MODERN MINING

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IN THIS ISSUE...

SOUTHERN AFRICA'S TOP MINING PROJECTS

- Major upgrade underway at Karowe
- Liqhobong enters construction phase
- Khoemacau – Botswana's next copper mine

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COVER

A blast by leading explosives supplier and blasting specialist BME. See page 22 for an interview with Francois Hay, Managing Director of BME.

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CONTENTS

ARTICLES

REGULARS

MINING NEWS

PRODUCT NEWS

Novatek profile

Established in South Africa in 1979, Novatek has been a pioneer in hydropower ever since. Based in Gauteng, wholly South African owned, and a level 7 BBBEE contributor, Novatek develops and manufactures innovative rockdrilling and mining machinery, with the objectives to make mining safer, more profitable and to make new technology implementation easy for our clients.

The energy-saving benefits, productivity and safety of hydropower are becoming increasingly important in meeting the challenges facing the South African mining industry and Novatek is considered a market leader in the design and development of water-powered rockdrills and in localised turnkey hydropower systems.

Novatek's expertise lies in hydropowered mining equipment and they supply a range of products and services that include: complete turnkey hydropowered mining systems, rockdrills for hand-held and rig use, drilling and roofbolting rigs, mining tools, powering systems, reticulation equipment, onsite contract maintenance and hydropower training, assessment and moderation.

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Novatek operates nine mine-site workshops for key customers in addition to its head-office workshop in Robertsham, Johannesburg and our customers include blue chip mining operations in the gold, platinum and contract mining industries. The head office houses a 3 800 m² factory, stores, workshops and assembly areas and manufacturing is done in-house in a well-equipped facility to ISO 9001 standards.

Products are all engineered in-house using three-dimensional computer-aided design systems, the firm's data acquisition capability and dedicated development and testing facilities. Novatek holds a number of patents on its products.

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Mining in 2015 off to a less than stellar start

Last year wasn't a great year for mining and the early signs for 2015 suggest that it's probably not going to be any better. Copper has finally got into step with all the other commodities and has taken a tumble to five-year lows, Eskom is promising us nothing but "blood, sweat and tears", there are signs of fresh labour turbulence in the platinum sector and a number of mines and mining companies are struggling to survive. Every cloud is supposed to have a silver lining but it's hard to discern one in mining at the moment – unless it be the fact that the low oil price will certainly reduce operating costs at all mines, open-pit mines in particular.

The woes of the mining sector are exemplified by the news from Shaft Sinkers that it has lost several contracts in South Africa, having received 'notices of termination' from Implats in respect of its Leeuwkop and Impala 16 Shaft contracts and from RBPlat in respect of the Styldrift 1 contract. According to Shaft Sinkers, the notice of termination concerning the Leeuwkop contract stated that the termination of the project was due to the prolonged strikes in the platinum industry.

Shaft Sinkers' financial woes have resulted in CEO Alon Davidov and CFO Christopher Hall leaving the company "with immediate effect" with Non-Executive Chairman Marius Heyns stepping into the breach as Executive Chairman. Let's hope that he can keep the company together. It was founded in the early 1960s as the shaft-sinking arm of Anglo American and its demise – given its vast expertise and its record of innovation in shaft-sinking technology – would be a blow to the global mining industry.

Another sign of the times is the news that Beacon Hill, the coking coal developer which owns the Minas Moatize mine near Tete in Mozambique, has had to call in the administrators. Minas Moatize is not a big operation when set alongside the scale of its neighbours – Vale's Moatize mine and Benga, now owned by an Indian consortium – but the problems it has encountered are, at least in part, indicative of the poor state of the international coal market.

Moving to another of South Africa's neighbours, Botswana, the new Boseto copper mine in that country is also proving problematic, with its owner and operator, Australia's Discovery Metals, announcing in December its decision to place the operation on care and maintenance within the next six months.

Boseto – located in the so-called 'Kalahari Copperbelt' running between Maun and Ghanzi – has never lived up to its promise since being commissioned in 2012. Its problems are not only a result of the copper price falling by about US$1 000 a tonne over the course of 2014 but also reflect the fact that Discovery originally chose to go the open-pit mining route rather than pursue underground mining – the option selected by its neighbour Cupric Canyon Capital, which is in the process of developing its Khoemacau mine, just several kilometres from Boseto (as we explain on page 62 of this issue).

The Boseto story might yet have a happy ending as Cupric Canyon – run, incidentally, by a team of highly experienced copper mining executives who cut their teeth at the old Phelps Dodge – is in talks with Discovery to acquire the Boseto asset. Its plans for the property – should a deal go through – have not been disclosed at this stage but there are clearly huge potential synergies between Boseto and Khoemacau. Discovery has said that it will update the market on its discussions with Cupric in the second half of this month (January), so probably there will be more news by the time this issue is in print.

Diamonds, of course, have not been affected in the same way that other commodities have by the current weak state of the global economy, and certainly it is very encouraging (see page 56 of this issue) that Firestone Diamonds is pressing ahead with the construction of its new Liqhobong mine in the highlands of Lesotho, which will produce more than a million carats a year. On the downside, though, Lucara has decided to divest itself of its Mothae property, which is a near neighbour of Liqhobong. Mothae, which has been subjected to three phases of bulk sampling, is a relatively minor project in the scheme of things so this news is not too significant – but it's nevertheless consistent with the generally negative trend we're seeing in mining.

It's going to be fascinating to see what the mood is at the upcoming Mining Indaba in Cape Town – always a good gauge of the health of African mining. I'm not expecting it to be very positive but perhaps I'm in for a surprise and we'll be able to report in our February issue that the outlook is not as dismal as feared. But I wouldn't count on it!

Arthur Tassell

Copper has finally got into step with all the other commodities and has taken a tumble to five-year lows, Eskom is promising us nothing but "blood, sweat and tears", there are hints of fresh labour turbulence in the platinum sector and a number of mines and mining companies are struggling to survive.

The metallurgical plant at Otjikoto (photo: B2Gold).

New Namibian mine pours its first gold

Bill Lytle, MD of B2Gold Namibia, with Otjikoto's first gold bar (photo: B2Gold)

Canada's B2Gold Corp reports that the first gold pour has occurred, ahead of schedule, at its new Otjikoto gold mine in Namibia. Otjikoto is only the second Namibian gold mine and – says B2Gold – has made history as one of the fastest-moving mine construction projects in the country.

B2Gold received the Otjikoto mining licence in late 2012 and bush-clearing started in January 2013. With the groundbreaking ceremony held on 26 April, 2013, construction of the Otjikoto gold mine was officially underway. Since that time, the team has placed over 1,3 million m^3 of earthfill, over 20 000 m^3 of concrete and has worked over 3 million man hours.

The nations represented in the construction crew include Namibia, South Africa, Canada, the US, Russia, Ghana, Italy, Portugal, Mexico, Peru, Chile, the Philippines and Nicaragua. "As a result of their incredible work, B2Gold now has a world-class mine and processing facility in Namibia," says the company.

B2Gold's wholly owned subsidiary, B2Gold Namibia, entered a transition phase several months ago from construction to steady state. The focus of this plan is the end of construction and preparation for production and operations.

Otjikoto achieved a substantial and significant overall safety performance during 2013 and 2014. During the construction phase of the project a number of significant safety achievements were recorded: there were no fatal incidents, there was a year-to-date Lost Time Accident Frequency rate of only 0,08 (project-to-date 0,16) and over 2 million man hours were worked without a single Lost Time Injury (reached on 29 June 2014).

The mine is located approximately 300 km north of Windhoek between Otjiwarongo and Otavi and is owned 90 % by B2Gold and 10 % by EVI Mining

Kangala colliery passes its project Completion Tests

ASX-listed Universal Coal has reported that its Kangala colliery near Delmas in Mpumalanga has successfully met project Completion Tests to the satisfaction of debt financier Rand Merchant Bank (RMB). Universal says this represents another significant milestone for the company, marking the official transition to steady state operations for Kangala.

Located near Delmas in the Witbank coal field of South Africa, Kangala is a 2,4 Mt/a run-of-mine (ROM) operation, with installed plant capacity to expand to 4,25 Mt/a. The operation is cashflow positive, with the majority of its thermal coal product supplying South Africa's primary power utility, Eskom.

Completion testing for a continuous period of 90 days commencing on 1 August 2014 and running through to 31 October 2014 was deemed satisfactory according to the 'Independent Technical Advisor' based on their assessment of the mine safety record, various designs, mine plan, mine production performance, product yields and qualities, plant performance and customer delivery.

Universal Coal has now fully complied with its performance obligations and qualifies for more attractive project finance facility terms. Furthermore, the Kangala colliery is now entitled, under certain circumstances, to make permitted cash distributions to its shareholders in the form of shareholder loan repayments and/or dividend distributions.

Universal Coal has also provided an update on its NCC (New Clydesdale Colliery) project in the Kriel District south of Witbank and says it only awaits approval of the Section 11 from the Department of Mineral Resources prior to finalising the impending NCC acquisition, which is expected to conclude early this year. At present, the opencast tendering process is underway on Roodekop while discussions are ongoing with underground mining contractors in order to re-activate the workings once NCC is started up.

A bankable feasibility study as part of the debt funding is also progressing,

(Proprietary) Ltd, a Namibian empowerment group.

For 2015, Otjikoto is expected to produce between 140 000 and 150 000 ounces of gold at a cash operating cost of approximately US$500 per ounce and all in sustaining costs of approximately US$700 per ounce.

Once the planned mill expansion is completed in the third quarter of 2015, B2Gold expects annual gold production to increase to approximately 200 000 ounces in 2016 and 2017. Otjikoto's gold production will also be enhanced by the development of its Wolfshag zone, located adjacent to the main Otjikoto pit. The company expects to complete an updated indicated resource study in the first quarter of 2015 along with an updated mine plan by the end of 2015 which will evaluate open-pit and underground mining at Wolfshag.

Namibia is not known as a significant gold producer, with – for many years – only one active gold mine, Navachab, in the country. Navachab, which produced just over 60 000 ounces of gold in 2013, was originally owned by AngloGold Ashanti but was acquired by QKR Corporation last year. Otjikoto is a much bigger operation and will result in Namibia's total annual gold production being substantially increased.

B2Gold is a Vancouver-based gold producer with four mines around the world: El Limon and La Libertad in Nicaragua, the Masbate mine in the Philippines and, of course, Otjikoto. The company is projecting to produce approximately 540 000 ounces of gold in 2015 and approximately 610 000 ounces of gold in 2017. ■

anticipated to be finalised in the first quarter of 2015, to allow for the seamless development of the joint operation. The equity component of the mine financing was successfully raised as part of the A$25,5 million capital raising undertaken with Ichor Coal and Coal Development Holding during October 2014.

Universal Coal remains on track to deliver this operation to the market during 2015, having successfully developed and commissioned the Kangala colliery during the 2013/2014 year. The combined operations will have an installed capacity in excess of 6,25 Mt/a of processing capacity, with expected ROM of 5 Mt/a. ■

Tschudi enters the final straight

Weatherly International, whose shares are quoted on London's AIM, says its Tschudi copper mining project in northern Namibia is continuing to make good progress. Comments company Chairman John Bryant: "Tschudi is on track to commence production in the second quarter of this year. I must congratulate our UK and Namibia teams on the progress they have made."

Tschudi is an open-pit mine which will use heap leaching, solvent extraction and electro-winning to produce high quality copper cathodes. The mining reserve is 22,7 Mt at 0,86 % Cu, sufficient to support an annual production of 17 000 t Cu over a mine life of 11 years.

Mining at Tschudi has been underway since July 2014 and ore continues to be stockpiled in readiness for the crushing plant to come on line.

On 19 December, 2 000 tonnes of ore were run through the crushing and agglomeration plant as a pre-commissioning test with the plant achieving the desired throughput rates. A second 2 500 tonnes was crushed and agglomerated on 2 January this year, this time focusing on achieving the required agglomerate quality under full throughput. This resulted in some minor modifications that have now been completed.

Leach Panels One and Two are close to completion (as of early January) and will be ready to receive ore once the crushing plant is in operation. The raw water and raffinate ponds have been completed and were filled with water over the Christmas break.

On 17 December, the first acid road tankers arrived from the Rössing uranium mine and began unloading into the newly commissioned acid storage tank, with approximately 650 tonnes delivered.

Originally, acid was to be sourced from the nearby Tsumeb smelter but construction of the smelter's acid plant has been delayed. As an interim move, Weatherly has signed a one-year contract with Rössing Uranium to import acid through the port of Walvis Bay. Imported prices are currently lower than those offered by the smelter and, as a result, the contract (with Dundee Precious Metals) is being renegotiated.

On 14 December, Nampower (the Namibian power utility) signed off on the high voltage installation, enabling the site to switch to the main grid supply when ready and replacing the temporary generating sets that have been used for much of the commissioning work.

Recruitment of the Weatherly workforce is complete and operators are currently undergoing training under the supervision of the specialist commissioning group, PPM Global.

Commissioning of the SX-EW will commence as soon as there are sufficient stocks of pregnant leach solution available at the required grade. ■

Heap leach pad construction at Tschudi in November last year.

Murray & Roberts companies have 22 shafts underway

The Murray & Roberts Underground Mining platform not only has growth in its order book but – with 22 active shaft projects underway globally – is the single most active shaft-sinking group in the world outside of China. This is according to Allan Widlake, Business Development Executive of Murray & Roberts Cementation.

Sinking headgear at the Gloria Shaft in South Africa.

The Murray & Roberts Group has sunk the deepest single-lift shaft in South Africa (at South Deep), the deepest single-lift shaft in the USA (at Resolution) and the deepest shaft in Canada (at Kidd). It is also busy sinking what will be the deepest shaft in the US, namely a winze, at Lucky Friday.

The platform comprises the following businesses: Murray & Roberts Cementation (Johannesburg-based); Cementation Canada (North Bay-based); Cementation USA (Salt Lake City-based); Cementation Sudamérica (Santiago-based) and RUC Cementation Mining (Perth-based).

The Murray & Roberts Group consists of three additional operating platforms. The new Oil & Gas platform was previously known as Construction Australasia Oil & Gas and Minerals, the Energy & Industrial platform was previously known as Engineering Africa while the Infrastructure & Building platform was previously known as Construction Africa and the Middle East.

"The Underground Mining platform will be the main focus at Mining Indaba, with the other three platforms participating too, as a large part of their business is exposed to the mining sector. We believe that Mining Indaba 2015 will be the premier event to showcase our total service offering to the mining industry, with synergies across all four operating platforms," Widlake says.

"We are utilising both the Australian and Canadian experience in our platform to introduce First World development and shaft-sinking expertise to the South African mining industry," Widlake says. Additional cooperation between South Africa and Australia has involved the establishment of internal joint ventures to bring skill sets together for projects elsewhere in Africa.

Murray & Roberts Cementation itself is focusing on West, Southern and East Africa as its main target markets. "We have opened an office in Zambia and entered into a partnership with Enterprise Générale Malta Forrest (EGMF) in the Democratic Republic of the Congo (DRC). In terms of Ghana, the Murray & Roberts Group opened an office in Accra in 2013," says Widlake.

He adds that in Zambia, Murray & Roberts Cementation is blind sinking and equipping the main shaft at Mopani Copper Mines' Synclinorium project. Similarly, Murray & Roberts Cementation is carrying out shaft sinking and high speed development at the Mufulira Deeps expansion project for Mopani Copper Mines.

In South Africa, Murray & Roberts Cementation is delivering a twin vertical and single decline shaft (blind sink) at Sasol's Impumelelo. It is deepening the No 1 and 3 shafts at Petra Diamonds' Cullinan mine, in addition to slipe and line development, while it is blind sinking a ventilation shaft at Assmang's Gloria mine. ■

Shanta Gold appoints Chief Operating Officer

Shanta Gold, which operates the New Luika Gold Mine (NLGM) in the Lupa goldfield of south-west Tanzania, has announced the appointment of Dr Toby Bradbury to the senior management team as Chief Operating Officer, effective from 1 January 2015.

Shanta's CEO, Mike Houston, has informed the board of his decision to retire on 31 March 2015 upon the completion of his contract and it is intended that he will be succeeded by Dr Bradbury as CEO effective from 1 April 2015.

Dr Bradbury has 30 years' experience in corporate, strategic and operational roles across a broad range of commodities and geographies through which he has gained significant expertise in opencast and underground mining operations, as well as in the delivery of development and expansion projects. Previous executive roles have included Chief Operating Officer for Anvil Mining in the DRC and Senior Vice President at AngloGold Ashanti in Ghana, where he had full accountability for all in-country operations for both underground and surface mining with gold production capacity of 600 000 ounces per annum. He has a BSc and PhD in Mining Engineering and a Masters degree in Business Leadership and is a Fellow of IMMM and AusIMM.

"We are delighted to welcome a mining professional with the experience and track record of Toby to the management team," comments Shanta's Chairman, Tony Durrant. "With the need to deliver both opencast and underground mining at New Luika in the coming years, Toby will add significant value in guiding the company through this critical period in its short history. Joining now as Chief Operating Officer will allow for a suitable period of transition and help to ensure a seamless handover.

"Mike joined us on a 30-month contract in October 2012 with a remit to address start-up issues at the New Luika mine, develop a management team, strengthen the balance sheet and develop a life of mine and growth strategy. Mike has accomplished a number of important milestones during his successful tenure. Production has grown significantly from 5 748 ounces in Q4 2012 to being on track to produce 83 000 ounces in 2014 at an all-in sustaining cash cost of US$900 to $950 per ounce, and is targeted at 83 000 to 85 000 ounces in 2015 at a reduced all-in sustaining cash cost of US$830 to $880 per ounce." ■

Savannah defines maiden resource at Jangamo

AIM-listed Savannah Resources has defined an initial maiden inferred mineral resource estimate (MRE) at its Jangamo heavy minerals sand project. Jangamo is located in a world class heavy minerals sands province adjacent to Rio Tinto's major Mutamba mineral sands deposit in southern Mozambique.

Comments Savannah's CEO, David Archer: "We are delighted to announce a maiden inferred mineral resource estimate of 65 Mt at 4,2 % THM (Total Heavy Minerals) from a modest initial round of resource drilling over part of the eastern arm of the Jangamo tenement. The MRE provides us with a very solid resource base to build on with further resource drilling. The deposit we have identified is part of the very large Mutamba heavy mineral sands system with excellent potential to further expand the mineral resource in Savannah's tenement area. The mineral resource identified remains open along strike.

''We have also identified a major HMS (Heavy Mineral Sands) system in the western part of the tenement with excellent intersections of up to 45 m at 3,51 % THM from 12 m in JMRC133. The western system, which extends over at least 10 km in strike, requires further exploration to be undertaken prior to resource drilling.

"Jangamo is part of a very large system and we are focused on defining a higher grade project that has superior economic characteristics for the development of a profitable mining operation with modest capital costs. Importantly, much of the mineral resource is from surface. This complements the favourable local infrastructure setting that benefits from nearby roads, power and port.

''We will now look to assess a number of promising commercial and strategic options for Jangamo following on from the definition of the maiden MRE. This is being done in parallel with the field programme in Mozambique which is expected to recommence in March following the wet season with work to focus on expansion of the current resource base." ■

Jangamo is located in southern Mozambique adjacent to Rio Tinto's major Mutamba mineral sands deposit.

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Liberian project showcases Zest WEG's capabilities

The Zest WEG Group is showcasing its full suite of products and manufacturing capabilities at a flagship infrastructure and iron ore mining project in Liberia. This follows Group company EnI Electrical clinching two major contracts for ArcelorMittal at Buchanan Port in Liberia as well as at the Tokadeh iron ore mine near Yekepa in Nimba County.

"These projects will serve as a vehicle for the Zest WEG Group product portfolio to arrive on site," says Trevor Naude, MD of EnI Electrical.

One of Africa's largest electrical construction companies, EnI Electrical forms a significant part of the Zest WEG Group's value addition and total service package for the African mining industry.

"While the Zest WEG Group is well known as an importer and distributor of WEG electric motors from Brazil, one of the largest ranges of its kind in the world, our full product line-up includes transformers, switchgear, variable speed drives, motor control centres, gensets and renewable energy solutions. We also have three fully fledged manufacturing facilities in South Africa that we are in the process of expanding as we increase our footprint in Africa," Louis Meiring, CEO, Zest WEG Group, says.

Steel and iron giant ArcelorMittal is currently mining and shipping 5 Mt/a of iron ore a year from its Phase 1 operations in Liberia. A Phase 2 expansion project will boost shipments to 15 Mt, with first production earmarked for end 2015.

The first contract focuses on a ship loading facility at Buchanan Port, where EnI Electrical will construct 6,6 kV overhead power lines in addition to all medium voltage infrastructure, electrical infrastructure and instrumentation works.

The second contract relates to mine infrastructure at the Tokadeh iron ore mine, which has a rail link to Buchanan Port. "We are responsible for all overhead line infrastructure from medium voltage to all the electrical work and instrumentation," Naude explains. "This flagship project represents what EnI Electrical has been striving towards since its inception. We are positioning ourselves as the electrical infrastructure construction team within the Zest WEG Group." ■

The Tokadeh iron ore mine near Yekepa in Nimba County in Liberia, where the Zest WEG Group's EnI Electrical is responsible for all overhead line infrastructure.

Lucapa kicks off at Lulo diamond concession in Angola

Bulk sampling operations at Lulo.

Lucapa Diamond Company, listed on the ASX, says that the mining of alluvial diamonds at its Lulo diamond concession in Angola will start this month (January).

This follows the recent announcement that Lucapa and its fellow project shareholders had signed a comprehensive mining agreement providing them with a 35-year licence to mine alluvial diamonds at Lulo. The licence covers a 218 km^2 area where Lucapa has been recovering alluvial diamonds of exceptional size, colour, quality and value from its bulk sampling activities.

As part of the diamond mining preparations, Lucapa is evaluating various debt financing options to fund the following Phase 1 optimisation and technology improvements:

- A 150 t/h treatment plant – modifying the receiving module into a full wet front end to allow for wet gravel reception during the heavy rainfall months;
- Recovery plant – investment in new X-ray transmissive technology to optimise recovery of low luminescent Type IIa diamonds, which bulk sampling results have proven are a significant portion of the diamond population; and
- Working capital – Phase 1 mining throughput will be increased monthly to 14 000 bulk cubic metres per month within H1 2015 and working capital for this ramp-up period is required. The working capital requirement will be supplemented with the sale of a third parcel of diamonds during Q1 2015.

Lucapa's new Chief Executive Officer, Stephen Wetherall, said the plant efficiency improvements and technology investment would enable Lulo to meet its Phase 1 mining throughput target of 14 000 bcm per month before the end of H1 2015.

Thereafter, a second phase capacity increase, through the sourcing of additional earthmoving equipment and in field screening units, will see mining activities ramping up to supply gravels for a targeted plant throughout rate of 40 000 bcm per month.

Wetherall noted that mining under Phase 1 would focus on select areas within the mining licence area that produced higher grades during the alluvial bulk sampling programmes.

"The pits we have bulk sampled to date have delivered an overall average grade of just under 11 carats per 100 m^3," he stated. "However, as is the nature of an alluvial resource versus that of an open-pit hard rock mine, we are able to more easily adapt our mine plan to target specific high grade areas without compromising future mining. If we were to target areas that produced bulk sample grades greater than 5 carats per 100 m^3, our average sampled grade increases to around 15 carats per 100 m^3. These higher grade resource areas will be the focus of our Phase 1 mine plan." ■

Tiger Resources to postpone Kipoi expansion

In an update on its operations at the Kipoi copper project in Katanga in the DRC, Australian miner Tiger Resources says that the ramp-up of the solvent extraction and electrowinning (SX/EW) plant at Kipoi has been successfully completed and the operation continues to achieve nameplate production at an annualised rate of 25 000 t/a.

While the Kipoi Phase 2 expansion to 50 000 t/a continues to represent a low-risk, low capital intensity growth option with attractive returns, Tiger says it considers it prudent to postpone the expansion until the forecast balance sheet ratios comfortably support the required capital expenditure profile.

Postponement of the expansion will enhance balance sheet strength as net cash flow from the existing 25 000 t/a production will reduce the level of net debt, says Tiger. In addition to the deferral of capital expenditure associated with the expansion, the current SX/EW operations will continue to process ore from existing stockpiles at Kipoi, thereby extending the period before recommencing mining activities.

Tiger is reviewing term sheets for long-term financing arrangements with the aim of restructuring existing debt with longer-dated facilities. This will include refinancing the Taurus bridge facility which is due for repayment in mid-October 2015. The company is confident that this process is on track for completion during the first half of 2015. Following the refinancing, Tiger will re-evaluate the development timeline for the Kipoi Phase 2 expansion. ■

Amara lifts Yaoure indicated resources by 63 %

AIM-listed Amara Mining plc has announced an updated NI 43-101 compliant mineral resource estimate for its 100 %-owned Yaoure gold project in Côte d'Ivoire.

The project is now estimated to have a resource of 6,8 million ounces – 4,4 million in the indicated category (106,3 Mt at 1,29 g/t) and 2,4 million in the inferred category (63,0 Mt at 1,19 g/t). The updated estimate represents a 1,7 million ounce (63 %) increase in the higher confidence indicated category compared to the mineral resource update announced in September 2014.

According to Amara, Yaoure is the largest gold development project in West Africa in terms of mineral resources. Amara's total mineral resources are 9,6 million ounces – apparently the largest resource base of any London-listed junior miner.

The higher grade indicated mineral resources are contained within US$950 and US$800 per ounce pit shells. The US$950/oz pit shell contains 3,1 million ounces (64, 8 Mt at 1,48 g/t) in the indicated category, a 32 % increase compared to the September resource update, while the US$800/oz pit shell contains 2,6 million ounces (50,7 Mt at 1,57 g/t) in the indicated category, a 44 % increase compared to the previous update.

Amara says there is further exploration upside as the deposit remains open along strike with indications of additional gold in parallel structures to the west (towards surface). A Pre-Feasibility Study (PFS) is expected in March 2015. Amara anticipates that this will confirm the compelling economics outlined in the Preliminary Economic Assessment (PEA) due to Yaoure's excellent existing infrastructure, including the availability of low-cost hydro-electric power. ■

Geologists on site at the Yaoure gold project in Côte d'Ivoire (photo: Amara Mining).

Trial mining at Baoulé pipe going well

Stellar Diamonds plc, the AIM-listed diamond development company focused on West Africa, has issued an operational update on the trial mining at its 5 ha Baoulé kimberlite pipe in Guinea.

The trial mining has yielded a total of 2 145 carats to date (early January) at an average grade of 15 cpht and high quality gems continue to be recovered including stones of 8,5 ct and 6,6 ct. The processing plant is running at the target rate of 50 t/h and a monthly production of 2 000 carats is expected, assuming the average grade of 15 cpht is maintained.

Stellar Diamonds Chief Executive Karl Smithson commented: "We are pleased with the on-going progress of the trial mining at Baoulé. The regular occurrence of larger gem quality stones is highly encouraging, as is maintaining our target plant processing capacity and run of mine grade in order to achieve our objective of processing 2 000 carats per month during 2015." ■

Sishen housing showcases Raubex's turnkey skills

The Raubex Group has showcased its turnkey solutions capability at a 476-unit housing project for Kumba Iron Ore at its Sishen mine at Kathu in the Northern Cape.

"The success of the housing project undertaken for Anglo American at Kumba holds huge potential for Raubex in the mining services sector," says Barend Badenhorst, MD of Raubex Housing.

The housing project forms part of Kumba Iron Ore's commitment to convert all mine hostels in line with the Mining Charter. It is being undertaken by the Raubex Matlapeng Joint Venture.

Construction began in October 2013 and since then the first three phases have already been handed over. The project was complicated by a 6 km long, 700 mm high-density polyethylene dewatering pipeline that bisected the site, a contract awarded in May 2013 to Raubex Infra and scheduled for completion in May 2015.

The latter contract includes a pump station and associated concrete works. Raubex Group companies Raubex Housing built the top structures, L&R Civil was responsible for the 13 km of water and sewer reticulation and Raubex KZN built the 8 km road network. Raubex Housing achieved a rate of 1,7 houses a day with six trucks delivering 60 000 bricks a day.

The project required careful coordination and management as a result of the immense scale and scope. "Essentially this meant building the top structures while simultaneously putting in the water, stormwater and sewerage reticulation, electricity and building the road network," says Badenhorst. "All four of these disciplines were on site at the same time."

Anglo American contract specialist Renier Goosen and Raubex Housing MD Barend Badenhorst on site at the Raubex Matlapeng JV housing project at Kumba Iron Ore's Sishen mine near Kathu in the Northern Cape.

The ground conditions were another challenge as the predominance of calcrete posed a major problem in terms of the installation of bulk services. A Vermeer milling machine was used to trench the calcrete to the required depth, with the minimum depth of the trenches being 1,6 m up to 4 m for the water and sewerage reticulation. This resulted in 80 000 m^3 of waste material that L&R Civil screened and crushed on site for re-use as layer works in the road construction, and to sell into the open market. The top structures on the other hand were built on concrete rafts as opposed to foundations.

About 1 500 workers were on site at the peak, with 12 excavators and ten TLBs at one stage. The workforce has since been scaled back to about 200 as the project enters the finishing stretch, with a single plastering team on site to complete the final eight houses. A key focus was investing in local skills development, with the Raubex Group establishing a contractors' camp on site to provide training in trades such as plastering, bricklaying and carpentry. ■

Redis Construction awarded Asanko contract

Redis Construction Afrika has announced that it has been awarded the SMP contract for the construction of the Asanko Gold Mine (AGM) in Ghana, a milestone step in the company's West African and pan-African growth strategy.

The contract is a ground-breaking one for Redis, as it is the first time the company will be operating in Ghana, and it is also its first project with project owner Asanko Gold Inc and EPCM contractor DRA.

"We were extremely excited to be awarded the contract for the Asanko Gold Mine. This award will see us working very closely with DRA, one of the largest EPCM companies working in Africa. It is the culmination of focused relationship building, and proving our worth in the construction contracting and project delivery arena across Africa," says Paul Edwards, MD of Redis Construction Afrika.

According to Redis, it has established a reputation for excellence and a solid safety track record throughout the continent within a decade.

"We are proud of our track record on a number of industrial projects in Africa," says Edwards, pointing out that Redis has had a presence in the DRC since 2006, securing repeat contracts for several blue-chip mine owners.

"We have also recently completed a highly successful mineral sands construction project in Kenya, and further project work is underway constructing a sugar refinery in Port Harcourt, Nigeria."

The scope of work for Asanko includes supplying and erecting 1 000 tons of structural steel and 1 300 tons of plate work, the erection of 2 000 tons of mechanical items, and the installation of 7 000 m of HDPE overland piping. Completion is scheduled for October 2015.

Diversifying the business into other geographical regions on the continent is part of the company's risk mitigation and growth strategy and West Africa has been firmly on the agenda for a number of years. The company has been targeting opportunities and building relationships with key clients in the region since 2009, according to Edwards. ■

Nachu graphite project heads for development

The port of Mtwara, approximately 200 km from the Nachu site, has sufficient capacity to handle exports from the project.

ASX-listed Magnis Resources has signed a Memorandum of Understanding (MOU) with China Railway 24th Bureau Group Co, Ltd. Under the MOU, the two companies will enter into formal negotiations to secure a contract for engineering, procurement, construction and contract mining for the Nachu graphite plant in south-east Tanzania. The proposed value of the contract is US$150 million.

Magnus says the next steps are a site visit and negotiations for the signing of contracts. All parties are aiming for project development commencement in 2015.

China Railway 24th Bureau Group Co, Ltd is wholly owned by publicly listed China Railway Construction Corporation Limited (CRCC), which is one of the largest integrated construction groups. It ranked 80th among the Fortune Global 500 Enterprises in 2014 and first among the ENR Top 250 Global Contractors in 2013.

CRCC and its subsidiaries – including China Railway 24th Bureau Group Co, Ltd – have a long history of working throughout Africa including on the iconic Tanzania to Zambia rail link. Currently, they are working on a number of major infrastructure projects in Tanzania with over 1 000 employees in the country. CRCC has also been involved in the construction of a number of mining plants in Africa.

Magnis recently announced the completion of a positive PFS on the Nachu project, based on an open-pit operation producing 180 000 t/a of graphite concentrate with an average ore grade of 5,1 % graphite. The PFS put the capex at US$171,4 million with a capital payback period of 1,4 years. It estimated the after tax NPV at US$1 040 million and the IRR at 84 % (at a 10 % discount rate). Operating costs for the first three years of mine life are projected at US$448 per tonne of product.

The plant design is based on a relatively standard crushing, rod mill grinding and flotation process. Several stages of regrind and cleaner flotation have been included.

The PFS was conducted by BatteryLimits of Perth, a specialist process engineering and study management consultancy, in joint venture with LogiMan, a project engineering company based in Johannesburg. The mining study, including mining cost estimates and development of the mining schedule, was conducted by Orelogy Group, a Perth-based mining consultancy. The initial design work on the tailings facility and associated volume estimates was done by Knight Peisold, based in Johannesburg. ■

Kumba reviewing all aspects of its business

In a technical update issued in December 2014, Kumba says that its Sishen mine continues to perform well against its operational plan and remains on track to increase production to 35 Mt in 2014, 36 Mt in 2015 and 37 Mt from 2016. Regarding the Kolomela mine, Kumba states that its life of mine (LoM) production capacity will be increased to 11 Mt/a from 2015. Studies are in progress at Kolomela which could result in increasing production further to 12 Mt in 2016 and to 13 Mt from 2017.

At Sishen, the 'Operating Model', which was implemented in August 2014 at the ore and internal waste mining operations at North mine, is already yielding results including: improving scheduled work to increase efficiencies; a 50 % reduction in waiting time on shovels; and a 23 % efficiency improvement in total tonnes handled since June 2014.

In 2015, the Operating Model is expected to be rolled out to the pre-stripping operations at Sishen mine to meet ramp up requirements, and to the Kolomela plant to increase throughput to 13 Mt/a in the medium term.

Kumba aims to deliver approximately 5 Mt low capex production growth, which includes 2 Mt from Kolomela and the remainder from Sishen.

Kumba anticipates total iron ore production of approximately 47 Mt in 2014, 47 to 48 Mt in 2015, 48 to 50 Mt in 2016 and 48 to 50 Mt in 2017. Blended free on board (FOB) cash costs are expected to be US$35/tonne in 2014, US$39/tonne in 2015, US$40/tonne in 2016 and US$41/tonne in 2017.

In the current low price environment, which is expected to persist, Kumba is reviewing all aspects of its business. This includes optimising its production portfolio, focusing on low cost production, optimally filling the rail line capacity and assessing Thabazimbi mine as part of the portfolio.

It also includes reviewing capital expenditure requirements and costs. Based on the current review, the company is planning to reduce SIB (Stay in Business) capex (including deferred stripping at Sishen and Kolomela) by approximately 20 % and by a further 10 % in 2015 and 2016 respectively when compared to SIB capex guidance disclosed in the 2013 Anglo American Investor Day presentation.

Kumba is targeting reducing exploration, technical and project studies expenditure by approximately 50 % and is assessing a restructuring to deliver on the revised portfolio, potentially reducing Head Office roles by approximately 40 %. ■

A-Cap Resources reports good progress on uranium project

Uranium and coal explorer A-Cap Resources, listed on the ASX and in Botswana, has announced "excellent results" from its recently completed infill drilling programme at its Botswana uranium project (known as Letlhakane), located 80 km south of Francistown. Feasibility work on the project, says the company, is progressing well with good progress on resource work, mining, metallurgy and process design and environmental studies. These studies will support a mining licence application in the second quarter of 2015.

Comments A-Cap's CEO Paul Thomson: "We are very happy with the excellent results from our last drilling programme, which continues to confirm the presence and continuity of high grade mineralisation in shallow zones targeted for early production. This is good news for project economics. Our feasibility work is progressing very well and we are on track and on budget. We are fortunate to be operating in Botswana, a premier mining jurisdiction with stable government and clear and simple mining laws where a strong rule of law applies."

The drilling programme completed in November 2014 was carried out to further define potential early start pits. Previous optimisation studies to determine pit areas highlighted higher grade shallow zones targeted for early production. Best intervals at 200 ppm eU_3O_8 cut off include: 3,25 m at 2 386 ppm eU_3O_8 in hole SERC0364; 2,05 m at 2 124 ppm eU_3O_8 in hole MOKR2582; and 1,25 m at 2 123 ppm eU_3O_8 in hole SERC0362.

Recent trials utilising Uniform Conditioning (UC) and Localised Uniform Conditioning (LUC) resource modelling techniques have been successful. The LUC uses the proposed mining unit which has been reduced in size due to the selectivity of the surface miners that will be utilised. Following the successful current drilling campaign a new resource will be released in 2015.

Ongoing work on the mining operations is continuing and both Vermeer and Wirtgen surface miners are being evaluated which will allow very selective mining of the orebody.

A-Cap is planning to mine on flitches of 0,25 m and anticipates reduced dilution and a reduction in tonnes but an increase in grade by doing so. Grade control will be undertaken using a GPS fitted vehicle mounted scintillometer to provide better than 1 m sampling in pit to a depth of around 0,3 m.

Two haulage scenarios are currently being investigated for delivery of ore to the ROM pad. These are: trucking of the ore or, alternatively, trucking of ore to strategically located belt feeders which will convey the ore to the ROM pad. These initiatives also have the potential to further reduce the operating costs.

SLR South Africa has completed a high level option study to determine the most cost effective and environmentally acceptable heap leach facility. Based on this study, an expanding pad using grasshoppers to convey the agglomerated ore to the pad was chosen, and a detailed engineering study using this option is in progress. This study will also form part of the input into the ESIA.

An acid heap leach route is proposed for all the primary, oxide and lower mudstone secondary ores with a modified solvent extraction system being the principal uranium recovery method. Solvent extraction (SX) testwork was completed successfully at the Australian Nuclear Science and Technology Organisation (ANSTO) at Lucas Heights' facility in Sydney using the pregnant liquor solutions produced from column leaches. Process modelling work was also completed during 2014 indicating that a two-stage leach has significant advantages over a single-stage leach in terms of cost effectiveness. The remaining calcrete and upper mudstone secondary ores will be treated using a separate alkali leach circuit once the main acid heap circuit is in operation.

According to A-Cap, the remaining metallurgical testwork to finalise feasibility studies is progressing very well, exceeding expectations and is due for completion in the first quarter 2015. This work was awarded to two groups, ANSTO in NSW and SGS in Perth. ANSTO has been awarded the contract to complete the final two campaigns of primary and oxide columns, and SGS has been awarded the remaining testwork on the secondary ore, as well as a series of geotechnical/geochemical columns for the engineering study being carried out by SLR Consulting (SLR). ■

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Banro achieves record quarterly gold production at DRC mines

Canada's Banro Corporation has reported its best quarterly gold production since it began producing gold. The company has developed and is operating two gold mines in the DRC – Twangiza and Namoya – located in the 210 km long Twangiza-Namoya gold belt in South Kivu and Maniema provinces. Also on the same gold belt it has the Lugushwa and Kamituga projects, both of which have the potential to be developed into standalone mines.

Twangiza, which was commissioned in 2011, poured 8 071 ounces in October, 9 825 ounces in November and 11 549 ounces in December for a fourth quarter 2014 total of 29 445 ounces of gold. Namoya, which was commissioned last year, poured 1 749 ounces in October, 3 042 ounces in November and 4 000 ounces in December for a fourth quarter 2014 total of 8 791 ounces of gold. Together, Twangiza and Namoya produced 38 236 ounces of gold during Q4 2014.

Throughout 2014, the management teams at Twangiza and Namoya focused on operational and cost efficiencies. In particular, significant steps were taken to ensure that operations were less hindered during the frequent periods of adverse weather conditions at each site. As a result of the operational efficiency drive, Twangiza production has grown significantly throughout 2014 and strong quarterly production improvement has been experienced at Namoya. The production growth of the two operations, during Q4 2014 in particular, provides a strong foundation for meeting steady state production at Twangiza and Namoya.

Banro also reports that it has purchased the agglomeration drum required for the Namoya processing plant enhancement. In order to fast track the time to deliver a drum assembly to site at Namoya, a drum assembly was procured which had been in operation for a few months. The procurement and shipping of a new drum for Namoya could have taken in excess of 12 months.

The drum, its support structure and spare components were shipped by Banro as air cargo to Entebbe in Uganda over the December 2014 holiday period. A road truck convoy is currently en route to Namoya and – as this issue was being prepared – was scheduled to arrive mid-January 2015. Site civil work for the installation of the drum, its feed conveyors and other ancillary equipment commenced in November and commissioning completion is scheduled for mid-February 2015.

"The inclusion of the agglomeration stage (with cement added as a binder) into the Namoya heap leach circuit is expected to allow for more efficient processing of the fines content of the Namoya ore and ensure more efficient reagent percolation in the heap process, leading to better gold recovery," commented Banro CEO and President John Clarke.

With installation of the drum scheduled for completion during Q1 2015, it is anticipated that the gold production profile for the Namoya operations will be raised incrementally from its current level of approximately 4 000 ounces per month achieved during December 2014 to a monthly rate of up to 6 000 ounces per month by the end of Q1 2015. With heap leach operations taking several months of continuous percolation to fully recover the leachable gold, the full benefits of the improvements to the heap leach circuit are expected to build up during Q2 2015 to a monthly gold production rate of up to 8 000 ounces per month by mid-year 2015. ■

Process plant ordered for Zimbabwean tungsten project

Premier African Minerals Limited (PAM), the AIM-traded natural resource company with mineral projects located in Southern and Western Africa, has placed an order for the process plant for the RHA tungsten project (RHA) in Zimbabwe. Premier is the operator of RHA and holds a 49 % interest.

The project is located in the Kamativi tin belt of north-western Zimbabwe and PAM is planning two stages of development – a first phase, low capex (US$4,8 million) open pit, which provides an 18-month life of mine, followed by an underground mine (capex estimate – US$14,7 million) based on mechanised long-hole open stoping. The open-pit annual production will be 96 000 t (ROM) while the underground production rate will be between 192 000 and 288 000 t (ROM).

George Roach, CEO of Premier, commented: "Confirming this order is a further step in the process of re-opening the RHA mine. Although the initial deposit has been paid from our cash on hand, additional finance as set out in our press release of 25 November 2014 will still be required and we continue our advanced negotiations on off-take and/or marketing contracts and other finance options."

A 3D model of the process plant for the RHA tungsten project.

The process plant is designed to meet a throughput of 16 t/h or 8 000 tonnes per month and achieve a wolframite recovery of 82,8 %. The stated production rate excludes any consideration of a pre-concentration circuit which, if implemented in future, could increase the plant throughput fivefold at a 20 % recovery loss as determined in the metallurgical test work announced on 10 September 2014.

The modular plant will be built in Johannesburg by Appropriate Process Technologies (APT). The modules will be containerised and trucked to site where it is expected that the process plant will be fully commissioned by mid-2015. The PEA released on 28 October 2014 modelled average gross monthly revenue before expenses of US$1,78 million. ■

Rockwell to acquire MOR properties

Alluvial diamond miner Rockwell Diamonds Inc reports it has entered into a conditional agreement to acquire certain alluvial diamond properties and associated plant and equipment from Bondeo 140 CC and its affiliates. The deal will be worth C$28,5 million (R284,2 million)

The assets are contiguous to Rockwell's existing properties in the Middle Orange River (MOR) region and will significantly enlarge its operating and resource base.

The total acquisition consideration includes C$12,0 million (R120 million) for the mineral rights and three fit-for-purpose processing plants with such consideration payable on the closing date.

Commenting on the transaction, James Campbell, Rockwell's CEO and President, said: "We are delighted to have concluded this agreement as it represents an exciting growth platform for Rockwell. Our executive and operational management have demonstrated their alluvial diamond production expertise during Rockwell's corporate turnaround and have the capacity to take on these additional assets.

"We have reviewed a number of consolidation opportunities and the transaction met all our strategic criteria. The assets are contiguous to our existing MOR operations, which are known for their gem quality diamonds. We know the geology of the area. So these new assets offer economies of scale, with the potential to reduce the volatility of our quarterly production results and take us above our target of processing 500 000 m^3 per month. It will also give us the opportunity to allocate our financial, human and intellectual capital more efficiently across a broader resource base." ■

Trial programme will deliver real-time drilling results

Real-time drilling results will be available to resource prospectors for the north-west corner of South Australia.

The far north of Eyre Peninsula has been selected as the location for a world-first trial programme which delivers real-time drilling results, improving explorers' chances of finding the next major discovery.

Opening the South Australian Exploration and Mining Conference in Adelaide recently, Mineral Resources and Energy Minister Tom Koutsantonis said the new A$2 million PACE Frontiers 2015 Mineral Systems Drilling programme will allow explorers to make decisions "on the spot" and better target their efforts to drive exploration dollars further.

"Rather than having to wait days and weeks to see the results of sampled drill cores, the participating explorers will effectively have 'instant' access to live sensors and on-site analysis of geology," Koutsantonis said.

"This will drastically speed up exploration results testing, enabling explorers to quickly adapt their drilling programmes, improving their chance of success.

"With the roll-out of this technology in our own backyard, South Australian explorers will be among the best-placed in the world to rapidly assess the merits of mineral assets, and make a quantum leap in productivity gains."

Koutsantonis said the northern Eyre Peninsula was the perfect location to test-drive the next generation of exploration technologies. ■

Goldplat to acquire dedicated elution capacity

Goldplat plc, the AIM-listed African gold producer, has issued an operations update for its gold recovery businesses in South Africa and Ghana.

In order to increase the value added to the Group's products, the company has decided to increase its production in gold bullion and correspondingly reduce product sold in concentrate or other forms. To achieve this objective, the Group has entered into a toll-treatment agreement with a local mine in South Africa to acquire dedicated elution capacity.

Under this arrangement, material from Goldplat Recovery (GPL) is being processed and material from Gold Recovery Ghana (GRG) will also be processed in the near future. The intention is for GPL to increase its in-house elution capacity and, to this end, it has purchased an elution plant to be re-erected and commissioned at the Benoni site, with a view to being operational towards the end of H1 2016.

GPL is in discussions with Rand Refinery to redefine the relationship between the two companies for the longer term benefit of both. Initiatives taken by GPL as detailed above, as well as arrangements with other refineries with respect to certain materials, will allow the processing of the material currently not being processed at Rand Refinery. The effect is to increase the volume of bullion bars supplied to the Rand Refinery for final processing.

According to Goldplat, GPL continues to perform satisfactorily on the back of the successful implementation of various initiatives made by the company during FY 2014.

The upgrading of GPL's rotary kilns to reduce electricity consumption and improve the quality of ash produced is progressing well and remains on target to be completed at the end of March 2015. ■

Maiden resource announced for Brakfontein

Universal Coal has announced a maiden JORC 2012 compliant coal reserve estimate of 9,62 Mt within the northern open pit areas of its Brakfontein project.

Brakfontein is located in the Delmas district, 25 m east of the company's Kangala mine, and contains a total JORC compliant resource of 75,8 Mt.

Commenting, Universal Coal's CEO, Tony Weber, said, "The declaration of a maiden reserve represents the next important milestone in the project's development and a significant step in our medium-term goal of bringing this asset to book.

"Following the recent granting of a mining right, Brakfontein only awaits the receipt of its water licence (IWULA) before proceeding to development. We will now focus our efforts on optimising the feasibility study including investigating the case for utilising excess capacity at the nearby Kangala operation." ■

Francois Hay, Managing Director of BME.

BME resilient in the face of mining industry downturn

Explosives supplier BME, part of the R16 billion-a-year Omnia Group, has remained remarkably resilient in the face of one of the worst mining markets seen in recent years. According to the company's MD, Francois Hay, the revenue recorded by BME (and its sister company, Protea Mining Chemicals) in the six months to 30 September 2014 was only marginally down – R2,7 billion as opposed to R2,8 billion – on the equivalent six months in 2013, a very creditable performance given the poor mining environment, particularly the West African market where all mining activity – but especially gold mining – has been under severe pressure.

Hay has no illusions about 2015. "We're hoping for a good year but not expecting one," he says. "The global outlook for commodities does not look promising and this is bound to impact on the African mining sector. But we accept that we're in a highly cyclical industry and are confident that we will be able to ride out the downturn."

While BME and Protea – who collectively form Omnia's mining arm – managed to maintain revenue at a reasonable level in the six months to 30 September 2014, profits were down by 6,4 % to R424 million from the R453 million recorded in the comparable period in 2013. Comments Hay: "We contained our costs very well but the market is fiercely competitive and our operating margins were down as a result – but nevertheless within our target range."

Hay makes the point that if West Africa is taken out of the equation, BME performed well

BME's emulsion plant at Dryden showing hot solution tanks and finished product silos.

in both its home market, South Africa, and the Southern African region generally, with the exception of Zimbabwe. "There's been some shuffling of contracts between the major suppliers but this is nothing unusual and overall we've been encouraged by the stability of the Southern African market. In South Africa itself we were far less affected by the platinum mining strike than our competitors due to our relatively small exposure to underground platinum mining while we continue to have a good workload in Botswana, Namibia, where we have two new contracts, Zambia, where we remain very active at the expanding Kansanshi mine, which is Africa's biggest copper mine, and in the DRC, where we now count global miner ENRC as a major customer."

Of course, the two big mining growth projects in the Southern African region are First Quantum's Sentinel copper mine in north-western Zambia, which will rival Kansanshi (also owned by First Quantum) in size and which is now commissioning, and the Husab uranium mine in Namibia, still in the early stages of construction. Between them, these two projects represent an investment of at least US$4 billion in Africa's mining sector. "The explosives supply contracts for both these mines have been awarded to companies not based in Africa," notes Hay. "This is disappointing as Africa needs a strong 'home grown' explosives industry to underpin the development of its mining sector."

A section of Omnia's new nitric acid plant with the ammonium nitrate plant in the background. Hay views the plant as a strategic asset that will give Omnia and BME a competitive edge for years.

Discussing West Africa, Hay says this has unquestionably been the most difficult market for BME in recent months, a combination of the effects of falling commodity prices, the Ebola outbreak and – in some countries – political factors. "We lost one contract in Mauritania and generally we've seen a cutback in production at mines in the area, which has in turn impacted on the volumes of explosives they require. Although we still have a strong belief in the potential of the region, we are slightly restructuring our West African operation to align it with the current business realities."

Turning to BME's technological expertise, Hay says that BME has now completed a several-year period of intense R&D which has seen its AXXIS electronic detonator system reach full maturity and gain widespread acceptance in mining and quarrying, its BlastMap III software become ever more versatile, enabling complex timing designs to be undertaken, and its new portable emulsion pump being fully commercialised after six years of development and trials.

"We're excited by all these products, of course, but our narrow reef technology is extremely significant," comments Hay. "As you probably know, BME is the market leader when it comes to emulsion explosives for the surface mining sector. But we've traditionally had a low share of the underground market. We believe the portable emulsion pump will act as a 'game changer', allowing us to grow significantly in this segment of the market. Indeed

"We believe the portable emulsion pump will act as a 'game changer', allowing us to grow significantly in this segment of the market."

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we've already picked up a gold mine contract on the strength of this technology and we're expecting another in the platinum field to be awarded shortly."

BME's narrow reef system allows mines to deploy cost-effective emulsion-based blasting in highly confined underground spaces. Advantages of the system include the compact size of the equipment, simplicity of operation and high levels of safety.

At just 14 kg, the pump can be easily carried to the drilled face for charging; the emulsion and sensitizer itself is contained in two separate bags – which can be filled on surface or at a central point underground and then sealed to avoid any contamination by dust or dirt. The bags, each weighing 25 kg for easy portability, are connected to the pump just before charging. The fail-safe pump control mechanism allows the volume of explosive per hole to be pre-set, ensuring that blasting performance and emulsion costs are carefully controlled.

Looking at the value that BME can add to its customers' operations, Hay quotes BME's Blasting Technology Director, Tony Rorke, who a few months ago went on record as saying that "the days of just selling explosives as a commodity are long over." Rorke added that a commitment to technology was an essential part of BME's ethos.

"Tony had it absolutely right," says Hay. "The margins in mining are progressively becoming tighter and mines therefore need to be ultra-efficient in every aspect of their operations, including blasting. Many mines get their blasting right but others – particularly those operated by juniors, who don't normally have any depth of in-house expertise – can get it badly wrong. The point is that poor blasting practice can be very costly, impacting not only on the efficiency of mining operations but also on 'downstream' processes such as crushing and milling of the ore. The consultancy service we provide – which addresses both blast planning and execution – can ensure that mines achieve highly efficient blasting.

"I think it's only fair to say that our competitors also provide expertise to their customers so our 'value add' services are not unique. But I would venture to suggest that nobody does consulting better than BME. The services of Tony and his technical team are in demand not only here in South Africa but throughout Africa. The reputation of the team is such that they're sometimes called in to assist even when we have no contract in place for the particular mine or quarry involved."

Pointing to other highlights of the past year for BME, Hay says the company has eliminated the supply constraints that sometimes caused it problems in past years. "There was a time when we had to source raw materials on occasion from competitors," he states. "The opening of the Omnia Group's new R1,4 billion nitrate plant in Sasolburg in 2012 has totally reversed this situation. The plant – which is state of the art – has pushed up Omnia's nitric acid capacity by 140 %. It is a strategic asset that will give Omnia and BME a competitive edge for years. The timing was fantastic. Anyone trying to put up a similar plant today would probably need twice the capex."

BME's reef-pump is light and small and easy to move around narrow stopes.

He adds that BME now has total security of supply with two nitric acid plants and two ammonium nitrate facilities in place, as well as two major emulsion plants in South Africa (quite apart from ten smaller plants in the rest of Africa). "We've increased the capacity of our Fochville emulsion plant on the outskirts of Johannesburg and we're also in the process of commissioning a brand new plant in Delmas in Mpumalanga at the site of our very first emulsion plant, which was established in the late 1980s," he says.

Finally, it is worth mentioning that BME recently celebrated its 30th anniversary. Reflecting on this, Hay says that BME has seen sustained growth over these three decades, particularly over the past five years, during which the company's employee complement more than doubled with the number of emulsion trucks in the field rocketing from 80 to over 180.

"The company has had a fantastic ride and has established itself as one of South Africa's 'Big Three' suppliers and indeed one of the leaders in its field in Africa," he concludes. "As I've said, current conditions mean that there could be a temporary pause in our rapid growth but we are highly positive on prospects for Africa's minerals industry in the medium to longer term and remain committed to expanding our footprint both in South Africa and on the continent generally."

Report by Arthur Tassell, photos courtesy of BME

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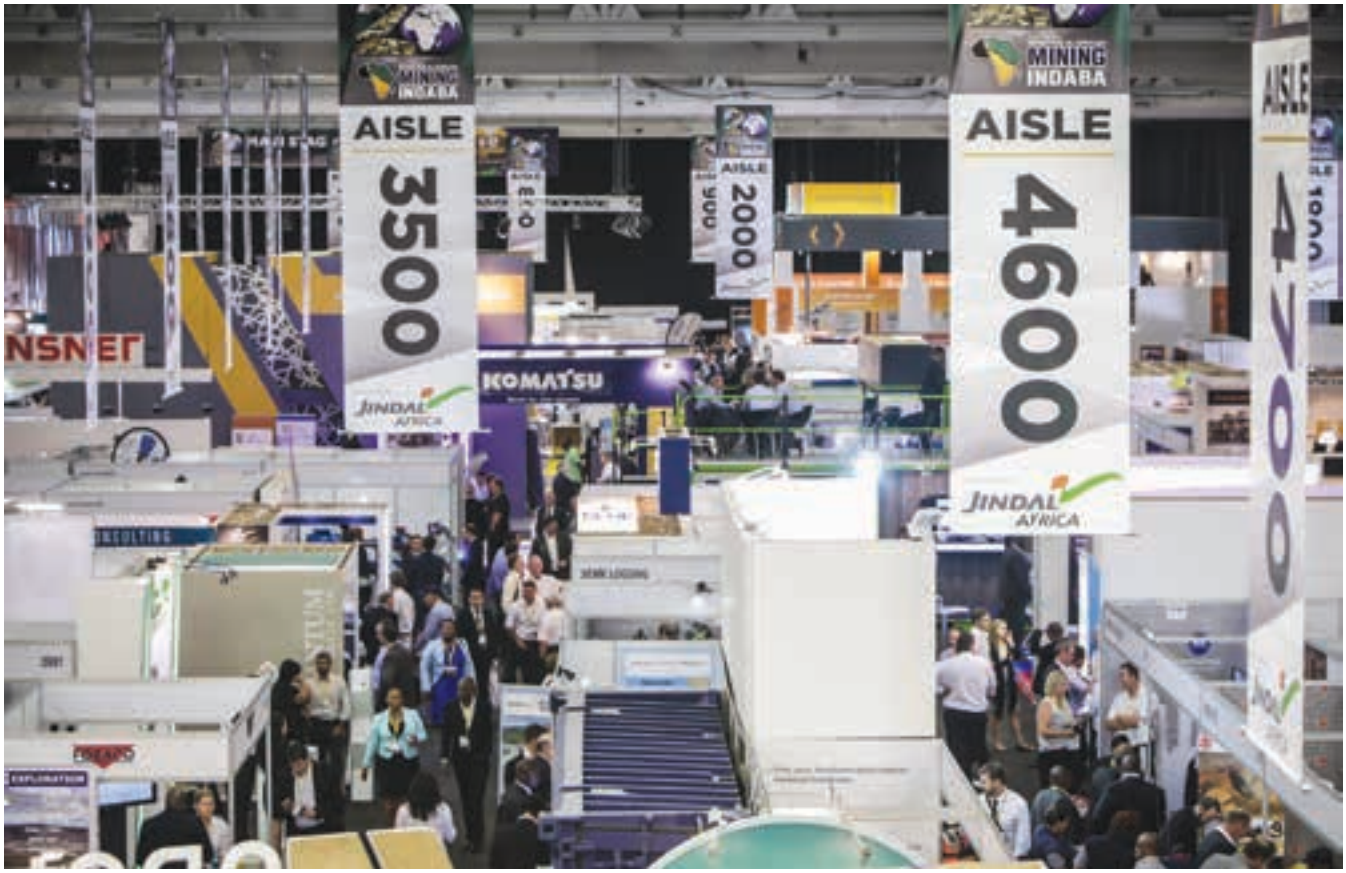
Top speakers lined up for Mining Indaba 2015

This year's Investing in African Mining Indaba, to be held in Cape Town from 9-12 February, is taking place against the backdrop of a South African – and indeed global – mining industry in severe trouble. The organisers are nevertheless expecting at least 7 000 delegates from over 100 countries to attend the event which will be addressed by an array of top speakers, including former UK Prime Minister Tony Blair. This year's Mining Indaba, the 21st in the series, is the first to be held under the aegis of the event's new owners, Euromoney Institutional Investor plc.

Jonathan Moore, Managing Director of Mining Indaba, pictured at last year's event, with Patricia de Lille, Mayor of Cape Town.

At the time the Euromoney acquisition was announced in July last year, the UK-listed group said it would draw on its strong links to institutional investors and governments worldwide to further advance the investor content and networking which is at the heart of the Mining Indaba. Notwithstanding the new ownership, Jonathan Moore, MD, Mining Indaba, remains at the helm. He has led the event for five years, with the value of the Mining Indaba brand having increased by an estimated 150 % during his tenure.

"The 2015 Mining Indaba features a number



A scene from last year's Mining Indaba, showing the crowded exhibition area.

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High profile speakers at Mining Indaba 2015 will include (from left) Mark Bristow of Randgold Resources, Robert Friedland of Ivanhoe Mines and Dr Dambisa Moyo, best-selling author and economist.

of substantial investments we have made under our new ownership," Jonathan Moore said recently. "These investments, made at a time when other events and the overall sector are contracting, reaffirm our belief that the long term outlook for African mining is excellent and our commitment for the Mining Indaba to remain the premier forum for uniting investors, mining companies and mining ministers."

Apart from Tony Blair, prominent speakers at this year's Indaba will include Dr Dambisa Moyo, the Zambian-born author and global economist, who will speak on the topic of 'What's it Going to Take to be Successful in our Future World." Moyo's best-selling books include *How the West Was Lost: Fifty Years of Economic Folly – and the Stark Choices Ahead* and, most recently, *Winner Take All: China's Race for Resources and What it Means for the World*. This latter book – which has not been without its critics – details how China has embarked on one of the greatest commodity rushes in history and examines the effects this is having on the global economy.

Another well-known economist who will grace the event is Jim O'Neill, currently Chairman of the Cities Growth Commission in the UK but perhaps best known for his long stint (from 1995 to 2013) with Goldman Sachs, where he was Chief Economist. He is also the creator of the acronym 'BRIC', which he coined in 2001 as a shorthand way of referring to Brazil, Russia, India and China, four countries which he then believed had enough economic potential to challenge and possibly eventually overtake the mature economies of the First World. He will be talking on 'Managing the Commodities Curse – What Are the Options?', a subject which is bound to attract a full house when he delivers his keynote address,.

Other speakers with a financial background who should be worth listening to are Bob Diamond, the ex-Chief Executive of Barclays (he departed after the bank was fined for its role in the LIBOR scandal) who has now founded Atlas Mara, a company which is busy investing in Africa's banking sector, Rob Hersov, founder (in 2013) of Invest Africa, described as a "private members club with a multi-service platform for access and investment into Africa", and Paolo Scaroni, Vice Chairman of Rothschild (and prior to that CEO of Eni, one of the world's major integrated energy companies). Diamond, Hersov and Scaroni will all be speaking during a keynote panel session entitled 'Why Africa? Why Now?"

As always, senior management of many of the world's major mining companies will be presenting at the Mining Indaba. Among those thus far confirmed as speakers are Alan Davies, Chief Executive, Diamonds and Minerals, Rio Tinto, Srinivasan Venkatakrishnan ('Venkat'), CEO of AngloGold Ashanti, Mike Schmidt, CEO of ARM, Brad Gordon, who runs Acacia Mining (previously African Barrick Gold), Tom Albanese, CEO of Vedanta (which has recently announced the go-ahead of its US$782 million Gamsberg-Skorpion integrated zinc project), Ben Magara, CEO of Lonmin, Mark Bristow, Chief Executive of Randgold Resources, and Graham Briggs, CEO of Harmony Gold.

Executives of some junior to mid-tier companies who will be present are R. Michael Jones, President and CEO of Platinum Group Metals, who will update delegates on the progress at the company's Western Bushveld JV (WBJV) project near Sun City and its Waterberg projects on the Northern Limb of the Bushveld Complex, and Clive Johnson, who runs B2Gold Corporation, which has just commissioned its new Otjikoto gold mine in Namibia.

Based on past events, probably the standout speaker from the mining sector will be Robert Friedland, whose company Ivanhoe Mines has

"The 2015 Mining Indaba features a number of substantial investments we have made under our new ownership."

Jonathan Moore, MD, Mining Indaba

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three prime projects in the Southern African region – the Platreef mine near Mokopane, the Kamoa copper project near Kolwezi in Katanga in the DRC and the redevelopment of the historic Kipushi copper-zinc mine, also in Katanga. Friedland has presented on these projects at previous Mining Indabas but he is a gifted speaker who talks up the projects in a most engaging way and who is bound to pull a huge audience. The Platreef project, incidentally, has received some bad overseas press recently, leading Ivanhoe to accuse the publication concerned of "false allegations and misrepresentations, and gratuitous exaggerations".

The opening address at the Mining Indaba is due to given by South Africa's Minister of Mineral Resources, Ngoako Ramatlhodi. Only appointed to his current position in May last year, one of his tasks at the Mining Indaba will be to reassure delegates that South Africa's mining industry still represents a good investment opportunity, notwithstanding the fractious labour relations that characterise it and the problems presented by Eskom's generating capacity shortfall.

The Mining Indaba, of course, is more than just a conference and there will be well over 200 companies exhibiting their products and services in the exhibition area of the event. They will include not only mining companies but also suppliers of mining equipment (among them Komatsu, Sandvik, FLSmidth, Bell and Caterpillar), consulting engineers and EPCM contractors (for example, WorleyParsons, DRA, SENET, Sedgman and AMEC Foster Wheeler) and mining, civil and drilling contractors (such as Master Drilling, Murray & Roberts, Major Drilling, Raubex, Aveng Mining and WBHO).

The Mining Indaba has been a spectacular success since being established in the 1990s, showing growth in just about every year since then. The new owners have taken over at an unpropitious time but seem confident that this year's event will measure up to its predecessors, saying that it remains "better positioned than ever to deliver an unparalleled deal-making and discovery platform for global investors and mining companies." The list of speakers and exhibitors suggests that this confidence is well founded and that this year's Mining Indaba will be highly successful, reaffirming its status as the world's third largest mining conference and Africa's largest mining event. ■

Bakubung shaft sinking runs

Wesizwe Platinum, which is developing the Bakubung Platinum Mine (BPM) on the Western Limb of the Bushveld Complex north of Rustenburg in the Sun City area, achieved another milestone in early December (2014) when the mine's ventilation shaft intersected the Merensky Reef at a depth of 725 m below collar. Sinking of both the ventilation and main shafts is now well ahead of the original programme, with the 8,5 m diameter main shaft expected to reach its full depth of 970 m in November this year, 55 days ahead of forecast, and the 7,5 m diameter ventilation shaft its full depth of 880 m in September 2016, 144 days ahead of schedule.

Eddie Mohlabi, GM of the Bakubung Platinum Mine.

Looking up the ventilation shaft from the kibble towards the sinking stage (photo: Arthur Tassell).

To mark the intersection of the Merensky Reef, Wesizwe hosted a visit to the mine by a media group (including *Modern Mining*) which was taken down the ventilation shaft in a kibble to view the progress being made by the shaft sinkers, Aveng Mining – Shafts & Underground. The media tour was hosted by BPM's General Manager, Eddie Mohlabi, who joined Wesizwe in April 2013 from AngloGold Ashanti where he was

ahead of schedule

Production Manager at Great Noligwa.

Mohlabi's tenure at BPM has coincided with a significant revision of the project – the Bakubung Platinum Mine Optimisation Study – which was approved by Wesizwe in March 2014. This was designed to reduce the timeframe to full production, reduce capex, improve efficiency and flexibility and generally adapt the mine to the more constrained metals market seen over the past 18 months. The Optimisation Plan was prepared by Wesizwe in conjunction with its EPCM contractor for BPM, WorleyParsons SA.

In terms of the Optimsation Plan, it is now anticipated that there will be a 26-month reduction in the time to full production, with the initial 230 kt/month production level now planned for October 2020, as opposed to December 2022, with this increasing to 250 kt/month run-of-mine ore at full capacity. There will also be an increase in the PGM production of the mine to 420 000 oz 4E per annum, a 20 % increase in the annual production rate. The decision was also taken to undertake all mining on a fully or semi-mechanised basis (with the introduction of the UG2 mechanised methods envisaged in the BFS to the Merensky Reef horizon as well).

As a result of the Optimisation Plan, the nominal capex for the project has reduced from R12,3 billion to R10,69 billion although the real capital cost has seen a 9 % increase, largely due to the decision – as part of the optimisation process – to make substantial use of conveyor belts for ore transport and chair lifts for people transport to reduce operating costs over the life

Above: *The award-winning, 87-m high main shaft steel headgear (photo: Arthur Tassell).*

Centre: *Shaft sinking at Bakubung is running ahead of schedule.*

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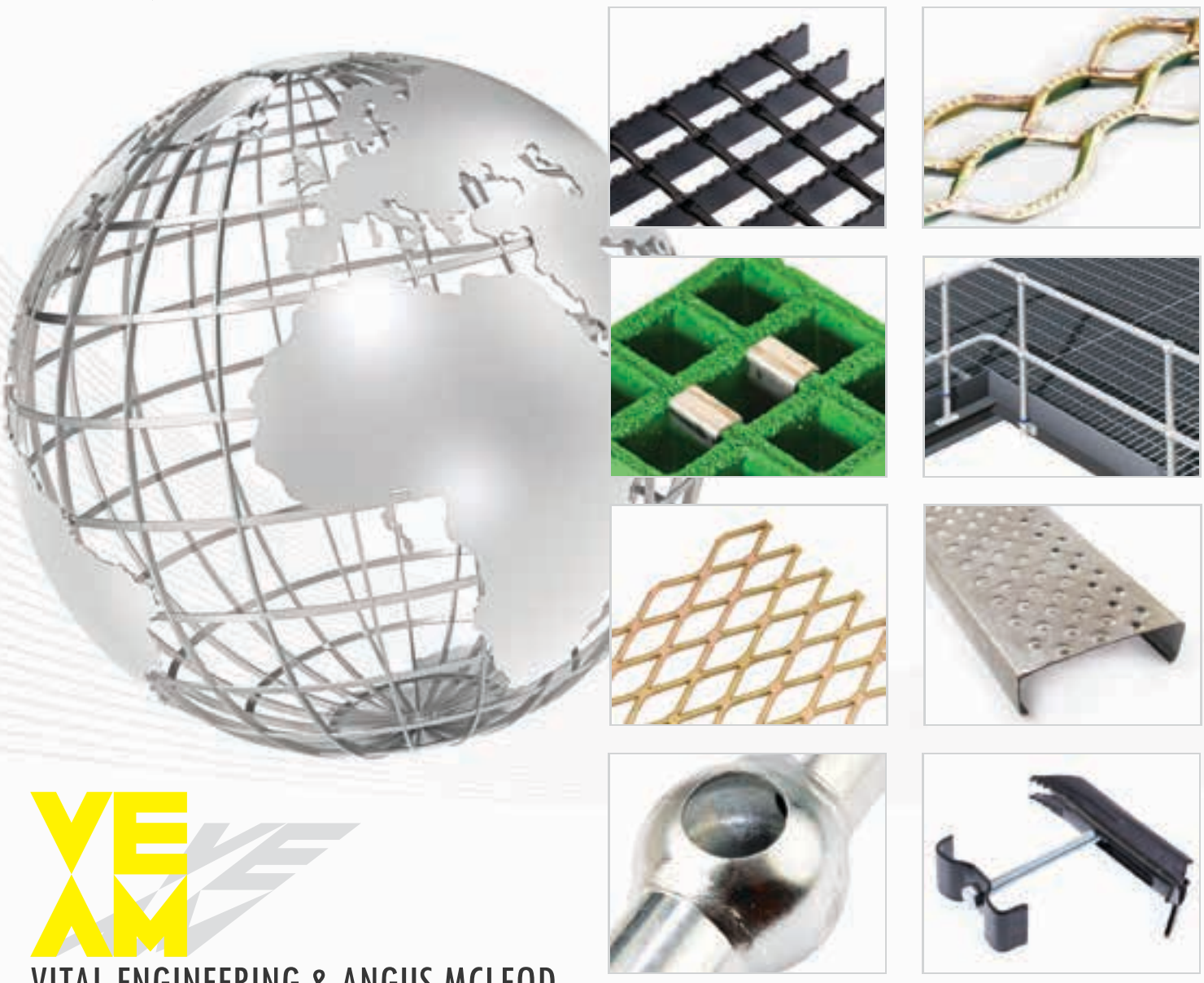

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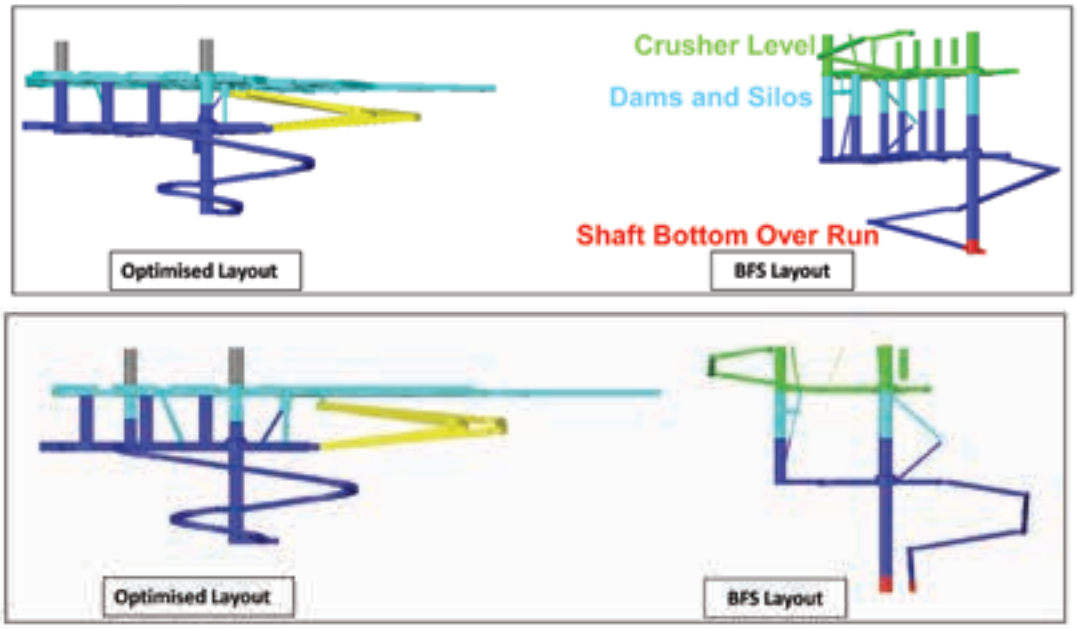


As a result of the Optimisation Plan, both the main and ventilation shafts have been shortened.

of mine. The net change in the project's NPV is a positive R2,1 billion to R6,5 billion, the main contributors to this being the shorter timeframe to full production and the lower nominal capital cost.

Prior to the recent Merensky Reef intersection, the previous major milestone passed during 2014 was the cutting of the first station/level on the ventilation shaft at a depth of 680 m in May. When *Modern Mining* visited the site at that point, the project was progressing well with the rate of advance on the shafts being targeted at 58 m per month, an objective which has since been met.

The fact that the main and ventilation shafts are now expected to be completed well ahead of the original schedules is a considerable achievement for Wesizwe given that the shaft sinking was at one stage running late as a result of the delayed delivery of Eskom's phase one 20 MVA power supply to the site. However, an intense focus on shaft sinking performance has helped reverse the situation, as has the simple fact that – as a result of changes implemented as part of the Optimisation Study – the shafts are now shorter (by 30 m in the case of the main shaft and 50 m in the case of the ventilation shaft) than originally designed. The shortening of the shafts has been accommodated by the removal of the large underground primary crusher chamber originally planned and by bringing level development onto on-reef horizons.

As part of the optimisation, a third shaft has been added to BPM's infrastructure. This will be a 6 m diameter, 720 m deep shaft which will give extra capacity for men and materials and added ventilation capacity and current thinking is that it will be raise-bored. The new shaft will only be needed towards the end of the development phase, so it will probably only go out to tender in late 2016.

Generally, BPM has experienced a good safety record but this was marred in October last year when a fatality was experienced during shaft-sinking operations – the first on the project. Ironically, the fatality occurred not long after the site had celebrated reaching the milestone of 500 000 fatality-free shifts.

The main shaft will have a hoisting capacity of 255 kt/month of ore and 15 000 t/month of waste. An initial 230 000 tonnes a month will be mined from the Merensky Reef with the balance coming from the UG2. Ultimately, once the Merensky reserves are depleted, the mine will become an exclusively UG2 operation – but this is not expected to occur until well into the mine's 30-year life.

The steel headgear of the main shaft, incidentally, is noteworthy as being – at 87 m – one of the tallest in the world. As has already been widely reported, it received recognition in the 2014 Awards of the Southern African Institute of Steel Construction, winning the Mining and Industrial Category of the competition.

The structure consists of an A-frame designed to resist horizontal, vertical and wind loads. The top three levels of the A-frame form the sheave decks with the upper level at 72 m above the bank. There is a 14 m square centre tower between the bank and the underside of the sheave levels that accommodates six operating floors. A 30-ton capacity electric overhead travelling (EOT) crane and its support structure tops off the headgear. To achieve a quick and safe completion of the steel erection, the main contractor – Louwill Bakgoni JV – planned and

The net change in the project's NPV is a positive R2,1 billion to R6,5 billion, the main contributors to this being the shorter timeframe to full production and the lower nominal capital cost.

Inside the main shaft winder house. Bakubung's total hoisting capacity is 265 000 tonnes/month.

assembled large assemblies on the ground. A 1 100-ton crane was brought to site to lift these large assemblies with masses of up to 235 tons.

The Bakubung Platinum Mine is expected to start commissioning in late 2018. Once steady state production is reached in 2021, it will employ approximately 3 130 people, providing a major economic boost to an impoverished area. Wesizwe, which has a range of ambitious community and labour initiatives in place, is highly focused on maximising employment opportunities for the local community during both the construction and operating phases of the project. Around 30 % of the current workforce on site is drawn from within a 50 km radius of BPM (with much of it from the community of Ledig, which directly adjoins the mine property). Once the mine is in full operation, it is expected that at least 70 % of the labour complement will be recruited locally.

Wesizwe is listed on the JSE and is 45 % owned by Chinese interests in the form of the Jinchuan Group and China Africa Development Fund. The Chinese involvement in Africa's mining industry has been controversial at times but Wesizwe is generally regarded as an example of a highly successful Chinese/African partnership. Certainly the Chinese involvement in Bakubung has given the project the financial resources to proceed in a constrained market which has seen other players in South Africa's platinum mining industry cutting back on new capital investment.

Photos courtesy of Wesizwe (unless otherwise acknowledged)

From aggregates to road markings, the Raubex Group can carry out the entire road cycle.

Raubex Group aims to strengthen its vertical integration

Message From Rudolf Fourie, Ceo, Raubex Group

The Raubex Group is the only contractor that can carry out the full road cycle, says CEO Rudolf Fourie, from sourcing the aggregates and crushing the stone to the asphalt and concrete work, and even bridge work and road markings.

"That is the difference between us and the rest of the market," Fourie says. "It has become a trend in the rest of the world and therefore is not unique to us. However, it is a model that is certainly working." Fourie says the Raubex Group's strategy is to strengthen this approach through either acquisitions or organic growth.

"The strategy is essentially to focus on our vertically integrated model in South Africa. We also want to increase our geographical spread so that we have a strong foothold throughout South Africa. That has been our policy with our latest acquisitions, while most of the future acquisitions will also be in that light."

Good order book in Africa

Apart from this internal strategy, the Raubex Group is also looking to bolster its growth in Africa. "We are tendering for road and construction work. We are quite fortunate at the moment as we have quite a good order book in Africa, but are looking for work with better margins, mainly because the South African construction industry is under major pressure," Fourie says.

"The entire construction and mining environment in which we operate is very challenging at the moment." Therefore the Raubex Group is looking to extend its vertically integrated model to the rest of the continent.

Acquisitions and local partners

"We will achieve this goal through acquisitions and also by tying up with local partners. You need to have a local presence in Africa." An example of this would be to acquire a crushing company and then to incorporate an asphalt and concrete focus.

"The strategy of the Raubex Group going forward is to have a visible presence in the rest of Africa and to be a major mining solutions supplier, while remaining the leading road construction company in South Africa."

Fourie adds that the Raubex Group will look beyond Zambia, Namibia and Botswana, as it already has an established presence in these countries. "At this stage we are not looking at Australia and India, as we feel that these markets are too competitive at the moment."

Strong balance sheet, cash position

While the construction and mining industries are under pressure at the moment, "I believe there are going to be opportunities in that difficult environment," Fourie says. "We have a strong balance sheet and are driving our cash position so we are able to capitalise on these opportunities."

As an example, Fourie points to the acquisition of Buildmax Crushers in September this year. "Due to economies of scale, efficiencies and cash injections, we have turned it around and it is making a very nice profit now. If you have cash, there will be opportunities, especially for us, and I believe we are well positioned for that."

Outsourcing trend

"The labour instability in the mining industry is prompting a trend towards outsourcing, which provides an ideal opportunity for us to provide our total solutions approach," says Fourie. This is because the Raubex Group has capabilities in everything from crushing to infrastructure and housing.

"For example, we will engage with major mining houses to determine whether or not we can provide mining solutions for their operations that encompass their entire businesses. These are the sorts of opportunities I am referring to."

Rudolf Fourie, CEO of the Raubex Group.

The trend towards outsourcing in the mining industry presents an ideal opportunity for the Raubex Group's total solutions approach.

22 companies in the Group

"At this stage we have 22 companies within the Group," Fourie says. This marks the significant evolution of the Raubex Group from its initial formation as a private company during the difficult economic conditions of the early 1990s. The current structure is that while the individual companies remain autonomous and in charge of their own day to day operations, the majority shareholding and strategic direction lies with the larger Raubex Group.

It is this differentiation from a typical large corporate entity that has resulted in the ongoing success of the Raubex Group. "Our latest results will probably be some of the best results out there in the construction industry today with a strong order book of R7.5 billion." Fourie says the capex budget for the current financial year is pegged at R500 million. "It is based predominantly on the mining side, which is quite hungry for capex," he concludes.

Raubex 2014 Results

The Infrastructure Division performed well during the year, while the Construction and Materials Divisions continued to seek opportunities beyond South Africa's borders, making good progress in Zambia and Namibia, Rudolf Fourie, CEO, says in the 2014 Raubex Integrated Report. "The construction industry continues to experience slow payments on some provincial projects, but we have been able to maintain tight financial control over our debtors as well as cash flow."

Looking at 2015, Fourie notes: "We are expecting trading conditions in the South African road construction industry to remain challenging but stable in the short term. Competitive pressures, particularly in the heavy rehabilitation and construction sector, are expected to continue in the year ahead. We believe the attrition and consolidation within the construction sector is also set to persist. "The volume of work out to tender is expected to remain steady and sufficient to maintain the group's order book.

"Improvements in the sector remain dependent on the timely rollout of the government's infrastructure development plan, the successful implementation of tolling and associated revenue collection, as well as the continued handover of strategic and primary road networks and associated maintenance budgets, from provincial governments to the South African National Roads Agency Limited (SANRAL)."

Fourie concludes: "The Raubex Group will continue to seek growth through expansion into Africa in both the road construction and the mining and material handling sectors."

Organogram

CONSTRUCTION DIVISION: Raubex Construction, Roadmac Surfacing, Roadmac Surfacing Cape, Milling Technics, Raubex KZN, Raubex Zambia, Centremark Roadmarking

MATERIALS DIVISION: Burma Plant Hire, SPH Kundalila, National Asphalt, Raumix Aggregates, B&E International, Tosas, Strata Civils, Shisalanga Construction, OMS Crushers

INFRASTRUCTURE DIVISION: Raubex Infra, L&R Civil, Raudev, Raubex Housing

Materials Division

An asphalt plant on the N1 near Vanderbijlpark.

The Materials Division was formed mostly out of the acquisition of various other companies in keeping with the Raubex Group's strategy of vertical integration.

"Raubex essentially started out as a road construction company and then post-listing went on the acquisition trail in 2007 for companies in the mining, materials supply and engineering environment," Tobie Wiese, Head of the Materials Division, says.

"The engineering aspect services both the mining industry and process plant manufacturing, in-house and for the external market. One of the most important things about the Materials Division is that although it forms part of the vertical integration strategy of the Raubex Group, its main client base is external." The companies that constitute the Materials Division only generate about 20% of their revenue from the Raubex Group.

The Materials Division has also secured a substantial contract for the design, build and operation of a crushing and processing plant at the Tschudi copper mine in Namibia. "We are working for most of the major listed mining companies, including De Beers, Billiton, Kumba, Gold Fields, Sibanye and Pilanesberg Platinum," Wiese says.

"Hence we have got quite a diversified exposure. However, we do not own resources as such. We provide engineering, materials handling, processing, mining and beneficiation services. We gravitate towards the minerals processing side, where we have a lot of technical strength."

Wiese says the strength of the Materials Division lies not only in the technical and engineering skills of its member companies, but also in the highly competent and dedicated management team.

The division employs about 4 300 people out of a total of 9 000 within the Raubex Group.

This means that health and safety is high on the agenda. "Our target is to have a Lost Time Injury Frequency Rate (LTIFR) of below one, and this year it is at 0.8. This is a major driver for us in the Materials Division," Wiese says.

The Materials Division has also embarked on a number of Corporate Social Responsibility initiatives, such as a school project in Namibia.

Raumix Aggregates

Raumix Aggregates, established 23 years ago exclusively to service the road construction arm of Raubex with aggregate and sand, now operates 12 quarries. "It is important for us that we service our external clients to their satisfaction on a competitive basis. I think the Materials Division has grown substantially since the listing, partly as a result of organic growth and partly as a result of acquisitions. Some of the latest acquisitions we have carried out are in commercial supply of aggregates.

"We have just acquired a cluster of quarries in Gauteng, where we are carrying out sand mining operations as well as an aggregate and gypsum operation in the North West province, through the acquisition of OMV Crushers. At this point in time we are also looking at acquisitions in Botswana in order to increase our geographic spread."

B&E International

B&E International focuses on the design, build and operation of minerals process plants and brands itself as a 'partner of choice' for the mining and construction industries with its integrated crushing, mining and mineral processing solutions.

While B&E International has been designing and manufacturing plants at its Port Elizabeth facilities since the 1990s on an in-house basis, it has now branched out, offering this to the market in general. "We believe there is a definite gap that we can fill in terms of purpose built plants and maintenance and operational plants for mine owners," Wiese says.

The company was established in 1972 as a drilling and blasting specialist in the Eastern Cape and soon diversified into the mobile crushing sector with its own mobile and static crushing division. In 1993 it entered the mining services sector and diversified further into bulk mining, processing and mineral beneficiation. B&E International was acquired by the Raubex Group in 2008, completing its transformation into a strongly focused crushing, mining and mineral processing company.

On the mobile crushing and screening side, the company operates various crushing plants ranging in size from about 50 tph to 500 tph, and from single stage plants all the way up to massive five stage crushing plants. This gives B&E International the capability to produce a range of products from road stone to high quality manufactured concrete sand, base course, concrete aggregates, water bound Macadam, ballast and filter media.

Comar

Comar, a business that designs and manufactures asphalt plants, was acquired by B&E International in 2012. It started out as a small local manufacturer and has since expanded to supplying equipment to the Democratic Republic of the Congo (DRC).

Tobie Wiese, Head of the Materials Division.

Raumix Aggregates has just acquired a cluster of quarries in Gauteng where it is carrying out sand mining operations.

A LT 120 crushing plant in operation at Pilanesberg Platinum Mine.

➤ National Asphalt

National Asphalt is the second largest asphalt supplier in the country. It is also a local leader in the implementation of global trends and developments in pavement technology. National Asphalt has a strong presence throughout Africa due to the fact that it has both static and mobile plants. It recently acquired Shisalanga Construction in order to consolidate its presence in northern KwaZulu-Natal.

Sustainability and rehabilitation are of equal importance, particularly given the drive for environmental awareness in the mining industry. "National Asphalt, for example, monitors its carbon footprint very closely," Wiese says.

"It is in the process of installing bag houses on all its Comar mobile plants in order to improve air quality, while on the mining side we also look closely at factors such as diesel consumption per ton. We also strive to procure equipment that is more eco-friendly and energy efficient," Wiese says.

SPH Kundalila

Established in 1969 as Saldanha Plant Hire for general plant hire and exploration drilling and later to mine limestone for Anglo Alpha near Saldanha in the Western Cape, Materials Division stable mate SPH Kundalila specialises in materials handling, crushing and screening, loading and hauling, rehabilitation and other turnkey solutions.

It originally entered into a commercial aggregate venture called Canyon Rock in partnership with the Raubex Group in 1997, which acquired it in 2007. Wiese points out that SPH Kundalila has over 320 items of earthmoving equipment in its fleet and is the largest owner of 950H front end loaders in the Southern Hemisphere, many of these being Caterpillar equipment. Its fleet is maintained to the highest standards by means of on-site workshops staffed by highly skilled technical personnel.

Wiese characterises SPH Kundalila as a mining services supplier with a large capacity to take on critical outsourced work. It prides itself on its ability to process and produce large volumes and has the capacity to screen over a million tons a month, with screen apertures ranging from less than 35 mm. It has also screened low diameter material of 0.8 mm through its dry screening operations.

SPH Kundalila also operates various primary and secondary crushers throughout the country for various mining houses. For example, it crushes up to 350 000 tons of ore a month for Pilanesberg Platinum.

Another focus area is loading, hauling and materials handling as the backbone for SPH Kundalila's operations. Its fleet comprises front end loaders, articulated dump trucks, graders, water trucks, excavators, hammers, mobile screens, crushers and a variety of rigid and interlink trucks.

It transports high grade materials from opencast pits or stockpiles from underground shafts to the respective processing plants. "At present SPH Kundalila processes about a million tons of raw materials a month," Wiese says.

The company celebrated its 45th anniversary last year. "A lot of its continued success is built on good relationships and customer service." For example, it has been working at the Black Mountain Mine near Aggeneys in the Northern Cape ever since it was established.

"It is very important to the Materials Division of the Raubex Group that we service our external clients to their satisfaction on a competitive basis."

Burma Plant Hire

Founded in 2003 with a facility in the Western Cape supporting five employees and three items of plant, Burma Plant Hire now has branches in the Eastern and Northern Cape as well as in Gauteng. "Its growth can be attributed to two predominant factors – uncompromising customer service and a fleet of quality, application-specific equipment," says Wiese. The current fleet of 250 items of predominantly large capital equipment is updated regularly as new technology becomes available.

Tosas

Tosas has been supplying bituminous product into the South African roads and mining industries for over four decades. Specialist products include dust proofing of haul and access roads and specialised crack-resilient rubber bitumen for sealing severely cracked roads more economically than with asphalt.

The Roads Division is geared for both rehabilitation and greenfield projects.

From grandmother's kitty to listed industry giant

History And Background

Raubex was incorporated on 28 November 1974 by founder Koos Raubenheimer, thereby securing his status as a legendary figure in the South African construction industry.

"My father started this company with R27 000 borrowed from my grandmother's pension kitty. His biggest hurdle was obtaining a performance guarantee. He had to put up cash, rand for rand, in order to get that," Louis Raubenheimer, Head of the Construction Divisions, says. Raubex had 45 employees back in 1974 and a revenue of R1 million in its inaugural year; in 2015 it has 9 000 employees and a revenue of R8 billion, with a proud record of 39 years of uninterrupted profitability.

Raubex was awarded its maiden contract by the Free State Provincial Administration on 1 January 1975, which was an R800 000 project for a bridge over the Vet River between Bultfontein and Wesselsbron in the Free State. The province's road network was developing, which required a number of bridges, and Raubex was in the right place at the right time.

During the period from 1975 to 1986, Raubex diversified further into road construction as well as crushing, completing a record 109 projects in this period, of which 50 were bridges. These included the Vaal River Bridge between Potchefstroom and Viljoenskroon in 1979. Raubex's first major road construction project was the Kroonstad to Koppies road.

First cross-border contract

Raubex's first cross-border contract was secured in Lesotho in the late 1980s. This comprised access roads and town infrastructure at Butha-Buthe for the Lesotho Highlands Water Project (LHWP), in addition to crushing stone for the Muela Dam and for the tunnel linings. Raubex's involvement at the LHWP would last for an impressive four years.

Raubex then diversified even further with the commencement of crushing operations at Kroonstad in the Free State in the mid 1980s. This strategy resulted in the ultimate acquisition of various crushing operations in Gauteng in the 2000s, which saw another feather added to Raubex's cap: this time as one of the leading crushing companies in South Africa.

As Raubex began to take on ever larger road projects, so it began to venture outside its home market of the Free State. The period 1987 to 1996 saw its tally of completed projects ratchet up to 200. In 1996, Raubex embarked upon an unbundling process to unlock further value in the group, and also as an 'adapt or die' response to South Africa's international isolation at the time.

> *"My father started this company with R27 000 borrowed from my grandmother's pension kitty."*
>
> **Louis Raubenheimer.**

Decentralised

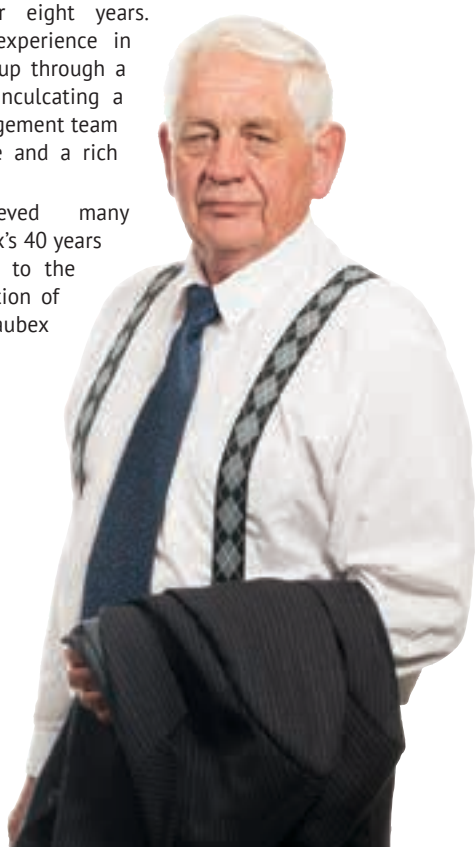
It decentralised its activities into smaller companies, with the management of each company holding a substantial shareholding. This quickly resulted in the formation of Raumix, Roadmac Surfacing and Roadmac Surfacing Cape. In 2004, the group consolidated into the three main divisions that are prevalent today.

Raubex meanwhile continued with its acquisition strategy in order to grow the business even further. From 2004 to 2007 it acquired Canyon Rock, SPH Kundalila, Phambili Road Surfacing, Milling Techniks, National Asphalt and Centremark, while at the same time laying the groundwork for its eventual listing on the Johannesburg Stock Exchange. This auspicious event took place on 20 March 2007, catapulting the Raubex Group to the forefront of the construction industry in South Africa.

Koos Raubenheimer

Born on 15 March 1943, Koos Raubenheimer founded Raubex in 1974 and has been Chairman of the Group since its inception. Prior to founding Raubex, Raubenheimer served as an engineer with the Free State and Kruger National Park Roads Departments for eight years. He gained invaluable experience in steering the Raubex Group through a challenging market by inculcating a cohesive and loyal management team with a common purpose and a rich skills base.

"We have achieved many milestones during Raubex's 40 years in business, mainly due to the commitment and dedication of our employees to the Raubex family."



Koos Raubenheimer, founder of Raubex.

The Materials Division focuses on both mining and materials supply.

Infrastructure and Construction Divisions

The Infrastructure and Roads market segments contribute a large proportion of the Raubex Group's total profit, despite margins in the construction industry currently being under pressure, Louis Raubenheimer, Head of the Construction Divisions, says.

The Roads Division comprises five companies that cover different areas of the country. Three are coastal companies while two focus inland. "Then there is Raubex Africa, with the Group having a registered company in every country in which it operates, which gives it the capability to move resources in and out of these countries."

While some of the road construction companies in the Roads Division favour rehabilitation and asphalt work, others are more geared for greenfield work. "Hence we offer the entire spectrum. Whatever is required in terms of roads, we are able to provide it. I believe our Materials Division strengthens our competitive edge.

"When we tender on a major project, where there is crushing, structures and asphalt involved, we have all the necessary companies on hand. We even have a road marking company. Traditional contractors would be able to supply the asphalt but not have the crushing capability, for example. We have the entire spectrum on hand."

Raubex Infra

The Infrastructure Division contains a company called Raubex Infra that "covers all those areas that the road construction companies do not, with the exception of building work. We do not build shopping malls, office developments or high rises.

"Raubex Infra focuses on renewable energy projects, rail work and optic fibre rollouts in Africa, such as in Zambia and the Democratic Republic of the Congo (DRC). We also execute civil works at mines, including concrete structures, such as the R40 million Kumba Iron Ore Scrap Yard project, in addition to the dewatering pipeline at Sishen," Raubenheimer says.

"At Tweefontein we have completed Phase 1 of the project to construct a coal rail loading loop for Glencore which is now operational. This project contained a lot of specialised elements, from concrete to rail work and overhead track electrification.

L&R Civil

L&R Civil carries out reticulation and major steel pipeline projects. "The reticulation work is to fill out any gaps in its order book. We are confidently awaiting the government's rollout of its infrastructure development plans in terms of bulk water services in particular, which is critical to the mining industry as well," Raubenheimer says.

Raubex Housing

Raubex Housing carries out mass housing projects, such as the 476 Housing Project it has just completed for Kumba Iron Ore's Sishen mine at Kathu in the Northern Cape. It also builds top structures for private property developers, like IHS (International Housing Solutions) and Valumax. "Project sizes range typically from 400 to 1 000 units, allowing us to establish an 'assembly line' type system and achieve economies of scale while cutting the building cost per square metre.

"We do not compete in the lower end of the market at all. We are currently one of the biggest players in this market, which is a remarkable achievement given the fact that this company has only been up and running for two years now. The housing market is looking quite rosy at the moment, particularly on the mine housing side," Raubenheimer says.

Raudev

Raudev is a property development company that obtains land and secures the rights to develop and market that land. "However, our focus is not only to make a profit on the development but also to add to the order book of all our other companies, such as Raubex Housing for the top structures and L&R Civil for the infrastructure. An example is the Wood Winds development in Midrand, where Raudev will be breaking ground in the next three to four months on this 400 unit project," Raubenheimer says.

Louis Raubenheimer, Head of the Construction Divisions.

Raumix Aggregates supplies material to the road construction arm of the Raubex Group.

"Hence we offer the entire spectrum. Whatever is required in terms of roads, we are able to provide it. I believe our Materials Division strengthens our competitive edge."

WBJV Project 1 platinum mine now 70 % complete

In its latest quarterly report (for the three months ended 30 November 2014), Platinum Group Metals (PTM) says that it achieved a solid performance in 2014, with a good safety record, at its Western Bushveld Joint Venture (WBJV) Project 1 platinum mine, which reached 70 % completion. Project 1, located on the Western Limb of the Bushveld Complex 35 km north-west of Rustenburg, is due to enter production towards the end of this year. After a planned two-year ramp-up, steady state production is scheduled at 275 000 ounces 4E a year.

The new mine, which according to PTM, will exploit one of the last large, near surface sections of the Merensky Reef, will be an underground operation. Proven and probable reserves are estimated at 4,7 Moz 4E, sufficient to support a mine life of in excess of 20 years. Its neighbours include two other developing mines, Bakubung and Styldrift, which are owned by Wesizwe and RBPlat respectively. While all three are underground mines, Project 1 is accessed by declines while Bakubung and Styldrift both have vertical shaft systems.

PTM, which owns 82,9 % of the project, says its investment in the new mine totalled US$343 million as of the end of November 2014 with the peak funding requirement currently projected at US$502 million. According to the company, its current cash position should be sufficient to complete the mine build to initial production.

With production nearing, Project 1's management team has been expanded. Key operational roles that have been filled in recent months include mine general manager, production manager, equipment specialist, engineering specialist, safety and environment manager and a training superintendent.

Project 1 will have two distinct sections – the North and South mines. As at the end of the reporting period, over 7 600 m of access development had been completed at the North Mine and chairlift and conveyor construction had begun. Development along the Merensky Reef and the first underground raises had been started and stockpiling of Merensky Reef development material was underway, with approximately 106 000 tonnes on surface as at 30 November.

At the South Mine, the boxcut is complete and, by the end of November, underground mining had advanced the material decline for approximately 949 m and the conveyor decline for approximately 741 m. In total, over 2 206 m of access development has been completed at the South Mine.

Flotation circuit construction at the WBJV Project 1 site.

As regards the processing plant, foundations for major mill and concentrator components have been completed and major mill components delivered, including the mill shell. The structural steel for the mill and flotation circuits has largely been completed.

In terms of Project 1's power requirements, a 10 MVA installation is in place with work underway on an additional 10 MVA supply. The full steady state requirement of the mine is 40 MVA.

Current site construction, underground development and management complements total over 1 700 people, with approximately

Above: *Aerial view of the Project 1 site. As at the end of November, the project had reached 70 % completion.*

Right: *The Waterberg discovery represents a new PGM district and extends the known limits of the Northern Limb of the Bushveld Complex.*

24 % of the workforce drawn from local communities.

In its quarterly report, PTM also updates on developments at its spectacular Waterberg PGM discovery, north of Mokopane on what is now perceived as a new 'lobe' of the Northern Limb of the Bushveld Complex. The mineralisation identified constitutes a large system with multiple thick layers, making it amenable to bulk mechanised underground mining.

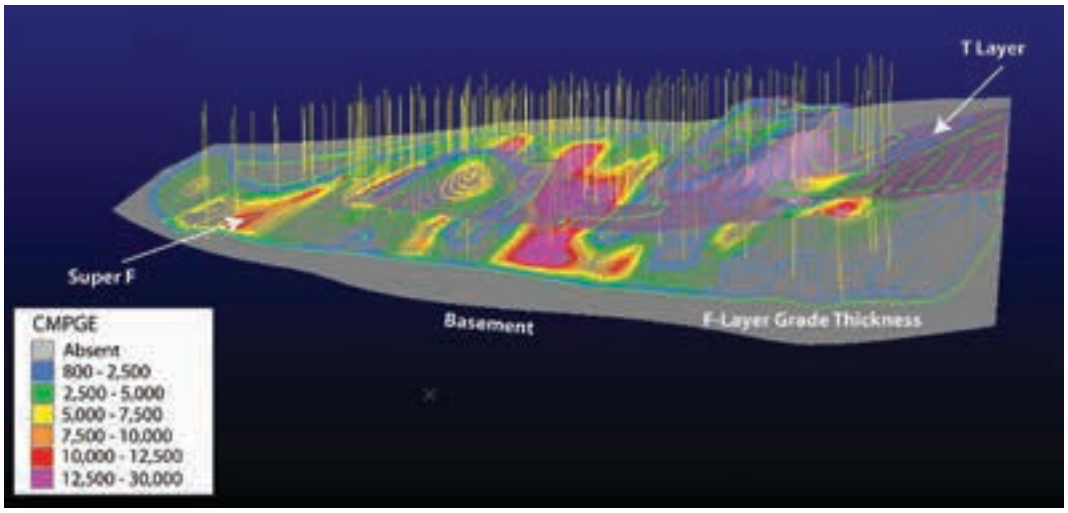
The discovery was made 70 km north of Anglo American Platinum's Mogalakwena mine and was announced by PTM in November 2011 in a release in which the company reported drill intercepts grading 3,47 g/t platinum, palladium and gold over 3,5 m at a depth of approximately 660 m. "The high grade, thick, layered intercepts are located in an area north of the previously mapped North Limb of the Bushveld Complex," said PTM at the time.

The Waterberg discovery has attracted attention internationally and in December 2012 it was named as 'Global Exploration Discovery of the Year' at the prestigious Mining Journal Outstanding Achievement Awards, part of the Mines and Money Conference held in London every year. It is a genuine virgin discovery, as there was apparently no recorded PGE exploration in the area (although regional mapping was conducted by JCI and the Council for Geoscience) prior to PTM's involvement.

PTM's interest in the Waterberg discovery is via two separate projects – the Waterberg JV project, in which it holds an effective 49,9 % stake, and the Waterberg Extension project, in which it has an 87 % share. Its partners in the Waterberg JV are the Japan Oil, Gas and Metals National Corp (JOGMEC) and empowerment company Mnombo Wethu Consultants. The total identified resource over both projects now stands at an exceptional 29 Moz 4E (287 Mt grading 3,15 g/t 4E) in the inferred category and a new resource update is expected shortly. The resource has been modelled from 127 m deep to a model cut-off of 1 250 m.

The results of a Preliminary Economic Assessment (PEA) on the Waterberg JV project undertaken by WorleyParsons were announced roughly a year ago. Highlights were a steady-state production of 655 000 ounces of platinum, palladium and gold (3E), a two-year construction period, a project post-tax NPV (7,5 % discount rate) of US$509 million and a peak funding requirement of US$885 million. The mine plan proposed in the PEA utilises three decline clusters for access as a result of the shallow depth of the deposit. The planned mining method is all mechanised including a combination of room and pillar mining on mineralised layers 3 to 10 m thick and longhole open stoping on layers from 10 to 60 m thick.

In October last year, PTM announced that it had completed 71 000 m of vertical core drilling at the Waterberg projects, successfully expanding and detailing the Waterberg T, F and Super F Zones. Intercepts included hole WB123 on the Waterberg JV returning an 80 m thickness intercept of 4,80 g/t 3E (1,41 g/t platinum, 3,18 g/t palladium, 0,21 g/t gold, 0,10 % Cu and 0,23 % Ni) from 370 to 450 m. PTM followed up with an announcement in early December that a new high grade intercept on the Waterberg Extension had confirmed the strike continuation of the F Zone for



Waterberg deposit – perspective view looking north-east.

1,9 km north of the known Waterberg deposit.

Looking ahead, PTM, which is now undertaking a Pre-feasibility Study (PFS) on the Waterberg JV project, says that during 2015 it will be speaking with its partners and other third parties interested in becoming involved at Waterberg. In its quarterly report, it states: "The company will consider transactions with the potential to provide funding for additional work. The goal will be to keep the Waterberg projects advancing and on track to the completion of the planned Pre-feasibility Study and beyond while maintaining our interest in the Waterberg JV and maintaining an effective majority interest in the Waterberg Extension. We plan to work with Macquarie Bank in South Africa to identify financing alternatives for our Black Economic Empowerment partners so that they may become fully funded at both Project 1 and at Waterberg." ■

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SOUTHERN AFRICA'S TOP MINING PROJECTS

The Karowe diamond mine of Lucara – one of our Top Projects (photo: Arthur Tassell).

In our regular Top Mining Projects feature we look at projects distinguished by their size, innovation or pioneering spirit. With mining in Southern Africa generally in a depressed state, finding projects meeting these criteria is not easy but we have identified three that fit the bill. Two are diamond mining developments, one in Botswana and one in Lesotho, while the third is a bold copper mining initiative in Botswana. It says something about the parlous state of South African mining that all our projects are located in neighbouring states.

The first of our Botswanan projects is the **Karowe** diamond mine of Canada's Lucara Diamond Corp. Located in the Orapa Kimberlite Field (OKF) and only commissioned in 2012, it has proven to be a spectacular success – with the big surprise being the unusually high number of large stones it has produced, several of them exceeding 200 carats. To cater for this large-diamond population and also to handle the harder unweathered ore being encountered as mining moves into deeper parts of the orebody, a substantial US$55 million upgrade of the plant is currently underway.

Interestingly, the upgrade incorporates new technology that Lucara believes represents a 'first' – not only in Botswana but worldwide. This is the use of X-ray Transmission (XRT) machines in a primary diamond recovery role.

The irony of Karowe is that the kimberlite it exploits – AK6 – was discovered by De Beers around 45 years ago. Due to limitations in the exploration technology and methods then being used, both its size and grade were under-estimated and the true potential of the orebody was only realised more than 30 years later when the kimberlite was subjected to re-evaluation.

Moving to Lesotho, Firestone Diamonds, now headed by Stuart Brown, who spent 20 years with De Beers, is well into the construction phase of its **Liqhobong** mine. Although Liqhobong has been mined in the past (a pilot processing plant was erected on site 10 years ago to treat ore from the small satellite pipe), the new project is focusing on the main pipe and is designed to produce over a million carats a year. This is an exceptional figure for Lesotho, although the diamonds produced will generally be of much lower value than those from the nearby Letšeng mine, currently the flagship of diamond mining in Lesotho.

Liqhobong will not be an innovative mine in the sense of pioneering new technology but what makes it exceptional is the fact that Brown and his team have been able to secure the funding required for its development in a market which is resistant to new mining projects – particularly those being undertaken by juniors.

Moving back to Botswana, the third of our Top Projects is the **Khoemacau** copper mine of Cupric Canyon Capital, which is on the brink of construction. Located in the new copper mining district between Maun and Ghanzi in northwest Botswana, Khoemacau is a bold venture given current conditions in the commodities market – and also the fact that the only other copper mine in this area has under-performed since being opened in 2012. Cupric is confident, however, that the Khoemacau orebody can be mined effectively using underground methods (as opposed to the open-pit methods used by the neighbouring operation) and that it has a highly viable project on its hands.

Khoemacau will have an ore treatment capacity of 3,6 Mt/a and is designed to produce up to 50 000 t/a of copper in concentrate. This is not a big figure by world standards but exceptional for Botswana, which is not noted as a copper producer. The new mine, which should enter production in 2018, will also produce silver as a by-product although this will only account for about 10 % of the revenue stream. ■

Karowe – off to a **brilliant** start

Back in the early 1970s the newly discovered AK6 kimberlite near Orapa in Botswana was adjudged to be sub-economic by De Beers, which put its grade at a paltry 3 cpht. Today this same kimberlite underpins one of the most successful new diamond mines established in Africa in recent years – the Karowe mine of Lucara Diamond Corp, which recently passed the million carat milestone. The mine's processing facilities are now undergoing a major modification to allow the treatment of harder ores and enhanced recovery of large stones, as ***Modern Mining's*** *Arthur Tassell saw on a recent visit to the site in the company of Paul Day, Lucara's Gaborone-based COO.*

Seen here (left to right) are Tony George, Paul Day and Dr John Armstrong. Day is COO of Lucara and Armstrong is Lucara's VP, Mineral Resources. At the time this photo was taken George was Lucara's Senior VP but he has since left Lucara to assume a similar role at Lundin Gold, which – like Lucara – is part of the Lundin Group (photo: Arthur Tassell).

The under-estimation of the grade of AK6 – and indeed its size – more than 40 years ago resulted from the limitations of the exploration techniques and drilling equipment then in use. Re-evaluation of the kimberlite starting in 2003 by De Beers revealed that its grade was in fact a very respectable 16 cpht on average and that its size, just over 3 ha near surface, had been under-estimated as it reaches a maximum area of 7 ha at 120 m below surface.

De Beers and its partner in what was then known as the Boteti Joint Venture, African Diamonds, advanced the project through to a Definitive Feasibility Study but did not actually take the kimberlite into production (with African Diamonds keen to proceed and De

but the best is yet to come

The Karowe site (in September 2014) showing new conveyors in the foreground, the final recovery building in the distance and (to the right) the XRT plant under construction (photo: Arthur Tassell).

Beers favouring deferral). The 'ins and outs' of subsequent negotiations between African Diamonds, De Beers and the Botswana government are not important here but suffice it to say that the 'logjam' was broken in 2009 with De Beers selling its 71 % stake in the project to TSX-listed Lucara Diamond Corp, part of the Lundin Group of Companies. African Diamonds initially continued as a partner in the project but was acquired by Lucara in late 2010, giving the latter 100 % control of AK6.

The decision to proceed with mine development was taken by Lucara in November 2010 and the mine – which was given the name Karowe, meaning 'precious stone', in 2011 – came on stream in April 2012. It was officially opened by the President of Botswana, Lieutenant General Seretse Khama Ian Khama, in August of the same year. It is an open-pit operation with the processing circuit combining autogenous milling – the first such installation in the diamond world outside of ALROSA – with a conventional DMS circuit. The capex involved in developing the mine was approximately US$120 million, less than half the estimate of the De Beers DFS,

The mine is located near the town of Letlhakane in the heart of the Orapa Kimberlite Field (OKF), which hosts over 80 kimberlite bodies. Its neighbours include the BK11 mine (owned by Firestone Diamonds but not currently operating and up for sale) plus three Debswana mines – Orapa, one of the world's largest diamond mines, Letlhakane and Damtshaa.

The AK6 kimberlite is a minnow compared to Orapa (the AK1 kimberlite which Orapa exploits had a surface area of 110 ha when mining started) but it nevertheless represents

Inside the mine's final recovery building.

Above: *Aerial view of the Karowe mine, which is located in the Orapa Kimberlite Field near the town of Letlhakane.*

Centre: *The pit at Karowe. All the lobes are currently being mined and the North Lobe, the initial focus of mining operations, is over 60 % mined out. Remaining pit life is about 13 years (photo: Arthur Tassell).*

a formidable high US$/carat resource. The mine plan is based on probable reserves of 33,1 Mt containing 5,1 million carats from an open pit designed to 320 m depth. The indicated resource from surface to a depth of 400 m amounts to 48 Mt containing 7,6 million carats. There is also an inferred resource from 400 m to 750 m of 21 Mt containing 3 million carats. The deposit is open at depth.

The geologists describe AK6 as "a three-lobed body primarily composed of volcanoclastic kimberlite with lesser hypabyssal facies kimberlite." The three lobes are referred to as the North, Centre and South lobes, with the bulk of the reserve (75 %) being contained in the South Lobe. All the lobes are currently being mined and the North Lobe, the initial focus of mining operations, is over 60 % mined out. At the present processing rate of approximately 2,5 Mt/a, the open-pit mine life is around 13 years – with the ultimate dimensions of the pit expected to be 800 m x 700 m by 320 m.

Commenting on the performance of Karowe, Paul Day – who joined Lucara as COO in March 2013 and who was previously GM at the Trekoppje uranium mine in Namibia (and before that a senior manager with AngloGold Ashanti in Mali) – says the mine has met Lucara's expectations, and more. "It was designed to be roughly a 400 000 carats a year producer and we are achieving this easily," he says. "In 2013 we produced just over 440 000 carats and our guidance for 2014 is between 400 000 and 420 000 carats at an operating cost of US$31 to US$33 per tonne treated. But the really exciting feature of Karowe is the sheer number of large stones that have been recovered which is way ahead of what Lucara expected when it commissioned the mine. For example, in the first half of 2014 we recovered 547 diamonds larger than 10,8 carats, including 67 larger than 50 carats and 25 larger than 100 carats."

In fact, several stones have been above 200 carats, with the biggest to date being 281 carats. Diamonds above 100 carats – and, even more so, 200 carats – are extremely rare and, apart from Karowe, the only other regular producers of stones this size in the Southern African region – and indeed globally – are Letšeng in Lesotho, owned by Gem Diamonds, and Petra's Cullinan mine near Pretoria. The value of Karowe's diamonds has also been greater than originally anticipated, with the average price achieved in H1 2014 being over US$750/ct (including all the 'specials' above 10,8 ct).

Operationally, Karowe is run on an outsourced model, with contractors running the main functions of open-pit mining operations and ore processing. The mine is operated by Lucara's local subsidiary Boteti Mining headed by MD Ribson Gabonowe. Day-to-day management of the mine is in the hands of GM Gerry Ndlovu and the total employee complement he is responsible for (including contractors) is around 800 people. He takes satisfaction from the fact that his senior managers are mainly Batswana with just one expat in the team.

Ndlovu is a metallurgist (he graduated from Queen's University in Kingston, Ontario, Canada) and prior to joining Boteti Mining in 2010 spent nearly 20 years with BCL in Selebi-Phikwe.

He was Karowe's third employee and has seen the project move through from concept to commissioning to operation. Like Day, he labels it a "huge success" but says that a particular focus at the moment is safety. "In 2012 we were one of the best performing mines in Botswana in terms of safety and received an award from the Botswana Chamber of Mines," he notes.

Above: *Kalcon machines working in the Karowe pit. By the time this article is in print, MCC will have taken over as the mining contractor (photo: Arthur Tassell).*

"Since then we have experienced three LTIs, all of them minor in nature. Nevertheless, we view them seriously and we are currently putting an enormous effort into safety, with the emphasis on internalising safety behavior. Overall our safety performance, though, is creditable and thankfully we have never had a fatality."

When *Modern Mining* was at Karowe late last year the mining contractor in place was Kalcon (part of WBHO), which was operating a fleet of 36 Cat 730 and Cat 740 ADTs, working in conjunction with Cat 345, Cat 374 and Cat 390 excavators. The mining operation was explained to *Modern Mining* by Mining Manager Joe Mchive, who said that the pit would produce around 3,8 Mt of ore and 11 Mt of waste by year end. He noted that stripping levels would steadily increase as work started on Cut 2, with the intention of exposing ore by 2018. He also said that Kalcon's three-year contract was drawing to a close and that – based on the results of an open tender – it would be replaced by MCC as from January 2015. MCC's contract is for six years and the company will be deploying a fleet which includes 100-ton rigid trucks for waste and 40-t ADTs for ore, with the largest excavator being a 150-t Liebherr machine.

The EPCM contractor during the initial construction of Karowe was DRA and Minopex, also part of the DRA Group, has an SLA (service level agreement) contract to operate and maintain the process plant. The current flowsheet is fairly simple and consists of primary crushed ROM being processed through a single autogenous grinding (AG) mill with the +35 mm product crushed in a single pebble crusher and recirculated back to the mill and the +1,5, -35 mm mill product being processed through a DMS with final recovery using DEBTECH X-ray sorting machines.

According to Paul Day, the current modifications to the plant – which are budgeted at US$55 million and which are scheduled to be completed in Q2 2015 – are intended to optimise operations and allow the facility to maintain throughput at 2,5 Mt/a as the orebody at depth is mined. "The plant in its present configuration was designed around treating the near surface material, which is weathered and transitional ore," he explains. "It was always understood that it would have to be modified to handle the harder unweathered ore present at depth – in the South Lobe in particular. Quite apart from the need for increased comminution capacity, it was also understood that the characteristics of the ore change as we go deeper, with the near density material (material with a density close to that of diamond) steadily increasing. This, in turn, results in the DMS circuit becoming less effective, and this is another issue we're addressing with the upgrade.

"What was not originally realised when the plant was designed is that Karowe would become a prolific producer of large stones. It was only in 2013 that we started to recover

Lucara – based in Canada but rooted in Africa

Although it can trace its antecedents back to the 1980s, Lucara in its present form was founded in 2007, with its first CEO – and now Chairman – being Lukas Lundin. The present President and CEO, William Lamb, a South African-trained metallurgist, joined the company as GM in 2008 (he was previously Process Manager at De Beers' Victor mine in Canada).

Lucara is listed on the Toronto Stock Exchange, Nasdaq OMX Stockholm and the Botswana Stock Exchange and has its corporate office – very lightly staffed – in Vancouver. The company's focus, however, is entirely in Africa at present and it maintains an office in Gaborone where COO Paul Day and Ribson Gabonowe, MD of Boteti Mining, Lucara's subsidiary in Botswana, are based.

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A striking shot of the AG mill, the first of its type in Southern Africa (with the exception of some units at the Catoca diamond mine in Angola).

large diamonds and understand that there was a large-diamond population outside of the original resource model estimation. We quantified this by undertaking a bulk sampling campaign on the South Lobe and we subsequently published a new NI43-101 compliant resource statement reflecting this characteristic of the orebody. To handle the large stones and ensure that we realise their full value, we decided that the upgrade project must include a 'Large Diamond Recovery' circuit treating material up to 60 mm in size. This will permit Karowe to recover an undamaged diamond of well over 1 000 carats."

The upgrade of the comminution circuit, currently underway, involves a new secondary gyratory crusher (a Kawasaki machine supplied by IMS) being installed, with a variable scalping screen arrangement ahead of the crusher to maintain a controlled percentile of larger material to act as grinding medium in the AG mill. There will be a bleed circuit ahead of the AG mill to allow finer material to bypass the mill and continue on to the downstream processes. The AG mill has been fitted with Turbo Pulp Lifters and re-designed discharge grates. The modifications will allow for flexibility around the AG mill so that its operation can be optimised to varying degrees depending on the hardness of the ore.

To cater for the anticipated increase in DMS yield and assist with the recovery of large stones, Lucara has elected not to increase the DMS capacity, but to go for new technology that represents a 'first' in the diamond mining industry. Says Day: "The +1,5 mm, -8 mm size ore fraction will continue to report to the DMS but the other size fractions will report to a new bulk sorting circuit with a maximum capacity of 415 t/h. This is the most technologically innovative and exciting part of the upgrade and consists of five high-capacity X-ray Transmission (XRT) machines, which are able to identify the carbon signature of diamonds (atomic number) and eject them separately from the gangue material. Each machine treats a different size fraction, and can sort efficiently at up to 100 t/h depending on the size fraction being treated.

"The concentrate from the XRT circuits is delivered directly to a glove box and hand sorted in the conventional mode. XRT rejects either go to tailings or back into the circuit for milling or crushing and further diamond liberation. This again is dependent on the size fraction. There will also be a sixth audit machine on the tailings stream to check upon operational efficiency. We believe the system is unique in the world in terms of primary diamond recovery although XRTs have been used to treat recovery tailings in some operations."

The EPCM contractor for the plant upgrade is DRA. "It makes sense for us to be using DRA again," comments Day. "They delivered the original plant under budget and on schedule, so – based on the fact that the relationship with them worked the first time around – we engaged them directly rather than going out to tender. It's going well, though a brownfield expansion is a very different animal to a 'new-build'.

"To supply the XRTs, we've chosen TOMRA Sorting Solutions of Germany. We undertook an extensive suite of testwork with TOMRA and the other suppliers of XRT equipment. We

"What was not originally realised when the plant was designed is that Karowe would become a prolific producer of large stones."

Paul Day, COO, Lucara

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shipped tonnes of Karowe ore up to Europe and did initial tests with graphite tracers, then – as we gained confidence with the technology – we introduced Karowe's diamonds into the process, including a +200 carat stone! TOMRA was selected following a technical and commercial adjudication. The net result of the selection process is that we have a cost-effective technology that can obtain high diamond recovery at high throughput for all our ore types with minimal need for further sorting."

Once the upgrade is complete, Karowe will be able to maintain its annual production in the 400 000 to 450 000 carat range through to 2026. After that there is the possibility that the mine could transform into an underground operation and a preliminary desktop study on this option is being undertaken.

Lucara is also embarking on an intensive programme of exploration in the Karowe area with the aim of identifying additional resources. It recently put in some "aggressive applications" – as Dr John Armstrong, the company's VP, Mineral Resources, puts it – for prospective ground in the vicinity of the mine that was 'on auction' and was awarded two exploration licences, both of which host known diamondiferous kimberlites, in September 2014. One of the licences, Block A, is located 30 km to the east of Karowe while the other, Block E, lies 15 km to the north of the mine.

According to Armstrong, all the kimberlites were discovered by De Beers in the late 1960s, with some having been subject to further exploration in the intervening period since and others almost totally neglected. "Our intention is to bulk sample these kimberlites and – to this end – we've contracted ADP Projects of Cape Town to supply us with a 15 t/h bulk sample plant, which we will install at Karowe. If all goes to plan, we should be putting material through the plant in the third quarter of 2015," he says.

Karowe, of course, is not Lucara's only asset and it also owns the Mothae kimberlite project in Lesotho, which is just 6,5 km from the Letšeng mine.

Lucara was considering expanding the current bulk sampling plant on site to treat Mothae's significant resource of weathered ore – as the first stage in developing a fully fledged mining operation – but has recently announced that it intends divesting itself of Mothae. In a statement issued early this year (2015), Lucara said that while it had evaluated multiple development options for Mothae, it had concluded that the project did not meet "the company's disciplined investment criteria for its targeted return on capital".

Summing up, Day says that with Karowe in full production, Lucara is becoming a significant player in the diamond market. "We're a young company but we've achieved a great deal over our relatively short history," he says. "Karowe is our flagship and will underpin Lucara for years to come but we will not necessarily remain a 'one-mine company' and we remain on the lookout for attractive opportunities, either in Botswana or the wider Southern African region."

Photos by Lucara Diamond Corp (unless otherwise credited)

Detailed planning the key to success

Leading the DRA team on site on the Karowe upgrade as Construction Manager is Clint Jennings, who told *Modern Mining* that the contract was progressing well. "The main challenge is that we're having to handle some very complex construction in and around an operating plant, at the same time fitting in with the operational cycle," he said. "The success of a 'brownfield' project is a function of how much planning goes into it at the beginning and I spent four months coming up here from Johannesburg prior to the project starting on site in March this year (2014) to ensure that we could achieve a good alignment of construction with operation."

DRA is managing a large contingent of sub-contractors and suppliers who include Basil Read subsidiary Sladden International, responsible for civils and earthworks, SMEI Projects, which is handling structural, mechanical, piping and plating work, and HVC, the electrical instrumentation contractor. The labour force deployed on site is due to peak at around 480.

Million-carat-a-year mine on

Lesotho is well on its way to getting its first truly high volume (in terms of carat production) diamond mine, with AIM-quoted Firestone Diamonds already well into the construction phase of its US$185,4 million Liqhobong mine in the Maloti mountains. Liqhobong is designed to deliver 1,1 million carats a year over 15 years starting in 2016, which is roughly 10 times what nearby Letšeng – Lesotho's best known mine – produces (although the dollar price per carat of Letšeng's stones is the highest of any producing kimberlite in the world). ***Modern Mining's*** *Arthur Tassell recently spoke to Firestone's CEO, Stuart Brown (right), to learn more about the Liqhobong project, which can claim to be virtually the only real 'greenfield' diamond mine development of any substance currently underway in the Southern African region.*

Some might argue with the characterisation of Liqhobong as a greenfield project as it has a history of commercial mining but, as Brown points out, Firestone has removed the previous pilot plant that was in use – intermittently – from around 2005 to 2013 and is essentially starting afresh at the site. "To all intents and purposes, this is a greenfield development and we have salvaged very little from the previous plant, which was sold for scrap and removed from the mine earlier this year (2014) at no cost to Firestone," he says. "We are replacing it with a large custom-built plant with a capacity of 500 t/h – or 3,6 Mt/a – which will be entirely new and based on modern, well-proven technology."

The Liqhobong kimberlites – there is a main pipe and a satellite pipe – were discovered in the late 1950s but remained unexploited (other than by operations of an artisanal nature) until 2005 when European Diamonds (later Kopane

course for 2016 start-up

Diamond Developments) erected a pilot plant at the site to treat material from the small satellite pipe. This operation ran through to 2008 after which the plant was put on care and maintenance. In 2010 Firestone – which was then focused on Botswana – bought out Kopane and in 2011 restarted the plant. Between July of that year and October 2013 it produced in excess of 325 000 carats, mainly from the main pipe.

"When Firestone acquired Liqhobong, it was always with the intention of developing a large scale mining operation based on the main pipe," says Brown. "The mining that took place from 2011 onwards was a trial mining exercise designed to provide some cash flow while, at the same time, allowing the company to get data on the quality, grade and size of stones in the orebody. Firestone did modify the plant to increase efficiency and capacity somewhat but with only limited success. It was, however, able to complete a Definitive Feasibility Study – later updated – during this period which indicated that the main pipe could form the basis of a very viable large-scale mine."

Brown's involvement with Liqhobong dates back to September 2013, when he was appointed an Executive Director of Firestone. Subsequently (as from 1 December 2013) he was appointed CEO in succession to Tim Wilkes, who remains associated with the company. Brown was brought on board specifically to advance the Main Treatment Plant project to production. It was an inspired choice by Firestone's board, as Brown had previously enjoyed a stellar 20-year career in the diamond field with De Beers – which saw him ultimately becoming Group CFO and Joint Acting CEO. His appointment was a declaration of intent by

Left: *A view of the Liqhobong project site (November 2014).*

Below: *Earthworks underway on the the Residue Storage Facility.*

Liqhobong in winter. This photo, taken in 2012, shows the original plant at the site which has now been removed.

Firestone that, despite being a cash-strapped junior, it was determined to develop a Tier 1 mine at Liqhobong.

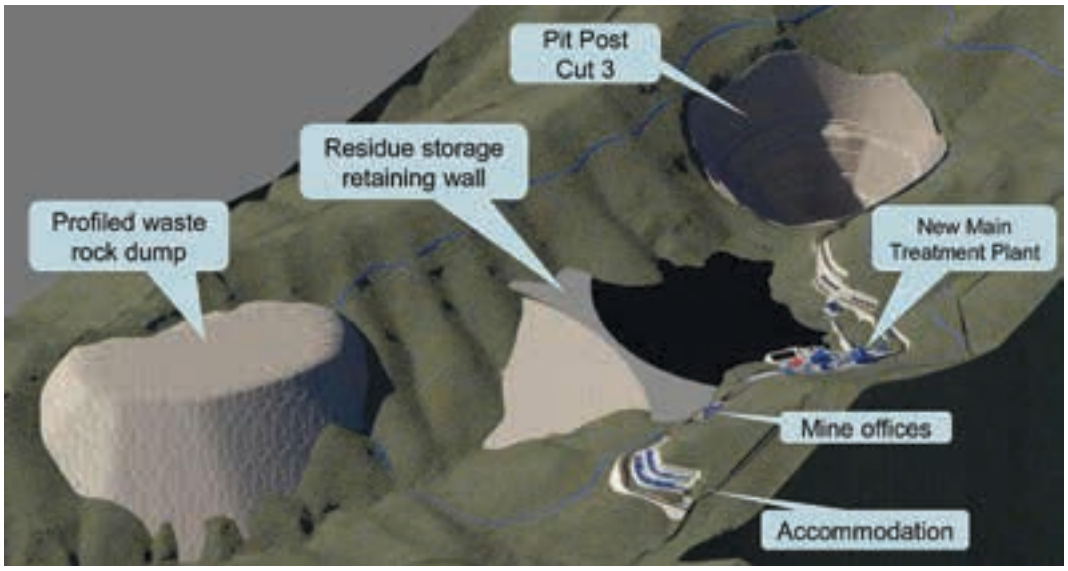
At the time of being appointed CEO of Firestone, Brown said, "I am extremely excited by the opportunity that Firestone provides and I look forward to bringing all my experience and passion for diamonds to the company as it moves to its next phase of developing the Liqhobong deposit. After two years out of the diamond industry – an industry that has been a huge part of my life for 20 years – I am thoroughly revitalised, and ready to help Firestone bring a high quality, near-term asset on stream."

Revitalised he has proved to be. Within weeks of becoming CEO, he had secured the funding for Liqhobong and in mid-January 2014 Firestone was able to announce a funding package of US$140 million and a project debt facility of US$82,4 million, no mean achievement given then – and indeed current – conditions in the resources industry and the extreme difficulty of raising money for new mining projects of any type.

Recalling this period, Brown says there was a great deal of scepticism in the market about Firestone's plans. "This was evident during the road show we undertook at this time," he recalls. "People asked me how a company with a market cap of around US$35 million could possibly expect to raise an equity/debt package of over US$220 million. They said, 'You're joking – it can't be done.' But I'm pleased to say we proved them wrong. I attribute our success in great part to the quality of our DFS, which was completed by DRA in 2012, revised in late 2013 and thoroughly reviewed by independent experts. In addition, we had put together a well thought-out plan for project implementation over a two-year period which was realistic and attainable and which impressed the market."

The revised DFS indicates a base case project NPV at 8 % of US$379 million and a post-tax IRR of 30 % but with a significant upside case based on the potential revenues from larger diamonds of 100 carats plus. The upside case would deliver an NPV at 8 % of US$728 million and an IRR of 40 %. Explaining these figures, Brown says the main pipe at Liqhobong is something of an anomaly, with most of the neighbouring mines and projects having kimberlites which are extremely low

Bell ADTs from Turnkey Civils Lesotho (TCL), shortly after arriving on site. TCL is the contractor for the Residue Storage Facility (RSF) and moved on to site in June last year.



Left: *Plant and infrastructure layout post 15 years of phase 1 mining.*

Below: *Layout of the new plant, which will have a capacity of 3,6 Mt/a.*

grade – approximately 2 to 6 cpht. This low grade is offset, at least in the case of Letšeng, by the consistency with which large high-quality stones are produced – in fact, Letšeng typically gets an average of well over US$2 000/carat for its diamonds.

"Liqhobong, by contrast, has an exceptionally high grade by Lesotho standards of 33 cpht but its diamonds have generally been regarded as low value," he explains. "The base case price per carat used in the revised DFS is a relatively modest US$107 and the project, of course, is highly viable on this basis. We do believe, however, that Liqhobong – like its neighbours – has the ability to produce large stones. The figure of US$107 is based on the recovery and sale of the diamonds from the pilot plant operation but does not take into account breakage of large stones in the plant which – due to shortfalls in its design – was a persistent problem.

"We estimate that over the 22 months we operated the pilot plant nine large 100 carat plus stones were crushed. Based on an analysis of the fragments, three of them were calculated to be over 200 carats, with the biggest being an approximately 430 carat yellow diamond. Taking large stones into account, our expectation is that the average price could rise to US$156 per carat – hence the upside case in the revised DFS."

The DFS envisages open-pit mining of the main pipe down to 393 m over 15 years – exploiting a reserve of over 11 million carats at a grade of 32,07 cpht – at an average strip ratio of waste to ore of 2,28. The ore will be treated in the Main Treatment Plant (MTP) which utilises a conventional flowsheet comprising scrubbing, screening, crushing, concentration via DMS, and final recovery using X-ray machines. The plant will have 2 x 250 t/h streams. The mining cost is estimated at R21,5/t and the processing cost at R57,8/t. The total cost per tonne of ore processed is projected at R140,92/t. The mine will have a power draw of approximately 5 MW, to be supplied from the Lesotho grid.

With the funding under its belt and available in the second quarter of 2014, Firestone was able to award the key contracts and launch the construction phase of the project in May/June 2014 and by 20 June over R1 billion of the project budget had been committed. DRA was appointed as the EPCM contractor while other awards include the residue storage facility or RSF (Turnkey Civils Lesotho), the civils and earthworks (Stefanutti Stocks), the structural, mechanical, piping and platework or SMPP (SMEI Projects) and the overhead power line required to connect the site to the Lesotho grid (Infrastructure Projects). Some of these elements are substantial with the RSF contract being worth R330 million, the civil and earthworks R263 million and the SMPP R327 million.

In addition, the contracts for the supply of long-lead items such as the crushers, scrubbers, apron feeder, vibrating screens and primary rock breaker have all been placed. The fact that the mining industry globally is in a subdued state has assisted Firestone inasmuch as suppliers generally have capacity and have submitted competitive prices. The escalation risk has

"We estimate that over the 22 months we operated the pilot plant nine large 100 carat plus stones were crushed."

Stuart Brown, CEO, Firestone Diamonds

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Looking up the Liqhobong Valley towards the temporary site accommodation and the RSF.

been removed by converting all the contracts to fixed prices.

As of late November, when *Modern Mining* spoke to Brown, the project was on time and within budget with 460 people already on site (this number will rise to around 800 in 2015) and over 200 pieces of earthmoving and construction equipment deployed. Work on the main plant terraces, the accommodation terraces and the RSF was well underway. Construction of the plant will start in Q1 2015 with the C2 commissioning scheduled for Q1 2016 and C3 commissioning for Q2 2016.

To ensure that Liqhobong is implemented smoothly, Brown has selected as Chief Project Officer one of South Africa's most experienced project managers in the diamond mining field – Glenn Black. He was appointed in February 2014. Like Brown, he enjoyed a 20-year career with De Beers, during which he worked on major projects in Namibia, South Africa (the Voorspoed mine, among others), Canada and Botswana. He reportedly successfully delivered nine of the largest and most complex projects undertaken during this period by De Beers. Comments Brown: "Glenn and I go back a long way and from the moment I became involved with Firestone I had him earmarked as our Project Manager."

One of the challenges presented by Lesotho's kimberlites is their remote location high in the Maloti mountains. While this does complicate logistics, it probably should be pointed out that Liqhobong is accessible via the asphalt-surfaced road leading to the Katse Dam, with only the last few kilometres being on gravel. The gravel road accessing the site is being upgraded, with the work including 5,8 km of new road alignment which takes the road around the RSF and also enhances safety.

Although a mining contractor for Liqhobong has not yet been appointed, Firestone is talking to Maseru-based Matekane Mining Investment Company (MMIC), which operates one of the largest fleets of earthmoving equipment in Lesotho and which is the mining contractor at Letšeng. MMIC has worked for Firestone in the past and is thus well acquainted with the Liqhobong site. "We are currently redoing the Whittle optimsation of the pit and revising the mine plan," says Brown. "Once these tasks have been completed, we'll be in a position to finalise a mining contract."

Finally, what is the upside for Liqhobong in terms of mine life? "When we get to pit bottom we will only have mined about 60 % of the known 29 million-carat resource in and below the open pit," Brown responds. "Apart from this, we have holes down to 760 m and we're still in kimberlite, so there is scope to grow the resource. Clearly an extension of mine life is possible via either a fourth cut in the open pit – which would involve some formidable stripping of material – or we could transform into an underground mine. Obviously, we'll do the necessary trade off studies at the appropriate time to assess whether and how we should proceed. But this decision is years away. In the meantime, we have a world-class kimberlite project to deliver and are totally focused on this task, which will result in Firestone emerging as a significant mid-tier diamond producer."

Photos courtesy of Firestone Diamonds

Kalahari Copperbelt to get new underground mine

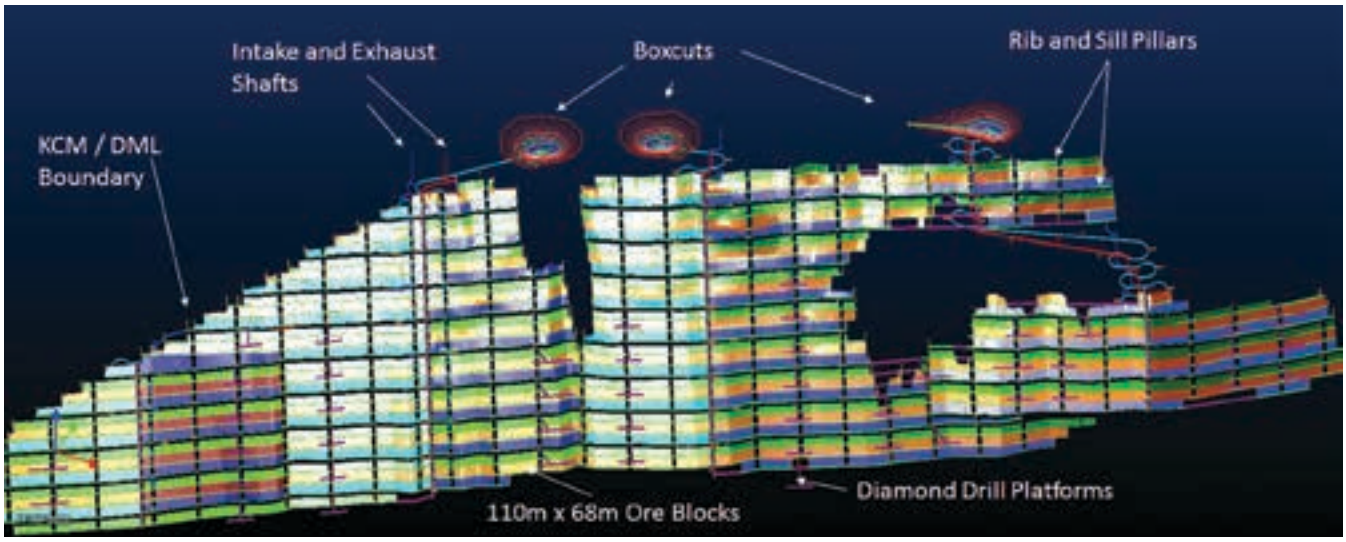
Given current market conditions in the resource sector, a brand new, large-scale (3,6 Mt/a) underground copper mine in Botswana's 'Kalahari Copperbelt' – which currently hosts a single mining operation – would seem an unlikely proposition. But this is precisely what US-based Cupric Canyon Capital (Cupric) is proposing. Its new Khoemacau mine will produce up to 50 000 t/a of copper (in concentrate) and is scheduled for commissioning by 2018, as Sam Rasmussen, Cupric's CEO for Africa, recently explained to ***Modern Mining's*** *Arthur Tassell.*

Cupric is not a particularly well-known name in Southern Africa but the company has enormous expertise in the copper mining field. It was founded in 2009 – with the backing of the Barclays Natural Resource Investments division of Barclays Bank – by a group of experienced mining executives, who were mostly from the Phelps Dodge (later Freeport-McMoRan) stable.

Cupric's aim was to target promising copper projects around the world, particularly in the Americas and Africa, and it was not too long before a series of deposits and prospects in a relatively remote part of Botswana attracted its attention. Collectively, these formed the Ghanzi project, as it was then known, of Canadian junior Hana Mining, whose extensive tenements covering over 2 000 km^2 were located in the north-west of the country between the towns of Maun and Ghanzi. Impressed by the amount of copper identified in the project area, Cupric, based in Scottsdale, Arizona, made a bid for Hana in 2012 and in February 2013 announced that it had completed the acquisition of the Canadian company.

While Hana advanced Ghanzi considerably during the several years it controlled the project, carrying out extensive drilling and completing a preliminary economic assessment, Cupric has undoubtedly brought fresh energy to the development process. At the time of acquisition, Cupric's Chairman, Tim Snider, said: "We plan to utilise our expertise in development and operations, along with our considerable financial resources, to accelerate

Personnel of Cupric Canyon and Khoemacau Copper Mining at a 'turning the soil' ceremony at the site of the tailings dam.



Mine design (1 000 m – 400 m asl).

development of the Ghanzi project with a goal of copper production within the next several years. This investment demonstrates our vision of the potential for economic development of mineral resources within the Kalahari Copperbelt."

Snider has been as good as his word. Less than two years later, Ghanzi – subsequently renamed Khoemacau, meaning 'Hills of the People' – is ready for development, with preliminary works such as camp establishment, bush clearing and access road upgrading planned in preparation for the start of construction soon after receiving the necessary mining licences. A two-year construction and commissioning phase is anticipated with the ramp-up of mining operations starting in 2017 and full production planned for 2018.

Rasmussen's involvement in the project dates back to April 2013, when he was appointed as CEO of Cupric's African operation. He, too, has a background with Phelps Dodge and Freeport-McMoRan and was GM of Freeport's Tenke-Fungurume copper mine in Katanga in the DRC (from 2006 to 2009) before moving on to become first the MD of Lundin's Zinkgruvan mine in Sweden and then GM of Los Bronces copper mine in Chile. He holds a Bachelor of Science degree from the Colorado School of Mines where he majored in Chemical Engineering and Petroleum Refining.

Explaining what Cupric has achieved in respect of Khoemacau, he says the company's strategy is quite different from Hana's. "The focus of Hana's activities was the Banana Zone in the south-west of the tenement area and the company's preliminary economic assessment was based on developing an open-pit mine in

Drilling underway in the Khoemacau project area.

Core from the Khoemacau project.

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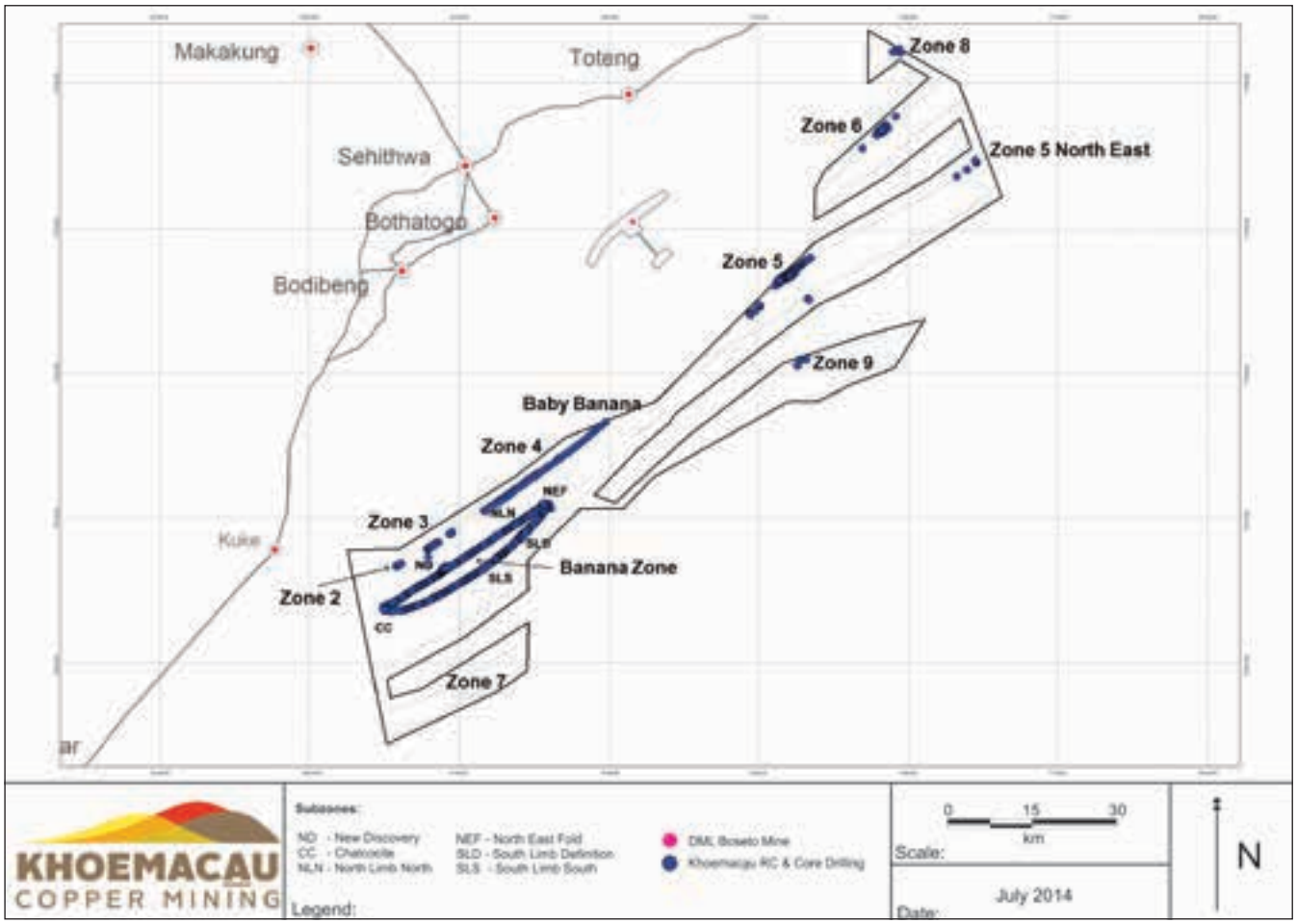

this location. We've shifted the project's centre of gravity about 60 km to the north-east to what we call Zone 5 which is the site of our mine – which will be an underground operation. We certainly haven't abandoned the Banana Zone but its development, if it does take place, is some years in the future."

Interestingly, Zone 5 is situated just a few kilometres to the east of the Kalahari Copperbelt's only existing mine, Boseto. Owned by Australia's Discovery Metals, Boseto is an open-pit mine served by a plant with a name-plate capacity of 3 Mt/a. It was officially opened in 2012 but has not yet met expectations. It produced 18 000 tonnes of copper in concentrate in the year to the end of June 2014, which is well below the production level of approximately 30 000 tonnes/annum predicted when the mine was planned.

Discovery said in early December that it was in negotiations with Cupric on the sale of Boseto to the latter. It also announced that, as part of the discussions, a US$5 million working capital facility had been agreed with Cupric. A condition of the agreement is that it grants Cupric a period of exclusivity allowing it to complete a due diligence on the operation. Since this news was released to the market,

Khoemacau Copper Mining's tenements in Botswana. The new mine will be located at Zone 5.

The Khoemacau Copper Mining team is currently approximately 60-strong.

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Discovery has also announced that it will be placing Boseto on care and maintenance within the next six months but this will not detract from its on-going discussions with Cupric.

To implement Khoemacau, Rasmussen – who is based in Johannesburg – has put together a team which now consists of around 60 full time employees (who mostly work for Khoemacau Copper Mining, Cupric's subsidiary in Botswana) and which includes, as Project Manager, Rob Dey, a veteran of the South African platinum mining industry (he worked for Impala Platinum for many years and was Group Engineering Manager). The GM of the mine has also been appointed. He is Richard Boffey, whose past experience has been at mines in Australia, Papua New Guinea, Tanzania and Turkey. Prior to joining Khoemacau Copper Mining in March last year (2014) he was GM at the Efemçukuru gold mine in Turkey.

When *Modern Mining* spoke to Rasmussen recently, the project was on the brink of implementation, with a new resource statement imminent, the feasibility study in the final stages of completion and first tender documents – for example, for the mining contractor – out in the market. The application for a mining licence was submitted in September 2014 and Cupric is confident that it will be approved and issued shortly.

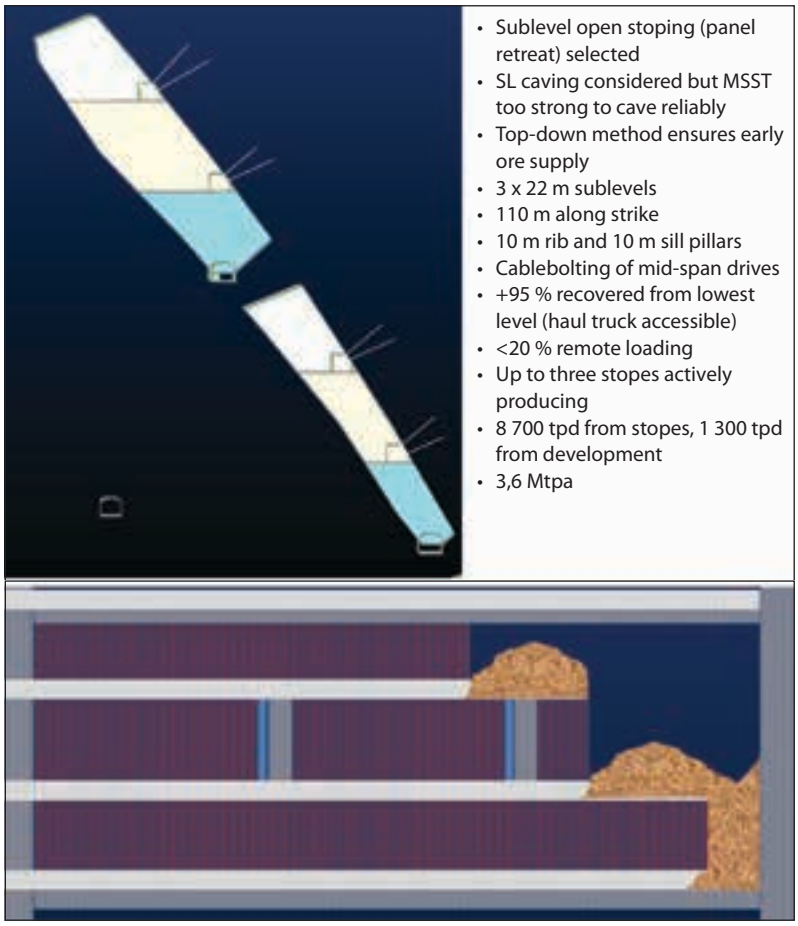
The feasibility study has been undertaken in-house but with key contributions from Mining Plus, an Australian consultancy which has prepared the mine design, and Sedgman (based in Australia but with an office in Centurion, Pretoria), which has designed the plant. Sedgman was responsible for the plant design at the neighbouring Boseto mine and was also the EPCM contractor for the construction of that facility.

The feasibility study has demonstrated that the Khoemacau project is viable as a 3,6 Mt/a (10 000 t/d) copper – and silver – producing operation commencing in sulphide material and with recovery via conventional milling and froth flotation processing. It will exploit the resource at Zone 5. Copper is the driver of the project with silver expected to contribute only around 10 % of Khoemacau's revenue stream. The final product of the mine will be a high-grade concentrate of approximately 40 % copper with relatively low impurity levels which will be shipped to smelters either in the region or overseas for final processing. The plant is expected to recover 85,4 % of the copper in the ore and 75 % of the silver.

Says Rasmussen: "We did trade-off studies to determine whether to go the open-pit or underground mining route and there is no doubt that the underground option is far superior, despite the higher capex involved and the fact that it will take us up to 18 months to reach the orebody. Militating against an open-pit solution is the very high strip ratios involved – at least 11 to 1 is the best case. As our mining method, we've chosen sublevel open stoping, which is successful at mines around the world. Some of our neighbours have material that demands sub-level caving; however, our rock is very competent and sublevel open stoping is ideal.

"The mine will have three independent declines, each with a capacity of 3 500 t/d and each with multiple working faces – which will give the opportunity to blend generated ore and optimise the concentrate quality to minimise smelter penalties. The maximum depth of mining operations initially will be about 600 m but we will hit mineralisation at around 300 m. The three declines will be sufficient for the initial years of mining and a vertical shaft might be a possibility later in the mine life."

The plant will be very similar to the facility at Boseto and will include primary crushing in a single-toggle jaw crusher, secondary and tertiary crushing in cone crushers (three in total) and a single stage of ball milling. The ball mill operates in closed circuit with



Proposed mining method for the Khoemacau mine.

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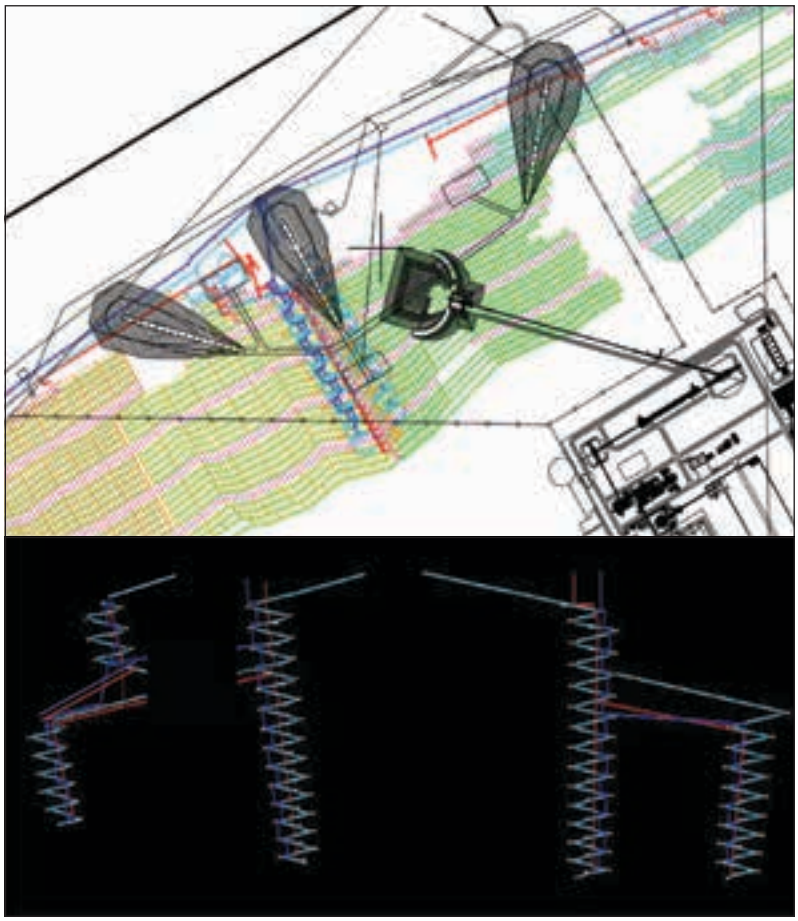
classification hydrocyclones mounted in a cluster. Circulation load to the ball mill is targeted at 250 % with cyclone underflow returning to the ball mill. Cyclone overflow reports to a rougher flotation feed surge tank. Flotation feed is pumped to the rougher circuit whereby the concentrate reports to a dedicated concentrate product circuit for upgrade into final product. Regrinding of rougher concentrate and cleaner flotation processes are used to further upgrade the rougher concentrate into high grade copper concentrate.

The rougher tailings are pumped to the tailings thickener before being pumped to the tailings storage facility. The final concentrate reports to the concentrate thickener with the thickener underflow being pumped to the filter feed tank. The concentrate in this tank is pumped to a pressure filter in a batch operated manner.

The tailings storage facility will be developed as a single compartment ring dyke type storage facility. The footprint is 210 ha with a final vertical height of 32 m.

As regards bulk services, water will be supplied from a nearby wellfield which has already been permitted for 12 000 m^3/d, which is more than sufficient as the maximum demand of the plant will be 10 000 m^3/d. According to Cupric, the wellfield can be doubled without negatively affecting the aquifer. Electricity supply is a bit more problematic. Says Rasmussen: "We have a commitment from the Botswana Power Corporation (BPC) to connect us to the grid by July 2018 and our intensive discussions with the Corporation have left us confident that this date will be met. Clearly though there is a gap between the initial commissioning and ramp-up of the mine and the connection to the grid, so we'll be starting up on diesel gensets which will have a combined capacity of 22 MVA."

Looking a decade ahead, Rasmussen says that once Zone 5 tonnages start to reduce, Cupric will look at mining the Banana Zone. The particular area of interest in the Banana Zone is a sub-zone known as NE Fold, which hosts sufficient resources to continue to provide feed to the Zone 5 plant. "Whether mining will be by open-pit or underground methods will be determined in the light of economic conditions at the time and the normal trade-off studies," he says. "Whatever the case, we will truck the ore to the concentrator at Zone 5." He adds that Cupric is continuing its exploration on the six prospecting licences it has in Botswana – which extend over a distance of nearly 100 km on a SW to NE axis (see map) – and is optimistic that further satellite deposits with the potential to feed the plant will be identified.



Mine access. The mine will have a three-decline system growing to four as the strike extends. The declines will be 5,8 m high by 5,5 m wide and capable of accepting 60-t class haul trucks.

The company has also taken out licences in neighbouring Namibia in the Gobabis area. "The Kalahari Copperbelt extends into Namibia, hence our interest in that country," states Rasmussen. "We've already identified similar mineralisation at similar grades to what we're getting in Botswana, although the amount of sand cover is much higher. The distance to our plant means that if we do find economic deposits in this area, then we're looking at a new standalone operation."

As a final comment on the new Khoemacau mine, Rasmussen makes the point that Cupric is building in a downturn. "Most other mining companies are currently cutting back on capital expenditure and new projects in response to softening resource prices," he observes. "But one can argue a different approach. Once commodities recover, everyone will be scrambling to build new mines whereas Cupric and Khoemacau will be ready – depending on when exactly the recovery comes – to take full advantage of renewed demand. We will also have benefited from having implemented our project during a period when prices from suppliers and contractors are competitive and lead times on equipment short. Overall, we believe our strategy is the correct one." ■

FLSmidth helps boost recoveries at New Luika

An Adsorption, Desorption and Refining (ADR) plant supplied by FLSmidth has allowed Shanta Mining Company Limited (SMCL) to boost its gold and silver recovery at the New Luika Gold Mine (NLGM) in south-west Tanzania. Dave Capstick, Business Development Manager at FLSmidth, says the 2-t ADR plant has resulted in an increased carbon throughput to the CIL circuit at NLGM from 20 t a month to 80 t at present.

An ADR plant supplied by FLSmidth for Shanta's New Luika Gold Mine in Tanzania is exceeding the design performance target.

The ADR plant comprises an acid wash, a Zadra strip circuit with an FLSmidth designed heater skid, an electrowinning circuit and a carbon regeneration kiln, in addition to ancillary equipment such as pumps, screens and tanks for carbon handling. "All the equipment was designed and manufactured by FLSmidth. It was shipped, installed and commissioned jointly by our South African and Salt Lake offices," Capstick says. Commissioning took place in the second quarter of 2014.

Initial results from the new plant point to an improvement in gold recovery of two percentage points, while silver recovery has tripled. The benefits of the new ADR plant were apparent at an early stage, and the plant represents an important step in the debottlenecking of the gold/silver recovery process.

The ADR plant forms part of FLSmidth's offering of gold recovery equipment. The strip circuit in particular consistently delivers stripping times of between eight to nine hours. "Given the rise in energy costs, our improved heater skid designs have resulted in significant power savings for the end user compared to competitor designs." Capstick points to a recent field case study that highlighted heat recoveries of about 90 %.

"Our electrowinning cells with basketless cathodes carry a patented in-cell washing design that reduces cathode washing time and eliminates the need to remove the cathodes from the cell for washing," says Capstick. He adds that FLSmidth's carbon regeneration kiln has a patented sealing arrangement that avoids air entering the kiln. "The kiln also features a robust design to avoid warping, which otherwise results in kiln misalignment and operational inefficiencies."

Wally Channon, Technical Manager at SMCL, says: "The ADR plant at our New Luika mine has already exceeded the design performance target and removed the previous bottleneck to increased process plant throughput."

FLSmidth, tel (+27 10) 210-4820

Growth for MSP despite the mining downturn

Despite a turbulent year with regards to local labour unrest and pressure on international commodity prices, Mine Support Products (MSP) experienced growth in 2014, thanks – it says – to its proactive approach to business in a constantly-changing environment.

Vereeniging-based MSP is a globally recognised manufacturer of products and solutions for underground mining applications, and is jointly owned by international manufacturing and engineering company DCD Group, and Robor.

A major contributor to MSP's success was the launch of the innovative new Shredderbolt system – a unique underground support system that acts as a non-mechanical end anchored bolt that can be used with cement or resin. The patented wedge-shaped mixing cone at the end of the bolt aids in cement or resin mixing, acts as an end anchor and allows for constant yielding of the bolt through cement if required.

MSP General Manager Conrad Engelbrecht notes that after drilling a support hole in the rock to the required diameter and length, the cement or resin capsule is inserted and the Shredderbolt is connected via a spinning adapter to the drilling machine and spun into the hole. "This ruptures the capsule and effectively mixes the cement. Once the capsule contents are mixed and cured, a tensile force can be applied onto the bolt. The yielding force of the bolt linearly increases to the maximum strength of the material, and occurs over a minimum elongation distance."

Shredderbolt has already been implemented at a number of gold mines in South Africa, and Engelbrecht is confident that the product will achieve measurable success in the future. He does, however, indicate that service delivery excellence is just as important as new product innovations when it comes to maintaining consistent success in a highly competitive market.

"We are committed to constantly improving our service and solutions offering to our client base, by correctly interpreting the clients' requirements and understanding the unique challenges that they face. From there, we are able to create a customised solution that is not simply product-based, but tailor-made to meet the expectations of our broad client base," he continues.

MSP also reports that it exports its proprietary Rocprop all-steel elongated support system to the Asian, North American and Australasian mining markets. Engelbrecht admits that low coal prices have placed pressure on the export business, as mining operations continue to reduce overhead costs.

"The United States coal market is a major Rocprop client; however, an oversupply of gas in that region has pushed the coal prices down, which has supressed the market considerably. We are in the process of testing a new product called the Combination Prop, in an effort to remain competitive in a market that is becoming increasingly cost conscious," he explains.

DCD Group, tel (+27 16) 427-2850

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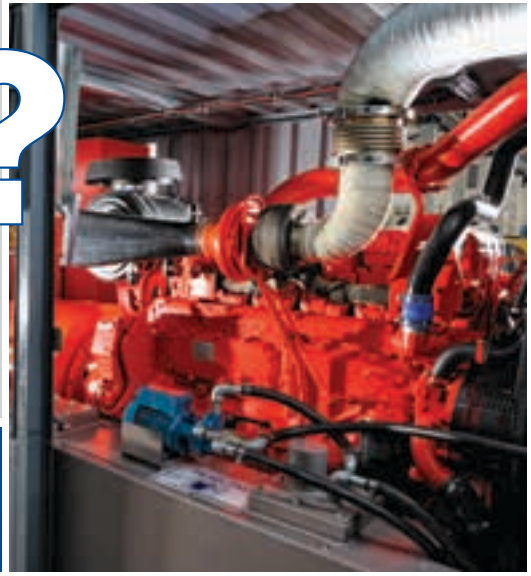

MBE Minerals invests in pilot plant

Pneuflot® pneumatic flotation technology from MBE Minerals has been installed at mines around the world.

MBE Minerals' Pneuflot® pneumatic flotation technology has been installed in a range of applications internationally. In the last six months, the company has commissioned plants for a magnetite application in Chile and a scavenger application at the back end of a gold float plant and replaced an existing coal float plant in Russia.

The German Original Equipment Manufacturer (OEM) introduced Pneuflot® into Africa in 2012 through its wholly owned subsidiary MBE Minerals SA, which has been operating in South Africa for more than 47 years, explains Gregory Niekerk, Business Development Manager, MBE Minerals SA. Its extensive footprint of products in the South African mining industry includes the biggest Wet High-Intensity Magnetic Separator (WHIMS) plant in the world outside of Brazil in the Northern Cape, its jigging installation at Assmang and Leeuwpan and a number of screens in the coal and iron ore industries.

To date the company has made significant investment in laboratory equipment and a pilot plant in order to prove the technology in local applications. In coal, MBE Minerals SA has already tested material from the Waterberg, Soutpansberg and Central Basin areas.

"The results achieved with both the laboratory cell and pilot plant show that our technology is capable of producing a final product that is within the specifications for both the metallurgical and coking coal markets," Niekerk says.

Recent tests performed on a graphite sample from Mozambique Graphite demonstrate the flexibility of Pneuflot® pneumatic flotation technology. Here the Pneuflot® laboratory cell was able to recover large flakes at a top size of 675 micron in a rougher/cleaner combination, and in the process produce on-specification material without the need for further regrinding. "This will have a material impact on the company's bottom line, as larger flake sizes are worth at least a multiple of two over smaller flakes in the world market," Niekerk says.

MBE Minerals SA is also performing pilot plant trials in the platinum industry on PGM ultra fines, which would normally report to tailings. "We proved in a head-to-head test campaign in Canada a few years ago that Pneuflot® is able to outperform column cells on verti-milled product at less than 40 microns. It is early days, but if the quality of the froth produced recently is anything to go by, then we are on a good wicket here," Niekerk says. "The natural progression of our work in this sector is to prove within the next two quarters that Pneuflot® can produce market-grade chrome from the final tails of plants in the Rustenburg area."

The pilot plant, comprising a 1 m^3 tank and a cell (separation vessel), is easily containerised for transportation. It can be run in both batch and continuous mode and can treat up to 10 m^3/h of slurry. MBE Minerals SA offers a full testing programme in Southern Africa. Its laboratory-scale Pneuflot® cell is stationed at Mintek and test work can be done there through either Mintek or directly through MBE Minerals SA, or the unit can be transported to customer sites. The same applies to the pilot plant.

Industrial units are available from 0,8 m to 6 m diameter or in slurry feed rates from 10 to 1 400 m^3/h. "MBE Minerals SA can supply its customers with a fully engineered solution, from purely designing the flotation process flow sheet together with a 10 % cost estimate to full turnkey execution. As per standard, we provide process guarantees based on both laboratory and pilot/semi industrial scale test work," Niekerk says.

Pneuflot® technology is claimed to use 35 % less electricity then competing technologies. It also features lower maintenance requirements given that it has no motor-driven mechanism in its cell or expensive auxiliaries. Pneuflot® has a 30 % smaller structural footprint than agitator cells and a 60 % smaller footprint than column cells of a similar capacity.

MBE Minerals SA, tel (+27 11) 397-4660

Joest launches 4,3 m wide screen for coal market

Specialist vibrating equipment manufacturer and supplier Joest has designed and developed a 4,3 m wide banana screen to cater for the ongoing trend in the coal processing sector to opt for larger equipment so as to increase throughput and boost efficiencies.

"We have paid close attention to our clients' needs by assessing the failure modes of existing 4,3 m wide screens in this market and designed our screen with the focus on reduced downtime and ease of maintenance when required," says Derrick Alston, Chief Executive Officer, Joest.

"There are 50 to 60 screens of this size in the coal processing sector at present, many of which are approaching the point in their lifecycle where they will need to be replaced. Our new 4,3 m wide screen, which incorporates the latest technology and refinements, is therefore ideally positioned to fill this gap in the market," Alston adds.

The trend towards larger equipment in the coal processing sector is being driven by the need to increase tonnage throughput and plant availability. "This has had an impact on the entire equipment supply chain, from screens through to cyclones and centrifuges. Joest has therefore been ideally positioned to incorporate the latest advances into its own 4,3 m wide screen, which means that the coal processing sector in South Africa can now be confident it is on par with what is happening internationally," Alston says.

A typical large-width banana screen in Joest's Kempton Park, Johannesburg facility that is destined for a colliery in South Africa.

Kenny Mayhew-Ridgers, General Manager: Engineering, Joest, explains that Joest's 'engineered excellence' approach to its development of its own 4,3 m wide screen focused on critical issues such as lifespan and structural integrity. "A screen may be sufficiently strong but can still wear away at certain points," he says. "We ensured that the mass of the screen was distributed correctly. The major benefit for clients is that downtime is reduced dramatically. Added benefits of the Joest approach are that the screen can be designed for specific applications and can accommodate any existing footprint."

A particular design innovation of Joest's new screen is the use of circular hollow sections as cross members as opposed to traditional H-beams.

Joest, tel (+27 11) 923-9000

New generation Cat D10T2 drives down cost per tonne

The Cat D10T2's mainframes are built to absorb high impact shock loads and twisting forces encountered during severe dozing and ripping applications.

For decades Cat D10 track-type tractors, in successive model configurations, have delivered on mine sites worldwide in roles that include truck dump maintenance, ripping, stockpile management, stripping overburden, dragline support, trapping, or road building.

Keeping pace with industry requirements, the latest generation Cat D10T2 launched globally in the first quarter of 2014 debuts – says Caterpillar – as the safest and most fuel efficient model to date. Refined large structures in key areas, such as the track roller frame, increase the machine's already legendary durability, plus there are new features such as the Advanced Productivity Electronic Control System (APECS) and Enhanced AutoShift (EAS) that enhance output.

"APECS is a key enabler to obtaining the full benefits of EAS, which improves fuel efficiency and productivity by automatically selecting the optimal gear and engine speed combination based on power train load and desired ground speed. This feature is similar in function to an automatic transmission," explains Johann Venter, Product Application Group Manager for Barloworld Equipment, the Cat dealer for Southern Africa.

The Cat D10T2 is powered by a Tier II Cat C27 ACERT™ engine that performs at a full rated net power (ISO 9249) of 447 kW at 1 800 rpm in forward drive with a high torque rise of 21 % (in forward gears), enabling the machine to doze through tough material. (The previous D10T model has a net flywheel output of 433 kW for all modes of travel.)

On the move, the A4E4 engine controller automatically switches power settings based on direction of travel. In reverse mode, this translates to a rated net output (ISO 9249) of 538 kW, an approximately 20 % power increase when compared to the previous model.

New safety features include an in-cab emergency stop device, a seat belt warning alert, and an 'operator not present' monitoring system, which locks out the power train and hydraulics under certain conditions to prevent unintentional movement when the operator is not in the seat.

During the dozing cycle, an auto downshift feature adds value by enhancing safety and productivity when not in EAS mode and when significant load increases are detected. "However, this feature won't automatically up-shift when load is reduced," says Venter. (The operator can override these automatic shift features at any time.)

To further enhance durability where operating loads are highest, the Cat D10T2's newly redesigned roller frames consist of three main castings to resist bending and twisting. The new roller frame improvements also include larger rear major bogie pivot pins, redesigned carrier roller mounting pads, and improved major bogie mounting locations to consistently deliver in varied and demanding mining conditions.

The undercarriage system also features a redesigned track master link with single tooth and coarse thread bolts, which is said to provide superior reliability and durability.

Barloworld Equipment, tel (+27 10) 040-3347

Moolmans chooses Sandvik rigs for Nkomati contract

Sandvik Mining has been chosen by Aveng Moolmans, one of Africa's largest surface mining contractors, to provide new rigs for its Nkomati mine site.

Aveng Moolmans will add five Sandvik D25KS drills to its fleet, bringing the total number of Sandvik drills on its various sites to 40. The agreement also includes a service contract, with Sandvik providing on-site training and spare parts.

The Sandvik D25KS is a diesel-powered, self-propelled crawler-mounted blasthole drill rig.

The Sandvik D25KS is a diesel-powered, self-propelled crawler-mounted blasthole drill rig for mining and large-scale quarrying. Known for its compact size and powerful undercarriage, it is a stable and highly manoeuvrable surface drill. The D25KS offers a high pressure air compressor for drilling with down-the-hole (DTH) hammers, a two-person cab for training and operator efficiency, rugged design for durability in continuous drilling operations and an optional external loader that adds flexibility to the hole depth, hole diameter and drilling method.

Aveng Moolmans selected Sandvik as its equipment provider based on a 15-year relationship. Additionally, the ease of operation, minimal downtime and ability to transport rigs to other sites reportedly attracted Aveng Moolmans to the Sandvik products.

"We look forward to expanding our Nkomati fleet with Sandvik's drills," said Dewald Hattingh at Aveng Moolmans. "We have trusted Sandvik to provide us with reliable equipment for years, and have successfully used its rigs on our mine sites across Africa."

Sandvik has a wide reach across Africa. It provides drills to all of Aveng Moolmans' contracts at African mines, including the Sishen iron ore mine, the Tshipi Borwa manganese mine, the Klipbankfontein Kolomela iron ore mine, the Smaldel coal mine, the Sadiola, Siguiri and Iduapriem gold mines in West Africa and the Langer Heinrich uranium mine in Namibia.

"We are really pleased to have this additional opportunity in South Africa, "says Ken Stapylton, VP for Surface and Exploration Drilling, Sandvik Mining. "It's a major market with significant mining activity. Our growth in the region depends on great partnerships with customers like Aveng Moolmans."

Sandvik Mining, tel (+27 11) 929-5300, website: www.mc.sandvik.com/za

Growing need in African mining for heavy-lift skills

The growing scale of Africa's mineral and infrastructure projects is demanding expert skills and fit-for-purpose equipment to lift, transport and install heavy plant in remote and often inhospitable sites, according to SA-based heavy-lift specialist Vanguard.

"Recent figures indicate that, despite low commodity prices, a new gold mine is opening in Africa every quarter, indicating that there are many thousands of tonnes of plant and machinery to be moved into and around the continent," says Vanguard General Manager Craig Pace.

A further sign that exploration and mine development remains a busy sector, he says, is the estimate that about 30 important mine feasibility studies have been underway – together reflecting a potential investment of almost US$7 billion.

Having provided engineered solutions in countries including Angola, the DRC, Kenya, Ivory Coast, Namibia, Madagascar, Mozambique and Uganda, Vanguard recently completed the heaviest strand-jacking lift yet seen on the Zambian Copperbelt. At First Quantum Minerals' Sentinel mine near Mwinilunga, the company lifted two pre-fabricated conveyor trusses – each weighing 1 200 tonnes – to their working positions 50 m above ground in May last year.

According to Pace , mining developments in other African countries have tended to shift investor interest away from South Africa: "Of the top ten gold mines in Africa, only two or three are in SA; and while SA dominates in the coal sector, it has only one copper mine in Africa's top ten."

Over half of exploration funding in African mining projects tends to be gold-focused, he says, but there is huge potential for large iron ore mines in West Africa to kick-start a new era of mineral-driven growth in that region – a boom that would draw in substantial inputs from service providers globally.

He argues that mining growth, especially in bulk commodities, is an important spur for infrastructure development – which is another vital sector relying on quality services in the field of heavy lift and abnormal transport.

"The energy sector in Africa is attracting increasing attention as a fundamental building block for economic growth, and we are regularly involved in lifting, moving and installing heavy components for power generating projects, for instance," says Pace.

Having recently acquired a specialised GTK1100 crane – the only unit in Africa – Vanguard has also been kept busy erecting wind turbines at wind farm projects in various parts of South Africa.

The company has been a leader in heavy lift, relocation, rigging and installation services for 40 years.

Vanguard, tel (+27 11) 616-1800

The first 1 200-tonne prefabricated conveyor truss in position at First Quantum Mineral's Sentinel copper mine near Mwinilunga in north-west Zambia.

Multotec offers holistic approach to managing wear

As the pioneer of wear lining materials in the minerals processing and materials handling sectors, Multotec Wear Linings is well positioned to provide a far more holistic approach to managing wear. Mike Dexter, MD of Multotec Wear Linings, says that its extensive reference base across all commodities and other materials has given the company the ability to provide the most appropriate wear solution for a given application.

Multotec is also responding proactively to the latest industry trends. "Preventative maintenance is more of a focus than ever with plants looking for major reductions in unplanned downtime. At the end of the day, the most effective maintenance is planned maintenance, while ease of maintenance also needs to be factored in," Dexter comments.

Multotec Wear Lining's flagship product in this regard is a quick fit panel consisting of ceramic tiles embedded in polyurethane, aimed at simplifying wear lining installation. The tiles are attached to the chute by means of threaded studs that are simply welded on, which allows for rapid change out. There is little surface preparation necessary as the process requires no epoxy and therefore no curing time. This means the panels are equally quick and easy to remove, which also assists in reducing downtime.

The panels are available in three sizes, namely 300 mm x 150 mm, 300 mm x 300 mm and 600 mm x 600 mm. Standardised components also translate into reduced stockholding.

A major additional feature allowing for ease of maintenance is that the panels can be supplied with tiles featuring an integrated wear indicator. This consists of a 'green dot' that is a 20 mm diameter cylindrical insert in the centre of the tile. The green portion of the insert wears down over time to reveal a red layer, at which point 25 % of the tile thickness remains, indicating it is due for replacement.

Multotec's PIG-i (Pipe Inspection Gauge) system for preventative maintenance of pipes.

Another example of Multotec's innovative approach to the maintenance issues facing minerals processing plants and mines is MultoLag™, a direct bond ceramic pulley lagging system for drive and non-drive pulleys. The system uses standard 100 mm x 25 mm x 6 mm smooth high alumina ceramic tiles for non-drive pulleys and studded tile lagging for drive pulleys.

"MultoLag™ lagging functions as a maintenance free wear resistant cover that is applied to pulley shells to improve traction in the case of drive pulleys and provide a polished low friction surface on non-drive pulleys," Dexter explains. The studded tiles on the drive pulleys have a high co-efficient of friction of 0,78, which means no movement between the surface of the ceramic lined drive pulley and the surface of the conveyor belt. The smooth ceramic surface on the non-drive pulleys results in minimal friction and reduced resistance, and therefore no wear.

In terms of total wear lining solutions, Dexter says that quick fit panels with wear indicator tiles are ideal components for the MultoCano™ Modular Chute, which is designed for ease of transportation, erection and commissioning. "The modular replaceable panels allow for rapid replacement and interchangeability and therefore reduced downtime. The focus here is efficiency, adaptability and ease of maintenance," he explains.

Another product aimed at assisting clients with their routine maintenance requirements is Multotec's PIG-i (Pipe inspection Gauge) system for visual inspection of pipelines. The PIG-i system features an electronic display with a live video feed of the pipe area being measured, the calculated lining wall thickness and a graph displaying wall thickness at various intervals in the pipe. The wall thickness is displayed as an inside diameter (ID) reading, versus the original ID. "This allows for both a visual and electronic inspection to be made at specific points in the pipe," Dexter says.

Bernadette Wilson, Multotec Group, tel (+27 11) 923-6193

New MD takes the helm at JVT Vibrating Equipment

A number of changes have taken place over the last few months at JVT Vibrating Equipment and KFJ Steel. The Jöst group, their holding company, has been co-ordinating the changes to ensure the local companies combine their service offerings from one focused approach.

Henri Robertson, the newly appointed Managing Director for both companies, says "the re-shuffle was deemed necessary to ensure a customer focused strategy is maintained."

Educated at the University of Pretoria, Robertson is a highly skilled engineer with vast experience in vibrating equipment. He spent many years developing and manufacturing a range of reliable, cost effective vibrating equipment through his own manufacturing business, HD Engineering (Pty) Limited. As owner of the business, he had the opportunity to design and develop complete plants for various mineral processes.

JVT represents the Jöst AG group in Africa as the appointed Jöst vibrating equipment agent. The Jöst range is supplied into the mining, aggregate, food, foundry and other related industries. "Jöst is fully endorsing our supply into the local market, with engineering and commercial support, giving JVT the advantage of having access to the latest European R&D and technology," says Robertson.

The complete range of Jöst drives, including the JR range of exciters, JV range of unbalanced motors and MS range of electromagnetic drives , is marketed by JVT into the local market with a growing local stock holding. These drives are used on new equipment and also supplied to the aftermarket and other OEM manufacturers.

KFJ Steel, an established steel fabricator, was purchased into the Jöst AG group of companies in July 2013. Medium to heavy general engineering is the company's specialty. The company has a long history as a vibrating equipment manufacturer for various OEM companies making it the ideal sister company to JVT.

JVT Vibrating Equipment, tel (+27 11) 397-1087

Martin develops moulding cell for conveyor belt cleaners

In a move designed to deliver global product availability and consistency with the fastest possible response to customer orders, Martin Engineering has announced the design and manufacture of a custom moulding cell for its polyurethane conveyor belt cleaners. By mixing, forming and curing its own designs in the modular work station – rather than subcontracting the production as most suppliers do – the company is taking complete control of the entire process, allowing one-day turnaround on most orders and even same-day shipping in many cases.

"We're one of the few manufacturers that designs and moulds its own belt cleaner blades," explains Global Engineering Manager Paul Harrison. "We've been manufacturing them in the US for many years. With this modular work cell, we now have the ability to replicate the same manufacturing process in any of our business units, ensuring that we provide consistently high-quality products and quick delivery times virtually anywhere in the world." The work cell combines all the elements necessary to generate mixed, coloured urethane with the forming and curing process that is specific to Martin Engineering products.

Harrison explains that by custom-engineering the process from the ground up, the design group was able to solve many of the problems inherent to urethane moulding in other regions of the world. "The work cell is voltage- and frequency-independent," he says. "It will function effectively whether the power source is in the US, South Africa, China or the UK."

In order to accommodate the varying skill levels around the world, Harrison and his team designed-in monitoring for all essential steps to relieve operators of the need for manual tracking. The pressures, power availability and quality, temperatures, speeds and many other parameters are all monitored continuously, and the system can even be diagnosed and controlled remotely.

The prototype moulding centre has been disassembled and shipped to the Martin Engineering South Africa facility in eMalahleni (Witbank), where it has been operating successfully for three months. "South Africa was one of the few business units that subcontracted the moulding process," he continued. "So it made sense for us to establish the first unit there in response to increasing customer demands."

Operators of the new work cell have the ability to mould straight cleaners, segmented designs and long blades that can be cut to length. By stocking the appropriate profiles in longer lengths, conveyor owners can replace worn blades by simply cutting to the required size, which can help reduce inventory of replacement belt cleaners.

Martin Engineering South Africa, tel (+27 13) 656-5135

The work cell combines all the elements necessary to generate mixed, coloured urethane with the forming and curing process.

Booyco at the forefront of PDS technology

The mineworker is equipped with a two-way Radio Frequency Identification (RFID) tag fitted into a cap lamp cover that flashes a warning whenever he or she approaches machinery.

The drive by Booyco Electronics to pioneer Pedestrian Detection System (PDS) technology in South Africa is expected to change the face of mining. Legislation under development by the Chamber of Mines' Mining Industry Occupational Safety and Health (MOSH) taskforce is being fast tracked to compel the implementation of PDS wherever Trackless Mobile Machinery (TMM) is deployed, whether in underground or surface mining.

"We will probably see some developments in this regard in the first quarter of 2015. There is a lot of attention being paid to PDS technology at the moment," says Anton Lourens, MD of Booyco Electronics. Booyco Electronics has been at the forefront of PDS technology in the mining industry since 2006, and has since grown to be the industry leader and innovator.

"When we started out with collision warning systems, there were no specific regulations or functionality requirements that had to be complied with, which meant that manufacturers simply adhered to their own best practices in conjunction with the specific needs of their customers," Lourens says.

It is for this reason that Booyco Electronics has emerged as the market leader, due to its continuous and considerable investment in research and development over the years, in addition to its rigorous testing, verification and trialling procedures.

"The one factor in favour of our products is definitely the quality, while the other related issue is the maturity of our products due to our experience and expertise. We do regard ourselves as probably the most experienced player in this sector. Even we are constantly encountering new challenges, different scenarios and applications, specifically because this technology does not comprise simple off-the-shelf solutions," Lourens says.

The MOSH taskforce is adding definite value to the South African mining industry, particularly as progress has to be reported on a monthly basis. "What is quite important is that all the TMM suppliers have acknowledged the technical complexity of the PDS technology. An important breakthrough in this regard is that the taskforce has been able to define clearly where accountability rests in terms of functionality. In other words, what happens when a PDS detects a worker and then relays that signal to the TMM. Defining that boundary of responsibility has been a really significant achievement."

Booyco Electronics' PDS is based on Very Low Frequency (VLF) technology, which the original equipment manufacturer has verified as being the most suited to the particular conditions of the South African mining industry.

In terms of the latest developments, Lourens says that Booyco Electronics has added a data capturing or logging functionality to its PDS, which is also included as a DMR requirement in the near future. "We have also increased the level of diagnostics in the equipment to ensure that the system is fully functional at all times and that it can be connected 'fail to safe' on a continuous basis."

Booyco Electronics, tel 0861 BOOYCO (266926)

BMG acquires valve company

BMG – Bearing Man Group, part of Invicta Holdings Limited, has extended its operations in the fluid technology sector with the recent acquisition of Klep Valves.

"This strategic acquisition follows an 18-month period where Klep Valves supported BMG in our expansion into the dynamic valves sector," says Gavin Pelser, MD of BMG. "Klep Valves, which forms part of BMG's Fluid Technology division, will retain its manufacturing facility in Krugersdorp under the BMG banner.

"This development augurs well for both companies. BMG will broaden its product range and service offering and, with the combination of its positioning as a respected manufacturer and BMG's extensive distribution reach, Klep Valves is set to significantly extend its market share."

Klep Valves specialises in the manufacture of diaphragm, pinch and wedge gate valves, which are designed for enhanced operating efficiency.

BMG – Bearing Man Group, tel (+27 31) 576-6221

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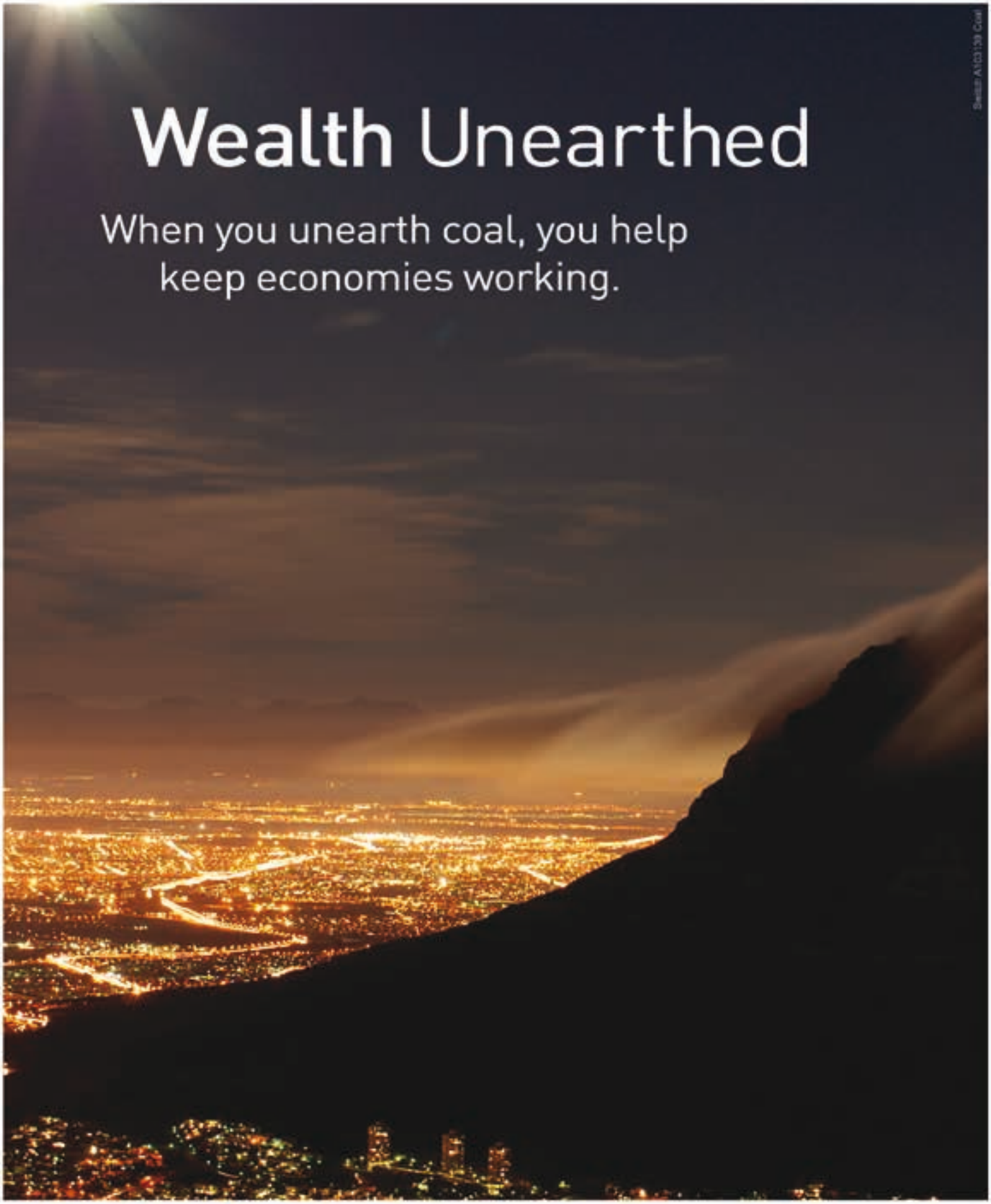

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