time, however, is not the big issue for the 122-year-old Mt Lyell mine as plans are laid for its re-start.

Keeping costs down and ensuring high safety standards are the big issues and if that can be done then Mt Lyell will have confirmed its reputation as the Nellie Melba of the world's copper mines.

Services

INSURANCE

Risks transform insurance world

A leading mining risk management and insurance expert talks to *Mining Journal* about the state of the market

Richard Roberts

Matthew Gooda has been in the thick of the mining insurance action during the biggest period of change in the industry's history. In *Mining Journal*'s 2014 Global Risk and Insurance Guide it was said the massive expansion of the mining industry over more than a decade, during a time of rapidly increasing commodity prices, spawned 'super claims' and individual insurance losses that ran into hundreds of millions of dollars.

Some of the claims exposed issues "that had simply not been experienced in the same way before", the guide said.

"The mining industry presents some unique challenges for insurance companies. The very nature of mining results in a business that is constantly changing and developing and any insurance product needs to be able to react appropriately."

Gooda has spent more than a decade in group risk and insurance management roles, including six years at Anglo American. The global mining practice leader at insurance broker Marsh spoke to *Mining Journal* in London.

Mining Journal: First, how long have you been with Marsh and where were you prior to joining the company?

Matthew Gooda: I've been with Marsh for a year, and leading the global mining practice since October 2014. Prior to joining Marsh, I spent six years at Anglo American plc, and three at Hanson plc. My career in risk and insurance began with five years at Marsh from 2000.

All told, I've worked in risk and insurance for 15 years, 10 of which were within the mining and basic materials industries.

MJ: What would you say have been the three biggest, or most influential, changes in the mining insurance market in the past five years and why?

MG: Focusing on property damage and business interruption (PD/BI) first, as it is typically a miner's largest risk financing cost. The most febrile period of the commodity super-cycle had a significant influence, with several large mining loss events coinciding with commodity prices accelerating away from historic norms. The near tripling of manganese prices between the start of 2007 and the peak in mid-2008 is a good micro illustration of why underwriters for commodity risks started to wonder whether premiums could keep pace with business interruption exposures and potential claims.

A series of significant loss events prior to the global financial crisis led to several insurers leaving the mining sector altogether, which contributed to a "hardening" market. The

Marsh global mining practice leader Matthew Gooda ... insurance market 'hardened' after big loss events

financial crisis itself then resulted in a flood of new capital into risk transfer markets as conventional asset classes presented a weaker balance of risk/reward, and this capital supply led to a full turning of the wheel for the insurance of mining risks: rates for PD/BI risks have now dropped consistently for the last three years.

One of the slower burning but more radical changes we're seeing is in surety and reclamation solutions. Increasing regulator acceptance of insurer-issued securities is allowing significant amounts of committed capital to be released in certain jurisdictions and for lower-cost insurer solutions to replace more expensive or capital intensive letter of credit or trust options.

MJ: What, generally, has happened to the industry's annual insurance expenditure levels in this time – meaningful change?

MG: Change has certainly been meaningful: PD/BI rate reductions have been an average of 30% in total over the last three years for our mining clients accessing the international insurance markets. Insurance rates for bulk -commodity shippers have likewise softened materially. However, certain other costs – such as those associated with legacy disease liabilities or employee injury claims, for example – are increasing in some jurisdictions, and there we see concern about adverse development protection, rather than the enjoyment of materially reduced costs.

MJ: Going back even further, and it is said that while investor activity/finance-sector activity around mining has slumped, and the outlook is poor, the actual 'business' of mining has grown massively since the early 2000s, such that the industry itself is many times bigger than it was then. What has this done to the scale of the annual insurance activity around it?

MG: The scale of industry growth shows up most obviously in construction numbers. My London construction colleagues alone placed insurance for mining projects with combined contract values of more than US$10 billion/y for each of the four years from 2010 to 2013 (inclusive), and in two years came closer to US$20 billion, before we saw the flow reduce to below US$10 billion/y of contract values for 2014 – a clear reflection of the much reported reduction in mining capital expenditure. But while the pace of construction activity has slowed, projects are now transitioning to operations of course, and in 2015 we have once again exceeded the US$10 billion estimated contract value threshold for our construction appointments.

MJ: Is there any evidence, and/or meaningful indicators of climate-related risks to the industry's activities increasing during that time?

MG: The La Nina/El Nino phenomena famously influence either the weather patterns in the Americas or Australia. At the moment, several Chilean copper producers are recovering from flood shut-downs, while the Australian Bureau of Meteorology reports a steady trend towards conditions typically associated with drier weather in Australia. Notwithstanding the impact of climate change on rainfall distribution and drought conditions in several regions, the escalation of mining activity and coincident escalation in other demands for water are sufficient themselves to aggravate risks associated with access to this critical resource.

MJ: What have been/are likely to continue to be, the three biggest risks miners (and their insurers) face generally, in terms of potential high-level losses to sales, profits and/or market/asset values?

MG: I'm sure there are many analysts almost exclusively focused at the moment on commodity price outlook and the risks and opportunities this creates – while at the human level, nothing is more critical than safety.

We have an innate bias towards overweighting recent and negative events in our thinking, and have difficulty categorising events probabilistically, even if we have the data to do so. For example, the broad impacts of recent dam failures come readily to mind, with their various impacts on the environment, employees, management, and permitting in other regions. Yet, we rarely read data on the billions of tonnes of safely contained waste that provides context for the high impact but infrequent failures. We also have a tension between major latent exposures, such as the common association of major copper mines with seismicity, for which we have no real experience of a loss in recent years, versus those events that are currently impacting the industry and insurers – such as the claims and losses generated by restructuring or the insolvency of marginal producers.

A point all can likely agree on is that thinner margins, thinner balance sheets and generally higher barriers to finance make the industry more brittle than it has been in recent years – while the "real", non-financial world continues to force the reassessment of risk. The recent rapid spread of Ebola, introduced to Nigeria by a mine employee, poses enormous questions about the vulnerability of mine operations to pandemic and the potential role of transnational workforces as vectors of contagion.

The role of risk professionals of course is to support the methodical identification and assessment of risk in the round, and develop appropriate risk management and risk-transfer techniques to ameliorate risk impacts.

MJ: How much 'risk engineering'/consulting work are you doing in the mining market, and how has that business evolved in recent years?

MG: This is a significant area of work, both for our 'business as usual' service to clients, but also in terms of capability development. Concepts such as supply-chain risk management and cyber security risks have transitioned from niche to core for some operators, but not all. For some these certainly represent areas of opportunity for improved business resilience. The Ebola outbreak resulted in the metals and mining industry undertaking pandemic preparedness/impact assessments to a greater extent than earlier pandemics such as SARs did, no doubt reflecting the region of the outbreak.

Core property and business interruption risk consulting, of course, remains very important to our business, and our clients. This is an area where my Marsh risk consulting colleagues have been effectively re-writing our methodologies and data architecture, so we can provide a service that more effectively leverages the experience and insight we gain across our large metals and mining client base, to help reduce both the probability and impact of loss events.

MJ: How are mining companies addressing risks related to cross-border resource (water, power, other infrastructure) security – adequately, or not; and is there much call for new solutions/why?

MG: The generally successful, quiet, continuous operation of mining and mineral processing assets around the world is a solid testament to the stakeholder engagement efforts undertaken by the world's miners, as well as the careful weighing and appraisal of risks at the investment stage.

Using insurance to transfer risks of appropriation or currency inconvertibility has certainly been very successful in supporting substantive investments in certain regions. However, in general the lack of homogeneity and limited demand for transferring cross border dependencies on utilities means we have not seen strong product development in this regard – which is not to say we cannot work to develop solutions on a case-by-case basis.

MJ: Finally, what specific risks are posed by the mining industry's embrace – by no means rushed – of technologies, and particularly those around remote-operations centres/separation of field-based activities and decision-making centres, enterprise-level connectivity, and industrial IoT and cloud-based data management, etc? And to what extent is investment in these areas reflected in higher levels of insurance expenditure/risk management?

MG: The fact that many mineral processing plants rely on time-proven technologies has historically been a key source of resilience for the industry, although risks are changing, and remote control and networked controls do introduce novel risks. In December, the BBC reported the forced shutdown and "massive damage" of a German blast furnace for example, after a "spear phishing" attack allowed intruders to access plant control systems.

While the physical risks associated with automated plant spring easily to mind, destruction, theft or publication of data are equally real issues. I'm pleased to note that pricing for cyber insurance coverages for both physical impacts and data breaches is becoming more attractive, as insurers build towards a critical mass of both client interest and premium volume, and also data and risk insight. ▼

LEGAL

Contractual disputes top list of concerns

Contractual, labour and regulatory issues are the most disputed areas for in-house mining counsel, according to a recent survey.

The 2015 Litigation Trends Annual Survey canvassed the opinion of more than 800 legal and corporate counsel working at companies headquartered across 26 countries worldwide. The survey, commissioned by global law firm Norton Rose Fulbright, spans six industry sectors – technology and innovation; financial institutions; energy; infrastructure, mining and commodities; life sciences and healthcare; and transport – and 65% of survey participants work at companies with revenue greater than US$1 billion.

Out of 20 categories, 57% of survey participants working in infrastructure, mining and commodities said contracts were the most frequently disputed area for them in 2014, compared with 28% of their peers in other industries. A further 27% cited a rise in labour and employment disputes, while 13% said legal tussles over regulatory issues and investigations had occupied much of their time last year.

When asked to choose the types of legal disputes that most concerned them, 50% of mining in-house counsel said they were most worried about contractual disputes, compared with 34% of the broader sample.

Some 21% of mining and commodities respondents said they were most anxious about the potential for lawsuits arising from commercial and construction issues, compared with only 8% of participants from other sectors.

Nick Merritt, global head of infrastructure, mining and commodities at Norton Rose Fulbright, said in-house counsel at mining companies faced a growing number of challenges. "As with the energy industry, mining and commodities companies can face disputes over contracts, or investment rights with host countries. Such companies often invest heavily in developing or emerging markets where the regulation may be unclear," he said.

"It's a challenge for counsel and few firms have the necessary in-country experience to help clients through the issues. 57% of survey participants working in infrastructure, mining and commodities said contracts were the most frequently disputed area for them in 2014."

Largely due to the rising number of class-action lawsuits and regulatory investigations worldwide, 22% of respondents across all industries said they had increased the number of outside counsel they instructed over the past year.

"The increase in lawsuits and potential lawsuits faced by companies worldwide, along with the trend toward more regulatory oversight and investigations, results in higher litigation budgets and more time and attention required on behalf of legal departments and senior executives," said Gerry Pecht, Norton Rose Fulbright's global head of dispute resolution and litigation, in the report.

Yet despite the large volume of disputes playing out in the energy and natural resources sector, in-house litigation teams at energy, infrastructure, mining and commodities companies had the smallest average headcounts of all industry sectors surveyed, with just 12.1 lawyers and 13.5 lawyers, respectively.

By contrast, companies in the life sciences and healthcare sector tended to have the most, with an average 28-strong headcount. ***– Ruth Green***

What readers say about…

VIEW FROM THE WEST END

"'View from the West End' hilariously brings the magnifying glass to the industry we love … fortunately without the subjects bursting into flames."

– Wayne Bramwell, managing director, Kasbah Resources

"Every week my inbox is bombarded with opinions, articles and news, much of it is deleted without so much as a glance, some of it saved in the vain hope of reading later, regrettably even much of that never is. There is, however, one exception. When 'View from the West End' pops up, I stop what I am doing, make a coffee and read it. It's always well written, always amusing and always on target. It's often said common sense is anything but common – that's certainly true in the mining industry and in those journalists/columnists who pander to it. 'View from the West End' has common sense in spades and the majors, deservedly, in his sights. What a breath of fresh air."

– Sean Russo, principal, Noah's Rule

"I am an avid follower of 'View from the West End' and rate it as my favourite piece in all the internet publications I receive. It is witty, incisive, displays excellent command of the English language and is highly entertaining. Most of all it shows a bitingly accurate insight into the small end of the mining and exploration scene from both a participant and investor's view and throws refreshing and well-deserved satire at many sacred cows of the current obsession with propriety and regulation. To me it is the 21st-century equivalent of Pierpont's 'Blue Sky Mines' of the previous two mining booms."

– WJ Ryan, former president of the Association of Mining and Exploration Companies / mining company CEO

"'View from the West End''s sentiment and opinion can only come from one with huge experience and broad knowledge of the ins and outs of mining companies from boardroom to pit floor. On many occasions I have laughed and said to myself, 'he's spot on'. It is refreshing, humorous and somewhat cynical but always on the money. For anyone in mining, it is a must read to get a real sense of balance in this somewhat uncertain and chaotic environment."

– Phil Edmiston, general manager - Australasia, Hexagon Mining

Read VIEW FROM THE WEST END each week, *only at* www.mining-journal.com

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Mining Journal

FROM THE CAPITAL

Doubts over dysprosium miner's 'binding' agreement

Judge's ruling loosened seemingly hard and fast definition of a compelling compact

John Robertson

Northern Minerals had been doing an outstanding job in bringing forward the Brown's Range dysprosium development until it jeopardised its credibility with some slipshod disclosure practices.

Northern Minerals has a plan to develop an extensive rare earth mineral find in Western Australia. As with all companies at its stage of development, its investment prospects will hinge on putting funding and offtake agreements in place.

On 18 February, 2015, Northern Minerals announced that it had "signed a binding memorandum of understanding (MoU) with Jien Mining Pty Ltd (Jien Mining), for equity funding of up to A$49.5 million (US$39 million)". Of this amount, A$5 million was to be subscribed through a convertible note offering. The remainder was to be "subject to final due diligence and shareholder approval".

This description of the deal seemed straightforward. The company appeared to have assured itself of funding for the next phase of its development activities without unduly diluting shareholders' interests or compromising the project's future commercial flexibility.

The key word here is "binding", a term generally used to convey a sense of certainty or an obligation imposed on a contracting party. So, anyone reading headlines at the top of an announcement saying "A$49.5 million binding MoU signed", "Funding to deliver A$49.5M" and, "A$44.5 million to be received" should have been able to infer that a deal was subject only to the small number of standard conditions.

Contrary to this impression, A$27.5 million of the funding package depends on Jien Mining exercising options it will have been granted to subscribe for shares.

By definition, the holder of an option does not have an obligation to buy. More accurately, Jien Mining has been given up to one year to exercise an effective first right of refusal to fund the company.

Since the option exercise price is now 43% higher than the company's current share price, some doubts must surround the funding. Until the Chinese mining house confirms its decision, shareholders and investors generally will not know whether the company

will be funded adequately or whether alternative sources of funding will be needed.

The agreement may be better than nothing, but hardly watertight. What happens will depend largely on whether the option holder wants to make maximum use of its commercial leverage. Jien Mining would not be the first Chinese company to ask for rejigged terms more in its favour.

Use of the word binding is not uncontroversial in the Australian regulatory context. Its use was at the centre of a high profile 2012 High Court decision. In a case involving ASIC and Fortescue Metals Group, the court examined extensively what constituted a binding agreement and the circumstances in which use of the word may be misleading.

As with the Northern Minerals agreement, the agreement at the heart of the dispute between ASIC and Fortescue had not been made public. This opened up the possibility that statements made about the agreement, if not carefully framed, could be misleading, which was the allegation levelled at the company by the corporate regulator.

Perversely, the High Court took a view favouring corporate exaggeration. In the eyes of the court, investors were "tough, shrewd and sceptical" and readily able to see through corporate spin. One High Court judge, with a touch of sarcasm, characterised investors as "not an audience to whom the adjectives 'Western Australian', 'mining' and 'Chinese' would excite a sudden certainty about the imminent creation of wealth beyond the dreams of avarice".

On the court's reasoning, even a palpably untrue statement directed to investors who are deemed to know better may not be misleading. Australia's miffed corporate regulator has been left an almost impossible policing task as a result.

In rejecting ASIC's arguments, the judges obliterated previously assumed protections for ordinary investors even while endorsing the need for heightened scepticism when the words 'Western Australian', 'mining' and 'Chinese' were found in close proximity. In short, investors must look out for themselves.

The company made fresh disclosures about the nature of the funding arrangements put in place in February when it sent out its 24 April, 2015, notice convening a meeting of Northern Minerals shareholders. Investors would have discovered that due diligence and shareholder approval are no longer sufficient to get even the A$17 million referred to in February and not subject to the option arrangements.

Funding is now also conditional on the two parties "entering into a memorandum of understanding in relation to a marketing and offtake agreement in relation to 50% of the Brown's Range project", according to the new description of the agreement between the two companies.

The newly disclosed conditions add further uncertainty to the financing package. What happens to the financing, for example, if marketing terms cannot be agreed?

This extra condition also forces shareholders to decide their attitude about an already uncertain funding package without a full explanation of the connection between the funding and marketing arrangements. Could, for example, Jien Mining elect not to exercise its funding option after being given effective marketing control? Will the need for finance lead to overly generous marketing concessions?

The pressure on shareholders is made more severe by a hitherto unveiled threat of a financial penalty if they exercise their right to reject the proposal. The company must pay a fee of A$1 million if shareholders do not pass the relevant resolution.

Such a penalty would be a heavy burden on a company with just A$2.8 million on hand at the end of March and anticipated spending during the current quarter of A$2.5 million. Shareholders are being coerced into approving the deal or possibly ruining the company.

Presumably, lawyers have now made sure all the legally required information is on the table, but one obvious question remains. Next time the company says it has done a deal, how many of its statements about the terms and conditions should be waved through unquestioningly?

**John Robertson is a director of EIM Capital Managers, an Australia-based funds-management group. He has worked as a policy economist, business strategist and investment-market professional for nearly 30 years, after starting his career as a federal treasury economist in Canberra, Australia*

Opinion

MINER'S RIGHT

Rare mess

Monstrous manipulation of market by government has had catastrophic consequences

Tim Treadgold

Illegal production is a source of acid-rich, radioactive waste that seeps into natural waterways

It is unlikely that many people in charge of China's rare earths industry have studied the writings of Mary Shelley, but those who have will understand what happens when a man-made monster runs out of control.

Frankenstein was the name of Shelley's hero. The creature he made had no official name but was referred to in passing as Adam.

China's rare-earths policy also lacks a name, but like Frankenstein's monster it is causing havoc across big chunks of the Chinese environment and damaging attempts by other countries to develop a rare-earths industry to meet a growing market for the 17 unique elements that are in demand across a range of high-tech industries.

Repeated attempts by the Chinese government to control rare-earth production, either at a factory level or through export controls and taxes, have largely failed to do anything except spread confusion and threaten one of the country's most valuable sources of drinking water with a deadly flood of acid-rich, radioactive pollution.

Last week saw a fresh move by China to control rare-earth production by announcing the forced merger of six government-owned producers in what could be a first step in a production cutback as part of an overdue clean-up.

What is happening in Chinese rare earths is important for a number of reasons, not the least being that the country accounts for 85% of global production of materials that have critical uses in electronics, medicine and modern weaponry.

For much of the past 50 years, China has treated its dominance of rare-earth production as a national treasure, which a former leader Deng Xiaoping equated to the Middle East's control of the world's oil supply.

Control of the rare-earth market is also seen as a strategic advantage for Chinese industry, and an economic weapon to be applied when another country behaves in an annoying way, such as when supplies to Japan were cut off a few years ago during a territorial dispute.

Playing political games with rare-earth export policy is also a tactic to encourage international investment in China's manufacturing sector as a way of ensuring access to rare earths.

But, every time China fiddles with the economic forces of supply and demand the effect on rare-earth production and price is a bit like the unintended consequences of what happened after Frankenstein made his monster.

In 2010 China cut its rare-earth export quotas, sending prices into the stratosphere, triggering a rush to develop mines in other countries as well as starting a World Trade Organisation investigation into China's control of the industry.

After a period of shortage, China fiddled again, encouraging more production and higher levels of exports that, naturally, killed prices and led to the financial problems of rival miners such as Molycorp in the US.

Troubling as the misuse of economic power might be, there is something far worse happening in China today that is alarming the government and independent observers of the rare earths industry – an environmental catastrophe.

Dudley Kingsnorth, a long-term consultant to the industry, as well as holding an academic position at Curtin Graduate School of Business in Western Australia, is as much concerned about the activities of the Chinese government-controlled rare-earth companies as he is about the activities of illegal operators.

Kingsnorth said China had been so successful in encouraging rare-earth production that its capacity now exceeded demand by a factor of three.

"The relatively lax enforcement of environmental standards in years past has led to a proliferation of small, illegal backyard operations," he said. "In essence China has been damned by its success, such that rare-earth production is almost a cottage industry that is proving impossible to control."

Having created a monster China is now struggling to control it with potentially serious consequences for its own already heavily polluted environment and to the flood of material hitting world markets, which is preventing other countries from developing their own rare-earth mines.

Another unintended consequence is that lower prices for rare elements, such as neodymium, means they are being used as high-strength magnets in children's toys and snap-on cufflinks, rather than for their more important purposes.

Much of the material being consumed in frivolous applications comes from illegal producers who are becoming a prime cause of the acid-rich, radioactive waste that is seeping from tailings ponds towards the Yellow River, a source of fresh water for an estimated 150 million people.

Kingsnorth estimates that one-in-four of the world's rare-earth magnets comes from illegal materials "that has been produced with little or no concern for the environment".

Last week's announcement about the forced mergers is a sign the Chinese government is aware of the problem it has created by classic command-economy dictates which first seek to limit production, and then encourage it. The result of this politically-inspired process is a domestic environmental disaster, the threat of international trade sanctions, and a difficult climate for rival miners to enter the industry.

China's rare-earth monster is also a clear warning to other countries that they need to intervene and provide financial incentives to non-Chinese producers of elements essential for their own manufacturing industries.

To not encourage alternative sources of rare-earth supply risks another period of sky-high prices and supply shortages caused either by economic or political action on the part of China – or by a shutdown caused by a forced environmental clean-up that might follow the forced mergers.

RUSSO'S RULES

Of tortoises, hares and hare-brained inquiries

Some like it hot, and it doesn't get hotter than Western Australia's Pilbara region. Now the heat is really on

Sean Russo*

Australia's prime minister seems to be getting behind calls from iron ore "maverick" Andrew Forrest to have an inquiry into the iron ore price. Oh dear. Mr Abbott, you don't need to squander taxpayers' money on such a circus, you only need to know this.

Much time, effort and money is already wasted trying to project into the future the likely fair value of commodities and currencies. Meanwhile, in the market place the price for anything that trades freely rarely, if ever, trades at what the experts might have predicted would be "fair value". Fair value, in my experience, is in fact the line another group of experts draws in afterwards as the market price, meanwhile, careens from overvaluation to undervaluation and back again. T'was ever thus.

No one had a problem recognising we were in a mining boom. The problem is there are those who believed it might be different this time. It wasn't. It never is. Why can't we just accept that this is the bust that follows every boom, as sure as night follows day? But then again if the solar industry has more problems that would only require more daylight hours to solve we could always have an inquiry into that as well.

Forrest has less excuse for getting the market wrong than many of his bewildered mining peers, and the politicians he has bewitched. Long before Forrest went mining he was a stockbroker. He should have learned in that environment how prices of financial assets (and commodities when viewed as financial assets) are driven more in the near term by sentiment than they are by fundamentals.

Forrest claimed in a recent interview that his friends in China were happy to pay more than US$100/t for iron ore until various iron ore producers started talking down the price. If that is the case, then by his own standards, his friends are not the friends of China.

Forrest passionately believes Australians should want "our" miners to achieve the best possible price when they sell "our iron ore". In the current political environment in China one can only imagine the nature of an inquiry into iron ore traders that were discovered to not be working just as hard to buy iron ore at the lowest possible price.

A few years ago, most iron ore producers acknowledged the good times couldn't last forever. Ironically that's why they kept borrowing and expanding production in the hope they would sell more ore before the prices fell.

"It's a sprint to get it out of the ground before the price falls," is how one of Forrest's contemporaries described the market several years ago. Over time, buyers who had been panicked about whether their needs would be met realised that future production was much more assured and figured out it was probably better to wait a while before expanding their purchases.

This situation is only exacerbated, in this particular case, because the buyers think in terms of decades and centuries, while increasingly the marginal suppliers are thinking in terms of the next time they have to test their covenants with their lenders, or roll further forward debt they wish not to service.

Aesop would be proud to see how well the story of the Tortoise and the Hare has stood the test of time. Time is on the side of the buyers. Yes they need to keep moving forward, but they certainly don't need to sprint.

In fact pretty much everything is on the side of the buyers. One of the great truisms is, "buyers make markets". No buyers, no market. You can have a complete global monopoly on the supply of a commodity, but if no one wants to buy it then it's worth nothing.

The iron ore majors ignored this simple truism a few years ago when they deliberately squeezed their customers in a time of high demand and moved away from long-term contract pricing to spot pricing to maximise their short-term gain. Smaller, higher-cost producers could have struck long-term contracts at this time and made valuable long-term partners, but they went on the spot price ride.

Spot pricing of iron ore led to iron ore derivative markets evolving where they had previously not been possible. Derivatives markets allow those who care to use them to properly manage their businesses through volatile times (albeit producers seem largely to ignore them at their peril). Most significantly, derivatives on iron ore turned a sleepy old bulk commodity market that traded on long-term fixed contracts between buyers and sellers into a fully-fledged financial asset, tradeable by anyone who cares to put down a deposit and have a punt.

Futures exchanges flourish in China for the same reasons casinos flourish in Macau. The Chinese love a punt. I read recently that one of the exchanges that iron ore trades on in China has brokers who collectively have 7 million clients. Imagine the impact on prices if just a million punters all decide to short sell just 500t of iron ore (US$25,000-US$30,000 worth) on a 5-10% margin. That's 500Mt of selling totally unrelated to market fundamentals. The production of Australia's mid-tier higher-cost producers pales into insignificance. Those punters might all be proved wrong, some might win, some might lose, but for everyone that loses you can guarantee there will be a fresh punter turning up the next week to try their luck. The main point is these are the very drivers that ensure financial markets can often stay irrational for longer than many seemingly rational players can remain solvent.

And it's not just lots and lots of small futures punters, hedge funds of every shape, size and nationality, see iron ore prices (and often the AUD/USD) as a proxy trade for China. Being short iron ore, and iron ore stocks, particularly those with debt and no hedging, has been one of the biggest games in town for several years now. Of course, short positions need to be covered and that in itself is a form of demand.

The current rally in iron ore and iron ore stocks looks very much like a short covering rally. Doubtless somewhere in the future if "the China trade" is back on, iron ore prices (and the AUD/USD) will again surge from "undervaluation" to "overvaluation".

Those who are feeling the pain of depressed iron ore prices right now need to first plan to survive, then they need to think about how to harvest the gains next time prices are rallying. The upside of derivatives markets is when prices are great, producers who aren't too greedy can sell large volumes, quickly and well into the future. Then they can go about their business producing all that they have forward sold slowly and deliberately, not just creating jobs, but jobs that last. And the best part, not an expert panel or politician in sight.

Behind closed doors if Abbot and Forrest chat, I hope the Australian PM calls on his days as a rugby coach and says: "Andrew, if you want to play with the big boys you had better be ready to take a few knocks. Toughen up princess, if you upset the Chinese they might take a leaf out of my book and start turning back the boats". ▼

*Sean Russo is managing director of Noah's Rule, a specialist debt and risk advisor

ETHIOPIA AND ERITREA

Things heating up on the Danakil

A major potash province is edging towards production

A test well being drilled at Circum's project

Gareth Tredway

It is not just an average annual temperature of 34.4C that makes the Danakil depression in East Africa one of the hottest places on earth. It is also warming up to become a significant potash production base as several players operating there are making the right noises about heading in that direction.

The country's government has also committed to providing the key infrastructure required to for the region to be developed.

Existing transport routes are currently being upgraded, including the paving of the road from the city of Mekele (a key logistics base) to the Danakil Basin. The government has agreed to build a 400km reinforced concrete main production haulage road for potash transport out of the Danakil to the main rail line.

The Ethiopian Electric Power Corporation is conducting a feasibility study to expand the national grid to the Danakil region with a 440MW substation.

According to the World Bank, the country is endowed with vast hydropower potential, so much so, that it could become one of Africa's largest power producers and exporters. The planned 6,000MW Renaissance Dam project will be Africa's largest power plant. Costs of power are also expected to be among the cheapest in the world at US$0.30/kWh.

Ethiopia has averaged a 10.7% economic growth rate over the past 10 years, more than double the annual average of countries in Sub-Saharan Africa, which was around 5.2%, making it the world's fifth fastest growing economy.

Agricultural growth was the main driver of poverty reduction in Ethiopia since 2000, according to the World Bank. Poverty has fallen from 44% to 30% in 2011, a 33% reduction of people living in poverty.

"Ethiopia is often unfairly seen as emblematic of poverty and deprivation – but the progress it has seen over the past decade should help change that," said Ana Revenga, senior director for poverty at the World Bank. Only Uganda has had higher annual poverty reduction in Africa during the same period.

A recent World Bank report into the mineral potential of the country predicted that by 2025, mining could contribute US$2 billion to the country's economy.

Kirsten Hund, senior mining specialist at the World Bank, said: "The report assesses that Ethiopia can do a lot to put in place a proper framework that would really help the development of the sector.

"Ethiopia is often unfairly seen as emblematic of poverty and deprivation— but the progress it has seen over the past decade should help change that"

"The country has joined the extractive industries transparency initiative (EITI) as a candidate country, which means they have committed to making public information about revenues from their extractive sector, which is a very positive step."

The country has also attracted significant foreign investment to its shores, including Iceland's US$4 billion geothermal power pro-

Danakil developers

Owner	Stage	Capex (US$m)	Opex	SOP production
Yara	FS	740	US$167/t	600,000t
Circum	PEA	2,000-2,500	US$87.5/t MOP; US$133/t SOP	750,000t
Allana/ICL	PEA (SOP); FS (MOP)	787 (SOP); 1,320 (MOP)	US$98.75/t MOP; US$130/t SOP	1Mt
South Boulder (Eritrea)	PFS (Phase 1)	442	US$189/t (mine gate); US$210/t (total)	425,000t
Total		**5,300-5,800**		**2.8Mt**

ject, which received support from the US government as part of its six-nation Power Africa initiative. It is the largest alternative-energy project ever recorded in LDCs, Rejkavik Geothermal (Iceland) will build and operate up to 1,000MW-worth of geothermal power in the next 8–10 years.

In 2013, Huanjin Group (China) opened its first factory for shoe production, with a view to establishing a US$2 billion hub for light manufacturing in the country.

In December 2014, Ethiopia conducted an oversubscribed debut, 10-year US$1 billion bond issue.

Potash potential

Having originally been assessed and even had a mine built on it in the 1950s, the region's potash potential was more recently 'rediscovered' in the mid-1990s when Norsk Hydro was searching for oil in the region. This after the potassium showed up in the gamma-gamma logs testing for radioactivity, according to an operator of one of the assets.

Again things went quiet until the mid-2000s, when several juniors staked their respective claims, mostly on the Ethiopian side but also over the border in Eritrea (South Boulder). Some have not made it this far in their original form, but the projects are still around and much more advanced now.

This year all of the companies involved there have announced significant milestones and activity, including, resource increases, takeovers, new economic studies and the intention to welcome strategic partners into the fold.

In total, *Mining Journal* estimates that combined, the projects currently being assessed have a total capital expenditure requirement of plus-US$5.3 billion and would produce 2.8Mt/y of sulphate of potash (SOP) and 3Mt/y of muriate of potash (MOP).

It did not take long after Allana Potash released a preliminary economic assessment (PEA) for SOP production at its project for existing shareholder Isreal Chemicals Ltd (ICL) to make a US$150 million offer for the whole company. NYSE-listed ICL is an established producer with fertiliser projects in the Dead Sea, UK and Spain and supplier of about 11% of the world's potash production.

Allana, which already released a feasibility study for a MOP project in 2013, said that despite the quality of the asset, the "generally challenging" financial environment for junior mining companies would potentially result in significant dilution to shareholders to fulfil the financing needs of the Danakhil project, hence acceptance of ICL's offer.

MOP production	M+I Resource
-	n/a
2Mt	4,200Mt @ 19.2% KCl
1Mt	2,447Mt @ 17.9% KCl
-	1,289Mt @ 10.76% K_2SO_4
3Mt	**7,936Mt**

In an investor-day presentation this week, ICL said it planned to develop several bulk blending facilities across Ethiopia to support demand growth in the country. The facilities are fertiliser plants designed to blend several nutrients with the final formula determined according to crop needs and nutrients in the soil. Currently the company is expecting the Ethiopian project to add 1Mt/y of production to a 1.6Mt/y-2.8Mt/y growth profile over the next 10 years.

According to the presentation slides, Africa's annual demand for potash is expected to reach 6Mt this year, having grown by 43% since 2008. Currently the consumption in Ethiopia, Tanzania and Kenya is just 40,000-50,000t/y with potential to grow tenfold, according to ICL.

The PEA on the SOP portion carried a healthy US$1.17 billion after-tax NPV (12% discount) and a 39% IRR, it also required US$787 million of upfront capital expenditure.

The MOP project study showed a US$642 million capital cost and US$1.3 billion NPV, and also showed good returns.

Norwegian chemical company, Yara and the private company, Circum are both seeking partners to help develop their respective projects.

Yara tells *Mining Journal* there is no specific deadline for this to be completed, but that it is in a process now of identifying potential partners.

"We will evaluate partners with different capabilities, such as financial strength, mining expertise and Africa experience. A prerequisite is that a partner also conforms to Yara's business partner code of conduct," says Bernhard Stormyr, Yara's head of sustainability management, corporate communications and branding.

The company has spent US$100 million on the project so far, getting it to the bankable feasibility study stage, and plans to begin mining in the September quarter of 2018.

It has plans to only develop a sulphate of potash (SOP) mine on its tenements saying it "is a better utilisation of the minerals area". With an initial forecast output of 600,000t/y SOP over at least 20 years, Stormyr says "reserves do not seem to represent a bottleneck for the foreseeable future".

Private play Circum, which includes mining entrepreneur Steve Dattels and former BHP Billiton executive Brad Mills among its shareholders, is also about ready to initiate its search for strategic partners. T

he company is in the process of appointing "a major international investment bank" to advise strategic alternatives. Circum says it has already identified a number of Asian institutions interested in becoming involved in various aspects of the projects development.

Brad Mills, who manages the project on behalf of his group Plinian Capital, told *Mining Journal* he expected the process to take about 12 months to complete. "Hopefully we will have somebody in place by this time next year," he said.

A feasibility study on Circum's project is expected to be complete by mid-July, with the original scoping study estimating a US$2 billion-US$2.5 billion project that would produce both MOP and SOP.

"In total *Mining Journal* estimates that combined the projects currently being assessed have a total capital expenditure requirement of plus-US$5.3 billion and would produce 2.8Mt/y of sulphate of potash (SOP) and 3Mt/y of muriate of potash (MOP)"

The hot temperatures actually provide an extraction advantage as the projects will be able to use solar evaporation year round as the primary concentration method for the brines.

The primary exit from Ethiopia for the potash will be the Tadjoura port of Djibouti. It is estimated the port will have the lowest transportation cost of any major potash producer to the Indian, Malaysian, Indonesian, Thai and South Chinese markets, a key consuming region.

The Djibouti government-owned Port Authority supports the project and discussions are underway for product storage facilities at the brand new bulk terminal at the port expected to be completed in the first quarter of 2016.

Mills says part of the US$30 million raised under a private offering currently underway will go towards some extra drilling outside of the resource area. The geologic estimate of the endowment of the remaining 65% of the project area is an additional 7,000Mt-9,000Mt to a depth of about 800m.

"We would like to put some money into wide-space drilling in the rest of the basin to pin that down and say OK, it is not reserve status but the seismic [data], plus a couple of key strategic holes prove the point from a resource perspective," he said.

Some of the money will also go towards further work on the water programme. This is to get a clear picture of the long-term water

East Africa

KEFI's Tulu Kapi project

resource, not only for the 2.7Mt/y project but also looking at what is required if there is an expansion to 5Mt/y thereafter.

Scoping work will also take place on a move to 5Mt/y and firming up the rail option.

"We need to survey routes and all the numbers that would back up a major rail-development programme."

Over in Eritrea

Not to be outdone by its rivals over the border, ASX-listed South Boulder has just announced a maiden 1,100Mt reserve for its proposed Colluli open-pit mine in Eritrea. A long-term price of US$586/t FOB at Anfile Bay was used for the ore-reserve estimate.

"Important to note is the unique mineralogical composition of the Danakil evaporite deposit, which allows the production of a diverse range of potash products, including sulphate of potash (SOP), potassium magnesium sulphate (SOP-M) and potassium chloride (MOP)," South Boulder Mines' managing director, Paul Donaldson, said.

"The very large mineral resource and associated ore-reserve estimate allows the project substantial growth and product diversification over time. Once the definitive feasibility study for the two-phase production of SOP has been completed, work will commence on the logical pipeline of projects that will grow the project to its full potential."

The company has also just launched a rights issue and placement to raise about A$6 million to complete its definitive feasibility study.

Colluli has several advantages, including being the shallowest known potash deposit in the world, starting at a 16m depth, and it is also the resource is only 75km from the Red Sea coast making it the most accessible SOP deposit globally.

The company has a two-stage approach to its project, and even at the proposed SOP production rates, it has a 200-year mine life.

South Boulder has also recently produced about 20kg of high-purity SOP from a pilot test facility at the Saskatchewan Research Council for marketing purposes.

Pilot plant tests conducted throughout March 2015 demonstrated high-purity SOP, with average grades of 52.9% K2O (98% pure) in contrast with an industry average of about 51% (94% pure). Chloride levels were determined to be below 0.1%.

Confident KEFI

Back to Ethiopia and its gold sector, where KEFI minerals is nearing gold production.

At present the country has a single large-scale gold mine, the Midroc operation at Lega Dembi, which is an operating open pit.

The mine was privatised and awarded to Midroc Ethiopia in 1997. A mining licence was awarded and production started in August 1998.

Kefi has made solid progress at Tulu Kapi since acquiring the asset in December 2013. The company has just published a JORC-compliant reserve of 15.4Mt at 2.12g/t Au for 1.05Moz Au.

"We are on track for finalising full development funding in Q3-2015, with a plan for up to approximately US$100 million senior-secured finance and the remainder in equity at parent or project from contractors and/or investment institutions. Then development can start in Q4-15 and production in 2017," said executive chairman, Harry Anagnostaras-Adams.

In April the official signing of the mining agreement between Anagnostaras-Adams, and the Ministry of Mines of the Democratic Republic of Ethiopia took place.

A definitive feasibility study is expected in mid-2015. The company is currently evaluating the a US$120 million investment into a 1.2Mt/y processing plant with total production of just under 1Moz over the life of mine at all-in costs of US$897/oz. Historic expenditure totals US$50 million, according to Kefi. ▼

TANZANIA

Strong growth trickling down

World Bank suggests poverty levels are trending in the right direction in Tanzania

Tanzania's GDP has grown by over 7% in the past two years, and is expected to do the same in 2015 and 2016. It has been growing strongly for a long time now.

This sustained economic growth and concerted efforts around national strategies to alleviate poverty have led to a decline of about 1% a year in the rate of poverty in the country between 2007 and 2012, constituting the first significant reduction in 20 years, according to the World Bank.

Tanzania is also credited by the International Monetary Fund (IMF) as being one of the standout African countries that have better integrated into global value chains, a process that has been associated elsewhere in the world with a higher level of activity and income growth over time.

For the East African nation it has been the manufacturing arena that has benefited the most from this deepening integration into global value chains. "There are emerging signs of increased participation of the poor in the growth process during the last five years," said Nadia Belhaj Hassine Belghith, World Bank senior economist.

Despite these gains the reality is that the majority of Tanzanians remain close to the poverty line, with more than 70% of the population living on less than US$2 per day. There is a lot of work ahead to improve the living standards of all Tanzanians.

Philippe Dongier, World Bank country director for Tanzania, Burundi and Uganda, said: "There are emerging signs of pro-poor growth.

"These can be seen in the improved levels of education, access to basic services and ownership of land and other assets among poor households. In addition, the economic returns to the poor's economic activities have also increased, particularly outside agriculture."

Mining also has a part to play in improving local communities near large-scale mines, but also by encouraging the formalisation and sustainable development of artisanal mining.

With regard to the latter point, the World Bank's Board of executive directors recently approved a new US$45 million credit to Tanzania following the success of the Sustainable Management of Mineral Resources Project (SMMRP) that, amongst other things, strengthened government capacity to manage the sector, improved the regulatory framework and expanded the country coverage with geological surveys.

The miners themselves have played their part too, not least of all, Acacia Mining, the largest private employer in the country.

"We have been part of that initiative for several years. We, along with other mining companies in Tanzania, have been working with the World Bank on a small-scale mining initiative for some time," chief executive Brad Gordon told *Mining Journal*.

"We have actually been providing land for that initiative to flourish. If you look at the amount of land that we controlled in Tanzania, compared to now, we have relinquished 80% of our landholding in the country, so that initiatives like this World Bank one can succeed."

The World Bank said it planned to scale up the original project to help identify suitable geological areas for artisanal miners, create demonstration centres to improve knowl-

Acacia's Bulyanhulu gold operation

East Africa

Dave Hammond, Peak technical director, outlining the project to consultants

Sunset drilling at Ngualla

edge on various aspects and also to boost marketing and financial access.

Gold remains an important cog in the economy, made clear in a recent EY report on Acacia's contribution to the economy. The report estimated that Acacia made a total contribution of more than US$675 million to the Tanzanian economy, or about 2% of total Tanzanian gross domestic product (GDP).

The company paid each employee an average of US$16,400/y, which is more than 11-times the average wage in Tanzania. In 2014, Acacia purchased US$488 million of goods and services from suppliers located in the country.

"There are emerging signs of increased participation of the poor in the growth process during the last five years"

Gordon said at the release of the report's contents recently several local suppliers spoke of how their respective businesses had grown by supplying mining companies. "Some of these examples of companies and contractors wouldn't be around today if it wasn't for us," he said.

Outside of gold, Peak Resources, with a rare earth project, recently introduced both a private equity investor, Appian, and the International Finance Corporation as investors.

The IFC has invested in several early stage projects globally, not only providing funding, but also assistance in maximising projects' social benefits and minimising environmental footprints.

"For a junior mining company or a junior development company we have standards that you would see in a Rio Tinto as far as environmental, health, safety and CSR reporting," the chief executive of a South American project with IFC as a shareholder once told *Mining Journal*.

Peak recently announced an increased focus on magnet metal rare earths, particularly neodymium and praseodymium, because of their use in personal electronic mobile devices, hybrid and electric cars and wind energy. At current prices and the Ngualla project's revised rare earth production profile, 81% of projected revenue will be derived from neodymium and praseodymium.

Peak has also appointed AMEC Foster Wheeler as the lead engineer to oversee the completion of the Ngualla feasibility study.

Powering the region

Infrastructure, including power, transport and water, is vital to any country's growth. Tanzania prime minister Mizengo Pinda recently highlighted some of the key achievements since 2005, including the tarring of more than 1,200km of road and construction of a further 1,300km of new roads, while port, rail and air infrastructure capacities are also improving.

Once again for Tanzania, and the region, the mining industry can play a significant role.

Kibo Mining, with several projects in country, recently put its Rukwa coal-to-power project (RCPP) into a special purpose vehicle, where SEPCO III of QingDao, China has agreed to invest US$3 million that will go towards completing a feasibility study by October.

A pre-feasibility study on the project in December recommended two 150MW thermal plants be evaluated further. Total capital cost was estimated at between US$640 million and US$760 million.

The additional Rukwa resource was also deemed sufficiently large enough to potentially double the design size to 600MW. The mining component had an estimated capital investment of between US$46 million and US$89 million.

"Up to now we have demonstrated the merits of the project, which we have done through the feasibility work. The critical thing that we had to demonstrate was the technical capacity and capability to execute on the project and that is what SEPCO brings to the table: the ability to actually execute," Kibo chief executive Louis Coetzee told *Mining Journal*.

Kibo also owns the Imweru gold project and the Haneti nickel project.

Across the border to the north and Reuters reports that China's HCIG Energy Investment Company has won a bid to develop two coal blocks into a coal-to-power project. Coal production is also planned to supply the country's steel and cement industries. ▼

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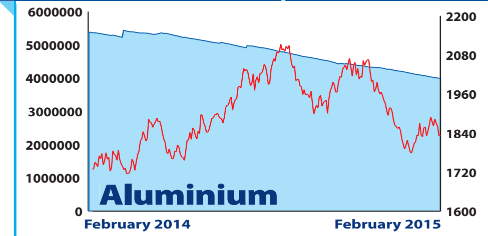
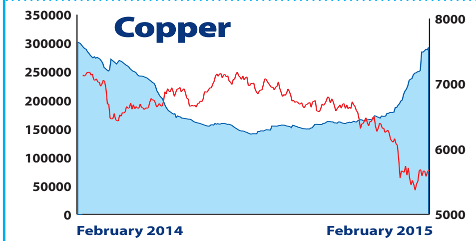
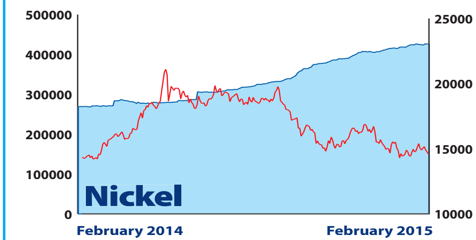
Market update

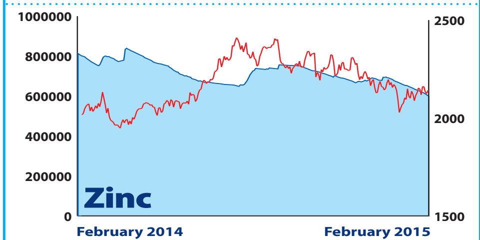
LME metal stocks and prices

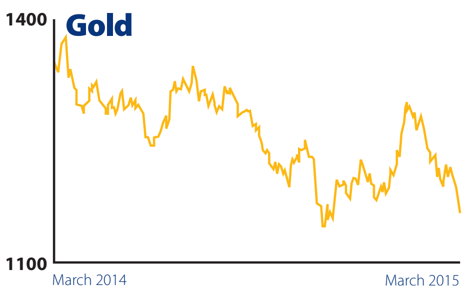
Stocks (t)
Three-months price US$/t (rhs)

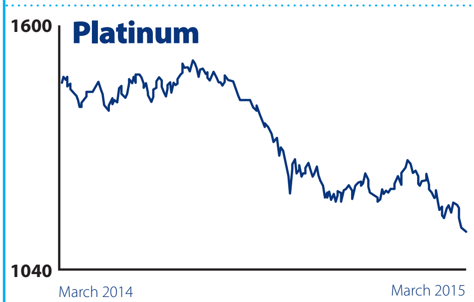












LME prices

May 20		US$/t	% change on week
Aluminium	Cash	1749	-6.0
	3 months	1790	-5.5
Aluminium-alloy	Cash	1735	-4.1
	3 months	1750	-3.6
Copper	Cash	6208	-3.2
	3 months	6206	-3.2
Lead	Cash	1919	-5.9
	3 months	1929	-6.0
Nickel	Cash	12830	-8.6
	3 months	12865	-8.6
Tin	Cash	15950	0.0
	3 months	15805	0.0
Zinc	Cash	2203	-7.3
	3 months	2212	-6.5

Source: Bloomberg, LME

LME official averages

April 1-30	(US$/t) Settlement	Cash	3-mths
Aluminium	1817.13	1816.8	1807.65
Alum-alloy	1795.8	1791.88	1802.4
Copper	6028.48	6027.96	6019
Lead	1999.8	1999.35	2001.06
Nickel	12782.75	12779.75	12829.13
Tin	15985.5	15979	16007
Zinc	2206.9	2206.51	2209.36
Settlement exchange rates	**£/US$** 1.4952	**US$/¥** 119.59	**€/US$** 1.0783

Settlement is the average of the cash sellers' price. Cash and three-months are the average of the buyers' and sellers' price.
Source: LME

Exchange stocks

May 20	t	% change on week
LME aluminium	3773275	-1.1
LME aluminium-alloy	21140	-4.9
LME copper	334875	-0.9
Comex copper	20095.5	-12.2
Total copper	354970.5	-1.6
LME lead	162525	0.0
LME nickel	446640	1.3
LME tin	8355	-2.7
LME zinc	467125	611.0

* Assuming 0.75t per Comex aluminium piece
Source: Bloomberg, LME, Comex

Comex copper prices

May 20	(US$ c/lb)
May	285.15
Jun	283.60
Jul	282.90

Source: Bloomberg, Comex

Leading indicators

May 20	Last	% change on week
Dow Jones Industrial Average	18285.40	1.25
Nikkei 225	20202.87	3.23
Hang Seng	27557.52	0.99
Euromoney Global Mining	324.85	-4.55
FTSE Gold Mines	1239.11	-3.70
FTSE/JSE Africa Gold	1129.04	-7.34
S&P/ASX 300 Resources	3442.91	-2.90
S&P/TSX Capped Diversified Metals & Mining	764.04	-2.70

Precious metals

May 21	US$/oz	% change on week
Gold (pm fix)	1205	-1.6
Silver (spot)	17.18	-1.3
Platinum (J Matthey)	1165	0.8
Palladium (J Matthey)	784	-0.8
Iridium (J Matthey)	580	0.0
Rhodium (J Matthey)	1100	-0.9
Ruthenium (J Matthey)	50	0.0

Shipping rates

Representative dry cargo single voyage rates (May 20)

Route/Size ('000 dwt)	US$/t	% change on week	% change on year
Coal			
Richards Bay-ARA (100-150)	5.8	0.2	-26.5
E Aus-South Korea (120-160)	6.7	0.0	-38.2
E Aus-ARA (100-150)*	n/a	n/a	n/a
Hay Pt-China (100-150)	6.1	0.1	-33.7
Iron ore			
Narvik-ARA (100-150)	4.0	0.1	-14.9
Brazil-ARA (100-150)	6.3	0.1	-16.9
Brazil-China (100-150)	12.4	0.2	-34.5
W Aus-China (120-160)*	n/a	n/a	n/a
W Aus-ARA (120-160)	4.9	0.0	-52.7
Saldanha Bay-China (100-150)	5.8	0.2	-58.4

*Source: Drewry Shipping Consultants Ltd *Data not available*

Bulk minerals

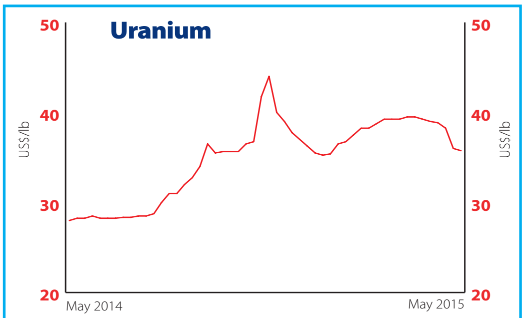
May 22	US$/t	% change on year
Rutile Aus export fob (February 2015)+	785	-15.1
Ilmenite export fob (February 2015)+	103	-27.0
Zircon export fob (February 2015)+	1087.5	1.2
globalCOAL RB™ Index (March 2015)‡	60.95	-19.3
globalCOAL NEWC™ Index (March 2015)‡	62.87	-14.3

Source: † monthly from TZ Minerals International Ltd
‡ Global Coal Ltd (www.globalcoal.com)

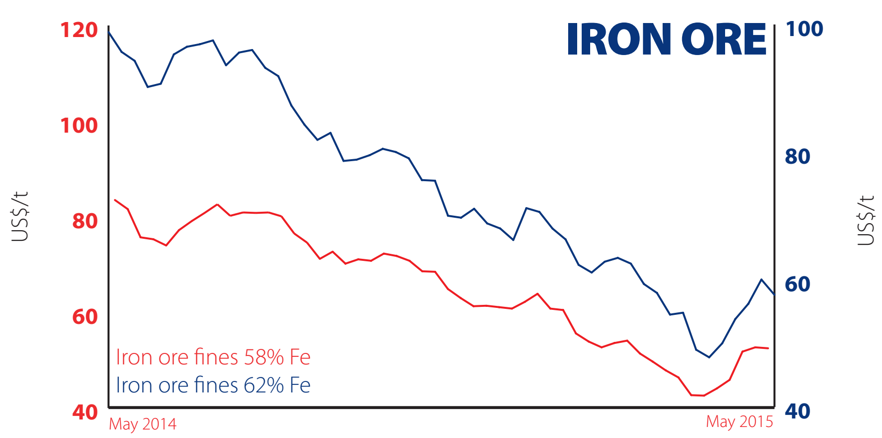
Other metals

February 12	Price	% change on week	% change on year
Antimony US$/t cif **	7650	0.33	-21.3
Arsenic (Rotterdam 99%) US$/lb cif **	0.75	0.00	0.0
Bismuth US$/lb cif **	8.4	-2.33	-17.2
Cadmium (99.99%) US$ c/lb cif **	81	0.00	0.0
(99.95%) US$ c/lb cif **	76.5	-1.92	0.0
Indium US$/kg **	555	0.00	-25.5
Mercury (99.99%) US$/ flask **	2550	0.00	-19.7
Selenium US$ c/lb cif **	23.5	0.00	-13.0
Uranium U_3O_8 $/lb* (May 18)	35.75	-0.69	27.7
Iron ore 62% fines (The Steel Index; CFR; May 21)	57.6	-4.00	-41.7
Iron ore 58% fines (The Steel Index; CFR; May 21)	52.5	-0.38	-37.1

**Source: Ux Consulting; **Minor metals prices will not be updated for the foreseeable future*



Source: Ux Consulting



Source: Steel Index

Finance

Euromoney indexes

All five of the indexes graphed below commenced in December 1985. The market capitalisations below are for end-October 2010.

Mining: This index comprises 202 companies with a total market capitalisation of over US$1,300 billion, half of this being in ten companies. The index is split 49% diversified, 21% gold, 14% base metals, 8% coal and 8% other metals.

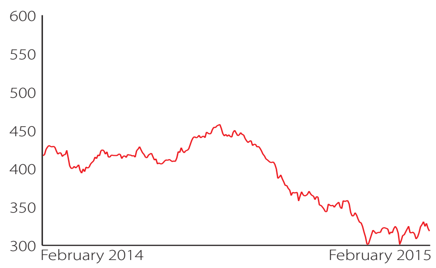
Diversified mining: This index comprises 29 companies, with a combined market capitalisation of some US$660 billion, with the top four companies accounting for 56% of the total.

Base metals: An index of 48 companies (some US$190 billion), with Freeport McMoRan Copper & Gold representing 24% of the total market capitalisation. Grupo Mexico and Alcoa Inc account for a combined further 15%.

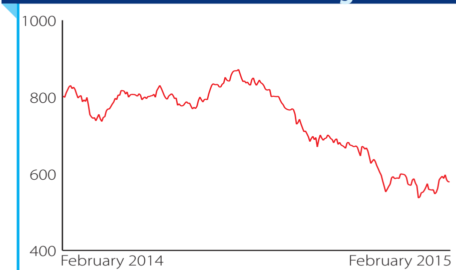
Gold: This index of 50 companies has a market capitalisation of US$280 billion. The top three companies account for 39% of the total.

Coal mining: The 36 companies have a market capitalisation of some US$100 billion. Peabody Energy and China Shenhua account for a combined 26% of the total.

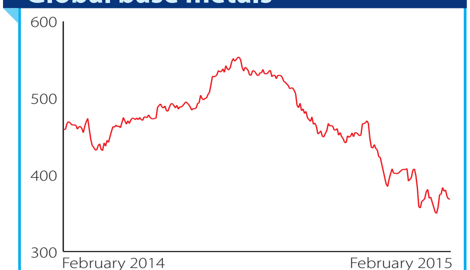
Global mining



Global diversified mining

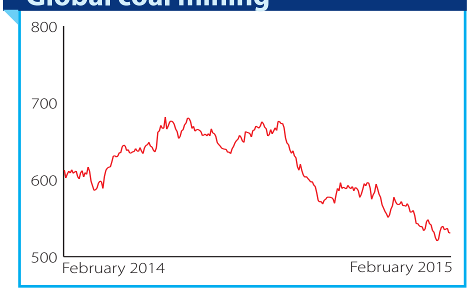


Global base metals



Global gold

Global coal mining



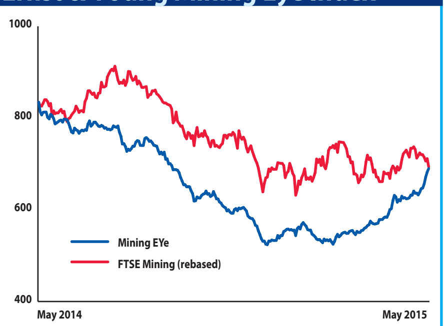
Share prices

May 20/21	Local	Change 5-day %	Local hi-lo %	Mkt cap US$m
Diversified				
Anglo American (£)	10.66	-3.9	12	23,719
African Rainbow Minerals (R)	102.42	0.7	13	1,876
BHP Billiton Ltd (A$)*	29.24	-8.5	36	120,973
BHP Billiton plc (£)*	14.08	-2.5	31	121,413
Glencore plc (£)	2.95	-1.1	49	60,596
Industrias Penõles (MP)	273.24	-2.8	21	7,168
Rio Tinto Ltd (A$)*	56.90	-1.4	31	83,004
Rio Tinto plc (£)*	29.01	-1.4	32	83,513
Teck Resources Ltd (C$)	15.68	-7.1	22	7,429
Vale SA (BR)	20.01	-7.4	18	32,373
Vedanta Resources (£)	6.51	-1.1	35	2,803
Gold/Silver				
Acacia Mining (£)	3.00	-1.0	85	1,923
Agnico-Eagle (C$)	40.00	-2.0	72	7,083
AngloGold Ashanti (R)	121.28	-6.8	29	4,266
Barrick Gold (C$)	15.15	-4.4	37	14,479
Buenaventura (US$)	11.53	-3.5	47	3,176
Centamin (£)	0.70	5.5	82	1,256
Centerra Gold (C$)	7.40	5.4	91	1,428
Eldorado Gold (C$)	5.88	-5.2	10	3,476
Fresnillo (£)	7.68	3.2	34	8,983
Gold Fields (R)	41.35	-8.4	20	2,756
Goldcorp (C$)	22.59	-2.8	26	15,348
Kinross Gold (C$)	2.99	-2.0	28	2,799
Minera Frisco (MP)	12.93	3.1	8	2,172
New Gold (C$)	3.93	-3.9	3	1,610
Newcrest Mining (A$)	13.99	-3.6	80	8,464
Newmont Mining (US$)	27.50	0.7	96	13,826
Pan American Silver (C$)	12.33	2.0	33	1,528
Polymetal (£)	5.62	1.1	63	3,743
Polyus Gold (£)	1.83	1.7	44	8,729
Randgold Resources (£)	47.59	-2.0	53	7,014
Sibanye Gold (R)	21.83	-5.7	25	1,694
Tahoe Resources (C$)	17.08	0.6	23	3,181
Yamana Gold (C$)	4.67	-3.3	12	3,603
Zijin Mining (H$)	2.99	0.0	81	15,619
Platinum Group Metals				
Anglo American Platinum (R)	308.00	-1.6	14	7,102
Impala Platinum (R)	64.41	-0.3	12	3,532
Lonmin plc (£)	1.39	-0.4	21	1,281
Northam Platinum (R)	48.30	2.3	82	2,072
Stillwater Mining (US$)	14.10	-2.8	30	1,702
Aluminium				
Alcoa (US$)	13.08	-4.0	8	16,007
Aluminum Corp of China (H$)	4.82	-6.2	72	4,232
Hindalco (Rs)	139.10	0.9	21	4,511
Norsk Hydro (NK)	36.70	0.7	37	10,164
Rusal (Rb)	294.00	-8.8	38	9,023
Diamonds				
Alrosa (Rb)	66.00	-3.2	64	9,849
Dominion Diamond Corp (C$)	23.30	-1.5	88	1,632
Petra Diamonds (£)	1.74	-0.3	33	1,398

May 20/21	Local	Change 5-day %	Local hi-lo %	Mkt cap US$m
Copper				
Antofagasta (£)	7.90	-0.6	70	12,188
First Quantum Minerals (C$)	17.26	-4.6	42	8,494
Freeport-McMoRan (US$)	21.08	-6.8	20	21,924
Grupo México (MP)	48.79	-2.0	90	25,069
Jiangxi Copper (Yu)	22.73	-3.7	85	10,350
Kaz Minerals (£)	2.45	-4.6	43	1,718
KGHM (Zt)	126.80	-3.2	68	6,916
MMG (H$)	3.14	-4.0	76	2,143
Southern Copper (US$)	32.17	-0.7	83	25,663
Sumitomo Met. Min. (¥)	1875.50	-1.0	86	9,055
Turquoise Hill Res (C$)	5.46	6.0	87	9,037
Nickel				
Aneka Tambang (Rp)	800.00	-3.0	5	763
Norilsk Nickel (Rb)	10164.00	-1.7	64	32,542
Sherritt Intl (C$)	2.58	-11.6	20	619
Zinc / Lead / Tin				
Boliden AB (Sk)	182.50	0.8	83	6,059
Hindustan Zinc (Rs)	177.45	0.8	72	11,772
Lundin Mining (C$)	5.78	-5.6	73	3,453
Minsur (PS)	1.27	9.5	15	1,150
Ferrous				
Assore (R)	105.33	-3.2	2	1,274
Cliffs Natural Resources (US$)	5.00	-14.7	6	771
Ferrexpo (£)	0.74	-3.0	33	683
Fortescue Metals (A$)	2.12	-8.2	11	5,210
Kumba Iron Ore (R)	151.06	-4.4	12	4,154
NMDC (Rs)	130.70	-1.7	11	8,136
Energy Minerals				
Alliance Resource Partn's (US$)	31.85	0.0	3	2,331
Banpu (Bt)	27.25	0.9	36	2,104
Bayan Resources (Rp)	7875.00	-1.3	85	2,625
Cameco (C$)	19.28	-6.3	39	6,240
China Coal Energy (H$)	4.73	0.4	51	14,544
China Shenhua Energy (H$)	19.10	-0.4	8	63,306
Coal India (Rs)	373.70	1.1	46	37,052
Consol Energy (US$)	31.55	0.8	25	7,112
Exxaro (R)	87.54	-4.1	3	2,686
Peabody Energy (US$)	3.79	-14.8	2	1,033
Whitehaven Coal (A$)	1.42	-7.8	36	1,150
Yanzhou Coal (Yu)	15.13	1.0	74	9,033
Industrial Minerals & Others				
Eramet (€)	74.43	-1.8	18	2,199
Iluka (A$)	8.73	2.6	86	2,885
Israel Chemicals (US$)	7.25	3.3	34	9,218
K+S (€)	30.27	4.5	77	6,442
Mosaic Company (US$)	47.16	3.8	51	17,263
Potash Corp (C$)	40.15	4.0	41	27,450
Uralkali (Rb)	149.60	-2.4	50	8,884

** Dual-listed companies, with effective cross-holdings*

Ernst & Young Mining Eye Index



Mining EYe represents the weighted average market capitalisation of the top 20 mining companies on London's AIM market.

Source: Thomson Financial Datastream

Mining Journal's share constituents are reviewed on a quarterly basis.

The companies in the gold section comprise the leading stocks by market capitalisation.

The constituent companies in all other commodity sections are chosen on a subjective basis to include the major producers, and are allocated to sections based on revenue.

Fast-track entry into the share table will apply in the case of significant flotations or company-transforming mergers.

Euromoney indices

May 20 100 on 31.12.88		Change day (%)	Change week (%)	Change year(%)
Global Mining	324.85	-0.51	-3.71	-22.37
Global Diversified Mining	592.29	-0.71	-5.23	-26.31
Global Base Metals	414.10	-0.67	-2.74	-15.45
North American Base Metal†	562.10	-0.94	-6.02	-30.94
Global Gold Index	96.43	0.05	-1.02	-13.42
Global Gold Ex South Africa	124.67	0.23	-0.62	-11.26
North American Gold	118.73	0.49	-1.27	-15.89
Global Coal Mining†	507.25	0.06	-2.07	-25.56
Other Metals/Minerals†	480.36	-0.54	-1.99	-21.43
Latin American Mining*	1326.74	-0.93	-5.98	-35.02
Latin American (Ex Vale)*	1459.60	-0.03	-0.26	-5.27

** 100 on 31.12.89 † 100 on 31.12.85*

This week's main movers

May 20/21	Price	Change %
Top 6 risers		
1 Minsur	1.27	9.5
2 Turquoise Hill Resources	5.46	6.0
3 Centamin	0.70	5.5
4 Centerra Gold	7.40	5.4
5 K+S	30.27	4.5
6 Potash Corp	40.15	4.0
Top 6 losers		
1 Peabody Energy	3.79	-14.8
2 Cliffs Natural Resources	5.00	-14.7
3 Sherritt International	2.58	-11.6
4 Rusal	294.00	-8.8
5 BHP Billiton Ltd	29.24	-8.5
6 Gold Fields	41.35	-8.4

All data on this page sourced from Bloomberg unless otherwise stated

Bloomberg

IRAN SANCTIONS

Deal or no deal?

White & Case considers possible Iran sanctions relief and its impacts on miners and traders

James Killick, John Tivey, Nicole Erb, Rebecca Campbell, Cristina Brayton-Lewis, Sally Tucker and Sara Nordin

Energy and resources companies that have been steering clear of the complexities of three distinct, but overlapping, Iran sanctions regimes would have been encouraged by an interim deal between Iran and international community representatives announced on April 2, 2015.

The 'Parameters for a Joint Comprehensive Plan of Action (JCPOA) regarding the Islamic Republic of Iran's nuclear program' lays a foundation for a final deal to be agreed by June 30, 2015. It also establishes Iran's agreement to curtail its nuclear programme significantly. In return – and provided that the International Atomic Energy Agency verifies implementation of Iran's key nuclear commitments – the UN, EU, and US would give Iran relief from certain nuclear-related sanctions.

Some US and EU sanctions – for example, those relating to certain trade in gold, precious metals and petrochemical products – are already temporarily suspended under an interim agreement reached in November 2013 that expires on June 30, 2015. Some of these suspensions could be extended, and the underlying sanctions even lifted, under a final deal.

That is why companies are paying attention: broader relief for mining companies may be in the pipeline.

The details – that is, what sanctions relief will be provided in exchange for Iran taking steps to curb its nuclear programme – remain subject to ongoing negotiations. The final agreement will likely provide for lifted or suspended sanctions to be immediately "snapped back" into place if Iran violates the deal. In the meantime, sanctions that have not been suspended remain in place.

The issue facing miners and traders is what sort of sanctions relief is on the cards after June 30, 2015. Will trade in gold, precious metals, diamonds, graphite, raw and semi-finished metals, oil, gas and petroleum be liberated? Will it be possible to invest in major resources projects with Iran-related persons or entities, including companies owned or controlled by Iranian companies outside Iran? White & Case is monitoring developments, but in the interim it is possible to recap on what is expected to come and how that might affect and benefit miners and traders.

The EU has tentatively agreed to "terminate the implementation of all nuclear-related economic and financial sanctions", which includes asset freezes; import and export bans relating to oil, gas, petroleum, petrochemicals, diamonds, graphite and raw or semi-finished metals; investment/financing restrictions in the Iranian oil and gas, uranium mining/enrichment and petrochemical industries; and fund transfer monitoring requirements.

Iran's President, Hassan Rouhani

The US Congress has taken an active interest in the negotiations. In May, the US Congress approved a bipartisan bill giving themselves the power to review any deal before sanctions can be waived or lifted and the power to disallow a deal if they enact a joint resolution. President Obama is expected to sign the bill imminently.

Against this backdrop, US officials have been reluctant to give details of the particular sanctions that could be lifted or suspended. Under the 'Parameters for a JCPOA', the US tentatively agreed to "cease the application of all nuclear-related sanctions", but not sanctions related to terrorism, human rights abuses and ballistic missiles.

Relief is therefore likely to relate to "Secondary Sanctions" that target activities with no US nexus. It is unclear whether any deal will provide relief on sanctions applicable to US persons.

Although core nuclear restrictions relating to "sensitive technologies and activities" (such as cargo inspections and a special procurement channel for certain nuclear-related and dual-use items) would remain under a new UN Security Council (UNSC) resolution, the final deal is expected to include substantial UN sanctions relief. All past UNSC resolutions relating to Iran's nuclear programme would be terminated if Iran completes specific nuclear-related actions and replaced with the new core nuclear restrictions UNSC resolution.

Thanks to the interim suspension of sanctions in 2013, trade in gold, other precious metals and petrochemical products is permitted until June 30, 2015. However, the 2013 selective suspension did not extend to trade in diamonds, graphite, raw and semi-finished metals (such as iron ore, aluminium, steel and coal), which is currently sanctioned. In 2013, Iran was the world's third-largest importer of coke, semi-coke of coal, lignite or peat (accounting for 7.5% of world imports) and the world's fourth-largest importer of ingots and other primary forms of iron or steel and semi-finished products (accounting for 6% of world imports by value).

If a deal is struck with Iran before June 30, 2015, producers and traders may have the opportunity to satisfy fresh demand for diamonds, graphite, raw and semi-finished metals. In this distressed commodities environment, we expect that miners and traders will be keen to understand the trade opportunities to come and position themselves to satisfy Iran's demand when it comes to market.

A deal would also impact companies importing from Iran. In 2013, Iran's list of exported commodities (where types were specified) was topped by petroleum oils, crude and gaseous hydrocarbons including petroleum gases. In the same year, the World Steel Association ranked Iran as the 15th-largest steel producing country, accounting for 15.4Mt of global crude steel production.

Currently, trade in steel is sanctioned and the suspension of sanctions in relation to trade, transport and insurance for oil, gas and petroleum is both very limited and complicated by overlapping and differing sanctions regimes. If these sanctions are more broadly – and uniformly – suspended under a final deal, additional steel, oil and gas supply will come onto the market and may drive prices down further. This will likely reduce transport costs across multiple commodities and, for example, provide further welcome cost relief for seaborne iron ore exporters.

Furthermore, if a final deal suspends or lifts sanctions on fund transfers, doing business with Iran-related persons or entities, including companies owned or controlled by Iranian companies outside Iran, will become much easier. Existing joint ventures with such companies may be able to ease measures/protections introduced due to sanctions regimes, and farming-out joint-venture interests to an Iran-related person or entity may be an option that is back on the table.

It should be assumed that existing relief will expire on June 30, 2015, and existing sanctions will continue until a deal is struck. But if a deal is struck, more sanctions relief and therefore trade and investment opportunities can be expected. Miners and traders alike will be affected and potentially stand to benefit.

OBITUARY

Developer and community leader

Courtney Charles Chamberlain, December 1944 – April 2015

David Royle

Courtney Charles Chamberlain was born on December 17, 1944, in Rochester, Minnesota, US, and died in Melbourne, Australia, on April 20, 2015, after a short illness. His father, Clair C Chamberlain, was a mining engineer who no doubt motivated Courtney to pursue a career in the same industry.

Courtney obtained a BSc in Metallurgical Engineering in 1967 and an MSc in Metallurgical Engineering in 1969 from the University of Idaho.

His early career was spent at Newmont's Tsumeb mine in Namibia, where he developed a great love of the African bush and its wildlife. He became a keen photographer and loved to go on intrepid safaris with his lifelong friend and mentor Peter Philip. While at Tsumeb, Courtney and Dick Banghart established the Tsumeb Swim Club which, after a few years became the top swim club in Namibia. Some exceptional athletes were trained there, who garnered not only country but even a few world age-group records.

Courtney was always looking for new opportunities and challenges, so in the mid-1970s he moved to Western Australia to join the Newmont team developing the newly discovered Telfer gold mine located in the Great Sandy Desert. Courtney's first task was to oversee the design of the metallurgical lab and gold room at Telfer. He was the first mill superintendent in 1975-1977 under the management of Bert Mason, who was then site manager. Courtney was resident manager twice at Telfer: first in 1977-79, when he took over from Bert Mason; and later in 1982-1984. The Telfer mine had a nominal eight-year life when Courtney first went to site. It is still operating some 39 years later in large part due to his initiatives.

Courtney was also involved in the development of the New Celebration mine south of Kalgoorlie in 1985-1986.

In the late 1980s he played an important role in the creation of Newcrest Mining Limited from the merger of Newmont Australia and BHP Gold. He took a strong interest in all the exploration efforts in Newcrest, including the deep drilling programme at Telfer that resulted in major discoveries of the deep gold reefs. In NSW Courtney encouraged exploration for bulk tonnage low grade Cu-Au mineralisation, which led to the Cadia discovery and in 1995-1996 he subsequently headed the feasibility and development of the Cadia Mine. He quickly saw that sub-level caving could make the Ridgeway discovery a cash cow.

Courtney Chamberlain influenced mine developments and communities in nearly 40 countries

Elsewhere he supported the Pacific Rim exploration effort that resulted in the Gosowong gold discovery in Indonesia, Rio Blanco copper deposit in Peru and Cerro Negro gold deposit in Argentina. Courtney's contribution to Telfer, Cadia and Gosowong – the foundation stones on which Australia's largest independent gold company is based – will live long in the corporate history of Newcrest.

After leaving Newcrest in 1996 Courtney launched himself on a new career path. He joined Graham Tuckwell in Melbourne as a founding partner at Investor Resources Limited, a boutique technical and financial consultancy to the international mining industry.

Courtney, however, was at heart a developer and operator, so in 2000 he was instrumental in the establishment of Minera IRL Limited in Peru, together with Barrie Sullivan and Diego Benavides. He was recognised as the driving force behind Minera IRL in the role of executive chairman for the 10 years before his death. In that time he led the successful development of Corihuarmi gold mine and completion of a definitive feasibility study of the emerging Ollachea gold project.

Corrie Chamberlain, Courtney's son, has maintained the family's mining industry tradition, becoming an exploration geologist, a fellow passionate traveller and explorer with Courtney. They trekked in the Patagonian Alps together and enjoyed glacier travel in the US Rockies and Alaska.

One of Courtney's great strengths throughout his career was his interaction with local communities; he firmly believed in bringing everyone along with the mining venture at hand. This was wonderfully demonstrated by the mutual trust and respect he generated between Minera IRL and the indigenous community of Ollachea through his generosity, honesty and love.

In summary, Courtney Chamberlain was one of the most experienced and respected mining professionals in Australia, with exceptionally strong mine development, project management and technical skills. He was a metallurgist by profession with over 40 years' experience in 39 countries.

Courtney was greatly admired and respected by all who came to know and work with him. He was a bottom up manager, a good listener with excellent interpersonal skills. He believed that good outcomes were best achieved though friendship, based on the premise that each person is a human being to whom you should give exactly the same amount of attention and respect, whether they are a child in a Peruvian village or a CEO of a major mining company.

He was a man of small stature but with huge reserves of energy, enthusiasm and drive with a steely determination to get the job done to the highest standards. At the same time he achieved positive outcomes with his sharp intellect and humour.

On behalf of his professional associates and friends in the mining industry, we offer our most sincere condolences to all the members of Courtney's family.

We honour and salute Courtney Chamberlain's exceptional service and legacy to the mining industry and his contribution to the social fabric of the communities he so closely worked with for over 40 years, particularly in Namibia, Australia and Peru. ▼

Compiled and written by David Royle, a lifelong colleague and friend with contributions from other close friends and colleagues Doug Buerger, Doug Jones and David Tyrwhitt

Opinion

VIEW FROM THE WEST END

Running for the door

Great mines make good companies, but great minds can produce great ones

"The ability to inspire rather than enforce loyalty is a critical quality of leadership." – Geoffrey Hindley

Loyalty is a thin commodity on the ground these days, it seems. As I wrote some weeks back, my beloved golf is going through something of a sticky patch. Much of this was self-inflicted as I mentioned at the time, but much also stems from a change in priorities.

For reasons I have yet to fathom, middle-aged men with young families seem no longer allowed to spend nine hours on a Saturday with their chums at the golf club batting a ball about and drinking. Somewhere, somehow, expectations changed and I can't put my finger on when that was.

In the old days fatherhood was somewhat simpler and very much a hands-off activity: provide food and shelter, be that scary bogie man for those "just wait until your father gets home" moments, and occasionally march off to Europe to be slaughtered repelling Jerry.

Post-conception, any physical or emotional participation in child rearing was very much voluntary, if indeed not actually forbidden until it was time to attend graduation ceremonies or give daughters away at weddings.

Being a product of that time, it seemed to work just fine for me, but now dammit, we have to bog in – we have to change nappies, we have to cook, we have to kick footballs, we have to know the names of teachers and friends, take kids to parties and by and large take an interest. As I write this, having just returned from an hour huddled beneath a plastic tarp in torrential rain scoring for my dear little daughter's netball match, there are some pleasures to this parental involvement, but comfort isn't one of them.

Golf clubs are expensive beasties to build and maintain, and without the loyalty of members they don't work. Annual dues are a large part of that, as is tossing money over the bar, but one component that is under pressure is the nomination fee – that large, non-refundable wad of cash, anything from one-to-ten-times the annual fee, that new members hand over for the privilege of then handing over more wads every year until they die.

In theory, this controversial fee is justified as being a contribution to the millions that have over the years been poured into the course and buildings, but in reality, clubs charge it because they can. Despite the downturn a posh club with an amazing course in a nice spot will still have prospective members lining up to pay it, while the lower tier clubs out the back of the housing estate no longer have this luxury, and that is the start of a slippery slope. Not only does a couple of hundred grand a year from new members make a nice dent in the bottom line, but it engenders loyalty.

Perhaps it does not engender it in the right way, but having thumped a fistful on the table, new members will invariably go on to become old members as the large upfront investment tends to encourage longevity of membership even in the face of time spent at netball games, and that makes a difference. Traditions are forged and maintained, club memory is preserved and in general a sense of belonging is engendered that simply does not form when members can come and go as they please.

Having been on the pointy end of a few involuntary departures from mining companies, I can attest that loyalty is not a word that finds its way into too many mining HR manuals. Yes, there is the façade of love and affection, but it's a thin one at the best of times and non-existent at the worst.

It wasn't too long ago that the miners were bemoaning the disloyalty of their mercenary staff jumping from job to job as regularly as the rest of us change underwear. Apparently it was all their fault that capital costs escalated out of control and not at all to do with dopey directors, sycophantic lickspittle executives and their tenuous grasp of reality. If only the staff were more loyal then none of this would have happened.

But the worm turns and suddenly those valuable employees seem less valuable and loyalty seems an inconvenient liability.

Some chums back in Australia have been of late regaling me of the latest human carnage that has befallen the industry during any given week as this company or that belatedly gets around to making the cuts it should have made 18 months ago. We have been there before, so no major surprises that companies time after time pay such scant regard to corporate memory. Predictably it seems, many of those being let go are the senior people, on the presumably rational premise that they are the most expensive – but the result is a dumbing down. This is not to denigrate the bright young things that remain, but I hear now from my mates in the service industries that the miners have rid themselves of the people that know stuff and can do stuff and so now they are forced to deal with a corporate kindergarten.

The number of times over the past few months someone moaned to me that so and so large company has decided on a moronic course of action simply because the people with the experience and common sense to prevent it were retrenched. The numbers of times consultants are asked to provide expensive advice on some complex issue the company used to be good at. The number of times mistakes are repeated because those that made them the first time around are no longer there to advise. Big companies used to be full of clever people, but it just seems they are full of compliant people.

And yet the mines continue, which I guess speaks volumes for the quality of the mines, but not every company has that luxury.

Four years ago this week, Glencore sprung fully formed upon the public markets of the world. Not a miner, but a trader, and as such at the time no nice mines that could continue to operate even if the talent pool was thinned. Its revenue were its people and their talent, and so quite logically, the really valuable ones were shackled to their desks with lock-ins that prevented them selling their very, very large piles of shares for some years. Quite a few of those lock-ins expire this week and it will be interesting to see how many decide to go golfing. Glencore clearly has developed a defence by absorbing Xstrata, but a large chunk of its revenue remains exposed to talent simply walking out the door – a door that has just opened a chink.

One wonders then if Ivan, who is on the record as saying he does not believe in life-work balance, will get all cuddly on us? I won't wait around. ▼

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