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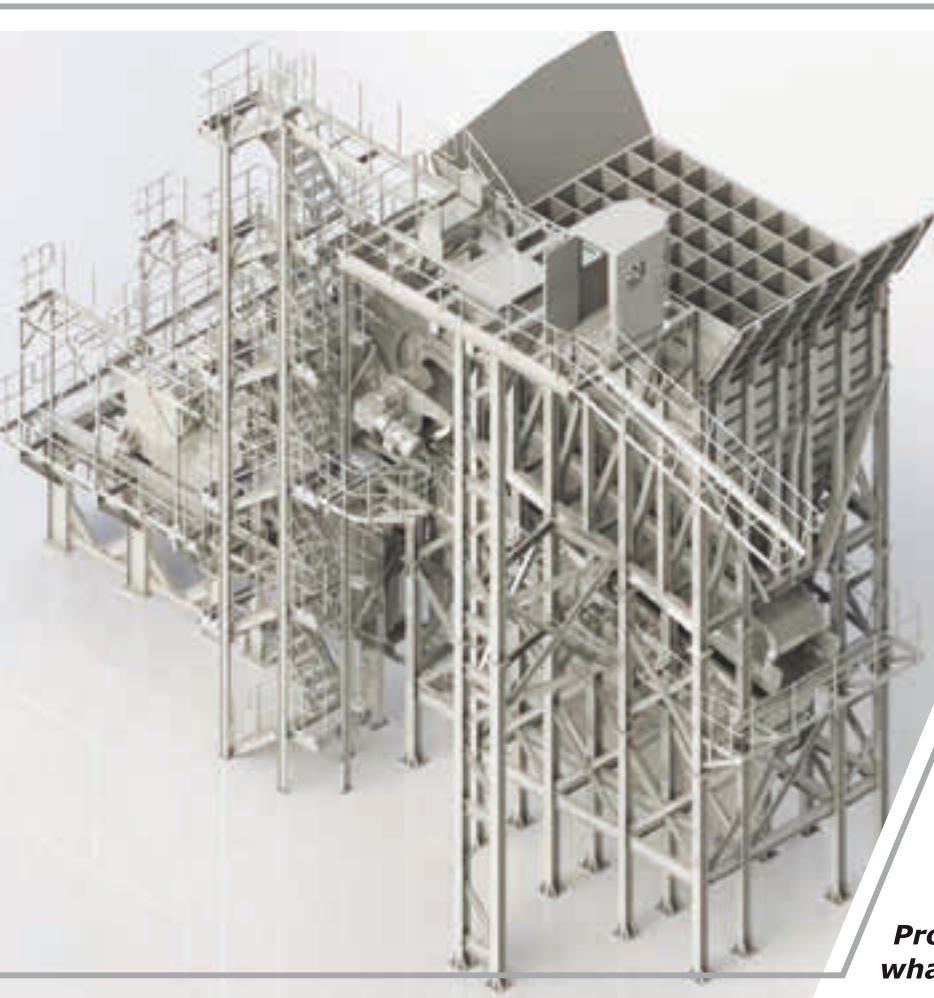


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#### Cover

One of SPH Kundalila's Cat 340D L excavators on site at Pilanesberg Platinum Mine. See page 20 for further details.



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## Zambian power problems highlight a continent-wide electricity deficit

The power shortages now hitting the Zambian Copperbelt which are threatening – in particular – the ramp-up of First Quantum’s new growth projects are a reminder (if one were needed) that electricity supply shortfalls are not just a South African phenomenon but a continent-wide problem. In country after country across Africa demand consistently exceeds what national electricity generating utilities can supply, with the result that commercial consumers of electricity all over the continent, especially mining companies, have to rely on expensive genset power to make up the deficit.

This is not a new phenomenon – I can remember making trips to Ghana, for example, in the early 2000s, when mines all over the country were battling power constraints – but until recently Zambia seemed to be an exception to the rule. It was long ago recognised that the very ‘wet’ underground mines of the Copperbelt – Konkola reputedly has an inflow of 400 000 m<sup>3</sup> per day of water – could not afford to have their electricity-intensive pumping operations interrupted for any length of time. In fact, the present Copperbelt Energy Corporation (CEC) was established in the 1950s – it was known during this period as the Rhodesia-Congo Border Power Corporation – specifically to ensure a reliable and stable supply of power to the Copperbelt mines.

The CEC – which in the 1980s became the power arm of ZCCM and in 1997 adopted its present name when ZCCM’s assets were privatised – is primarily a transmission company (although it does have 80 MW of generating capacity to handle mining emergencies). It buys its electricity from ZESCO, Zambia’s state-owned power utility, so it can’t really be blamed for the present problems.

ZESCO itself, which relies on hydropower schemes such as Kariba and Kafue Gorge for most of its generating capacity, attributes its current inability to meet demand to drought conditions. Whether this is correct I’ve no idea but I’ve seen at least one recent article in the Zambian press – by an ex-senior executive of ZESCO – suggesting that the utility has exaggerated the scale of the drought and that water levels in the Kafue River in particular are entirely normal. Whatever the case, drought is not an uncommon occurrence in Africa and one would think that ZESCO – and other utilities in Africa who habitually use ‘drought’ conditions as an excuse for erratic supply – would plan accordingly.

There are some projects currently in the process of coming on stream in Zambia, including the Itezhi-tezhi hydro scheme on the Kafue and a thermal plant in the Maamba coalfield, but whether these are going to be sufficient to plug a countrywide deficit currently estimated at up to 600 MW remains to be seen. To give some perspective on this, the mills alone at First Quantum’s new Sentinel mine will consume 100 MW when the mine is in full production – which is not far short of Itezhi-tezhi’s entire capacity of 120 MW.

Moving on from Zambia to the continent as a whole, one wonders where the electricity to accommodate Africa’s high projected growth is going to come from over the next few years. The World Bank Group – in a report entitled *The Power of the Mine: A Transformative Opportunity*, published earlier this year – has predicted that demand for power from the mining sector alone in sub-Saharan Africa will potentially reach 23 000 MW plus as early as 2020, roughly a tripling of the 8 000 MW required in 2000. This figure of 23 000 MW may not mean much to some readers but it is substantial if one considers that sub-Saharan Africa’s total installed generating capacity is currently (according to the World Bank report) around 78 000 MW.

On a more optimistic note, I should mention that a just released report from PwC – *Africa power and utilities* survey – summarises the views of 51 senior power and utility sector executives from 15 African countries, with 96 % of them saying that there is a medium or high probability that load shedding will be the exception rather than the norm by 2025. A similar percentage says there is a medium or high probability that, by the same year, the challenge of finding a market design that can balance investment, affordability and access issues will have largely been solved.

I certainly hope the executives surveyed are right in their predictions. The growth potential – especially in mining – that could be unlocked if the continent’s power restraints were removed is truly huge. It’s probably worth pointing out though that utilities around Africa – not least our own Eskom – have consistently got things wrong over a period of many years and that the optimistic views expressed in the PwC survey (while encouraging) should be treated with a degree of caution. These are, after all, the views of executives who are – presumably – at least partly responsible for getting us into the present mess in the first place.

Arthur Tassell



*The World Bank Group has predicted that demand for power from the mining sector alone in sub-Saharan Africa will potentially reach 23 000 MW plus as early as 2020, roughly a tripling of the 8 000 MW required in 2000.*



The Lerala mine showing the crusher installation (photo: Kimberley Diamonds).

## Consulmet awarded contract for Lerala plant upgrade

The board of ASX-listed Kimberley Diamonds Ltd (KDL) has given the 'green light' for the recommencement of mining, processing and diamond sales operations at the Lerala diamond mine in Botswana and has approved the expenditure of A\$14,6 million to be spent on upfront capital items required to bring the plant and mine to a state of readiness.

KDL has entered into a lump sum turnkey contract with Consulmet for modifications to the plant at Lerala to allow it to operate more effectively and reliably treat 200 tonnes per hour. KDL has been in ongoing discussions with Consulmet regarding the plant modification work since 2014.

Consulmet will be paid approximately A\$9,83 million to undertake the plant modifications and is scheduled to complete the work by February 2016.

Discussions with Consulmet had been on hold since December 2014 until KDL was able to raise the funds required to proceed with the modifications. As announced in June 2015, KDL has now received the first A\$5 million under the terms of a loan agreement entered into with a third party lender, Zhejiang Huitong Auction Co Ltd (Zhejiang).

Consulmet is a South African-based

company which specialises in the design, supply and construction of mineral processing plants, and has significant experience designing plants for diamond producers, having operated in Africa since 1993.

Included within the Consulmet scope is the procurement of new or modified equipment including a primary scrubber module; a secondary crusher surge bin module; a secondary crusher module; a DMS surge bin module; and a recovery module.

In addition and due to its long delivery time, KDL purchased a Kawasaki CYBAS-i cone crusher in mid-2014 as a replacement secondary crusher and this is ready for delivery from South Africa when required.

In parallel to the work being undertaken by Consulmet, KDL has a detailed schedule of activities it will also be undertaking at Lerala prior to recommencement of operations, including construction of slimes and process water containment facilities, infrastructure and communications upgrades, and the recruitment and training of operational and support personnel.

In addition, ongoing discussions are

*The processing plant at Lerala was commissioned in 2008 by DiamonEx, the developer of the mine. The project was acquired by Kimberley Diamonds in 2014 (photo: Kimberley Diamonds).*

currently taking place with prospective mining contractors who have submitted qualifying tenders for the contract mining at Lerala. It is anticipated that a final selection will be made and the contract awarded in October 2015. The mining contractor will commence site establishment shortly thereafter in order to start mining in February 2016.

The plant will start commissioning on



existing run of mine (ROM) stockpiles until freshly mined ore is generated from the K3 pit commencing in February 2016. It is estimated that the plant will process at 30 % capacity during February and 70 % capacity during March before reaching full production capacity from April 2016.

The Lerala mine is situated in north-east Botswana, approximately 34 km north of the Martin's Drift border post with South Africa, and comprises five diamondiferous pipes totalling 6,66 ha in size. The kimberlites were discovered by De Beers in the early 1990s and subjected to limited mining by DiamonEx in 2008 and 2009. Most recently, Mantle Diamonds operated the mine between February and July 2012, producing 73 403 carats from 0,26 Mt at 28,2 cpht. The mine was placed on care and maintenance in July 2012. KDL acquired Mantle in February 2014.

The current total resource estimate for the Lerala kimberlites is 10,3 Mt at an average grade of 31,5 cpht – equating to approximately 3,3 million carats. Once in production (and based on current resources), Lerala will have a life of mine of seven years treating 1,4 Mt of ore per annum and producing an average of 357 000 carats per year.

KDL also owns the Ellendale diamond mine in Australia although it announced in early July that it had been forced to suspend operations at Ellendale and place its subsidiary, Kimberley Diamond Company, the holder of the Ellendale mining licence, into voluntary administration. ■



## Safety considerations slow Lace underground development

In its latest quarterly update (to 30 June) on its Lace diamond project near Kroonstad in the Free State, DiamondCorp, which is developing an underground operation at the property, says that development work in the Upper K4 (UK4) block remains close to schedule for commencement of mining operations in the coming months. For safety reasons, underground tunnel development is proceeding slower than planned in fractured ground close to old workings.

Processing of K6 kimberlite recovered from the production level drives continues and processing of higher-grade K4 kimberlite has commenced. Controlled bulk test sample work of the K4 unit continues with encouraging initial results.

Blasting of the final near surface leg of the conveyor belt tunnel system has been successfully completed to join up with the surface boxcut, providing clear tunnel access for the conveyor belt installation from the production level to surface.

The conveyor belt system has been 99 % fabricated and 75 % installed. Final installation and commissioning has been delayed due to a Department of Mineral Resources requirement to fit additional safety protection systems. This is not expected to impact the critical path ahead of the mining ramp-up.

The slower than planned development rate means mine development costs to date are averaging R44 193 per metre

against a budget of R37 000 per metre due to the impact of fixed labour and electricity costs.

During the period, DiamondCorp reported the first recovery of a Type IIa white diamond, which has potential value implications for the entire Lace resource. The company says it is pleased to report that – so far – diamond recoveries from the development K4 kimberlite processed are exceeding expectations with respect to overall quality and that it is confident that the UK4 operating margins will exceed 70 % as previously predicted from micro-diamond analysis.

The company's 220 tonnes per hour (tph) dense media separation plant operated efficiently on a batch basis during the period, processing 1 000 tonne K6 and K4 kimberlite bulk samples extracted from the development tunnels.

Detailed studies with respect to the company's options for installing high volume optical and/or x-ray waste sorting ahead of the dense media separation plant continued during the period. The studies are expected to be completed before the end of the year and, if positive, the preferred capital investment recommendation put forward to management. Waste sorting has the potential to significantly reduce plant water and electricity consumption and could also allow kimberlite to be processed faster than the current planned 220 tph. ■

### Aurecon appointed to manage RBCT project

The private sector-owned Richards Bay Coal Terminal (RBCT) announced in July that it is embarking on a R1,34-billion equipment replacement project. The project will boost South Africa's coal supply chain and help RBCT expand its footprint in the coal industry. Specialist technical services, management and engineering consultancy, Aurecon, was announced as the project manager for the large scale project.

Aurecon's Global Chairman, Teddy Daka, says that Aurecon is honoured to be appointed as the project manager for the replacement project and commended

RBCT on future-proofing its business.

"At Aurecon, we understand the value of coal to the South African economy. As we know, coal is critical to the electricity supply of our country. It's vital to many industries, the country's GDP and exports, as well as the labour force," said Daka during a media briefing.

The equipment that will be replaced includes two stacker reclaimers and two shiploaders. The equipment has been used by the RBCT for 39 years and the replacement project will have minimal impact on the coal terminal's daily operations and business. ■



The Kansashi smelter, which has now achieved commercial production (photo: FQM).

## First Quantum reports on progress of Zambian projects

In its report for the three months ended June 30, First Quantum Minerals (FQM) says that its new smelter at the Kansashi copper mine in Zambia reached commercial production status ahead of expectation.

During the six-month commissioning and ramp-up period, approximately

157 600 tonnes of copper concentrate was processed consisting of a mixture of stockpiled and fresh concentrate from FQM's Kansashi mine and fresh concentrate from its new Sentinel mine in north-west Zambia. Production totalled 46 700 tonnes of copper anode and

201 300 tonnes of sulphuric acid.

The smelter recorded throughput of over 80 000 tonnes during the month of June, representing 76 % of design capacity, and smelter recovery rates were above design rates in the same period.

Commissioning progress continued at



The Sentinel mine showing the stockpile area. Sentinel will have the capacity to produce up to 300 000 t/a of copper over a 15-year mine life (photo: FQM).



Sentinel in Q2, with the focus being on achieving steady state operation within the process circuit. Periods of above name-plate design throughput for Train 1 were achieved during the quarter. Production ramp-up was scheduled to continue during Q3 with the commissioning of Train 2 and completion of power infrastructure.

At the Enterprise nickel mine (located close to Sentinel), site construction work for the Enterprise process plant continued to ramp up as Sentinel construction work tails off. Commissioning is expected to take place during Q4 2015.

FQM notes that on July 25, 2015 electricity supply to all mines in Zambia's North Western Province was reduced due to low water levels in the reservoirs at hydro-power schemes. As a result, the Kansanshi mine and smelter are currently operating at reduced capacity while the Sentinel process plant has been closed since July 27, 2015 as the proposed power limit is not sufficient to produce suitable quality concentrate at Sentinel.

The Kansanshi mine is Africa's biggest copper mine and in 2014 produced 263 000 tonnes of copper as well as 155 000 ounces of gold. The new smelter is expected to process 1,2 Mt/a of concentrate to produce over 300 000 t of copper metal once in full operation. It will also produce 1 Mt/a of sulphuric acid as a by-product. The new Sentinel mine is costing US\$2 billion to develop and has the capacity to produce 300 000 t/a of copper concentrate. The project includes a modern, full-service town. ■

*(Editor's note: Since issuing its quarterly report, FQM has released a statement saying that full power has been restored to its operations by ZESCO although it says that it believes some restrictions may be re-imposed during the remainder of 2015.)*

## Positive results from Kipoi debottlenecking study

Australian company Tiger Resources has announced positive results from an engineering and costing study for the debottlenecking of the Kipoi SX/EW plant in the DRC's Katanga Province to increase production to 32 500 t/a.

The study focused on potential modifications to utilise the identified latent capacity of the SX/EW processing train at Kipoi and was completed by Tiger with the assistance of independent consultants, Cube Consulting and WorleyParsons.

The study confirms the potential for a high return, low capital cost debottlenecking of the Kipoi SX/EW train. The debottlenecking project has a forecast IRR of 107 % and a payback period of 10 months at a copper price of US\$3,00/lb.

The debottlenecking works are expected to be completed within an eight-month period including detailed design, procurement and construction. Thus a commencement of works in Q4 2015 would see completion during Q3 of 2016.

The study utilised the existing Kipoi JORC reserve of 50,5 Mt grading 1,4 % copper for 689 kt copper. The heap leach feed schedule was optimised to provide sufficient recoverable copper to sustain production at 25 kt/a, ramping up to 32,5 kt/a in late 2016. The optimisation assumes the resumption of mining in Q3 2016.

The mining schedule assumes the utilisation of conventional open-pit mining methods with a LOM strip ratio of 2,1:1 and an average copper grade of 1,4 %.

Following exhaustion of above ground ROM stockpiles and HMS floats, ROM ore will be delivered to a two-stage crushing circuit. The circuit will be designed with a capacity of 4,5 Mt/a and reduce 1 000 mm ROM to 25 mm which will then be fed onto the heaps.

The tank leach will process slurry from

the HMS fines or fines generated run of mine. The resultant pregnant leach solution (PLS) will then be pumped to the SX/EW plant. The modular tank leach design incorporates a scalable modular plant that can easily be expanded as the tank leach throughput requirement increases.

Increased solvent extraction capacity can be achieved by elevating the PLS grade and increasing the extractant concentration to facilitate the transfer of copper cathode. These minor operational changes will not require any capital works and can be achieved with existing infrastructure.

The electrowinning circuit currently includes a power rectifier with a design rating of 40 kA. With minor site modification, this is expected to provide sufficient power for installation of an additional 14 electrowinning cells. These will be accommodated in two extra bays to be installed in the existing tank house.

The estimated power requirement for 32 500 t/a cathode production is 10 MW, which is a 1 MW increase on the power draw for the current production rate of 25 000 t/a. As Tiger has previously advised, the transition to grid power commenced in Q2 2015 and Kipoi expects to commence sourcing majority grid power during H2 2015. However, the diesel power station on site is capable of delivering up to 12 MW and provides a backup to grid power.

The study indicates a capital cost estimate of US\$25 million (including contingency) and includes: expansion of the electrowinning facility by adding an extra 14 cells (US\$4,4 million); and modular tank leach plant and reclaim system (US\$15,3 million).

The average LOM cash operating costs under the 32 500 t/a SX/EW configuration are expected to be US\$1,27/lb. ■



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## Metallon progresses new projects at Zimbabwean mines

AIM-listed Metallon Corporation, a gold mining company with producing assets in Zimbabwe, has reported on the progress being made on several new projects in its latest quarterly report.

Underway at Mazowe mine north of Harare is the sands retreatment project. Construction of civil engineering work at the mine commenced in March 2015 and was approximately 70 % complete by late July. Fabrication of the 60 000 tonne per month plant by Baldmin Engineering in South Africa is nearly complete and plant erection on site will commence this month (August) with commissioning of the plant delayed by a month until November 2015.

The sands retreatment project will deliver gold at a grade of about 1,3 g/t to produce approximately 2 000 ounces of gold each month for six years, at a forecast C1 cost of approximately US\$350 per ounce in Year 1.

Also planned for Mazowe is a new tailings storage facility (TSF) and work is expected to commence in October 2015.

The capex for the sands retreatment project is approximately US\$10 million while the new TSF is expected to cost

approximately US\$5 million. This is being financed through cash flows and bank debt.

Metallon is also working towards resuming operations at Redwing mine, located near Mutare. Installation of services and rehabilitation of underground areas above 6 level has progressed well and a reasonable amount of ore has been stockpiled on surface. The refurbishment of the surface metallurgical plant circuit is now at an advanced stage. The late delivery of materials and spares, coupled with unforeseen contractual delays, has slowed completion of expected works. To date (late July), 50 % of the expected work has been completed and commissioning is targeted for the end of October 2015.

Production at Redwing will begin in 2015 at a lean capacity of 15 000 tonnes a month and then ramp up to an installed capacity of 22 500 tonnes a month in H2 2016. 2015 production at Redwing is expected to be approximately 3 400 ounces at a cash cost of US\$959 per oz and 2016 production is targeted at approximately 17 500 ounces at US\$935 per oz.

Redwing has a current total establish-

ment of 346 employees. Once mining commences in October 2015, the mine will employ over 500 staff and once the mine reaches installed capacity in H2 2016, the number of employees will increase to over 700. The majority of employees are drawn from the local community.

The capex at Redwing will be approximately US\$1,6 million in 2015 and US\$2,6 million in 2016.

A new TSF is also being constructed at Shamva mine north-east of Harare. In April 2015 Metallon appointed Fraser Alexander Zimbabwe as the contractor for the 27 hectare TSF and mobilisation of staff and equipment began in May 2015. Since then excavation by dozer of the starter wall area, the return water pond, the camp site and the two access roads to the slimes dam and camp site has been completed. Soil baseline test pits have been dug and soil profile samples have been sent to the laboratory for analysis. Once soil sample results are received, construction of the starter wall will commence. Commissioning is expected in mid-October 2015.

The capex for the Shamva TSF is approximately US\$4,5 million. ■



Redwing, one of Zimbabwe's historic gold mines. It has been flooded in recent years but dewatering has now been completed and it will re-enter operation later this year (photo: Metallon).

## Vis Reddy appointed MD of SRK Consulting (SA)

SRK Consulting (SA), the Africa arm of the global consulting engineering firm, has appointed principal scientist Vis Reddy as Managing Director, based in the Johannesburg office.

Reddy has been with SRK since 1997 and has managed the KwaZulu-Natal business unit for eight years, growing the operation into a substantial contributor to the company. With 24 years of experience in environmental geochemistry and air quality management, Reddy has consulted extensively in these fields as well as in contaminated land and water quality management.

He was made a Partner in SRK in 2005, and a Director in 2009. Taking over the reins from former MD Peter Labrum, who stepped down at the end of April 2015 but remains a full time employee of the company, Reddy leads an organisation that has grown to 12 offices around the African continent – including South Africa, Ghana, the DRC and Zimbabwe. The global

SRK network, of which SRK Consulting (SA) is a part, comprises over 50 offices on six continents, employing more than 1 500 professionals.

Reddy said his focus as MD would be to build on the strong reputation of SRK in the mining sector – its primary market segment – while continuing its expansion into the range of other sectors where the business now has considerable involvement.

“Our services outside of our core business – which is to service the mining sector – have grown steadily over the years,” said Reddy. “We plan to continue building our market share in industrial, petrochemical, government and water sectors, for instance. Our offices around Africa signal to these markets that we are there to stay, and offer a valuable combination of local expertise and global standards.”

He said SRK’s work in the public sector was an important growth area, including infrastructure services such as stormwater management, water supply, water reticu-



Vis Reddy, MD of SRK Consulting (SA).

lation, flood risk assessments and disaster management.

Reddy studied geology and chemistry at the University of Natal, where he also completed a BSc (Hons) in geology; he went on to obtain an MSc in environmental geochemistry at the University of Cape Town. ■

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The existing processing plant at Cullinan, which was commissioned over 60 years ago. The new plant will be much more efficient, feature AG milling and have a very compact footprint (photo: Petra Diamonds).

## Bulk earthworks underway for new Cullinan plant

In its latest trading update, LSE-listed Petra Diamonds says that the bulk earthworks for its new R1,65 billion processing plant at the Cullinan mine near Pretoria have started and all long-lead items have been ordered.

The plant is scheduled to be fully operational by the end of FY2017. MDM Engineering has been contracted to deliver the plant. The project has an IRR

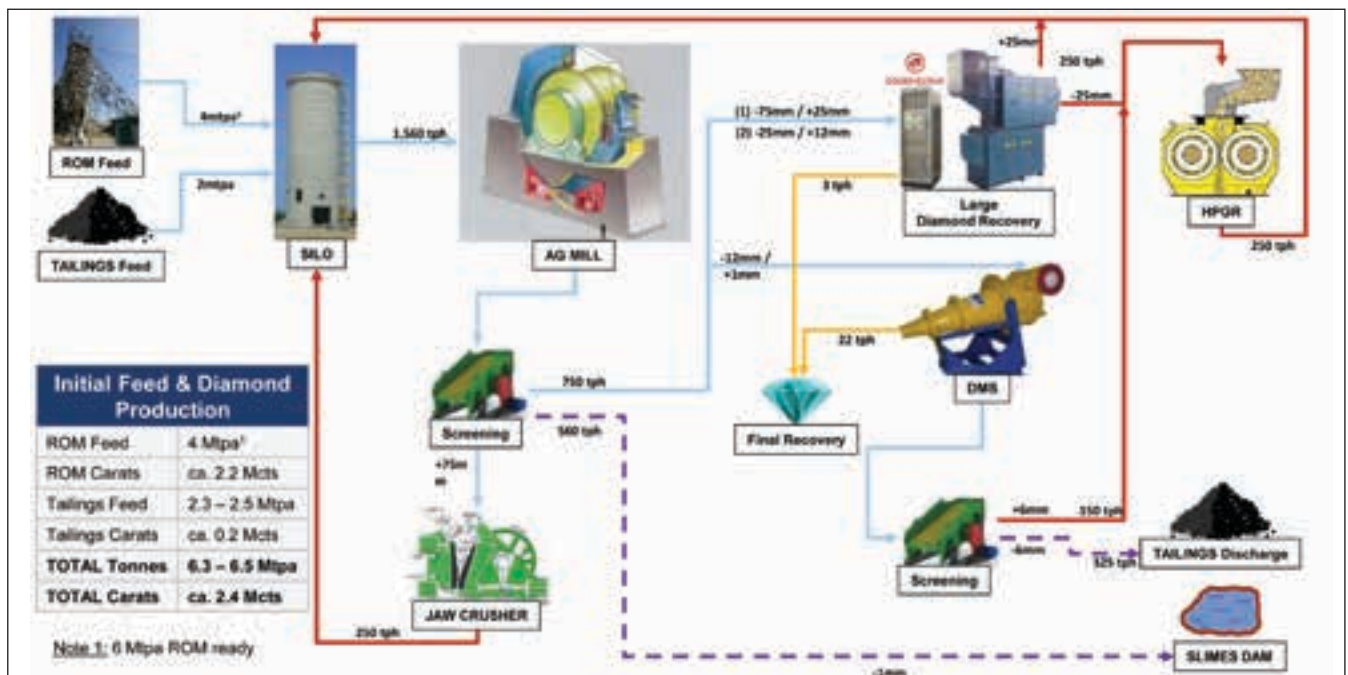
of 25 % and a payback period of approximately three years.

The new 6 Mt/a ROM capacity plant will utilise gentler processing methods (comminution via attrition) instead of extensive crushing, which is expected to reduce diamond breakage and increase revenue from larger/exceptional diamonds. This will be achieved through the use of AG (Autogenous) milling (a method

of comminution using attrition to enable self-grinding of ore) and high pressure grinding rolls (HPGR) technology, the latter representing a move away from high impact cone crushing.

The new plant will feature enhanced utilisation of XRF X-ray technology to replace conventional DMS processing when treating coarser +12 mm material.

Petra says the new facility will result in



Simplified flowsheet of the new Cullinan processing plant.

an increased revenue per tonne of 6 to 8 % due to an increase of approximately 10 % in grades (ROM and tailings) as a result of increased diamond liberation across the spectrum; improved recoveries of larger, high-value stones; and a saving of R20 to 25 per tonne in processing costs.

Operating cost savings will be due to increased energy efficiency, improved water consumption, reduced circulation and a reduction in maintenance requirements.

Energy savings will be realised through a range of measures. An average 5 % efficiency improvement will result from the use of IE3 Top Premium motors, enabling an almost constant efficiency in the 75 to 100 % load range, while all conveyor drives and pumps will be controlled via VSD. All MCCs will be equipped with multi-step low voltage power factor correction units. Additionally, mills will be powered with a medium voltage VSD drive motor combination.

The plant will consume 25 MW of power compared to 22,5 MW with the existing

plant. The power consumption per tonne, however, will be improved by 12 %.

The new plant will reduce the processing footprint at Cullinan from (approximately) 26 hectares to 5 hectares with the associated reduction of engineering infrastructure deployed, including an expected reduction in the number of conveyor belts used from 151 (spanning 15 km) to 22 (spanning 3 km). The facility will have just 84 electric motors (compared to 589 in the current plant) and only 22 screens (compared to 88 in use at the moment).

The feed to the plant will initially consist of 4 Mt/a ROM and 2,3 to 2,5 Mt/a of tailings.

The current Cullinan plant was originally commissioned in 1947 and has undergone various refurbishments over the years since its initial construction. Due to its age and operational complexity, it is expensive to maintain, requiring significant stay-in-business capex, and costly to operate, particularly given the large size of its footprint. ■

## Process route for Namibian lead zinc mine now defined

AIM-listed North River Resources has announced that, following supplementary metallurgical testwork, confidence in the planned ore processing solution for the Namib lead zinc project in Namibia has been improved significantly. It sees this development as a critical milestone as it moves towards the construction phase at Namib, focused on developing a 250 000 t/a operation.

The ore processing flowsheet has now been defined, which eliminates variability associated with the previously proposed process.

“The optimisation work carried out by independent experts provides the company with a definitive and robust processing solution for our stand-out Namib lead zinc mine in Namibia,” comments North River CEO James Beams. “The improvement in operational control that this process flowsheet provides will add significant value to our preparations for Front End Engineering and Design ahead of a construction decision.” ■

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## Plant upgrades at diamond project completed

Canada's Diamcor Mining Inc has provided an operational update and announced the results of rough diamond sales for the first fiscal quarter ended June 30, 2015 for its Krone-Endora at Venetia project in South Africa.

Operational efforts during the quarter focused on the completion, commissioning and refinements of the previously announced upgrades and expansions to the project's processing plant. These include the installation of a large autonomous mill/wet scrubbing unit to enhance

the liberation of all material; the expansion of the treatment plant's feed bin capacity and conveyor structures to support added processing capacity; and the installation of nuclear density measurement equipment to increase operational efficiencies and controls associated with the plant's pre-concentrating pans.

In addition, Diamcor has expanded the tailings storage and automated conveyor loading systems and installed and calibrated additional weightometer systems on various conveyor structures

located throughout the project.

Diamcor says these upgrades have achieved the desired goals of increasing the liberation of the conglomerated material in all size fractions, and enhancing the overall operational efficiency of the treatment plant. The project's large in-field dry-screening plant developed for the removal of fine material <1,0 mm continued to operate efficiently and met company expectations throughout the quarter.

Overall, processing levels remained intermittent during the early portion of the quarter, followed by increased levels later in the quarter as upgrades approached completion, with the combined dry screening and treatment plant facilities demonstrating the ability to achieve initially targeted processing levels approaching 100 000 tons per month by the end of the period.

The company participated in one rough diamond tender selling 2 856,24 carats generating gross revenues of US\$455 227,66, yielding an average price of US\$159,38 per carat during the first fiscal quarter ended June 30, 2015. An additional 2 050 carats of rough diamonds were recovered during the period and are being prepared for sale at upcoming tenders along with rough diamonds expected to be recovered in the current fiscal quarter.

Rough diamonds recovered and sold during the period were primarily the result of the continued processing of material in the +1,0 mm to -26 mm size fractions early in the period, along with



The main processing plant at the Krone-Endora at Venetia project (photo: Diamcor).

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limited processing of material from various larger size fractions throughout the later part of the period. The initial processing of larger size fractions during the commissioning of the upgrades provided the company with important insight into the processing of this material, its impact on the processing of other sized material, and the combined impact on operational efficiencies overall.

Diamcor says its focus will now shift to increasing processing volumes, the size fractions of material being processed (with consideration for above larger material cut-off size), and a move towards advancing objectives consistent with the recommendations of the updated NI43-101 Technical Report filed by the company in April this year.

The Krone-Endora at Venetia project is located directly adjacent to De Beers' flagship Venetia mine, and the associated deposits have been identified as being the result of the direct-shift and erosion of material from the higher grounds of the adjacent Venetia kimberlite areas. ■

## Mwana Africa's profits deteriorate sharply

Mwana Africa, which operates mines in Zimbabwe, has announced improved consolidated revenue of US\$152,3 million for the financial year to 31 March 2015. It says this was achieved even though the year presented particular challenges of falling gold and nickel prices, challenges that have persisted beyond the end of the financial year.

Consolidated profits deteriorated sharply with a number of operational setbacks that contributed to higher unit costs. The group's net profit fell to US\$7,0 million from the preceding year's US\$50,6 million, although there was a US\$28 million impairment reversal in the prior year, which contributed to higher profits.

At the Freda Rebecca gold mine, production stagnated as a result of equipment failures that needed to be addressed and improvements that were effected on an ad hoc basis.

These technical problems were paralleled at Bindura Nickel's Trojan mine

where a large part of the mine's equipment had been allowed to deteriorate during the period of care and maintenance and needed to be progressively refurbished and replaced throughout the year.

The planned re-start of Bindura Nickel's smelter was initiated during the past year at a budgeted cost of US\$22 million, with internal financing augmented by the issue of a US\$20 million five-year bond. The smelter will have the capacity to process Trojan's own concentrates and to toll-treat outsiders' concentrates to produce nickel leach alloy. The bond will be serviced from revenues enhanced by the smelter's operations.

In South Africa, while the recovery of diamonds at the Klipspringer residue treatment joint venture reached planned capacity, this was less than anticipated. Consideration is now being given to the reprocessing of coarser tailings and to an eventual reopening of underground operations on the mine's Leopard fissure. ■



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## Maseve now in the final straight

Platinum Group Metals (PTM), listed on the TSX and NYSE, reports that its 82,9 %-owned WBJV Project 1 platinum mine (Maseve) located near Rustenburg is approximately 90 % complete and is on track for planned production in 2015. Cold commissioning of processing plant equipment is planned for this month (August) with initial concentrate production on track for the fourth quarter of calendar 2015.

The mineral resources and mineral reserves for Project 1 have been updated to account for the planned increased use of mechanised mining methods where the deposit is estimated to be thicker and accessible from nearby completed underground development.

Production guidance for fiscal 2016 is 116 000 ounces platinum, palladium, rhodium and gold (4E) (100 % project basis) and 185 000 ounces 4E in fiscal 2017 in concentrate. Steady state has been estimated to be 250 000 ounces 4E per year.

Exclusive of smelter discount, on site costs are estimated to be US\$526 per 4E

ounce for the life of mine on the Merensky Reef including copper, nickel and other minor elements as a credit and US\$774 per 4E ounce on the UG2.

Comments R Michael Jones, CEO of PTM: "We have done well at 90 % completion on the project construction utilising a well-known plant design and our proven team. We are operationally ready with our experienced owner's team. We have updated our mine plan for current underground development and updated mineral resources and mineral reserves. Underground trackless mechanised development is planned to be used for more of the mining as compared to our original design, thereby improving ramp up and flexibility."

The revised mine plan takes advantage of recently advanced underground development proximal to thicker, deeper mine blocks as compared to the shallower more variable blocks mined in the original design. PTM expects that the adoption of mechanised and hybrid mining approaches will allow for a rapid ramp-

up of production with significantly lower waste rock development compared to the conventional mining method that the company had planned to use previously. PTM expects that dilution resulting from the mechanised approach, along with new block information, will result in a 17 % lower grade on the early mined Merensky ore, which is largely offset by lower waste rock development and costs.

Approximately 1 900 people are currently on site. Surface construction manpower is expected to decline as the underground work force increases over the coming months. Safety has been and continues to be a priority. The current safety record is better than the industry average with approximately 2,6 lost time injuries per million man hours worked.

As mentioned, initial production of concentrate is planned for the fourth quarter of calendar 2015. Initial production is planned from a number of underground blocks that PTM expects will soon be reached with underground development. The largest production ramp up area planned is from 'Block 10' and 'Block 11', using hybrid and room and pillar mining methods respec-



Recent photo of the Maseve processing plant. It has a capacity of 110 ktpm but allowance has been made for this to be increased to 160 ktpm (photo: Platinum Group Metals).



tively. The main north decline access is approximately 60 m away from Block 11. Mining access for both Block 10 and Block 11 is scheduled for August 2015. On the south mine, Block 16 is scheduled to contribute to the ramp up phase.

Underground development and the establishment of infrastructure towards blocks that can benefit from mechanised or partly mechanised hybrid mining has been the focus for PTM and its contractors over the past few months. A conveyor from 1 423 m down the north decline to the ore silo on surface and into the mill is expected to be completed in October 2015. The above ground portion of this conveyor has now been completed.

The mill has been completed in accordance with the original design and as planned. The decision to add a MF-2 grinding circuit on completed foundations, thereby increasing capacity from 110 ktpm up to a full 160 ktpm and take the mine up to its planned 250 000 ounce 4E steady state capacity, will be made as required during 2017. ■

## Hatch Goba designs Copperbelt mine shafts

The capability to design deep mine shaft complexes, including ancillary infrastructure such as underground materials handling systems, has stood Hatch Goba in good stead in completing a second major contract on the Zambian Copperbelt.

Having successfully completed a two-year detailed engineering design project in 2013 for a 1 300-m deep shaft (which comprised a shaft complex with headgear, shaft steelwork, winder house, underground materials handling systems and a mine dewatering pumping system), Hatch Goba was subsequently awarded the detailed engineering design for an expansion of the same project.

Hatch Goba's scope of work covers two shafts, each about 2 000 m deep, to allow the client to proceed with project implementation. Hatch Goba Project Manager Louis du Plessis states that

the aim is to access deeper parts of the orebody and thereby reduce operating costs.

"The detailed engineering design of the two shaft complexes includes the headgear, shaft steelwork, winder house and underground materials handling systems. Hatch Goba began work in early 2013, with a projected completion date of June 2015 for the design phase," du Plessis comments.

"We were able to leverage off our experience and incorporate it into the expansion project, thereby saving the client both time and engineering design cost." Hatch Goba has extensive experience in this regard, having designed numerous shaft complexes over the years. "We have an excellent track record, in addition to employing highly skilled and competent people in our Mining Business Unit," du Plessis confirms. ■

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## First results reported from Etango demo programme



The ore was fed into the agglomeration drum via a conveyor at a controlled feed rate, and agglomerated through adding sulphuric acid, a polymer binder and water to produce agglomerated ore with properties as per DFS specifications. Agglomerate samples were taken from the stacking conveyor on an hourly basis and analysed for moisture content (photo: Bannerman).

Bannerman Resources, listed on the ASX, TSX and NSX, has reported positive results from Phase 1 of the Etango heap leach demonstration plant programme. According to the company, the results strongly support the assumptions and projections incorporated in the Etango Definitive Feasibility Study (DFS).

Owned 80% by Bannerman, the Etango

uranium project is located on the Namib Desert sands approximately 38 km (by road) east of Swakopmund in Namibia and has proved and probable reserves totalling 279,6 Mt at an average grade of 194 ppm for 119,3 Mlb of contained  $U_3O_8$ .

Bannerman published the DFS on Etango in April 2012, which confirmed the viability of the project – although its conclusions were based on a base-case uranium price of US\$75/lb  $U_3O_8$ , which is well in excess of the present price. The DFS detailed a mine processing 20 Mt/a via on-off sulphuric acid heap leach operation. It envisaged the mine producing 7 to 9 Mlb  $U_3O_8$  per year over a minimum mine life of 16 years – with plenty of upside for this to be extended – and put the pre-production capital cost at US\$970 million.

Highlights of the Phase 1 programme include:

- ❑ Fast and high leach extraction on a 121,6 tonne sample – within 20 days average total leach extraction of 94% for the cribs (not previously conducted) and 93% for the columns (similar to that achieved in previous laboratory testing).
- ❑ Low sulphuric acid consumption – on

average less than 16 kg/tonne (compared with the DFS projection of 18 kg/tonne).

- ❑ Geotechnical stability - visual observations during the unloading of the cribs confirmed the uniform percolation through the material, integrity of the agglomerate and geotechnical stability of the heap.
- ❑ The similar performance of the four larger scale (30 t sample) cribs to the eight (200 kg sample) columns may be an indication of potential upside related to the projection of the previous column testing results to the full scale heap leach pad performance in the Definitive Feasibility Study.

The 18 to 24 month demonstration programme, which commenced in April 2015, is an integral step of the project's detailed engineering and financing phases.

The flowsheet of the demonstration plant resembles the front end of the processing plant up to the heap leaching stage. Acid leaching of agglomerated ore stacked to 5 m occurs in four 2 m x 2 m x 6 m leach cribs. In addition to the cribs, eight 5 m high columns with an internal diameter of 0,185 m enable parallel leaching.

Bannerman's Chief Executive Officer, Len Jubber, said: "We could not have asked for a better start to the Etango heap leach demonstration plant programme.

"The scale and quality of the plant, which reflects significant consideration of the environment, has surprised all of those who have visited the site. Moreover, the results from testing over 120 tonnes of ore strongly support the Definitive Feasibility Study. The team in Namibia has done a great job. It would be fair to say that we are very excited about what we have seen to date and look forward to the next stages of the programme.

"The location and set-up of the plant provides Bannerman with a real advantage with respect to the ease of being able to conduct ongoing work to increase the metallurgical knowledge base and conduct further value engineering.

"The Etango project continues to progress and remains one of the very few globally significant uranium projects that can realistically be brought into production in the medium term." ■

### New Managing Director for AEL Mining Services

Edwin Ludick has been appointed MD of AEL Mining Services, with immediate effect. He has been acting in this position since 15 May this year.

Ludick joined Chemserve as a Human Resources Manager in 1991, was appointed to its Executive Committee in 2008 and to its Board in January 2010. He joined AECI's Executive Committee later in 2010.

He has served as MD at four companies in the specialty chemicals cluster and as Chairman of several others. He is currently also a member of the Specialty Chemicals Executive Committee. He has a BCom (Hons) degree from UNISA. ■

## New resource estimate for Waterberg project

Platinum Group Metals (PTM) has reported an updated independent resource estimate for platinum, palladium and gold (3E) on its 58,62 %-owned Waterberg Joint Venture, effective July 20, 2015.

Mineral resources at Waterberg on a 100 % project basis have increased to an estimated 25,64 Moz 3E in the inferred category plus 12,61 Moz 3E in the indicated category, from 29 Moz 4E inferred in June 2014.

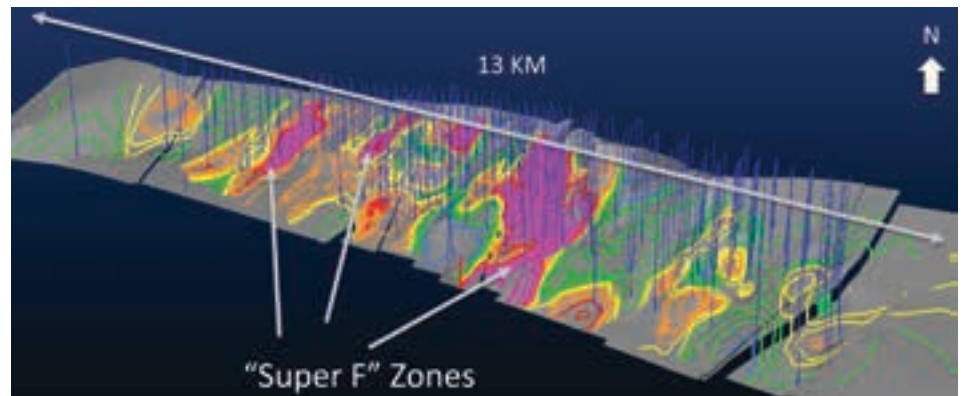
Drilling is continuing at Waterberg with 10 drill rigs and the deposit is still open for expansion. Drilling and engineering work is being funded at this time 100 % by the Japan Oil, Gas and Metals National Corporation (JOGMEC) under a US\$20 million firm commitment to the Joint Venture.

The shallowest T zone intersection is at 140 m below surface. Expanding the shallow T zone resource for prefeasibility planning is an objective of the current on-going drill programme. Super F zones

within the resource near surface where thickness exceeds 15 m are also a focus of current drilling. The thicker zones have potential to add significantly to early mine plans for bulk mining considered in the ongoing prefeasibility study.

The prefeasibility work is being completed by project teams from DRA, a global

independent mining engineering firm, and PTM on behalf of the Waterberg Joint Venture. Metallurgical work, plant designs, metal marketing studies, costing, engineering, servitude layouts for water and power and project planning are advancing as drilling continues for further resource expansion and definition. ■



The Waterberg project was recently consolidated into a single JV to allow for maximum exploitation of thick, high grade zones such as the Super 'F' zones seen here. The near surface T Reef and Super F allow for potential multi-decline ramp access for equipment.

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# Cat machines perform for SPH Kundalila



*SPH Kundalila is forging ahead on its materials handling contract at Pilanesberg Platinum Mines, where 40 and 50 tonne class Cat hydraulic excavators form the backbone of the run of mine ore crushing programme.*

**E**ntering the Southern African earth-moving market in late 2014, the latest generation Cat 340D2 L is a key mid-range unit in Caterpillar's large excavator line-up and designed for high production loading of mobile crushing and screening plants, as well as 28 tonne payload capacity trucks.

One of the first contractors to deploy the Cat 340D2 L in Southern Africa is Raubex Group Limited company, SPH Kundalila (SPH), which has a proud history in the mining and allied materials handling industries that dates back to its foundation in 1969.

Key SPH services encompass drilling and blasting; crushing and screening; ore loading and handling; haul road construction and maintenance; plus mine rehabilitation services.

SPH's new Cat 340D2 L is now working at one



*On site at Pilanesberg Platinum Mine are (from left) Michaël Fourie, SPH Kundalila project manager, and Regardt Keller, SPH Kundalila site accountant.*

of the company's Saldanha projects on the West Coast, joining an existing fleet of Cat 340D L units deployed across various SPH contracts nationally. These include SPH's Pilanesberg Platinum Mines project in North West province, an uninterrupted ROM (run of mine) stockpile movement contract first awarded in 2009.



Michaël Fourie, SPH project manager at Pilanesberg Platinum Mines, has been on site since 2011 and has seen a steady ramp up in their earthmoving and allied machine fleet to keep pace with increasing mine throughput. Rising production has also led to a progressive up-sizing of the capacities on individual earthmoving units.

At the ROM stockpile, SPH's Cat fleet of hydraulic excavators and wheel loaders works in conjunction with three Metso Mobile LT120 jaw crushers. All blasted in-pit material is transported to a ROM stockpile area by a separate load and haul contractor. A total of around 300 000 tonnes of ore (Merensky Footwall Pseudo Reef (Silicate) and UG2) is processed and hauled for the client, Pilanesberg Platinum Mines, on average per month.

"Two thirds of our tonnage is Silicate ore," Fourie explains. Allied materials handling chiefly comprises UG2 reef. These are relatively high Specific Gravity (SG) materials. With these SGs all machines work physically hard and need to be optimally configured for their assigned tasks to ensure predicted availability

goals are met, and scheduled maintenance stays within budget.

SPH deploys a Cat 980H wheel loader to handle any oversize. Cat 320D L excavators equipped with hydraulic hammers then break up larger 'boulders' for subsequent feeding into the Metso Mobile jaw crushers.

Cat 966H units are utilised for general pre- and post-crushed materials handling stockpile management. The Cat 980H has recorded close to 22 000 hours from new since being on site with only minor interventions, and SPH plans to run the machine to 25 000 hours before reviewing component rebuild requirements.

Meanwhile, SPH's Cat 966H units on site have each achieved around 12 000 hours; a new Cat 966H joined the fleet in July 2015 bringing the total to four. The new unit comes equipped with a larger counterweight and a 4 m<sup>3</sup> bucket.

On the critical path to the crusher, material loading is carried out by 40 and 50 tonne class hydraulic excavators. These include a Cat 340D L, which is one of the key loading tools, and comfortably keeps pace with the LT120's volume throughput. This typically averages

**Above:** The Cat 340D L is manufactured at Caterpillar's Xuzhou factory in China for worldwide distribution.

**Above left:** In the foreground, a Cat 320D L hydraulic excavator, equipped with a hydraulic hammer, breaks up oversize material, which will then be fed into one of SPH's Metso LT120 mobile jaw crushers.

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around 490 to 510 tonnes per hour. Crushed material is loaded onto SPH's articulated dump truck haulage units for transfer to Pilanesberg Platinum Mines' process plant.

The operating track record of the current Cat 340D L unit supported SPH's decision to add the Cat 340D2 L as part of its ongoing plant modernisation programme. The same principle applies to other original equipment manufacturers (OEMs) that make up SPH's diversified fleet purchasing mix.

For contractors, the Cat 340D2 L upgrade responds to customer requirements for a machine that delivers the same power and productivity, but with less fuel consumption and lower owning and operating costs. This is a common characteristic on new model upgrades across Caterpillar's earthmoving range.

Manufactured for the global market at Caterpillar's Xuzhou factory in China, the 340D2 L retains the previous model's Tier II Cat C9 engine. However, there are various technological improvements that pass on key efficiency gains. These include an advanced three stage fuel filtration system, which makes the machine less sensitive to low-quality diesel.

"The C9 engine burns up to 7 % less fuel than the previous D series power plant, due primarily to automatic engine speed control," explains Barloworld Equipment Cat sales professional, Piet Smith. (Barloworld Equipment is the Cat dealer for Southern Africa.)

The factory default power setting is ECO mode, with the option of selecting High Hydraulic Power (HHP) where the application demands it. Net power remains the same at 200 kW.

On the Cat 340D2 L, hydraulic system pressure remains at 35 000 kPa: the efficiency



gain here is due to a new electric pressure sensor that reduces pump flow when there is no load or a light load to improve fuel consumption. The flow rate from each of the two hydraulic pumps on the Cat 340D2 L is 265 litres/min compared to 280 litres/min on the Cat 340D L.

Along with key 'under the skin' improvements, some features have been retained. For example, the Cat 340D L and Cat 340D2 L share common linkages, which means the same buckets and work tools can be utilised on both machines.

In terms of ground engaging tools, two new Heavy Duty (HD) bucket sizes are available on the Cat 340D2 L, namely a 2,60 m<sup>3</sup> and 2,69 m<sup>3</sup>. The Cat 340D2 L sold into the Southern African market also comes standard with the optional and heavier 8 450 kg counterweight, which brings the machine's weight up from around 38 080 kg to 40 270 kg.

"We expect our investments in technology to keep pace with SPH's expanding business model as we seek to pass on the best cost production model for our clients," adds Fourie. "This will be a strong motivator when making current and future machine purchase decisions." ■

*Top: A panoramic view of a section of the mining operation.*

*Above: Cat 966H units are utilised for general pre- and post-crushed materials handling stockpile management.*

# Maiden resource a milestone for

*Gemfields, whose shares trade on London's AIM, has announced the publication of a Competent Persons Report (CPR) produced by SRK Consulting (UK) Limited on the Montepuez ruby mine in Mozambique, which is 75 %-owned by Gemfields and 25 % by local partner Mwiriti Limitada. The CPR includes Montepuez's maiden mineral resource and ore reserve estimates, prepared in accordance with JORC Code (2012), and also details a planned significant expansion of operations at Montepuez which will see a new process plant being constructed and the mining fleet expanded. Ian Harebottle, CEO of Gemfields, describes the resource statement as a "milestone event" for the mine.*



**T**he resource statement estimates Montepuez's indicated and inferred mineral resources at 467 million carats of ruby and corundum at an in-situ grade of 62,3 carats per tonne (ct/t). This consists of an indicated resource of primary mineralisation of 2,1 Mt or 245 million carats at a grade of 115,4 ct/t; an inferred resource of primary mineralisation of 0,4 Mt or 44 million carats at a grade of 115,4 ct/t; and an indicated mineral resource of secondary mineralisation of 5,0 Mt or 178 million carats at a grade of 35,7 ct/t.

Probable ore reserves are put at 432 million carats of ruby and corundum at a diluted ore

grade of 15,7 ct/t. These reserves comprise a probable primary ore reserve of 2,2 Mt or 253 million carats at a grade of 114,9 ct/t; and a probable secondary ore reserve of 25,3 Mt or 179 million carats at a grade of 7,07 ct/t.

"As the first recorded mineral resource and ore reserve statement for Montepuez, the significance of this report is not only a milestone event that bears testament to the quality of work carried out by SRK and the expertise from within the Gemfields team, but provides further evidence to the continued growth, positive momentum and opportunity inherent within the coloured gemstone sector," comments Gemfields' Harebottle.

*The 100 t/h wash plant. Gemfields is planning to expand capacity at Montepuez to 320 t/h by upgrading this plant and building a new permanent process plant.*



# Gemfields' Montepuez ruby mine



“This, together with various expansion opportunities that are already at hand, and the impact that our continued global marketing and promotional initiatives are expected to generate, deliver a high level of confidence in Gemfields’ ongoing efforts to reinvigorate the global coloured gemstone market place. As I have said on many occasions over the past few years, this is still just the very beginning, with much more yet to come. I would also like to thank Mwiriti and the Mozambican government for their continued support.”

Discovered in 2009 and located in the north-east of Mozambique in Cabo Delgado Province approximately 170 km west of Pemba,



Montepuez is said to be the world’s largest ruby and conundrum deposit. Gemfields acquired its 75 %-stake in 2011 from Mwiriti Lda for a total consideration of US\$2,5 million and the acquisition was completed in February 2012. Montepuez Ruby Mining Lda (MRM) is the project operator and represents a joint venture between Gemfields and Mwiriti.

Although still in the bulk sampling phase, Montepuez is already a fairly substantial operation, with 369 employees (including 51 expatriates), 248 contract security personnel, as well as additional civil and drilling contract employees. There is a semi-mobile 100 t/h wash plant, complete with jigs, on site plus a sorting house while the Gemfields-operated mining fleet consists of six excavators, 17 ADTs and 18 tipper trucks. A 10 km long powerline connects the site to Mozambique’s national grid but backup generators are also available. Water (potable and process) is sourced from seven boreholes.

Gemstones are currently mined from a series of shallow open pits. Some 45 % of the total production is being sourced from the Maninge Nice pit, a primary amphibolite deposit that extends up to 28 m below surface, with the balance coming from the Mugloto pits, which extract secondary gravel deposits originating from ancient river channels. Most of the material is free dig with some of the harder laterite needing to be ripped by a bulldozer.

Bulk sampling operations started in August 2012 and have continued to scale up progressively, producing consistently encouraging results, says Gemfields. As of July this year,

*Gemstones are currently mined from a series of shallow open pits. There are two main operating areas – Mugloto and Maninge Nice.*

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total rock handling amounted to 3,16 Mt, with the ore mined amounting to 675 000 tonnes. The stripping ratio is estimated at 3,4:1. Ruby production to date is just over 16 million carats at an average ore grade of 38,1 ct/t.

Although Mozambican rubies reportedly sell for about half the price of comparable Burmese (Myanmar) rubies, Gemfields says market recognition of Mozambique's rubies has steadily risen in recent years and the value has tripled. Over 4 million carats have been sold in the four auctions held so far by Gemfields, generating US\$122,2 million with the average price achieved for high quality sales being US\$688/ct and for low quality sales US\$4/ct.

Montepuez has produced some exceptional rubies, notably the 40-carat 'Rhino Ruby', whose recovery was announced in November last year. It was successfully sold at auction in December 2014 although the price achieved remains undisclosed (given the principles on which Gemfields' auctions are conducted). More recently (in June this year), Gemfields announced the discovery of a rare pair of matching rubies with a combined weight of 45 carats, which it described as an "extraordinary find".

In terms of its Life of Mine (LoM) plan, Montepuez is progressing from the bulk sampling phase to full scale production. The principal targets are achieving an annualised processing rate of 1,3 Mt/a of ore by July 2016 and increasing the total mining capacity to 5,6 Mt/a by July 2017, objectives which SRK in the CPR considers to be achievable and appropriate for the orebody as currently defined.

It is envisaged that a contract miner will be brought in to provide sufficient waste stripping capacity for 3 Mt/a with the balance of waste movement being handled by Gemfields' owner-operated fleet. The planned expansion will also require upgrading the existing plant to 150 t/h capacity (operating at 120 t/h) plus the

construction of a new, permanent 250 t/h (operating at 200 t/h) process plant incorporating washing, screening and DMS/optical sorting to recover the rubies.

The new plant will produce a significant quantity of fine tailings and will therefore incorporate a fines thickening circuit. The concept for tailings slurry handling includes a number of concrete ponds into which the thickened slurry will be deposited to allow further settling and water removal. The ponds will be used in continuous rotation. The intent is that the settled muds will be excavated and transferred to the old worked-out pits for final disposal with the coarser waste material.

The projected LoM of Montepuez is 21 years producing a total of 432 million carats. Projected real cash flow (no discount rate applied) over the LoM is estimated at US\$2,76 billion. The independent technical economic model prepared by SRK shows a post-tax NPV of US\$996 million based on a 10 % base case discount rate and an IRR of 311,7 %. Required capex is estimated at US\$64 million over the first two years and US\$305 million over the LoM.

Regarding exploration, Gemfields has a substantial programme planned for the next few years in its 336 km<sup>2</sup> concession area. Exploration to date – a total of 1 090 drill holes, over 15 000 m in total, as well as 823 small-scale exploration pits – has only covered around 36 km<sup>2</sup> of the concession. Two core drills and one contracted auger drill are currently on site.

Apart from the Montepuez mine, Gemfields – which is based in London – also has a 75 % interest in the Kagem emerald mine near Kitwe in Zambia (covered at length in our April issue this year) and a 50 % interest in the Kariba amethyst mine, also in Zambia. It is also the 100 % owner of the Fabergé luxury goods brand.

*Photos courtesy of Gemfields*

*Haulage operations underway at Montepuez. The Gemfields-operated mining fleet consists of six excavators, 17 ADTs and 18 tipper trucks.*

**Montepuez has produced some exceptional rubies, notably the 40-carat 'Rhino Ruby', whose recovery was announced in November last year.**

# Panda Hill project makes progress

*ASX-listed Cradle Resources (Cradle) is making good progress on the development of its Panda Hill niobium project in Tanzania and expects to make a decision on whether to proceed with the construction of a mine early next year. The results of a pre-feasibility study (PFS) undertaken on the project were released earlier this year and indicated that Panda Hill could be developed as a highly economic operation based upon a base case mining scenario of 2 Mt/a. If Panda Hill does become a mine, it will mark the emergence of Cradle as the first new commercial-scale niobium producer since the 1970s.*

**N**iobium (which decades ago used to also be known as columbium, a name which still lingers on in the term ‘columbite/tantalite’ or ‘coltan’) is not a well-known commodity. Cradle refers to it as a ‘boutique metal’ and it is mainly used as an alloy in steel making, finding particular application in the production of High Strength Low Alloy (HSLA) steels. The metal has a long history of stable prices – the price increased steadily from US\$34/kg in 2008 to US\$42/kg in 2014 – and Cradle believes this upward trend will continue, with a likely growth in demand of around 25 % expected over the next six years.

Roughly 84 % of world production is in the hands of one company – CBMM of Brazil, a private company 70 %-owned by a Brazilian banking family. The only other two producers of any significance are Anglo American, which, like CBMM, mines its niobium in Brazil, and Magris Resources, whose niobium assets – previously held by IAMGOLD – are in Canada’s Quebec Province. Africa has no formal niobium mines although very small quantities of niobium ore are produced from artisanal operations in several African countries, including the DRC.

Since the existing players all reportedly have the capacity to increase production, Cradle – if it does mine at Panda Hill – will be entering a market where there is no basic supply shortfall and where price is largely dictated by CBMM. It reasons, however, that the sheer quality of its resource – which lends itself to low-cost mining methods – plus the fact that Panda Hill would account for only a tiny part – perhaps 5 % – of world production should ensure that there is a place for a new supplier in the market.



While Cradle has only been involved with Panda Hill since 2013, the deposit has been subjected to exploration over a period of decades and in the 1950s and 1960s was even trial mined by a joint venture which included the then NV Billiton, a predecessor company of today’s BHP Billiton. With a total mineral resource of 178 Mt at 0,5 % niobium pentoxide or  $Nb_2O_5$  (and an exploration target of a further 200 to 400 Mt at between 0,4 and 0,6 %  $Nb_2O_5$ ), Cradle believes the deposit to be the most viable undeveloped niobium project worldwide.

Apart from the excellent geology, another plus for the project is its location just 26 km from the major regional centre of Mbeya in south-western Tanzania. The area is well-served by infrastructure (including the new Songwe international airport) and is also home to a burgeoning mining sector based upon the reopening of the old Lupa goldfield, which was intensively mined from the 1930s to the 1960s before production tailed off. Shanta Gold commissioned the New Luika Gold Mine, roughly 100 km north of Mbeya, in 2012 and there is a strong possibility that at least one other operation will follow.

Cradle, which currently owns 50 % of Panda

# on multiple fronts



Tremont is described as “an African-focused mining platform backed by Denham Capital, a leading energy and resources global private equity firm.” Tremont is advised by Pangea Exploration, led, of course, by well-known South African explorationist Rob Still.

As evidence that it is serious about developing Panda Hill, Cradle has recently appointed Dennis Cooke as General Manager of the project. A metallurgist by profession, he has over 25 years’ experience in the mining industry and is well-known in South African mining circles as he was, for 11 years, the GM of the Vergenoeg fluorspar mine north of Pretoria. He will be responsible for the construction, commissioning and ultimate steady state operations and performance of the Panda Hill mine.

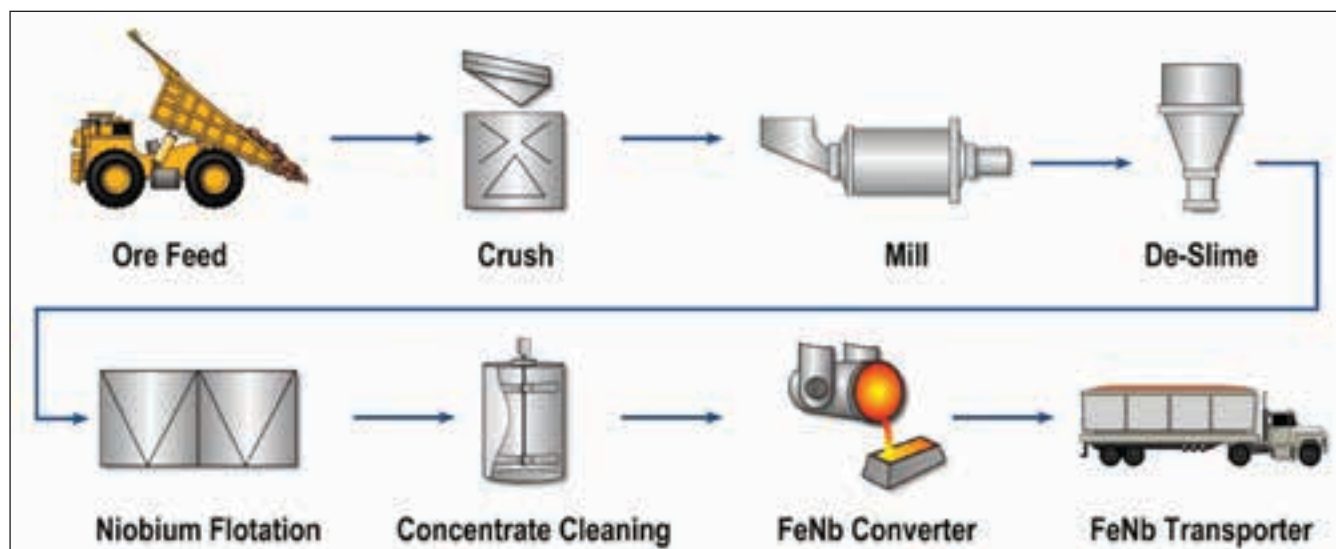
The project is now well into the Feasibility Study (FS) phase. The same consultants who were involved with the PFS have been retained for the FS, namely MDM Engineering, responsible for the plant and infrastructure component of the study, Coffey (geology), SRK Consulting (mining and geotechnical), SGS Canada (metallurgical test work), SLR Consulting (tailings and groundwater study) and MTL Consulting (environmental).

The PFS outlined a base case project based on an open-pit mining operation providing 2 Mt/a mill feed over a 30-year life of mine (LOM) with material being treated through milling and a single stage flotation process to produce a concentrate suitable for standard ferroniobium (FeNb) production in an on-site converter. This is the same scale of operation that was considered in the Scoping Study and

Hill (with an option to purchase the balance), is a junior company. The project is nevertheless well resourced with Cradle having executed a binding agreement with Tremont Investments recently in terms of which Tremont will provide up to US\$20 million to earn up to a 50 % stake of Cradle’s interest in Panda Hill. It is anticipated that post the farm-in and option exercise, Cradle’s interest will remain at 50 %.

*Centre: Drilling at the Panda Hill project site in Tanzania.*

*Below: Stylised processing route for the Panda Hill niobium project.*



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is the current size of Magris Resources' Niobec operation in Canada, thus allowing useful comparative analysis.

With the success achieved in the PFS in both mill feed grade and metallurgical recoveries, the initial ferroniobium production from a 2 Mt/a plant now approximates to 8 to 10 % of world production. For this reason, and to simplify financing arrangements, the FS has been scoped so as to achieve a more modest entry into the market (i.e. throughput commencing at 1,3 Mt/a). The FS will allow for expansion of production as demand grows. The base case examined in the PFS estimated an initial capital expenditure of US\$158 million but a staged approach will reduce this figure to US\$123 million.

The FS is on track for completion in the fourth quarter of 2015 with key milestones including: the finalisation of the geotechnical drilling campaign for the plant foundations and tailings facility area completed in June 2015; the export of geotechnical samples to Johannesburg, with two of the three batches already at the laboratory and test work having started; and finalisation of the mineral resource model for use in pit optimisations.

On the metallurgical side, mini pilot plant tests on approximately 5 tonnes of RC chips have been completed at SGS Lakefield in Canada with the preliminary results confirming the robustness of the PFS flowsheet. SGS is now following up with larger-scale tests in a 75-t integrated pilot plant that was entering operation as this article was being prepared.

The mining licence renewal documents have been submitted to the Tanzanian Ministry of Energy and Minerals and the ESIA documentation has been submitted to the National Environmental Management Council. These authorisations are expected to be completed in the third quarter of this year.

Offtake discussions with traders and end-users are progressing well, says Cradle. The discussions are focused on optimising pricing and volume and both end-users and traders in the USA, Europe and Asia are being targeted.

Two rigs were mobilised to site in June 2015 for drilling of geotechnical and hydrological holes. One rig was dedicated to drilling the 13 geotechnical diamond holes (typically <25 m deep) to enable characterisation of the ground beneath the proposed process plant and tailings facility; this work has now been completed. The other rig is focused on drilling hydrological observation holes in the area surrounding the proposed Tailings Storage Facility (TSF). Consultants from SLR Consulting (Africa) and SRK Consulting (Australasia) have been on site to supervise the logging and preparation of these samples.

"The Feasibility Study is progressing as planned with a processing plant throughput of 1,3 Mt/a being selected for initial production expanding to 2,6 Mt/a after five years," says Cradle's MD, Grant Davey, commenting on the progress of the project. "Preliminary financial results calculated for a staged throughput scenario continue to highlight that Panda Hill is a world class mineral resource project. We are actively collecting all the necessary field information as well as preparing for the 75-tonne pilot plant test so that we have all the technical information to complete the final Feasibility Study. The appointment of Dennis Cooke is instrumental in ensuring that the construction and operational team is appointed and have ownership of the Feasibility Study. Offtake negotiations are progressing well and all licensing approval applications have been submitted to the government for assessment. The Cradle team is focused on ensuring that Panda Hill is the next world class niobium producer."

*Photos courtesy of Cradle Resources*

*View of Panda Hill. It is located just 26 km from the major regional centre of Mbeya in south-western Tanzania.*

***The base case examined in the PFS estimated an initial capital expenditure of US\$158 million but a staged approach will reduce this figure to US\$123 million.***



## Winder house heavy lift saves on time

*A critical and groundbreaking point in the development of Sasol Mining's Shondoni project was reached recently when the strategic and highly technical lift and positioning of the mine's winder house – with winders installed – onto the top of the headgear took place. The operation is expected to recover at least three months of time that has been lost during the sinking of the main and decline shafts, which was mostly due to ground water challenges and poor ground conditions.*

The Shondoni mine is a strategic project for Sasol, replacing the Middelbult mine and protecting the baseline feed stock for the Coal-to-Liquids (CTL) operations within Sasol Synfuels. Construction of the mine began in May 2013 and is expected to be completed by late 2016. It forms part of a R15,3 billion project being undertaken by Sasol Mining to replace three of its ageing coal mines in the Secunda area. Upon completion of the project, the three new mines will be capable of supplying Sasol's Synfuels complex with 42 Mt/a of coal and will result in the Secunda

area having one of the largest underground coal mining complexes in the world.

In January 2012 WorleyParsons RSA was awarded the EPCM contract for Shondoni. Its scope of work over the 45-month contract period includes design through delivery of an incline conveyor shaft, an underground equalising surge facility, a man and material shaft complete with winders, a ventilation shaft with three 350 m<sup>3</sup>/s main fans, and allowance for underground capital infrastructure to support the mine. Other major packages are the main surface civil infrastructure as well as an extensive materials handling system, which includes a 21 km overland conveyor.

The recent lift of the winder house marked a milestone for the project. Malcolm Bentley, WorleyParsons' Project Area Manager for the Shondoni mining packages, says that what made this particular portion of the operation so unique is the fact that the Koepe winders were installed into the winder house on the ground, concurrent with sinking and equipment activities on the main shaft. This is something that has not happened before on any similar projects or designs.



## at Shondoni

The original schedule and methodology allowed for the winder house to be lifted in two parts onto the top of the headgear, followed by the winder installation, which takes several months. Lifting the winder house as a fully installed unit, as opposed to moving it in two parts and only then installing the winders as is the norm, will recover – as mentioned above – at least three months of the time lost during the sinking of the main and decline shafts.

The lifting and mounting of the winder house was a crucial stage in the surface infrastructure development that required intricate planning due to the high risk implications associated with this extreme hoist and the level of accuracy needed to align the winder house onto the existing headgear.

The massive winder house, including rigging, weighing 291 tonnes, was moved by crane across 58 m and hoisted to a height of over 30 m before finally being positioned on top of the headgear. Sarens, a world-wide leader in heavy lifting and engineering transport, undertook the lifting operations.

Bentley says that while heavier crane lifts have been successfully achieved in South

Africa, what made this process different and highly challenging is the size of the winder house, making the lifting operation highly vulnerable to climatic conditions.

“It was vital that there was minimal wind on the day of the hoist; moderate to strong winds could have created a force on the building, placing the lift at risk,” he explains. Advanced weather forecasting technology was used and all risks identified and mitigated.

The hoisting and positioning of the winder house began early in the morning on Saturday 1 August, and took just an hour and a half from the start of the lift to the commissioning position.

Bentley goes on to explain that once successfully positioned, the winder house was precisely surveyed before hydraulic rams were used to micro-shift the headgear around until the winders were perfectly aligned with the shaft, and finally the unit was fastened to the headgear by the following day.

The winder house is expected to be fully licensed and operational in early November with the completed 11.7 m diameter main shaft system fully operational in January 2016, reaching a total shaft depth of 155 m. The shaft conveyance will be licensed to hold up to 200 people and carry a load of up to 65 tonnes. ■

**Above:** The operation took just an hour and a half from the start of the lift to the commissioning position.

**Left:** The start of the heavy lift at Shondoni. The massive winder house was moved by crane across 58 m and hoisted to a height of over 30 m before finally being positioned on top of the headgear.



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# Sinking operations poised to start at Platreef project

*In its review of operations for the second quarter of 2015, TSX-listed Ivanhoe Mines, which is developing the Platreef project near Mokopane on the Northern Limb of the Bushveld Complex, says that commissioning is underway for the pre-sink winder that will be used to sink Platreef's Shaft 1 to a depth of approximately 60 m below surface. It also reports that (as of 12 August), construction of the foundations for the large winding equipment needed to sink the shaft below 60 m were almost complete.*

The Platreef project is 64 %-owned by Ivanhoe through its subsidiary, Ivanplats, and 10 %-owned by a Japanese consortium of ITOCHU Corporation and its affiliate, ITC Platinum; Japan Oil, Gas and Metals National Corporation (JOGMEC); and Japan Gas Corporation. The remaining 26 % interest is held by B-BBEE partners, which include communities, employees and entrepreneurs.

Since 2007, Ivanhoe has focused its exploration activities on defining and advancing the down-dip extension of its original Platreef discovery, now known as the Flatreef deposit, which is viewed as being amenable to highly mechanised, underground mining methods.

The construction of the large, concrete shaft collar and plenum is well underway. Construction is nearing completion on the foundations for the large winding equipment required for deeper shaft sinking. The winding equipment has been refurbished and is being stored off-site. Commissioning is underway for the installed pre-sink winder that will be operated during initial sinking down to 60 m.

Other work on site includes the construction of the primary terraces for Shaft 1 and the stormwater pond. A total of 73 % of the 611 permanent and contract workers presently employed by the company are from the local area.

Ivanhoe completed a pre-feasibility study (PFS) in January 2015 that covered the first phase of development that is expected to include construction of an underground mine, concentrator and other associated infrastructure to support initial concentrate production by 2019. There will be opportunities to refine and modify the timing and capacities of subsequent phases of production to suit market conditions during the development and commissioning



*Collar construction in progress for the 975 m deep, 7,25 m dia Shaft 1 (photo: Ivanhoe).*

of the first phase. The feasibility study, based on the first phase, began earlier this month (August 2015).

As detailed in the PFS, the first phase mine will be a mechanised underground operation using the longhole stope mining method with a 4 Mt/a concentrator and a planned initial average annual production rate of 433 000 ounces of platinum, palladium, rhodium and gold (3PE+Au), plus 19 million pounds of nickel and 12 million pounds of copper. The PFS estimated a pre-production capital requirement of approximately US\$1,2 billion, including US\$114 million in contingencies, at a rand/dollar exchange rate of 11 to 1. Ivanhoe is planning three stages of development with phase 2 doubling production and phase 3 taking it to 12 Mt/a, which would make the mine one of the largest PGM operations in the world.

The shaft-sinking contractor for Shaft 1 – which will be used to extract a mineralised bulk sample for metallurgical testing from the 800-m level of the Flatreef deposit – is Aveng Mining. The shaft will have an internal diameter of 7,25 m and is projected to reach a total depth of 975 m in 2018. ■

# Price crash leaves Africa's iron ore

*The long slide in the iron ore price – which peaked at US\$191/tonne in early 2011 – has left the iron ore mining scene in Africa in tatters. Just two years ago, there were projects speeding ahead all over the continent. Now most projects have been slowed or deferred and some new mines which were launched with great fanfare several years back – Tonkolili and Marampa in Sierra Leone – are no longer producing (although Shandong is reportedly planning a resumption of operations at Tonkolili). **Modern Mining's** Arthur Tassell gives a round-up of some of the latest developments.*

**O**ne effect of the fall in the iron ore price is that activity in what used to be one of the most promising iron ore destinations in Africa – the West Central African region taking in Cameroon, Gabon and the Republic of Congo (ROC) – has tailed off sharply.

The region was once touted as the next iron ore frontier. No more. Exarro has taken a R5,8 billion write down on its **Mayoko** project in ROC while ASX-listed Equatorial Resources announced earlier this month (August) that it had entered into a conditional agreement with Midas Global, a subsidiary of Inter alloys Trading, for the sale of its nearby **Mayoko-Moussondji** iron ore project. Also under development in ROC is the plus US\$2 billion **Zanaga** project (a JV between Glencore and AIM-listed Zanaga Iron Ore), which is at an advanced stage with a feasibility study and mining licence in place. Zanaga said at the end of last year that – in the light of changing iron ore market conditions – the JV planned to reduce the cost base of the project during 2015 while continuing to advance key preparatory work.

Sundance Resources, an ASX-listed company, is continuing with its **Mbalam-Nabebe** project which straddles the border between ROC and Cameroon but activity on the ground seems to have waned, with Sundance now mainly focused on achieving funding of the mine infrastructure. Nevertheless, it says it is moving ahead with “a high level of confidence”.

Interestingly, John Welborn, Equatorial's MD for the past several years, has now stepped down from that role (although he remains a Non-executive Director of the company),



and has recently surfaced as CEO of another Australian miner with interests in Africa, Resolute Mining, which owns the Syama gold mine in Mali and the Bibiani gold mine in Ghana. As MD of Equatorial, he was obviously a cheer-leader for the iron ore market but has now changed his tone markedly and was recently quoted in the Australian media as saying that “I can't be more delighted to move from a commodity that's measured by the tonne, and increasingly worth nothing, to one that has always been valuable and has been measured by the ounce.”

Further south, in South Africa itself, Kumba Iron Ore's recently announced interim results for the six months to 30 June, give some idea of the challenges facing the iron ore mining sector. Although the company's **Sishen** and **Kolomela** mines in the Northern Cape continued to perform strongly at an operational level and total sales volumes increased by 16 % over the equivalent period of 2014, headline earnings were 61 % lower at R2,5 billion. To handle the tough market conditions, Kumba

# miners and explorers reeling



**Left:** The Kolomela mine near Postmasburg in Northern Cape Province is Kumba's newest mining operation, having been completed at the end of 2011. Kolomela is expected to produce in excess of 11 Mt in 2015 with waste of 35 Mt (photo: Kumba Iron Ore).

**Below:** The processing plant of the Tonkolili mine in Sierra Leone. The mine was developed by African Minerals but is now owned by Chinese steel-maker Shandong. There were reports in May this year that Shandong had re-opened the mine but – as far as 'Modern Mining' is aware – production has not yet restarted.

says it “has undertaken a number of key interventions, which are expected to result in a reduction in the group’s cash breakeven price to US\$45/tonne (62 % Fe CFR China) from

the US\$63/tonne in 2014. These initiatives include reducing overhead costs, reinforcing capital discipline, reconfiguring the operations and maintaining the focus on product quality





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through the production of lump products.”

Kumba also announced in July that it had instituted closing procedures for its **Thabazimbi** mine in Limpopo Province, by far the smallest of its three mines. It has given several reasons for this decision including the fact that the mine is now more than 80 years old and has – over the past 15 years – had its closure postponed six times; difficult mining conditions; high operating costs due to high waste stripping requirements; and a recent slope failure. One suspects, however, there might have been some chance of keeping the mine operating if the iron ore price environment were more buoyant.

Kumba and Assmang (which owns the Beeshoek and Khumani mines in the Northern Cape) are the two main players in South Africa’s iron ore mining industry but there are several aspirants, among them Ferrum Crescent, listed on the ASX and AIM, which has the **Moonlight** project in Limpopo Province, and AIM-listed Ferrex, which is developing the 1,8 Mt/a **Malelane** project. Ferrex announced earlier this year that Malelane had been placed on hold because of the low iron ore price (it is now concentrating its energies on its Nayega manganese project in northern Togo) but Ferrum Crescent appears to be hard at work on the development of Moonlight, now in the BFS phase.

The project involves the mining and beneficiation of the Moonlight magnetite deposit – which was explored in the 1980s and 90s by Iscor – to produce a high-grade concentrate for transport to a pellet manufacturing facility at

or near the town of Thabazimbi for the production of 6 Mt/a of Direct Reduction (DR) and blast furnace grade iron pellets for export or domestic sale.

In May this year, Ferrum Crescent announced it had signed an MoU with Principle Monarchy Investments (PMI) – described as “a BEE controlled South African company with extensive commercial interests in South Africa.” In terms of the MoU, PMI will acquire a 39 % stake in the project for a consideration of R142 million, with the incoming funds to be directed towards the BFS, with the next key stages to include large scale pit design and sampling work and assessment of the need for a bulk sample, as well as definitive metallurgical testing for full process design. In its latest quarterly report (issued at the end of July), Ferrum Crescent said it was expecting the first R2 million interim funding payment shortly (upon receipt of which the MoU will become legally binding).

A major advantage that South African projects have as opposed to those further north in Africa is that (current power constraints notwithstanding) they have access to generally good infrastructure. In the rest of Africa, developing iron ore deposits often means that mining companies have to address huge infrastructure deficits. This is the case with Sundance’s **Mbalam-Nabeba** project, for example, which – to get into Stage 1 production of 35 Mt/a of Direct Shipping Ore (DSO) – needs a 510 km rail line from Mbarga in Cameroon (and a 70 km rail spur connecting to Nabeba

*The Canga camp of Rio Tinto’s Simandou project in Guinea (photo: Rio Tinto).*

***A major advantage that South African projects have as opposed to those further north in Africa is that (current power constraints notwithstanding) they have access to generally good infrastructure.***



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in Congo) to Lolabe on the Cameroon coast to transport the ore. Also required is a Multi-Terminal Facility at Lolabe capable of loading 'China-max' vessels.

As a result of this heavy infrastructural demand, the total cost of the project has been put at around US\$5 billion – a huge hurdle for Sundance, essentially a junior company, to clear given current market conditions. The company though has made what it calls a "breakthrough" on this front, having signed a Transition Agreement with the Cameroon Government in June this year moving the funding and ownership of the port and rail link to the latter, leaving Sundance with responsibility for just the mine infrastructure.

Another project with a major infrastructural component is Rio Tinto's **Simandou** in Guinea, said to host one of the world's largest untapped (over 2 billion tonnes), high grade iron ore resources. According to Rio (whose partners in the project include Aluminium Corporation of China (Chinalco) and the International Finance Corporation), the resource can sustain a mine life in excess of 40 years at a production rate of 100 Mt/a and has the potential to make Guinea one of the world's top iron ore exporters. It requires, however, a new multi-user 650 km long railway line, the Trans-Guinean, linking south-east Guinea with the coast along the Southern Growth Corridor, as well as a new deep-water port at Moribaya, south of Conakry, which will be the first in Guinea to provide access to large cargo ships.

The cost of the project is estimated at a huge US\$20 billion (which would make it the biggest ever African mining development), with about two-thirds of this going into the infrastructure. Balanced against this, the economic impact of the project would be substantial and it would

probably double the size of Guinea's GDP.

Rio's plan is to develop Simandou in stages. Stage 1 encompasses the development of the southern Ouelaba mine to a capacity of approximately 50 Mt/a while Stage 2 would see the Pic de Fon deposit being developed, which would double capacity to 100 Mt/a.

The tentative date for first production at Simandou is 2019 but it not clear at the moment what impact – if any – the plunge in the iron ore price will have on this timeline. Of course, the public image of the project has been damaged by the ongoing dispute – now before the US courts amongst others – over two of the exploration blocks at Simandou, with Rio reportedly claiming that Beny Steinmetz's BSGR and Brazilian iron ore giant Vale had conspired to "snatch" its rights to the two blocks. As far as *Modern Mining* is aware, the blocks in question do not figure in the current development plan so – in theory – the legal wrangling should not impede the progress of the project but it could certainly deter potential investors.

Elsewhere in West Africa the outlook for new iron ore mining ventures is mixed. Many of the juniors are continuing to work on their projects but few seem to have made any really significant progress in recent months.

In Cameroon AIM-listed International Mining & Infrastructure Corp (IMIC) is planning an initial 1 Mt/a mining operation at **Nkout** and has promised a PFS in H2 2015 while, in Guinea, Sable Mining Africa, also listed on AIM, is continuing to progress its **Nimba** project. A PFS on Nimba completed in March last year outlined a US\$299 million mine able to produce 3 Mt/a and Andrew Groves, the company's Chief Executive Officer, said earlier this year that the goal was to

*A blast at Kumba's Sishen mine, Africa's biggest iron ore mine. It will produce 33 Mt of iron ore in 2015 (photo: Kumba Iron Ore).*

*The cost of Simandou is estimated at a huge US\$20 billion (which would make it the biggest ever African mining development), with about two-thirds of this going into the infrastructure.*



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Drill rig working at Ferrum Crescent's Moonlight iron ore project in Limpopo Province, South Africa (photo: Ferrum Crescent).

achieve commercial production in the second half of 2016.

In Liberia, Australian explorer Tawana Resources has slowed engineering and direct design work associated with the PFS on its **Mofe Creek** project with the aim of conserving cash. It did announce recently, however, that the discovery of Direct Shipping Ore on one of its newly acquired tenements offered “a potential strategic opportunity to mine and supply high-grade feed to an early start-up, low capital intensity project at a significantly reduced OPEX and CAPEX cost, due to very simple crushing and screening requirements only (i.e. no beneficiation).”

Although it is not normally considered an iron ore destination, Nigeria reportedly has iron ore resources amounting to around 3 billion tonnes (and some limited production). There is also at least one iron ore project under development. This is **Agbaja**, owned by ASX-listed Kogi Iron, headquartered in Perth. Kogi has completed a PFS which confirmed the viability of a 5 Mt/a project (with a capex of nearly US\$500 million). Kogi, however, has said this year that it is actively pursuing a “value realisation process”, which means that it is open to selling the asset or alternatively securing some sort of joint venture.

Moving further north to Mauritania, the country is the second biggest producer on the continent after South Africa. All of its production—roughly 13 Mt/a—is through SNIM (Société Nationale Industrielle et Minière), mainly owned by the state, which operates several mines. Glencore (through its subsidiary Sphere Minerals) was planning to build the US\$900 million **Askaf** mine in the country, with an initial capacity of 7,5 Mt/a, but the project has now been put on hold until the iron ore price provides some relief.

Summing up, Africa clearly has tremendous iron resources which have – by some estimates – the potential to support an annual production of 400 Mt, which is in excess of what is currently being produced by Brazil and Australia's Pilbara region, the two biggest sources of iron ore in the world. The problem is that many of the African projects outlined here would need an iron ore price at least US\$30/tonne better than what it currently is (around US\$60/tonne) to make economic sense. This being the case – and with many forecasters predicting further falls in the price – it seems fair to say that Africa's emergence as the world's next big supplier of iron ore is still years away. ■

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# Vertical ring WHIMS machines can boost chromite recovery

According to Multotec Process Equipment, its vertical ring Wet High Intensity Magnetic Separator (WHIMS) technology is proving effective in recovering the fine chromite in Platinum Group Metals (PGM) tailings.

**T**he need exists to separate platinum group metal rich silica and chrome as the first step in PGM beneficiation. The material is then milled even finer and the platinum is separated from the silica, commonly using flotation. Tailings in South African operations typically contain a large portion of unrecovered chromite, which can range from 8 to 20 % by mass and 80 % passing 100 microns. While this is fairly well liberated, with the minus 1 000 to plus 115 microns being recovered by spirals,



**Above:** Slimes dam ultra fine chrome separated from PGM containing silica with a Longi-Multotec vertical ring WHIMS machine.

**Below:** The Longi-Multotec vertical ring WHIMS machine for paramagnetic mineral beneficiation.



to date there has been no proven technology with which to recover the fine chromite.

Due to the fact that the chromite is paramagnetic rather than ferromagnetic, a very high force factor is required to attract this material. The Longi-Multotec vertical ring Wet High Intensity Magnetic Separator (WHIMS) now offers PGM tailings operations the ability to recover this chromite, says Willem Slabbert, Application and Process Manager at Multotec Process Equipment.

WHIMS is a well-known and proven technology across a range of commodity sectors having been extensively used in haematite beneficiation, in the recovery of ilmenite in minerals sands applications, in manganese beneficiation, copper beneficiation and pyrite scavenging. The application for the recovery of chromite is fairly new and Multotec is currently involved in extensive test work.

Magnetic field intensity is measured in Gauss and the field gradient is measured in units of Gauss change per mm. The field

intensity multiplied by the gradient is called the force factor and is responsible for separating minerals. The Longi-Multotec WHIMS machines typically have a force factor of 200 million Gauss<sup>2</sup>/mm and this is a vastly significant difference when compared to a traditional low intensity wet drum magnetic separator, which has only 20 000 Gauss<sup>2</sup>/mm.

“Trials indicate that the WHIMS can recover particles down to a fraction size as small as 5 micron, a characteristic that is attributed to the exceptionally high force factor. Particle sizes as small as 80 % passing 30 microns have been recovered. To put this in perspective, this particle size is finer than the diameter of a 40 micron human hair,” Slabbert points out.

In some areas PGM ore has a head grade of between 1,4 and 2,5 mg/t and the tailings that have been processed in the test work to date have had a head grade of 0,8 to 1,5 mg/t. This is significant given the fact that through the conventional flotation process it is not economically feasible to attempt to float the tails again if below 3 mg/t.

With the Longi-Multotec WHIMS, the chrome is removed so that a saleable product is recovered and, furthermore, the PGM grades are upgraded to above 3 mg/t. It then becomes economically feasible to refloat through existing capital infrastructure. This presents advantages over and above the costs associated with mining and the comminution process, which may well contribute to almost 60 % of the operational costs of a plant.

A major benefit of the Longi-Multotec WHIMS machine is that once the test work data has been verified the machine can be upscaled to a capacity of up to 300 t/h of solids (or 1 000 m<sup>3</sup>/h of slurry) through a single machine. Multotec is able to supply vertical ring WHIMS machine sizes in the range of 1 t/h up to 300 t/h.

“This high capacity completely overshadows the much lower maximum capacity of 30 t/h that a horizontal ring WHIMS can achieve. Extensive tests have shown chrome grades of 43,8 % are readily achieved with the vertical ring WHIMS, which is significantly higher than the industry standard of 42 %, and indicates that the percentage grade achievable on full



scale plants in all likelihood will be higher,” says Slabbert.

In addition to its proven increased recovery capacity, the Longi-Multotec WHIMS machine provides industry with a number of attractive benefits that are said to include ease of maintenance and operator friendliness, lower operating costs, environmentally friendly equipment operation and easy and reliable process performance.

The vertical ring WHIMS makes use of only one coil, resulting in savings on electrical infrastructure and electrical consumption for decreased capital cost of ownership and operational costs. By feeding into the slurry feedbox instead of directly onto the matrix, there is a better tolerance of feed fluctuation without the separation process being affected. Control of the machine is also improved and it is more reliable resulting in better separation consistency.

“Pulsation allows a cleaner product to be produced, with better upgrade ratios achieved under variable and controlled conditions. The matrix boxes in the rotor can be changed out in situ and individually after wear or damage to a box, eliminating a total rotor change out. This, again, provides significant operational savings and ease of maintenance,” adds Slabbert.

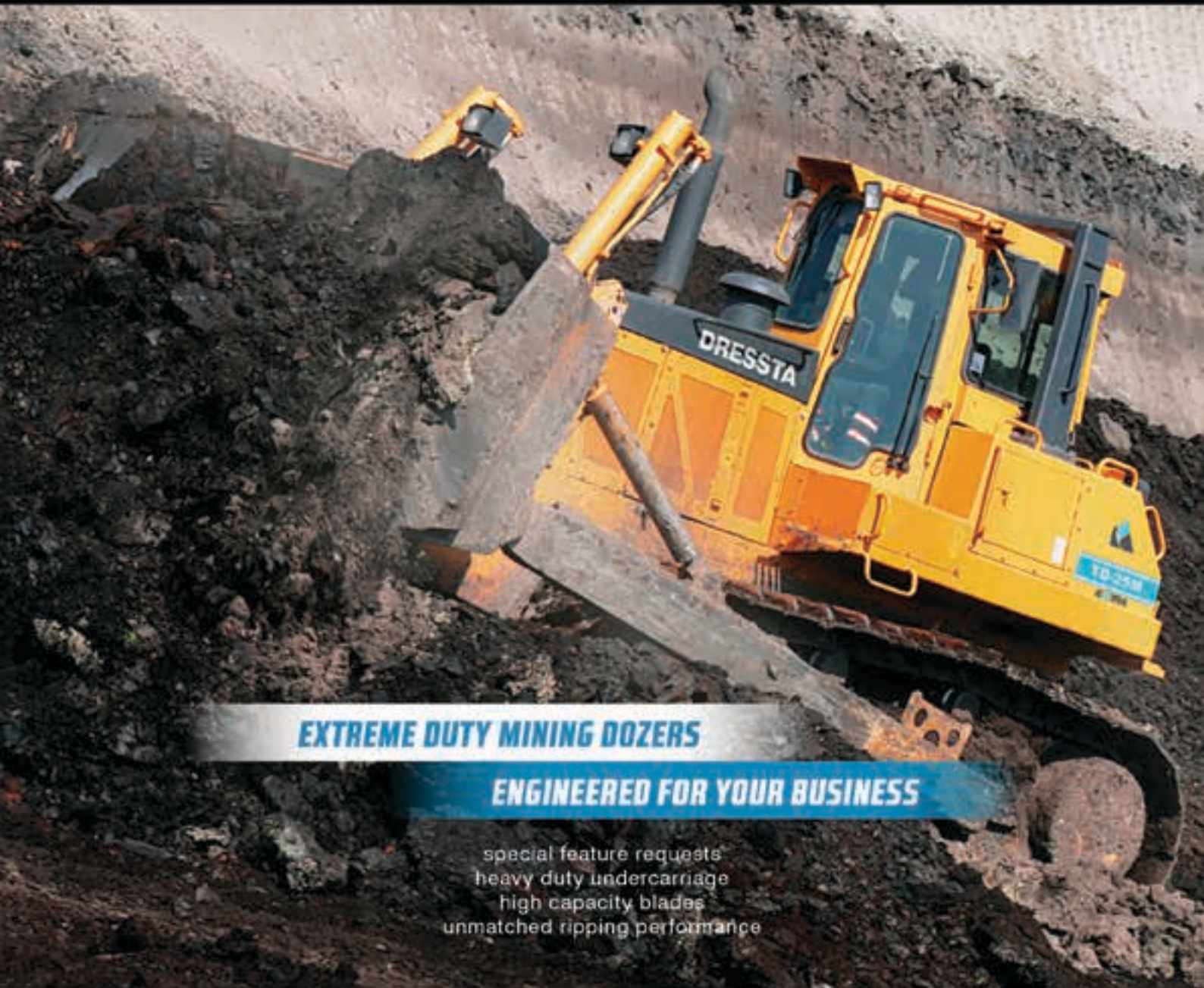
Slabbert explains that most of the test work has been done repeatedly using the Multotec vertical ring WHIMS on different samples and different seams of UG2, LG6 and MG tailings derived from Western Limb of the Bushveld Complex material, with some tests having been conducted on the Eastern Limb material. ■

*Two large Longi-Multotec vertical ring WHIMS machines, each capable of processing up to 150 tons per hour of solids.*

***“Trials indicate that the WHIMS can recover particles down to a fraction size as small as 5 micron ...”***

***Willem Slabbert,  
Multotec Process  
Equipment***

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# Drug and alcohol testing now a necessity on mines

*Spurred on by increasingly stringent legislation, virtually all mines now put a huge effort into ensuring that they have comprehensive safety systems in place and that zero harm comes to employees. But the best systems in the world can be compromised if employees whose performance has been impaired by the use of alcohol or drugs are able to find their way into the workplace. To prevent this happening, alcohol testing and drug screening are now commonplace procedures on mines all over Africa – and certainly in the case of South Africa virtually a mandatory requirement. A company which can provide all the screening and testing equipment required is Pretoria-based ALCO-Safe, one of the market leaders in its field in Africa.*



*The popular Lion AlcoBlow high-speed testing breathalyzer.*

**A**LCO-Safe has now been around for 43 years. Explaining its origins, Rhys Evans, a Director of ALCO-Safe, says the company was founded by his father in the 1970s with its main activity being the manufacture and marketing of weather instrumentation. The company also sold breathalyzers but this was very much the smaller part of the business, the only clients of significance in those days being the various police forces in the country.

“By the 1990s, the weather instrumentation business had weakened to such an extent that the decision was taken to focus on the breathalyzers, which were by then coming into much more widespread use,” says Evans. “This change of strategy proved successful and in 2009 the scope of the business was expanded to include drug testing and related services, a development which was largely driven by demand from our client base.”

Although ALCO-Safe has clients spread over a range of industries, the biggest single market for the company is the mining sector – not just in South Africa but all over the continent. “Our products are in use at mines all over Africa,” states Evans. “In most African countries the mining legislation – in the case of South Africa the Mine Health & Safety Act – states quite specifically that mines are required to ensure that their workers are not under the influence of alcohol or drugs, so we don’t have to justify or explain the need for our products. But we are operating in a crowded market – particularly when it comes to drug testing kits – so we do

need to market intensively to ensure that our customers and potential customers are aware of the breadth of our range and the quality of our products.”

The issue of quality is important as tests have to stand up in disciplinary and (in South Africa) CCMA cases. That ALCO-Safe’s products are indeed manufactured to very high standards is guaranteed by the fact that they are sourced from companies with global reputations in their fields – Lion Laboratories in the case of the breathalyzers ALCO-Safe sells and Alere Toxicology in respect of the drug testing kits it markets. Both companies are based in the UK (though both are ultimately US-owned).

ALCO-Safe has enjoyed a particularly long relationship with Lion and ranks as its second biggest distributor internationally. Operating

*Multi-panel drug test cups. These cups will provide indications from two up to ten different drugs.*





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from its own purpose-built premises in Wales, Lion is recognised as one of the pioneers of the breathalyzer industry and in 1980 it won the Queen's Award for Technological Achievement for its development of fuel cell sensor technology for use in breathalyzers. Its products are used by many UK police forces and are exported to more than 70 countries.

The products within ALCO-Safe's breathalyzer line are differentiated on the basis of speed and ease of use. "In all, we have five breathalyzer units plus a disposable unit," says Evans. "Our biggest seller is the Lion AlcoBlow Rapid Test which is a high-speed unit capable of testing 15 people per minute. It's the obvious choice for high volume locations such as mines where hundreds, sometimes even thousands, of people per day are passing through entrance points.

"At the other end of the range, we have the extremely sophisticated Lion Alcometer 600, which offers a full touch screen, a GPS facility and also data logging ability. The data logging feature allows information such as the test subject's name and ID number – as well as the operator's ID number – to be captured. Of course, with the built-in GPS the exact location at which a test has taken place can also be logged."

Evans adds that a new development, in conjunction with Lion, is an unmanned breathalyzer known as ALCOEntry, expected to be available in South Africa very shortly. "Typically, we see this being fitted to turnstiles and it will not allow access to anyone failing the test. It will have several optional extras, including a camera link," he explains.

In respect of drug testing equipment, ALCO-Safe can provide multiple solutions ranging from single strip drug tests which test for one specific drug type, multiple panel drug tests which test for six or ten different drugs in one test and drug testing cups which test for six or ten different drugs in one cup. Disposable saliva tests are available to test for six different drugs in one test.

Evans says the flagship of the range is the Alere DDS2, which combines speed, ease of use and reliability. Test results for multiple drugs are available within five minutes once a saliva sample has been collected. The system is lightweight, portable and compact with a full colour screen – readable day or night – and can store 10 000 results.

Says Evans: "Drug abuse is now starting to be very common and we've seen a huge increase in demand over the past couple of years for drug testing equipment – from all industries but

particularly mining. One of the problems in Africa is that – South Africa apart – there seems to be very poor control of prescription drugs. One result of this is that we're seeing very brisk demand for our ten panel tests, which test for not just the normal illegal drugs such as cocaine and marijuana but also the most common prescription medicines that are abused."

ALCO-Safe can provide training and certify personnel in the correct operation and usage of all the products it sells and also offers a complete rapid repair and calibration service on its electronic devices.

Evans stresses that while it is perfectly legal for mines to screen employees for alcohol and drug use, great care has to be taken when testing programmes are planned and instituted. "Management cannot simply impose programmes arbitrarily without due regard for workers' rights," he says. "It's important to follow the right procedures and absolutely imperative that the unions are brought on board and that concerns they might have – for example, over the reliability of test results – are addressed. We can help with this. The experience we've gained over many years means that we can advise on the development of substance abuse policies and control programmes that are effective, fair to all parties and legally compliant."

A final point that Evans makes is that the benefits to mines of having substance abuse programmes in place goes well beyond simple compliance with the law. "There's no question that abuse of alcohol and drugs negatively affects the competence and productivity of workers," he states. "While it's difficult to quantify the scale of this impact, I think that few would disagree with the proposition that ensuring that workers are free of alcohol and drugs must result in improved productivity, better relationships in the workplace and a reduced potential for accidents to occur, which are all benefits that eventually translate to the bottom line." ■



Multi-panel drug screen tests are used to test urine samples for a variety of drugs of abuse, providing an instant result at the point of care.

**"One of the problems in Africa is that – South Africa apart – there seems to be very poor control of prescription drugs."**

**Rhys Evans, Director of ALCO-Safe**



## BAUMA CONEXPO AFRICA 2015 will

*From the point of view of the mining industry, which is currently in deep recession, the upcoming BAUMA CONEXPO AFRICA – designed to be a showcase for the latest in construction and mining machinery and equipment – is perhaps not being held at the most propitious of times. Nevertheless the organisers, B C Expo South Africa, report a tremendous response from both the construction and mining sectors and Elaine Crewe, the company's CEO, says the 2015 show will comfortably exceed in size the launch event, held in 2013 under the name of bauma Africa.*

**A**s this article was being written in mid-August, the amount of exhibition space booked was in the region of 68 000 m<sup>2</sup> compared to 65 000 m<sup>2</sup> in 2013. In terms of visitors, the 2013 show attracted 14 700 visitors from 110 countries, just marginally short of the target of 15 000. Says Crewe: "Our target this year is similar and, in particular, we're looking for more visitors from African countries (other than South Africa), as they constituted only 6 % of attendance in 2013. We've made a big investment in establishing offices and agents in a number of African countries in order to publicise the show and we've also put up billboards in several

countries, which has proved very successful.

"In addition, I and some of my colleagues – including representatives of our German principals – have been on a 'road show' in the SADC region to promote the event. As a result, we've managed to secure the support of several important industry associations – for example, the Chamber of Mines of Botswana."

The venue for bauma Africa 2013 was Gallagher Convention Centre in Midrand but the 2015 show is to be held (from 15-18 September) at the Johannesburg Expo Centre (Nasrec). Commenting on this decision, Crewe says that while Gallagher is an excellent venue, it cannot really cater for an event of the size of BAUMA CONEXPO AFRICA.



Elaine Crewe, CEO of B C Expo.

“We filled out all available space in 2013 and in fact we couldn’t accommodate some companies who applied to participate at the last moment, even after we expanded the outdoor exhibit area,” she notes. “There is no danger of this happening at the Expo Centre, as it is one of the largest trade fair venues in Africa, offering over 50 000 m<sup>2</sup> of purpose-built hall space and around 60 000 m<sup>2</sup> of outdoor space. Other pluses are that the floors at the Expo Centre are designed to cater for heavy loads, which means that exhibitors can display their biggest machines, and the ample parking available.”

On the subject of the change of name of the show, Crewe says that Messe München International (MMI), which is the organiser of bauma in Munich and is B C Expo South Africa’s parent, has had a strategic partnership with the Association of Equipment Manufacturers (AEM) in the US dating back several years. “AEM – which represents more than 850 companies – is the organiser of CONEXPO in Las Vegas, one of the biggest trade fairs in the world,” she explains. “They supported bauma Africa in 2013 and this arrangement has now been formalised via a joint venture. The primary responsibility for organisation remains



**Above:** The 90-t capacity Belaz 75581 dump truck pictured on the Belaz stand at the 2013 show. Belaz has also signed up for this year’s event.

**Left:** Held at Gallagher Convention Centre in Midrand, bauma Africa 2013 attracted 754 exhibitors.

with B C Expo South Africa but AEM is responsible for marketing in North America and will host a North American pavilion at the event.”

## exceed the 2013 launch show in size



Krugersdorp-based AARD Mining Equipment, whose stand at bauma Africa 2013 is seen here, will once again be exhibiting.



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Crewe notes that a supporting programme will be introduced for the first time at BAUMA CONEXPO AFRICA. Included will be ‘country specials’ to be held in the Forum area, which will focus on the opportunities and challenges presented by selected African markets, and ‘industry specials’, which will see experts and associations from the construction and mining industries discussing trends and technologies within these two sectors. The Chambers of Mines and other associations from countries such as Namibia, Botswana, Mozambique and Kenya will participate in the country specials and present projects in the planning and developmental phases.

It is not uncommon for shows with some crossover in terms of visitors and exhibitors to run in parallel and this strategy is being adopted for BAUMA CONEXPO AFRICA. Says Crewe: “Co-located with the show will be IFAT Environmental Technology Forum Africa, which will showcase the latest environmental technologies available to the construction and mining industries in respect of water, sewage, refuse and recycling. IFAT is well-known internationally and is one of Messe München’s biggest events after bauma in Germany. It is now being staged in Africa for the first time and we’re expecting in the region of 100 exhibitors

and 2 000 visitors. We anticipate that most of these visitors will also visit BAUMA CONEXPO AFRICA.”

The bauma Africa show in 2013 had a very international flavor with the exhibitors coming from 38 countries. Based on current bookings, BAUMA CONEXPO AFRICA will be no different. China will have the single biggest contingent from overseas with nearly 130 companies having booked space (as of early August). Other countries with sizeable representation include Germany, with over 50 exhibitors, Italy with 34, the UK with 24 and Turkey with 15. A number of countries or regions will have pavilions at the show. These are China, North America, Finland, Germany, Italy, France, Spain, the UK and the Walloon Region (this last being the French-speaking part of Belgium).

When bauma was first staged in Germany in the 1950s it was purely a building machinery (‘baumaschinen’) show but in recent years MMI has made a huge effort to position it as a construction and mining machinery event. The question is, how successful has this been? Certainly bauma Africa in 2013 managed to attract many mining exhibitors and Crewe says this year’s show will build upon this success. “We have marketed very intensively to the mining industry and we estimate that a large

*The Barloworld Power stand at bauma Africa 2013. The company will participate at this year’s show.*



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number of our exhibitors will be from this sector, although it is difficult to be precise as so many companies are active across both mining and construction,” says Crewe.

Bell Equipment was one of the anchor exhibitors in 2013 and, amongst other things, unveiled its 60-ton B60 ADT, very definitely a mining machine, at the event. This year it will have an even bigger presence with its stand in the outdoor area including a pre-production large ADT from its latest E-series generation of trucks. Other companies offering heavy plant for mining will include Barloworld Equipment, Case Construction Equipment, HPE Africa, which markets and supports Hyundai

earthmoving equipment, JCB dealer Kemach Equipment, Hitachi, Daewoo and Belaz (which has the world’s biggest rigid dump truck in its line-up).

The presence of Caterpillar dealer Barloworld Equipment is a particularly exciting development for BAUMA CONEXPO AFRICA as the company is one of the market leaders in its field. The Caterpillar range it represents is arguably the most complete line-up of products for mining and construction available from a single manufacturer.

On the underground mining side, a company to look out for will be Krugersdorp-based AARD Mining Equipment, established under

*A pre-production model from the Bell E-series large articulated dump truck range will head up the company’s extensive product offering that will be on display at the show.*

## MBE Minerals has more than 40 years of African experience

MBE Minerals South Africa, with a legacy of over 40 years on the African continent, will share its technology capabilities and services with visitors to BAUMA CONEXPO AFRICA. MD Johannes Kottman explains that the company is focused on providing a complete technical solution to the mining sector that encompasses innovative technology, capital equipment and support services.

As one of the leading suppliers of iron ore and coal beneficiation technology, MBE Minerals offers basic and detailed engineering, components for complete plants and systems including modernisation and capacity increase measures, as well as automation and process control equipment.

The company’s scope of services includes feasibility studies, raw material testing, financing concepts, erection and commissioning, personnel training and pre- and aftersales services. Available technologies include its Pneuflo<sup>®</sup> flotation, BATA<sup>®</sup> jig, ROMJIG<sup>®</sup>, Jones<sup>®</sup> Wet High Intensity Magnetic Separator (WHIMS), PERMOS<sup>®</sup> (LIMS), the Palla Vibrating Mill<sup>®</sup>, TESKA<sup>®</sup> HMS Separator and a wide variety of screens and feeders.

MBE Minerals SA receives expertise and technical support from its worldwide network, including the MBE Coal and Minerals Technology’s R&D centre in Cologne, Germany. The R&D centre consults with customers from all parts of the world with regard to optimum processing and this service is backed

up by an in-house laboratory facility and pilot test work capabilities. The centre is also used as a training facility for customers, either on general mineral processing or on the operation and maintenance of specific MBE equipment. ■



*BATA<sup>®</sup> jig from MBE Minerals SA offers excellent separation accuracy.*



Nicola Cristantielli  
with an Indeco HB 27  
from 1990.  
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The models in this photo are both 25 years old. But only one of them looks it.

We trust our friend Nicola won't be offended, but our HB 27 doesn't really look its age, even after 25 years of hard work. It could be because when we design our products, we listen to what our users have been asking for. Or because we make them at our factory in Italy, with special materials manufactured exclusively under our patents. Or because we put all of our hearts into testing and after sales service. Perhaps it's because all Indeco products, old and new, are made for demolition and built to last.



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its present name in 2008. Its speciality is the design and manufacture of trackless mobile mining equipment and it had an impressive stand – in fact, one of the biggest at the show – in the outdoor area at bauma Africa 2013.

Among the drilling companies represented will be Botswana's Bauer Dewet Equipment, which manufactures a range of rigs at its premises near Gaborone. It is a joint venture between Dewet Drilling, one of the leading drilling companies in Botswana, and Bauer Maschinen of Germany.

Companies offering process solutions to the minerals industry will include MBE Minerals South Africa (see sidebar), which is particularly focused on iron ore and coal beneficiation technology, Birkenmayer, which – among other things – is the South African agent for the Eirich range of industrial mixers, and Haver Southern Africa, whose product range includes screening, washing and pelletising technology.

A company which exhibited in 2013 and will be returning this year is Eazi Sales & Service, the local distributor for JLG and Magnis telehandlers. Also offering access and lifting equipment will be the Goscor Group, which has booked two stands.

Finally, and on the subject of future events, it is worth mentioning that the originally



JCB machines on show at bauma Africa 2013.

planned two-year cycle for BAUMA CONEXPO AFRICA has now been changed. "This current show is obviously being held two years after the first one but going forward BAUMA CONEXPO AFRICA will be held every three years – which means that the next one will be in 2018," Crewe explains. "It's a decision we've taken after close consultation with local and international industry representatives – including CONMESA (Construction and Mining Equipment Suppliers Association) – who recommended the three-year cycle for the markets of Africa. We're confident that the decision is the right one and that it will ensure the success and sustainability of the show over the long term."

Report by Arthur Tassell

## Comprehensive lifting solutions from Torre

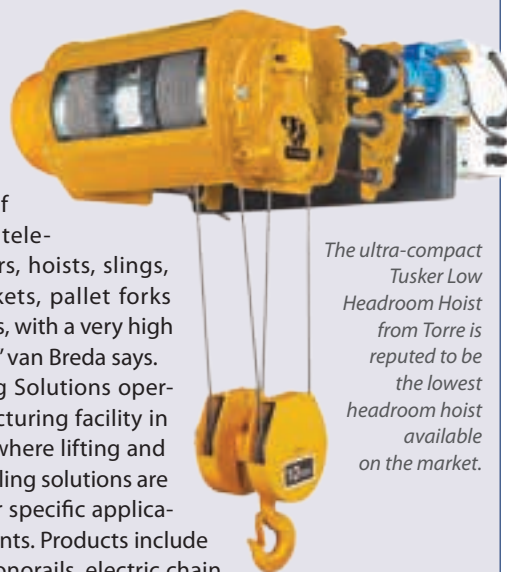
Torre Lifting Solutions will use its presence on the Torre Industries stand at BAUMA CONEXPO AFRICA to showcase its comprehensive lifting solutions to the local and African market. Incorporating SA French and Elephant Lifting Equipment, Torre Lifting Solutions offers a large and diverse footprint of customised lifting and materials handling solutions from respected leading brands.

The company offers a genuine single supply source for tower cranes, purpose built overhead cranes, slings, shackles, concrete buckets, pallet forks and brick baskets. It is the sole Southern African distributor for the reputable Potain range of tower cranes. According to Technical Director of Torre Lifting Solutions Quentin van Breda, it has been recognised as an Elite Dealer by Potain of France, which means a guarantee of 80 % availability of spare parts on first call.

"Access to parts and consumables is critical as many of the projects on which our equipment works are of a fast-track nature. In addition to the Potain tower cranes, we also distribute a hoist range from Orbit as well as offer this product on rental. Dieci telescopic handlers and self-loading mixers are a new

addition to the product line up, and we operate a rental fleet of tower cranes, telescopic handlers, hoists, slings, concrete buckets, pallet forks and brick cages, with a very high utilisation rate," van Breda says.

Torre Lifting Solutions operates a manufacturing facility in Pretoria West where lifting and materials handling solutions are customised for specific application requirements. Products include EOT cranes, monorails, electric chain hoists, chain and lever blocks, winches and wire rope pulling machines, lifting and spreader beams, slings, shackles and rigging accessories. ■



The ultra-compact Tusker Low Headroom Hoist from Torre is reputed to be the lowest headroom hoist available on the market.

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## New triple deck screen offers volume and versatility

Pilot Crushtec International believes its recently launched DynamiTrac TDH6118 triple-deck screen is one of the most exciting developments in the company's 25-year history. Designed and built completely in-house, it represents a new departure in high output screen technology.

Pilot Crushtec International CEO Sandro Scherf describes the rationale behind the new product's introduction: "The mining and construction industries have become even more competitive as a result of current market conditions, both locally and globally. This in turn puts increased pressure on margins and, as a result, more emphasis than ever on designing and building equipment that will bring down the average cost per tonne of a given material. That is the purpose for which the DynamiTrac is intended."

The unit is by far the largest product ever built at the company's Jet Park-based manufacturing facility situated close to OR Tambo International. The track-mounted, mobile triple-shaft, triple-deck horizontal screen is designed to produce as many as four products simultaneously with a capacity expected to easily exceed 350 tonnes per hour (tph).

Scherf believes that the DynamiTrac is poised to succeed in both domestic and



The track-mounted, mobile triple-shaft, triple-deck horizontal screen is designed to produce as many as four products simultaneously.

export markets. "On the one hand, it will serve as a key import replacement, providing local operators with a homegrown solution for the cost effective production of high quality aggregate," he says. "We do believe, however, that the economies offered by the DynamiTrac also make it a paying proposition in export markets, especially with exchange rates at current levels."

The TDH6118 will be going into production around the last quarter of the year. In the interim, the initial prototype is undergoing an exhaustive 2 000-hour field trial at a quarry in Ventersburg, 180 km north of Bloemfontein.

The site belongs to SANRAL and is currently servicing five separate road renovation projects. Danohar Contracting, which is managing the operation, is keeping a critical eye on the DynamiTrac and Director Royden Webster is impressed with the machine's potential.

"Even at this early stage we rate it as a very capable screen, highly productive and easy to operate. As this is a brand-new product, we're taking things cautiously and operating at around 150 tph, but estimate that it could be capable of delivering as much as three times that amount."

Pilot Crushtec International, tel (+27 11) 842-5600

### 'SLAP' system boosts operational efficiency

SEW-EURODRIVE Johannesburg has improved its operational efficiency by as much as 40 per cent, after rolling out its new standardisation of logistics and assembly processes (SLAP) system earlier this year.

SLAP specifically focuses on the goods receipt process, assembly and capacity planning, commissioning assembly, and packing and shipping. SLAP was initially implemented at SEW-EURODRIVE Germany, with South Africa being the sixth country to roll out the efficient new system.

According to SEW-EURODRIVE General Manager Finance Gerd Seuffert, it took eight months to implement SLAP due to the large-scale factory refitting, re-orientation and training necessary to accommodate the system.

"Now that the system is up and running, it has become apparent that all the hard work and investment was worth it. Conservatively, it's safe to say we have seen an operations improvement of between 30 to 40 per cent," he states.

Since the implementation of SLAP, Seuffert says there has been a marked improvement at the Johannesburg branch on the goods receiving side. "One of the major benefits is that SLAP barcodes enable local warehouse staff to identify exactly what parts are in a fully-loaded container from Germany, for instance."

He adds that each part can be quickly matched up with the corresponding job via the SLAP interface, before being sent for assembly. Prior to the implementation of SLAP, Seuffert reveals that it would have taken a significant time to perform this task. "Now it takes a matter of hours, which has resulted in significant time and cost savings," he continues.

Seuffert indicates that efficiencies have also been greatly improved on the assembly line. Once the assembly department receives the parts, job sheets are printed and allocated for assembly by SLAP according to a work cell's availability, capacity and skill set.

"The SLAP system also tracks how long

it takes each particular cell or worker to retrieve the necessary parts, assemble and pack a unit. This not only enhances productivity, but also enables the branch to accurately predict when an item will be ready for dispatch," says Seuffert.

"Dispatch matters had to be handled manually in the past. Now all dispatch items are electronically logged, located and invoiced via the SLAP system, which can also automatically transfer data to a courier's system via standardised message formatting. Depending on the requirements, this in turn triggers a carrier sticker or list, and opens up the opportunity for multiple deliveries via one transport or delivery group," he says.

The rollout of SLAP at SEW-EURODRIVE Johannesburg represents the first step in SEW-EURODRIVE South Africa's nationwide rollout of the system. A further four branches will implement the system in the near future, taking into consideration the lessons learned during the rollout in Johannesburg.

SEW-Eurodrive, tel (+27 11) 248-7000



Jaco du Toit - 12 years



Christina Ramotsabi - 9 years



Ricardo Montoya - 25 years



Rejean Foisy - 25 years



Godwin Dzwauro - 26 years



Noel Mills - 33 years



Anthony Yell - 33 years

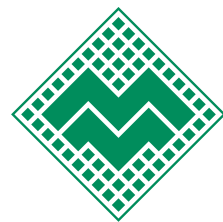


Roy Roche - 34 years

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## Flotation devices added to rental fleet

Integrated Pump Rental now has a range of Pump Flotation Devices (PFDs) and Hose Flotation Devices (HFDs) available for customers to purchase or hire. A sister company to Integrated Pump Technology, Integrated Pump Rental is focused on providing its customer base with cost effective solutions that meet specific needs in the market.

Lee Vine of Integrated Pump Rental explains that a PFD is used to suspend the pump during pumping operations. "This prevents the pump from burrowing into the bottom of the dam/stopes/pond, thus eliminating situations where a pump could be damaged or lost if this happened. The use of a PFD will also significantly reduce the wear on the pump, since it is not in direct contact with the sediment at the bottom during pumping operations."

The exterior or outer skin of the PFD used by Integrated Pump Rental is manufactured from low density high strength polyethylene and is filled with poly-

urethane foam, which ensures that the flotation device will not sink, even in the unlikely event of the outer skin being punctured.

Integrated Pump Rental is able to supply three different sizes of PFDs with carrying capacities of 250 kg, 600 kg and 1,2 t. In the event that a heavier mass needs to be suspended, a number of PFDs can be used in series to accommodate this.

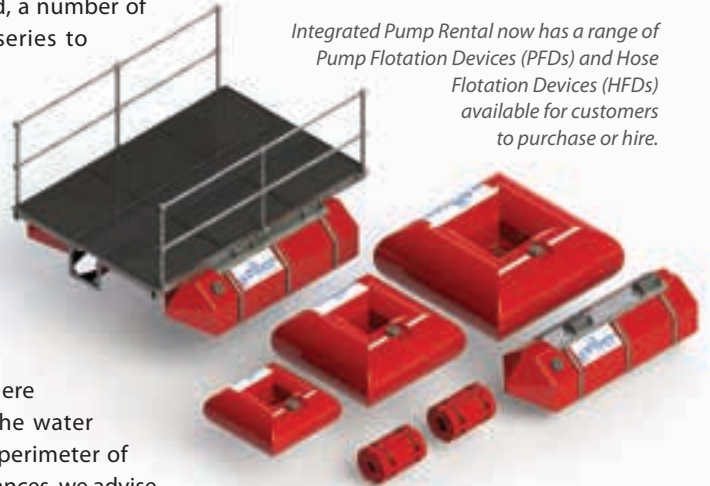
Hose Flotation Devices (HFDs) are used to suspend hoses during pumping applications where either pontoons or barges are used and the hose needs to be suspended above the water, or where hosing is laid across the water instead of around the perimeter of the water. "In these instances, we advise

customers to route the pipework across the direct line of sight to the barge or pontoon. This will result in substantial cost savings," Vine points out.

The HFD from Integrated Pump Rental has been engineered to accommodate cables that cover the same distance as the hoses. HFDs are available in all common hose sizes.

Lee Vine, Integrated Pump Rental, tel (+27 72) 627-6350

*Integrated Pump Rental now has a range of Pump Flotation Devices (PFDs) and Hose Flotation Devices (HFDs) available for customers to purchase or hire.*



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## Flexible dewatering solutions from Weir Minerals Africa

Dewatering solutions for open pits and slimes dams generally comprise a choice between undertaking civil construction for pump stations or selecting a mobile pontoon or skid-mounted pumping solution. Experience indicates that the land-based pump station does not always have the same flexibility that pontoon or skid-mounted pump sets would offer.

Howard Jones, Weir Minerals Africa's Product Manager – Dewatering Africa and Middle East, says that this is apparent in the fact that pontoons are installed at the source, making pumping more efficient as the pumps face consistent suction conditions.

In addition, pontoon or skid-mounted pumping solutions can be readily migrated to wherever they are required. This eliminates the costly and time consuming alternative of developing a new pump station for each location.

Weir Minerals Africa is one of three Weir Minerals global design centres that focus

on pontoon and structural design specifically, with modifications implemented for local conditions. The selection of the pumping unit could include any of the well-established Weir Minerals brands such as Warman® and Multiflo® and could vary from pure dewatering or dirty water pumps to submersible dirty water pumps, as well as heavy duty slurry submersible and other end suction products.

Multiflo® pontoons are constructed with integral access walkways which could either be fixed to the bank or floating. The walkway holds the cable and piping from the docking station to the shore and provides ready access to the pumps for inspection or regular maintenance. Light masts, as well as LED strip lighting, form part of the offering and are supplied according to clients' requirements.

The pipes comprise Linatex® rubber hoses which are also locally manufactured by Weir Minerals Africa and offer the customer extended wear life because of the



One of two Warman DWU 125 dewatering pumps mounted to a pontoon and walkway during assembly phase.

specialised rubber compounds used in their manufacture.

Solutions available from Weir Minerals include complete steel pontoon barges as well as linear low density polyethylene flotation devices with steel frames for lighter applications, where mobility from one pond to another is required. These designs can handle most Weir Minerals pump offerings, with a load bearing capacity from 500 kg to 10 t, including the structure.

Rene Calitz, Weir Minerals Africa, tel (+27 11) 929-2622

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HazardAvert® is a proximity detection system designed to increase safety awareness and prevent accidents and injuries by detecting when a person enters a specifically marked area (zones) around operating machinery. When these zones are breached, the system emits an audible and visual warning alarm and can be programmed to automatically slow down or stop the machine.

HazardAlarm™ is a simplified, alarm-only proximity detection system that uses a single generator to create an electromagnetic field around machinery to warn the machine operators and individuals of the potential for collision. It is ideal for use on any haulage type machinery. Because it uses only a single generator, it is a cost-effective, easy to install proximity solution.

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- System can be programmed to slow down and stop machinery

#### HAZARDALARM™

- Used for entry monitoring
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- Will only alarm when there is a potential for collision between the machinery and a PAD

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## Cat articulated fire truck a world first



During a fire, the main tank has the capability of deploying 2 900 litres per minute from a height up to 28 m and an estimated range of close to 45 m.

The colour is distinctively red, which is unusual for a Cat machine, but then again this is an emergency response vehicle, and a very unique one, which took close to a year to design and configure.

Built around a Cat 740B articulated truck chassis, Johannesburg-based specialist body builders and fluid handling specialists, Cobra Petro Projects, have developed what is believed to be a world first: an all-terrain vehicle that combines and inte-

grates a rescue and fire-fighting aerial sky lift platform with an on-board 21 000 litre tank incorporating an AFFF (Aqueous Fire-Fighting Foam) compartment, pumping equipment, plus allied hose and cannon connections. The truck also has an on-board fire suppression system.

It's a formidable machine purpose-built for Kumba Iron Ore's Sishen mine that meets exacting safety and performance standards.

"Globally, conventional designs to date have seen aerial platforms mounted on rigid on-highway vehicles," explains Cobra Petro Projects' MD, Lloyd Darby, "but never to our knowledge on an articulated truck and not in combination with a water bowser tank system." Cobra secured the order from Southern African Cat dealer, Barloworld Equipment.

The sky lift is designed to reach a vertical height of around 28 m (with the stabilisers down) and supports a basket with a 325 kg carrying capacity for trans-

ferring personnel to safety during a fire. A stretcher attachment facilitates rescue operations for injured personnel. The basket rotates 360 degrees endlessly via a rotary union arrangement in the turret and is connected via telescopic pipe work to the water tank. The sky lift draws its 24 V power from the Cat diesel engine, whilst the fire-fighting pumps operate off the hoist hydraulic system.

The aerial technology was provided by Finnish original equipment manufacturer, Bronto Skylift, in consultation with their South African agent, Fire Raiders, the latter responsible for installing the fire-fighting equipment. Technical input was also provided by Caterpillar's articulated truck manufacturing centre in Peterlee, England.

One of the biggest challenges was the need to identify the best position for the truck's 21 000 litre tank, which needed to be positioned on top of the sky lift platform tied in to the chassis, thereby optimising the centre of gravity and weight distribution.

The final gross vehicle mass is around 70 tonnes, of which the cab and chassis account for approximately 28 000 kg.

During a fire, the main tank has the capability of deploying 2 900 litres per minute from a height up to 28 m and an estimated range of close to 45 m. The truck also comes equipped with lay flat hose connections, as well as hose reels for bush fires.

Another distinctive feature is the integrated 1 800 litre AFFF tank section. AFFF technology significantly improves fire-fighting capabilities by depriving oxygen at the source of the flames. Three settings enable either a one, three or six per cent foam additive.

Barloworld Equipment, tel (+27 11) 929-0000

### Latest version of GEOVIA Surpac released

Dassault Systèmes has announced the release of the latest version of GEOVIA Surpac, the popular geology and mine planning software. Surpac 6.7 features design improvements for grade estimation and vast increases in the processing speed of block models.

According to Dassault, Surpac 6.7 helps users to optimise performance of block models through its support of multiple CPU cores, dramatically reducing estimation times from hours to minutes.

The new software offers an up to 95 % reduction in processing times for block model operations such as estimations. It is

also said to deliver an up to 200 times performance improvement for inverse distance, ordinary and simple kriging, and nearest neighbour estimations when used with a minimum recommended configuration of a Quad core CPU with hyper-threading.

Advanced Drill & Blast functionality allows for easier editing of blast holes and animation of blast sequence.

As Surpac 6.7 uses the available processors to their fullest capacity, performance improvements for certain operations will be in line with the number of cores available.

Dassault Systèmes South Africa, tel (+27 11) 805-0277

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## Advanced fire-rated cables from Helukabel

Advanced cables with the ability to maintain their integrity for up to two hours in fire conditions have been introduced locally. The new generation cables are designed to self extinguish when exposed to flames and are halogen-free so will not emit corrosive or toxic gases under fire conditions.

The new Helufire PH30/120 cables from Helukabel expand the company's range of function integrity products that include a large variety of security cables, as well as heat and fire resistant cables.

"The range of Helufire cables is specially designed to withstand direct flames and heat

of 850 deg C for 30 minutes for the PH30 cables and two hours on the PH120 cables. They are also shock resistant and able to withstand the kind of forces that one might expect in a severe fire-related incident with falling objects or even shock from blasts caused by flammable substances exploding," says Doug Gunnewegh, MD of Helukabel South Africa.

"All Helufire cables are also manufactured in accordance with BS EN 50200:2006 which requires tests to be conducted to verify circuit integrity of cables exposed to fire at 850 deg C for the required duration as well as mechanical shock."

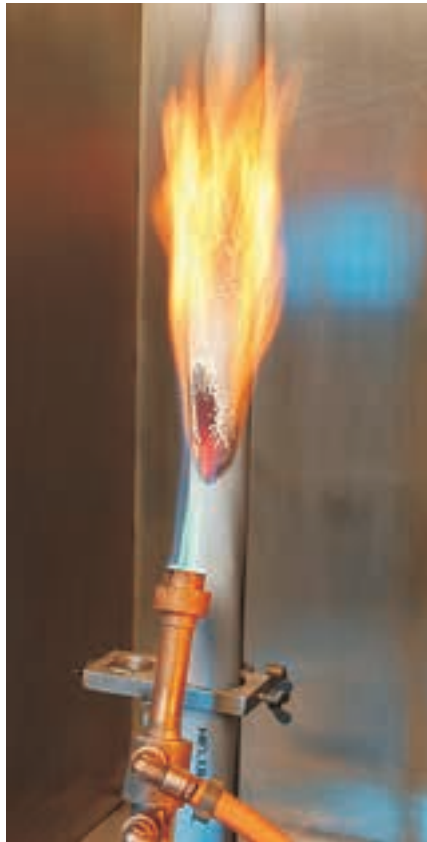
Helufire cables are typically used in industrial complexes, power stations, communal establishments, mines and public places or wherever the highest levels of function integrity are required to ensure the safety of people, animals or property. The cables are suitable for fixed installations on or beneath plaster in dry and moist room applications. They are also suitable to be run outdoors or underground in conduits that exclude excessive water build-ups.

The cables are available in 2 or 4 core varieties from 1 mm to 2,5 mm cross sections to complement Helukabel's extensive range of function integrity cabling products and accessories.

The line up of new products is further bolstered by security cables up to 1 kV with the ability to withstand bare flames for extended periods of time with ratings up to three hours.

In addition to cables, Helukabel also offers the full range of Spelsberg function integrity junction boxes and enclosures. These are able to match the cable products with different flame resistance ratings with the additional benefit of having IP67 protection ratings for dust, water and mechanical stress resistance.

Helukabel South Africa, tel (+27 11) 462-8752



*Helukabel fire testing of cables.*



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Afrimat has established a strong foothold in contracting services comprising mobile crushing, screening, drilling and blasting.

Backed by more than 45 years' experience, Afrimat listed on the JSE Limited in 2006. As part of its continued diversification strategy, the group is expanding its footprint into Africa.

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## Cameras provide frontline defence against belt fires

Advanced thermal imaging cameras are being used as a frontline defence against fires on conveyor belts transporting warm materials or in instances where a risk of fires poses a danger to people or process equipment.

Although infrared thermal imaging cameras are not new in military and law enforcement circles, the adaptation of the cameras to meet industrial applications is

unusual. Ruggedised versions from specialist manufacturer Land have been designed to work in gruelling industrial applications using non-military type technology that circumvents the need for expensive export licences.

Introduced locally by process specialist Protea Automation, the new range of cameras can operate in environments such as mining.

According to Protea Automation's Product Manager Gavin Westley, the cameras are used to detect hotspots that are above the desired temperature of materials being transported. With parameters stored on board the camera as well as on the Arc Land Imaging Processing Software (LIPS), the detection of a hotspot will trigger an alarm and set in motion a sequence of measures to prevent fire and avoid damage to the belt.

In the event of the Scada or control system being unavailable for whatever reason, the onboard intelligence of the

camera acts as a failsafe system and still triggers an alarm.

"Management of warm materials on conveyors is a hot topic following a recent fire which destroyed an entire incline conveyor system at a lime manufacturing plant in the Northern Cape which caused several millions rands damage to the plant and led to considerable loss of production," says Westley.

"Following the catastrophe we were called in to design and install a system to prevent a recurrence of this type of event and have subsequently installed Land Arc Thermal cameras as well as scanners to identify hotspots, as well as identify trends which show when the temperature of clinker from the rotary kilns is rising above the normal range. With the equipment and procedures in place, the plant is now able to significantly reduce costly belt repairs, reduce downtime and prevent dangerous situations from occurring in future."

Gavin Westley, Protea Automation, tel (+27 11) 719-5700



Land Arc thermal imaging cameras installed at a lime manufacturing plant in the Northern Cape.

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## Coal handling equipment in demand

Despite tough times in the coal sector, Johannesburg-based equipment manufacturer Osborn reports continued demand for its robust coal handling equipment, both locally and as far afield as Turkey and China.

Since January this year, Osborn has supplied a range of machines to coal producers in South Africa's Waterberg area, Mpumalanga and KwaZulu-Natal, as well as



A typical Osborn rotary breaker installation.

in China and Turkey. The equipment supplied includes two 3054 Osborn double roll crushers, two vibrating grizzly feeders, a 6' x 16' triple deck modular screen, a 3 600 mm x 6 700 mm Osborn rotary breaker and two 3036 Osborn double roll crushers, says Product Specialist Etienne Swanepoel.

"Osborn has been supplying the coal industry with tough, high quality equipment for more than five decades. The current economic climate may be challenging, but our customers clearly recognise the value of hardworking, long wearing machines that have proved themselves in the market and have the backing of a well-established, reputable manufacturer," he adds.

Osborn supplies coal handling equipment ranging from the largest jaw crusher and rotary breaker to mineral sizers, double roll crushers, rolling ring crushers, modular plants and vibrating equipment, right down to the smallest components, laboratory crushers and conveyor idlers.

Swanepoel says that the company's recent sales enquiries and its order for a rotary breaker for an Mpumalanga coal mine reflect the resurgence of this machine in the coal industry. "The rotary breaker has come back into favour in the coal industry. Its simplicity and the fact that it offers reduced operating costs and minimal downtime is making it sought after – particularly in these difficult economic times." He notes that the rotary breaker has proved to be the most efficient machine for use in 'dirty' coal mining environments.

Osborn rotary breakers are capable of

processing up to 2 000 t/h with a maximum feed size of 600 mm, depending on the type of coal being processed. Swanepoel says that the machine is generally fitted with screen plates to continuously produce one product size. "Should the product size need to be changed, new sized screen plates would have to be fitted. Due to variations in the types of coal being processed, capacities and power requirements will also vary from mine to mine," he stresses.

Swanepoel says that the Osborn rotary breaker's benefits include its ability to simultaneously size and clean raw coal. "By removing the uncrushable material, it decreases the wear rates on equipment downstream. Fines generation is also minimised since the coal fractures along the natural cleavage lines."

A new service offering called a 'Drop Test' has recently been launched by Osborn to ensure that rotary breaker customers get the ideal machine for their requirements. Swanepoel explains that this test is used to accurately size the rotary breaker needed for customers' specific applications, based on coal hardness.

Other Osborn machines that he says are continuing to hold their own in the coal industry include the manufacturer's largest jaw crusher. "Osborn's immense Hadfields 80 x 60 single toggle jaw crusher is firmly positioned as the primary crusher of choice in the African coal industry. It handles up to 2 m x 1,5 m feed size with throughput in excess of 1 600 t/h. This impressive machine, which weighs 140 000 kg and stands as tall as a double-decker bus, is one of the largest manufactured in the world."

Osborn Engineered Products, tel (+27 11) 820-7600

## Condra supplies headgear cranes for Zambian shaft



Load testing on one of the two 25-ton headgear cranes manufactured by Condra for Mopani Copper Mines' Synclinorium shaft.

Condra recently completed load tests on two 25-ton headgear cranes manufactured at the company's Germiston works for Mopani Copper Mines' Synclinorium shaft.

The tests were witnessed by a representative from Mopani Copper Mines (MCM) during June ahead of delivery to the Nkana mine in Kitwe, Zambia, where the new shaft is scheduled for commissioning toward the end of this year.

The two headgear cranes are part of a bigger order that includes two 70-ton maintenance cranes for the project's winder house. Condra will begin work on these this month (August).

MCM's headgear cranes were manufactured as identical machines with very high lifts of over 80 m. They feature high tensile ropes and incorporate materials of the best possible quality on critical components.

Condra has manufactured several cranes for MCM over the years, including overhead cranes, high lift machines and hoists.

MD Marc Kleiner said that this customer had named reliability and rapid service response among the reasons for awarding the order for the Synclinorium's headgear and winder house cranes to Condra, which submitted a tender price higher than those of two rival bidders.

Rapid response is supplied by company agent EC Mining, which is based on the Copperbelt and able to react quickly to

service calls using spare parts held in stock.

Kleiner said competitor manufacturers in the northern hemisphere generally found it difficult to respond promptly to service requirements in Zambia.

"Last year, we lost the order for Synclinorium's workshop cranes to a European company, but there have apparently been long waits for spare parts for these cranes when they were needed," Kleiner said.

"Copper mining companies need maximum production because of the currently depressed copper price, but this is dependent on the reliability of all machinery installed in the mines. There is no margin for excessive machine downtime.

"It is a fact that the ability of some of our competitors to respond to needs and realities of African continent lags behind that of Condra. I am pleased that we have been able to add Synclinorium's headgear cranes to our long list of successful installations throughout this continent," Kleiner said.

Condra, tel (+27 11) 776-6000

## I-CAT products win international accreditation

I-CAT continues to consolidate its reputation as a leading environmental solutions company, having achieved internationally-recognised accreditation from the 'Ecospecifier Verified Product Programme' in May 2015.

Ecospecifier is an online platform that promotes the protection and restoration of natural systems by building awareness of practical solutions that support healthy environments and ecological regeneration in the built environments and construction sector.

I-CAT products that received this

high-profile certification include RDC 20, GreenGrip and Greenbit.

**RDC 20** is a water-soluble anionic polyelectrolyte polymer comprising an exclusive formulation of blended emulsified co-polymers and ionic modifiers. It is produced from natural substances and features no petrochemical or hydrocarbon ingredients, making it 100 per cent eco-friendly.

**GreenGrip** is a natural polymer-based, durable gravel road sealant that is an environmentally-safe alternative to chemically-based products for semi-permanent

gravel roads on mines and residential areas.

**GreenBit** is a natural binding agent combined with an emulsified bituminous product to create a durable gravel road sealant. It is an environmentally-safe alternative to pure chemically-based products for permanent gravel roads on mines and in residential areas.

I-CAT Environmental Manager Leon Jansen van Rensburg notes that this reputable third party product verification is of great importance to the company. "The independent assessment reaffirms the results obtained during our own extensive research and development trials."

Leon Jansen van Rensburg, I-CAT, tel 086-112-4228

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