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CREAMER MEDIA'S MINING WEEKLY

BRIGHT FUTURE

Analysts paint sparkling picture of coloured gemstone market

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GENDER BALANCE BY 2025: The world's largest mining company, BHP Billiton, is taking lessons from banks to bring its boys' club era to an end. Chief of staff and geoscience head **Laura Tyler**, above, who is one of three women in top BHP leadership positions, has been tasked with achieving gender balance by 2025. Financial companies have the highest share of female staff at 52% and mining companies the lowest share at 19%, according to Bloomberg's world index, which finds the best-performing companies to be those with the highest percentage of female executives. Already, the ten BHP operations with the highest female complements are averaging 15%-better productivity and safety.

FACTS IN FIGURES

350

The amount in million dollars for which Canadian project developer Leagold Mining has acquired the Los Filos gold mine, in Mexico, from compatriot major miner Goldcorp.

110

The volume in carats of a gem-quality light yellow diamond recovered from Aim-listed Firestone Diamonds' Liqhobong mine, in Lesotho – the largest diamond recovered from the mine to date.

SHEILA BARRADAS | CREAMER MEDIA RESEARCH COORDINATOR & SENIOR DEPUTY EDITOR

ESKOM BALL AND CHAIN: Although State utility Eskom has referred to a change of ownership "sticking point" and the need for an urgent meeting with Anglo American, two labour unions have publicly backed the sale of Anglo's Eskom-tied coal assets to Seriti, the new 79% black-owned start-up that is aspiring to be South Africa's next big mining champion. Headed by mining luminary **Mike Teke**, Seriti easily ticks all the transformation boxes in being jointly owned by four equal anchor shareholders made up of Teke's Masimong Group Holdings, Thebe Investment Corporation, headed by executive chairperson **Vusi Khanyile**, Zungu Investments Company, led by **Sandile Zungu**, and the black-women-led Community Investment Holdings Projects, which was established in 1995 by Dr **Anna Mokgokong**, who is also the Seriti chairperson, and **Joe Madungandaba**. Both the National Union of Mineworkers and the Solidarity union expressed strong support for the R2.3-billion deal, which is seen as being jobs positive.

SPEAKOUT

"Leadership stability and capability in the . . . Finance Ministry and Treasury are crucial to sustaining progress in avoiding a downgrade."

– The South African Chamber of Mines (CoM), commenting on President Jacob Zuma's Cabinet reshuffle on March 31, which resulted in Finance Minister Pravin Gordhan and his deputy, Mcebisi Jonas, being dismissed. The CoM has described Gordhan's dismissal as "bizarre and difficult to understand"

"This is the beginning of the capital market tsunami . . ."

– Pan-African Investment and Research Services CEO Iraj Abedian, commenting on ratings agency S&P's decision to downgrade South Africa's credit rating to junk status on April 3

SHEILA BARRADAS | CREAMER MEDIA RESEARCH COORDINATOR & SENIOR DEPUTY EDITOR

Platinum still in wrong direction, new rock crushing technology, revised charter fails to emerge

THE PLATINUM PRICE IS STILL TOO LOW to keep the industry from inflicting damage to itself. Bank of America Merrill Lynch made the point at the Prospectors and Developers Association of Canada in March that the platinum price would rally if platinum producers cut supply by 300 000 oz to 400 000 oz. But, in the absence of that, a continued downward trend for the industry is being forecast.

US-based independent commodities research, consulting and corporate advisory company CPM Group foresees platinum continuing to head in the wrong direction. The newly released 2016 edition of the yearly 'Platinum Group Metals Long-Term Outlook' report is a 300-page study focusing on critical trends in above-ground platinum-group metals (PGMs) inventories, investment demand, mine production, secondary supply and fabrication demand.

The projected CPM data anticipates both platinum and palladium adding to already large above-ground stocks, with supply and demand fundamentals continuing to require lower prices to induce investors to buy the PGMs in addition to their already sizeable holdings.

CPM believes that PGM mining companies need to refine their current operations by producing fewer ounces in the lower half of the cost curve; success in doing so will be rewarded by a relatively quick market upturn.

In short, the pursuit of value over volume across a broad primary producer front would lift platinum from its low point.

Meanwhile, on mining's technical front, engineering group Metso has launched a new rock crushing technology that is said to decrease operational costs by 10% and increase uptime by the same percentage.

The new cone crusher, which combines the piston and rotating bowl into a single crushing unit, takes the cost pressure off aggregate producers operating in the most demanding rock conditions, without the loss of end-product quality during the lifetime of the wear parts.

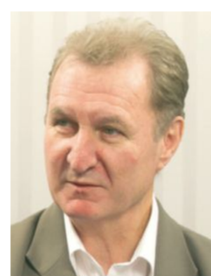
On the local political front, the month of March has come and gone without the promised revised Mining Charter making its feared appearance.

However, what did pop up again unexpectedly is the word "nationalisation", this time in association with one of new Finance Minister **Malusi Gigaba**'s appointed advisers, who has reportedly tabled a blueprint that puts banks, insurance companies and mines back in the line of nationalisation fire.

The Sunday Times' Business Times reported last Sunday that the eight-page proposal, if adopted collectively, starkly contradicts Gigaba's recent statements about sticking to fiscal discipline and inclusive growth.

Interestingly, a country that saw a radical economic shift to resources nationalisation, Venezuela, under the Presidency of the late **Hugo Chávez** from 1999 to 2013, was last year ordered to repay a Russian-owned junior mining company nearly $2.2-billion in compensation and interest for illegally expropriating the company's assets without compensation in 2011.

In today's interconnected globe, it must thus be borne in mind that for every action there can be an eventual equal and opposite reaction, which points to the need to heed a policy of social and economic balance that avoids the potential of compensatory comebacks.



Martin Creamer

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COAL

Labour Endorsement

Unions back Seriti's purchase of Anglo coal mines

MARTIN CREAMER | CREAMER MEDIA EDITOR

STORY HIGHLIGHTS

- Both the National Union of Mineworkers and the Solidarity union put out statements welcoming the R2.3-billion deal, which involves the sale of three thermal coal operations and four closed collieries.
- Sereti has also expressed interest in acquiring the undeveloped New Largo coal project, which is earmarked to supply coal to Eskom's new Kusile power station.

Two labour unions have publicly backed the sale by Anglo American of coal assets to Seriti, the new black-owned start-up with aspirations to be South Africa's next mining champion.

Both the National Union of Mineworkers (NUM) and the Solidarity union put out statements welcoming the R2.3-billion deal, which involves the sale of three Eskom-tied domestic thermal coal operations and four closed collieries that have reopening potential.

Anglo has signed a binding sale and purchase agreement with Seriti in a deal that has been two years in the making. The coal operations consist of Anglo's Eskom-tied New Vaal, New Denmark and Kriel collieries.

However, Eskom spokesperson**Khulu Phasiwe** said in response to *MiningWeekly* that the question of the ownership of the mines remained a "sticking point" and that Eskom would be seeking an urgent meeting with Anglo to understand how the issue could be resolved.

Headed by CEO **Mike Teke**, Seriti is owned jointly by four equal anchor shareholders made up of Teke's Masimong Group Holdings, Thebe Investment Corporation, headed by executive chairperson **Vusi Khanyile**, Zungu Investments Company, led by **Sandile Zungu**, and the black-women-led Community Investment Holdings Projects, which was established in 1995 by Dr **Anna Mokgokong** and **Joe Madungandaba**.

NUM deputy president **Joseph Montisetse** expressed the union's happiness with the potential reopening of four closed collieries presenting the possibility of "massive job opportunities in communities around those closed coal operations".

He expressed the hope that Seriti would desist from retrenchment and instead play a major role in job creation.

Solidarity deputy mining industry general secretary **Connie Prinsloo** was encouraged by Seriti's vision of long-standing support for the development and sustainability of South Africa's mining industry.

The union looked forward to the majority black-owned start-up becoming the second largest provider of thermal coal to Eskom, supplying almost a quarter of the State electricity utility's coal requirements of more than 100-million tonnes a year.

During a media briefing in which Creamer Media's *Mining Weekly* participated, Anglo American South Africa deputy chairperson **Norman Mbazima** said that Anglo had been keeping Eskom advised about the sales process "hopefully to make it a lot easier".

"I think we'll have to have the discussions with Eskom going forward.

"We have read some past pronouncements in the press regarding ownership and we'll have to deal with that when we speak to Eskom from now onwards," Mbazima added under journalist questioning.

Eskom interim CEO **Matshela Koko** said recently that Eskom had received an asset register from Anglo confirming that the State electricity utility owned assets at the mines in question, but that these assets were not reflected on its balance sheet.

The utility had also conducted an audit of all its mining assets, but had not yet disclosed the value or nature of the assets.

"However, we definitely believe we have a right to have a say over what becomes of those assets,"Phasiwe said in a telephonic interview with *Mining Weekly.*

He also stressed that it was the issue of ownership, rather than the nature of the buyer, that would be the main focus of the upcoming "one-on-one meeting" with Anglo.

KwaThema-born Teke, 52, has reached the uppermost positions in business, including being director of a number of public companies, all way beyond his starting point as a R76-a-week labourer at Van Leer, in Springs, in 1984.

He is president of the Chamber of Mines and was until recently chairperson of the Richards Bay Coal Terminal, where he is still on the board.

He outlined the funding plan as being a combination of shareholder equity and debt from South African banks, and he committed Seriti to maintaining Anglo's worldclass operating standards in partnering with Eskom.

Under his leadership, Sereti has already also expressed interest in acquiring the undeveloped New Largo coal project, which is earmarked to provide coal to Eskom's new Kusile power station, which is at an advanced stage of construction.

Teke has ambitions for the 79% black-owned Seriti to become a massive diversified mining company that could conceivably take over Anglo's Kumba Iron Ore and eventually becoming an across-the-board diversified mining giant.

Mbazima said Anglo was hoping to close the Eskom-tied coal asset transaction significantly sooner than the year-end deadline it had set to finalise the deal.

A Section 11 application for transfer of ownership would be made to the Department of Mineral Resources shortly and talks would get under way to obtain Eskom's consent for the transfer to Seriti of the coal supply agreements that govern the supply of coal to Eskom.

● *With reporting by* Engineering News *editor Terence Creamer.*

Picture by Senior Chief Photographer Duane Daws

MIKE TEKE
Funding plan for Anglo mines acquisition is a combination of shareholder equity and debt from South African banks

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BASE METALS

New Lease of Life?

Funding under way for revival of old Prieska zinc/copper potential

MARTIN CREAMER | CREAMER MEDIA EDITOR

Funding efforts aimed at reviving the old Northern Cape mining area endowed with significant zinc and copper potential are gaining momentum.

Acknowledged as the host of one of world's most noteworthy volcanogenic massive sulphide (VMS) base metal deposits, the Prieska area has a well-recorded history of zinc and copper production.

Anglovaal, once one of South Africa's big-four mining houses, employed 4 000 people there and produced more than 430 000 t of copper and a million tons of zinc at Prieska Copper Mines from 1971 to 1991, when the uncertain economic outlook and the high cost of capital influenced its closure.

Now, wanting to rework the well-understood deposit is the Australia-listed Orion Gold NL, which earlier this month announced that Tembo Capital, a UK-based private-equity investment adviser on junior and midtier mining investment opportunities in emerging markets, is to acquire a cornerstone 19.9% of its company, with the aim of advancing the South African zinc/copper endowment.

Orion, through its subsidiary companies, already owns 73.33% of the Agama Exploration & Mining company, the holder of the prospecting rights over the historical Prieska Copper Mines, as well as the Marydale gold and copper project, a volcanogenic gold/copper discovery located 60 km from the Prieska mine.

Of the R53-million purchase price, R31.5-million was paid in cash and R21.5-million in shares.

In addition, Orion provided finance for Agama to enable it to settle all historical shareholder loans of R33.3-million.

A South African investment fund has reportedly granted Orion a R30-million project loan facility for the Prieska Copper Mines project.

Remarkably, the old asset still has a cash-backed environmental fund of R18.2-million, which has not been needed since the mine closed in 1991.

Exploration results already completed are being fed into an openpit mineral resource calculation to form part of a prefeasibility study and South Africa's Department of Mineral Resources has reportedly granted permission for the Prieska mine's underground workings to be accessed through its decline roadway.

This will allow the company, headed by CEO **Errol Smart**, to conduct a detailed assessment of the state of the underground workings, as well as the mine's 8.8-m-diameter concrete-lined vertical shaft that descends 1 024 m below surface.

Planned are an underground infill drilling programme, as well as a drilling programme from surface to test the depth extensions of the mineralisation mined in the past.

Name Change

Owing to Orion embarking on a base metal development strategy after completing the acquisition of the VMS zinc/copper project in South Africa, its board has recommended that the company change its name to Orion

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PLATINUM – 1

Unconditional Approval

Sibanye wins US thumbs up for Stillwater acquisition

MARTIN CREAMER | CREAMER MEDIA EDITOR

Precious metals mining company Sibanye has received unconditional approval from the Committee on Foreign Investment into the United States on the proposed acquisition of platinum-group metals (PGMs) mining company, Stillwater, which mines and processes the metals in Montana.

Johannesburg- and New York-listed Sibanye, headed by CEO **Neal Froneman**, is offering \$2.2-billion for Stillwater, the biggest producer of platinum and palladium outside South Africa and Russia.

All regulatory conditions required for the implementation of the transaction have now been satisfied, despite earlier media speculation that the latest approval may be held up owing to Sibanye's major Chinese shareholding.

The \$2.65-billion bridge loan facility that Sibanye secured for the deal in December has since been syndicated to a consortium of 16 banks to conclude the transaction.

On April 25, shareholders were to be asked to vote at an extraordinary general meeting, when the go-ahead to raise \$1-billion in equity capital through the rights offer was to be sought – the timing of which the company regards as being optimal in current market conditions. Shareholders had until April 7 to give notice of their intention to take part in the general meeting.

Sibanye also plans to raise \$1-billion in debt, "most likely through the bond market", the company said in a release to *Mining Weekly*.

Both capital tranches are expected to be raised during the first half of 2017, which, the company said, would enable it to restructure most of the "acquisition bridge".

Additional Funding

To optimise the financing structure, ensure appropriate financial flexibility and minimise financing costs, Sibanye said it would continue to explore other sources of long-term capital that might be applied to settle the balance of the outstanding acquisition bridge.

Additional funding was likely to comprise a combination of capital sources, including equitylike products such as commodity streaming transactions, convertible bonds or new equity issued under the group's general authority, as well as debt instruments such as bank debt and bonds.

The balance of this funding, the company said, was expected to be completed before year-end.

The results of the general meeting will be published on Wednesday, April 26.

Earlier this month Sibanye announced that it had filed the yearly Form 20-F with the US Securities and Exchange Commission, which includes the audited financial statements available to shareholders.

The acquisition has the potential to put Sibanye on the inside track of low-cost mechanised primary mining as well as provide it with deep insight into secondary mining and PGM recycling, both of which will help Sibanye become the globally competitive South African mining champion that it is going all-out to be.

South Africa's Public Investment Corporation, as a major Sibanye shareholder, has given its formal support to the Stillwater deal, as well as Sibanye's foray into platinum, which includes its acquisition of Rustenburg Platinum for \$326-million and the acquisition of Aquarius for \$294-million, the latter taking it into Zimbabwe's Great Dyke platinum belt.

The South African Reserve Bank authorised the deal in February, the same month in which the required bridge finance facilities were structured into three tranches, the first being a \$750-million bridge-to-equity raise, which will be repaid following Sibanye's planned rights issue. The other two comprise a \$300-million bridge-to-cash and a \$1.6-billion bridge-to-debt capital raise.

The change in the withholding tax position introduced in the South African Budget in February may result in Sibanye changing its stance on dividends.

Up to now, Sibanye's first call on free cash after stay-in-business capital expenditure has been to pay dividends amounting to at least 35% of normalised earnings.

But, subsequent to the withholding tax rate having been raised from 15% to 20% in the last Budget, that stance may need to be reconsidered, Froneman stated when, in February, the company declared a final dividend of 60c a share, amounting to R560-million, taking the total dividend for the year ended December 31 to 145c a share, equivalent to 37% of normalised earnings.

• From page 7

Minerals NL and a shareholders meeting to do that is expected to take place May 17.

In addition to the Prieska and Marydale projects, Orion has entered into options and earn-in rights agreements over a combined area of 1 606 km^2 in the Northern Cape's Areachap belt, which is regarded as being highly prospective. (Also see map).

Orion reports that Tembo has technical and financial experience with in-house expertise in the fields of geology, mine engineering, metallurgy, mining finance and private equity.

This experience, coupled with a strong network of relationships in the mining industry, enables Tembo to add long-term value to its investments through technical input, strategic guidance, financial structuring advice and industry introductions, Orion said in a release to Creamer Media's *Mining Weekly*.

PROSPECTIVE TERRAIN
Northern Cape's Areachap Belt, where Orion has options and earn-in rights over a combined underexplored area covering 1 606 km^2

PLATINUM – 2

Downward Trend

Continuing slide in platinum prices predicted as demand declines, surpluses persist

DYLAN SLATER | CREAMER MEDIA STAFF WRITER

US-based independent commodities research, consulting and corporate advisory company CPM Group forecasts that the platinum price will continue on a downward trend as a result of decreasing demand, increasing surpluses and no foreseeable future offtaker products to stimulate renewed demand.

This sentiment is stated in CPM Group's newly released 2016 edition of its yearly 'Platinum Group Metals Long-Term Outlook' report – a 300-page study focusing on critical trends in above-ground platinum-group metals (PGMs) inventories, investment demand, mine production, secondary supply and fabrication demand.

CPM Group MD **Jeffrey Christian** says all these factors are central to understanding the price prospects for PGMs over the next ten years.

"PGM market observers have expressed confusion that platinum and palladium prices have halved over the past few years, while the PGM statistics they use show persistent long-term deficits in these markets," he explains.

However, Christian states that, in all financial markets, if statistics do not correlate with the price of an asset, the odds are that the statistics are inaccurate rather than the market "mispricing" the asset.

CPM Group's data shows persistent long-term surpluses over the past several years, which correlate with the decline in prices.

Investors are expected to play the most important role in determining the course of prices, he says, adding that the first several years of the projected period in the CPM Group data are expected to be characterised by continued surpluses for platinum and palladium. These surpluses are larger for platinum than for palladium and are expected to add metal to the already large stocks of above-ground inventories.

Further, at the end of 2016, it was estimated that cumulative above-ground inventories for platinum reached about 13-million ounces, while those for palladium reached 25-million ounces.

Christian explains that when stocks are "at rest", they have a stagnant impact on price; however, when stocks are "in motion" (being bought or sold), they have a positive or negative impact on price. Most of these inventories are held by investors.

JEFFREY CHRISTIAN
Platinum stocks that are 'in motion' have a positive or negative impact on price

In terms of current offtaking, he says investors are expected to continue absorbing the surpluses of platinum, but warns that the weakness in supply and demand fundamentals is expected to require lower prices for investors to be induced to buy these metals in addition to their already sizeable holdings.

A lack of investment in new and expansion projects for platinum mining, following years of weak prices, coupled with higher operating costs, especially in South Africa, as well as concerns regarding future demand, are expected to weigh on the volume of the metal available for extraction in the future, highlights Christian. In addition, he says mine supply in the near term is expected to be mostly flat.

For platinum mining to be sustainable in the near term and foreseeable future, he adds that miners need to refine their current operations and mine fewer ounces at a more profitable rate.

"What is required to achieve this future sustainability plan is enlightened management. Miners need to get into the lower half of the cost curve.

"If the platinum industry starts paying attention to the realities of the market and really starts forcefully slashing its long-term growth expectations for demand while redesigning its mines . . . to be more efficient, then I think the market can turn, and it can do so quickly," he concludes.

MINING WEEKLY COUPON ON PAGE 36 E449763

PRECIOUS MINERALS

BRIGHT FUTURE

Analysts paint sparkling picture of coloured gemstone market

ILAN SOLOMONS | CREAMER MEDIA CONTRIBUTING EDITOR

GLISTENING PROSPECTS
There will be strong growth in the sales of coloured gems, particularly in India and China, which have a long-standing affinity for these precious stones

The shift from small-scale artisanal mining to larger mechanised mining, owing to the increasing involvement of larger mining companies and greater formalisation of the sector, is expected to increase the distribution channel of the coloured gemstone industry, which will continue to consolidate as smaller market participants disappear.

This is also likely to result in improved transparency of the coloured gemstone industry over time, as larger mining houses are accountable to their shareholders as well as local and international operating regulations.

This is according to nonprofit organisation representing the coloured gemstone industry the International Coloured Gemstone Association former VP and senior industry analyst **Jean Claude Michelou**, who predicts that, in time, there will be "strong growth" in the sale of coloured gems in Brazil, Russia, India and China, particularly in India and China, which have a long-standing affinity for coloured gems.

The advancement of the coloured gemstone market, like the jewellery sector, in general, continues to bifurcate as it grows at the lowest and highest ends of the gem value chain, while generally remaining stable in the middle, according to nonprofit gem research institute Gemological Institute of America senior industry analyst **Russell Shor**.

He tells *Mining Weekly* that the most reliable estimates of yearly coloured-stone sales at retail level are in the $18-billion to $21-billion range, which includes the total cost of jewellery pieces, mountings and side stones.

About one-third of this is ruby, with emerald and sapphire accounting for an additional 25%. However, this does not include jade, nearly all of which is sold in China.

Shor says the market fundamentals for quartz-type stones, such as amethyst, citrine and blue topaz, remain good because they offer "budget-conscious" consumers a "larger look" for their money. Shor also notes that demand for the Burmese ruby and the Colombian emerald remains strong among wealthy buyers, particularly if they are untreated.

Countries of Interest

Michelou comments that reform of Colombia's legal framework regarding the emerald mining industry, with emphasis on attracting foreign investment and setting standards for the mining industry, is transforming the country's emerald industry.

Moreover, he points out that new deposits of emerald, grossular and opals are being investigated in Ethiopia and might soon be mined on a medium to large scale, noting that Mozambique and Madagascar have large unexplored resources.

Michelou expects many announcements to be made regarding investment in these countries this year.

"Nigeria also has a proven resource of gemstones, with some of the largest pegmatite and tourmaline deposits in the world, particularly rubelite, as well as indicolite. Large local artisanal and mechanised mining has been in place for many years and is organised in the traditional African way of 'sponsoring and sharing' for each pit.

"The Mambila sapphire occurrence in Taraba state is entering into large-scale mechanised production in the next few months under a Nigerian company. This is seen as a significant new source of sapphires in Africa," Michelou highlights.

Additionally, Shor tells *Mining Weekly* that Myanmar, in Asia, was the world's most prolific ruby producer until the US embargo on ruby and jade imports in 2008. In September 2016, these sanctions were

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lifted and he believes this could result in increased interest in the country's gemstone sector.

Sector Status

Michelou says the global gemstone industry is commonly described as "fragmented, opaque and unregulated".

He remarks that, while the gemstone trade is one of the oldest and most globalised industries, the way in which business has been conducted has not changed significantly, at least not compared with other industries.

However, Michelou believes that several forces are reshaping and transforming the industry, such as regulatory reforms in precious minerals, banking, environmental and labour regulations, and the positive impact of the rise in global access to information through the Internet on distribution channels and points of sale, with bigger, well-financed corporations also entering the industry.

He laments that determining an accurate value for the total size of the industry is "impossible", owing to the informal nature of most of the industry.

"Most numbers that circulate are a sophisticated guess at best, with some huge variances in most cases. In my opinion, the best method to estimate the industry size is to look at the value of coloured gemstone jewellery and add a percentage of high-end stones which are traded but never set in jewellery."

Industry Leader

Coloured gemstone mining and marketing company Gemfields – the largest producer of coloured gemstones worldwide – is playing an important part in the global marketing, promotion and distribution of coloured gemstones by raising demand for these precious gems.

Gemfields CEO **Ian Harebottle** notes that, while its Montepuez ruby mine, in Mozambique, is outperforming its Kagem emerald and beryl mine, in Zambia, the company is "reasonably pleased" with the overall performance of all its operations.

During the six months to December 31, 2016, Kagem produced 10.7-million carats of rough emerald and beryl. This is lower than the previous equivalent period and Harebottle attributes this mainly to the varied nature of emerald mineralisation and the mining of lower-grade areas. He says these challenges have forced the company to reduce the targeted production numbers for the 2016/17 financial year to some extent.

Gemfields completed a significant upgrade to the wash plant at Montepuez towards the end of last year. This project included the replacement of almost all the existing processing equipment and is set to deliver a targeted processing rate of about 150 t/h, Harebottle explains.

The total production at Montepuez over the six months ended December 31, 2016, was 5.6-million carats of rough rubies and corundum, at an average grade of 29 ct/t. Harebottle highlights that this was further supported by a 52% increase in the overall volume of premium-quality rubies recovered, compared with that of the previous period. This boost in production was achieved despite the processing plant being shut down throughout December to allow for the upgrades.

Additionally, he says, Gemfields is pleased with the performance of its gems at auction during the 2016 financial year.

"As a result of the ever-increasing global demand for Gemfields coloured gemstones, total revenue generated since our first auction in 2008 has exceeded \$700-million, an impressive achievement, given the challenges faced by the mining and luxury goods industries during this same period," Harebottle points out.

Gemfields also achieved its highest-ever auction revenue in June 2016 in Singapore, where the auction of rubies from Montepuez resulted in 95% of the higher, medium and commercial goods available sold for \$44.3-million.

Harebottle contends that Gemfields' success is attributable to its "widely acclaimed" proprietary rough grading system, alongside the stock inventory it holds to ensure its product offering has a high level of consistency.

During the 2016 financial year, the company held four rough emerald and beryl auctions – two auctions of predominantly higher-quality emerald and two of predominantly commercial-quality emerald and beryl. About 8.3-million carats was sold at these auctions, yielding an overall average value of \$12.22/ct.

Harebottle asserts that, in response to Gemfields' marketing campaigns, there is currently a significant upturn in the popularity of coloured gemstones, particularly as engagement ring choices. "As consumers understand more about the origin and history of coloured gemstones, appreciation of them increases."

The company has always positioned itself as a mining company that markets, focusing on supporting an increase in the supply and demand of coloured gemstones, he adds. The acquisition of luxury jewellery business Fabergé, in 2009, enabled Gemfields to accelerate its vision of raising the international presence and perception of coloured gemstones.

Harebottle highlights that Fabergé has continued to expand its global presence. In addition to the directly operated stores, Fabergé has increased the number of multibrand retail partners it works with to 41. Fabergé products are now available in Australia, Azerbaijan, Bahrain, Canada, the Czech Republic, France, Italy, Malta, Qatar, Saudi Arabia, Switzerland, Thailand, the United Arab Emirates, the UK, Ukraine and the US.

He says this growth is also reflected through sales, with transactions during the period increasing by 53%, compared with the half-year ending December 31, 2015, while the average selling price per piece increased by 30% over the same period.

Fabergé launched new collections at BaselWorld 2017, in Switzerland, in March, including fine jewellery pieces, and expanded its timepieces collection in collaboration with world-leading Swiss watchmakers.

Fabergé has won the prestigious Grand Prix d'Horlogerie de Genève (GPHG), the Swiss watchmaking industry's highest honour, for the past two years, while its Visionnaire dual time zone (DTZ) timepiece won the award in the Travel Time category this year. "The award cements Fabergé's position as a leader in the watchmaking industry," Harebottle enthuses.

Fabergé has also initiated the product launches of the #SayYesInColour emerald, ruby and sapphire engagement rings and the #DTZ GPHG-winning men's timepiece, the Visionnaire DTZ, during the past year, which Harebottle says were "extremely well received".

Moreover, he states that the resurgence of coloured gemstones in the luxury sector has been most notably demonstrated by the "exquisite coloured gemstone collections" of the leading jewellery houses, including Pomellato's Pom Pom jewels, Piaget's Sunny Side of Life collection, Cactus de Cartier, and the new Bulgari, Louis Vuitton and Chopard creations. Harebottle notes that, along with Fabergé, French jewellery designer Chaumet also recently introduced comprehensive coloured gemstone engagement ring collections.

"The clear shift in consumer trends and the increased urgency with which so many of the world's leading luxury brands are beginning to embrace coloured gemstones remain extremely encouraging and provide for a continued long-term positive outlook for the sector," Harebottle concludes.

MINING WEEKLY COUPON ON PAGE 36 E449646

Positive prices buoying ferrochrome business – Merafe

Merafe Resources CEO **Zanele Matlala** in conversation with *Mining Weekly* editor **Martin Creamer**

Pictures by Chief Photographer Duane Daws

MARTIN CREAMER | EDITOR

Ferrochrome prices for the first half of 2017 are providing ongoing momentum for the ferrochrome business, which is poised to benefit from this year's stainless steel production growth rate forecast of 3.5%.

The demand for ferrochrome is driven overwhelmingly by the production of stainless steel, which in 2018 is projected to grow by an even higher rate of 3.8%.

The latest European benchmark ferrochrome price for the three months to June 30, 2017, has been settled at \$1.54/lb, well up on the average of \$95.5/lb of 2016 and the \$1.07/lb of 2015.

Though slightly lower than the first-quarter price of \$1.65c/lb, the second-quarter price settlement continues to indicate a deficit in supply.

Pricing for the first half of this year is positive, Merafe Resources CEO **Zanele Matlala** commented to *Mining Weekly* during an exclusive interview.

Starting this year, Merafe's policy is to pay a minimum dividend equal to 30% of yearly headline earnings and then also to declare special additional distributions of remaining cash not required within the business.

The idea is to return as much as possible to shareholders.

JSE-listed Merafe was formed in 2001 and had its own a chrome smelter and two chrome mines, which were pooled with those of the former Xstrata in July 2004 to form the Glencore-Merafe Chrome Venture, the largest ferrochrome producer in the world, which operates eight chromite mines and 22 ferrochrome furnaces.

The way the Glencore-Merafe Chrome Venture works is that both parties retain ownership of the assets that each contributed to the venture, which uses those assets to generate the earnings before interest, taxes, depreciation and amortization (EBITDA) that are shared in the ratio of 79.5% Glencore to 20.5% Merafe.

Stainless steel production forecast to grow at a rate of 3.5% in 2017

– ZANELE MATLALA

"Our partner, Glencore, markets our products efficiently, adds value logistically and gets good prices," said Matlala, who heads a company that employs six people at its head office and pays 20.5% of the salaries of the venture's 13 000-plus employees.

Eighty-seven per cent of its board members are black, 62% of its board members are women and 71% of its employees are black.

In the 12 months to December 31, 2016, Merafe's share of the venture's EBITDA was R1 176.2-million, 38% higher than in 2015.

Glencore has a 29% shareholding in Merafe and South Africa's State-owned Industrial Development Corporation a 22% shareholding.

The rest of the shareholding is in free float, 41% of it in South Africa and the remaining 8% offshore.

In the past 18 months, the Merafe share has become far more liquid owing to investment management companies and institutions showing increasing interest in the share, which has been trading at prices well below the 190 c a share. The analyst consensus on the share is currently between 179c to 300 c a share.

STRONG INVESTMENT CASE

Merafe has a strong investment case that centres on factors such as its strong cashflow generation, its secure long-term supply of ore reserves, its partnership with the global leader of chrome-ore and ferrochrome marketing, its energy efficient technology that makes Merafe the lowest-cost producer in South Africa and the second-lowest cost producer in the world.

MM

Cost containment and cost reduction are the major pursuits of both the Glencore-Merafe Chrome Venture and the Merafe head office, where corporate costs fell to R30.2-million in 2016 compared with R34-million in 2015.

Chrome ore, electricity and reductants are the main cost contributors. The cost of chrome ore is driven mainly by labour, with wages being negotiated by labour unions.

The cost of electricity, which has been a major factor in the past, is no longer as big a concern, exemplified by the National Energy Regulator granting electricity utility Eskom a tariff increase from April 1 of 2.2%, the lowest for some time.

Because of the use of Premus technology at the Lion II smelter, a key competitive advantage is that the venture's power costs are lower than those of its competitors.

Had the Lion operation not installed the Premus technology, it would have needed an additional 1 776 MWh to produce the same volume of ferrochrome.

Reductant costs have also been declining. The Lion smelter also uses considerably less coke and more locally produced, lower-cost anthracite and char than conventional smelters.

Efficiency is increased through pelletising to cope with increasing volumes of fine chrome ore, with the pelletised material put through prereduction kilns that radically reduce furnace time and, thus, electricity consumption.

The exchange rate of the rand against the dollar is a significant factor because most of the Merafe product is sold in dollars, making the conversion to rand important.

The exchange rate prevailing at the time of going to press was similar to the 2016 average exchange rate of R14.70 to the dollar.

DEBT REDUCTION

Ranking after cost management on the priority list is debt reduction. In early 2017, Merafe debt was reduced to R226million, the planned elimination of which in the next two years will position Merafe to take advantage of opportunities that may arise and augment dividend payouts.

When the company was investing heavily in large new cost-reducing projects in past years, there were more moderate dividend prospects for share investors than is the case now that the company is harvesting the fruits of all those investments and has fewer demands on its cash.

Throughout the lengthy period of capital project funding, Merafe at no stage resorted to the raising of equity capital and in the main funded most the capital programme from cash flow.

The large Lion II smelter project was funded largely from cash flow and some debt, which has been substantially repaid, as have is capital contributions to the Bokamoso and Tswelopele pelletising and sintering plants, the upper group two (UG2) plants and the Wonderkop acquisition.

Last year's ferrochrome revenue and chrome ore revenue were the highest ever.

Merafe reported a 61% year-on-year increase in chrome ore revenue on 38% higher chrome ore sales volumes to 372 000 t and 7% higher chrome ore prices.

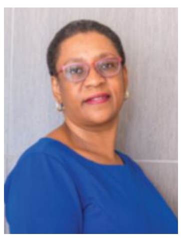
The record production of 393 000 t in 2016 was only at about 82% of installed capacity and the company's latest guidance to the market is that production at a level of 85% of installed capacity of 2.339-million tonnes is achievable in 2017, taking into account the maintenance carried out during the winter months when power is more expensive.

The record level of sales of 437 000 t in 2016, which included selling from stock, will not be repeated in 2017.

The company recorded its highest profit in 2008, when ferrochrome prices soared to $2/lb. With excess electricity supply now available, incentivized rates may well be negotiated for the winter months for additional use of electricity.

Merafe's attributable ferrochrome production from the Glencore Merafe Chrome Venture for the first quarter of 2017 increased by 10% to 113 000 t compared to the comparative period. This increase was primarily attributable to improved performances and efficiencies across the Venture's furnaces, coupled with the restarting of Rustenburg furnace 5 in the second half of 2016. Merafe will hold its next annual general meeting on May 4 and present its interim results for the first six months of 2017 on August 7.

LION SMELTER
Power costs lower than those of competitors



Zanele Matlala CA(SA) – Chief Executive Officer Matlala joined the Merafe Board in 2005 as an independent nonexecutive director. She was appointed Merafe's CFO in October 2010 and CEO in June 2012. She is a nonexecutive director of Dipula Income Fund, Stefanutti Stocks Holdings and Old Mutual Investment Group Holdings.

Kajal Bissessor CA(SA) – Financial Director Bissessor joined Merafe as Financial Controller in March 2009 from KPMG where she was Audit Manager. She was appointed Finance and Investor Relations Manager in June 2010 and Financial Director in January 2015. She is a nonexecutive director of Anchor Group Limited.

3.7-million tonnes

Total South African ferrochrome production

11.2-million tonnes

Total global ferrochrome production

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MERAFE
RESOURCES

GOLD

Accelerated Development

Pan African capital raise puts gold project on fast track

MARTIN CREAMER | CREAMER MEDIA EDITOR

Midtier gold mining company Pan African Resources has successfully raised R705-million in a share placing, the net proceeds of which will be used, together with a R1-billion seven-year debt facility, to fast-track the high-return Elikhulu gold tailings project in Mpumalanga.

Pan African CEO **Cobus Loots** expressed his appreciation for the good support the company received in the placing from both new and existing investors. Application was to be made for the placing shares to be admitted to trading on the London Aim and JSE on April 19.

Picture by Senior Chief Photographer Duane Daws

CHAPTER AND VERSE
Pan African CEO Cobus Loots (right) in conversation earlier this year on Elikhulu with *Mining Weekly*'s Martin Creamer

The accelerated bookbuild was conducted in South Africa by Standard Bank and Rand Merchant Bank (RMB) and in the UK by Numis Securities, Hannam & Partners and Peel Hunt.

The issue prices represented discounts of 11% to the R2.72 a share price in South Africa and 12.5% to the 16p a share price in the UK.

At a gold price of $1 180/oz, Elikhulu has a net present value of $75.6-million, a real post-tax internal rate of return of 34.3% and a low all-in sustaining cost (AISC) of $527/oz of gold for a 13-year life-of-mine at an average gold production of 52 000 oz/y.

Elikhulu will produce at a rate of 56 000 oz/y of gold for its first eight years of operation and at a rate of 45 000 oz/y for the remaining five years, a definitive feasibility study (DFS) completed in December has determined.

The project's debt redemption profile matches its cash flows, resulting in the funding arrangements not impacting on Pan African's ability to pay dividends during the construction period.

Project commissioning and first gold are forecast for the final quarter of the 2018 calendar year. Project construction will begin in the third quarter of 2017, with timeline advantage arising from the fast-tracking of earthworks and the placing of deposits for long-lead items.

Long-life, low-cost tailings retreatment operations are becoming synonymous with Pan African and Elikhulu's successful entrenching of this position could possibly unlock other tailings opportunities.

The DFS, undertaken by DRA Projects, indicated excellent recovered grades and gold production, attractive financial returns and a low execution risk.

The R1.74-billion project is expected to add 25% to the group's current 200 000 oz/y production profile and reduce its AISC, and its advance comes against the background of the refurbishment of the 7 and 8 shaft complex at its Evander mines coming in within the R40-million budget, and on time for the April 15 completion.

Cash outflow an ounce over the life of the operation is below $650/oz and amounts to $805/oz over the debt redemption term. The average gold recovery rate over the life of the project is 47.77%.

The environmental and water licence approvals are expected by late 2017.

Pan African will be bolstered by the experience gained in the construction and operation of the Barberton tailings retreatment plant and the Evander tailings retreatment plant, positioning it well for Elikhulu's smooth construction and operation.

In addition to the RMB debt facility, which will be repaid from the project's cash flows, Pan African has a revolving credit facility of R800-million, which is extendable to R1.1-billion.

The project, which entails establishing facilities and infrastructure at Evander, is in addition to the existing production from the existing Evander tailings retreatment project, which will continue to operate independently of Elikhulu for the next 13 years.

Elikhulu, meanwhile, is expected to reduce Evander's cost profile as the three existing Kinross, Leslie and Winkelhaak tailings storage facilities are reclaimed, in that order.

The gold dissolution value estimated for Kinross is 51.38%, Leslie 48.29% and Winkelhaak 53.77%.

Pan African's successful capital raise puts this high-return gold project into fast-track mode.

COPPER

Heavy rainfall hits production at Namibia's Tschudi copper mine

ILAN SOLOMONS
CREAMER MEDIA
CONTRIBUTING EDITOR

COPPER mining company Weatherly International (WTI) CEO **Craig Thomas** has provided an update for copper cathode production in the March quarter for the company's Tschudi openpit copper mine, in Namibia.

He says that, as the mine's openpits have progressed deeper, the proportion of mixed oxide and sulphide ore has increased as expected.

Thomas elaborates that this mixed ore is expected to leach more slowly than pure oxide ore and the mining and stacking schedules have been designed to accommodate this.

He comments that slower than expected recoveries from ore stacked in late 2016 resulted in a need to accelerate stacking rates to compensate, but says that, unfortunately, this coincided with above-average rainfall, which caused operational delays that were typically two to three times longer than those experienced in previous rainy seasons.

Therefore, Tschudi was unable to further accelerate stacking rates to compensate, and instead of producing at above-nameplate rates to recover more of the shortfall from the September 2016 quarter as scheduled, production rates fell to 24% below nameplate, at 3 236 t, with the greatest impact felt in March.

"As rain delays reduced through March, the rate of stacking contained copper metal improved notably and these improved rates of stacking copper are expected to be sustained going forward. The rate of leaching is expected to recover during the June quarter and full-year production to June 2017 is now forecast to be between 14 500 t and 15 000 t."

Thomas remarks that, as an additional response to the slower leaching of mixed ore, a greater pad area is required to maximise the recovery of copper prior to overstacking.

RA

MINE-COMMUNITY RELATIONS

Compensation Guideline

Firm develops compensation framework for KZN mining-affected community

DAVID OLIVEIRA | CREAMER MEDIA SENIOR STAFF WRITER

A complicated dispute over compensation for land damages has led to the development of a compensation framework aimed at strengthening trust between a mining company and the affected community at a mining operation in KwaZulu-Natal.

While the framework was developed to address this specific mining-affected community, the concept could possibly be duplicated within the specific parameters of other mines.

South African multidisciplinary engineering consultancy Gibb was appointed in October last year by the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs to develop this framework.

Gibb notes that the current compensation management procedures of the mine show some gaps, from both a policy and a "system interface standpoint", particularly in terms of how the compensation claim process is logged and captured and how the process is managed.

Further, there is no indication of how post-project monitoring is undertaken with regard to compensation and, as such, the framework could act as a best practice guideline for mines to consider when they improve on and address the issues brought to the fore, going forward.

The new compensation framework was developed in December 2016, however, it will not be implemented until outstanding historical and degradation claims have been addressed.

The need for the framework arose after the mining community concerned claimed compensation for mining-related environmental impacts.

With the community having blockaded roads in May last year, jeopardising the continuous operations at the KwaZulu-Natal-based mine, a meeting was held with all parties, where a resolution was passed that a framework be developed after the review had been undertaken by Gibb.

It was concluded that claimants would be paid and the shortcomings of the current compensation process addressed.

The Gibb team comprised senior social scientist and project lead **Jessica de Beer**, mining expert and project manager **Daniel Lachenicht** and compensation and sustainability expert **Shantal Beharie**.

The key objectives of the project were to get independent views on the legitimacy of previous claims logged with the mine, the fairness of the compensation process that had been followed up to that point and the grounds of approval for beneficiaries' claims, as well as recommending the best approach for future mining-induced environmental damage claims and corrective actions where necessary.

De Beer highlights that her role during the process was mainly community consultation, where the community indicated their concerns that the compensation process had previously been biased and unfair. "We had to investigate their complaints and develop a plan, which included the community's inputs, that would provide the company with a best practice guideline going forward."

Workshops were also held with community members and traditional councils and a sample of respondents were visited to gain insight into the concerns of community members that needed to be resolved.

A geotechnical investigation was also conducted by a Gibb engineer, which included a site visit to determine any vibration impacts caused by mining activity.

Several reports had to be drawn up to inform the drafting of the framework, including a baseline report, which established the status quo, and a report that identified the existing challenges. To complete this report,

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MINING SERVICES

SRK rated among SA's top five consulting engineering firms

ILAN SOLOMONS
CREAMER MEDIA
CONTRIBUTING EDITOR

INDEPENDENT engineering and scientific consultancy SRK Consulting South Africa was recognised as a top five company in South Africa's consulting engineering, mining and infrastructure segment in the recent Top 500 Companies Awards.

The awards survey over 3 000 businesses and honour those that excel in their sectors in terms of best practice standards and implementing strong social, empowerment and development policies.

Conducted by business-to-business publishing house Topco Media and the University of Cape Town's Development Policy Research Unit, the survey singled out the five top firms in each of 100 different economic segments.

The top 500 companies currently have a collective turnover of R3.5-trillion.

SRK MD **Vis Reddy** enthuses that "being ranked so highly among peers is gratifying and humbling".

"We are certainly known as innovators and perfectionists in our efforts to create value for our clients' businesses, and we work hard to stay at the cutting edge of what is an increasingly competitive and demanding field," he states.

Further, Reddy remarks that it is also vital that businesses promote equity and social

VIS REDDY
SRK Consulting South Africa is owned and managed by its staff and invests significantly in 'fostering talent in a culture of excellence'

transformation; therefore, it is fitting that is recognised in the adjudication.

The Top 500 Awards consider employment profiles and diversity in management and control, as well as commitment to corporate social investment, employment equity and skills development.

As an independent network of consulting engineers and scientists, SRK is owned and managed by its staff and invests significantly in "fostering talent in a culture of excellence".

Reddy comments that the growing social, environmental, financial and legal pressures on industry have over the decades motivated SRK to broaden its expertise from its traditional mining base into fields including civil engineering and infrastructure; water and waste; environmental management, social impact and governance; and the energy sector, including renewables.

"The SRK approach is to integrate all aspects of project success to optimise opportunities and manage risk," he concludes.

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GOLD

On Schedule

Côte d'Ivoire gold project on track to start production in March 2018 quarter

MIA BREYTENBACH | CREAMER MEDIA STAFF WRITER

The development of dual-listed gold miner Perseus Mining's Sissingué gold mine, in Côte d'Ivoire, is on schedule and was 42% complete at the end of last month.

The project, which remains on track to produce its first gold in the March 2018 quarter, is also within budget, with Perseus having spent $12-million on development activities during the quarter ended March 31. This brought total expenditure to date, including the early works, to $55-million, Perseus CEO and MD **Jeff Quartermaine** commented during a conference call from London earlier this month.

MAKING PROGRESS
Perseus Mining's Edikan gold mine, in Ghana, remains on track to achieve its production guidance of 90 000 oz to 110 000 oz for the six months to June 30

The contractor's construction team has progressed with the bulk concrete works associated with the plant, and installation of underground services is well under way at Sissingué.

On-site work on the construction of the airstrip, tailings dam and mine camp also continued to progress in line with the project's master schedule during the March quarter and was expected to be completed in the June quarter this year, Quartermaine said.

The forecast cost to complete Sissingué's development remains $61-million. This will be funded from existing cash and a $40-million project debt facility provided by financial institution Macquarie Bank.

An updated life-of-mine (LoM) plan was also prepared for Sissingué, assuming ore reserves from each of the Sissingué, Bélé East and Bélé West mineral deposits would be processed through the Sissingué processing facility.

"The estimated gold production of 80 000 oz/y at an all-in site cost (AISC) of $624/oz is predicted for the first 3.25 years of operation, or [production is estimated to average] 70 000 oz/y at an AISC of $628/oz over the currently estimated five-year mine life," Quartermaine said.

"It's a smallish project, but it is a fairly economically robust project," he added.

Perseus Mining has made a positive start to 2017, having produced 48 655 oz of gold at its Edikan gold mine, in Ghana, in the quarter ended March 31.

Production for the quarter was 51% higher than production in the December 2016 quarter.

The Edikan mine, therefore, remained on track to achieve its production guidance of 90 000 oz to 110 000 oz for the six months to June 30, Quartermaine suggested.

Gold sales for the period totalled 55 532 oz at an average price of $1 266/oz, which were also "well above" the 22 431 oz sold at an average price of $1 115/oz in December.

"The March quarter . . . has certainly vindicated my optimism and, if anything, it has increased my confidence in Perseus' future because not only did we get it back on track at our all-important Edikan operation but also, as promised, we have also ticked off . . . key milestones that are very important in terms of laying the foundation for a very positive future for Perseus," Quartermaine said.

Perseus was further "doing its best" to extend Edikan's LoM beyond the current plan, Quartermaine said, adding that further exploration around the Edikan mine had been conducted and Perseus was awaiting the results.

Perseus will, in the June quarter, continue to implement improved grade control practices at Edikan, while investigating potential opportunities for improvements in grade estimation. It will also assess exploration targets and prepare drill programmes for targets identified by the recent review of geological datasets pertaining to the Edikan mining leases.

Quartermaine further noted that, during the quarter under review, work on preparation of the definitive feasibility study (DFS) for the Yaouré gold project, also in Côte d'Ivoire, was progressing slightly behind schedule, owing to delays in completing land access negotiations.

However, the resource drilling programme had progressed well and was 80% complete by quarter-end.

Work has started on resource modelling, metallurgical testwork and assessment of mining, processing and infrastructure options as part of Stage 2 of the DFS. This stage is due to be completed in the June quarter.

Completion of the DFS is scheduled for October.

As part of this process, a new mineral resource will be published early in the September quarter.

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interviews were conducted with all concerned parties, including the Gibb professionals, the community's leaders, traditional council members and municipal officials. This report was vital in generating a holistic view of the situation.

Beharie points out that a lot of research had to be done: "There was the massive task of reviewing all the historical documents relating to the claims and payments, [as well as] the policies and protocols the company follows regarding compensation."

The solution-driven approach was needed to develop best practice guidelines for any future claims, ensure the sustainability of the process and restore the community's faith by developing a transparent and fair compensation process.

Following the commissioning of the reports and the drafting of the framework, the next phase of the project is to develop an implementation plan, which Beharie points out provides the means to efficiently and fairly log, investigate and settle, through compensation or other corrective means, damages relating to mining activities.

The plan is in alignment with international best practice and the World Bank's compensation standards.

De Beer highlights that the project provided insight into how compensation processes were dealt with in the past, how poor processes can be rectified by establishing best practice guidelines for mining companies to follow, and how communities can be provided with a defensible and dependable framework to deal with future compensation problems.

Gibb is awaiting feedback from KwaZulu-Natal Economic Development, Tourism and Environmental Affairs MEC **Sihle Zikalala**.

RA

CRUSHING & SCREENING

Efficiency Enhancer

Metso's new crusher reduces costs, improves uptime by 10%

ILAN SOLOMONS | CREAMER MEDIA CONTRIBUTING EDITOR

Diversified engineering group Metso launched its new rock crushing technology at the Conexpo-Con/Agg 2017 industry event in Las Vegas, in the US, last month.

The Metso MX cone crusher is based on the company's patented Multi-Action crushing technology, which combines the piston and rotating bowl into a single crusher. Metso states that the new crusher provides a "giant leap" in profitability by cutting operational costs by 10% and enabling 10% higher uptime, compared with traditional cone crushers.

"Aggregate producers are facing increasing pressure on efficiency and cost management. Therefore, to meet these demands, we rethought the crushing basics and combined our long experience in different cone crusher technologies with our extensive engineering knowledge.

"Two individual crushing methods based on the piston and rotating bowl were conjoined and, as a result, we created the MX Cone with Multi-Action technology," elaborates Metso global sales and product support VP **Jouni Mahonen**.

He comments that the new technology is designed for the "most demanding" rock conditions and, with a special focus on automated adjustment features, the MX enables "extremely" cost-effective and safe operations.

Mahonen remarks that it also provides a high reduction ratio with a premium end-product shape and consistency critical in aggregate applications. Further, he points out that its robust design also makes the MX suitable for demanding mining applications.

Mahonen highlights that key benefits of the company's patented Multi-Action technology include its easy underload setting adjustment and wear compensation without having to stop the process.

He notes that this can be combined with extended wear life and better mechanical protection.

Mahonen points out that the optimal cavity design, stroke direction and effectively distributed crushing action leads to the "ultimate rock-on-rock crushing motion". He says that this, combined with the innovative Multi-Action technology, results in extended maintenance intervals and higher production.

Additionally, Mahonen highlights that the MX also provides for maximum tramp release distance with high protection against uncrushable objects and overloading. He says the crusher can use up to 70% of the mass of new wear parts, which Mahonen claims is "a record-breaking use rate".

Further, Mahonen says, owing to the intelligent design of the crusher, the quality characteristics of all sized end-product fractions remain consistent throughout the lifetime of the wear parts.

"After 10 000 hours of rigorous testing, we are proud to say the MX meets our targets for increased profitability by allowing 24/7 crushing with minimum downtime," he concludes.

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COMING UP

Talison, a joint venture between Albemarle Corporation and Tianqi Lithium Corporation, plans to more than double the lithium carbonate equivalent capacity at its Greenbushes spodumene mine project, located in Western Australia

COMING UP

Building on the positive results of the front-end engineering design study, Energizer Resources has decided to initiate the detailed engineering study on its Molo graphite project, in Madagascar; this study represents the final stage of project development before development starts

PROJECTS IN PROGRESS

By Sheila Barradas

SOUTH DEEP GOLD MINE EXPANSION

Name of the Project
South Deep gold mine expansion.
Location
Gauteng, South Africa.
Client
Gold Fields.
Project Description
The project comprises a main shaft and a ventilation shaft – collectively referred to as the Twin Shaft complex – which will have a combined hoisting capacity of 370 000 t/m of ore.
The main shaft was completed in 2004 and comprises a single drop to a depth of 2 995 m.
The ventilation shaft has been deepened from 2 760 m to about 2 950 m and is fully equipped with ore storage silos and conveyor belts at shaft bottom, a new rock winder and new headgear.
The mine's headgear at the vent shaft was completed in 2011 using one of the largest fabricated steel headgear frames in the world.
The South Deep metallurgical plant, which was commissioned in November 2012, has also been expanded and has increased processing capacity from 220 000 t/m to 330 000 t/m.
From 2010 to 2012, the mine completed the construction of the centralised tailings storage facility, developed and installed infrastructure around the shaft systems and changed to full plant tailings backfill for increased production levels. The backfill plant was commissioned in early 2012.
The South Shaft complex will add an additional 120 000 t/m of hoisting capacity to the mine, bringing the total hoisting capacity to 450 000 t/m.
The South Deep operation had a mineral resource of 62.5-million ounces as at December 31, 2015, and a mineral reserve of 34-million ascertained ounces, which will give the operation a life-of-mine to about 2094.
Jobs to Be Created
Most of the critical skill positions identified at the start of 2015 have now been filled, with a limited number of specialist positions unfilled as yet.
Net Present Value/Internal Rate of Return
Not stated.
Value
An estimated R31-billion has been invested to date.
Duration
The timeline for the roll-out to steady-state production was presented to the board in February 2017. Under the new plan, South Deep has a life-of-mine to 2094.
Latest Developments
The South Deep gold mine achieved several milestones in 2016, as interventions implemented over the past two years started yielding results. Gold Fields will now embark on a new R2.3-billion rebase plan at the mine to create a defensive asset in a spiralling industry.
Equipped with a new long-term build-up plan for South Deep, the next five years will result in the ramp-up to steady-state production of 500 000 oz/y at an all-in cost (AIC) of below $900/oz, with a 70-year life span.
About R2.28-billion in total growth capital will be spent on the mine over the next six years, including R287-million in 2017 and the peak of R582-million in 2019, to bring the mine to steady state by 2021/22. The bulk of this capital is required for underground infrastructure and R724-million for follow-on development. About R104-million is budgeted for electricity, R88-million for vertical development, R66-million for the mine fleet and R58-million for drilling.
Gold Fields CEO **Nick Holland** has pointed out that most of these items are part of original project capital deferred in 2013.
A lot of work has been done over the past two years, including a thorough diagnostic assessment during 2015 and 2016, which resulted in 68 business improvement projects being identified to create a long-life, sustainable mechanised mine.
Twenty-nine of these projects have been completed. A further 27 will be completed this year and the remaining 12 in 2018.
South Deep has also tackled several challenges surrounding people and skills, fleet and maintenance, underground working conditions and the mining method.
In a turnaround on the mining method, which Holland believes will be the reason the new plan will succeed, several improvements have been made on the overall design and mining layouts and an experienced management team with extensive exposure to mechanised and deep level mining has been established.
South Deep has also instituted a number of key strategies to upgrade the condition of the mechanised equipment fleet and the effectiveness of its maintenance practices, while also working on initiatives to improve various elements of the underground infrastructure, including roadways, water management, backfill and ventilation.
This had delivered a 47% increase in gold production to 290 000 oz, and improvements in lead indicators, and resulted in achieving beyond the targeted cash breakeven, generating net cash flow of $12-million, compared with an outflow of $80-million in 2015.
Key Contracts and Suppliers
Redpath (backfill piping, battrice panel installation and replacing the South Shaft steelwork); Newrack (secondary support); TWP (metallurgical plant design); AEL Mining Services (supply of explosives for blasting); Atlas Copco and Sandvik (the supply of heavy mobile equipment and spares).
Previous contractors and suppliers: Murray & Roberts Cementation (mine development and shaft deepening); Wilson Bayly Holmes-Ovcon (WBHO) and Wade Walker (tailings dam); MM&G (steelwork fabrication); Steel Services & Allied Industries, Hatch and Cadhouse Design Enterprises (ventilation shaft headgear); Howden Africa (commissioning of main surface ventilation fans); and Sarens South Africa and Crane Corporation (overhead crane for the ventilation shaft headgear).
On Budget and on Time?
The project is on budget.
Contact Details for Project Information
Gold Fields VP corporate affairs **Sven Lunsche**, tel +27 11 562 9763 or email media@goldfields.co.za.

BAUXITE HILLS MINE PROJECT

Name of the Project
Bauxite Hills mine project.
Location
The Bauxite Hills Mine is located about 95km north of Weipa, on western Cape York, in North Queensland, Australia.
Client
Metro Mining.
In December 2016, Metro completed the acquisition of Gulf Alumina. This added to Metro's reserve and resource base, recently announcing updates to 92.2-million tonnes and 144.8-million tonnes respectively. The acquisition also consolidated tenement ownership in the region, bringing Metro's total tenement holding to more than 2 500 m^2.
Project Description
A bankable feasibility study (BFS) on the Bauxite Hills mine has confirmed strong financial returns from the project and demonstrated the benefits of Metro Mining acquiring Gulf Alumina in February.
The mine plan is based on the integrated Metro/Gulf reserves of 92.2-million tonnes, resulting in an estimated 17-year mine life.
The BFS envisages a simple mining operation where free-dig bauxite is mined by front-end loaders and hauled by truck to a port infrastructure area, a haul distance of between 6 km and 22 km.
At the port, bauxite is expected to be screened to a maximum product size of 100 mm and then fed into a barge loading facility (BLF), which will load awaiting barges.
Tugs will tow the barges down the Skardon river to an anchorage point beyond the river mouth, where awaiting freight vessels will be loaded with bauxite.
There is potential to extend the mine through the conversion of the existing Bauxite Hills

RA

resources to reserves, and possible exploration success in regional tenement holdings of 2 500 km^2.

While the BFS has been completed for steady-state production of six-million tonnes a year, environmental approvals will allow production of up to ten-million tonnes a year.

Jobs to Be Created

When fully operational, Bauxite Hills is expected to employ up to 200 people, with a 30% indigenous workforce target and about 80 people on site at any one time.

Net Present Value/Internal Rate of Return

The project has an after-tax net present value, at a 10% discount rate, of A$601-million and an internal rate of return of 81%.

Value

The initial capital cost of the project has been estimated at A$35.8-million, including 10% contingency, with a payback of 1.7 years.

Duration

Mining operations are expected to start in April 2018.

Latest Developments

Final environmental approvals are expected by mid-2017, with construction planned to start shortly thereafter, subject to finance being in place. Metro has started its financing activities to ensure sufficient funding through to receipt of first revenue, expected during the second quarter of 2018. Discussions have started with potential debt providers and current expectations are that financing will be sourced through a combination of debt and equity.

All construction is expected to be completed during the dry season of 2017.

Key Contracts and Suppliers

None stated.

On Budget and on Time?

Not stated.

Contact Details for Project Information

Metro Mining project manager **Nicholas Villa**, tel+61 7 3009 8008 or email nvilla@metromining.com.au.

BLOOM LAKE IRON-ORE PROJECT

Name of the Project

Bloom Lake iron-ore project.

Location

Bloom Lake is located near Fermont, in north-eastern Quebec, Canada.

Client

Champion Iron.

Project Description

Bloom Lake has total proven and probable reserves of 411.71-million tonnes grading 30.01% iron; and measured and indicated resources of 911.6-million tonnes grading 25.6% iron.

A feasibility study completed on the project has shown that restarting iron-ore mining operations at Bloom Lake is financially viable and would be competitive in global iron-ore markets, with the potential to be one of the region's leading long-life iron-ore mines.

The restart of operations at Bloom Lake is based on different operating assumptions, which include an upgrade to the concentrator plant and a mineral reserve and mining scenario updated for the current iron-ore market.

The operation comprises a conventional surface mining method using an owner mining approach, employing electric hydraulic shovels and mine trucks. All major mine equipment required for the restart of the mine is on site, as this equipment is among the assets bought by the company's subsidiary, Quebec Iron Ore.

Jobs to Be Created

Not stated.

Net Present Value/Internal Rate of Return

The project has a pretax net present value, at an 8% discount rate, of C$1.68-billion and an internal rate of return of 43.9%, with a payback of 2.5 years.

Value

Initial capital expenditure, including the mine upgrade capital cost of $157.2 million, has been estimated at C$326.8-million.

Duration

Not state.

Latest Developments

None stated.

Key Contracts and Suppliers

None stated.

On Budget and on Time?

Not stated.

Contact Details for Project Information

Champion Iron VP corporate secretary (Canada) **Jorge Estepa**, tel +1 416 866 2200 or email jestepa@championiron.com.

BEL AIR BAUXITE PROJECT

Name of the Project

Bel Air bauxite project.

Location

The project is located in central north-west Guinea.

Client

Alufer Mining.

Project Description

The proposed project comprises the extraction of ore from six openpits 15 km from the planned export facility at Cap Verga. More than 146-million tonnes of the Joint Ore Reserves Committee-compliant resource has been identified. The pits will be mined sequentially using Wirtgen surface mining technology, followed by the haulage of bauxite to the export facility where barges are loaded to transfer the direct shipping ore to the transshipment zone located 25 km off the coast. The project is expected to have a 15-year mine life, including less than two years of construction.

Jobs to Be Created

About 610 people will be employed at peak construction and 485 during operation. The project will prioritise local recruitment and will aim for at least 30% of the operations jobs to be allocated to residents of the local community and nearby settlements.

A training programme is being developed to support local residents in becoming 'employment ready' for the operations phase.

Net Present Value/Internal Rate of Return

Not stated.

Value

Not stated.

Duration

All required permits are in place, and construction will begin in February 2017, with first commercial production scheduled for the third quarter of 2018.

Latest Developments

Alufer has successfully completed a financing package of $205-million from the US, West Africa and other international investors.

The company has raised $90-million in convertible debt and $35-million in equity from a consortium comprising Resource Capital Funds, the Africa Finance Corporation, Orion Mine Finance and existing shareholders.

Alufer has also secured $80-million of senior debt from Orion Mine Finance. Additionally, Alufer has signed a six-year offtake agreement with Orion Mine Finance, which will work with the company to market the product and secure revenue during the ramp-up.

Key Contracts and Suppliers

None stated.

On Budget and on Time?

Not stated.

Contact Details for Project Information

Alufer Mining communications, **Scott Fulton**, tel +44 7788 144993 or email scott.fulton@alufermining,com.

Readers of *Mining Weekly* are requested to email details of projects to Sheila Barradas at sheila@engineeringnews.co.za

CONSULTING ENGINEERS IN MINING

Consulting engineering's viability proportional to mining's growth Page 22

Greater emphasis on ensuring sustainability Page 28

Compiled by NADINE JAMES

Mining consulting outlook stable to positive – consultancy

NADINE JAMES | CREAMER MEDIA STAFF WRITER

DIGGING DEEP
Deeper and complex deposits signal a positive outlook for consultants

The short-term outlook for the mining consulting industry is "stable to positive", says SRK Consulting, a firm of consulting engineers and scientists.

SRK partner and principal consultant **Andrew van Zyl** stresses that the South African economy is still in a transitional phase which – combined with generational transitions in management, societal changes and continued political and economic uncertainty – ensures that creating any type of forecast or outlook is extremely difficult.

Despite this, Van Zyl believes that increasingly complex deposits will need to be mined as and when simpler orebodies are depleted.

This will require thorough and expert technical knowledge, increasing the need for collaboration between mining consultants and their clients.

SRK Consulting partner and mining head **Marcin Wertz** agrees that the immediate outlook is positive, citing encouraging improvements in the number of projects that are available in the African mining consulting space and in the amount of work SRK has secured.

"We have even seen some old projects being 'dusted off' – such as the return of a study we did about ten years ago on a project that has now been taken on by a new client."

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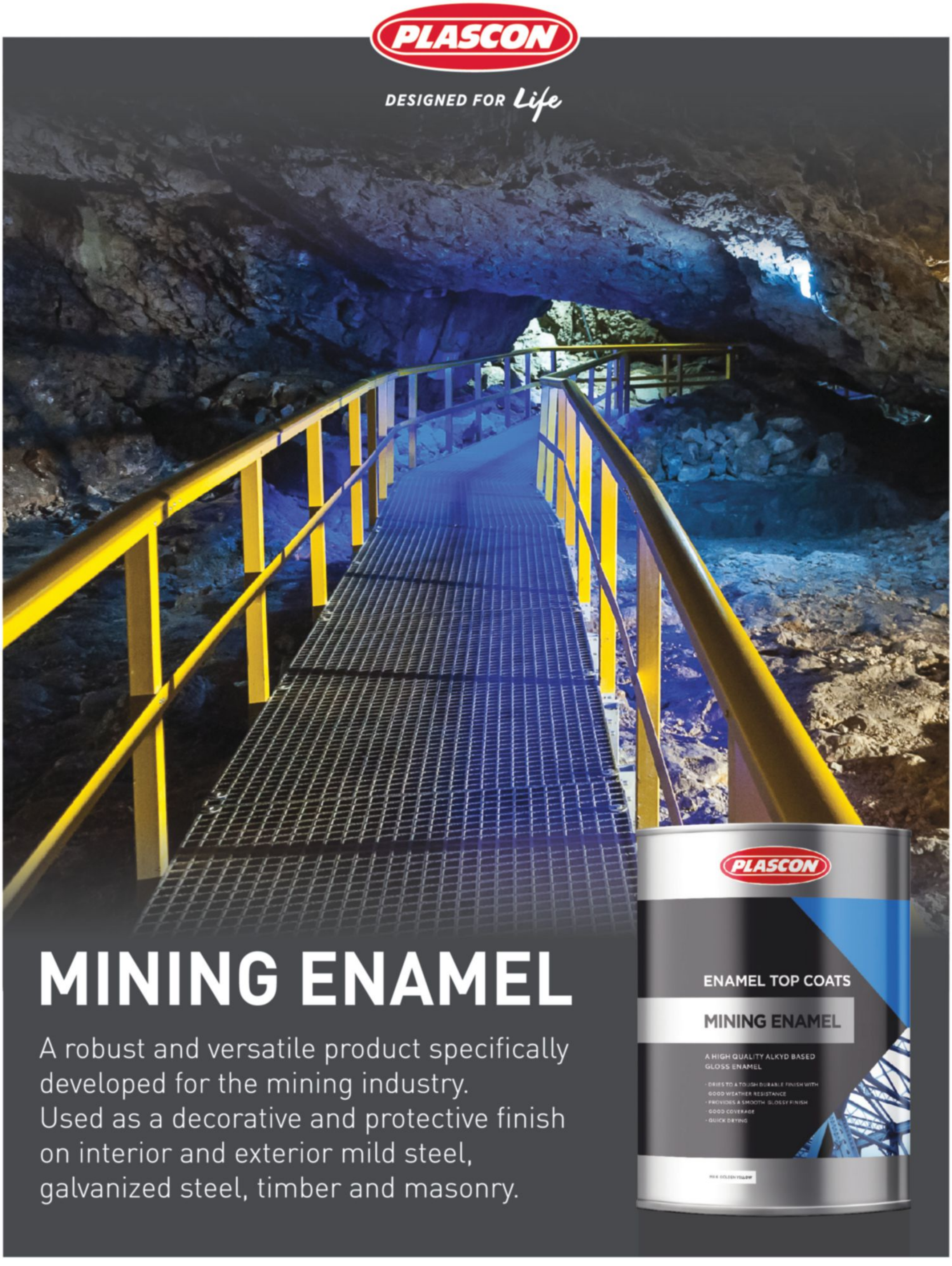
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Consulting engineering's viability proportional to mining's growth

NADINE JAMES | CREAMER MEDIA STAFF WRITER

The consulting engineering industry's sustainability and growth are largely dependent on and proportional to the mining industry's sustainability and growth respectively, says industry body Consulting Engineers South Africa (Cesa).

Cesa CEO **Christopher Campbell** notes that the success or decline of the mining industry directly impacts on the success or decline of consulting engineering companies, as the two are intrinsically linked.

Well aren't you a waste of two billion years of evolution.

To illustrate, he cites economic changes in China that have had an impact on commodity prices and, as a result, have impacted on mining consulting.

"China, one of the largest users of mined commodities, decided to temper its growth rate from 7.5% in 2014 to 6.7% in 2016.

"This 0.8 percentage point decrease meant a sizeable reduction in demand for the commodities required for infrastructure development, such as iron-ore, which caught mining and related industries off guard," he explains.

This resulted in reduced investment in mining-related infrastructure development, with projects undertaken to develop logistical infrastructure for the transport of commodities becoming "pedestrian" and others being put on hold indefinitely.

"To fuel what became a perfect storm, we saw commodities markets worldwide slow down.

"In South Africa, we probably added a bit more fat to the fire by creating a huge amount of political and policy uncertainty to scare off potential investors even more," he comments.

"The consulting engineering industry, along with others, became a direct victim of this perfect storm, as investment, even in prospecting, stalled."

Campbell notes that, in the past two years, when the African mining industry had all but stagnated, "many of Cesa's mining-focused member companies had great difficulty surviving, as they did not have a diversified service offering targeting either public-sector projects or even private-sector property development".

He adds that those with a multinational footprint moved their resources to other parts of the world, while others had to resort to staff retrenchments.

However, the lack of mining projects not only adversely affected mining consultants.

The reduction in mining tax revenue for governments – especially in countries where gross domestic product relies heavily on mining activity – adversely impacted on governments' infrastructure spend, thereby impacting on the entire consulting engineering industry, regardless of specialisation.

"This does not bode well for the sustainability of our industry, especially when the effects are felt not only in local markets but also international markets, such as Zambia, Mozambique and Guinea, as well as . . . in Canada, Australia and Chile, among other countries – where our engineering expertise is held in high esteem and much sought after," Campbell warns.

He notes that, during this period of decline, there were cases where mining companies disregarded recommendations by consulting engineers in a misguided attempt to cut costs.

Campbell stresses that this "unfortunate phenomenon" of second guessing the expertise of someone who has the requisite knowledge and skills is in direct conflict with the mining industry's stringent health and safety regime and must be discouraged at all costs.

He notes that, apart from the potentially dire consequences for mineworkers, this casual disregard of consulting engineers' recommendations by mining companies further hinders the sustainability of both industries.

"We are not ignorant to the fact that mining investors have very little regard for the sustainability of our industry," Campbell comments, pointing out that this is short-sighted, because without a local and effective consulting engineering

EDUCATION MATTERS

In South Africa's list of the top ten scarce vocational skills, six of the ten are engineering vocations, including electrical, chemical, industrial, mechanical and civil engineers, as well as physical and engineering science technicians, says industry body Consulting Engineers South Africa CEO **Christopher Campbell**.

He notes that the country cannot afford to lose any of these skills, as it takes a minimum of ten to 15 years to replace a qualified, experienced and professionally registered engineering practitioner.

"The limited number of job opportunities in South Africa does not bode well for retaining seasoned engineers."

Further, Campbell notes that the most recent comparative study of matriculants' competency in mathematics and science in 59 countries, compiled by the Boston-based International Study Centre, ranked South Africa forty-seventh in mathematics and forty-eighth in science. He notes that, without work to retain engineers and with an education system that cannot sufficiently replace engineers, the sustainability of the industry is questionable. "Our industry recognises this challenge and has been contributing to invest in the future talent pool." But Campbell believes that contributions at various levels – namely high school, university and corporate – would be more beneficial.

He stresses that the process of skills development is linked to economic growth and political certainty, as "very little can be done for skills development without financial stability and future predictability in the projects landscape".

To ensure a stable skills pipeline and enable the youth to continue aspiring to becoming engineering practitioners, Campbell believes that the planning of infrastructure development by government should span over longer periods to avoid the 'feast and famine' syndrome.

CHRISTOPHER CAMPBELL
The current impasse between South Africa's government and its mining industry needs to be resolved

industry, owing to "little or no engineering practitioners with sufficient mining experience", the result will be either costly and unproductive projects or projects that "never get off the ground".

Despite these challenges, "there seems to be some hope on the horizon," he says, citing China's growth, which has picked up from 6.7% in 2016 to 6.8% in January, with prospects of this growth reaching 7% by year-end.

Campbell notes that this growth will likely drive up demand for commodities, supporting expectations of a mining boom in the not too distant future.

Therefore, he suggests that stakeholders start preparing to deliver the stock needed to supply such a boom.

However, whether this stock will be available is yet to be seen, as recent media reports paint a picture of local mining houses not investing enough in exploration.

Cambell says another area that has not been adequately explored is how to leverage local engineering expertise to develop industries around the beneficiation of commodities.

He calls for the development of a more holistic approach to mining by South Africa's public and private sectors, with consulting engineers and the construction sector contributing as interested and affected parties to address some of the challenges facing the country's mining industry.

Campbell adds that the current impasse between South Africa's government and its mining industry needs to be resolved, concluding that "we need to ensure that we have a sustainable mining industry, regulated by constructive and well-informed policy [that is implemented] led by competent people who put South Africa first".

MINING WEEKLY COUPON ON PAGE 36 E449102

Optimisation tools up probability of success

AIDING DEVELOPMENT
Advisian acts as lenders' independent technical and environmental adviser for nonrecourse project finance, export credit agency finance and structured trade commodity finance

In today's world of constrained capital, engineering, procurement and construction, consultant WorleyParsons notes that clients in the mining sector are seeking ways to improve returns while reducing their exposure to risk, particularly those companies that need to make strategic decisions on potential investments.

WorleyParsons CEO **Denver Dreyer** states that front-end services are critical in a cash-strapped environment. As a result, the company, through its global advisory and technical consulting arm Advisian, has introduced optimisation tools to help its clients identify opportunities upfront and create value across every phase of a project. This is to ensure that once a project is ready for execution, it has the highest probability of success.

Advisian sub-Saharan Africa regional executive manager **Adam Boughton** says the company's optimisation tools help address the modern day challenges that mining companies are facing and offer real solutions to real problems.

"We draw on our deep domain expertise and experience in the mining sector to advise our clients and then partner with them to implement that advice. Our solutions and tools are centred on creating assets, improving asset efficiency and sustainability, and optimising asset portfolios.

"When used together, these tools go beyond optimisation – we can identify risks and mitigate them, as well as identify opportunities across the full business value chain. This combination of multiple techniques has improved our capability to help our clients reinvigorate stalled projects and current unprofitable operations," Boughton says.

Forecasting risks and returns needs to be evaluated in a clear model. To this end, he explains, Advisian uses a unique financial and technical process model called StepWise. This provides the best possible technical alternatives for a project in a quick and cost-effective way, so that clients can make the right investment decisions. It is a low-cost approach that provides a sales case based on the client's desired business outcomes and identifies risks and opportunities early on in the project development process.

The *Titanic* was built to last – let that sink in.

Operational Improvement

Advisian operational improvement advisory principal **Steve Burks** explains that operational improvement increases net cash flow by boosting revenue while simultaneously reducing costs.

"Our objective is to implement recommendations and embed them into the culture of the operating company [to steadily improve] cash flow during the entire life of the planned operation," says Burks.

Advisian recently entered into a regional framework agreement with mining strategist Whittle Consulting Africa to enhance and extend its optimisation capability. This focuses on early cash flow to achieve significant improvements in net present value. Advisian links this technique with nine other business improvement mechanisms and identifies the most beneficial mix of technical, project delivery, and conventional management consulting processes.

The consulting firm has also entered into a regional framework agreement with project management firm Ensight Energy, which will enable its clients to implement energy optimisation initiatives and realise immediate short-term benefits.

Advisian highlights that the initial assessment and energy efficiency initiatives will improve cash flows steadily through the entire life of the planned operation.

"Ensight Energy has deep domain experience in solving energy challenges. The combination of Advisian's heat recovery expertise and global engineering, procurement and construction management capabilities through the WorleyParsons group, together with Ensight Energy's approach to energy optimisation and record in energy cost savings, provides our clients with a comprehensive suite of energy optimisation solutions covering every aspect of their operations.

"Mining companies and investors need energy surety in order for new projects to be successful. The Advisian/Ensight joint energy optimisation solutions will provide unparalleled capabilities for businesses that have energy challenges," says Boughton.

Transaction Services

An additional service offered by Advisian is the provision of comprehensive services to support corporate and project development transactions, leveraging the company's due diligence processes and capabilities according to the structure and requirements of each different transaction type, across all sectors including minerals and metals.

"We support corporate development ('inorganic' growth transactions) by providing technical and environmental due diligence for mergers and acquisitions with buy-side target due diligence, and divestitures with sell-side vendor due diligence," explains Boughton.

He states that the firm also supports project development by acting as lenders' independent technical and environmental adviser for nonrecourse project finance, export credit agency finance and structured trade commodity finance.

"Our approach is to focus on providing independent assurance by rigorous analysis of the available documents and material issues associated with the investment. Our key deliverable is a succinct report with a focus on the material issues which present residual risks," Boughton adds. Dreyer points out that the specialist services offered by Advisian enable WorleyParsons to partner with clients right from the start of a project. This ensures that a project is financially viable, while also ensuring that opportunities are identified upfront to develop optimised strategic plans.

"With Advisian spearheading the study phase, WorleyParsons can take the project across all the phases of the asset life cycle [offering] the maximum probability of success," he concludes.

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ANDREW VAN ZYL
Increasingly complex deposits will require thorough and expert technical knowledge, increasing the need for mining consultants

MARCIN WERTZ
Improving corporate governance procedures have resulted in a higher proportion of consulting work going out to tender

• From page 20

Some recent mining projects SRK Consulting has been involved in include a diamond project, in Sierra Leone; an iron-ore project, in Mozambique; three base metals projects, in Iran; and platinum projects in Zimbabwe and South Africa, he notes.

"We have also undertaken a number of reviews and due diligence studies."

Wertz adds that, while mining consultants – specifically those who work in the exploration space and early stages of projects – have struggled since the fall of commodity prices in 2015, "studies related to mergers and acquisitions, such as independent engineers reports and other due diligence-type mandates, have provided SRK with an adequate amount of work during the downturn".

Van Zyl is hopeful that this period of relatively consistent work, as well as the need for future collaboration, will lead to the establishment of long-term, mutually beneficial relationships between mining consultants and their clients, underpinning the future of the sector.

Consulting engineers often have to convince clients of their value, he states, adding that it is in mining companies' best interest to form symbiotic relationships with the consulting industry.

"In many ways, consulting companies have more institutional memory than mining companies . . . while employees in mining companies tend to move into other roles – replaced by new employees who are not familiar with historical work – many of the people who have been consultants for mining projects remain connected to them in various roles," he explains.

Van Zyl notes that additional value stems from consultants conducting studies on a continual basis, as "practice tends to lead to better outcomes – and this is to the benefit of the client".

Value is also derived from consultants' extensive technical knowledge that is gained only from extended and focused experience – which Van Zyl comments is not typically found in a career in a corporate entity.

He adds that the excessive focus on the cost of consulting "leads to a destabilising level of 'churn' in the industry – which reduces the value that can be added, as technical skills move out of the consulting industry and into sectors like banking, to the detriment of the industry".

This ultimately reduces the number of technically skilled consultants in the industry, further impacting on the skills dearth, specifically in mining, but in the country generally.

Besides convincing clients of their value, a frequent challenge faced by mining consultants is clients who try to take 'short cuts' through the project development process, highlights Wertz.

"This results in pressure being placed on consultants to provide solutions that necessarily carry caveats."

While these 'caveats' do provide opportunities to rectify the situation when a project encounters difficulties, he notes that it is not an ideal approach to ensure smooth and sustainable projects.

Wertz also notes that the mining consulting sector has become significantly more competitive, as a higher proportion of consulting work is going out to tender rather than simply being awarded, which could be partially attributed to improving corporate governance procedures.

Recent Trends

Van Zyl comments that, in recent months, there has been some interest in less conventional minerals such as graphite.

Wertz adds that this renewed interest also covers a range of commodities as diverse as chrome, platinum, diamonds, gold, copper and iron-ore, noting a likely increase in the interest in coal based on activity in countries such as Tanzania and Swaziland.

From a project perspective, "there is certainly a general uptick in interest. Significantly, our projects are more 'positive' in nature – with more companies looking to explore, study and invest, rather than sell or cut costs," he emphasises.

Van Zyl explains that, globally, there is an economic need for mining companies to replace and grow production, as current production is not forecast to meet rising demand. "This is particularly the case for large companies that need to retain the size and scope of their operations to support their overheads."

He concludes that the creation of new mines is inevitable, as they "are also required if companies want to remain cost competitive, as ageing mines are associated with rising costs because of increased stripping or their depth, distance from infrastructure and lower grades".

MINING WEEKLY COUPON ON PAGE 36 E449110


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Greater emphasis on ensuring sustainability

NADINE JAMES | CREAMER MEDIA STAFF WRITER

Engineering expertise can be used to generate socio-economic gains for mining companies, particularly in jurisdictions that are dependent on the finite business of mineral extraction, states global engineering and infrastructure advisory firm Aurecon, an adviser to the African mining sector.

Aurecon client director for resources – Africa, Dr **Eduard Vorster**, states that "mining is big business, but it's also susceptible to big change".

He notes that companies that want to succeed in the increasingly scrutinised mining environment will need to leverage more than just traditional design and project delivery tools to succeed. "Today's definition of 'success' has evolved beyond only meaning fiscal stability to also include being a contributor to a future-ready society."

As such, mine closure and rehabilitation presents "one of the most difficult and often emotional, yet potentially most advantageous, opportunities for the mining sector globally".

Vorster says closure and rehabilitation offer the mining industry the opportunity to become known for sustainability, rather than simply extraction

ECONOMIC TRANSFORMATION
Engineering innovation could transform mining assets into new business opportunities

"by envisaging the transformation of mining assets into new business opportunities past the end of a mine's life".

Engineers are key to this endeavour, he avers, as they will need to help clients design mines and plan their end-of-life transformations in a way that ensures they add value to the surrounding community beyond their original core business.

"We're now asking whether we monetise mine closure? Imagine a future where mining companies, government and communities work together, finding viable solutions that yield financial, social and environmental benefits.

"Looking at each site as a blank canvas and imagining new opportunities presents a pathway to create assets that continue to perform long after their mining use is over," Vorster proposes.

He says as and when the mining industry becomes receptive to asset transformation "we're likely to focus on business opportunities beyond just the extraction of a commodity".

Vorster cites the use of engineers in determining the best way to deal with mine water challenges – which often extend beyond a mine's life – as an example, noting that this is an opportunity to rethink how water is being used in the mining process and even how the industry's wastewater could benefit a water-scarce country like South Africa.

He postulates that engineering innovation could revolutionise the mine water aspect of a project for the benefit of both the project owner and the surrounding communities, adding that companies could also turn mines into power generating units to alleviate the continent's energy security challenges, by designing mines to function as mini hydropower plants post-closure. This would generate income and boost energy supply for surrounding communities. Further, he proposes that employees of a mining facility could be re-equipped to ensure a sustainable economy for the facility's host community.

Vorster stresses that these types of solutions will require partnerships between the mining industry, including its consultants, governments and mining communities. But, if implemented successfully, these initiatives could be the catalyst for real, lasting change and reinforce the importance of mining's involvement in building successful societies.

"Looking forward, it's those who grasp the notion of 'business unusual' that will forge the way to success amid the changing industry expectations," he concludes.

MINING WEEKLY COUPON ON PAGE 36 E449188

Internship to benefit more students

NADINE JAMES
CREAMER MEDIA
STAFF WRITER

ALBERTON-based wear solutions company Rio-Carb is contemplating the extension of its internship programme into its black economic-empowerment programme. The programme is aimed at preparing second-year engineering students for their careers, in the near future.

With two students having completed the internship programme, launched last year, the chromium carbide (CrC) plate manufacturer says two more students will be accepted into the programme in November. The programme represents a significant investment on the part of Rio-Carb in the future of the industry and the company, says Rio-Carb director **Martin Maine**.

"Our aim is to make a meaningful contribution to the development of the engineering industry by upskilling the engineers of tomorrow," he comments.

The six-week programme covers aspects of industrial, mechanical and metallurgical

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We are all time travellers moving at the speed of excactly 60 minutes per hour.

RA

Evaluation reaffirms decision to acquire gold assets

London investment company Opera Investments' decision to acquire the Lubando and Imweru assets, in Tanzania, has been reaffirmed by an evaluation by South African consulting group Minxcon, which confirmed Lubando's gold resource at 6.78-million tonnes, grading 1.10 g/t and containing 293 870 oz.

Minxcon completed the evaluation of the Lubando gold project's geological assets – which are currently owned by Tanzania-focused miner Kibo Mining – in February.

Minxcon's evaluation of Imweru, also completed in February, showed that it hosted 2.36-million tons of indicated resource, at 1.19 g/t and 90 800 oz, while its inferred resource measured 9.24-million tonnes, at 1.43 g/t and 424 310 oz, for a total resource of 515 110 oz.

Kibo and Opera, in September, signed a heads of agreement for the unloading of Kibo's wholly owned UK subsidiary, Sloane Developments, for 61-million Opera shares of 1p issued at a price of 6p apiece to satisfy the acquisition of the Imweru and Lubando gold projects.

In a March press release, Kibo stated that the proposed acquisition was nearing completion.

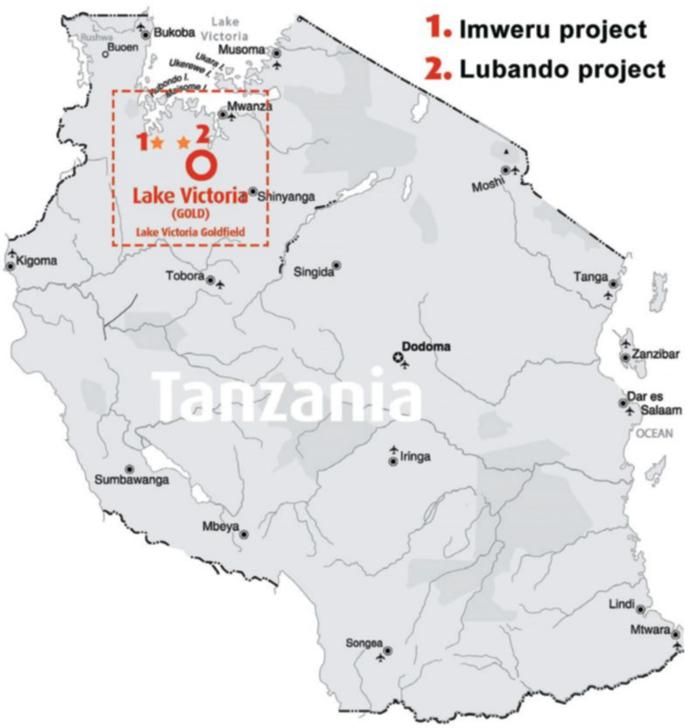
Minxcon's website provides insight into its evaluation process, noting that it conducted a reinterpretation of the digital wireframe model based on existing data, using a 0.2 g/t shell cutoff grade. Additionally, it completed an updated mineral resource estimate to produce a Joint Ore Reserves Committee-compliant competent person's report.

The company used geophysical interpretations and historical interpretations compiled by the Lubando project geologists to generate the resource wireframes and the interpretation of crosscutting faults to generate a properly faulted model. It conducted statistics, geostatistics and variography to generate what is known as a Kriging mineral resource estimate.

Minxcon adds that, at Lubando, a mineral resource depth cut-off of 200 m was applied to the mineral resources to calculate the openpittable mineral resources, while the balance, at a depth greater than 200 m, was declared as the underground mineral resource at a higher cut-off grade. These parameters were based on economic calculations and pit optimisations.

Overall, the updated geological model and estimation methodology increased the mineral resource tonnage by some 160% and the gold content by more than 42%, adding significant value to Opera's intended asset.

MINING WEEKLY COUPON ON PAGE 36 E449199



GOLD STRUCK
Lubando's evaluation demonstrated an increased mineral resource tonnage of 160%, with gold content increasing by more than 42%

RA

Durban-based plant delivered to Guyana mine

A $2.5-million project, facilitating, executing and unloading a shipment of assets for an 800 t/d modularised gold plant relocated from Durban, in South Africa, to Buck Hall, in Guyana, was concluded toward the end of last year by Canadian engineering, procurement and construction firm JDS Energy & Mining.

In January 2015, *Mining Weekly* reported that Canada-based mineral exploration company TMAC was selling the gold processing plant, which can be adapted for use across all commodities in mineral processing.

The plant, previously owned by US-based mining company Newmont Mining was destined for a site in West Kitikmeot, near Cambridge Bay, in the North Canadian Arctic.

The plant's 26 modules were designed and built by South Africa-based minerals technology company Tenova Bateman's Modular Plant division and it had been in storage at the Durban harbour for three years since construction was completed in early 2012, ahead of Newmont's anticipated production date of April 2014.

Its fate was decided, however, when TMAC – which *Mining Weekly* reported in January 2014 had acquired Newmont's Hope Bay property on a definitive acquisition agreement – decided in late 2014 to sell the plant rather than ship it to the Arctic.

In TMAC's management discussion and analysis of the year ended December 31, 2015, it notes that it sold the plant for $2.5-million in late 2015, at a loss of $1.3-million.

In 2016, JDS reports selling the Hope Bay mill assets to Canada-based midtier gold producer Guyana Goldfields and was awarded the contract to relocate the assets from Durban, through Baltimore, in the US, and Montreal, in Canada, to Guyana Gold's river port facility in Buck Hall, Guyana.

In its management discussion and analysis of the year ended December 31, 2016, Guyana Goldfields reports spending

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Any married man should forget his mistakes, there's no use in two people remembering the same thing.

HEAVY LOAD TO BEAR
The majority of the mill assets totalled over 16 000 m^3 and necessitated the chartering of a speciality heavy-lifter ship to accommodate all cargo as a single load

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engineering, with the mentoring focus being on physics."We are illustrating the importance of physics as a background platform for all aspects of engineering by emphasising its importance in processes, demonstrating this by providing lessons in welding-arc behaviour and plasma interactions inside a cutting-head, among other aspects."

He notes that Rio-Carb's associate company, water-jet cutting service provider Aquajet Profiles, also covers this physics-grounding through lessons on "the physics of extremely high water-pressure acting as a precisely controlled abrasive tool".

Rio-Carb, which manufactures liner plates for heavy materials handling applications in the mining and resources industries, is essentially a one-stop shop where interns can learn everything from computer-aided design (CAD) to actual engineering production, says Maine.

"This is a hands-on, real-life learning environment that provides tertiary students with much-needed practical experience."

Of the two students accommodated by the programme so far, University of the Witwatersrand (Wits) BSc mechanical engineering student **Uma Krige** completed the programme in February.

Krige, who impressed Rio-Carb with her notable academic achievements and leadership qualities, received "invaluable" exposure to production and business processes while benefiting

SOUND INVESTMENT
Promising students will be offered an opportunity for full-time employment at Rio-Carb upon successful completion of their studies

from the insights of experienced engineers, Maine tells *Mining Weekly*.

She stresses that the exposure to a broad-ranging production environment, such as that of Rio-Carb, rounded her theoretical training at Wits. Apart from being able to see processes, such as plasma cutting, welding, grinding, drilling and sheet-forming, and CAD, first-hand, in a highly-automated facility, Krige also attended client site visits, as well as sales and production meetings.

While acknowledging that it is challenging being a woman in her chosen career path, Krige notes that companies, such as Rio-Carb, are helping to challenge the status quo of this male-dominated industry.

Maine says promising students, such as Krige, will be offered an opportunity for full-time employment at Rio-Carb upon the successful completion of their studies.

The company has further assisted students by donating R950 000 to Wits to provide financial support for second- and third-year undergraduates.

Maine – a former South African Institute of Welding president – is encouraged to share his "fortunate mining and engineering background" with students.

His experience, which ranges from his involvement in a 1980s fuel-farm storage tank project; the Koeberg nuclear power station, in Cape Town; and interning at a large welding equipment company in Belgium, to name but a few, gave him "broad insights".

Outlook

"Engineering consultants and project houses are obviously the first to feel the pinch in a declining market," Maine says, adding that, fortunately, they are also the first to rebound once commodity prices increase. He notes that the mining industry and the South African economy are still in "a tenuous situation", but adds that at least data from national statistics authority Statistics South Africa shows that "2016 mining tax collections equated to those of 2014, with 2015 seeing the lowest amount of mining tax revenue collected". Based on this, Maine concludes that there has been a tentative up-tick in mining activity. He is not alone in noting this thinking, as he points out that mining sector shares on the JSE have improved dramitically over the last year.

Maine is hopeful that many of the vacant positions in the professional consultants arena will be filled once consulting companies restart or begin providing services across Africa "using South Africa's excellent product management capabilities, thereby synergistically taking our home-grown manufacturing capabilities with them".

He points out that Rio-Carb's new focus is on leveraging its extensive experience of CrC materials in the materials handling sector to explore methods of offering a total solution to the lifetime performance of specific equipment, such as chutes, cyclones and pipe circuits.

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RA

Collaboration key to build pipeline of opportunities on global scale

Quebec-based carbon-capture technology developer CO_2 Solutions president and CEO **Evan Price** expects its collaboration with global consulting and engineering firm Hatch to be central to the success of its Valorisation Carbone Quebec (VCQ) project and instrumental in building the company's commercial pipeline of opportunities on a global scale.

"By combining our technology with Hatch's expertise, we will be able to accelerate business development and deliver projects to the satisfaction of a broad and diverse customer base."

In March, CO_2 Solutions and Hatch announced a collaborative agreement in which Hatch will act as engineering services provider to the VCQ project.

The C$15-million VCQ project, sponsored by the Quebec regional government, aims to demonstrate carbon dioxide (CO_2) capture and beneficial reuse at the large-scale industrial facilities of Quebec's main industries namely manufacturing, power generation and mining.

The VCQ project also aims to support the development of second-generation reuse applications such as the production and sale of biofuels.

Hatch, which specialises in the design and realisation of major industrial engineering projects, will collaborate on delivering carbon-capture systems integrating CO_2 Solutions' low-cost, environmentally benign, enzymatic technology in large industrial environments.

Within these projects, CO_2 Solutions will license its proprietary technology and Hatch will provide its engineering and project delivery expertise, enabling CO_2 Solutions to reach the objectives of the VCQ project.

"We recognise that sustainability requires the optimisation of environmental, social and economic outcomes and is at the core of how Hatch delivers value to our clients as a socially responsible company. This collaboration with CO_2 Solutions supports the Hatch goal to plan, design and implement projects with our clients that focus on sustainable value creation," says Hatch CEO **John Bianchini**.

CO_2 Solutions Technology

Conventional technology used for the capture and production of pure CO_2 is primarily based on the use of chemical amine solvents such as monoethanolamine and piperazine, according to explanations on the CO_2 Solutions website.

The company states that these solvents require significant amounts of valuable, high-grade process heat for solvent regeneration, creating an inefficient process with high operating costs.

Additionally, it says conventional amine solvents suffer from significant operational and environmental issues including

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Keep the dream alive: Hit the snooze button.

EG

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$8.7-million during the fourth quarter of 2016, on the acquisition of a modular 1 000 t/d processing plant and a 6 MW power plant.

"The power plant will be sufficient to meet the additional power needs associated with the new ball mill which is to be installed in the second phase of the proposed mill expansion while the modular plant has the potential to be used at some of the company's satellite deposits pending exploration success," Guyana Goldfields explains.

The modular plant, originally designed and built for the Hope Bay project, in Canada, consists of a primary crusher, ball mill, gravity circuit, leach circuit and flotation circuit.

"The modular plant has never been used, while the power plant was only in operation for about 18 months before being put on care and maintenance.

"The majority of the parts and equipment associated with the modular plant have been shipped and are in storage at the company's Buck Hall facility near Georgetown," Guyana Goldfields adds.

JDS says the majority of the mill assets were relocated from Durban. The assets totalled over 16 000 m^3 and necessitated the chartering of a speciality heavy-lifter ship to accommodate all cargo as a single load.

SIZE MATTERS
No Guyana port could accommodate the breakbulk cargo, so the cargo travelled 70 km from the port of Georgetown to Buck Hall on the Essequibo river

JDS was responsible for the planning and execution of the shipment through to unloading the mill at Guyana Goldfield's Buck Hall laydown. Major components of the scope of work comprised preparing the equipment for shipment; sourcing a ship; moving the equipment to quay side and overseeing the loading; preparing the laydown; unloading the cargo to barges in Georgetown; and transporting and unloading the barges at Buck Hall.

"The oversize nature of the modules meant that there was no port facility in Guyana that could accommodate the breakbulk cargo. The ship was brought into port with the starboard side to shore and discharged the breakbulk cargo over port to a series of barges moored alongside. The ships then travelled the 70 km down from the port of Georgetown on the Demerara river to Buck Hall on the Essequibo river," JDS states.

The work was completed in 2.5 months, including 16 days of sailing time.

Meanwhile, Canadian gold miner Victoria Gold has awarded a contract for engineering services at its Yukon-based Eagle Gold project to a partnership between JDS and global engineering firm Hatch (JDS/Hatch).

Victoria has been undertaking engineering activities on some critical project elements, such as the heap leach pad, since delivery of the feasibility study in late 2016. JDS/Hatch has been engaged to continue and complete basic engineering

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degradation, toxic aerosol emissions, sensitivity to flue gas contaminants and corrosive agents.

CO_2 Solutions advocates its technology as the solution to these challenges by employing the most powerful known catalyst for carbon management, the enzyme carbonic anhydrase (CA), which is most commonly used by living organisms during respiration.

In an industrial system, CA can be used as a catalyst to dramatically accelerate simple and benign salt solutions, resulting in rapid CO_2 absorption kinetics and significantly reduced energy consumption. The technology is also designed for use within the existing solvent gas scrubbing architecture for plant retrofit.

CO_2 Solutions developed a high-performance CA enzyme named 1T1. According to the company, the 1T1 enzyme has demonstrated catalytic performance that considerably surpasses that of the best enzymes currently available as well as those used to date by CO_2 Solutions.

1T1 was developed with the financial assistance of the Canadian government's Industrial Research Assistance Programme.

Based on the developments observed thus far, this enzyme process has presented several significant advantages.

"The costs associated with the capture, sequestration and reuse of carbon using this enzyme are far lower than the costs associated with conventional processes, which require significant amounts of energy." Moreover, the technology is perfectly adapted to carbon capture from any source of combustion gas containing carbon dioxide.

At what age is it appropriate to tell my dog that he's adopted?

CLEAN TECH
The Valorisation Carbone Quebec project aims to demonstrate carbon dioxide capture and beneficial reuse at the large-scale industrial facilities of Quebec's main industries, namely manufacturing and mining

Oil-Related Application and Implementation

CO_2-based enhanced oil recovery is the practice of injecting pure CO_2 into an ageing oil well to repressurise the well and temporarily increase its production, notes CO_2 Solutions.

In the process, CO_2 mixes with crude oil during the miscible phase. The lower viscosity, combined with the increased pressure, ensures that crude oil flows to production wells. This is similar to the concept of a CO_2 and soda mixture released from a shaken fizzy cool drink bottle.

CO_2 Solutions states that it has a particular interest in the opportunity presented by the Alberta oil sands, which is the fastest growing source of carbon emissions in Canada. Both industry and government are focused on ways to reduce emissions from the oil sands, using carbon capture and sequestration technology, but without the prohibitive costs of conventional techniques.

The company notes that its technology can be used for carbon capture *in situ*, as well as at heavy oil upgrading operations.

Opportunities Going Forward

In its half-year report released in December, CO_2 Solutions cites work by researchers at Oxford University, which shows that emissions from existing power sector assets, if operated to the end of their normal economic life, will exceed the cumulative emissions budget consistent with halting global average temperature rise to 1.5 ºC, as agreed to at the twenty-first Conference of the Parties (COP21) held in Paris in 2015.

The report further noted that, to meet the COP21 resolutions, additional effort is required to develop techniques to capture and securely store carbon, adding that the company, "believes that it is very well positioned to capitalise on the convergence between the carbon tax associated with [emissions] and the cost of carbon capture".

CO_2 Solutions senior VP **Thom Skinner** says that the agreement with Hatch will lead to CO_2 Solutions' technology being implemented in industrial projects throughout the world, adding that the company, "has already entered into discussions with a number of entities regarding technology licensing opportunities beyond North America." Hatch, as an implementing partner with Southern African offices in Gaborone, Botswana, and Cape Town and Johannesburg, in South Africa, may, in future, implement CO_2 Solutions' technology at African industrial operations.

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and move into detailed design under an engineering, procurement and construction management contract.

The JDS/Hatch team have extensive experience working together on northern projects, including the Minto mine, in the Yukon; the Hope Bay project, in Nunavut; and the recently completed Gahcho Kué mine, in Canada's North Western Territories, which was built and brought into operation ahead of schedule and under budget.

"This is an important commitment for Victoria and we are eager to work with JDS/Hatch in the ongoing development of the Eagle Gold project," stated Victoria president and CEO **John McConnell.**

He added that the work that would take place would – by advancing the engineering – enable the start of site construction activities and the placing of orders for long-lead equipment as the company continued its drive to become Yukon's "next and largest-ever gold producer".

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COMPANY PROFILE

Jenny Internet

Business systems specialist Jenny Internet offers high-speed Internet connectivity to backup solutions, even in the remotest parts of South Africa.

"We have remote technicians to support our network countrywide," highlights the company, adding that its wireless networks cover most of South Africa, with all networks terminating into a fibre backbone.

Jenny Internet's custom-developed management system and local technicians enable the company to provide its clients with services faster than any other competitor. The company backs these services with a 365-day-a-year call centre, in Newcastle, KwaZulu-Natal, which boasts an average answering time of under 15 seconds. All support is monitored, recorded and tracked.

Jenny Internet can provide a full set of services, comprising wireless fibre, which enables high-speed connectivity in the country's most underserviced areas; fibre direct, which provides fibre connectivity in cities and towns; voice over Internet protocol and facsimile services, allowing clients to retain their telephone numbers; Cloud-based telephone systems; virtual private network services and backup services.

Established in 2007, Jenny Internet is headquartered in Newcastle and has an office in Randburg, Johannesburg. The licensed network operator has both the Individual Electronic Communications Service and Individual Electronic Communications Network Service licences from the Independent Communications Authority of South Africa.

Jenny Internet marketing director (back) Rolf Stucky and (front) MD Werner Stucky

MINING SERVICES

Upping Efficiencies

Consultancy offering miners ‘optimisation tools’

ILAN SOLOMONS | CREAMER MEDIA CONTRIBUTING EDITOR

In the current climate of constrained capital, clients in the mining sector are seeking ways to maximise returns while minimising exposure to risk, particularly those companies which need to make strategic decisions on potential investments, says engineering company WorleyParsons CEO **Denver Dreyer**.

“Front-end services are critical in a cash-constrained environment. Through our global advisory and technical consulting arm, Advisian, we have introduced innovative optimisation tools to help our clients identify opportunities upfront and create value across every phase of a project so that, when the project is ready to go into execution, it has the highest probability of success,” he says.

Advisian regional executive manager for sub-Saharan Africa **Adam Boughton** elaborates that Advisian’s optimisation tools help to address the modern-day challenges that mining companies are facing and offer “real solutions to real problems”.

He comments that the unit draws on the company’s “deep domain expertise” and experience in the mining sector to advise clients. It then can partner with them to implement that advice.

Boughton remarks that the solutions and tools are centred on creating assets, improving asset efficiency and sustainability, while also optimising asset portfolios. He says that, when used together, these tools go beyond optimisation. “We can identify risks and

ADAM BOUGHTON
The Advisian-Ensight joint energy optimisation solutions will provide ‘unparalleled capabilities’ for businesses experiencing energy challenges

mitigate them, while also identifying opportunities across the full business value chain.”

Boughton notes that this combination of multiple techniques has improved WorleyParsons’ capability to help clients to reinvigorate stalled projects and currently unprofitable operations.

He adds that forecasting risks and returns needs to be evaluated in a clear model. “To this end, Advisian uses a unique financial and technical process model called StepWise.”

Boughton highlights that this provides the “best possible technical alternatives” for a project in a quick and cost-effective way, which enables clients to make the right investment decisions. He says that it is a low-cost approach that provides a sales case based on the client’s desired business outcomes (or metrics for success) and identifies risks and opportunities early on in the process.

Further, Advisian operational improvement advisory principal **Steve Burks** explains that operational improvement increases net cash flow by increasing revenue, while simultaneously reducing costs.

“Our objective is to implement recommendations and embed them into the culture of the operating company to ensure that it steadily improves cash flow during the entire life of the planned operation,” he states.

Burks notes that Advisian recently entered into a regional framework agreement with business optimisation firm Whittle Consulting to enhance and extend its optimisation capability.

He says this focuses on early cash flow to achieve significant improvements in net present value. Advisian links this technique with nine other business improvement mechanisms and identifies the “most beneficial” mix of technical, project delivery and conventional management consulting processes.

Moreover, Burks points out that Advisian has also entered into a regional framework agreement with energy system design firm Ensight Energy Solutions, which will enable its clients to implement energy optimisation initiatives and realise immediate benefits in the short term.

He comments that the initial assessment and energy efficiency initiatives will improve cash flows steadily throughout the entire life of the planned operation.

“Ensight has deep domain experience in solving energy challenges. The combination of Advisian’s heat recovery expertise and global engineering, procurement and construction management (EPCM) capabilities through the WorleyParsons group, together with Ensight’s unique approach to energy optimisation and a track record in energy cost savings, provides our clients with a comprehensive suite of energy optimisation solutions covering every aspect of their operations,” Boughton asserts.

He adds that mining companies and investors need energy surety to ensure new projects are successful.

Boughton further states that the Advisian-Ensight joint energy optimisation solutions will provide “unparalleled capabilities” for businesses that have energy challenges.

An additional service offered by Advisian is the provision of comprehensive services to support corporate and project development transactions leveraging the company’s due diligence processes and capability within the structure and requirements of each different transaction type across all sector, including minerals and metals.

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EG

PLATINUM-GROUP METALS

Ramping Up

RBPlat lifts Q1 output, expansion projects advance

DAVID OLIVEIRA | CREAMER MEDIA SENIOR STAFF WRITER

Platinum-group metals (PGMs) miner Royal Bafokeng Platinum (RBPlat) achieved a 6.5% year-on-year increase in platinum, palladium, rhodium and gold (4E) metals in concentrate production to 72 300 oz for the three months ended March 31.

Platinum ounces were up 6.2% year-on-year to 46 300 oz.

Total tonnes delivered to concentrators increased by 17.1% to 721 000 t, with the Bafokeng Rasimone platinum mine (BRPM) having contributed 597 000 t and Styldrift 124 000 t.

Total tonnes milled during the period rose 13.7% to 690 000 t, with BRPM contributing 571 000 t and Styldrift 119 000 t. The contribution from the upper group 2 reef to overall tonnes milled reduced from 22% to 20.5%.

The average 4E grade reduced by 6.2% year-on-year from 4.04 g/t to 3.79 g/t.

RBPlat attributed the reduction in grade to "higher-than-planned on-reef dilution at Styldrift associated with the negotiation of a known fault structure to the south and west of the shaft infrastructure on 600 Level".

The company expects 4E grades at Styldrift to stabilise at the 3.30 g/t mark during the second quarter of this year, following the completion of negotiations of the fault structure.

Meanwhile, BRPM's grades reduced marginally by 0.7% and remain in line with RBPlat's expectations.

Costs

For the quarter under review, cash operating costs increased by 12.2% to R701-million, owing to higher production volumes and labour-cost-related inflation.

The cash operating unit cost for each tonne milled and 4E ounce produced were 6.8% and 7.2% higher than in the comparative 2016 period at R1 227/t milled and R10 823/oz respectively.

"A key operational focus for the business is to improve the fixed/variable cost ratio of our operations to target below-consumer-price-index unit increases for the [full] year.

"As such, we have initiated a formal review process of the entire business to identify opportunities and develop a detailed strategy to implement the changes required," RBPlat said.

Capex

RBPlat raised its capital expenditure (capex) by 56.6% year-on-year to R370.6-million in the quarter under review.

Expansion capex increased by 87.5% to R346.1-million in line with mining and construction activities geared towards achieving the 150 000 t/m ramp-up at Styldrift.

Replacement capex, meanwhile, reduced by 92% to R2.5-million, owing to current project construction activities. Stay-in-business capex increased marginally from R20.9-million to R22-million.

The BRPM Phase III replacement project, which involves the construction ore handling infrastructure on the 14 and 15 levels, remains on schedule. Project expenditure for the quarter amounted to R2.5-million, bringing the total project expenditure to date to R1.04-billion.

Meanwhile, activities at the Styldrift I expansion project, during the quarter, were focused on continuing with decline access to the north and south development on both the 600 and 642 levels to establish stoping sections, as well as ongoing development and construction work on 600 Level to establish workshops, stores and material bays.

Work also continued on mining and construction activities to support raise-boring, as well as sliping and lining of rock passes and water handling infrastructure on the 642 and 708 levels. The services shaft was also equipped and construction of the overland belt undertaken.

RBPlat invested R346-million in capex in the Styldrift I expansion project during the quarter, taking total expenditure on the project to date to R6.8-billion.

DIAMONDS

Rockwell files for business rescue

MIA BREYTENBACH
CREAMER MEDIA STAFF WRITER

DUAL-LISTED alluvial diamond miner Rockwell Diamonds has filed for business rescue, which will ensure any liquidation order is automatically stayed.

This follows after a judge in Kimberley on March 23 issued an interim liquidation order against subsidiaries Rockwell Resources RSA, HC van Wyk Diamonds and Saxendrift Mine after former Rockwell contractor C-Rock Mining launched a liquidation application against the subsidiaries.

Interim liquidators were also appointed by the Master of the High Court, in accordance with requisitions by the major creditors; however, because of the filing by Rockwell, the interim liquidators will not take control of the three subsidiaries, which continue to be operated by company personnel. If successful in its application for business rescue, a business rescue practitioner will be appointed to work with company management to restructure the affairs of the company, seeking input and consent from creditors, as well as considering strategic alternatives.

"As 96% of the dollar value of company creditors support Rockwell's plans, the company now believes this support should be a significant factor in likely restructuring options," the company noted in a statement released earlier this month.

The business plan includes the provision of $8-million in loan capital, completing the Wouterspan plant with such proceeds, a focus on cost reduction, efficiency improvements, the sale of certain redundant assets, the pay-down of all creditors under R50 000, as well as the purchase of all recent plant and mine supplies on a cash-only basis. "The implementation of this business plan is well advanced, despite the frustrating intervention by C-Rock Mining," Rockwell stated.

The remaining task is to complete the commissioning and ramp-up the production rate of the processing plant at Wouterspan and relocate the Holsloot plant to Stofdraai (at the northern edge of Wouterspan).

The Wouterspan plant, near Douglas, in the Northern Cape, is nearing completion, with ore being processed through lines one and two and commissioning of line three now complete, to be followed by the ramp-up in processing rate, the company noted in the statement.

"[Rockwell] remains persuaded that its case for dismissal of the liquidation application is sound, and, after a full hearing, it believes it should prevail and C-Rock Mining's actions will be shown to be spurious and without foundation," the company reported.

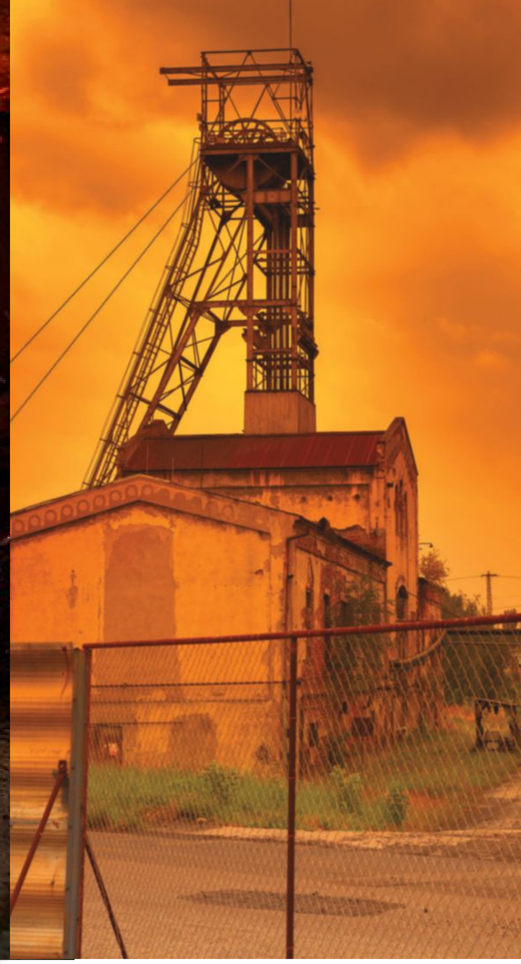
MINING WEEKLY COUPON ON PAGE 36 E449854

Mark Davis

Master Blaster

Full Name: Mark Rodney Davis
Position: CEO of Master Blaster
Main Activity of the Company: Offering innovative, alternative explosives solutions to the mining industry
Date and Place of Birth: November 12, 1957, Kitwe, Zambia
Education: Some schooling, some hockey, some army, some mining, lots of explosives engineering and then 20-odd years of continuous learning, doing what I love
First Job: Reserve Bank of Zimbabwe
Size of First Pay Packet: Far too little, I am sure
Management Style: I do not know; you would have to ask my partners
Personal Best Achievement: Inventing what is still the safest shock tube initiation system in the world and then passing the 100-million holes blasted mark
Person Who Has Had the Biggest Influence on Your Life: It would have to be my old man: father, mate, miner and Springbok hockey player
People Who Has Had the Biggest Influence on Your Career: Drew Jarvis, Peter Wentworth, Rob Lindsay, my current partners (Brian Fitzgerald and Jeff Fenwick) and all the 'haters' who helped me to get better at my job
Person You Would Most Like to Meet: Harry Oppenheimer
Businessperson Who Has Impressed You Most: Anyone who started with nothing and still managed to do what is right for his or her family, mates and the industry in which he or she works
Philosophy of Life: Family first, mates second, third and fourth, and "you don't have to do what the others do to succeed"
Biggest Ever Opportunity: Starting Master Blaster with two of my best mates, Brian Fitzgerald and Jeff Fenwick
Biggest Ever Disappointment: The continuous tactics employed by the supposed doyens of the South African explosives industry in attempting to maintain market share 'at any cost', despite the consequences to the underground work
Hope for the Future: That South Africa's mining executives finally accept that resistance to change is their biggest impediment to success and realise that there are already options out there to make continuous mining a reality – now
Favourite Reading: Newspapers
Favourite TV Programme: *Vikings* or *Banshee*
Favourite Food/Drink: Because my office is basically my car, I tend to focus on all the healthy options: pies, sausage rolls and chocolate, washed down with a Diet Coke
Favourite Music: Anything where the singer's voice sounds like his or her vocal chords have been sand-papered
Favourite Sport: International rugby
Hobbies: Watching all sport and news on television. I was going to say gym and mountain biking, but you have a picture of me – and it is my firm belief that men should not wear Lycra
Car: Lexus LS 460, eight years old and over 300 000 km, so not as larney as you think
Pets: My wife's three cats – by executive order
Miscellaneous Dislikes: Donald Trump; bullying and lying, or, as I said, Donald Trump
Married: To Merrill, for 38 years
Children: Two of my best mates, Dustin, 33; Cassandra, 28
Clubs: Left them all behind in Zimbabwe, after somebody asked me, not so politely, to vacate my farm, so a friend of his who lives in the UK could take it over. This is a very small exclusive club, which, quite frankly, I wish I was not part of





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