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- KX36 gives Botswana Diamonds its maiden resource
- Discovery of new gold zones boosts resources at Sanankoro
- Record plant throughput for Khanye Colliery

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## ON THE COVER

Fluor has many decades of project expertise and experience in the execution and management of large, complex projects in challenging and remote locations. As the company celebrates 60 years in South Africa this year, several flagship projects under its belt are testimony to its capabilities. See story on page 14.

# What proposed tax amendments mean for contract miners

**M**ining by its very nature requires large initial capital outlays and, in recognition of this, the South African Income Tax Act regime provides for an accelerated deduction of such capital expenditure by miners. The Income Tax Act No 52 of 1968 (ITA) provides a special regime for taxpayers engaged in mining operations. The reasoning behind the special treatment is that the establishment of a mine is an expensive and lengthy process, with long lead times until any profit is seen by the mining company.

In the *Benhaus Mining v Commissioner for the South African Revenue Service* (165/2018) [2019] ZASCA 1 (Benhaus Case), it was held that the special regime be extended to contract miners who engage in mining operations, under a contract with the holder of a mining right, and who earn a determinable fee under such agreement.

The judgement inarguably changed the tax landscape for contract miners. The court found that a contract miner would be entitled to claim the deductions and benefits conferred by sections 15(a) and 36(7C) of the ITA in respect of mining capital expenditure to a mining contractor. The dispensation was previously thought to be reserved only for mining taxpayers directly deriving income from the sale of extracted minerals.

However, following the Benhaus case, there has been uncertainty regarding the ability of contract miners to access the benefits offered to mining companies, and whether such contract miners are permitted to claim the capital expenditure allowances offered to mining companies.

It is for this reason that Annexure C proposals set out in the 2020/21 Budget have recommended that National Treasury considers the challenges in further detail with possible amendments to the capital expenditure regime contained in 36(11) of the ITA.

We covered this at length in the March edition of *Modern Mining*, where one of the experts explained that in terms of Annexure C of the 2020 Budget Review, the point of contention was whether a contract miner, who excavates for a fee, and the actual mineral rights holder, as principal, should both qualify for the accelerated capital expenditure allowance provided for under section 36 of the ITA.

Prior to the Supreme Court of Appeal's (SCA) judgment in the Benhaus Mining matter, which was handed down in 2019, only the mineral rights holder was entitled to claim the allowance. The SCA overturned the Tax Court's judgment in the

Benhaus case. The Tax Court had, in a separate judgment handed down prior to the Benhaus Mining judgment, decided that the contract miner could not claim the capital expenditure allowance.

As you will see in this edition of *Modern Mining*, Denny Da Silva, senior tax advisor, Baker McKenzie Johannesburg, believes that the proposed tax amendments will have far-reaching consequences on contract miners. On July 31, 2020, the National Treasury released the Draft Taxation Laws Amendment Bill for comment. The Bill includes proposed amendments to both section 15 and section 36 of the ITA, effectively noting that capital expenditure allowances are only available to taxpayers who hold the relevant mineral rights. The proposed amendment was alluded to earlier this year as part of Finance Minister Tito Mboweni's budget speech, during which he noted that it was being considered.

The proposed amendment, if passed in its current form, will mean that contract miners will not be entitled to claim any accelerated capital expenditure allowances, and will have to claim allowances for capital expenditure in terms of other provisions in the ITA. Contract miners will, therefore, no longer be entitled to claim 100% of the capital expenditure incurred in a particular year, and will instead need to determine whether other allowances are applicable – for example, the 40/20/20/20 allowance in 12C, available to taxpayers conducting manufacturing operations.

It is clear that this will have a significant impact on the contract mining industry. What is not clear, though is how contract miners will transition from being able to claim 100%, to a regime where they cannot do so. More particularly, it is unclear what will happen to the historical allowances claimed under section 15, read with section 36.

As is clearly evident from the lengths to which SARS contested the matter with Benhaus, it was never SARS' or Treasury's intention for contract miners to benefit equally in terms of capital expenditure deductions.

With the country's tax revenue under severe pressure, many experts don't foresee any amendments confirming the application of the mining tax regime to contract miners. The amendments will limit the regime to those extracting minerals for their own account. This will definitely impact the contract mining industry, especially in light of the current COVID-19 situation. ■



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## New global industry standard on mine tailings aims for zero harm

The International Council on Mining and Minerals and the United Nations Environment Programme have launched global standards for the safe management of mine tailings. The historic agreement to lay out a set of industry protocols comes 18 months after the tailings dam disaster at the *Corrego do Feijão* mine in Brazil that killed 270 people.

The UN and the mining industry were joined by the peak body for responsible investment, the Principles of Responsible Investment, to undertake the Global Tailings Review. These three co-convenors represent government, industry and investor stakeholders.

UNESCO Professor of Marine Science, Elaine Baker from the School of Geosciences

and GRID-Arendal at the University of Sydney, is a member of the international advisory panel that oversaw the development of the new protocols.

“The dams are some of the largest human-made structures on the planet and require careful ongoing management,” Professor Baker says. “While large-scale failures of tailings dams are uncommon, when they do occur, they can be catastrophic for downstream communities and the environment.”

The more than one-year process has resulted in the development of a revolutionary global standard for the management of new and existing mine tailings facilities. Mine tailings are material that remains after the commercially viable resources have been

removed in the mining process. This material is commonly stored as a slurry in dams.

The aim of the Global Tailings Review was to establish an industry standard that could eliminate tailings dam failures. The reasons for these failures are well understood, so the task of the review was to establish a standard that would ensure mine operators applied best practices in planning, design, construction, operation, maintenance, monitoring, closure and post-closure of tailings facilities.

“The differences between the global standard and many existing standards for tailings dam management include provisions for greater consultation from the outset with potentially affected communities,” Professor Baker says.

Ligia Noronha, director of the UNEP Economy Division, says: “The Global Industry Standard on Tailings Management is an important milestone towards the ambition of zero harm to people and the environment from tailings facilities.”

The standard will strengthen current practices in the mining industry by integrating social, environmental, local economic and technical considerations. The new standard covers the entire tailings facility lifecycle – from site selection, design and construction, management and monitoring, through to closure and post-closure. ■



The Corrego do Feijão tailings dam burst in Brumadinho, Brazil, on 25 January 2019, killing 270 people.

## Kumba approves Kapstevel South project at Kolomela

Kumba Iron Ore has announced the approval of its Kapstevel South project at its Kolomela mine by both the company's and Anglo American's boards.

The total capital cost of the project will be approximately R7-billion, including pre-

stripping. It is anticipated that the addition of the Kapstevel South pit will deliver an after-tax internal rate of return of 25% and allow Kolomela to maintain an estimated EBITDA margin of >35% in the long term.

The project entails the development

of a new pit, Kapstevel South and associated infrastructure at Kolomela. The pit is a conventional truck and shovel operation producing high quality direct shipping ore (DSO). While the pit is included in the current life of mine, it contributes significantly to sustaining production of 13 Mt for the remaining life of mine. Pit establishment and waste stripping will commence this year with first ore expected in 2024.

Themba Mkhwanazi, CEO of Kumba, says: “The approval of this project, at a time when the global and South African economies face the challenges of COVID-19, underscores Kumba's positive longer-term outlook for demand for its high-quality product. It also demonstrates our commitment to extend the lives of our mines and continue providing much-needed jobs and livelihoods in the Northern Cape region.” ■

### Implats appoints chairperson designate

The board of directors of Implats has announced the appointment of Adv Thandi Orleyn as independent non-executive director and chairperson designate. Her appointment to the board took effect on August 3, 2020 and she will assume the chairpersonship at the conclusion of the company's annual general meeting (AGM) on October 14, 2020. Dr Mandla Gantsho will retire from the board at the conclusion of the AGM as announced on June 10, 2020.

Adv Orleyn is a seasoned business-

woman and company director who holds B Proc, B Juris, LLB and LLM degrees and brings diverse corporate experience to her new role. She has built her distinguished reputation in various leadership positions, including the 11 years she served on the Implats board before stepping down in 2015. In addition to her executive role at Peotona Group Holdings, Adv Orleyn currently serves on the boards of BP Southern Africa, Reunert, Toyota SA and Ceramics Industries. ■

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## Final high-grade intersections at Longonjo

Pensana Rare Earths Plc (LSE: PRE, ASX: PM8) has revealed the final assay results from the last 86 holes of the 8 000 m drill programme completed at the Longonjo NdPr Project in Angola. The programme is in support of a Bankable Feasibility Study which is due to be reported in mid-October.

The latest results confirm the continuity of the weathered zone mineralisation from surface and also outline a wide area of mineralisation in fresh rock immediately below the current pit design that could add an extra dimension to the project

beyond the initial mine life.

Latest and final results continue to confirm the continuity of high grade rare earth mineralisation from surface in the weathered zone. The company expects to upgrade substantial amounts of Inferred mineralisation to higher categories, supporting an extended mine life.

Fresh rock mineralisation adds a whole new dimension to the project. Wide, continuous high-grade intersections grading 2% to 4% REO have been returned from the fresh rock immediately below the weathered zone. The mineralisation remains

open below the 80 m drill depth and to the north and west. The reported grades and potential size of the further mineralisation are very encouraging and whilst not currently included in the current Bankable Feasibility Studies work has commenced on including this mineralisation in the overall development of the project.

Meanwhile, work has commenced on an updated Mineral Resource estimate to be reported in September 2020.

Executive director & COO Dave Hammond, comments: "These final results have further highlight the world-class opportunity at the Longonjo Project. The drilling continues to prove the continuity of the weathered mineralisation, returning significant grades from surface outside of our current mine plan. We expect these infill drilling results will allow us to upgrade the existing resource categories and extend the mine life.

"Further drill testing of the fresh rock zone, which is not in the current mine plan, has also exceeded expectations. With many holes ending in mineralisation at eighty metres depth, identifying several open positions, the potential for a sizeable deposit of this second style of mineralisation is an exciting possibility.

All assay results have now been received, and SRK Consulting has commenced the estimation process. We look forward to reporting a new Mineral Resource estimate in September." ■



The latest results confirm the continuity of the weathered zone mineralisation from surface.

## Water use licence granted for Prieska Copper-Zinc Project

ASX and JSE listed Orion Minerals' subsidiary, Prieska Copper Zinc Mine, has been granted a 20-year Water Use Licence by the National Department of Water and

Sanitation, marking the achievement of another key permitting milestone for its development-ready Prieska Copper-Zinc Project in South Africa's Northern Cape Province.

"The grant of the Water Use Licence for the Prieska Copper-Zinc Project is a major milestone for the company and removes the largest remaining regulatory hurdle before the construction of the mine can commence," says Orion's MD and CEO, Errol Smart.

The licence has been granted in terms of the National Water Act, Act 36 of 1998 for a period of 20 years and includes permission for mine de-watering to proceed, as well as wet tailings and wastewater storage and management and the use of water for mixing with mine waste for void back-filling.

The licence conditions make provision for further improvements to how water pumped out of the mine is disposed of, allowing the prospect of artificial recharge into groundwater aquifers to be considered, as well as maximising the re-use of the discharged water by farmers in the surrounding area, as was described in the updated Bankable Feasibility Study.

"Many of the banks and potential strategic partners that we have been dealing with have flagged the outstanding licence as a major concern that could potentially hold up an investment decision," says Smart.

"We are pleased that this key outstanding approval has now been received, clearing the way for construction and development of our planned new state-of-the-art base metal operation to commence at Prieska," he says. ■



Errol Smart, Orion's MD and CEO.

## Gold price rallies with record ETF inflows

The COVID-19 pandemic impacted the consumer sectors of the gold market in H1 2020, with total demand dropping by 6% to 2 076 t versus the same period in 2019, according to the World Gold Council's latest Gold Demand Trends report.

However, while overall gold demand fell, H1 saw record flows into gold-backed ETFs of 734 t. The global response to the pandemic by central banks and governments, in the form of rate cuts and massive liquidity injections, fuelled these record inflows. The South African Reserve Bank (SARB) has followed suit, cutting interest rates to historical lows in an attempt to shore up liquidity in the domestic markets.

In contrast, bar and coin investment declined sharply in Q2 driven by Asian weakness and leading to a 17% decline to 397 t in H1. With global markets in lockdown and consumers deterred by high gold prices and a squeeze on disposable income, jewellery demand fell by 46% to 572 t and gold used in technology dropped 13% to 140 t in H1.

Inflows into gold-backed ETFs (gold

ETFs) accelerated in Q2, taking H1 inflows to a record-breaking 734 t. First half inflows surpassed the previous annual record from 2009 of 646 t and lifted global holdings to 3 621 t.

The US dollar gold price gained 17% in H1, following a 10% increase during Q2. Strong inflows into gold-backed ETFs fuelled the rise. The gold price reached record highs in numerous other currencies, including euros, sterling, rupee and renminbi, among others.

Investment in gold coins and small bars slowed sharply in H1 2020, down by 17% to 397 t – the lowest since H1 2009. Steep declines in demand across Asia outstripped growth in the West as investors' reactions to the pandemic diverged across the globe.

H1 jewellery demand halved to 572 t amid the global disruption caused by COVID-19 and in the face of high – and in some cases record – gold prices. The impact of the pandemic was unsparing and Q2 demand fell to an unprecedented 251 t.

Central banks bought 233 t of gold during H1, 39% below 2019's record level.

Buying has become more concentrated, with fewer banks adding to reserves so far in 2020.

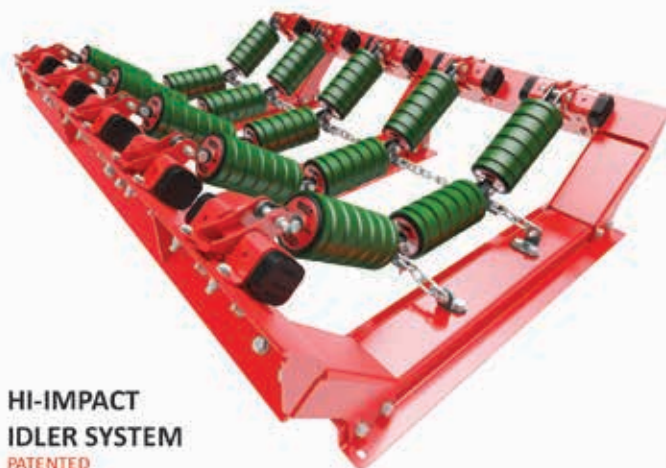
Gold supply was impacted by the pandemic: total H1 supply declined 6% to 2 192 t as both mine production and recycling were affected by lockdown restrictions.

Louise Street, market intelligence at the World Gold Council, comments: "COVID-19 created the perfect storm for gold investment as historic liquidity injections and record low interest rates significantly cut the cost of carrying gold. We witnessed a surge in gold price along with record inflows into gold-backed ETFs in the first half of the year," says Street.

"On the contrary, consumer demand took a brutal hit from COVID-19 in the first of 2020. The lockdowns implemented across Asia, Europe and North America severely disrupted the consumer-focused sectors of the market, with jewellery demand falling to unprecedented low levels. Bar and coin investment slowed sharply, as a significant reduction in Asian demand masked the strong surge in Western investment." ■

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## Lucara posts strong operating performance during Q2 2020

Lucara's Karowe mine in Botswana has continued to operate throughout the COVID-19 pandemic, and delivered strong production and cost results in Q2, consistent with the original 2020 plan and budget.

Lucara made a deliberate decision not to tender any of its +10.8 carat production after early March 2020 amidst the uncertainty caused by the global crisis, and instead entered into a ground breaking supply agreement with HB Group, for the remainder of 2020. The large, high

value production from Karowe has historically accounted for approximately 70% of Lucara's annual revenues. Revenue from this agreement will be realised starting in Q3 2020 based on a polished price mechanism.

The company generated cash inflows of US\$21-million during Q2, consisting of a partial payment of US\$13.5-million under the HB agreement and proceeds of US\$7.5-million from continuous sales on Clara, Lucara's digital sales platform and

a tender in Antwerp on June 18 for stones smaller than 10.8 carats.

Five sales were completed on Clara during Q2, providing liquidity for the company in this unexpected period of travel restrictions. Clara's customer base increased from 32 to 35 during the second quarter and now stands at 46. Third-party trial sales are expected to commence in Q3.

Lucara continues to have a strong availability of working capital, including US\$13.7-million in cash at the end of Q2 and \$31 million available from its revolving term working capital facility.

Eira Thomas, President and Chief Executive Office, comments: "Though our 100% owned Karowe mine continues to operate at full capacity, Lucara made the deliberate decision not to sell any of its +10.8 carat diamond production during the period, in response to a weakened market demand. Subsequently, we are pleased to report that Lucara has now secured a ground breaking supply agreement with the HB Group, which will deliver regular revenues on superior pricing terms to those currently being achieved at tender, and helps position Lucara to move forward with key underground expansion activities for Karowe in 2020." ■



Lucara's Karowe mine delivered strong production and cost results in Q2 2020.

## Hummingbird signs purchase agreement for Kouroussa Gold Project

Hummingbird Resources plc (AIM:HUM) has signed a conditional binding sale and purchase agreement (SPA) confirming and setting out the key terms for the acquisition of the Kouroussa Gold Project located in Guinea, from Cassidy Gold Corp, following the completion of confirmatory due diligence by the company on the project.

The company has also completed a more in-depth review of the project's geological database which highlights promising drill intersections both within and outside the current stated mineral resource used in the mine plan. These drill intersections also demonstrate the high grade nature of the targets proximal to the project and within

the permit area.

"I am delighted we have been able to confirm the purchase of the Kouroussa Gold Project and look forward to working with the Government of Guinea as we progress the development of the project as quickly as possible whilst continuing to explore the remarkable geological potential at the project," says Dan Betts, CEO of Hummingbird.

"This marks a pivotal point in Hummingbird's story and is a significant next step in achieving our long term ambition to create a sustainable multi-asset gold producer. I would like to take this opportunity to thank all stakeholders who have contributed to getting us this far and continue to support

us at this exciting time for the company."

"Having the opportunity to work on a new gold system at Kouroussa is extremely exciting. There is undoubtedly further potential to be discovered but what is most exciting is the abundance of high grades as evidenced by the large number of gram metre intercepts >50 gram metres but also the many occurrences of visual gold. The old adage 'grade is king' is particularly relevant to Kouroussa and our technical team is looking forward to the challenge of unlocking the system's full economic potential. We look forward to sharing the story as it unfolds," concludes Murray Paterson, VP Geology at Hummingbird. ■

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## Good progress on Palabora ventilation shaft

The sinking of the 1 200-m deep ventilation shaft at Palabora Copper is proceeding apace, notwithstanding the COVID-19 shut-down and restrictions.

Work began on the 8,5 m diameter shaft early in 2019; pre-sinking has reached a depth of 50 m and the change-over from pre-sink to main sink is almost complete, according to Murray & Roberts Cementation project executive mine

development Graham Chamberlain.

As part of the development of Palabora Copper's new LIFT II underground block cave mining area, the shaft will be developed to a final blind sink depth of 1 190 m, with a drop raise to its final depth. Completion is expected in the third quarter of 2022.

"We were required by the client and national lockdown regulations to pause our

work schedule, but operations resumed as planned when restrictions were relaxed," says Chamberlain. "The priority is to ensure that safe working conditions are maintained, and the COVID-19 infections are avoided."

The project is using automated machinery at the shaft bottom, removing employees from high risk contact areas. Modern, high-penetration rate hydraulic drills are deployed on robotic arms nested on the shaft-sinking stage. This allows operators to conduct drilling at any position in the shaft without physically being in contact with the drills.

"We shorten our cycle times with the use of explosive delivery pods containing sensitised emulsion," he says. "Electronic systems deliver real-time data on blast holes numbers, volumes and pressures, improving blasting efficiency and quality."

To reduce potential disruption from the intersection of poor ground conditions, Murray & Roberts Cementation takes the shaft lining to the bottom of the shaft during sinking. In the past, industry practice tended to carry this lining to about 20 m from the bottom.

"Our lining approach is applied with the use of a modified version of the traditional shuttering, and our specialised concrete mixes which we design for this specific purpose," he says. "The mixes are prepared and delivered by our on-site batch plant."

Chamberlain highlighted that the company's focus on Zero Harm and a rigorous safety regime continues to deliver a high level of safety on the project. ■



Pre-sink stage view from bank elevation.

## Working towards underground resources at Otjikoto mine

Vancouver-based B2Gold plans to conduct mining of the Wolfshag zone at its Otjikoto mine in Namibia and has appointed Murray & Roberts Cementation in joint venture with Lewcor Mining to establish the underground stoping horizon. Murray & Roberts Cementation is one of very few companies worldwide with the experience and capability to conduct both development work and raiseboring as part of a single package.

According to Allan Widlake, new business director at Murray & Roberts Cementation, mobilisation on site has begun and the contract will take 28 months. Otjikoto Mine is Namibia's largest

gold producer and has been in operation since 2015. The Wolfshag zone at Otjikoto comprises a series of shallow, easterly dipping mineralised shoots that sub-crop below calcrete cover, plunging for a strike length of at least 1 600 m.

The contract will see a decline of 5 m wide by 5,5 m high being driven to the orebody from a portal in one of Otjikoto's depleted open pits. There will also be two 4 m diameter ventilation shafts created using raiseboring methods. One will measure 200 m in depth, and the other 80 m.

"We will be conducting this project in a strategic partnership with a highly professional local Namibian opencast mining and

earthmoving contractor, Lewcor Mining," says Widlake. "Lewcor is an existing service provider at Otjikoto and is well-regarded by the client and the industry."

He says the operation will be highly mechanised and efficient, with equipment including drill rigs, dump trucks, load-haul-dumpers and utility vehicles, as well as shotcreting and ancillary equipment. About 150 employees will be active on the project, including a highly experienced crew from a recent contract in Zambia. Most of those involved will be Namibians, who will be trained as part of a special counterpart training programme to transfer skills to local workers. ■

## DRDGOLD reports 9% increase in gold production for FY2020

In a production update released on August 5, DRDGOLD Limited reports a 9% year-on-year increase in gold production to 5 424 kg (174 385 ounces) for the financial year ended 30 June 2020.

The increase is mainly attributable to a larger contribution from DRDGOLD's Far West Gold Recoveries operation.

The company had earlier provided production guidance of between 175 000 and 190 000 ounces. However, interruptions to its operations as a result of the national lockdown declared by the South African Government in response to the COVID-19 pandemic caused production to come in marginally below the estimated range.

Cash operating costs per kilogram are expected to be in line with the guidance provided of R490 000/kg.

DRDGOLD's cash and cash equivalents as at 30 June 2020 was R1 715,1-million after paying a cash dividend of R213,8-million in June 2020, and the company remains free of bank debt as at 30 June 2020. ■



The increase is mainly attributable to a larger contribution from DRDGOLD's Far West Gold Recoveries operation.

## Tsodilo Resources and TBM enter into royalty agreement

Tsodilo Resources Limited has reached an agreement with TBM (Pty) Ltd. to grant royalties on its wholly owned Botswana subsidiary Gcwihaba (Pty) Ltd. metal licences (base and precious minerals, platinum group metals and rare-earth elements) projects in consideration of the payment of US\$500 000.

The package of assets in the royalty sale includes the grant of a 0,5% Net Smelter Return or Net Mineral Return on Gcwihaba's seven prospecting metal licenses in northwest Botswana. The proceeds from this royalty sale will be used for exploration and general corporate purposes.

James M. Bruchs, chairman and CEO of Tsodilo, comments: "We are extremely pleased to have signed this agreement with TBM. The agreement represents significant potential revenue for the buyer and an attractive source of funding for Tsodilo, allowing us to fund our exploration activities while still giving Tsodilo shareholders full upside exposure to our projects." ■

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## AngloGold Ashanti CEO to step down

Kelvin Dushnisky will step down as Chief Executive Officer of AngloGold Ashanti, effective September 1, 2020. Dushnisky will remain in Toronto to spend time with his family but will be available to assist the group with a smooth handover until February 28, 2021, the company says.

"I would like to thank Kelvin for his role

in advancing our strategy, and wish him the very best for the future," AngloGold Ashanti chairman Siphos Pityana says. "AngloGold Ashanti is well positioned to further improve returns for shareholders, through improved operational performance and our rigorous approach to capital allocation."

Dushnisky leaves AngloGold Ashanti in solid shape, with robust cash flows aiding ongoing debt reduction. The quality of the portfolio continues to improve, with the agreed sale of the South African assets in progress, the Obuasi Redevelopment Project ramping up to full production, the two high-quality Colombia projects progressing through feasibility-study stage, and initiatives to increase reserve life at key assets, progressing well.

"I have enjoyed the challenge of leading AngloGold Ashanti over these past two years, during which time we have made tremendous progress on many fronts, from safety, to effective capital deployment and streamlining the asset base, all while continuing to deliver strong returns," Dushnisky says. "I would like to thank my executive team and employees across the business

for their hard work and dedication, and the board for its support."

The board has announced that Christine Ramon, currently chief financial officer (CFO), has been appointed interim CEO, while the company embarks on a comprehensive recruitment process to find a new CEO to deliver on the group's strategy for enhanced value creation. Ramon will assume the role on September 1, 2020. The recruitment process will be designed to search for the candidate with strong leadership skills and relevant industry experience as well as values which are aligned with AngloGold Ashanti's.

Ramon brings extensive experience and knowledge of the business to the interim role. A chartered accountant, she has been an executive director of AngloGold Ashanti's board and a member of its executive management team for the past six years. Prior to that, Ramon held senior management and executive positions in various companies, including CFO at Sasol from 2006 to 2013 after having served as CEO of Johnnic Holdings. Ian Kramer, currently senior vice president: Group Finance, will assume the role of Interim CFO for the duration of the transition period. ■



Kelvin Dushnisky is leaving his CEO position at AngloGold Ashanti.

## Orion granted Mining Right for Prieska project

Orion Minerals, the ASX and JSE listed mining company, today announced that it has received a notice of the grant of a Mining Right in terms of the Mineral and Petroleum Resources Development Act for the Vardocube extensions of its flagship Prieska Copper-Zinc Project in South Africa's Northern Cape Province.

"We are extremely pleased that the final regulatory hurdle for the development of the Prieska Copper-Zinc Mine has now been fulfilled. Prieska is now positioned to play a major role in the post-COVID economic recovery of the Northern Cape region of South Africa with the development of a world-class base metals mining

operation," says Orion Minerals MD and CEO Errol Smart.

The Vardocube Mining Right covers 27% of the ore included in the updated Bankable Feasibility Study announced on 26 May 2020 and, importantly, also covers highly prospective exploration upside in the near-mine area. It supplements the Prieska Copper Zinc Mine (formerly Repli) Mining Right granted last year, which covers 73% of the bankable mine plan.

The granting of the Mining Right follows the grant of the Environmental Authorisations over both areas and the Water Use Licence granted on 6 August 2020. Together these constitute the key approvals required to operate the Prieska Mine.

"The achievement of this major milestone is testament to the exceptional geological potential and attractive business operating environment that we have found and made our home in the Northern Cape. In less than five years we have been able to locate, acquire, drill out, complete a high-quality Bankable Feasibility Study and fully permit a world-class modern mine, to international best practice standards," says Smart. ■

## Northam acquires additional Zambezi pref shares

Northam has announced the acquisition of an additional 9 635 664 Zambezi preference shares for a total cash consideration of approximately R804,6-million. The latest transaction brings Northam's total holding of Zambezi preference shares to 74 729 551, representing 46,7% of the Zambezi shares in issue.

The face value of the Northam owned prefs as at 17 August 2020, calculated at the initial issue price of the Zambezi preference shares plus accumulated preference share dividends, amounts to approximately R5,96-billion.

Northam's acquisition of Zambezi prefer-

ence shares will reduce the preference share dividend expense and liability included in Northam's consolidated financial statements, as well as Northam's potential financial exposure under the guarantee it provided to holders of Zambezi preference shares, should the guarantee be called upon.

Furthermore, should Zambezi elect to redeem the Zambezi preference shares through a distribution of ordinary shares in Northam held by Zambezi, then the redemption of the Zambezi preference shares held by Northam will result in a distribution of Northam shares to Northam, thereby reducing the number of Northam shares in issue. ■

## Afrimat acquires additional iron ore capacity

Afrimat, a leading open-pit mining company providing industrial minerals, commodities and construction materials, has announced the acquisition of Coza Mining Proprietary Limited (Coza), which adds additional iron ore reserves to Afrimat's commodity segment.

The acquisition includes three mines namely Jenkins, Driehoekspan and Doornpan, adding substantial potential to Afrimat's iron ore and manganese operations in the Northern Cape.

"The high-quality resource, which is located adjacent to our current Demaneng iron ore mine, affords Afrimat additional iron ore sources to extend the 'life of mine', says Afrimat CEO, Andries van Heerden.

He adds that, most importantly and in-line with Afrimat's dedication to diversification, iron ore will now also be sold into the inland market, with a supply agreement in place. "This means that no additional pressure is placed on our current allocation on the Saldanha iron ore rail line, although any additional trains Afrimat is allocated on this line, we will continue to take and fill."

The total purchase consideration is R300-million in cash tranches, dependent on approvals from authorities such as the Department of Mineral Resources and Energy and Water Use License confirmations.

Van Heerden adds that given the proximity to the existing Demaneng operations, leverage opportunities exist. The asset includes a possible manganese resource for further exploration, which is similar to Demaneng and again, synergies through the combination of these resources are possible.

"Further expansion opportunities exist to increase the resource size at Driehoekspan and Doornpan, but this will likely only take place into the future, as it remains the Afrimat operating style, to take over and stabilise oper-

ations before attempting expansion," van Heerden elaborates.

A mining contractor agreement is in place with Coza which allows Afrimat to initiate mining operations during the interim period until all conditions precedent are met, starting at the Jenkins mine. Afrimat conducted a thorough due diligence and is confident that these three mines will add to the commodities segment and the ability to supply the inland market further strengthens diversification within the segment. ■



The acquisition offers additional iron ore reserves to Afrimat's commodity segment.

## Barrick's Mali mines unaffected by political transition

Barrick Gold Corporation maintains that its Loulo-Gounkoto mining complex had not been affected by the political situation in Mali and operations there are continuing as normal.

The complex has an adequate inventory for its foreseeable requirements and management has taken steps to secure its supply lines. The company is monitoring the situation closely in consultation with local stakeholders. ■



### 3D collision warning system for mobile machines



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# Trusted to deliver complex mining capital projects

The mining capital project market continues to shift. With ever growing pressures on capital efficiency and profit margins, there is no room for error. Fluor has many decades of project expertise and experience in the execution and management of large, complex projects in challenging and remote locations. As the company celebrates 60 years in South Africa this year, several flagship projects under its belt are testimony to its capabilities, writes *Munesu Shoko*.



Trevor Anderson, sales director at Fluor.

For the past 60 years of its South African presence, Fluor has enjoyed massive success in the regional Energy and Chemicals markets, as well as the Mining and Metals markets. Commenting on the company's success over the years, Trevor Anderson, sales director at Fluor, tells *Modern Mining* that clients choose Fluor for its comprehensive Engineering, Procurement and Construction (EPC) service capabilities that provide innovative lifecycle solutions, including design, engineering, procurement, construction, start-up, operations and maintenance.

Fluor has over the years completed various projects for Debswana in Botswana.

"Our Mining & Metals clients around the globe rely on our expertise and experience to execute and manage large, complex projects in challenging and remote locations," Anderson says. "We also provide detailed asset lifecycle expertise and execution capabilities."

The company's focus on capital efficiency during feasibility studies and front-end engineering design (FEED) resonates with its clients and has been a key differentiator in the market. Accuracy of project





estimates, says Anderson, is of high importance to Mining & Metals customers, as it offers realistic financial and cash flow planning, critical drivers for financial success in this industry. Understanding construction and commissioning aspects early in the study phase of a project, he says, is also an essential component that contributes to the development of accurate estimates.

“We see this as a three-pronged approach which includes utilisation of our experienced personnel, robust systems and procedures, and innovative tools and systems to drive execution excellence and deliver project certainty,” says Anderson.

With mining offices in Woodmead, Gauteng, South Africa and Gaborone, Botswana, Fluor operates across an array of commodities, including

copper, gold, iron ore, diamonds, nickel, alumina/aluminium, mineral sands, oil sands, uranium, coal and other precious base metals.

### Going underground

High-quality ore bodies that can be accessed via surface mines are depleting, and mines need to go deeper to access the plentiful reserves that are still deep below the ground, notes Anderson.

“We are currently seeing a global demand for new underground mines, as our key clients identify the need to transition from opencast to underground mining as surface reserves are depleting, as well as underground ore reserve replacement of expansion prospects are identified,” explains Anderson.

It is no overstatement to say that underground

Fluor was awarded the engineering, procurement and construction management contract for all the surface infrastructure for the Khoemacau copper and silver starter project in northwest Botswana.

Fluor recently applied its modular approach for the first time in southern Africa at Debswana's Letlhakane Diamond Mine's tailings resource treatment plant.





Morupule Coal Mine expansion project in Botswana.

projects are a highly dynamic environment with many complex interfaces and constraints that require a high level of expertise. Fluor's expertise in complex and challenging underground mining project design, execution and operation positions it well to deliver these projects within time and budget.

Underground mines often come with higher capital costs than surface mines and present unique challenges during project delivery. The projects require a high level of interaction and planning between mining and construction teams. "We believe in working with the client to determine the optimal mine design and solution based on multiple constraints in a fully integrated manner," he says.

In addition, Fluor has the capability to provide studies, engineering, procurement, construction and project management services for associated above-ground process plants and related infrastructure that incorporates seamlessly with underground operations, thus providing an integrated solution.

Another key competitive edge in this area is the company's experience to effectively manage, schedule and control the interfaces between all areas of an underground project through its proven project controls system.

To this end, Fluor has just been awarded an underground mining study project in South Africa. Elsewhere, global underground experience includes involvement in copper, gold and polymetallic projects in Mongolia, Indonesia, Australia and North America.

### More capabilities

Apart from the underground mining services business, Fluor can execute projects of all sizes, mainly Engineering, Procurement and Construction (EPC) / Construction Management (EPCM) services for high-tonnage mining facilities. "We also execute small and early work studies that help us better position for later project phases of execution," says Anderson.

Services include conceptual design of mineral processing facilities; development of bankable feasibility studies; design, procurement, construction and start-up of mineral and metals processing facilities; project management and modularisation.

The company's key differentiators include execution of work in challenging locations; mobilising diverse workforces; developing and utilising innovative tools and systems to deliver project certainty; linking global engineering resources; sourcing material globally; meeting compressed schedules; developing innovative and cost-effective project financing; optimising assets over a facility's lifecycle and managing joint ventures and alliances.

### Flagship projects

Fluor has completed several flagship projects over the years. One of the first projects the company completed in South Africa was Avgold Limited's Target Gold mine processing plant. It was the largest grassroots gold mine to be built in South Africa at the time.

Other major projects include Sasol's Twistedraai coal washing plant, Rio Tinto's Ilmenite mine in

Madagascar and Phalaborwa Copper Mine. “We also completed various projects in Botswana, including the Morupule Coal Mine expansion project and Debswana’s Jwaneng Cut 8 Diamond Mine in 2012,” says Anderson.

More recently, Fluor applied its modular approach for the first time in southern Africa at Debswana’s Letlhakane Diamond Mine’s tailings resource treatment plant.

Elsewhere, the company has just completed two major multi-year projects in Guinea, expanding its presence in bauxite and iron ore in West Africa.

Current projects in Botswana include the engineering, procurement and construction management of Khoemacau’s copper and silver starter project. It is at this project where a safety milestone of 3-million hours worked without a lost-time injury, has been achieved.

“The significant safety achievement can be attributed to the team’s commitment to safe work practices and a zero harm mind-set for everyone to go home safe and healthy every day,” says Anderson. “The milestone was reached over a period of one year with a peak workforce of more than 1 700.”

In 2019, Fluor was awarded the engineering, procurement and construction management contract for all the surface infrastructure for the Khoemacau copper and silver starter project in northwest Botswana. The project is expected to produce an annual average of 62 000 tonnes of copper and 1,9-million ounces of silver with a life of mine in excess of 20 years.

### To the future

The spread of COVID-19, says Anderson, is disrupting lives and operations across industries. The mining and metals industry has not been spared; the entire value chain has been affected as organisations are forced to limit access to offices, mine sites and all manufacturing facilities.

“The whole industry has been plunged into a period of change and uncertainty that requires immediate action. Moving forward, it will be a balancing act as we have to take appropriate steps to prevent the spread of COVID-19 at all operating sites, while gradually opening offices and mining sites to recover, adapt and thrive again,” he says.

Companies and industries, he adds, are being guided by the regulations of the Department of Employment and Labour, the Minerals Council of South Africa, the South African Occupational Health and Safety Act, and the directives and guidelines issued by Government.



One of the major projects for Fluor was Rio Tinto’s Ilmenite mine’s wet plant in Madagascar.

“While Fluor has been progressing on a number of innovation initiatives, the recent unexpected COVID-19 pandemic has highlighted the importance of our focus and intention towards innovation and execution excellence. During 2020, select global Fluor projects have been utilising technology which has enabled remote inspections and surveillance and has offered increased safety as a result of the application of such innovation and technology adoption during these times.”

In conclusion, Anderson says Fluor’s commitment to sustainability includes a pledge to work closely with clients to set up collaborative joint health, safety and environmental teams. “We view sustainability as meeting the needs of clients while conducting business in a socially, economically, ethically and environmentally responsible manner.

“Our local development and training programmes focus on mobilising and integrating client personnel into existing Fluor projects, thus advancing their personal development,” concludes Anderson. ■

## Key takeaways

- ❑ Mining & Metals clients around the globe rely on Fluor’s expertise and experience to execute and manage large, complex projects in challenging and remote locations
- ❑ The company’s focus on capital efficiency during feasibility studies and front-end engineering design resonates with its clients and has been a key differentiator in the market
- ❑ One of the major developments in the company’s offering in recent times was the launch of its underground mining services in Africa
- ❑ Fluor recently reported a new safety milestone of 3-million hours and no lost time injuries in one year at Khoemacau’s copper and silver starter project in Botswana
- ❑ Fluor South Africa (Pty) Ltd is a Level 2 BBBEE Contributor with an equivalent Black Ownership of 54,5% and Black Female Ownership at 24,2%, in terms of the new BBBEE Codes of Good Practice (COGP)

# KX36 gives Botswana Diamonds its maiden resource



James Campbell, MD of Botswana Diamonds.

The acquisition of the KX36 diamond discovery, together with two prospecting licences and a diamond processing plant from Petra Diamonds, affords Botswana Diamonds its first classified diamond resource. The KX36 kimberlite, which MD James Campbell believes to be the most significant diamond discovery in Botswana since Orapa and Jwaneng, not only gives Botswana Diamonds a quick route to possible production, but also adds scale to the junior exploration company's Sunland and Maibwe JV properties in the Kalahari Desert. *By Munesu Shoko.*

**B**otswana Diamonds (BOD) has acquired a kimberlite pipe in the Kalahari, along with two adjacent prospecting licences and a diamond processing plant for a deferred cash payment of US\$300 000 and a 5% royalty on future revenues. The interests are part of a package held by Sekaka Diamonds, Petra's wholly-owned operating subsidiary in Botswana. BOD is acquiring 100% shares of Sekaka, in a cash consideration that is payable on deferred basis, with US\$150 000 payable on August 30, 2020, while the balance is due on or before August 31, 2022.

Speaking to *Modern Mining*, Campbell says the KX36 diamond discovery is "an important step forward" for BOD. "Every junior miner has to grow at some point. You are 'born' when you list on the stock exchange, and then you go through your 'adolescence' as you work through your exploration projects. You hit adulthood with your first classified resource, and as BOD, this is our first resource. We can now

start talking about feasibility and technical studies, with a view to commercial production," he says.

Campbell adds that BOD's goal is to find a project that is commercially attractive, put it into production and start generating revenue, and KX36 gives the company exactly that. "KX36 is a very significant discovery and potentially offers upside potential, as do the two contiguous prospecting licences. We have evaluated options and believe we can add value to the discovery," he says.

"We first looked at KX36 some three years ago. It's a high-grade kimberlite, one of the most significant discoveries since Orapa and Jwaneng. It was discovered after painstaking work by Petra, which just shows that one needs to be more precise to find these kinds of new kimberlite. Because it's in the Kalahari and close to all our other activities in Botswana, there is a huge synergy," he adds.

From a geopolitical perspective, Campbell says Botswana continues to be an exploration

The transaction includes a bulk sampling plant at the KX36 site.



All photos courtesy of Petra Diamonds



destination of choice for BOD. “They call Botswana ‘the Switzerland of Africa’ for a reason: there is security of tenure and a simple mineral taxation regime,” he says, adding that the southern African country also ranks highly in the world in terms of low corruption. “It’s such a great country to do business in.”

### Project significance

Explaining the significance of the transaction, Campbell says there are three important parts to the acquisition. Firstly, he says, is the KX36 project itself. Petra Diamonds, he notes, has done a huge amount of work on the project, and has been able to determine an Indicated Resource of just under 18-million tonnes (Mt) at 35 carats per 100 t (cpht) and an Inferred Resource of 6,7 Mt at 36 cpht.

“To get to that particular point has taken a huge amount of money and effort,” says Campbell. “Additionally, the KX36 project is in the Kalahari of Botswana, where we already have a significant interest through our Maibwe JV and Sunland Minerals properties. The acquisition is synergistic with our existing exploration licences.”

Secondly, says Campbell, the transaction includes a bulk sampling plant, which has crushing and screening, dense media separation and X-Ray recovery on the KX36 site. “The plant is available to us as and when we do more work on the project itself, and also for working on our Maibwe and Sunland projects if need be.”

The third leg to the transaction, he says, is the Sekaka exploration database, which adds to Botswana Diamonds’ extensive database, improving the company’s exploration programme, particularly in the Kalahari Desert where BOD is currently focused.

“The Sekaka exploration database goes back to almost 20 years of exploration data, and is probably the most comprehensive diamond database in Botswana after De Beers. We are sure that when we interrogate it in more detail we will make more discoveries from it,” he says.

“So the transaction is significant in three ways: it is the KX36 itself, the sampling plant and the database. Additionally, we also have three prospecting licences; one of them holds the KX36 and the other two are immediately adjacent to KX36. There may be undiscovered kimberlites in the heavy mineral train of KX36,” says Campbell, adding that you rarely, if ever, find a kimberlite pipe on its own and further exploration may discover more kimberlite pipes in the vicinity.

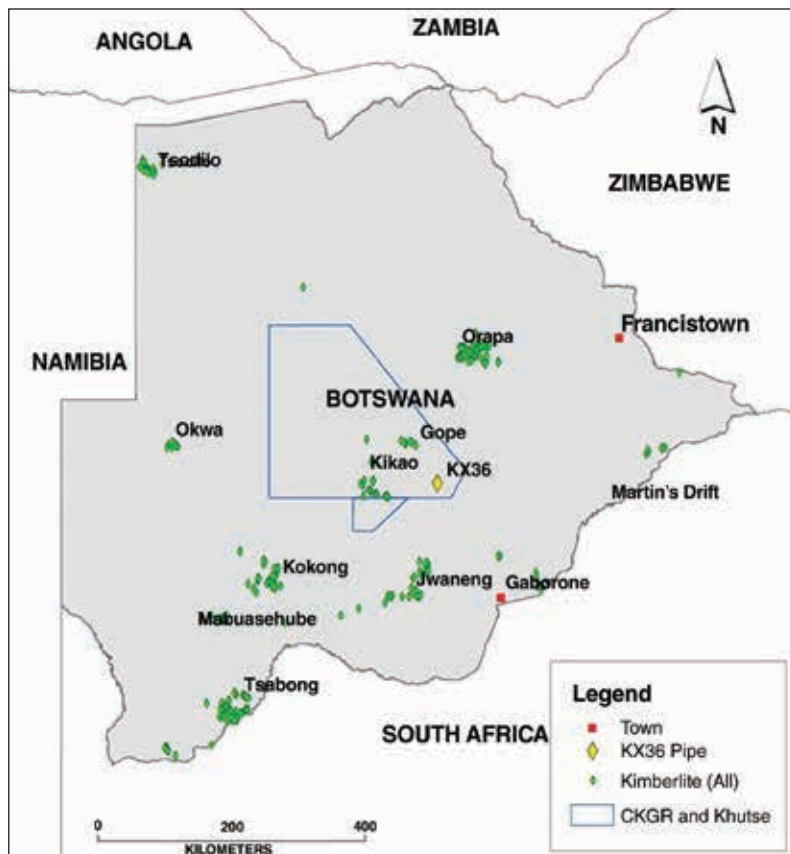
### Work ahead

Campbell notes that Petra has already done a significant amount of drilling – including 24” Large

Petra has already undertaken a significant amount of core drilling at KX36.

Exploration work at the KX36 site.





KX36 locality map.

Diameter Drilling – and processing of a large amount of kimberlite to get to the Indicated and Inferred Resource. Petra has also completed a pre-feasibility study on the project.

Looking ahead, Campbell says the first thing BOD needs to do is to upgrade the desktop study of the project. “We have already done significant work on that and focus will be on two main areas. The first one will be to narrow the resource variables, believed to be between 57 and 76 cpht at a value of between US\$65 and US\$107 per carat. We will take another bulk sample to make this determination,” he says.

The second thing BOD will prioritise is taking a “very hard look at the mining technology”. “There

is no assumption that we are going to employ a standard opencast mining method using the default arrangement. There has been talk of a floating barge and dredging to remove the high sand overburden,” he says.

To give perspective, Campbell cites the AK6 project as an example of the approach BOD will

take with the KX36 project. When he was MD at Botswana Diamonds’ predecessor, African Diamonds plc, AK6 was put under re-evaluation by De Beers and African Diamonds after originally having been discovered in 1969 by De Beers.

African Diamonds was in a joint venture with De Beers on AK6, and there was a difference of opinion on the merits of developing AK6. African Diamonds wanted to go ahead with the construction of a new mine but De Beers was deterred by the cost, which it estimated at US\$380-million, and what it perceived as poor market conditions for the diamonds. “We disagreed and came up with a Value Engineering Study, which indicated a considerably lower capex and a higher diamond value. We also proposed an innovative processing route, including the use of autogenous milling,” he says.

Through further optimisation of the plant and mine design, African Diamonds was able to narrow the cost of delivering the AK6 mine to US\$120-million, a third of the initial cost. While African Diamonds was unable to raise capital to develop the project, the company, however, found an alternative investor in the form of Lucara, which later bought out African Diamonds and proceeded to build a mine – now known as Karowe – based on the technical solution African Diamonds devised. Karowe has since established itself as one of the outstanding mines in the global diamond mining industry, and is particularly renowned for its large gem quality diamonds.

“So that’s the kind of work we want to do at KX36. Focus will be placed on narrowing the resource variables, specifically on the mining side rather than the metallurgical side of things. The other area of focus will be the mining techniques to reduce mining capex and opex,” says Campbell.

## Timelines

The acquisition, notes Campbell, is subject to customary regulatory approvals. BOD will therefore prioritise the completion of the conditions precedent on the agreement itself. “There are three important parts to that. The first one is seeking permission from the Petra bond holders, the second is Section 23 approval from Botswana’s Ministry of Mineral Resources and the third is competition approval in Botswana,” he says.

Once that is done, BOD can press the button on the desktop study which will start immediately after the regulatory approvals around September this year. “I hope that by the end of the year we would have completed that and then we can start planning the bulk sampling,” he says.

“In parallel to that, we would like to continue exploration activities on the other prospecting licences in the area and see if there isn’t another KX36 equivalent lurking in the vicinity. That’s obviously contingent on the COVID-19 pandemic,” he says, adding that in Botswana the state of

LDD drill bits used during drilling at KX36.



emergency will only be lifted around mid-September. "It all depends on how quickly we get through the pandemic and how swiftly we can get back to work."

### JV partnership

In line with its risk-sharing model, BOD may look for a JV partner to further develop the KX36 project. "Our model, as far as possible, is to spread our risk by partnering with people who share the same vision and values as us," he says.

The same model has been adopted across many of BOD's projects. For example, in Botswana, the company initially partnered with Alrosa in its Sunland Minerals subsidiary, which is now 100% owned by BOD. Elsewhere, BOD is part of the Maibwe JV, in which it has a 15% carry through to Bankable Feasibility Study. In Zimbabwe, the company is in partnership with Vast Resources, a local exploration company and in South Africa, BOD holds 40% of Vutomi Mining an active diamond explorer in the country

### Project update

Commenting on the state of the rest of BOD's projects, Campbell says the company has been able to complete the Marsfontein bulk sampling process. BOD collected samples from Marsfontein, located 50 km east of Mokopane in the Limpopo Province of South Africa, just before the COVID-19 lockdown.

"Because we were allowed to travel within provinces during Alert Level 4 of the lockdown in SA, we were able to process the bulk sample at African Diamonds Corporation. The results were what we forecasted. In exploration, things often don't go the way you expect, but in this instance the grade of the dump and the kimberlite were what we expected, which is encouraging," he says.

Once the ban on travel between provinces is lifted, BOD aims to continue its drilling programme at Thorny River project, which is adjacent to Marsfontein. Drilling in early 2020 did not intersect kimberlite. The site locations were selected using the latest, state-of-the-art technology. The data is being analysed and the techniques recalibrated to select the next tranche of drill sites. The targets are kimberlite pipes obscured by dolerite.

In Botswana, BOD's 100% owned Sunland Minerals subsidiary has several active licences. "We had planned further drilling during the winter of this year, but clearly we can't be drilling now due to the COVID-19 situation," he says.

Elsewhere in Botswana, the Maibwe JV, in which BOD holds 15%, has been subject to significant delays due largely to the liquidation of the main partner, BCL, a state-owned copper producer. A new liquidator has been appointed and proposals are circulating, which would eventually lead to the resumption of work on four of the 10 licenses where drilling discovered a kimberlite with

abundant microdiamonds.

"Last year a new liquidator was appointed, and we have been working closely with the liquidator to progress this important project," says Campbell. "We made two offers to buy out the majority partner in Maibwe and are yet to receive any formal response. We, however, hope that we will receive feedback soon from the current liquidator. We are keen to progress this project due to the exceptional microdiamond results in one of the kimberlites drilled. We are cautiously optimistic that there will be some good news in the near future," he says.

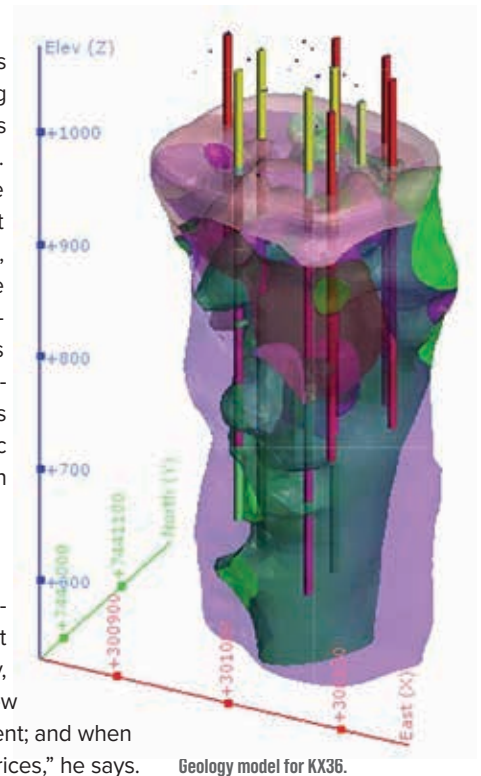
### State of market

Commenting on the state of the diamond market, Campbell agrees that it is in a bad space, but based on history, he is optimistic that it will rebound. "Few diamonds are being sold at the moment; and when they are, they are being sold at low prices," he says. "However, history shows us that the diamond market does get hit badly in times like this, but it also does recover quickly."

Campbell agrees with Mark Cutifani, CEO of Anglo American, who was recently on record saying that the diamond market will sparkle during the fourth quarter after severe COVID-19-related sales disruptions due to the pent-up diamond sales, and diamonds symbolise lasting values and are a long-term storer of value in the current volatile times.

Campbell believes China is a good indicator of the recovery mode of the diamond market, with a major Chinese retailer, Chai Tow Fook, opening up 50 new jewellery stores after the Chinese lockdown.

"Typically, during a downturn things drop quite quickly in the diamond market, but prices actually rise soon afterwards. I have been in this industry for 35 years and these cycles come and go," he concludes. ■



## Key takeaways

- ❑ Botswana Diamonds has acquired a kimberlite pipe in the Kalahari, along with two adjacent prospecting licenses and a diamond processing plant for a cash payment of US\$300 000 and a 5% royalty on future revenues
- ❑ The interests are part of a package held by Sekaka Diamonds, Petra Diamonds' wholly-owned operating subsidiary in Botswana
- ❑ BOD is acquiring 100% shares in Sekaka, in a cash consideration that is payable on deferred basis, with US\$150 000 payable on August 30, 2020, while the balance is due on or before August 31, 2022
- ❑ The KX36, said to be the most significant diamond discovery in Botswana since Orapa and Jwaneng, not only gives Botswana Diamonds a quick route to possible production, but also adds scale to the junior exploration company's Sunland and Maibwe JV properties in the Kalahari Desert

# Discovery of new gold zones boosts resources at Sanankoro

AIM-quoted Cora Gold Limited has discovered two new gold zones on its two permits close to its flagship Sanankoro Gold Project in Mali. The discoveries, CEO Bert Monro tells *Munesu Shoko*, are part of the West African focused gold company's extensive drilling programme this year to test for new zones of potentially near surface economic gold mineralisation in close proximity to the Sanankoro deposits.

**A**s part of its intensive drilling programme to test possible expansion of resources with a view to increasing the life of mine at its Sanankoro Gold Project beyond the currently projected three years, Cora Gold has announced the discovery of two new gold zones in the vicinity of the main Sanankoro deposits.

The new discoveries – two separate 1,5 km gold zones at the Bokoro II and Dako II permits – are results of a targeted drilling programme with the objective to identify new, near surface, oxide gold zones within easy haulage distance of the main

Drilling at Cora Gold's Madina Foulbe permit.



Bert Monro, CEO of Cora Gold.

Sanankoro deposit. The Bokoro II permit borders the Sanankoro to the East, while the Dako II permit lies immediately to the south of Sanankoro.

Speaking to *Modern Mining*, Monro says the company believes that there is a lot of scope to grow the resources on the Sanankoro permit, and having discoveries like these on the neighbouring permits only adds to the already exciting potential.

"The next steps are to tighten up the drilling and also add some deeper holes to test the depth of oxides and see what the available sulphides look like," says Monro, adding that the drilling is widely spaced, at around 320 m fences, which will be reduced down to 80 m on average in time.

## Bokoro II

Cora Gold has finalised a 67-hole (4 818 m) first pass reconnaissance drilling programme at the Bokoro permit which shares a boundary with the Sanankoro permit, and as such forms part of the Sanankoro Gold Project. The reconnaissance programme utilised aircore (AC) drilling on two NNE trending zones, both of about 900 m length that are located 400 m apart along the same structure.

The structure extends to the north across the

permit boundary to link with the southern extension of the Selin structure along which inferred resources have been delineated on the Sanankoro Permit about 1 500 m to the north. The Selin deposit has a current resource of 108 000 ozs Au at 1,8 g/t that has been delineated over about 2 200 m of strike length.

The objective of this reconnaissance exploration at Bokoro was to test for new zones of potentially near surface economic gold mineralisation that might lie within a 5 km radius of the main focus of the Sanankoro deposits.

The reconnaissance AC programme focused on two areas of extensive artisanal mining where shafts, galleries and small pits have historically been exploited to depths believed to be about 10-15 m over zones about 200 m wide, and up to 1 000 m long.

The area is entirely covered by a ferricrete plateau with the extensive artisanal workings believed to mainly target lateral mobilisation of gold beneath the ferricrete cap, likely to have been derived from one or more primary gold bearing structures. The drilling lies along fences orientated NW-SE, set about 160 m apart with the initial objective being to identify the likely primary “feeder” structures to the extensive near surface re-mobilised gold using “heel to toe” drill coverage in the near surface environment. The regular geometry of the programme was locally disrupted due to access around some parts of the workings. No follow up deeper reverse circulation (RC) drilling has yet been undertaken.

A westerly structure was also investigated in areas of additional artisanal mining, where earlier in-house rotary airblast (RAB) drilling indicated the presence of a gold bearing structure. Two drill fences about 320 m apart were completed in each of two broad areas of artisanal mining located about 250 m to the west of the primary area of investigation.

Drill hole lengths are generally between 50 – 80 m, entirely in an oxidised fine to coarse grained sedimentary package, cross cut by steep zones of quartz veining carrying variable amounts of visible gold grains in a manner considered to represent the same style of mineralisation as seen on the adjacent Sanankoro Permit.

The results of the programme confirmed the broad extent of near surface, anomalous levels (0,1 – 0,3 g/t Au) of gold lying immediately below the ferricrete cap in the mottled zone of the heavily weathered saprolite. Importantly, two primary “feeder” gold structures are interpreted from results over some 900 m of strike length in the northern zone and a single structure over some 600 m in the south. Geophysical anomalies derived from a previous ground induced polarisation survey (IP) underlie the primary structures and potentially could link the north and south drilled zones over the undrilled gap of some 400 m.

The newly discovered primary structures appear to correlate well from drill fence to fence, generally



Drilling at Sanankoro in April 2020.

3 – 12 m intercept length, and variable grade, 0,6 – 7,4 g/t Au, which includes a very high-grade intercept of 27,1 g/t Au over 2 m. This variability is not uncommon in the near surface environment. The combination of apparent continuity and potentially economic grade provides encouragement for future programmes.

Each AC sample was panned for visible gold at the rig side, and then either combined into 3 m composite samples or despatched as individual 1 m samples depending on the panning results. Samples were analysed for gold using 50 g fire assay at the SGS laboratory in Bamako, with standard quality assurance/quality control (QAQC) checks using blanks, duplicates and certified reference material inserted on a 5% basis.

In recognition of the variable amount of fine to coarse visible gold seen in panned drill samples, a check assay programme has also been conducted on selected samples using 1 kg screen fire assay at the SGS facility in Bamako, and also using 2 kg cyanide bottle roll at the Bureau Veritas laboratory in Abidjan, Cote D'Ivoire. Although some variation may occur in detail using the various techniques, it is believed that the original fire assay results provide a suitable assay result for the reconnaissance nature of the programme.

“These results are extremely positive given that it is the first time the Bokoro permit has been systematically drilled by Cora, with the programme achieving its objective by successfully delineating a



Drilling at the Bokoro permit in May this year.

1,5 km gold zone that lies close to Selin, one of our existing deposits. With many similar oxide targets remaining within the project area in close proximity to the defined resources, upside oxide potential remains significant, even before considering the future potential for the deeper sulphide mineralisation,” says Monro.

“Cora remains focused on the Sanankoro Gold Project, and with a very positive Scoping Study and a recently signed US\$21-million term sheet with Lionhead Capital to support its future development on completion of a DFS this continues to be a very exciting time for the company.”

### Dako II

Cora Gold completed a 1 264 m (18 drill holes) shallow AC drilling programme on the Dako II permit, with the objective of discovering a new, near surface, oxide

gold zone that could lie within easy haulage distance of the Sanankoro Gold Project. Final assay results, including check assays have now been received and together outline a new discovery that could be incorporated into the Sanankoro Gold Project where the Zone A resource blocks lie about 7,5 km to the north.

The reconnaissance drill programme covered approximately 1 500 m of the southern strike length of the target zone at Dako, where a combination of artisanal workings and historical soil and termite sampling suggesting the potential total length of the zone could extend to over 4 000 m but is yet to be fully drilled.

This first stage drill programme was set on drill fences orientated to the NW with a declination of 55° and with hole lengths of 60 – 80 m. One group of drill fences was spaced about 160 m apart, and others between approximately 400 – 600 m apart. Despite the wide spacing good evidence has been obtained for one or more parallel primary gold bearing structures with potential for more than 1 000 m of strike length. Gold mineralisation was encountered entirely within the oxide zone and remains open at depth and in all directions, in particular to the north towards the existing resources at Zone A.

The host rock is a fine to coarse sedimentary package cut by a linear zone of quartz veins carrying significant visible gold in the weathered / oxide material. The style of mineralisation appears to be very similar to that at Sanankoro.

Each AC sample was panned for visible gold at the rig side, and then either combined into 3 m composite samples or despatched as individual 1 m samples depending on the panning results. Samples were analysed for gold using 50 g fire assay at the SGS laboratory in Bamako, with standard QAQC checks using blanks, duplicates and certified reference material inserted on a 5% basis.

“We are delighted to have made a new discovery at the Dako II permit, only 7,5 km from the Sanankoro Gold Project southerly resources. This discovery adds to the Bokoro II discovery and once again it is exciting to see both good shallow oxide grades and widths of mineralisation. There remain further targets to test in the 7,5 km zone between this discovery and our nearest existing resources at Zone A,” he says.

“In spite of the challenges of COVID-19 over the past five months, we have managed to work safely and effectively and it’s a huge testament to the quality of the Cora exploration team that they continue to deliver as they have. I am extremely grateful for the effort they have put in, delivering excellent results under challenging conditions.”

### ESIA update

Meanwhile, Cora Gold has given an update on the progress made by Digby Wells Environmental on the Environmental and Social Impact Assessment (ESIA) for the Sanankoro Gold Project. The commencement

## Key takeaways

- ❑ First pass shallow reconnaissance drilling at Bokoro II discovered a new 1,5 km gold zone about 1 500 m to the south of the Selin deposit on the adjacent permit to Sanankoro
- ❑ 67 shallow oxide holes – totalling 4 818 m – were drilled to a maximum depth of 80 m with multiple holes ending in mineralisation
- ❑ First pass shallow reconnaissance drilling at Dako II identified a new 1 500 m gold zone approximately 7,5 km to the south of the Zone A resource at Sanankoro
- ❑ The reconnaissance programme covered about 1 500 m of the southern strike length of the target zone at Dako II

of the ESIA was announced on May 4, 2020.

Due to the accelerated strategy for moving the project forward, the company appointed Digby Wells to conduct an ESIA in accordance with the International Finance Corporation Performance Standards for the project. The collection of baseline data and social-economic surveys for the ESIA is ongoing. Final deliverables will include stakeholder engagement process, specialist baseline and impact assessment studies (including biodiversity, water and social studies), an integrated environmental and social management programme, a conceptual closure and rehabilitation plan, a resettlement policy framework and a community development plan.

Cora previously worked with Digby Wells to complete an initial environmental and social screening study in 2019 as part of the project's Scoping Study. The Scoping Study showed Sanankoro's potential to be a highly profitable standalone oxide mine, delivering a high internal rate of return and short capex payback period. Through the ESIA process, the baseline environment will be further scrutinised and potential environmental and socio-economic impacts associated with the project will be established and quantified. This will be used to inform a comprehensive and meaningful management programme in consultation with the host communities. The company remains focused on resource growth and then the delivery of the Definitive Feasibility Study before the end of 2021.

"I am delighted to report that the Digby Wells team has picked up where they left off with the Scoping Study. We appointed them a little over three months ago and in challenging conditions their team has been actively carrying out, with the support of the Cora field team, a number of parallel monitoring programmes and community surveys. The ESIA is a critically important part of developing a mining



project so it's pleasing that we are making good progress so quickly.

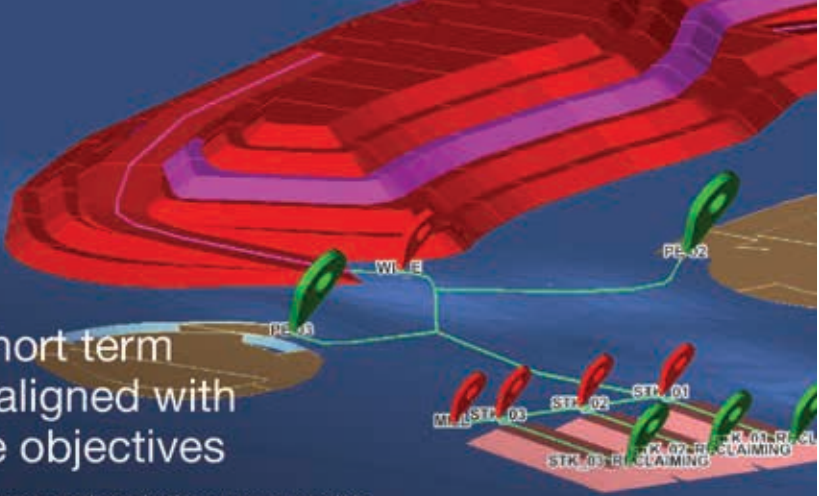
"The ESIA is expected to be completed in the middle of 2021 aligning it with our plans to move Sanankoro towards development as quickly as possible," concludes Monro. ■

Dust monitoring kit for the Environmental and Social Impact Assessment for the Sanankoro Gold Project.



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# Record plant throughput for Khanye Colliery

Canyon Coal's Khanye Colliery has achieved a major production milestone. The operation processed 204 480 tonnes in June, the highest ever processing plant throughput since the commencement of operations in January 2018. This, group project manager at Menar Clifford Hallatt tells *Munesu Shoko*, is indicative of the throughput ramp-up process, which has been gradual to date.

**D**espite the tough operational conditions imposed by the COVID-19 pandemic, Khanye Colliery posted its record plant throughput in June this year. The monthly processing plant throughput of 204 480 tonnes (t) surpassed the previous highest throughput achieved in May 2020, where the plant washed 186 342 t. This is part of the throughput ramp-up process, following the commissioning of the 400 tph large coal dense medium separator (Larcodems) plant at the start of 2019.

Commenting on the achievement in the face of the tough operating climate perpetrated by the COVID-19 pandemic, Hallatt tells *Modern Mining* that the experience and dedication of the on-site management team ensured that downtime and production losses were kept to a minimum.

"In addition, the mine received exemption from the Department of Minerals & Energy shortly after



Clifford Hallatt, group project manager at Menar.

the announcement of the national lockdown. This aided in minimising the effects of the pandemic on production," says Hallatt.

In terms of its health and safety protocols, Hallatt says the company was quick to draft a comprehensive policy in response to the COVID-19 pandemic. "Standard Operating Procedures were designed to execute the policy. It was communicated to all staff who fully cooperated," he says.

The newly built 400 tph Larcodems plant was commissioned at the start of 2019.



“Employees were trained on COVID-19 response protocols, including screening during working hours, and they are complying. Non-compliance constitutes a work place offence. The company also provides all employees with masks and sanitisers. We monitor the situation on a daily basis. We encourage transparency and accountability at all times,” he explains.

Hallatt is proud of the fact that Canyon Coal has been able to keep its opencast mines fully operational, notwithstanding the economic shocks associated with the pandemic.

### Flagship operation

Khanye Colliery is Canyon Coal’s flagship mine located in Bronkhorstspuit, Gauteng, South Africa. The mine is situated on the Wachtenbietjeskop 506 JR farm, approximately 10 km east of the town of Bronkhorstspuit.

The mine falls within the Magisterial District of Tshwane. Geologically the area is located within isolated sedimentary basins on the north-western border of the Witbank Coalfield.

Khanye commenced mining in January 2018 and is an open-pit, truck and shovel operation. The remaining Life of Mine (LoM) is 14 years at an annual Run of Mine (ROM) production target of 2,4-million tonnes per annum (Mtpa).

The mine has two processing plants, a smaller interim 110 tph DMS processing plant, and the newly built 400 tph Larcodems plant commissioned at the start of 2019. The coal is processed to the required standards, predominantly for the export market and some essential services clients domestically.

Canyon acquired the Khanye project in 2013 from a private party but it was only in December 2017 that the first boxcut was established. The mine produced its first coal for the export market in May 2018 with the ROM product being washed in a 110 tph interim DMS processing plant, which remains in use.

The permanent plant, commissioned early last year, utilises a large coal dense medium separator, with provision having been made in the plant design for a second unit to be added at a later stage. This technology was originally developed by the National Coal Board in the UK and is now well established in South Africa, having been installed at a number of coal mines. In essence, it replaces the more conventional drum and cyclone arrangement and can handle a single feed from 2 mm to 100 mm. It is particularly well suited to coal, which is slightly more brittle than usual – which is the case at Khanye.

The product destined to the export market is transported to the Bronkhorstspuit siding with road haul trucks and loaded onto trains for export via predominantly Richards Bay Coal Terminal. Initially, the product from Khanye was railed from



the Forfar siding located about 26 km from the mine but Canyon Coal invested in the upgrade of the Bronkhorstspuit siding, just 8 km from the mine, which was commissioned in mid-2019.

### View on tech

COVID-19 has forced businesses to re-think and do things differently. For the mining industry, many believe that the pandemic reinforces the business case for mines to embrace intelligent mining

Canyon Coal recently procured a Collision Avoidance System developed by Minetec Smart Mining. After rigorous testing, the system was installed on earthmoving equipment at Khanye.

The coal is processed to the required standards, predominantly for the export market and some essential services clients domestically.



## Key takeaways

- ❑ Canyon Coal’s Khanye Colliery achieved its record plant throughput of 204 480 tonnes in June this year
- ❑ The previous record was 186 342 tonnes, which was achieved in May 2020
- ❑ This is indicative of the throughput ramp-up, which has been a gradual process to date
- ❑ Canyon Coal has been able to keep its opencast mines fully operational, notwithstanding the economic shocks associated with the pandemic



The mine received exemption from the Department of Minerals & Energy shortly after the announcement of the national lockdown.

through investments in technology modernisation.

Hallatt is of the view that the required technologies and supporting guidelines are still at an infancy stage, especially in South Africa. If this technology was readily in place, he says, the impact of COVID-19 on the mining industry would not have been as severe as it has been globally in recent months.

“We use technology optimally to improve safety and comply with the Department of Minerals and Energy’s safety protocols. For example, we recently

procured a Collision Avoidance System (CAS) developed by Minetec Smart Mining, a technology company. The CAS is used in mining machines. After rigorous testing, the system was installed on our earthmoving equipment at Khanye,” he says.

The collision avoidance system prevents accidents by providing machine operators with early audio and visual warnings, when in close proximity to another machine or structure.

Key features of CAS include the ability to observe, detect and issue warnings to machine operators and sending notifications to field managers as well as control centres of existing problems. CAS provides substantial enhancement of the level of a driver’s awareness through its predictive detection system.

The installation follows Canyon Coal’s two years of seeking for a reliable and cost-effective CAS to get the most compatible system for its requirements. The Minetec System met Canyon Coal’s strict safety requirements following an extensive trialling period.

“A great deal of research & development is still required to see a transformation in the mining industry and the conventional mining methods being applied,” concludes Hallatt. ■



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# Water management at mines – every drop counts

Water plays an essential role in most mining and extractive processes, and responsible water management is a critical business case for the mining sector at large. Managing mine impacted water often requires water treatment, but there is no one-size-fits-all approach when it comes to the design of water treatment plants, thus mines need to select a site-appropriate water treatment technology that meets their project specific needs. To this end, Multotec offers integrated fit-for-purpose water treatment systems that consider overall requirements of the site. *By Munesu Shoko.*



Vincent Ridgard, process engineer, Multotec.

One of the greatest challenges facing mining operations is the development and management of water resources. It is important that every operation prioritises the most efficient control and management of valuable water resources to maximise the efficient use and reuse of every drop of water that is involved with a mine site operation. This also minimises the long-term environmental liabilities that could result from the mismanagement of water resources.

Reiterating the effect of mining practices on surrounding communities and the environment, Vincent Ridgard, process engineer at Multotec, quotes James Lyon, who, in an interview with the Mineral Policy Centre, said, “Water has been called mining’s most common casualty”.

According to Ridgard, mining affects fresh water

through heavy use in processing ore, through pollution from discharged mine effluent and seepage from tailings and waste rock impoundments, commonly known as acid mine drainage (AMD).

He is of the view that water pollution from mine waste rock and tailings may need to be managed for decades, if not centuries, after closure, as the water sources continue to naturally produce sulphuric acid when sulphides in rocks are exposed to air and water. This results in oxidation and acidification processes, which continue to leach trace metals from the exposed rock face, and are discharged into the environment.

“Furthermore, chemicals used in leaching or flotation process, such as cyanide or sulphuric acid, enter the process water that is being recirculated within an operation, and some of these solvents remain in

that water and, as it migrates, the toxic solvents are carried into the agricultural soils and into the water source of downstream communities,” explains Ridgard.

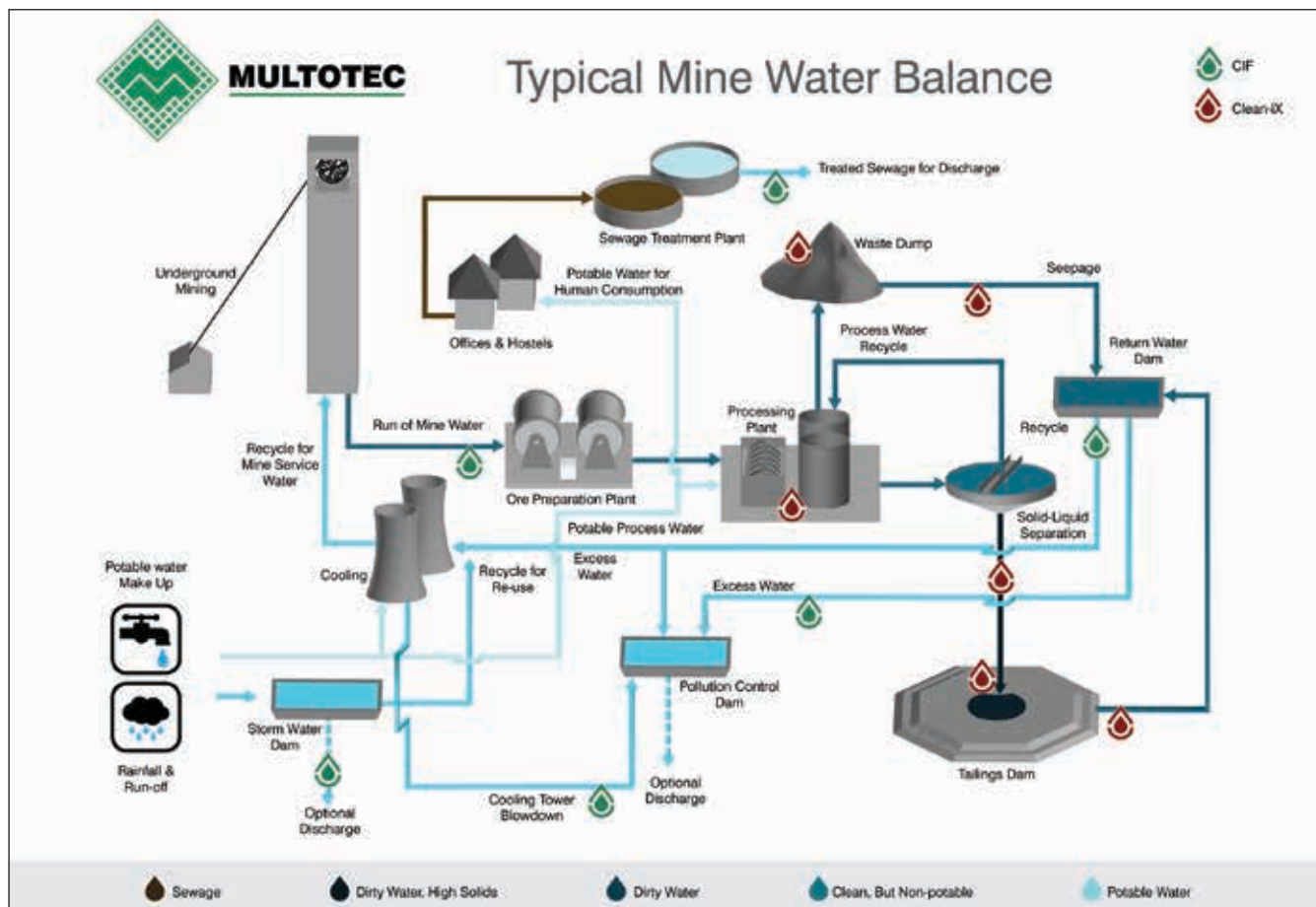
## Significance of water in mining

Water, according to Ridgard, is arguably the second most valuable asset on a mine after the ore body itself. Strangely enough, he reasons, it is more often considered an “afterthought” for many design houses and mine owners.

Mining uses water for mineral processing, including comminution practices, classification by screening and hydrocyclones, dust suppression, slurry transport and employees’ needs, among others.

The arsenic sludge from the HDS is dewatered by filter press while the solid cake is disposed of.





It is also used in some underground operations for hydro-powered equipment.

"Mining operations, commonly seek water from groundwater, rivers and lakes, or through municipal water service suppliers. It plays an essential role in most mining and extractive processes, and today, responsible water use is a critical business issue for the mining sector as a whole," adds Ridgard.

"Maintaining a constant water balance on your site is critical for both mining and mineral processing. For underground mining, you constantly need to dewater your shaft to allow for mining practices to continue. This water could now be contaminated by naturally leached components such as arsenic, and first needs to be treated before it can be discharged to the environment to maintain a water balance," he says.

On the surface, the water needs of the processing plant must be balanced with what is now in the tailings facility. Any excess water needs to be treated and discharged from the tailings facility to maintain the water balance. Overcapacity can be catastrophic, with dam failures inevitable, explains Ridgard.

### Effect of contaminants in process water

Water quality can have a detrimental effect on process efficiency and recovery, but it is often the last place that mine operators look when experiencing a drop in recovery. Water hardness (high concentration of  $\text{CaCO}_3$  and  $\text{MgCO}_3$ ) in process waters can

cause scaling of pipelines, which results in reduced throughput.

"Furthermore, it has been proven that contaminated waters can have a significant effect in recovery efficiency of hydrometallurgical processes. Compared to uncontaminated fresh water, lower recovery of target metals can be attributed to the presence of various metal ions in the process water," explains Ridgard.

For gold operations, for example, the gangue minerals are insoluble in cyanide solution. Some metallic minerals, however, are soluble and deprive the solution of its oxygen and cyanide.

Maintaining a constant water balance on your site is critical for both mining and processing.

Multotec has partnered with Australian based Clean TeQ Water to provide the African mining market with a continuous counter current ion exchange technology.





Multotec offers fit-for-purpose, niche technologies specifically suited to the treatment of divalent and trivalent containing mining waters.

“Utilising completely clean water, however, does have its disadvantages in that residual reagents which carry over back into the process have been removed, and your operational cost increases to supplement this. Thus, it is critical to implement a fit-for-purpose water treatment system which removes target contaminants while allowing other elements to make up the necessary process water composition,” adds Ridgard.

### High recovery water treatment systems

The cost of effluent treatment is significant, hence a high recovery system is essential. One of the common ways of treating effluent water is Reverse Osmosis (RO). RO was initially designed for sea water desalination to remove monovalent salt molecules (NaCl). Due to its success in this application, it has since been introduced to other sectors such as industrial and mining.

“The problem is that sources of wastewaters also include a wide variety of other elements, such as divalent and trivalent elements which cause scaling of membranes. This means that when a standalone RO plant is utilised to treat these waters, it is operated at lower recoveries to enhance the lifespan of the membranes. It results in large volumes of highly concentrated brine streams, which are either recirculated within the system or require very expensive effluent treatment systems,” says Ridgard.

Multotec offers fit-for-purpose, niche technologies specifically suited to the treatment of divalent and trivalent containing mining waters. To this end, the company has partnered with Australian based Clean TeQ Water to provide the African mining market with a continuous counter current ion exchange technology.

“The resin used in these systems is specifically manufactured to be more selective to the extraction of larger molecules and as a result provides the mining industry with a high recovery (>90%) system to provide fit-for-purpose process waters to be utilised within the water balance or discharged safely to the environment,” explains Ridgard.

The utilisation of resin-based chemistry for the removal of target species has long been understood and respected globally in the industry, he says. It offers the selective extraction of contaminants by the exchanging of ionic functional groups, engineered on the resin beads, for target elements in the surrounding solution of like charge. The problem, however, has always been that there has not been a suitable technology to effectively facilitate the enormous advantages provided by the resin chemistry.

“The Continuous Counter Current Ion Exchange technology, engineered by Clean TeQ and supplied to the African market by Multotec Process Equipment, is a game-changing, moving bed technology,” he says.

Contrary to the conventional fixed-bed systems, the use of resin transfer mechanisms allows the CIF (Continuous Ionic Filtration) to:

- ❑ handle up to 150 ppm of solids (conventional systems need a 100% clean liquor), hence offering simultaneous removal of TSS (total suspended solids) and TDS (total dissolved solids);
- ❑ offer optimised resin inventory (resin is the most expensive part of the plant and hence it is critical to ensure the longevity is maximised and the volume is minimised);
- ❑ provide very high water recoveries;
- ❑ handle in column precipitation;
- ❑ offer low power consumption (given the limited power availability on isolated mine sites in Africa, this is another major advantage); and
- ❑ produce valuable by-products and/or trace metal recovery.

### Fit-for-purpose treatment systems

When designing its plants, Multotec considers the overall requirements of the site before building a complete fit-for-purpose solution based on the various effluent feed streams and the desired product water quality. “There is no one-size-fits-all approach when it comes to the design of these plants,” says Ridgard.

If a certain quality of process water is required, then a system which produces the required qualities is specifically engineered, to treat specific elements which could potentially affect the overall process efficiency – such a system could potentially comprise of a combined HDS (High Density Sludge) and Continuous Counter Current IX system. If environmentally compliant dischargeable water is required, then a simple HDS system is perhaps the ideal solution.

“Even if the end goal is to change mine service water to potable drinking water, we design a high recovery system to meet these needs – this could potentially consist of an HDS, Continuous Counter Current IX and RO system,” explains Ridgard.

Depending on the customer’s ultimate water quality requirements, Continuous Counter Current IX

is combined and fully integrated with RO to produce a high-recovery or Zero-Liquid-Discharge (ZLD) solution.

“Remember that RO was designed to remove monovalent ions, while IX is more selective to larger divalent and trivalent ions. Hence, by combining the two technologies and allowing the IX to firstly remove the elements which scale up the RO membranes, you allow the RO plant to do what it was designed to do, which is to remove monovalent salts at significantly higher recoveries. Furthermore, we can potentially provide a ZLD system by recirculating the concentrated sodium brine stream to regenerate the resin in the ion exchange plant.”

### Proving capabilities

In one of the flagship Minimum Liquid Discharge (MLD) systems, Multotec designed and supplied a complete system to a mining operation that is extremely sensitive to water usage and waste production in the desert of the Middle East. For this plant, Multotec needed to consider four respective brine streams that were all significantly different in nature.

“As such we designed a plant comprising an HDS system for the specific removal of arsenic and antimony, although only two of the effluent streams needed to feed to this specific area,” he says. “The product water feeds the dual Continuous Counter Current IX system (known as DeSALx), which removes the scaling components, calcium, magnesium and sulphates among other components from the water stream.”

The softened stream is combined with two other effluent streams before being sent to an RO plant to produce potable water quality at >90% recovery.

The only effluent streams that are produced is the gypsum by product from the IX, which was incorporated in the onsite gypsum plant for profit and the minimal concentrated brine stream sent to an evaporation dam. The arsenic sludge from the HDS is dewatered by filter press while the solid cake is disposed of.

### Recovering residual precious metals

Water treatment is often considered a so-called “sin tax”, as it comes at a relatively significant capital cost without any clear and obvious advantages to the mine owner.

One of the major advantages of utilising ion exchange for the treatment of effluent and/or tailings streams, reasons Ridgard, is that in addition to being environmentally compliant, potentially increasing recoveries and reducing reagent consumption by providing a fit-for-purpose process water, ion exchange offers the possibility of recovering residual trace metals, which would have otherwise been lost to the mine owner.

“Mining operations spend millions of dollars to liberate and recover their target elements, but despite



their best efforts, 100% recovery of these elements is simply not possible and large percentages end up in the tailings dams or is lost to the environment,” says Ridgard.

“What the Clean-IX Continuous Counter Current Ion Exchange technology offers is the opportunity to recover what is lost from the processing plant and potentially provide an economic benefit which significantly offsets the cost of the water treatment plant. Depending on the concentration of the valuable metal and the total flowrate that is being treated, a complete payback within a matter of months could be possible,” concludes Ridgard. ■

The cost of effluent treatment is significant, hence a high recovery system is essential.

## Key takeaways

- ❑ One of the greatest challenges facing mining operations is the development and management of water resources
- ❑ Water is arguably the second most valuable asset on a mine after the ore body itself
- ❑ Multotec offers fit-for-purpose, niche technologies specifically suited to the treatment of divalent and trivalent containing mining waters
- ❑ Multotec has partnered with Australian based Clean TeQ Water to provide the African mining market with a continuous counter current ion exchange technology
- ❑ Multotec provides the mining industry with a high recovery (>90%) system to provide fit-for-purpose process waters to be utilised within the water balance or discharged safely to the environment

# Setting the trend for women in

The mining industry faces a gender diversity challenge, largely stemming from the sociocultural barriers centred on common prejudice, perceptions and implicit stereotyped notions on gender roles in the sector. Despite the gendered organisational nature of mine work, which affects effective participation of women in mine jobs, three women at AECI Mining – Meagan van den Berg, Sarah Leshabane, Linda Kretschmer – are setting the trend with their vigour to challenge the status quo and succeed in a male-dominated environment, writes *Munesu Shoko*.

**T**here is no better time to cast the spotlight on women's success stories in the mining industry than in August – the Women's Month in South Africa. Gender equality has over the years gained prominence in various socio-political and corporate discourses worldwide. Pressure has and is still mounting from the populace over increasing levels of gender disparities in male dominated industries, and one that quickly comes to mind is the mining sector, where women remain a minority.

Despite the focus on diversity and inclusion in the past two decades, women continue to be vastly under-represented at all levels in the mining sector. According to Bloomberg, the proportion of women employed by mining companies globally sat at around 15,7% in 2019, up only 1% in the previous five years – and the numbers are worse at management level. Just one in 20 global firms is headed by a woman. In South Africa, women represent only 13% of the mining labour force, according to the Minerals Council South Africa.

Meagan van den Berg was the first female mining engineer and regional manager at AECI Mining.



## Positive attitude to change

In an environment that's constantly being disrupted, the mining industry needs leaders who foster a positive attitude to change. When change is the only constant, the key to success is transformational leadership – a style that empowers and helps teams to build a sense of community and trust. One company that is putting emphasis on this leadership style to accelerate the strategic imperative to have more women in leadership positions is AECI Mining.

A case in point is the recent appointment of Meagan van den Berg to the company's executive committee. Although not the first female, she is the first female mining engineer to be appointed to the AECI Mining Group Executive Committee, and continues to break boundaries in a male-dominated industry.

In her new role, she is responsible for the company's Southern African business portfolio, which includes South Africa and the neighbouring countries – Zimbabwe, Namibia and Botswana and Mozambique. Her core function in this role is to develop and execute regional strategies in line with group's goals to foster sustainability and growth within these specific markets.

The role, explains van den Berg, provides the link between front-end teams and back office support functions to drive the greater AECI Mining goals, policies and strategic intent within these regions. "A critical function of the role is to unlock and grow value for our employees, shareholders and customers by delivering quality products and services to the mining industry," she says.

A dedicated individual with the discipline to become better at everything she does, van den Berg's appointment coincides with South Africa's celebration of women's month. Although a mining engineer by formal qualification, a final year project sparked her interest in drill and blast and the pursuit of a career within the explosives industry.

# mining

## Breaking boundaries

Van den Berg has over the years broken boundaries with several leadership roles, demonstrating that there are no limits to what women can accomplish in mining-related sectors, where the advancement of women has traditionally been limited.

Born and bred in the Eastern Cape, van den Berg matriculated from Port Rex Technical High School in 2003. She was one of the few students awarded a bursary by the De Beers Group to study for a Bsc in Mining Engineering at the University of the Witwatersrand and went on to graduate in 2008.

She started her working career with Detnet in 2009, a joint venture between AECI Mining and Dyno Nobel that specialises in the development and manufacture of electronic blasting systems as a conversions engineer. The purpose of this role was to provide product support on bench at operations, converting from NONEL to EDD (Electronic Delay Detonator) blasting systems.

In 2011, she completed the AEL Explosive Engineer program, before being appointed to the role of mining engineer, AEL Mining Optimisation. In this role, she provided technical consultation and support to the AEL business globally. "The role afforded me the opportunity to travel both locally and abroad to gain experience across multiple mining applications," says van den Berg.

In 2013, she was appointed AECI Mining Explosives' regional manager for Underground Mining, a role that saw her switch from technical to business management, overseeing the underground segment in the North West. To sharpen her management skills, van den Berg graduated with an MBA from the Gordon Institute of Business Science in 2014.

In 2017, she was appointed divisional executive for both underground and surface operations within South Africa, a role she held until her recent appointment as Chairperson AECI Namibia, Zimbabwe and Botswana, while serving as divisional executive in South Africa.

"A highlight of my career is that I was the first female mining engineer and regional manager in the company, a feat I hope encouraged other ladies within the organisation to be ambitious and apply for positions historically occupied exclusively by our male counterparts," she says.



Commenting on how women can break barriers in historically male dominated spheres, van den Berg says one needs to equip themselves with a solid foundation through education and be willing to do the hard yards by gaining experience, moving through various positions and deployments within an organisation.

She also believes that self-confidence, believing in your own capabilities, is of utmost significance. Rightly so, if you are confident, people believe you – confidence is attractive, brings success, helps to connect well with others and you generally feel happier. "One should also have a belief in equality – gender does not make you any more or less competent, deserving or able to fulfil a given role," she says.

Respect for the industry, its legacy and the people in it is also essential, she says. "It also takes a touch of bravery, exposing yourself to potential scepticism, which often comes with being in a minority," she says, adding that "remain true to yourself and the values and beliefs for which you stand."

Van den Berg hopes to use her position to inspire other women to embark on a career in engineering, to be a role model through actions and to contribute to achieving equality within the workplace.

"The senior leadership of an organisation has the opportunity and the very important responsibility to help shape corporate policies and practices that address complex issues around gender disparity in the workplace. I intend on using my own experience and learning to help foster these discussions and seek ways in which to break down some of the barriers which make it difficult for women to participate in the industry," she says.

True equality, she says, is when men and women

Despite the focus on diversity and inclusion in the past two decades, women continue to be vastly under-represented at all levels in the mining sector.



Sarah Leshabane, AECI Mining Explosives' site manager at Venetia Mine.

In South Africa, women represent only 13% of the mining labour force, according to the Minerals Council South Africa.

of any race or culture can be considered for roles that were previously earmarked for a certain group of people. "I hope to do my bit in making this industry attractive and accessible to men and women alike," adds van den Berg.

### Leading the women's revolution

Another woman who is leading the women's revolution in the mining sector is Sarah Leshabane, AECI Mining Explosives' site manager at Venetia Mine, who continues to prove that no barrier can be too high for women to carve their

own path in the mining environment.

Upon completing her matric, studying mining engineering at Wits University was both an opportunity and a challenge, given the status quo and stigma around the mining industry being a male-dominated environment. Being the only daughter in a family of three, however, was sort of a great preparation for the challenge.

After graduating with her BSc in Engineering, she still had her fears to enter a traditionally man-driven industry, but her vivacity to challenge the status quo

was incentive enough to take the challenge on.

"I am a natural go-for-it type of person who believes that nothing set before me is impossible. I have been in the industry for 10 years, moving from being a mere graduate miner to obtaining my Mine Manager's Certificate. I have spent the past few years of my career as a shift supervisor and mine overseer," she says.

Leshabane has been with AECI Mining Explosives for a year and some two months – a company that has been at the forefront of the change regime in this sector to bring inclusivity, defeminisation of the workplace, and working towards achieving organisational modernisation, competitiveness and an assurance for non-gender driven, innovative mining.

Her role as site manager entails overseeing the whole operation, ensuring that all the appropriate standards, systems and procedures are implemented in line with customer requirements.

For Leshabane, entering an industry such as mining as a young female comes not only as a great opportunity, but also presents its set of hurdles. "Accepting that this is the state of play is the first step in overcoming the hurdles," she says. "The majority of what the industry stands for promotes patriarchal stigmas and nuances. However, coexisting with these isn't as impossible as it has always been thought to be."

Yes, she has had to work extra hard to be afforded

the same privileges and honours as her male counterparts, but Leshabane believes that's the beauty of it all – it is a challenge for one's person, not just the intellectual ability, but the emotional aspect as well.

"Women are said to have great emotional instincts. This can be a curse to some, but can be also used as a powerful tool to pave one's way in an industry where the femininity is associated with mediocrity. In fact, being told 'I can't do it' is what motivates me to keep going," she says.

Commenting on some of the challenges women face in the industry, Leshabane says the greatest tragedy that could befall a young woman deciding to enter a male-dominated industry is lack of self-worth and identity.

"This can, and almost always, is defined by subtle utterances and 'jokes' about the inadvertent failure that she faces. The trick that has always worked for me is



to realise first that there is no need to turn into 'one of the guys' in order to achieve what I have set out to achieve," she says.

"Entering a male-dominated industry," declares Leshabane, "is not about losing the essence of what makes me a woman, but rather, embracing the differences between us, using my strengths to make up for what I don't have – the masculinity, maybe. It has to be about recognising that my male counterparts make it because they stand true to the 'bro code', supporting each other and pulling each other through."

For Leshabane, where her male counterparts lack self-sufficiency, "I, as a woman, excel. In an industry where one, in most cases, will not have a few other females around the boardroom table, the sheer essence of being a female around a group of male counterparts is what makes me thrive."

Looking ahead, Leshabane wants to move up the corporate ladder. "I am aiming to be one day part of the Executive Team of AECI Mining, and phenomenal women like Meagan van den Berg are indeed laying the petals for us to walk proudly on," she says. To achieve this, Leshabane is planning to study for MBA and CFA qualifications.

Her message to other women out there: "Pursuing a role/career in mining or anything else really, demands you to work only to impress yourself and satisfy YOUR desire to succeed. You are strong. You are capable," she says.

In conclusion, Leshabane says: "Embrace your weaknesses and identify what you are good at and make it count. Conquer your fears and move right on. Nothing that anyone says to you or about you is definite. A good friend of mine has always told me about 'performing for the audience of one'. Be your own audience. Set the bar high and once you have reached the heights you have set for yourself, everyone else will have no choice but to acknowledge. It all starts with you!"

### Challenging the status quo

Another woman who has successfully challenged the status quo of "not being taken so seriously" in the mining environment is AECI Mining's senior technical officer, Linda Kretschmer, who, in her current role, spends a large amount of her working time at the mine face.

Kretschmer started working in the mining industry in 2007, and over the years she has had the opportunity to work across commodities, including gold, diamond, platinum and now coal, in surface operations. She also previously spent significant time of her working career in the quarrying industry.

In her own words, "This career path sort of just happened. I started out as a site administrator with a mobile crushing company based in Port Elizabeth. From there, my path took me to a drill and blast company and that opened even more doors, finally

leading to AECI Mining. I have always enjoyed open spaces and the outdoors, and this line of work gives me exactly that," she says.

While Kretschmer enjoys her current field work, she is not resting on her laurels – she is aiming even higher. "I wish to advance up the corporate ladder," she says. To further advance in her career path, she finds satisfaction in learning. "I want to learn and earn. In my mind, I have a career path mapped out."

The wheels of learning have already been put in motion. Having obtained her blasting ticket in 2013, Kretschmer is currently studying for an Explosive Management qualification with the University of South Africa.

Having joined AECI Mining in April 2017, she is currently a senior technical officer, and spends most of her time on site. "I manage the 'A team' and I am responsible for the day to day operational issues," she says.

Commenting on the challenges women face in the mining industry, Kretschmer says one of the biggest hurdles is not being taken seriously. "I also find that 'guys' want to deal with 'guys', they want to speak to the 'man' in charge," she says.

There has always been a traditional perception in the mining environment that men are able to endure difficult tasks, perform heavy duties and handle heavy machinery better than their women counterparts. And since mine jobs are highly male skewed, the expectation that males are better miners is strongly and widely upheld in a section of the South African mining sector.

Rather than taking offence, Kretschmer has always chosen to see the 'fun' side of these gender stereotypes that are consistent in associating mine jobs to macho-masculinity.

"I have found out that the best way to deal with this is to just do what you want to do and do it really well. Just keep at it, and keep going. Keep smiling and never lose yourself," she says.

For women out there contemplating to take up a role in the mining industry, Kretschmer says the starting point is to find a mentor and take guidance from them. "Like with any other industry, not just mining, there are 'sharks in the water', and to navigate such an environment, you need help," she says.

She concludes: "Be true to yourself, if nothing else, you will always have your integrity. Have respect for yourself. If you don't respect yourself, how do you expect others to? Most importantly, SMILE, this is a journey, not the end, so enjoy it!" ■



Linda Kretschmer, senior technical officer at AECI.

# Preventing accumulation in mining hoppers and chutes

Efficient material flow is a critical element of wet mining processes such as stoping, hydraulic mining and wet dredging. Accumulation or blockages in storage systems and build-up in process vessels can impede material movement, causing bottlenecks that interfere with equipment performance, reduce process efficiency and put a choke hold on an operation's profitability. Poor material flow also raises maintenance expenses, diverting manpower from core activities and in some cases introducing safety risks for personnel.

**"M**ost systems suffer from some amount of accumulation on vessel walls, which can rob plant owners of the storage systems in which they've invested," observes Brad Pronschinske, global director of Air Cannons Business Group for Martin Engineering. "These build-ups reduce material flow, decreasing the 'live' capacity of the vessel and the efficiency of the bulk handling system overall." Pronschinske says the accumulations tend to take one of several forms: arches, plugs, build-ups or "rat holes".

"If they become severe enough, flow problems can bring production to a complete stop," Pronschinske adds. Although many plants still use manual techniques to remove build-up, the cost of labour and periodic shutdowns has led some producers to investigate more effective methods for dealing with this common production issue.

Industrial vibrators for bin and chute applications can reduce or even eliminate the need for cleaning.



Safe, effective cleaning requires tools that work inside the silo from the top, controlled by personnel outside.

## Build-up vs throughput

Even well-designed processes can experience accumulations, which have a significant impact on output and profitability. Changes in process conditions, raw materials or weather can all have an effect on material flow, and even small amounts of accumulation can grow into a serious blockage.

Beyond moisture content, there are many causes of raw material build-up on vessel walls. Some metals contain naturally occurring magnetic properties.

Nearly 90% of the earth's crust contains silica, and the sharp crystalline structure can contribute to build-up. Other factors can include the surface friction of the silo walls, the shape of the vessel, the angle of the slope and the size of the material being loaded.

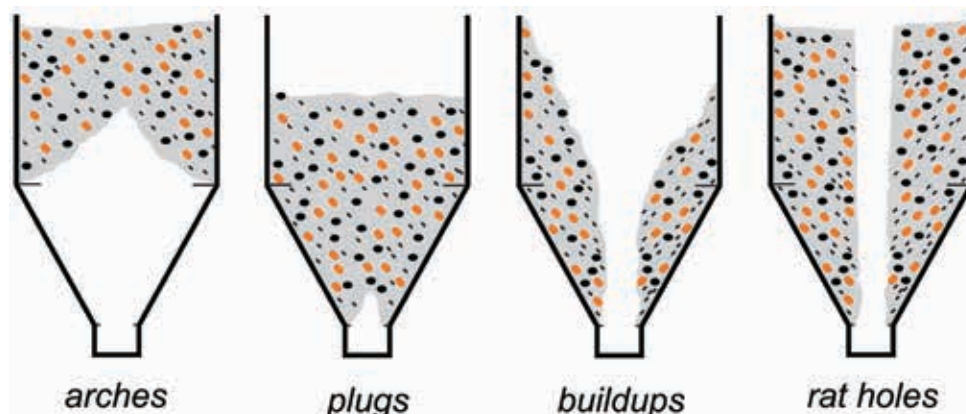
Lost production is probably the most conspicuous cost of these flow problems, but the expense can become apparent in a variety of other ways. Shutdowns to clear the restricted flow cost valuable process time and maintenance hours, while wasting energy during re-start. Refractory walls can be worn or damaged by tools or cleaning techniques. When access is difficult, removing material blockages may also introduce safety risks for personnel. Scaffolds or ladders might be needed to reach access points, and staff can risk exposure to hot debris, dust or gases when chunks of material are released.

Many of the most common problem areas for accumulation are classified as confined spaces, requiring a special permit for workers to enter and perform work. The consequences of untrained or inexperienced staff entering a silo or hopper can be disastrous, including physical injury, burial and asphyxiation. Disrupted material adhered to the sides of the vessel can suddenly break loose and fall on a worker. If the discharge door is in the open position, cargo can suddenly evacuate, causing unsecured workers to get caught in the flow. Cleaning vessels containing combustible dust – without proper testing, ventilation and safety measures – could even result in a deadly explosion.

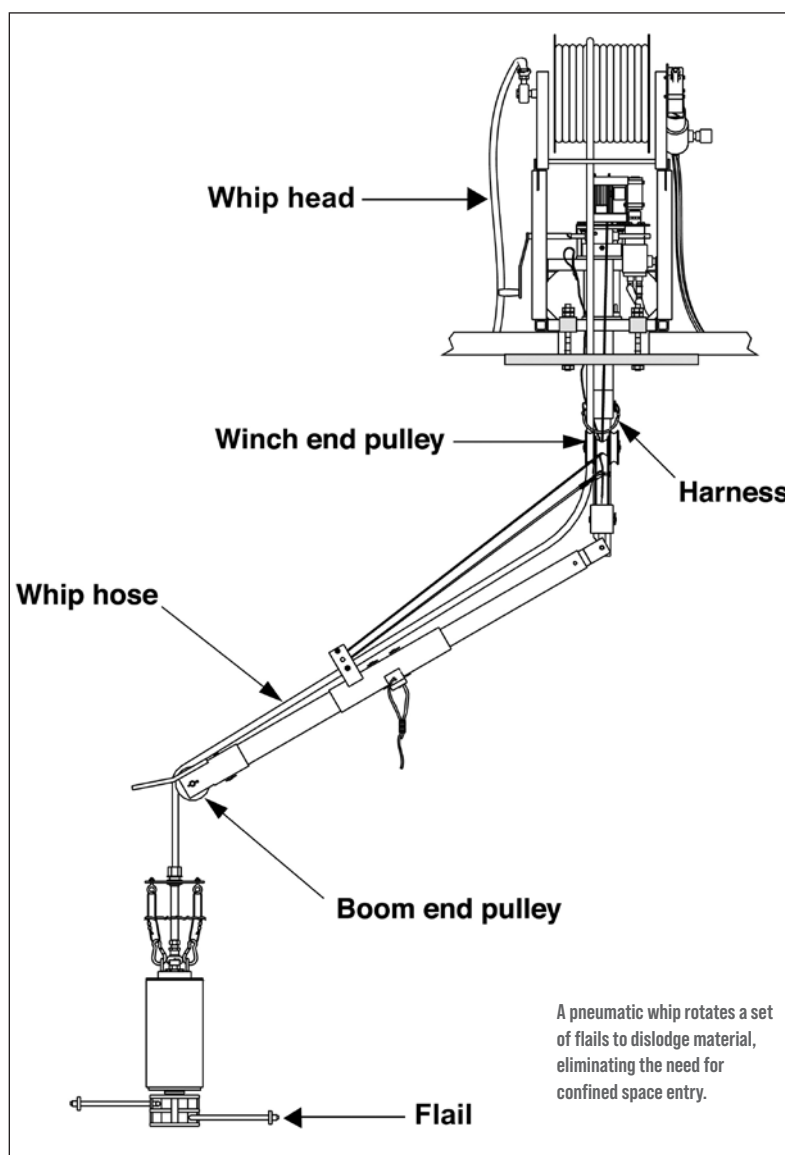
### Getting professional help

"While some large facilities choose to make the capital investment to purchase their own cleaning gear to clear process equipment and storage vessels – as well as train personnel – others are finding it more sensible to schedule regular cleanings by specially-trained contractors," says Pronschinske. "Given the costs of labour, lost time and potential risk to employees, this can often be accomplished for less than the total investment of in-house cleanouts."

At one location, for example, the blockage was so severe in one silo that it had been out of use literally for years. While it took the outside contractor almost two weeks to fully evacuate the vessel, the process restored 3 500 t of storage capacity. At another facility, the crew was able to remove enough "lost" product that the value of the recovered material actually paid for the cost of the cleaning. In short, regular cleaning of storage vessels can quickly turn into an economic benefit – not an expense, but rather an investment with a measurable ROI.



Build-ups reduce material flow, decreasing the 'live' capacity of the vessel and the efficiency of the bulk handling system overall.



### The costs of cleaning

There are a few types of equipment used for this purpose. One operates like an industrial-strength "weed whip", rotating a set of flails against the material in the vessel. This approach eliminates the need for confined space entry and hazardous cleaning techniques, typically allowing the material to be recaptured and returned to the process stream.



The whip can be set up quickly outside the vessel, and it's portable enough to move easily around various bin sizes and shapes. Typically lowered into the vessel from the top and then working from the bottom up to safely dislodge accumulation, the pneumatic cutting head delivers powerful cleaning action to remove build-up from walls and chutes without damaging the refractory.

Technicians lower the device all the way down through the topside opening, then start at the bottom of the build-up and work their way up, undercutting the wall accumulation as it falls by its own weight. In extreme cases, a "bin drill" can be used to clear a 30,5 cm pathway as deep as 45 m to start the process.

### Flow Aids

Regular cleaning is one approach to keeping materials flowing freely by removing build-ups from silo walls, but there are other flow aids which may reduce the need for cleaning or even eliminate it. One method is through industrial vibrators designed for bin and chute applications.

Electric vibrators are generally the most efficient, delivering the longest life, low maintenance and low noise. The initial cost for an electric vibrator is higher than for pneumatic designs, but the operating cost is lower. Turbine vibrators are the most efficient and quietest of the pneumatic designs, making them well suited to applications in which low noise, high efficiency and low initial cost are desired.

Air cannons are another approach to maintaining good material flow, particularly in larger vessels. Also known as an air blaster, the air cannon is a flow aid device that can

be found in mining, coal handling and many other industries. Applications vary widely, from emptying bulk material storage vessels to purging boiler ash to cleaning high-temperature gas ducts.

In the mining industry, air cannons are frequently specified to eliminate build-ups in hoppers, storage vessels, transfer chutes, bins and other production bottlenecks. They can also be found in mineral processing plants where metals are extracted using processes creating slurries and other wet, tacky tailings.

Air cannon technology has been used in mining and material processing for many years, helping to improve flow and reduce maintenance. The timed discharge of a directed air blast can prevent accumulation or blockages that reduce process efficiency and raise maintenance expenses. In underground mines with potentially explosive dust, manual firing of cannons without the use of electrical solenoids is an option. By facilitating flow and minimising build-up, air cannons help bulk material handlers minimise the need for process interruptions and manual labour.

The two basic components of an air cannon are a fast-acting, high-flow valve and a pressure vessel (tank). The device performs work when compressed air (or some other inert gas) in the tank is suddenly released by the valve and directed through a nozzle, which is strategically positioned in the tower, duct, chute or other location. Often installed in a series and precisely sequenced for maximum effect, the network can be timed to best suit individual process conditions or material characteristics.

"The core message for mines and material processors is that they don't have to put up with accumulation problems and the additional expenses they can cause. There are a number of approaches that can help resolve those issues before they turn into expensive downtime, lost material and safety hazards," concludes Pronschinske. ■

## Key takeaways

- ❑ Efficient material flow is a critical element of wet mining processes such as stoping, hydraulic mining and wet dredging
- ❑ Accumulation or blockages in storage systems and build-up in process vessels can impede material movement, causing bottlenecks that interfere with equipment performance, reduce process efficiency, and put a choke hold on an operation's profitability
- ❑ Beyond moisture content, there are many causes of raw material build-up on vessel walls. Some metals contain naturally occurring magnetic properties. Nearly 90% of the earth's crust contains silica, and the sharp crystalline structure can contribute to build-up
- ❑ Lost production is probably the most conspicuous cost of these flow problems, but the expense can become apparent in a variety of other ways. Shutdowns to clear the restricted flow cost valuable process time and maintenance hours, while wasting energy during re-start

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## Enhanced geology and mine design with Maptek's Vulcan 2020

Desktop tools that enable mining professionals to interact with their data are the building blocks upon which Maptek innovation was founded. Almost 40 years on from the early borehole modelling tools, Maptek has released Vulcan 2020, featuring integrated geology and optimised mine design.

Today Vulcan is populated with functionality that provides holistic benefits to modern mining operations. These translate into increased productivity for specific applications – such as geological modelling, automated mine design and grade control – as well as improvement to the mining business in terms of cost efficiencies, where examples include drillhole

optimisation and dynamic reserving.

New in Vulcan 2020, Vulcan Drillhole Optimiser helps exploration projects, open pit and underground operations to confidently develop infill drilling plans that maximise resource recovery. With Drillhole Optimiser geologists can accurately assess multiple scenarios and budgets taking into account existing drilling, locations and resource classifications. Operations see tangible results in greater orebody confidence, fewer wasted drillholes and improved cost-effectiveness.

Dynamic pit design is the goal of the Automated Pit Designer enhanced in Vulcan 2020. Engineers experience a

dramatically improved pit design process, reducing the time to proceed from pit optimisation outputs to an actual pit design complete with ramps.

End of period reconciliation of volumes is now easier than ever with the updated open pit Compliance tool. Automatic comparison of multiple surfaces against solids helps planners identify how closely short and mid-term plans have been followed.

Dynamic reserving is a fast, interactive feature that displays reserve information for nominated regions on the fly. Vulcan users can get basic or advanced reports, charts and fast reserves simply by picking a solid.

Digital processes and increased automation are key enablers for future mining success, according to Maptek Group product manager for Mine Planning, Jesse Oldham.

“The focus on how effectively material is moved has well and truly shifted to technologies that help acquire, manage and process data efficiently to generate value.”

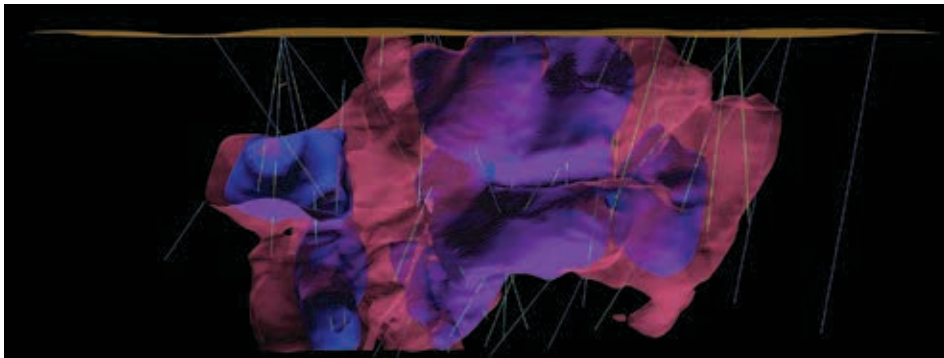
“The new crop of geologists and mining engineers has different expectations of the tools at their disposal,” Oldham adds. “They want to push and extend technology to the limits, using the workflows and automations to do the manual data work so they can spend their time on high-end tasks such as interpretation and analysis.”

“Maptek is driving a renewed focus on interoperability between applications, rather than recreating a similar capability in each product suite. This gives customers access to superior functionality that represents the most effective, productive and integrated approach to tackling a problem.”

“Centralised data plays a fundamental role in the digitalisation process. The greatest benefit is found in the ability to connect information to find the ‘signal within the noise’. The digital approach allows previously hidden data relationships to be identified and exploited.”

“Our technological innovations are matched by the way we enable the use of them from anywhere,” reflects Oldham. “The disruption arising from COVID-19 challenged Maptek, like most organisations, to think differently.”

“We are excited to help our customers transition to Vulcan 2020, and we can all look forward to more impressive developments on the geology and mine planning technology roadmap,” concludes Oldham. ■



Vulcan Drillhole Optimiser helps exploration projects, open pit and underground operations to confidently develop infill drilling plans that maximise resource recovery.

## Caterpillar's new bucket for hydraulic mining shovels

Caterpillar now offers an innovative two-piece bucket for Cat hydraulic mining shovels. The design reduces downtime by limiting refurbishment to the area of the bucket subjected to most of the wear – the basket. The replaceable basket enables faster, easier and safer rebuilds compared to traditional buckets. In addition, the basket design can evolve with mine site conditions to further reduce downtime and optimize capacity over the life of the bucket.



The two-piece bucket enhances both safety and serviceability.

The durable upper structure of a bucket will host several baskets during its long service life, thus the need for optimising basket replacement. Also, the two-piece bucket is lighter than conventional buckets, yet it features high wear resistance.

The basket is a single piece of structural steel with no liner or wear plates, and the floor and sideplate thickness are optimised for bucket size and anticipated wear rate. The basket is retrofittable onto legacy buckets used in compatible digging conditions.

The two-piece bucket enhances both safety and serviceability. Replacing just the basket requires less gouging, welding, and grinding than buckets protected with wear plates. The single-piece basket design also reduces potential hazards caused by stored energy.

After the initial design is completed for the application, replaceable baskets can be ordered in advance and stocked on site. ■

## Stainless steel pump solution for Namibian mine

The harsh coastal conditions at a mining operation in Namibia demanded a dewatering solution beyond the ordinary, so it turned to Integrated Pump Rental. The Sykes diesel driven pump set supplied was enhanced by a customised design.

Its remote location, combined with its highly corrosive environment, meant that the mine needed its equipment to be wear-resistant and require minimal maintenance. According to Steve du Toit, rental development manager at Integrated Pump Rental, its solution in this case was enhanced by a customised design.

“Our Sykes diesel driven pumps come standard with stainless steel internal wear-parts, but for this particular application we included a stainless steel volute – for a fully stainless steel pump,” says du Toit. “In addition, we constructed the entire pump set out of grade 316 stainless steel at our facility in Jet Park.”

The company designs and engineers its

pump sets in-house according to customers’ specifications, and in line with mining safety standards. For this project, therefore, stainless steel was also used for the integrated fuel tank, the drop discharge pipework, the single-point lifting frame and the engine mountings.

With its efficient working practices and established supply chain, the pump set was supplied to the customer within five days of the order being received. The work and handover were carried out during South Africa’s hard lockdown in the early days of the Covid-19 pandemic. Integrated Pump Rental was active during this period as an essential service provider to the mining sector.

“Our local manufacture by experienced professionals ensures a cost effective product that is built to the highest standards,” he says. “It also assures customers that our support and maintenance is similarly world class.”

The Sykes CP150 pump set boasts a



A custom engineered stainless steel Sykes pump set produced by Integrated Pump Rental.

maximum flow of up to 172 litres per second, pumping heads of up to 60 metres, with a solids handling capability of 77 mm. It is driven by an 83 kW Perkins diesel engine, a popular model in the mining market which is easy to maintain.

“The Sykes pump set can be towed behind a light vehicle, so mines can easily move it in and out of a pit as required,” du Toit says. “Where towing is not possible or permitted, the unit can also be lifted without the need for qualified riggers. Its single-point lifting lug allows the balanced unit to be conveniently lifted with one sling.” ■

## Invincible Valves enhances social responsibility values

The mining industry could be considered as one of the most competitive and the most hard-fought markets for suppliers of equipment and components. Achieving success in the industry requires dedication and forming long-term and lasting relationships which in many cases run into decades of business partnerships.

Economic conditions play a role in the supply chain, so mine operators are hard pressed to maintain the balance between economies of scale and product quality. One of the most important attributes for any company doing business with the mining industry or any industry for that matter is their ability to provide total solutions to suit that company’s needs.

Invincible Valves, established some 37 years ago and based on those sound principles, is a respected distributor and supplier of a comprehensive range of locally manufactured and imported valves and accessories for the mining, petro-chemical, power generation, water and sanitation and general industry. Their successful track record throughout the industry has earned them an enviable reputation amongst their clients and stakeholders.

Invincible Valves is the largest stockist in Africa of a full and comprehensive range of locally manufactured and imported valves from international suppliers. The company also offers full recondi-

tioning facilities for valves as well as a rubber lining division which meets the most stringent specifications for lining pipes, tanks, valves and any other specialised requirements.

“We have built this company on old fashioned family values without losing sight of good corporate governance. Our personnel are well trained and are put through regular programmes to enhance their business skills.

“We also give our staff empowerment opportunities by working in small teams with a team leader to co-ordinate the daily activities. This business model gives us the opportunity to reward achievements within the company. We also have an intern programme which gives disadvantaged scholars an opportunity to gain hands-on experience within the company and at the same time earn a wage while learning. A number of technical schools and colleges have embraced this initiative, so we have offered scholarships to both girls and boys thus creating equal opportunities for both genders within our industry.” ■



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## Wheel alignment the key to end-carriage life

End-carriages should be viewed holistically: as a key sub-assembly in any and all overhead cranes, customers should question the wisdom of attempting their own end-carriage assembly using individually sourced wheel-blocks, because wheel alignment is critical, and this is a specialised process.

The advice comes from Condra, a company well known for delivering durable, robust sub-assemblies to rival crane manufacturers. “Putting it simply, they come to us because we last longer,” says a company spokesman.

End-carriages are the “feet” at either end of the overhead crane. They support the girders and hoists, and move them along the rails. However, wheel wear can cause excessive and escalating end-carriage maintenance costs, the result of one or both of two factors: misalignment of the wheels at each end of the end-carriage, and/or distortion of the rails caused by heat.

The spokesman cautions that wheel alignment within the end-carriage should not be confused with alignment of the end-carriages at either end of the girder, which is a much simpler process that most manufacturers would be able to carry out.

It is to avoid misalignment within the end-carriage – the end-carriage wheels themselves – that Condra recommends sourcing the end-carriage as a completed sub-assembly from a single company.

“Wheel alignment is a very specialised and delicate process,” the spokesman explains. “Get it wrong, and the steel-on-steel nature of the crane’s wheeled movement will result in rapid wheel wear and increased maintenance costs.”

The second cause of wheel wear, rail distortion, is more difficult to counter, because it is caused by the very high temperatures that accumulate in the upper levels of all factories, where the rails are located.

Although periodic wheel replacement is inevitable because of rail distortion, Condra has minimised its cost through careful design of the wheel-block, fixing the wheels in position by means of a simplified bolt arrangement that allows quick and easy removal for exchange. Stocks of service exchange units, held either on site or by Condra according to customer preference, minimise downtime.

From the customer’s perspective, ordering an end-carriage from Condra as a completed assembly – aligned, tested and ready to work – is a simple process.

The design office needs only to know the load and how fast this load has to move. Armed with this data, Condra will supply a recommended configuration of wheel, motor, gearbox and brake for the wheel-blocks, a fully designed end-carriage recommendation, and a recommended rail. Should the rail not be available for any reason, Condra will adjust the wheel diameter and, if necessary, the motor and gearbox to suit.

“So, just tell us what you want to move and how fast you want to move it, and Condra will come up with the solution,” says the spokesman, explaining that the design process, simplified from the customer’s side, nevertheless involves for the design office very careful end-carriage design and component selection. ■



Typical Condra double-girder overhead crane under test.

## Master Drilling sets new world record with 1 382 m hole

Master Drilling Group Limited (JSE:MDI), a world leader in the raise bore drilling services industry, has added another record to its name, with the successful completion of the pilot hole for raise-boring at Northam Platinum’s Zondereinde mine.

Drilling of the pilot hole at number 3 shaft, a new vertical shaft at the Western extension section of Zondereinde, commenced on 25 September 2019 and the receiving chamber underground was reached on 18 July 2020, completing the 1 382 m hole, and setting a new world record. The previous record was that of a shaft measuring 1 070 m, that was drilled in 2012 at Lonmin’s K4 mine.

Number 3 shaft currently being developed by Master Drilling through raise-boring, is considered to be safer, quicker and more cost effective than traditional blind-sinking. Raise-boring comprises two

key phases: the drilling of a pilot hole, followed by reaming of this hole to its ultimate diameter. Critical to the success of raise-boring is the accuracy of pilot drilling and this becomes increasingly challenging the longer the shaft.

Commenting on the company’s record achievement, Danie Pretorius, CEO of Master Drilling, says: “What is impressive about this record is that it was achieved using a tool that has never before been utilised for such an application, coupled with one of our high technology machines. It clearly highlights the superiority that adaptation and technology bring to drilling solutions, which is something that Master Drilling has been working relentlessly at over the years. As a result, we are able to provide cost effective, safer and accurate drilling solutions for our clients.”

Master Drilling used ground-breaking oil well directional drilling and combined it with its own designed and manufactured, modern, high technology RD8 machine as well as skilled operators, to achieve the level of accuracy required by directional drilling in order to create a shaft that can be equipped for both man and material hoisting. The RD8 machine monitors a number of operational metrics and takes corrective actions automatically, providing the accuracy required. The water management regime is a fundamental part of this process, as it ensures that quality readings are obtained from the directional tool.

“At Master Drilling, technological innovation is matched by the appropriately trained human capital to provide a winning solution, which is why we have our own accredited training academy that produces world class operators for our ‘man and machine’ world,” concludes Pretorius. ■

## Booyco continues technology drive despite COVID-19

While the COVID-19 lockdown has forced many companies serving the mining sector to downscale, Booyco Electronics is continuing to apply and develop its technologies for safer, more productive mining operations.

With its nationwide team of some 180 field technicians serving opencast and underground mines – by far the largest footprint among players in this field – the proximity detection specialist has remained hard at work. While supporting those coal mines that worked through Level 5 and Level 4, the company has also been assisting customers to ramp up to full production after the initial stoppage.

According to Booyco Electronics CEO Anton Lourens, the lockdown has even given his engineering team some welcome breathing space for their technology development. With collision avoidance standards in mines becoming stricter, technology is responding rapidly.

“Our plans to grow our engineering team from 18 to over 30 experts this year

remains on track, giving us added capacity to meet industry needs,” says Lourens. “Even under lockdown restrictions, this expanding team has continued its work on new features and functionality for our products.”

The move to the Level 4 lockdown allowed opencast operations to resume and underground mines to move to 50% production. Booyco Electronics was on hand to assist with the required pre-start inspections and equipment checks, which then accelerated with the relaxation to Level 3.

“While the lockdown restrictions were disruptive to everyone, we have learnt valuable lessons and increased our efficiencies over recent weeks,” he says. “This has left us stronger and better prepared to support customers in the field.”

Lourens says the company has not rushed to bring employees back to its offices in Level 3, taking the safer route of allowing only one third back in June. Where employees were not required to physically



Production at Booyco Electronics is going strong to meet customer demand.

touch a product, they continued to be deployed at home.

“To date, we have used the lockdown as a valuable opportunity for training and refresher courses,” he says. “It has also been vital to communicate constantly with staff and entrench our safety procedures for future continuity.” ■

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## COVID-19 puts spotlight on mine digitalisation

The COVID-19 pandemic means less people in the mining area, working to achieve the same output; this makes digitalisation no longer a nice-to-have but a vital efficiency mechanism for survival. Sandvik Mining & Rock Technology's experience in this field is substantial, demonstrated by the fact that OptiMine has been installed at about 66 sites worldwide.

Niel McCoy, business line manager for automation and digitalisation at Sandvik Mining & Rock Technology, explains that digital strategies often fail due to lack of a vision.

"Most mining companies have for years been working to digitalise their operations, but the difficulty is to know exactly what this process is meant to achieve, and where managers want their mines to be in the future," says McCoy. "Bringing in new technologies means fundamentally changing

the way your operation runs, so you need to be ready for the change management that this will require."

The result is that many mines are still struggling to develop and apply digital strategies. Effective digitalisation, he says, involves nothing less than moving away from the traditional style of management. It means bringing everything towards a more centralised point.

"Digitalisation allows the whole underground mining operation to become visual – as if the 'roof' has been lifted off the mine – and to be managed from an operational management centre," he says. "This gives management a view of all operations in real time, and the ability to optimise the various processes."

Before any implementation can begin, the goal must be clear in everyone's minds – a picture of what their 'mine of the future'

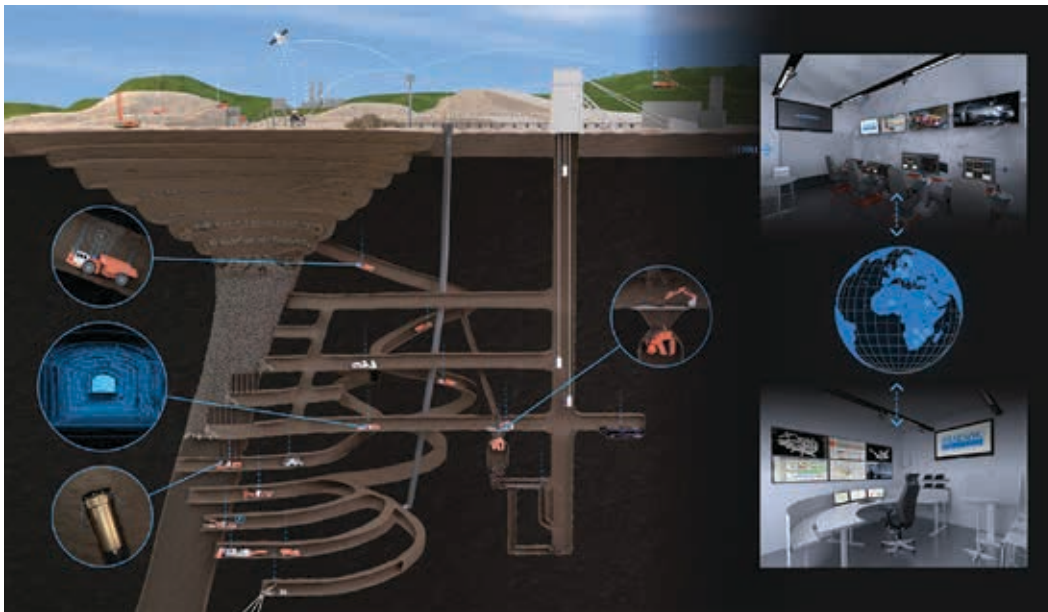
looks like. Failing that, he emphasises that the effort becomes extremely difficult to implement and success is not likely. This will then guide the roadmap to be followed for adoption of digital tools. There is a clear journey to follow to be successful in digitalisation.

"Without an end in mind, this will become just another initiative," he says. "Operations people will be unable to contextualise what the digital solutions mean within the big picture, and how it will improve their day-to-day activities and outcomes. This is mainly due to the data not being used in day-to-day management and decision making. It can never be a side project."

McCoy emphasises that digital solutions are not just for managers to see more clearly what is happening on their mines, but is vital for the people on the ground to run their operations more effectively and efficiently, there needs to be full buy-in from the start if the intended efficiencies are to be realised in practice.

"The only way of making mining operations more efficient is to understand what is happening and where, and to react accordingly as quickly as possible," he says. "One of the main shortcomings with traditional, hard-copy reporting methods on mines is that it simply takes too long for managers to sort through the raw reports from each shift and identify problems in time to make a meaningful intervention."

This means that operations can never be properly optimised. Digital tools play a valuable role in addressing this challenge, helping mines achieve their key performance indicators. ■



Sandvik's digital solutions for its mining products enabling effective operational management.



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## Streamline supply chain to keep mines viable

As mining companies cut back in efforts to remain viable under COVID-19's demanding conditions, crushing and screening specialist B&E International proposes a bold new approach that streamlines mines' supply chains. According to Ken Basson, director of plant and engineering at B&E International, mining suppliers and service providers need to be proactive in helping mines find sustainable solutions to the current challenges.

"COVID-19 will undoubtedly reduce demand for certain commodities, and, with geopolitical uncertainty, we are likely to see increased commodity price volatility," says Basson. "This is leading most mining companies – especially juniors – to try to strengthen their balance sheets."

To do this, there are inevitable cuts in capital expenditure and even operating expenditure. He says the time has come for mining suppliers to streamline the delivery of their services and products, and even to assume more of the day-to-day risk facing mining operations.

"At a time when mines are demanding even higher efficiencies and more plant uptime due to tough trading conditions, the post-COVID environment is expected to present a number of logistical and supply chain constraints," he says. "To cut through this double-whammy, suppliers need to be helping to consolidate supply chain networks. This is the only way of minimising procurement expenses while limiting process plant outages due to critical spares being unavailable in time."

A range of other imperatives also need to be addressed at the same time, he says. These include the growing demand for mines to support in-country job creation and local skills development, as well as local manufacturing and procurement. This means less reliance on costly expatriate skills, whose movement around Africa may in any event be restricted by COVID-related regulations.

"To streamline the supply chain, B&E International is forming strategic partnerships with key suppliers, to integrate their respective service offerings with ours," he says. "This gives the mine the advantage of dealing with fewer supplier interfaces. We also take over the responsibility of ensuring that our partners – and their products – perform to expectation."

## Accenture and Anglo extend technology services agreement

Accenture (NYSE: ACN) and global mining company Anglo American have signed an agreement to extend Accenture's role as a strategic IT services provider to 2023. The new agreement will help accelerate the development of Anglo American's information management (IM) capabilities with new technologies and delivery practices through a collaborative approach to drive innovation.

It builds on an already successful relationship between the two companies that began in 2011 when Accenture was selected as a key technology services provider.

"Prior to the extension of the agreement, Anglo American and Accenture worked together to co-create future services and determine key priorities," says Pavan Sethi, MD of Accenture Technology in Asia Pacific, Middle East & Africa. "We are honoured to continue our work with Anglo American and help fulfil their IM ambitions and mandate." ■



Locally manufactured mobile coal crushers offer a sustainable approach to current challenges.

He highlights that B&E International – with a 40-year legacy in contract crushing, screening and mineral processing services – has expertise across the process supply chain. With experience across commodities including coal, copper, diamonds, gold, iron ore, manganese and aggregates, the company engineers cost effective solutions in various conditions around Africa.

As one of the few companies in South Africa that both builds and operates its own equipment, B&E International is extending its level of vertical integration through this collaboration with strategic partners.

"Not only do we design, manufacture and install complete processing plants across various commodity sectors, but we also operate and finance these facilities," says Basson. "This places us in a unique position to partner with mines to reduce their capex, opex and risk." ■

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# Proposed tax amendments to have far-reaching impact on contract miners

**Contract miners play a significant role in managing a mining company's capital budgets. From a tax perspective, though, it has been a hotly debated topic for some years as to whether contract miners should be entitled to claim the accelerated capital allowances available to taxpayers conducting "mining" or "mining operations". By Denny Da Silva, senior tax advisor, Baker McKenzie Johannesburg.**

**O**n the face of it, it does not seem like much of a debate, and one would assume that a contract miner should qualify as an entity conducting "mining" or "mining operations". However, up until the Benhaus judgment delivered last year by the Supreme Court of Appeal, there was no absolute certainty in this regard. The Benhaus judgment clarified the matter and the contract mining industry breathed a collective sigh of relief as a result.

Fast forward to 2020 and in the midst of COVID-19, on 31 July 2020, the National Treasury released the Draft Taxation Laws Amendment Bill for comment. The Bill includes proposed amendments to both section 15 and section 36 of the Income Tax Act, effectively noting that capital expenditure allowances are only available to taxpayers that hold the relevant mineral rights. This proposed amendment was alluded to earlier this year as part of Finance Minister Tito Mboweni's budget speech, during which he noted that it was being considered.

## Proposed amendment

The proposed amendment, if passed in its current form, will mean that contract miners

will not be entitled to claim any accelerated capital expenditure allowances, and will have to claim allowances for capital expenditure in terms of other provisions in the Income Tax Act. Contract miners will therefore no longer be entitled to claim 100% of the capital expenditure incurred in a particular year, and will instead need to determine whether other allowances are applicable – for example, the 40/20/20/20 allowance in 12C, available to taxpayers conducting manufacturing operations.

It is clear that this will have a significant impact on the contract mining industry. What is not clear, though is how contract miners will transition from a regime where they were able to claim 100%, to a regime where they cannot claim 100%. More particularly, it is unclear what will happen to the historical allowances claimed under section 15, read with section 36.

## Unredeemed capex

One would assume, under legal principles, that those allowances previously claimed will remain. The problem, however, is that the so-called "unredeemed capex" can only be used to offset mining income, so contract miners are potentially in the precarious



Denny Da Silva, senior tax advisor, Baker McKenzie Johannesburg.

situation of having allowances they cannot utilise. Furthermore, just because a contract miner may be entitled to claim a 12C allowance, for example, it does not mean that it would qualify for the allowance, as some of the allowance provisions are only applicable to new and unused machinery, or machinery brought into use for the first time in a process of manufacture.

These are just some of the ramifications of the proposed amendment and we will be making a submission to National Treasury in this regard. However, given that this has been a bone of contention for many years, contract miners would be wise to consider the effect of the proposed amendment on their businesses. ■

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Contract miners play a significant role in managing a mining company's capital budgets.



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