

THE AUSTRALIAN MINING REVIEW

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STANDING RESOLUTE

Innovative thinking and new technologies has seen Resolute Mining extend mine life at its Ravenswood project in QLD out to 2032. Its success is set to continue as it begins a transition back to open cut mining, and journey to become a 500,000ozpa producer.

FEATURE p46

Image: Roslyn Budd.



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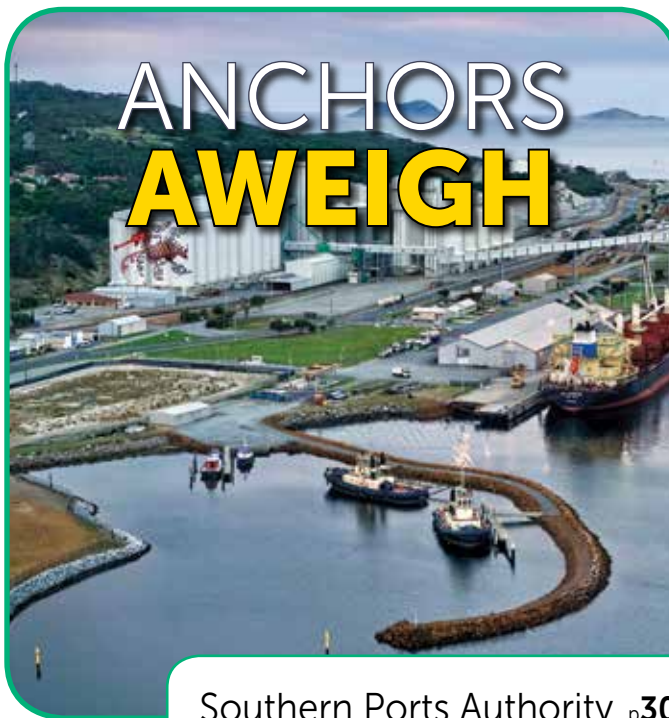
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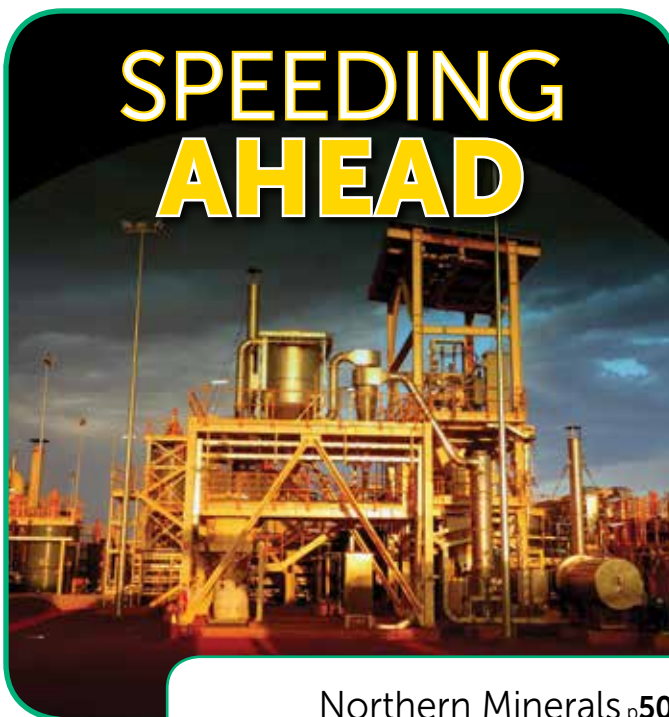
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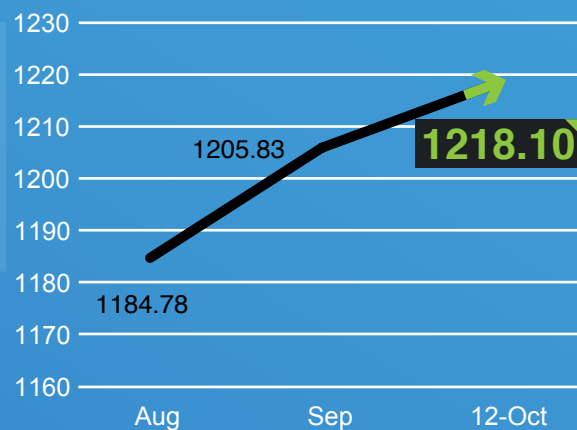
MAJOR COMMODITIES

SNAPSHOT

GOLD

\$US/oz

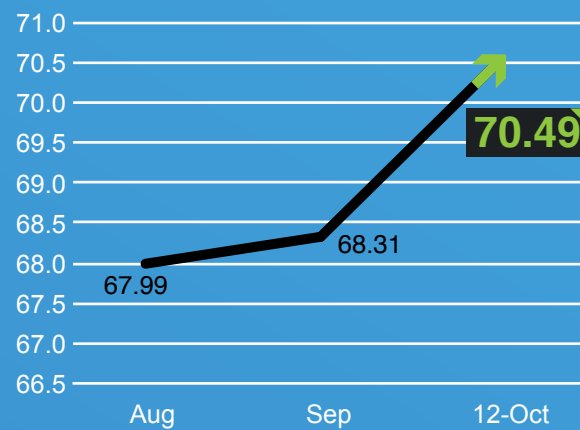
Gold prices edged higher in October due to a renewed weakness in the US dollar, which incited safe haven demand.



IRON ORE

\$US/t
62% Fe CFR China

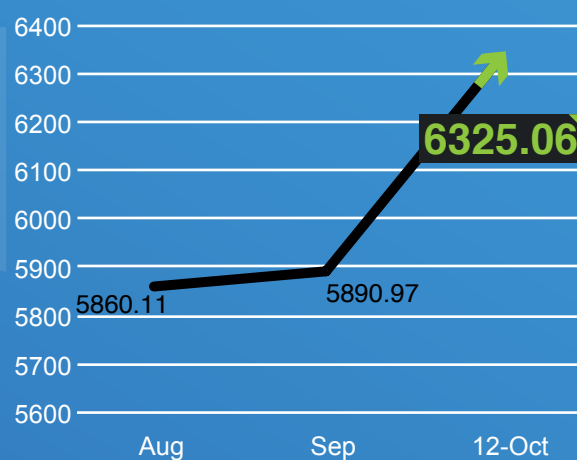
The spot price for benchmark 62 per cent fines saw some improvement, rallying to \$US70.49/t – its highest level in seven months.



COPPER

\$US/t
LME Price

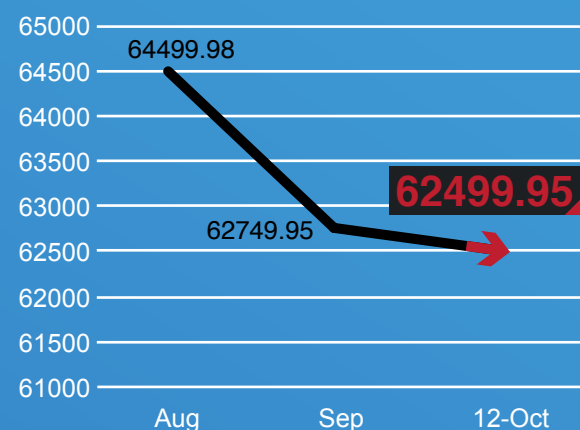
The red metal's prices climbed above the \$US6000/t mark in the wake of solid China imports.



COBALT

\$US/t
LME Price

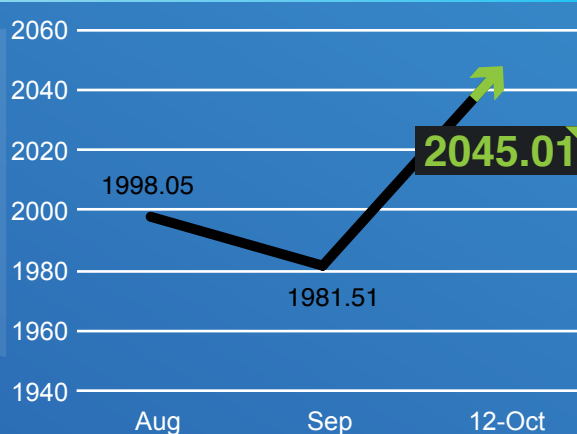
Cobalt spot prices tumbled again, but analysts remain optimistic that strong demand and limited supply will see it recover.



ALUMINIUM

\$US/t
LME Price

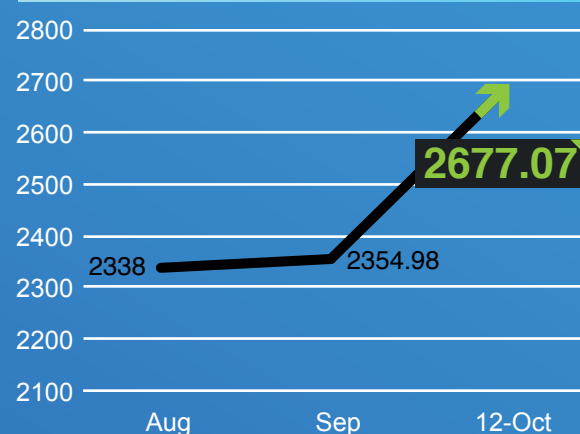
The aluminium price saw a 4 per cent spike in the beginning of October exceeding \$US2200/t before retreating to about \$US2000/t in the middle of the month.



ZINC

\$US/t
LME Price

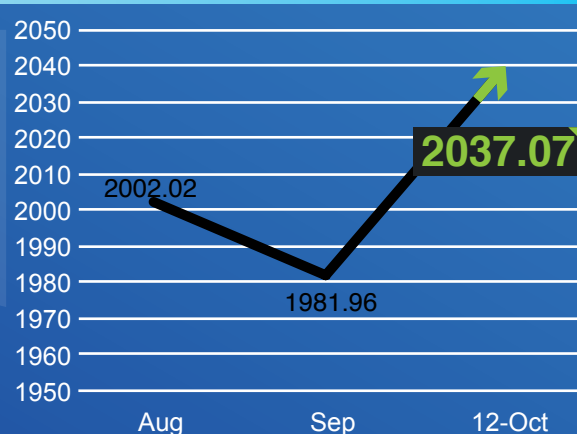
Zinc prices drifted higher, reaching its peak level in three months on 10 October as output cuts in China benefited the market.



LEAD

\$US/t
LME Price

Lead prices sank to two-year lows in early October but made a swift comeback days later to its highest level in six weeks.



NICKEL

\$US/t
LME Price

Nickel prices remained volatile, showing two sharp movements in the beginning of the month.



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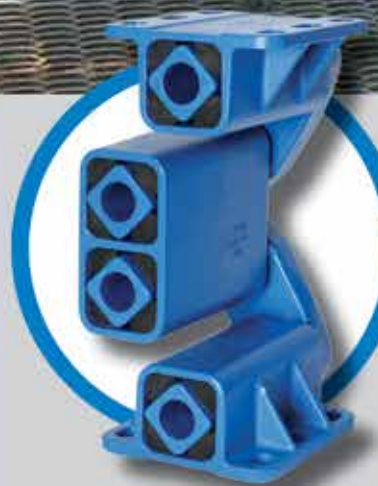
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IN BRIEF

Artemis signs MOU with Pacton

WA

ARTEMIS Resources and Pacton Gold have entered a Memorandum of Understanding to form a strategic processing alliance.

The deal would involve Pacton utilising Artemis's 100 per cent owned Radio Hill processing plant, 30km from the city of Karratha, on a non-exclusive basis.

Artemis executive chairman David Lenigas said Pacton was a sizeable tenement holder in the Pilbara and has recognised the strategic value of having access to Artemis's processing plants.

"Through this collaboration with Artemis, Pacton can potentially expedite their exploration and development initiatives and as such this strategic alliance is seen as win-win for both companies," Mr Lenigas said.

Aurizon coal volumes fall

NSW

AUSTRALIA'S largest rail freight operator has announced a 5 per cent drop in coal volumes during the September quarter.

The results followed a strike, which occurred in August and a derailment in September in the Hunter Valley.

The September quarter coal volumes were at 52.2mt compared to the 54.7mt recorded in the June quarter.

Coal tonnages remained in line with expectations with new contract railings and above rail productivity initiatives set to positively impact volumes in FY19.

The company's coal volume guidance for FY19 was still on track at between 215mt and 225mt.

Eastern Goldfields' recapitalisation

WA

BELEAGUERED miner Eastern Goldfields is set to be renamed Eris Gold Limited under a \$75 million multi-transaction recapitalisation plan.

As part of the recapitalisation, a new leadership team will be appointed with Craig Bradshaw to step in as managing director.

The company's non-executive chairman Peter Mansell said the deal will ensure that Eastern Goldfields is well funded with a strong balance sheet to develop its projects.

"Under Craig's new leadership team, the company plans to complete a review of the mine plan, implement the operating strategy and recommence mining operations at Davyhurst," Mr Mansell said.

South32 posts record production



Image: South32.

South32 reported record production from its manganese operations in the September quarter.

AMY BLOM
NATIONAL

SOUTH32 has more than tripled metallurgical coal production in the first quarter of FY19 compared to the first quarter of FY18, according to its September quarter report.

Production at Illawarra rose to 1.5 million tonnes (mt) in Q1, up from 494,000 tonnes in the previous year.

Despite the jump, South32 believed a significant increase in development rates was still required to sustain the operation

of two longwalls in parallel at the Appin colliery from H2 FY20.

South32's Australia Manganese division also achieved a record quarterly performance of 932,000 tonnes and an 8 per cent increase quarter-on-quarter in total manganese ore production as it continued to take advantage of strong market conditions.

South32 chief executive Graham Kerr said annual production guidance would be maintained for all of its operations.

"We finished the period with a net cash balance of \$US679 million and additional funds in our manganese joint venture as our key commodity markets benefitted from

robust demand and pricing," Mr Kerr said.

"This strong financial position enabled us to acquire Arizona Mining and Eagle Downs, and to continue our \$US1 billion capital management program."

Mr Kerr said South32 had continued to make excellent progress in reshaping its portfolio.

"In addition to the two acquisitions, we continued to advance our 18 greenfields exploration projects and commenced the process to broaden and transform the ownership of South Africa Energy Coal."

As at 18 October, South32 shares were at \$3.84.

Evolution to advance Mt Carlton

AMY BLOM
QLD

EVOLUTION Mining will go ahead with three projects at its Mt Carlton mine after the board approved the \$60 million investment.

The projects were the Mt Carlton underground development, stage four pit cut-back and relevant plant modifications.

Mt Carlton, 150km south of Townsville, QLD, has a mine life to at least 2025, with the projects allowing production from the higher grade Link zone to be brought forward.

First ore from the underground was expected to be delivered in FY21.

\$10 million would be put towards the projects in FY19, with the remaining \$50 million to be paid over FY20 to FY22.

Evolution was highly confident that the initial underground reserve could be expanded.

Once the underground development was in place, additional drilling would be undertaken to follow up on several promising drill intersections that were not currently included in the underground reserves or resources.

Evolution executive chairman Jake Klein said the company's focus remained on margin and profitability.

"Mt Carlton is a very high margin asset, which has been a standout in Evolution's portfolio," Mr Klein said.



Image: Evolution Mining.

The Mt Carlton operation.

"The mine has generated over \$100 million in net mine cash flow in each of the last three years.

"The underground development of the Link zone ensures the continued production of high margins."

Evolution still required approval from QLD's Department of Environment and Science, with submissions expected to be lodged in November.

The company's Cowal gold operation in NSW also moved a step forward in October after receiving regulatory approval from the NSW Department of Planning and Environment to increase the plant processing rate by 31 per cent up to 9.8mtpa.

"This approval is a significant step towards achieving our objective of increasing Cowal's annual production rate to over 300,000 ounces per annum," Mr Klein said.

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MCA push to reduce uranium red tape

ELIZABETH FABRI
NATIONAL

THE Minerals Council of Australia has urged the Federal Government to revise its “unfair and discriminatory” treatment of uranium mining in an upcoming review of the Environment Protection and Biodiversity Conservation (EPBC) Act due next year.

Analysis released in October by the council, found that issues related to uranium mining, including radiation safety, were not unique to the commodity, and environmental impacts were generally the same as those for mining other metals.

It also stated proliferation concerns were already dealt with by other legislation and treaties.

“Under the EPBC Act, two mines with identical impacts are treated differently merely because of the commodity that is being mined,” MCA executive director uranium Daniel Zavattiero said.

“Australia can reform its treatment of uranium under the EPBC Act – which requires that all uranium projects obtain Federal environmental approval, regardless of size or impact.”

Uranium mining was currently defined as a nuclear action, and companies seeking to open uranium projects faced added delays and costs, and required approval from the Federal Environment minister.

“No Federal environmental conditions in relation to the uranium projects approved



Image: Boss Resources.

The Honeymoon project in South Australia will reopen in the coming years.

to date have related to uranium-specific issues that were not already covered by the State approval process,” Mr Zavattiero said.

“Australia has almost a third of the world’s uranium – the largest share of any nation – yet produces just 10 per cent of world production.

“We are missing out on future investment, jobs and exports, while countries like Kazakhstan and Canada exploit continued expansion in the global nuclear industry.”

MCA recommended uranium mining and milling be removed as a nuclear action in the EPBC act, or if this was not supported by Government, that there would be more focussed EPBC assessments on radiological aspects rather than all impacts on the environment.

Australia currently had three operating uranium mines, which was set to grow once Boss Resources’ Honeymoon project restarts production.

Uranium mining was currently banned

in QLD, as well as WA following Labor’s election victory in March 2017.

However, WA Premier Mark McGowan has let uranium projects which had already received environmental approvals continue development, including Vimy Resources’ Mulga Rock project.

In January, a Definitive Feasibility Study for Mulga Rock was released, and Vimy was now submitting work plans for the project.

Doray to sell Andy Well

AMY BLOM
WA

DORAY Minerals has announced plans to sell its Andy Well and Abbotts gold projects to focus on its high-performing Deflector gold copper mine, 160km east of Geraldton.

The miner announced plans to sell Abbotts to Thundelarra on 17 October, following its 5 October announcement that it would sell Andy Well to Galane Australia, a subsidiary of Canadian gold miner, Galane gold.

In conjunction with the sale of Andy Well, Doray also reached a non-binding agreement for the Gnaweeda project to be farmed out and joint ventured with Galane.

Galane will pay Doray \$9 million over three instalments and \$1 million worth of Galane gold shares.

Doray managing director Leigh Junk said shareholders would benefit from Galane’s assumption of Andy Well rehabilitation liabilities, upfront and milestone payments, and any upside through the proposed farm-in agreement over the prospective Gnaweeda area.

Thundelarra chairman Phil Crab said the acquisition of Abbotts signified “exciting times ahead.”

The acquisition was expected to more than quadruple Thundelarra’s prospective Murchison tenure.

Glencore cuts 400 jobs at Hail Creek



Image: Rio Tinto.

Glencore began operations at Hail Creek in August after requiring the mine from Rio Tinto.

AMY BLOM
QLD

MORE than 400 workers were set to lose their jobs after Glencore announced a restructure of its Hail Creek open cut mine in Central QLD.

On 15 October, Glencore announced the total number of workers at the mine would decrease from 1360 to 930 by the second half of 2019.

Other changes included a reconfiguration of the mine from a two dragline operation to a truck and shovel operation.

QLD Resources Council chief executive Ian Macfarlane said it was a difficult time for the affected workers, but was confident strong demand for skills in the Bowen Basin resources sector would create new opportunities.

“Glencore’s announcement today is focussed on ensuring the ongoing viability of the Hail Creek mine,” Mr Macfarlane said.

“This will help sustain the project through the inevitable fluctuations of the commodity cycle.

“The QLD coal industry has a strong future and I expect its highly skilled and diverse

workforce, including employees from the Hail Creek mine, will continue to be in demand across the sector.”

Mr Macfarlane said across the State, there were about 1250 vacancies in the resources sector, with more than 440 of those jobs in the Mackay and Coalfields region.

Hail Creek was 120km south west of Mackay in the Bowen Basin.

Glencore began operational management of Hail Creek in August after acquiring Rio Tinto’s 82 per cent interest, along with a 71.2 per cent interest in the Valeria coal resource, as part of Rio’s exit from the coal industry.

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IN BRIEF

Three discoveries near Thunderbird

WA

SHEFFIELD Resources has uncovered three significant mineral sands discoveries at Cold Duck, Porphyry Pearl and Cisco prospects, all within 15km of its flagship Thunderbird deposit.

The results came after exceptional zircon rich drill results at Sheffield's Night Train deposit, with the multiple discoveries confirming the Canning Basin as a major new mineral sand province.

Sheffield managing director Bruce McFadzean said the new discoveries clearly demonstrated the global significance and strategic value of Sheffield's Dampier mineral sands project.

"These discoveries add to an already exciting time for shareholders as we move forward with the development of Thunderbird," Mr McFadzean said.

Tyranna hits shallow gold

SA

TYRANNA Resources has intersected mineralisation 12m down hole at the Campfire Bore gold prospect, about 37km north of the Challenger gold mine in SA.

Assay results from 35 reverse circulation (RC) holes drilled at the prospect turned up best results of 15m grading at 3.02 gram per tonne (g/t) from 36m down hole including 6m at 5.13g/t.

Tyranna managing director Bruno Seneque said the find was a welcome surprise.

"This infill program just completed is a major step forwards for Campfire Bore and will allow the company to upgrade and increase the confidence of the current resource," Mr Seneque said.

Tempus completes NT field program

TEMPUS Resources has completed an initial field visit and sampling program at its Montejinni copper project in the Northern Territory.

The company said copper mineralisation was identified in many of the samples collected, with laboratory analysis results expected to be ready within five weeks.

"The company is encouraged by the results generated from the Montejinni copper project in this initial phase of work," it stated.

Tempus said it was planning for follow-up programs, including detailed geochemical and geophysical surveys, with a goal of defining targets for drill testing.

Exploration model "needs fixing"



Image: Pexels.

A shortage of greenfields mineral discoveries has led to calls to fix the 'broken' exploration and financing model.

AMY BLOM
NATIONAL

AUSTRALIA'S chronic shortage of greenfields mineral discoveries could only be overcome by changing the sector's exploration, financing and training models, according to Western Mining Services principal Dr Jon Hronsky.

Addressing the inaugural four-day Australian Geoscience Council Convention in Adelaide, Dr Hronsky said resources exploration had continued to see a highly inefficient use of capital, while the availability of risk capital for exploration was volatile and sentiment driven.

"Our financing model strongly favours recycling of old, marginal to sub-economic mining and exploration projects rather than genuine greenfields for new Tier 1 deposits," Dr Hronsky said.

"We need to move on a sooner rather than later basis to breakthroughs in undercover exploration to unlock what we believe is

enormous potential to add to Australia's rich mining history of minerals discovery, albeit at surface or shallow depth.

"This at a time of continuing fall in greenfields share of exploration spending."

Dr Hronsky said juniors offered flexibility but did not have access to funding and were mostly financed from the retail sector, which was strongly sentiment driven and short-term focussed.

He said major mining and exploration companies were not incentivised to prioritise genuine greenfields undertakings, while majors had the funding but not the flexibility and struggled with the "nimbleness" required for effective greenfields exploration outcomes.

He said there was also a strong need to upgrade the industry's training protocols because although universities trained geoscientists, the industry needed explorers.

"Exploration skills need to be learnt and the current practice is ad hoc and largely on

the job," Dr Hronsky said.

"There is the challenge of transferring the tacit knowledge of long-term experience to university students and graduates through progressive curriculums and greater use of simulated environments."

Dr Hronsky urged the sector to "front-end load" the area selection process to target new search spaces and to better understand and exploit value created by strategic regional-scale geoscience data.

"We need to focus on the best deposits to be found in the covered search space, not the best deposits already found and in this sense, regional-scale Geoscience Data sets are becoming increasingly powerful," Dr Hronsky said.

He believed any new model should better aggregate sophisticated capital with specialist third parties or miners to deliver more strategic partnerships underpinned by greater technical discipline and specialist expertise.

Sipa launches Paterson North funding bid

AMY BLOM
WA

SIPA Resources has launched a share purchase plan (SPP) to raise \$1.5 million to underpin ongoing exploration programs at its Paterson North copper-gold project in WA's north west.

The SPP allowed eligible shareholders to purchase up to \$15,000 worth of shares at a 20 per cent discount, from 5 October.

According to Sipar, proceeds from the sale would strengthen the explorer's working capital position as its exploration program gathered momentum.

In mid-October, Sipar began its 500m diamond drill program at the Obelisk copper-gold discovery within Paterson, following the recent completion of a successful IP pole-dipole ground geophysical survey to optimise the targeting.

Additional funding would allow follow-up drilling and exploration to be undertaken at Paterson, including an airborne EM and magnetic survey, pivotal for discovery in the district, generating new high-quality exploration projects and providing



Image: Sipar Resources.

additional working capital.

The project is 120km north of the world-class Telfer gold and copper deposits, and the O'Callaghans tungsten deposit owned by Newcrest mining.

The Paterson North program would be

progressed in parallel with nickel sulphide exploration in Uganda, which was being funded by Rio Tinto under a recently established joint venture.

As at 15 October, shares in Sipar remained at a steady \$0.01.



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IN BRIEF

BHP awards Pilbara contracts

WA

BHP has awarded a string of new contracts across its Pilbara operations.

The contracts included a six-month power generation and dewatering contract to Babylon Pump & Power; a three-year maintenance services contract to Downer EDI across the Finucane Island and Nelson Point facilities; and \$240m three-year maintenance contract to Monadelphous for BHP's Mt Whaleback, Jimblebar, Eastern Ridge, Mining Area C, and Yandi mine sites.

Babylon Pump & Power said the initial contract was expected to continue on a rolling basis at the end of the six-month term, and deliver \$670,000 in revenue for FY18.

Boart Longyear wins GEMCO work

NT

BOART Longyear has nabbed a three-year drilling contract at the Groote Eylandt manganese mine, on an island in the Gulf of Carpentaria off the Northern Territory coast.

Boart Longyear said it would send 16 people to the mine, including fitters, and full-time drilling supervisors to operate two reverse circulation rigs.

The crews will drill 4800 holes and about 115,200m over a three-year contract.

"We are very happy to start drilling at GEMCO and to start building on our relationship with the team on site in Australia," the company stated.

"This contract was awarded based on Boart Longyear's strong safety and productivity performance."

Bis obtains Newlands extension

QLD

LOGISTICS provider Bis has secured a three-year contract extension at Glencore's Newlands coal mine in the Bowen Basin, QLD.

Bis has been a contractor to the Newlands operation since 1998 providing load and haul, underground equipment hire and site services to support the mine.

"We have enjoyed a positive, long-term partnership with Bis at Newlands," Glencore Newlands operations manager Paul Sear said.

"Bis' strong commitment to delivering safe and innovative solutions that add value to our operation has been recognised in this contract renewal, and we look forward to continuing our successful relationship with the team."

SMS secures \$640m in contracts



Image: SMS Mining Services.

ELIZABETH FABRI
WA

SMS Mining Services now has an order book exceeding \$1 billion after winning two proposed contracts at Capricorn Metals' Karlawinda and Adaman Resources' Kirkalocka gold projects near Mt Magnet, WA.

The mining services company has been named the preferred contractor for both projects, which was set to deliver combined revenue of \$640 million.

"These contracts are transformational for SMS," SMS managing director Danny Sweeney said.

"We now have contracts in the pipeline extending out to 2027, and a remaining

tender pipeline of over \$1.2 billion.

"This demonstrates the confidence in the SMS business model which delivers a flexible and fully integrated service offering from rental and maintenance through to contract mining."

The \$420 million Karlawinda work program would extend eight years and 10 months over the life of mine, and comprise open pit mining services, such as load and haul, drill and blast and mine development.

The formal contract was subject to final negotiations, which were expected to be complete in coming months, with work to begin in the second quarter of 2019.

Mr Sweeney said the team was "excited to be part of Capricorn Metals story".

"We look forward to forging a successful

long-term partnership and supporting the company in bringing the Karlawinda gold project into production in 2019," he said.

The contract at Adaman's Kirkalocka was also set to generate \$220 million in revenue over a four year period.

SMS, which owns a 33 per cent stake in Adaman, said it expected the contract to be finalised in the coming weeks, with works to start later this year.

The contract included open pit mining services, with an option to extend pending the outcome of drilling underway to extend the open pit mine life.

The deals followed SMS contract award at Coolgardie Minerals' Geko gold project in August, and contract win at Norton Gold Fields' Matts Dam South and Porphyry gold mines back in April.

Thiess nabs five-year Mt Arthur deal

ELIZABETH FABRI
NSW

CIMIC-subsiary Thiess has continued its winning streak, securing a \$1.2 billion contract to provide additional mining services at BHP's Mt Arthur coal project in the Hunter Valley, NSW.

The five-year contract included mine design, planning and scheduling services, drill and blast, overburden removal and coal mining.

It followed a \$185 million contract awarded in March to undertake load and haul services at the mine, which it had been providing since December 2016.

"This is the third successive contract that Thiess has secured with BHP at Mt Arthur Coal," CIMIC Group chief executive Michael Wright said.

"It recognises our team's specialist mining capability within the Hunter Valley's complex geology and our team's ability to work flexibly with our client."

Thiess managing director Douglas Thompson said the team was "pleased" to continue its work at Mt Arthur Coal's southern operations, and support local jobs, suppliers and businesses.

Mr Thompson said the scope of the work would create up to 300 permanent positions.

"We look forward to contributing to the



Image: BHP.

Mt Arthur is the largest individual coal production site in the NSW Hunter Valley.

success of the Mt Arthur Coal operation," Mr Thompson said.

The company added it had a strong presence in the Hunter Valley mining region, where it had operated since the 1940s.

Current contracts in the region included mining services work at Glencore's Mt Owen mine until June 2021, and an additional contract at MACH Energy's Mount Pleasant mine until 2021.

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MinEx CRC chief executive Andrew Bailey, South Australia Energy and Mining minister Dan van Holst Pellekaan, and MinEx CRC chairman Chris Pigram.

World's largest exploration centre opens

JESSICA CUMMINS
SOUTH AUSTRALIA

A NEW \$218 million research collaboration has launched in Adelaide that will develop new technologies to increase the discovery of mineral deposits across the country.

The MinEx Cooperative Research Centre (MinEx CRC) was opened at the Australian Geoscience Council Convention in Adelaide on 15 October.

The centre, backed by a \$50 million Federal Government grant, was a collaboration between 34 companies in the Mining Equipment, Technology and Services (METTS) sectors and majors including BHP, South32, Anglo American and Barrick, which will commit \$165 million over the next decade.

It would also be supported by research organisations including the CSIRO, University of Adelaide, Curtin University, University of South Australia, the University of Western Australia, University of Newcastle, and Geoscience Australia.

MinEx chairman Chris Pigram said the decision to open the centre was driven by the declining discovery of new mineral deposits, which posed a threat to the Australian economy.

"There are few, if any, major new mineral deposits that are exposed at the earth's surface yet to be found in Australia, and as a result, mineral exploration is moving from Australia to less well explored countries," Mr Pigram said.

"Today is an exciting day for Australia's mining and resources sector, as we begin meeting the technical challenge of finding deposits in a more cost-effective way."

The country's share of global mineral exploration has declined exponentially from about 25 per cent in the 1990s to 12.5 per cent currently due to issues such as the increased cost of drilling.

MinEx CRC chief executive officer Andrew Bailey said Australia had the chance to reverse the trend.

"We will develop new exploration tools and new ways to deploy them, recognising the fundamental importance of collecting data from the subsurface," he said.

"Lowering the cost of drilling, while gathering critical exploration data, means we can drill more holes and discover more deposits."

BHP drones take flight at sea

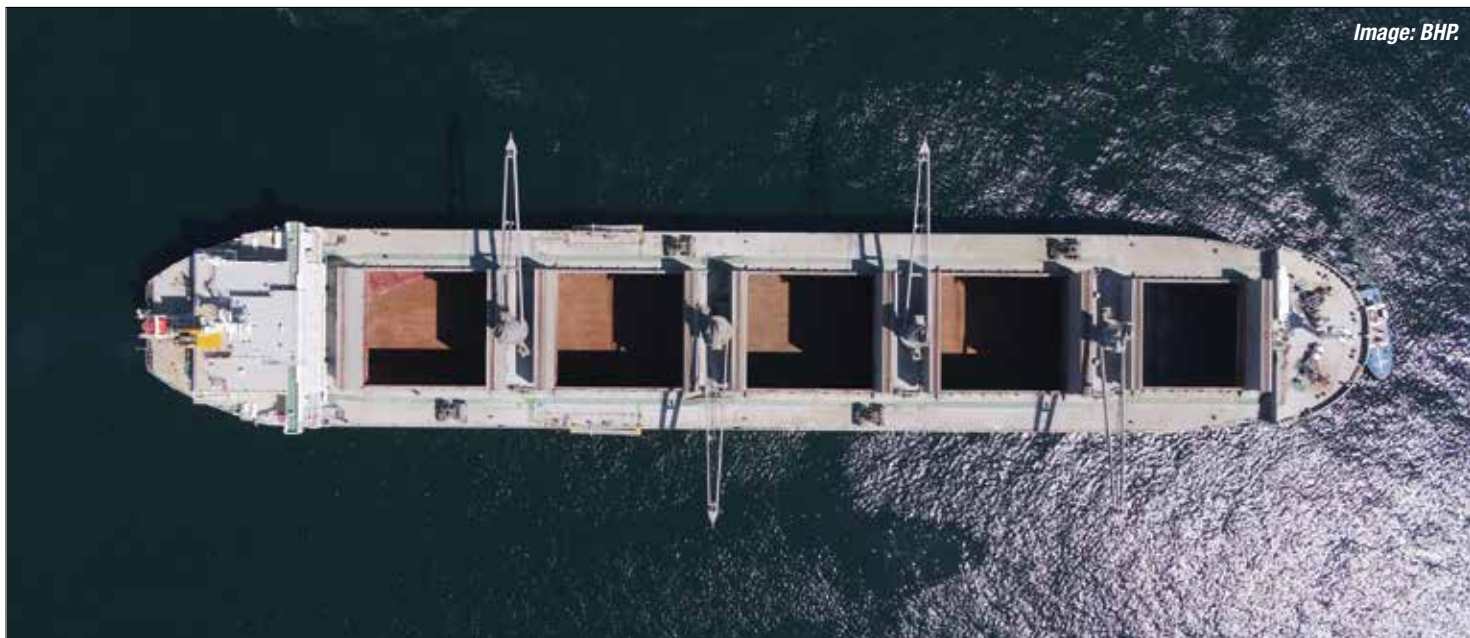


Image: BHP.

BHP vessels near Port Coloso in Chile.

ELIZABETH FABRI
INTERNATIONAL

BHP has begun trialling drones across its ocean freight operations in an effort to increase safety and efficiencies for the business.

The global mining giant has been using drone technology for years across its iron ore mines in the Pilbara, Olympic Dam site in South Australia and coal operations in QLD to help measure stockpiles, and avoid working at height.

The trial across its ocean freight division will see it play a key role in a tablet-based technology package, which incorporates artificial intelligence (AI) to provide a "digital view" of the ship.

BHP Marketing Freight vice president Rashpal Bhatti said all of the company's chartered ships received a tablet when they

berth, and on the tablet they could read the tension of the mooring line, which has major safety benefits.

"The question now is can the same tablet become a holistic technological package by also delivering ship hold inspection data, draft readings and other critical information captured by drones," Mr Bhatti said.

"It's all a bit futuristic but that is the direction we are going."

Mr Bhatti said marine drones could be programmed to complete a variety of specific tasks, including the inspection of holds, which would reduce the task time from one hour to 15 minutes.

"The hold inspection process involves ships which have five to nine holds which a person checks by climbing down ladders," Mr Bhatti said.

"The inspector has to be physically fit, use fall protection, and carry a parrot (oxygen meter) to make sure there is enough air in

the hold.

"With drones, we can fly them into a hold and capture 4K images, but also infra-red, and other types of cameras that can show cracks or other specific parameters that cannot be seen with the naked eye."

"There are basically three or four types of ships with hold sizes about the same. So once you program a drone to go in to a certain ship, it can become an autonomous process.

"So you have a better way to assess the condition of the hold, and you are removing a person from a potentially hazardous situation."

Drones were also being tested to improve ship draft readings, which was usually done from a boat when the ship was berthed and ready for a cargo.

"We are working with ship owners on this and other ways to use technology to improve safety and productivity," Mr Bhatti said.

Next step in WA battery hub bid

AMY BLOM
WA

A WA-led national consortium of industry and universities is a step closer to winning its bid to lead a \$100 million Future Battery Industries Cooperative Research Centre (CRC) after progressing to the second stage of applications.

The CRC was designed to position Australia as a global leader for the energy solutions of the future.

Curtin University was leading the bid in conjunction with a range of industry and education partners including BHP, Energy Queensland, Tianqi Lithium and the University of Melbourne.

The national consortium aimed to connect world-class researchers and industry to develop the processes and battery applications to make the most of Australia's abundant new energy metals such as lithium, vanadium, nickel, cobalt and graphite.

It has raised about \$27 million towards the bid, including \$6 million from the WA Government, and was seeking \$25 million from the Federal Government.

Curtin University deputy vice chancellor research professor Chris Moran said the proposal joined industry, government and researchers to solve the grand challenges for a future where Australia was a leader in the manufacture of the next generation of battery energy storage technologies and



Curtin University deputy vice chancellor research professor Chris Moran.

systems.

"The Future Battery Industries CRC will also provide important research opportunities for postgraduate students seeking to play a role in this significant initiative," Mr Moran said.

Bid chair Tim Shanahan said the proposal was responding to industry calls for Australia to act within the next five years or risk losing the opportunity to overseas competitors.

"The industry is telling us that there is an urgent need for Australia to take the lead in this next phase as our energy future and the Future Battery Industries CRC works to ensure we position ourselves as the global leader in low-cost, high-quality,



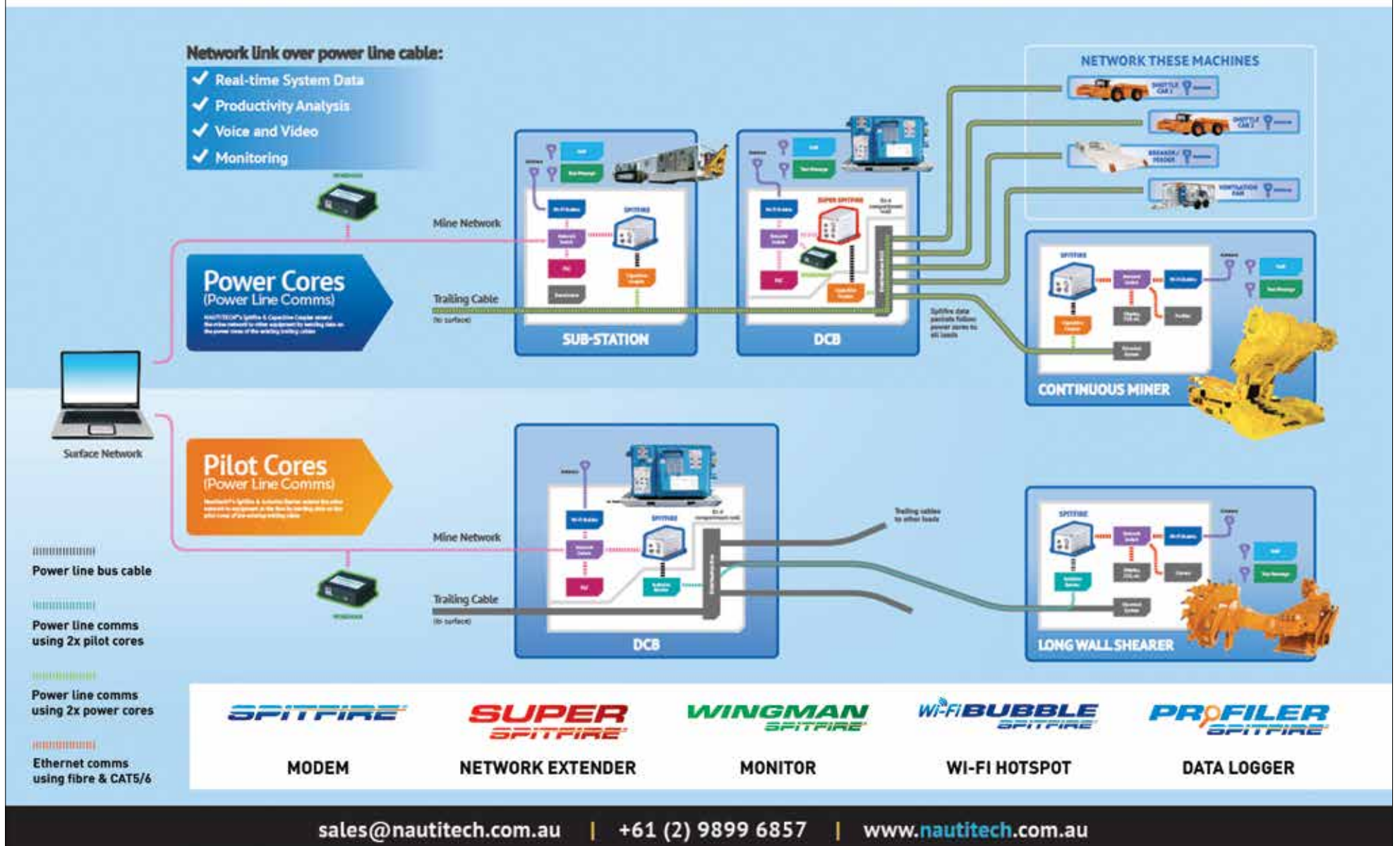
WA proposal bid chair Tim Shanahan.
All images: Curtin University.

technically superior battery materials and technologies," Mr Shanahan said.

"The project will help guide the future of the energy industry by mapping out the pathway for Australia to mine, extract, refine and recycle battery minerals, metals and materials with the required quality controls, as well as completing the value chain through the manufacture, deployment and use of batteries."

CRC proposals were considered in two stages, with successful first round applicants invited to submit a full written business case as part of round two.

The Federal Government was expected to announce the successful recipients of the CRC application process in early 2019.



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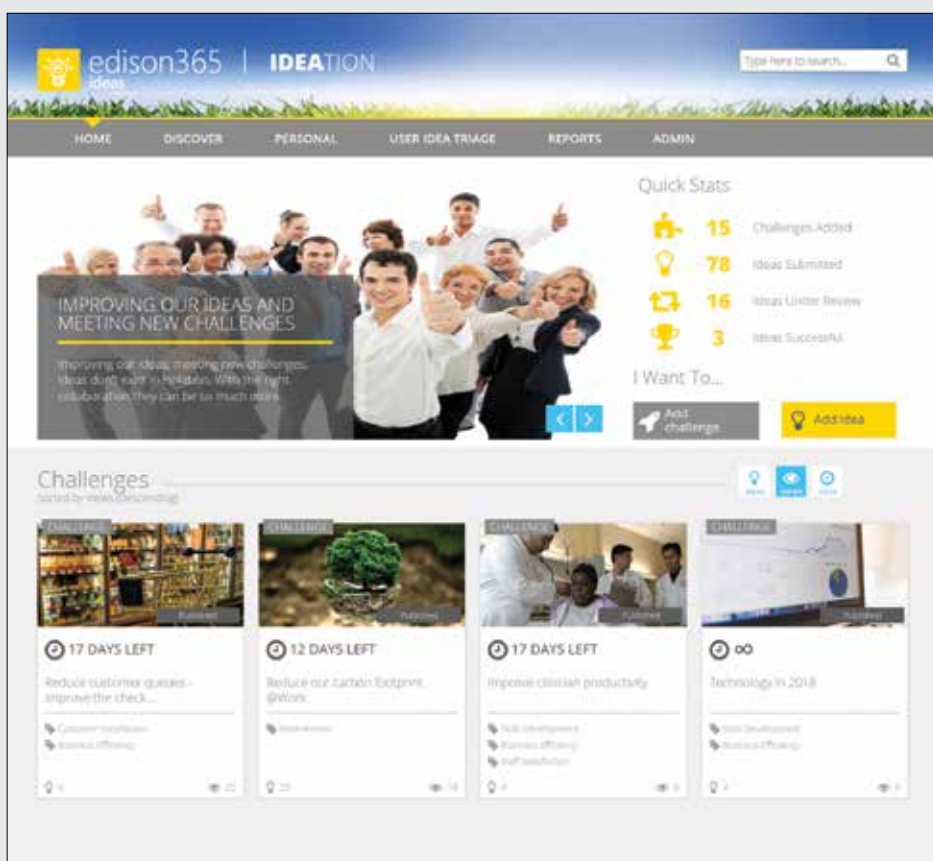
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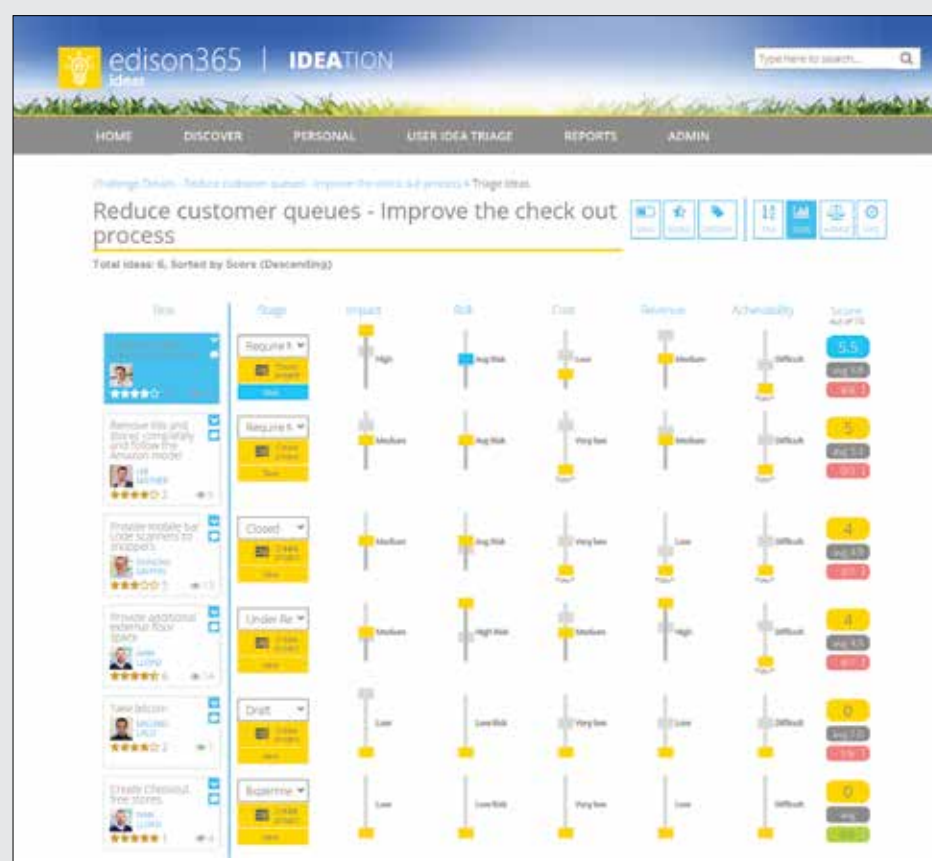
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NATIONAL

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Built for Microsoft O365 edison 365ideas is an open forum through which anybody can contribute ideas.

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Edison365ideas is part of the edison365 suite – a unified idea and innovation management solution that turns organisations' ideas into visible and actionable plans.

As miners face many challenges across core operations, Exxaro's management team decided to formalise the ideation process with an innovation program called 'functional excellence', supported by ideation technology.

The company tested a number of ideation platforms, using technical and business metrics to evaluate

performance and fit with the company.

"We set high standards for the ideation platform we wanted. It needed to be accessible at any time and easy to use," IM group manager Desmond Govender said.

"Technically, it had to be simple for us to configure, and usable at limited data cost to the employee — edison365ideas solutions is highly integrated within our current product stack."

Exxaro has planned its ideation program closely with all its functional divisions: Information Management, Human Resources, and Stakeholder Affairs and Sustainability.

Each division is assigned an innovation owner, responsible for identifying a group-wide or divisional challenge.

In less than three months, 15 challenges have been set by the divisions, attracting ideas from all areas across

the organisation with three successful ideas taken forward for implementation.

Challenges loaded range from seeking a name and branding for Exxaro's cultural drive, to a quest for derisking a brownfields mining project plan and schedule during construction phase.

Many ideas relate to business efficiencies and cost-savings.

Others support core company objectives: reducing energy and water usage and potential innovation projects for trainee engineers, for example.

The innovation team boosts the ideation program by offering recognition awards, and has developed a self-help user guide to make the platform even easier to use.

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GOING THE DISTANCE

While iron ore prices are set to slump in the coming years, Australia's big four players – BHP, Rio Tinto, FMG and Hancock Prospecting – remain confident, pouring capital into new projects to sustain and bolster production post-2020.

Image: Fortescue Metals Group.

ELIZABETH FABRI

IRON ore exports hit a new record in FY18, reaching an impressive 849 million tonnes; up 3.8 per cent from the previous year.

This number is forecast to rise again, increasing by a further 2.3 per cent to 869mt in FY19, and up to 878mt in FY20, according to the September instalment of the *Resources and Energy Quarterly* report.

The higher export volumes will be brought on by continued efficiencies across the majors' operations including the introduction of autonomous trains and driverless trucks, together with expansions and additions.

Rio Tinto has already increased output across its Pilbara operations following the opening of its Silvergrass mine in 2017, with plans to grow this to 360mtpa by the end of 2019.

BHP too was expected to expand capacity at its Port Hedland operations, with a projected output of 290mt by mid-2019.

While production and export volumes out of Australia remain robust, the outlook for iron ore prices in the coming years wasn't as rosy.

Lower prices in FY18 led to a 2.2 per cent drop in export earnings to \$61 billion, which was expected to drop further to \$56 billion in 2019-20.

The free on board (FOB) Australia iron ore price (62 per cent) decreased 13 per cent year-on-year in the September quarter to an average of about \$US56 per tonne.

And while the spot price for benchmark 62 per cent fines saw some improvement in October, at \$US70.39/t – its highest level in seven months – the rally will be short lived.

Department forecasts predict average FOB prices to fall to \$US52/t in 2019, and \$US51/t in 2020 due to weakening demand, with an expected decline in steel production in China and an increasingly well-supplied seaborne market.

"High steel prices, and China's ongoing government push to improve air quality through increasingly stringent air pollution policies, are expected to maintain the

price premium for high-grade iron ore and discounts for impurities contained in iron ore, namely alumina and silica," the *Resources and Energy Quarterly* report stated.

"Upcoming winter production cuts are expected to have a greater impact on Chinese steelmakers than they did in the same period last year."

The tumble in prices, however, was not comparable to the 2015 period when prices sank below \$US40/t.

And Australia's iron ore majors still have a consensus positive outlook for the long-term.

Pilbara Producers

Representatives from Rio, FMG, BHP, and Roy Hill met with customers at the Chinese port city Dalian in September to discuss business during the *China International Steel and Raw Materials* conference.

FMG's new chief Elizabeth Gaines said the Chinese steel industry had been stronger than anticipated this year, with another promising year ahead, despite growing trade tensions between the US and China.

"The sense we are getting from our customers is that they are fairly confident in the sector," Ms Gaines told *The Australian*.

FMG – which had been a victim of the widening gap between higher and lower grade ore – intended to produce a higher-grade 60 per cent product, which it will begin shipping at the end of the calendar year at an initial annual rate of between 10mt and 15mt.

Its \$US1.275 billion Eliwana project – approved by the board in May – will also produce a 60 per cent iron ore grade, when it opens in December 2020.

Construction was set to begin on the project soon, which will have annual production of 30mtpa with capacity for up to 50mtpa.

BHP has also made headlines with the approval of its mammoth \$US3.4 billion South Flank project in June.

South Flank – which has a 25 year mine life – will sustain group production as the

80mtpa Yandi mine winds up post 2021.

Rio has also reinforced the importance of iron ore in its portfolio, recently completing an exit from coal.

A decision was imminent on Rio's Koodaideri project, which was set to replace depleting resources in the Pilbara from 2021.

Furthermore, Rio and partners Mitsui & Co, and Nippon Steel & Sumitomo Metal announced in October they will invest about \$1.55 billion (Rio's 53 per cent share was \$820m) to maintain production capacity at two iron ore projects at the Robe River Joint Venture in the Pilbara.

The investment included \$967m to develop the Mesa B, C and H deposits at Robe Valley, and \$579m to develop Deposits C and D at the already operating West Angelas operation.

"The development at West Angelas will help sustain production of the Pilbara Blend, the industry's benchmark premium iron ore product, while the additional Robe Valley deposits will enable us to continue to provide a highly valued product to our long-term customers across Asia," Rio Tinto Iron Ore chief executive Chris Salisbury said.

"The approval of these two projects highlights the strong pipeline of development options within our portfolio as we remain focused on our value-over-volume strategy."

Days later, Rio Tinto, together with Hancock Prospecting, opened the Baby Hope mine at their Hope Downs JV project.

M&A

Hancock Prospecting – the majority owner of Roy Hill – had also made the landmark announcement it had won the three-way corporate battle for struggling junior Atlas Iron.

On 9 October, the mining giant secured a 90 per cent interest in the company, with intentions to compulsory acquire the rest.

In 2011 Atlas was worth \$3.5 billion, but its value plummeted since then due to the steep discounts it received for its lower grade iron ore.

Its Pilbara assets included two iron ore mines and two undeveloped projects, a 13 million tonne per annum (mtpa) port capacity at Utah Point, Port Hedland, and potential 30mtpa of additional capacity at South West Creek.

Mineral Resources, FMG and Hancock Prospecting all put in their bids, with the latter coming up trumps.

Hancock chief executive Garry Korte said he was "delighted" with the outcome.

"We will now be turning our attention to how best to integrate the Atlas business into the broader iron ore interests within the Hancock Group," Mr Korte said.

The majors were now circling to get their hands on BCI Minerals' iron ore assets – Iron Valley, Kumina, Bungaroo South, and Cape Preston East port rights – which were put up for sale in August.

In October, BCI – which changed its name from BC Iron last November – confirmed it was in discussions with potential buyers such as Mineral Resources, BBI Group, Hancock Prospecting, and FMG.

"Terms of any transaction, including the value of assets making up the portfolio, have not been settled with any party and discussions are continuing," BCI said in a statement.

Interest was not just in the Pilbara either.

The Northern Territory's iron ore industry was also undergoing a renaissance with two of its shuttered mines – Sherwin Creek and Roper Bar – to be reopened under new ownership.

In South Australia, GFG Alliance's SIMEC Mining was also undertaking due diligence at Havilah Resources' Maldorky and Grants iron ore projects.

Havilah chief executive Walter Richards told *The Australian Mining Review* earlier this year that iron ore was "not considered to be a core asset at this time" and "SIMEC could be the perfect partner" for its iron ore assets.

"They have access to a steel mill as well as a port, which is the missing piece of the puzzle for Havilah," Mr Richards said.

Time will tell how these prospective deals pan out.

Allied Equipment Sales expands east

NATIONAL

ALLIED Equipment Sales is spreading its wings after opening its first branch outside of Perth and welcoming mining and construction veteran Stephen Russell as the head of its newly formed NSW branch.

The new building and block at 37 Jack Williams Drive in Penrith was opened on 6 August and will be the first additional branch, servicing the entire east coast, as well as South Australia.

Its head office, which includes a full workshop and wash plant facilities, is in Midland, WA.

Allied Equipment Sales managing director Darren Smith welcomed the expansion.

“Being WA based, we are accustomed to east coast companies heading west, so we are excited about bucking the trend and opening in Penrith, providing more efficient on the ground access to our high quality stock offerings for our existing and new east coast customers,” Mr Smith said.

“I look forward to working with Stephen Russell and growing our east coast business during what is an exciting time to develop and grow opportunities in the construction equipment space.”

With more than 30 years of mining and construction experience, Mr Russell has extensive knowledge of asset management, equipment valuation, marketing and achieving sales results.

He was also well-versed in leading and developing sales teams, and maintained a strong global network.

Mr Russell, whose previous role was as the Used Equipment Manager at Westrac



Stephen Russell has joined Allied Equipment Sales as the head of its newly-formed NSW branch.

NSW, said he was excited to join the Allied Equipment Sales team.

“Allied Equipment Sales has a strong reputation for buying and selling quality equipment across a range of industries, which I’m pleased to be part of,” Mr Russell said.

“Backed by over 100 years of combined industry experience, Allied Equipment Sales is the undisputed authority in quality when it comes to industrial equipment.

“Customers at our NSW branch could

expect the same high-quality of service they had come to know in WA.”

Allied Equipment Sales specialises in sourcing high-quality new and used industrial machinery and equipment.

The company buys and sells mining, construction and on highway equipment at any location.

Its commitment to quality means Allied Equipment Sales specialises in all major OEM brands including excavators, dozers, graders and loaders, boasting brands such as Caterpillar, Komatsu, Volvo, John

Deere and Hitachi.

Allied Equipment Sales has always been customer focussed, providing ongoing advice, solutions, equipment valuation, and most importantly, personal service.

The company also offers disposal programs ranging from fleet purchases to sales of individual machines.

More information about Allied Equipment Sales can be found at: www.alliedequipmentsales.com.au, and across its social media pages on Facebook, Instagram, and LinkedIn.



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SPECIAL FEATURES

OLYMPIC DAM

All images: BHP.

BACK ON TRACK

Olympic Dam had mixed results in FY18 as a result of smelter issues as well as a planned rolling shutdown. However, BHP is back on track, pushing ahead with expansion projects and potentially game-changing innovations that could decrease costs while doubling production.

AMY BLOM

GROWTH plans for BHP's Olympic Dam were back on track following a slower than planned ramp-up after its major smelter upgrade earlier this year and ongoing technical issues.

The major smelter maintenance upgrade was the largest planned shutdown ever undertaken in Olympic Dam's 30 year history, running from August 2017 until February 2018.

Other major upgrade work was carried out on the refinery, concentrator and site technology to ensure the ongoing reliability and safety of the Olympic Dam operation.

The \$350 million project involved a planned rolling shutdown with up to 1300 contractors working around the clock to dismantle, rebuild and upgrade integral components of the facility.

Despite the smelter upgrade's successful completion in early 2018, BHP confirmed in August 2018 that the failure of several boiler tubes at the acid plant had caused technical issues.

In its full year earnings release, BHP stated remediation and mitigation activities were underway, and underground mining operations were continuing as normal.

The issues were expected to hinder production for about two months.

BHP chief executive Andrew Mackenzie said Olympic Dam was the one part of the business BHP wanted to get to previous levels of return since selling its US onshore oil and shale gas business to energy giant BP and Merit Energy in July.

"I accept that we have a lot to do to build confidence in Olympic Dam, but this is something that we can really concentrate on now as an organisation since we've cleared almost everything else off our table other than just making the most of this tremendous portfolio we've now got," Mr Mackenzie said.

"We have seen a considerable improvement in our development rates in the Southern Mine Area and that has put our growth plans that we have for Olympic Dam back on track.

"It will absolutely have the focus of the best and brightest in BHP to make that happen."

Guidance for Olympic Dam was reduced to about 135,000t from the previous 150,000t following the slower than planned ramp-up.

However, in its annual report released on 18 September, BHP announced Olympic Dam had slightly exceeded the revised guidance for the full FY18 at 137,000t.

In its September quarter operational report, released on 17 October, BHP announced its copper guidance for FY19 would be reduced by 3 per cent following the Olympic Dam outage, as well as an electro-winning plant outage at its Spence operation in Chile.

It stated Olympic Dam copper production had decreased in by 21 per cent to 33,000t in the September quarter as a result of the outage in August.

As a result, production guidance for FY19 was reduced from between 200,000 and 220,000t to between 170,000 and 180,000t.

Further Development

Production was expected to increase as development into the higher-grade Southern Mine Area (SMA) continued.

The move into the SMA would increase

copper grade to 3 per cent by the 2023 financial year, which is when BHP anticipated the copper market to enter a structural deficit.

SMA was a key foundation for sustainable future growth for BHP, accounting for about 70 per cent of the Olympic Dam future orebody.

BHP began development in the site in 2014 and produced first ore late last year.

Plans to develop a low-cost heap leaching technology in order to double mine output to 450,000 tonnes of copper per year by 2023 were also progressing well.

While doubling output, the heap leach copper extraction process was also expected to be far more cost-effective, with capital costs expected to be about 20 per cent lower than traditional mining methods.

Operating costs were also expected to be lower.

The first copper cathode was produced from the heap leach research and development trials in September last year.

A series of larger scale experiments and testing on the heap leach process were expected to continue over the next two years.

As one of the world's most significant deposits of copper, gold, silver and uranium, BHP considers Olympic Dam to be a multi-generational resource, and has a number of plans to fully unlock its potential.

BHP was also progressing plans on a \$2.1 billion expansion of its Brownfields copper deposit, known as the BFX.

If approved the BFX would increase output to between 280,000t to 330,000t per year in the medium term and move Olympic Dam into the first quartile of the

cost curve.

BHP was working towards board approval of the BFX at Olympic Dam in mid-2020.

First incremental production was targeted in late 2021 and project ramp up and completion was targeted for the following year.

Light Electronic Vehicles Deployed

In further developments at Olympic Dam, BHP unveiled its first light electric vehicle in June (LEV) as part of a trial, which could lead to the replacement of its existing underground fleet of 240 diesel-powered light vehicles.

A second LEV was expected to follow later in the calendar year.

As part of its day-to-day operations, Olympic Dam relies on a team of about 800 underground employees and uses diesel equipment for development, production, ore handling and mine services.

Although LEVs look similar to a traditional Land Cruiser or ute, BHP believed the vehicles were at the heart of the company's work on low emissions technology.

As LEVs are battery-powered, mine workers at Olympic Dam could expect their exposure to the diesel particulate matter generated by traditional diesel engines to be significantly reduced.

In an announcement on 27 June, BHP said the trial was part of a broader initiative aimed at achieving a 50 per cent reduction in the number of employees with potential exposure to particulate matter.

(CONTINUED ON PAGE 22)

Gender diversity in mining

NATIONAL

HISTORICALLY mining has been an industry with a gender imbalance.

In recent years the Australian resources industry has overhauled its recruitment and human resources practices to diversify the skills and talent mix of its workforces.

Research by McKinsey showed that gender-diverse companies were more likely to perform better by 15 per cent, and ethnically-diverse ones by 35 per cent.

About 85 per cent of chief executive's also believe that a diversified and inclusive workplace population improved their bottom line.

Organisations like BHP have gender diversity target of 50/50 by 2025.

WorkPac said it was proud to assist organisations reach these goals.

The WorkPac Group had a proud history of success as the largest Australian owned recruitment and labour hire company within the mining, construction and engineering sectors.

WorkPac Group was founded more than 20 years ago as a specialist provider of workforces to the mining industry.

The company now employs more than 12,000 workers across a range of industry sectors throughout Australia.

"Our private ownership structure provides the agility and responsiveness necessary to innovate and invest in becoming a great deal more than a traditional recruitment services



More information can be found at: www.workpac.com.

provider," Workpac Group general manager Mr Griffin said.

"With such a significant contribution to the sector's productivity, safety, diversity and inclusion targets as well as commercial outcomes, we are increasing our levels of involvement within the sector and our host clients."

WorkPac Southern Australia regional manager Chris Coffey said the company was pleased to be leading the way on mine sites

in South Australia, with its workforce split 44 per cent females to 66 per cent males.

"WorkPac also has a dedicated Indigenous recruitment division called JobTrail," Mr Coffey said.

The division had been recognised recently winning several commendations.

"Since JobTrail was founded in 2016, WorkPac's Indigenous workforce has grown 300 per cent and was at 743 people in June

2018, with our programs having a completion rate of 90 per cent," he said.

"It's great to see an increasing number of women and Indigenous Australians donning hi-vis and hard hats on our sites.

"We are well on our way to further strengthening the WorkPac Group's culture where our workplaces, and those of our clients, are free from discrimination and fully supportive of increasing minority and disengaged sector well-being."

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(CONTINUED FROM PAGE 20)



Olympic Dam has ramped up to normal production levels following a smelter upgrade earlier in the year.

BHP said Olympic Dam's switch to LEVs in its operations would reduce emissions, exposure and costs, as well as influencing the rollout of similar initiatives in its other locations.

During the trial, BHP will collect data on the vehicles' performance, power supply, maintenance requirements, charging time and corrosion resistance underground.

A wider deployment at Olympic Dam was expected to be made during FY19.

Olympic Dam is 560km north of Adelaide and is made up of underground and surface operations, as well as a fully integrated processing facility from ore to metal.

The mine is made up of more than 450km of underground roads and tunnels.

Outlook

BHP's expansion and improvement projects

have come as copper has taken a bearish turn in recent months, plunging by 20 per cent to a 14 month low of about \$US6000 per tonne in early August.

According to BHP's full year earnings release, copper prices rose over the 2018 financial year, with gains in the first half sustained for most of the second half.

The average realised price for BHP's copper in FY18 was \$US3.12 per pound.

Broad-based demand strength and the threat of supply disruption both contributed to the improvement in prices.

However, the rise in trade tensions pushed copper prices down early in FY19.

Grade decline, increased input costs, water constraints and a scarcity of high-quality future development opportunities would require attractive prices to secure sufficient investment to balance the market, with new mine supply

required in the early part of the next decade.

Copper production for the 2018 financial year increased by 32 per cent to 1.7mt largely due to a full year of production at Escondida, supported by the ramp-up of the Los Colorados Extension project and record production at Spence, in Chile.

This more than offset reduced volumes at Olympic Dam as a result of the planned smelter maintenance project.

According to the Department of Industry, Innovation and Science's September *Resources and Energy Quarterly*, US-China trade tensions played a significant role in the recent decline.

Instability in copper prices had been further exacerbated by events in Turkey, where high current deficits and a government freeze on interest rates have led to a currency crisis.

Despite the recent decline, rising demand was expected to gradually reverse this fall, with prices expected to rise from \$US6726 a tonne in 2018 to \$US7734 by 2020.

Global copper consumption was projected to rise from 24.5 million tonnes in 2018 to 25.7 million tonnes by 2020.

The forecast higher copper consumption reflected solid growth in global industrial production and a ramp-up in the development of copper-intensive technologies.

According to the department higher production and modest growth were expected to increase Australia's copper export earnings from \$8.5 billion in 2017-18 to \$10.5 billion in 2018-19.

Further price growth was then forecast to push earnings up to \$11.3 billion by 2019-20.

The department believed the long-term prospects for Olympic Dam remained strong, despite the mixed results caused by the smelter issues.

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Ensuring mining project success

NATIONAL

GBA Projects has been ensuring project success in mining and a range of other sectors for more than 30 years.

Its extensive experience in providing the mining sector with a broad range of project management services includes project management, planning and controls, risk management and strategic planning.

With a high focus typically on schedule and cash-flow management, GBA Projects has ensured its clients have certainty around the planning and cost control of mine and mine infrastructure development.

GBA Projects' experience has helped numerous projects finish ahead of time and under budget.

One of its recent mining projects,

the Olympic Dam expansion, saw GBA Projects provide a raft of services to BHP on what was arguably the largest mining expansions undertaken in Australia.

GBA Projects continues to provide BHP with critical projects services today.

The company provided project planning, scheduling and controls services to nearly all components of the expansion and at varying levels of management.

GBA Projects was also involved in the constructability audit undertaken to provide strategic planning advice with respect to the mobilisation of crews to site for the program of works.

Its other recent projects included the Olympic Dam accommodation facility expansion, Kanmantoo mine development, Bengalon mine development and Newcrest's Hire deposit mine development.

Experts in shutdown maintenance

NATIONAL

FIXED Plant Maintenance Solutions (FPMS) has a reputation for providing quality over quantity when dealing with shutdown manning and project work.

As a result, FPMS has regularly been asked to return and provide its trademark quality service and support.

More recently, the company has provided ongoing shutdown maintenance support for BHP's Olympic Dam.

FPMS director Brent Dangerfield has been involved with Olympic Dam for more than 20 years, having worked as both an employee and now a business owner and contractor.

"We have been pleased to offer our services at Olympic Dam, working on large scale projects such as dryer coil change outs, CCD thickener upgrades, ongoing maintenance support in the concentrator, and work on and around the grinding mills," Mr Dangerfield said.

Mr Dangerfield said FPMS' work group has maintained its core crew for about 10 years, due to its ability to work together and draw on everyone's experience levels.

He said the hardworking and capable team at FPMS has serviced a large number of sites on the eastern seaboard of Australia, including Tasmania.



Fixed Plant Maintenance Solutions provided ongoing shutdown support for BHP.

"Tasmania saw two of the biggest projects we have undertaken," Mr Dangerfield said.

"This included two complete shell change replacements at the Savage

River mine, taking about 50 days.

"We also provide supervision and technical support in PNG, Laos, Malaysia, the Philippines and more."

In addition to its shutdown

services, FPMS provides preventative maintenance, laser aligning and project management.

More information about FPMS can be found at www.fixedplantms.com.au.

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IN THE BOX SEAT

At the geographic heart of NSW lies the regional centre of Dubbo – the largest city in the Orana region with an impressive and growing economic profile. A new wave of mining projects is set to give the town a boost, with added jobs and flow-on benefits to local business.



Image: City of Dubbo.

ELIZABETH FABRI

DUBBO businesses already supply goods and services to a number of mining operations around the region and the promise of new mines is set to increase opportunities.

Dubbo mayor Ben Shields said mining was a growth industry in western NSW, with businesses expanding and taking advantage of the city's strategic location and junction for road, rail and air freight services.

"From heavy vehicle supplies and services, to civil construction consultancies and mining engineering specialist services to logistics and transport, Dubbo is integrally linked in the mining supply chain," Mr Shields told *The Australian Mining Review*.

"Dubbo has benefited from the development of new mines in neighbouring council areas and as actual mining production commences in the Dubbo local government area (LGA) there is further opportunity for local employment and the spin-offs this has in terms of new jobs in retail, housing and construction to service employees in the mining industry.

"The ability of Dubbo to grow its capacity as a service centre to play a more significant role in the Mining Equipment and Technology Services is significant, with available zoned land, strategic plans in place and businesses on the cusp of this type of development."

Mining projects that were set to benefit the town included Alkane Resources' Dubbo mine and Tomingley expansion, as well as Clean TeQ's Sunrise project.

Developments

Alkane Resources' construction-ready Dubbo rare earths project was now in the financing and offtake stage, and its established Tomingley Gold Operations (TGO) will also soon transition from open cut to underground mining.

In late September, the miner gave the Tomingley underground development the thumbs up, with ground support work for the portal to begin by the end of the year.

Tomingley, just 50km south-west of Dubbo, has been providing a steady flow of jobs for the region since it was opened in



Image: Alkane Resources.

The Tomingley mine, near Dubbo

February 2014.

Alkane Resources managing director Nic Earner said the commitment to go underground at Tomingley meant Alkane would continue to operate for at least an additional 40 months over the life of the open cut operations, and result in recruitment of about 30 underground miners.

First ore from the underground mine was expected in mid-2019, which will result in an estimate 93,000 ounces of gold production.

Mr Earner said the underground resource was open along strike and at depth, which meant they were hoping to drive wide and deeper than currently planned.

"We'll do this exploration for extensions from underground," he said.

"We continue to explore for gold in the region and would like to see ongoing production from around Tomingley, Peak Hill and other locations."

However, it was the undeveloped Dubbo project that presented a longer-term growth option for the region.

The deposit, comprising a large in-ground resource of zirconium, hafnium, niobium and other elements, was set to supply the emerging battery metals market.

With an 18.90mt ore reserve and 75.18mt resource, the project had an estimated

20-year mine life, 1mtpa plant feed rate, and significant extension and expansion potential.

The project had all major environmental approvals in place, and Alkane was continuing to progress discussions with customers and investors.

"Once we have financing in place we can begin," Mr Earner said.

He said there was excitement building in the region for the long-term careers and opportunities the project would bring.

"We buy and use local when possible which has helped many local businesses grow," he said.

"Dubbo has a large skilled workforce so we aim to employ mostly from the local area.

"We only have limited and specialised skills that travel in and out of Dubbo to work.

"The products from the Dubbo project are used in a lot of downstream manufacturing, we hope that other businesses will be attracted to the region for that purpose."

The next cab off the rank was Clean TeQ's Sunrise cobalt and nickel mine, 160km from Dubbo – which was scheduled to begin construction next year with first production in 2021.

According to Clean TeQ, the project was "one of the highest grade and largest nickel

and cobalt deposits outside of Africa and one of the largest and highest grade scandium deposits in the world".

In June, Clean TeQ completed a Definitive Feasibility Study, which demonstrated the project's global importance.

The DFS modelled the first 25 years of production, with sufficient ore reserves to extend beyond 40 years.

The company also said it planned for a peak construction workforce of 1000 people, and an operations workforce of about 300 people, which would generate strong employment opportunities in NSW.

In August, the project moved another step forward after Clean TeQ entered a heads of agreement with Metallurgical Corporation of China (MCC) to be a key project delivery partner.

Clean TeQ said the delivery of the EPC contract would reduce financial and project execution risk, and front-end engineering and design (FEED) was planned to begin later this calendar year.

"With MCC now engaged, Clean TeQ can continue to progress the build-up of our delivery team in preparation for the construction expected to commence in mid-2019," Clean TeQ chief executive Sam Riggall said.

"During operations, the majority of workers are expected to reside in local communities.

"As well as the considerable financial benefits from royalties and taxed paid by the project, there will be a strong community dividend in the form of employment opportunities, community enhancement contributions and infrastructure upgrades.

"When it comes to community investment and development, our approach seeks to recognise the importance of consulting the community about how it wants to grow and thrive."

The Dubbo community was also set to benefit from a pending decision to declare Dubbo a "fossicking district".

The Dubbo Regional Council was understood to be considering gazetting its local government area as a fossicking region; the small-scale search for mineral and gemstones in land holder approved areas.

Historically, gold, agate, common opal, chalcedony and fossils have been found in Dubbo.

Mining waste disposal services



More information can be found at www.samswaste.com.au.

NATIONAL

SAM'S Liquid Waste and Hire, based in central western NSW, specialises in the collection and disposal of domestic and commercial liquid waste and septic waste, commercial volume general waste, toilet, shower and office hire.

Another key aspect of the company was

its garbage division, which included hook bins, skip bins, and general waste bins. Areas of influence spread from far northern QLD, to Victoria and beyond for special needs. With the increase of mining activity in central western NSW, Sam's Liquid Waste and Hire was experiencing a shift in its business activities. While the business was conscious of

maintaining excellent relationships with existing customers, it had experienced an increase in business emanating from the mining and industrial sectors. Having built a new oily water plant, the company aimed to use this to accommodate the increase in mining activity. Other products such as hydraulic hoses were collected and transported to a facility for treatment and disposal, while

oil filters were picked up and taken to the company's Dubbo premise for drainage and recycling. The company's client base varied from domestic households, to commercial operations, to government departments, public events and festivals of all sizes to the industrial, construction and mining sectors. In fact, no job was too big or too small.



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All images: Bounty Mining.



BOUNTY-FUL ACHIEVEMENTS

In 2015, Bounty Mining found itself in voluntary administration; now the company has become a miner to watch, recently listing on the ASX, with an expanded portfolio in central and far north QLD.

JESSICA CUMMINS

SINCE completing the landmark acquisition of Cook Colliery and Minyango in late 2017, metallurgical coal miner and developer Bounty Mining has gone from strength to strength.

After a tough couple of years, on 15 June the miner was readmitted to the ASX, raising \$18 million in an IPO at an issue price of \$0.35 per share.

The listing represented a turnaround for the company, and a shot in the arm for its projects in the development pipeline, including Cook North, Minyango, and Wongai.

Bounty chairman and chief executive Gary Cochrane said this year the company had “achieved a series of milestones”.

“We started coal mining by the 24th of January; then there was first shipment, the first railing, and then we had the stock market listing, and now we have introduced the sunken machine,” Mr Cochrane said.

“We are in a strong position to grow Bounty’s production profile and develop the company into a leading Australian producer and exporter of hard coking coal, a product that attracts a premium price.”

With a five year vision to become a 5mtpa coal producer, Mr Cochrane said the company remained focused on ramping up production at Cook Colliery and Cook North, while developing Minyango, Wongai and other opportunities.



Bounty Mining chief executive Gary Cochrane said he believes the coal market should be strong for a few years.

Cook Colliery

Cook, a premium metallurgical coal mine, was previously owned by Caledon Coal from 2006 to 2017 before a major flooding event submerged its longwall, placing Caledon in voluntary administration, and eventually liquidation.

The longwall was promptly dewatered but the mine was placed under care and maintenance shortly after.

Mr Cochrane said it was not until the mine was eventually placed for sale that the

company decided to acquire the tenements for \$31 million.

“We went and had a look at the mine and went into negotiations with Caledon from May last year,” Mr Cochrane said.

“It wasn’t on the market until it had its production problems.”

Previously, Cook was mined using the ‘linear mining’ method – a first for Australia, which uses a continuous haulage system, a belt storage magazine, mobile tail end and expandable belt support cartridges.

“We are in a strong position to grow Bounty’s production profile and develop the company into a leading Australian producer and exporter of hard coking coal, a product that attracts a premium price.”

Bounty’s ownership of Cook saw it brought back into production as a bord and pillar style mining operation instead of the longwall.

Mr Cochrane said using multiple smaller mining units was less risky than one large machine in one area.

Since it’s reopening, Bounty has successfully mined 220,000 tonnes from January 2018.

“We had to recruit a workforce and find a whole lot of mobile equipment, which was very difficult – it just wasn’t available,” he said.

“We have all the equipment now and I would like to say we are halfway to where I would like us to be long term.”

In a separate transaction, the company acquired the assets associated with Cook Colliery from Glencore for \$10 million which included the mining lease, rail loop, Glencore wash plant and coal marketing agreement.

Since then, Bounty has managed to upgrade the Koorilgah rail loop to full axle load, allowing full capacity of 8500 tonnes trains, which reduced operating costs by at least \$5/tonne as it planned.

(CONTINUED ON PAGE 28)

ABM contractors at work

QLD

ABM Contractors has a reputation for taking on the tough jobs no one else wants or can accomplish, and completing those projects safely, on time and within budget.

Established in 2000, ABM is a family-owned business with an experienced senior management team and a belief that its people are its business, ensuring it strives to create a positive culture with employees at all its projects.

Having worked general services contracts for many years, the team at ABM has a solid understanding of the needs of a mining operation and the standards to which work must be completed.

Development drivage, roadworks, water management and all the associated activities out-by has been ABM's stock and trade, and it takes great pride in working hard to complete tasks without incident or impact on day-to-day operations.

In the ever demanding underground contracting game, ABM prides itself on finding safe and cost-effective solutions to client problems.

Some of ABM's innovations are now standard on certain underground bolting equipment.

ABM is committed to being the service provider of choice to a small list of exclusive clients.

With major contracts at Fitzroy Resources' Carborough Downs and Bounty Mining's Cook Colliery, as well as



ABM Contractors has a focus on safety and working with clients to fulfil their needs.

equipment hire and equipment repairs at various mines throughout the Bowen Basin, ABM has seen steady growth within its business since the downturn.

ABM's services include development

drivage, fault drivage, secondary support and VCD installations, fall recovery, conveyor installations, project management, out-by services, longwall relocations, and equipment hire and repairs.

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(CONTINUED FROM PAGE 26)

Mr Cochrane said this was part of the company's overarching plan to ramp up production with more expansion plans expected in order to reach its targeted 2.2 mtpa rate.

The company spent \$2m on the upgrade, which comprised the installation of new ballast, formation work, new sleepers, weightometer, and train overload facilities.

Prior to this, the rail loop had been downgraded to 20 tonne axle load due to a lack of maintenance.

This limited Bounty to using partly loaded trains carrying 5500 tonnes of coal at a time.

On 25 June, the company announced its first shipment of coal from the Port of Gladstone to China carrying 34,000 tonne of mid-volatile hard coking coal.

"We look forward to growing exports from Cook, taking full advantage of the underutilised infrastructure we have taken ownership of," he said.

Early last month the first sumping machine commenced extracting coal from secondary working at Cook Colliery, which completed the major change in the mining systems between the previous owners longwall to Bounty's multiple unit operation.

Minyango

The Minyango project is a large greenfields coking coal development to the south of the township of Blackwater and 10km from the Cook CHPP.

The project is expected to produce similar coking and thermal coal as Cook with an estimated mineral resource of 190mt.

Bounty plans to focus primarily on the Aries and Pollux seams for exploration within the area.

Wongai

Bounty's Wongai early-stage Wongai project also showed promise.

The project, in the Laura Basin in far north QLD, currently has an estimated resource of 67.5 million tonnes and is expected to produce about 1.5 million tonnes per year of coking coal, over an expected mine life of 15 years.

Expenditure in the near-term will be allocated towards resource delineation, pre-feasibility and feasibility studies, and the finalisation of the environmental impact statement.

Bounty has also ensured bord and pillar mining will take place at the project using continuous miners and shuttle cars.

Mr Cochrane said Wongai was the company's longer term project, with discussions taking place with the QLD government on minor works on site.

"We look forward to growing exports from Cook and taking full advantage of the underutilised infrastructure we have taken ownership of."

Looking Ahead

With global consumption of hard coking coal expected to grow to 635mt in 2019, Bounty Mining was set to find its main export markets in China, Japan, India and Brazil.

As offtake agreements with Lido Trading and Xcoal have been secured, Mr Cochrane said Bounty will continue to look for other acquisitions synergies to its coking coal position in QLD.

"I'm confident in the coking coal market – it should be strong for quite a few years now, especially because there is another three to four years before the next mine is built," he said.





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World-class engineering

NATIONAL

JA Engineering has superior engineering, design and refurbishment capabilities to deliver quality equipment and support products to the mining industry.

The company was established in 2006 off the back of growing demand from the Australian coal industry for alternative suppliers of quality mining machine parts and components.

JA Engineering relocated to a 1500sqm workshop in Rockhampton, QLD in 2016 so it could expand into mining machine rebuilds and supply its range of mining machines, with the new facilities enabling it to disassemble equipment, high-pressure steam clean, assemble and test all mechanical equipment.

Design has remained a key strength for JA Engineering over the years, with a dedicated team who possess extensive engineering and design capabilities combined with hands-on experience, enabling it to manufacture and restore products and equipment to a high industry standard.

Among its world-class products were the new Wildcat JAE42 CM – a remote controlled mid-high seam double pass continuous miner.

The Wildcat was capable of transforming a high installed cutting power through the machine weight into real production and cutting performance.



Be part of the JA Engineering experience.

It was designed to be used in a room and pillar coal mining operation where a high cutting force is required.

JA Engineering has also produced a heavy duty wheel unit, which was designed to withstand higher load demands for a

longer operational life.

More information about JA Engineering can be found at: www.jaeaust.com.au.



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ANCHORS AWEIGH

Record lithium exports coupled with an eleventh hour purchase of Cliff's closing Koolyanobbing iron ore mine has put the Southern Ports Authority – particularly Esperance – in the spotlight through 2018. Moving into the new year, opportunities are expected to continue across its diversified commodity mix.

All images: Southern Ports Authority.

ELIZABETH FABRI

SINCE the amalgamation of the ports of Albany, Bunbury and Esperance in 2014, it's been full steam ahead for the Southern Ports Authority.

In FY18 total exports came to 30.9mt as the ports continued to benefit from WA's growing economy.

Iron ore, mineral sands, and nickel have been key contributors for some time, and over the last couple of years newcomers bauxite and lithium had also earned their stripes.

However, it hasn't been a smooth ride: in 2017 news that First Quantum Minerals would close its long-running Ravensthorpe nickel operation – which used Southern Ports' Esperance stevedoring services – sent shockwaves through the community.

And in January, long-time customer, the Cleveland-Cliffs-owned Koolyanobbing mine, announced it too would be shutting its doors and waving off its last shipment from the Esperance port in June.

The news rattled the industry, putting a dent in the port's overall trade for FY18 as shipments wound down, with about 120 jobs on the line.

In mid-June – weeks before the last shipment – Mineral Resources came to the rescue, announcing a last-minute deal that it would purchase the Koolyanobbing project and associated infrastructure for an undisclosed sum.

Koolyanobbing was strategically positioned next to Mineral Resources' existing Carina iron ore project, just 50km north of Southern Cross.

FY18 HIGHLIGHTS

Lithium exports increased by almost 40 per cent to a total 885,000 tonnes.

Nickel exports grew by more than 65 per cent.

New trade at Esperance including IGO's Nova operation, and Tawana Resources' Bald Hill mine.

Iron ore decreased by 3 million tonnes following Cleveland-Cliff's exit from Australia.

Environmental licences, red-tape reduction activities and berth upgrade planning underway to facilitate new trade.

Under the terms of the purchase, the WA Government agreed to provide subsidies and fee waivers to facilitate the sale for the sake of jobs and State-royalties.

And while the deal was not able to rewind the clock and avoid a 27 per cent decrease in iron ore exports incurred in FY18 (from 11.2mt to 8.2mt), it would however guarantee continued exports through Esperance for the mid-term.

The acquisition was welcomed by the industry, with mining resumed in August, and less than a six month gap between Cliff's final iron ore shipment in June and Mineral Resources' expected first shipment in October/November.

However, under the purchase, Mineral Resources signed an agreement guaranteeing shipments of only 6mpta of ore out of Esperance for the next five years; a substantial slump from what the mine had been exporting previously.

The decreased throughput led to a number of voluntary redundancies at the port in September.

"Eighteen staff have accepted offers of voluntary redundancy as part of a restructure to accommodate a decline in iron ore throughput at Esperance," Southern Ports interim chief executive Alan Byers told *The Australian Mining Review*.

"This successfully concludes the voluntary redundancy process with the target reduction achieved, and helps secure the future of the existing Esperance workforce."

Mr Byers – who stepped in as chief executive in June after inaugural chief Nicolas Fertin resigned – said additional capacity available at the port meant opportunities were open to forge partnerships with new customers.

"The suspension of operations at First Quantum Minerals in August 2017, followed then by the announcement that Cleveland Cliffs would cease mining at its wholly-owned iron ore complex at Koolyanobbing, threw up both challenges and opportunities,"

"Southern Ports has been in discussions with about 20 potential new port customers, some of which may be able to utilise the capacity freed-up by the reduction in iron ore and nickel exports that has occurred in the past year."

Port Performance

While overall trade through the ports dropped 10 per cent in FY18, Southern Ports was optimistic for coming years, with lithium set to be a key driver for future growth across Esperance and Bunbury.

"Amendments to a Southern Ports' environmental licence allowed export of spodumene concentrate through Esperance Port, which secured ongoing exports from Galaxy Resources and attracted new customer Tawana Resources during FY17-19," Mr Byers said.

(CONTINUED ON PAGE 32)

MSC globally recognised



More information can be found at: www.msc.com/aus.

NATIONAL

AS one of the world's largest shipping companies, Mediterranean Shipping Company (MSC) has been recognised and respected as a global leader in shipping.

Operating in 155 countries with a fleet of 460 container ships and calling at 500 ports worldwide, MSC prided itself on offering a global service with local knowledge.

MSC has had an ongoing presence in Australia for nearly 30 years, calling at all

major Australian ports, as well as being supportive of the regional ports.

The company ethos of supporting regional ports has continued with scheduled port calls in Esperance since 2016.

This has provided customers in the Goldfields region with direct access to key international markets via MSC's global shipping network.

The Esperance port call was immediately well received by local companies and the MSC service has gone

on to become a key component of their supply chain.

Alongside the success of the container shipping division, MSC has diversified its operations with investments in terminals and ports, landside logistics consisting of road and rail, passenger ferries, and the highly successful cruise ship division MSC Cruises.

MSC Cruises recently began launching state-of-the-art cruise ships after an EU10.5 billion investment plan, which it started in 2014.



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(CONTINUED FROM PAGE 30)



“Southern Ports has been in discussions with about 20 potential new port customers, some of which may be able to utilise the capacity freed-up by the reduction in iron ore and nickel exports.”

The Albany port was the first port in WA.

Export of lithium at Esperance almost quadrupled through FY18 increasing from 55,000 tonnes to 202,000t.

Mr Byers said the amended licence would facilitate additional trade of up to 1 million metric tonnes per annum for export of spodumene using a tipping container system.

“We continue to work with our current spodumene concentrate proponents Galaxy and Tawana Resources to facilitate export of their product and continue to talk to other potential proponents about future exports,” he said.

Qube Bulk had also recently constructed a new state-of-the-art lithium bulk storage facility in Esperance, which would facilitate Galaxy and Tawana’s exports through the port.

In addition, Southern Ports had completed 12 shipments of nickel and copper concentrate since June 2017 via a trial arrangement with Independence Group’s Nova operation.

The arrangement contributed to a more than 65 per cent increase in nickel exports.

“We are now seeking to continue that trade on a permanent basis through an amendment to our environmental licence,” Mr Byers said.

The Bunbury port had its share of positive results too, with an almost 40 per cent increase in spodumene exports in FY18 to 683,000 tonnes, and 10.7mt of alumina exports.

The results were driven by two new trades – bauxite from Alcoa, and alumina hydrate from Worsley Alumina – facilitated by upgrades to Bunbury’s Berth 8.

“These major upgrades to Berth 8 will result in reduced shutdown time, the ability to facilitate different types of products, and increased load rates,” Mr Byers said.

“Equipment upgrades will reduce loading



Southern Ports Authority is the amalgamation of the Ports of Albany, Esperance, and Bunbury pictured.

time by at least 166 hours over the next 12 months, and washdown times by about 222 hours.”

He added modelling for a new in-house scheduling system at Bunbury was in the final stage, which would increase berth capacity.

The Year Ahead

Southern Ports was also set to get a new chief executive in FY19.

Mr Byers said recruitment was being undertaken by an executive search firm, which had “cast a wide net to identify candidates with the experience and background to successfully lead Southern

Ports”.

“To allow flexibility, the process does not have a set timeframe however it is not expected to be completed until at least the end of 2018,” he said.

“In the meantime, I am focussed on my role as interim chief executive, and am grateful for the support and experience of the Southern Ports team.”

Mr Byers said key activities for FY19 included improving access to the Albany port for potential customers via new leasing opportunities, as well as accommodating increased forestry and agriculture products.

At Bunbury, the process was underway for the amendment to the 2009 Inner Harbour Structure Plan.

Southern Ports was also working closely with the State Government’s Westport: Port and Environs Strategy.

Then at Esperance, the company was progressing plans to improve the Berth 3 facility.

“We have designed upgrades to the dedicated iron ore Berth at Esperance to take advantage of the new capacity that would enable the berth to cater to all vessels, including cruise ships,” Mr Byers said.

“Southern Ports is also working to address all recommendations in the State Government-commissioned independent Post-Amalgamation Review.”

LINX CCG supports WA's southern ports

WA

LINX Cargo Care Group (LINX CCG) proudly provides reliable and efficient port and logistics services to WA's Bunbury, Albany and Esperance ports, via its LINX and C3 businesses, and its Albany Bulk Handling Joint Venture.

LINX Cargo Care Group chief executive Anthony Jones said it's the local knowledge and ability to tailor solutions that enables LINX CCG, from all three locations, to deliver logistics, stevedoring and rail services, for customers who seek peace of mind when it comes to their cargo management.

"No matter your product or industry, we are committed to ensuring your success," Mr Jones said.

"Our experience in WA's ports for more than 20 years, working across a diversified portfolio of products and industries including mining, enhances our provision of customised, in-house solutions to ensure your LINX CCG customer experience is aligned with your strategic business needs.

"We are focused on supporting the southern mining industry, most predominantly through the local community and our positive working partnership with the Southern Ports Authority.

"Our ongoing dedication to delivering operational excellence for our customers enables LINX CCG to respond and adapt to changing market conditions."

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All images Iluka Resources.

THE HOME STRETCH

It's been a year of delivery for Iluka Resources, with completion of its \$275 million Cataby mineral sands project edging closer, and expansion plans moving forward across its Jacinth-Ambrosia and Sierra Leonean operations.

JESSICA CUMMINS

PERTH-based major mineral sands company Iluka Resources has its hands full with construction works in the final stages at Cataby, and development works progressing on four expansion projects.

The miner finished the first half of the calendar year in a strong position, with net profit after tax of \$126 million; underlying group EBITDA up 80 per cent to \$279 million compared to the first half of 2017; strong free cash flow of \$226 million; and a 21 per cent rise in mineral sands revenue to \$607 million as a result of an improving global market.

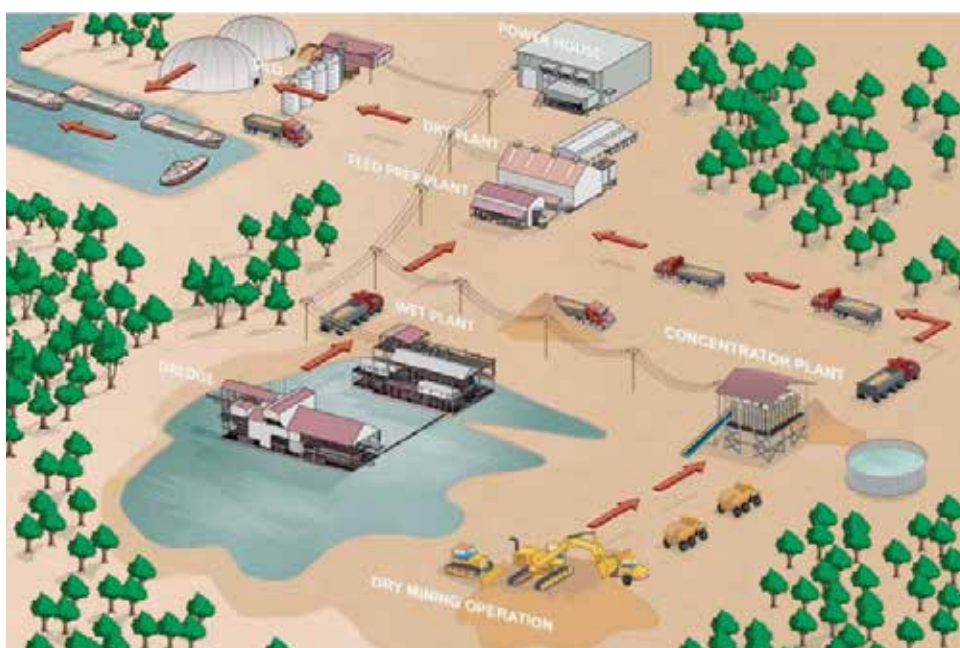
The results were impressive, given just two years ago the miner posted a net loss of \$20.9 million in the first half of 2016.

Iluka Resources managing director Tom O'Leary said the company was pleased with the direction the mineral sands market was now taking, which was having positive flow on effects to its finances.

"In the mineral sands market, we continue to see a strong, and we believe, sustainable price environment across our product suite," Mr O'Leary said at the release of the company's half-year results in August.

"While our balance sheet is in a strong position, disciplined capital allocation remains foremost in our thinking as we move forward with the execution of the Cataby mine development in WA and the Lanti and Gangama expansions in Sierra Leone, as well as with the definitive feasibility studies at Jacinth-Ambrosia, Sembehun and other projects in Sierra Leone to support production of additional tonnages," Mr O'Leary said.

"We are also focused on maintaining a sustainable pricing environment for our core products of zircon, rutile and synthetic rutile and have announced a 14 per cent



Sierra Rutile mining operations in Sierra Leone.

increase in rutile prices for the second half and a 12 per cent increase in the Zircon Reference Price, effective from 1 October 2018 for a six month period."

To ease potential zircon shortfalls, Iluka was also planning to sell additional zircon in concentrate (ZIC), and has increased zircon production guidance from 300,000t to 330,000t in 2018.

Cataby

Once Cataby comes online, the project is set to add 200,000t of synthetic rutile, 30,000t rutile, and 50,000t of zircon to annual production.

The project, 150km north of Perth, WA, is a chloride ilmenite deposit with an expected mine life of eight years.

Cataby was given the green light back in December 2017, after Iluka had secured offtake agreements for 85 per cent of its

synthetic rutile production.

First production was now months away, scheduled to begin in the first half of 2019.

"We're in the midst of some of the biggest months of the project, but I'm confident we're on track," Mr O'Leary said.

Stage one of the 18 month construction program included a 260 person mining village and bulk earthworks such as concreting, sealed roads, and the transport of buildings.

Reassembly of Iluka's Newman concentrator was also progressing, and construction of mining unit equipment was well advanced.

The heavy mineral concentrate produced at the mine will be split for further processing with ilmenite being converted to synthetic rutile at Capel and rutile and zircon final products processed at Iluka's Narngulu mineral separation plant in Geraldton.

Jacinth-Ambrosia

Work was also advancing on development plans at Iluka's Jacinth-Ambrosia operation in South Australia – the world's largest zircon mine.

The project, which was placed in care and maintenance in April 2016, reopened in December 2017 and has been performing well since.

Iluka has been examining options to "smooth the production profile" at the project to offset the outlook of declining grade over its remaining operating life.

The miner initially contemplated developing a second mining unit and increasing concentrator capacity by 30 per cent, however better than expected production performance since the restart – namely higher grade ore – has led to a change of scope.

Iluka's revised plan was to develop the Ambrosia deposit in the second half of 2019, rather than in 2022.

In a statement, Iluka said the higher grade ore encountered had resulted in an increase in Heavy Mineral Concentrate (HMC) inventory, which together with the acceleration of the mine move to Ambrosia and impending zircon production from Cataby, would enable zircon production levels to be maintained broadly at previously guided levels "without incurring the capital cost associated with introducing a second mining unit and increasing the concentrator capacity".

"A Definitive Feasibility Study (DFS) for the Ambrosia mine move is close to completion and Iluka will provide further guidance on capital estimates following the study, with current estimates of ~\$60 million," Iluka stated.

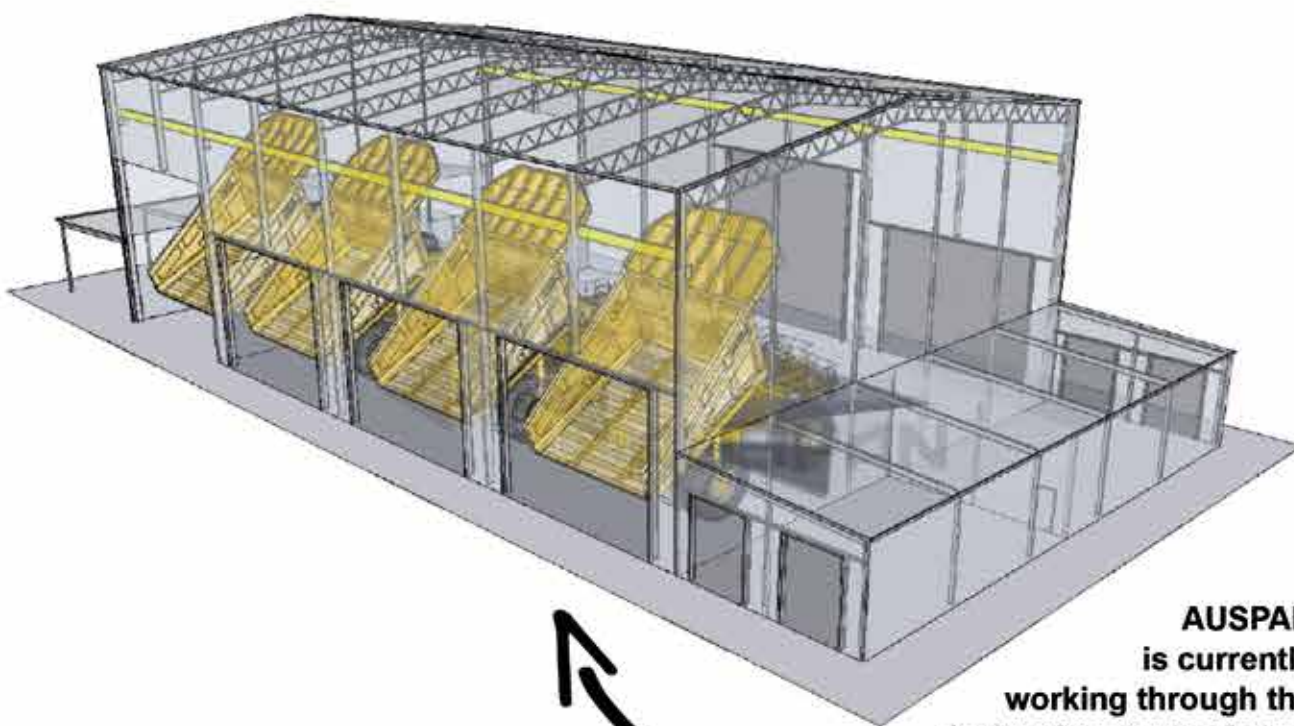
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AUSPAN is currently working through the design & construction of this 4-bay HV Workshop to be installed at Iluka's Cataby Project

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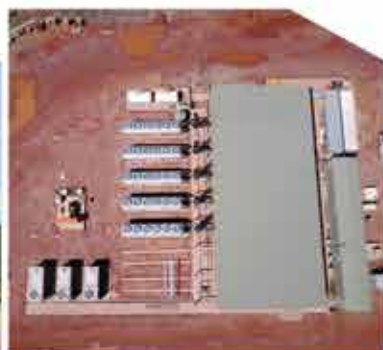
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(CONTINUED FROM PAGE 34)

Sierra Rutile

Expansions were on the cards at Iluka's Sierra Rutile operation in Sierra Leone too.

Iluka entered the African market with its acquisition of London-listed Sierra Rutile in December 2016.

The multi-mine operation comprises the Lanti dredge mine, Lanti mine, Gangama mine and undeveloped Sembehun mine.

Iluka was currently implementing a number of expansion and improvement projects, which included drilling programs to improve the resource and support mine planning; initiatives to improve productivity and product recovery rates; and developing the Lanti deposit to an in pit mining operation, which was completed in December 2017.

Lanti and Ganagama

In December last year, Iluka's board approved plans to double the capacity at both the Gangama and Lanti operations from 500-600 tonne per hour to between 1000t and 1200t per hour.

The main engineering, procurement

and construction (EPC) contract has been awarded and the contractor has mobilised to site with civil construction commencing recently.

Procurement was progressing with orders placed for all long lead items and the earth moving fleet, and commissioning for both dry operations scheduled for mid-2019.

Sembehun mine

In March, Iluka also began a DFS for the Sembehun mine development.

Sembehun was the final phase of the Sierra Rutile expansion, which at the time of acquisition, accounted for 70 per cent of the ore reserves in Sierra Leone.

However, since commencing DFS works, the company said it was becoming clear the PFS undertaken previously by an external engineering firm, had underestimated costs.

"Iluka has been progressing Definitive Feasibility Studies, which we expect to complete by this years end; disappointingly the preliminary estimate indicates a 40 to 60 per cent increase in real terms to the \$US300 million total capital cost guided," Mr O'Leary said.

The majority of the increase is related to

the Sembehun development and associated mineral separation plant upgrade.

"As part of the Sembehun DFS and separately the separation plant upgrade DFS, we're continuing to assess options for reducing capital costs and maximising returns," he said.

An Environmental and Social Impact Assessment was currently progressing with submission expected in late 2018.

Subject to board approval, early works construction was expected to commence in 2019 with commissioning of the operation planned for 2021, and an expected mine life of 20 years.

Organic Growth

Moving forward, exploration will be a key component of Iluka's growth platform.

June quarter results outlined expenditure for the first half of the year was \$4.4 million.

In the coming quarter, the company will continue drilling at the Pejebu exploration target, which is close to the Lanti mine in Sierra Rutile.

In August, Iluka said the target could potentially add between 180,000 and

275,000 tonnes of in-situ rutile, and could possibly extend existing operations by up to two years.

"Mineral Resource estimation for the Pejebu exploration target and near mine opportunities is expected to be complete in Q4 2018," it stated.

"Resource development at Sembehun will continue with 75,000 meters of drilling planned through to 2021.

"Both developments may add to Iluka's production optionality in Sierra Leone."

Meanwhile, in Australia, the company was set to benefit from a farm-out agreement entered with Western Areas.

Under the terms of the deal, Western Areas has the option to acquire up to a 75 per cent interest in base and precious metals rights, and all additional basement-hosted mineral and rare earth elements across five tenements in the Western Gawler region in South Australia.

Western Areas will need to spend \$2.75 million within the first three years to acquire a 51 per cent interest, and will need to spend a further \$3 million to earn an additional 24 per cent interest.

As part of the deal, Iluka will retain all rights to mineral sands elements of the tenements.

Proud service providers to Iluka Resources

NATIONAL

CAPEL Crane Hire has been building and strengthening its business capabilities as it looks to the future in the dynamic South West.

"Going forward we desire to be at the forefront of our industry and a market leader in our region which will allow us to build stronger professional and community relationships, expand employment and deliver revenue back into our local economy," Capel Crane Hire

business manager David Payne said.

Capel Crane Hire values its local business relationships, and for the last 40 years has been servicing the South West, including Iluka Resources, specialising in craneage, transport, fabrication and construction.

The company offers a full service that is both efficient and safe, while its local knowledge and qualified staff are dedicated to finding the right solution.

"Our experienced staff and the scope of what we can deliver is what sets us apart," the company director Ray Payne said.



More information can be found at www.cranehirewa.com.au.

Grounded Group completes Cataby ahead of schedule

WA

LEADING mining village construction company, Grounded Construction Group has installed two mining villages two weeks ahead of schedule for Iluka Resources' \$275 million Cataby mineral sands project.

The Grounded \$15 million project began with a 260-person mining village followed by a 180-person elevated campsite in Dandagaragan.

Currently in construction, stage 3 would encompass the administration, storage and medical necessities for the entire mine.

As with all of the company's projects, best practice methods were used to install accommodation facilities.

The entire project included the installation of all waste and water treatment plants, electrical plumbing, communications, bitumen roads, line-marking and car parks.

The greenfields site required bulk

earthworks, concreting, sealed roads and the transport of buildings.

Turnkey operations integrated landscaping, building and recreational facilities.

In a contoured and spacious design, generous outdoor and sporting facilities were constructed including a swimming pool, tennis court, gymnasium and BBQ for workers on site to enjoy a healthy experience.

Founded by successful entrepreneur Paul Natoli, Grounded Construction Group has been operating for five years and was one of the fastest growing civil construction companies in WA.

Based in West Perth, Grounded Construction Group specialises in the installation and refurbishment of permanent and temporary modular portable buildings, mining camps, non-process infrastructure, operational facilities and the development of long-term housing.



More information can be found at www.groundedgroup.com.au.

FLIGHT TO 400

Capping off FY18 with record breaking results and hitting 2.5 million ounces in gold reserves brings Saracen Minerals closer to reaching its goal of 400,000ozpa within the next seven years. Saracen Minerals managing director Raleigh Finlayson speaks with *The Australian Mining Review* about its achievements and plans for the rest of the year.

All images: Saracen Minerals.

JESSICA CUMMINS

GOLD miner Saracen Minerals is in good stead with a FY18 net profit surge of 166 per cent to \$75.6 million; an increase from \$28.4m a year prior.

Due to an increase in gold sales of 317,675 ounces; a 75 percent EBITDA rise to \$198.7m; and doubling of its underlying NPAT to \$67.3m, the company continues to be one of the top 10 gold miners in WA.

Saracen Minerals managing director Raleigh Finlayson said the strong results were particularly pleasing given the miner was in a growth phase.

Mr Finlayson said profit and free cash flow surged as the company grew production and reduced costs; a result of its huge exploration success.

“Exploration is the key to our ongoing growth and therefore we have committed \$60 million to exploration in FY19,” he said.

“With a 300,000ozpa production profile now established, growing mine life and no debt, Saracen has an excellent platform from which to capitalise on further growth opportunities as they rise.”

With a goal to reach 400,000ozpa within the next seven years, Mr Finlayson said exploration, again, would be a key driver of this along with the expansion of the Carosue Dam facilities to accommodate additional ounces.

“Our record spend on exploration is more than double than any other year so we are keen to see the results of that to help define the mine plan,” he said.

Having presented for the first time at the Precious Metals Summit in Colorado in September, Mr Finlayson said a key takeaway for Saracen was the varying difference in performance between Australian mid-tier gold producers and its American peers.

“Over the last five or six years the Australian gold mining space has performed very well from a delivery on guidance, cash flow, and share price point of view compared with our peer group in America,” he said.

“Both large and small companies and those in similar size have had varying and quite negative performances in comparison so there is quite a big disconnect and by default Australian companies have been outperforming.

“From an investor point of view they



Mining operations at the Thunderbox pit.

are very pleased with performance, very pleased with the track record, pleased with ongoing growth and the aspects on the back end of exploration.”

Carosue Dam

The company’s Carosue Dam operations incorporates the Laverton and Keith Kilkenny tectonic zones north east of Kalgoorlie in one of the world’s most prospective gold provinces.

With an overarching goal to build a long-term strategic infrastructure and position in the area, Saracen’s tenements included the Karari and Whirling Dervish gold deposits, the Porphyry project and the Deep South project.

The mid-tier gold producer committed to building a \$7m airstrip at the site, and Mr Finlayson said the project was progressing well with works about 30 per cent complete.

“We are looking to land planes by the end of FY19,” he said.

“It’s a more efficient way to get people out to the mine site and saves them 150km of travel with a chunk of that being on gravel road.

“So it’s a tick from a safety level and from a community level – the sourcing of drilling equipment, suppliers and contractors will be prioritised locally.”

Thunderbox

After purchasing the Thunderbox tenement in 2014 for \$23m and achieving its one millionth ounce of gold in October last year, Saracen kicked off development at its underground mine in June 2018.

Gold production for FY18 reached 145,152oz; up from 116,837oz last year.

Mr Finlayson said the company was now looking forward to seeing drilling results come out of an asset that, in the past, had been primarily focused on development and production levels.

In addition, he said the company was in a good position with Thunderbox seeing a grade appreciation as it gets deeper.

“The portion of the orebody is around 1 gram per tonne at the top and at the base of the tips its 2 grams per tonne, so favourable grade characteristics will continue to lower our costs as we get deeper into the mine life.”

The focus for FY19 will be on establishing the drilling platform to allow the ore body to be delineated at depth, through a methodical drilling program.

“The platform construction works in parallel with exploration spend so we will have the study on expansion done before the end of FY19 and a 12-month construction period for the additional bore mill and two additional tanks which will see completion set for FY21.”

Achievements

Mr Finlayson attributed recent success to acquiring its second asset, Thunderbox, swiftly, and at the right time.

Saracen, however, was not immune to the gold price crash in 2013 when investors saw the price drop by 28 per cent over night.

“It was on the 20 April and the reason why I remember it so well is because it was seven days into my 10 years as managing director,” he said.

“I think the key learning there is...I like the analogy of you plan for a draught when you’re not in a draught.

(CONTINUED ON PAGE 39)

Solution for Gold Leaching

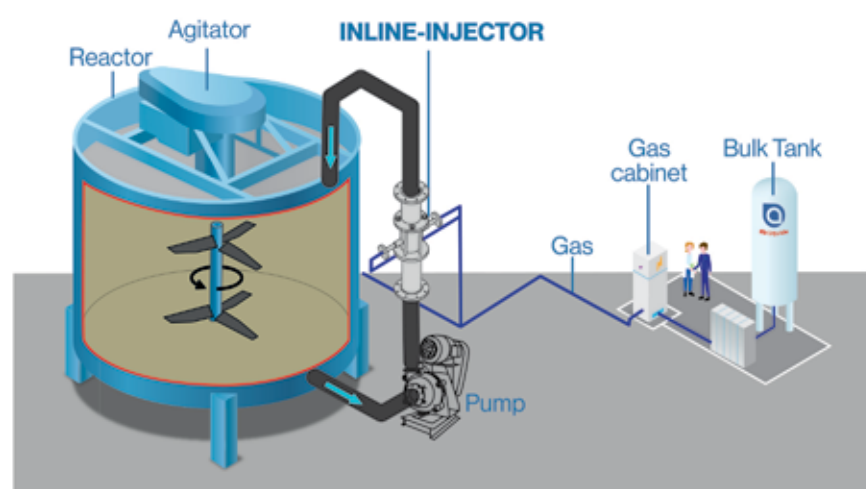


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Thunderbox underground.

“If you start planning for a draught when you’re in one, the horse has bolted.

“In Australia we are getting an A in the favourable gold price of the currency – around \$1700 dollars of the gold price which is an all-time high.

“We have been making sure we are taking advantage of new technologies and innovations to enable us to lower our cost base, and if we were encountered with a lower gold price we would be able to withstand it for longer.”

Mr Finlayson also highlighted Saracen’s hedge book as the second notable aspect.

“We have a locked in price of 270,000 ounces at \$6 dollars an ounce higher than the spot price so we are focussed on our revenue and cost line.”

Planning Ahead

Moving into 2019, Mr Finlayson said gold production would be sourced from the Karari, Deep South and Whirling Dervish

underground mines with balance coming from third-party ore purchase agreements and various ore stockpiles.

“With a 300,000ozpa production profile now established, growing mine life and no debt, Saracen has an excellent platform from which to capitalise on further growth opportunities as they rise.”

Over the next two years, he said the company’s business plan consisted of increasing production from Karari’s underground mine to 1.5mtpa, maintaining steady state production from Deep South, and ramping up production at Whirling Dervish.

Exploration would continue throughout the ‘corridor of riches’ with the hope to grow the current gold reserve base and reach its outlook of between 325,000-345,000ozpa.

Collaborative success between Mintrex and Saracen

NATIONAL

SARACEN has articulated a bold growth strategy called ‘Flight to 400’ and Mintrex is excited to assist with the Carosue Dam expansion pillar.

Collaboration between Saracen and Mintrex spans many years with provision of engineering services to the Thunderbox and Carosue Dam Operations since 2011.

Collaboration is a particularly effective approach because it allows the right issues to be solved.

Technical Director Hien Ngo said, “It is particularly effective in mining operations where the operating teams have huge knowledge to be complemented by practical, external design expertise”.

The Carosue Dam process plant was commissioned in 2000 with a 2.0 Mtpa design capacity.

Since 2010 Saracen has progressively

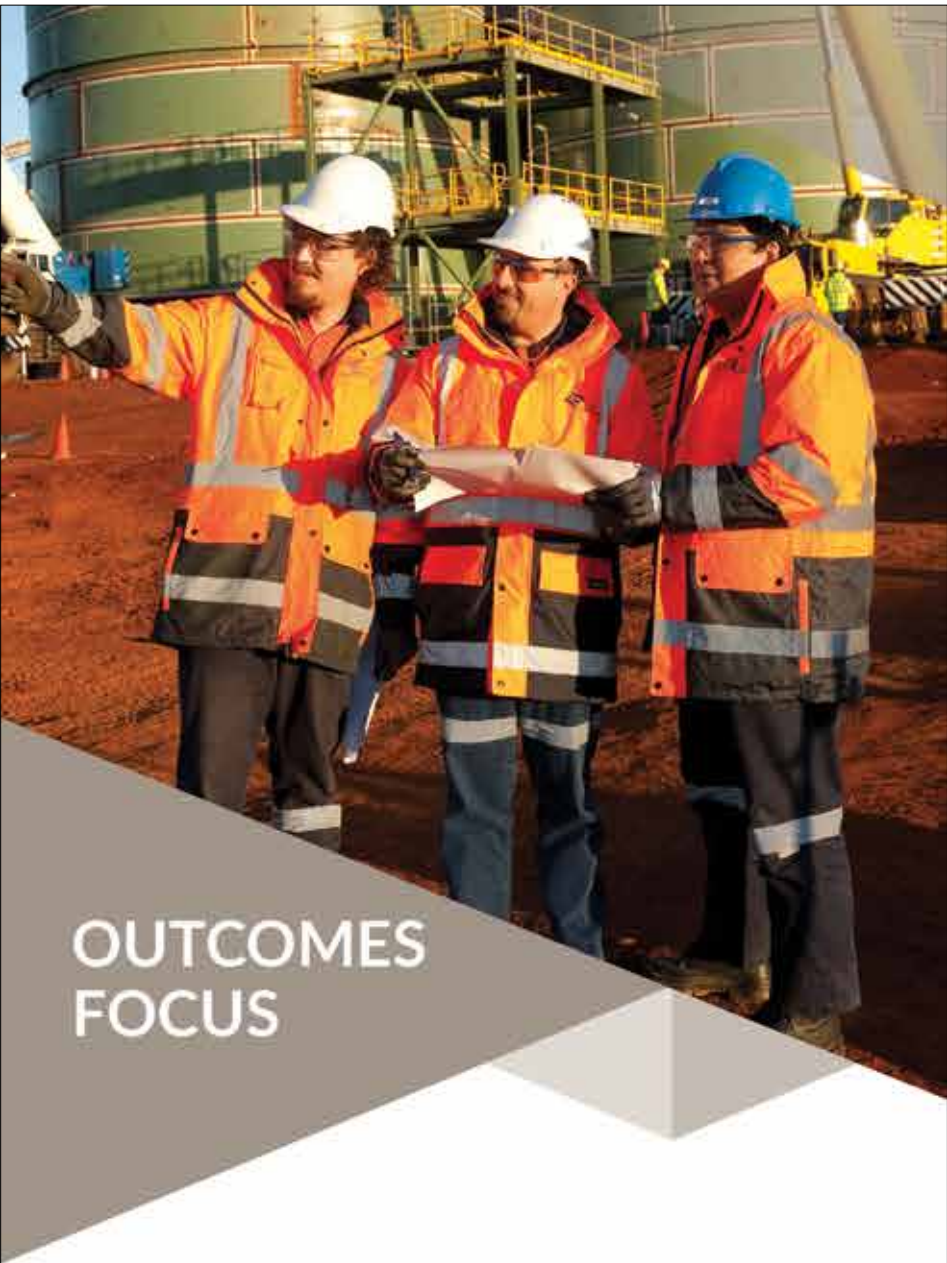
increased the throughput to a current rate of 2.4 Mtpa.

Current aspirations are to increase plant capacity to between 3.0 and 3.2 Mtpa and earlier this year Saracen commissioned Mintrex to undertake various option studies to that end.

The initial scoping level option study validated Saracen’s in-house assessments of the likely cost for an additional milling unit as well as the associated process plant changes.

Mintrex is now completing a Definitive Feasibility Study which will provide a project definition ready for implementation when required.

Throughout the study Mintrex has worked closely with Saracen’s personnel to gain their insights into the project criteria, constraints and opportunities, providing an invaluable contribution to the quality and confidence of the completed study.



OUTCOMES FOCUS

Mintrex engineers consult to the mining industry and we are passionate about mining because we believe it has been the foundation of development in our civilisation. We can contribute to improving our world through optimum use of its resources when we help mining companies produce more efficiently.

Mintrex enables mining companies to reduce their capital risk by converting ideas into cost effective operating solutions. We achieve this through due diligence, concept and feasibility studies, detailed design, project management, construction management and operational readiness. We support operating clients to optimise and simplify.

Our extensive, project-specific expertise and “Zero-Base Design” provides value-adding service saving money and minimising risk for clients. Effective project controls allow lump sum prices for design of well-scoped projects. We are transparent about risks and opportunities and manage total project risk. All clients benefit from our reinvestment of mutual learnings from long term relationships. We seek commitment to the highest business standards, ethics and integrity and we build our business by satisfying the needs of our clients.

Mintrex is committed to delivering value to our clients by providing sustainable and cost effective solutions and we would love to ‘engineer your success’.



ROOM TO GROW

Metro Mining is continuing its successful ramp up of Bauxite Hills mine, bolstered by strong alumina prices and high Chinese demand.



Metro Mining had completed 17 shipments from its Bauxite Hills mine by September.
All images: Metro Mining.

AMY BLOM

METRO Mining is shaping up to finish the year on a strong note following a number of major successes coming out of its flagship Bauxite Hills mine in QLD.

The miner began first production at Bauxite Hills in April, 10 months after construction commenced, with most construction taking place in just five months.

First shipment left the Port of Skardon in early May.

Then in August, Metro was named the leading emerging company at the 2018 Diggers and Dealers Mining Forum.

At the time, Metro Mining managing director Simon Finnis said the award was a significant achievement for the company.

"Most importantly, the award acknowledges the effort of our mine-site and support team," Mr Finnis said.

"The mine was constructed in near record-breaking time and commencement of operations, and quick ramp up, has involved considerable dedication, and of course hard work."

By September, Metro Mining announced it had already shipped its first one million tonnes of bauxite with a total of 17 shipments.

The millionth tonne of bauxite was loaded aboard the bulk carrier Isa Oldendorff as part of a 60,000 tonne shipment bound for Metro's foundation customer Xinfu Group.

Xinfu was one of China's largest integrated aluminium companies with significant refining and smelting operations.

Metro had a four year binding off-take agreement to supply Xinfu with 1mt this year, followed by 2mtpa for each of the next three years.

Sales Finalised

In September, Metro Mining also announced it had fully sold for planned 2018 production, having signed a contract



"We are experiencing particular interest from refineries located in the inland provinces where supply of domestic bauxite has been hindered by recent mine closures and environmental audits."

Metro Mining shipped its first million tonnes of bauxite in September.

with China's State-owned State Power Investment Corporation Aluminium and Electric Power Investment Co (SPIC).

The contract was for 300,000 wet metric tonnes (wmt) of bauxite to be delivered by the end of the year, following a trial vessel previously delivered to SPIC.

Mr Finnis said he was delighted to have finalised a new off-take agreement with SPIC, which had the capacity to be another long-term off-take partner, and to have successfully sold all of Metro's planned 2018 production.

"This year's shipments will be made to five different Chinese customers, confirming strong demand for Metro bauxite in China," Mr Finnis said.

"We are experiencing particular interest from refineries located in the inland provinces where supply of domestic bauxite has been hindered by recent mine closures and environmental audits.

"Our product specifications are well suited to their processing requirements."

China recently began a crackdown on illegal bauxite mining, while maintaining a focus on improving local environmental conditions.

The crackdown has seen domestic miners unable to use dynamite blasting for extracting ore and, in some cases they have been banned from using pneumatic drilling.

Under these circumstances, inland refiners' profits fell significantly, with some refineries reportedly closing capacity in response.

Several Chinese refiners have since been actively seeking imported bauxite or looking to test samples of imported bauxite; the raw material used to make aluminium.

While Guinea remained China's largest bauxite supplier, the situation has proven a boon for Australian operators including

Metro Mining, which anticipated steady and continued demand for imported bauxite in the Chinese market over the next decade, driven by its domestic supply shortage.

According to Mr Finnis, negotiations were progressing well to finalise the 2019 sales program.

"Production at the Bauxite Hills mine is steadily increasing, and we are confident of reaching production guidance for this year," Mr Finnis said.

"Given current demand we are actively looking at ways to increase 2019 production above the current planned rates."

Positive Forecasts

According to research released in August by Perth-based broker Argonaut, Metro was successfully ramping-up, with operations in key areas including mining and shipping steadily increasing month on month.

Argonaut found Metro was achieving key milestone targets, including mining and ship loading rates of more than 10,000t per day and ship loading times of fewer than six days.

Metro had a guided target of between 1.98mt and 2mt mined and shipped in CY18.

This was expected to increase to 3mt in 2019, with a further increase to 6mtpa by 2021 following an expansion.

In the report, Argonaut stated that while there were no fatal flaws in the operating process at Bauxite Hills, it would like to see some additional capacity, or sprint capacity to offset the risk of a major disruptive event, potentially though minor, low cost debottlenecking initiatives.

This could include an additional screen ahead of barge loadout and additional barges to better manage tidal constraints.

In the report, Argonaut gave Metro a buy recommendation and 40 cent target price – more than double the price at the end of September, which stood at \$0.18, suggesting significant potential.



More information can be found at www.transhipmentservices.com.au.

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TSA are proud to have project managed the construction of the barge loading facility and marine infrastructure at the **Metro Mining Bauxite Hills** project. As one of the most accomplished tug and barge transhipment companies in Australia, we are excited to also be carrying out the transhipment for this project.



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Argonaut also reported that while still technically in ramp-up mode, it expected Bauxite Hills to begin producing positive cash flow in the September quarter.

The Bauxite Hills operation, 95km north of Weipa on Western Cape York, has an initial mine life of 17 years.

It has an estimated reserve of 92.2 million tonnes and total resources of 144.8 million tonnes.

Argonaut's forecasts follow a successful June quarter, with Metro reporting production totalling 399,000t generating \$25.2m of revenue at the mine.

Metro's outstanding debt facilities, including accrued interest, were \$40.6 million.

In June, Bauxite Hills mine shipped 214,000 wmt, mined 245,000wmt and recorded its first monthly profit.

Mr Finnis said while it had begun as a challenging quarter, Metro had still finished on a high.

By the end of the quarter, the Bauxite Hills was achieving the daily production required for the 2mtpa targeted production.

"I am extremely proud of how the site team and our contract partners responded to resolving issues as they arose," Mr Finnis said.

"All aspects of the operation have finished the quarter performing strongly, and I look forward to the project reaching targeted operating rates during the September quarter."

Early challenges included those presented by tropical Cyclone Nora, which hit QLD in late March, forcing the workforce to evacuate Bauxite Hills.

Despite a two week delay causing June to be a half month, the disruption had no apparent impact on Metro being able to meet its 2018 production target.



Metro Mining began first production at Bauxite Hills in April, just 10 months after construction commenced.

Mining operations at Bauxite Hills were only undertaken in the dry season, which was notionally an eight month period between April and November.

Further Exploration

While Metro's focus has remained on its Bauxite Hills ramp-up, it was still committed to future exploration activities in the immediate area.

Exploration activities were expected to begin in July 2019 and would be aimed at identifying areas in the tenements close

to Bauxite Hills mine infrastructure that would warrant detailed, grid-based drilling.

This initial exploration would involve ground traversing, mapping and wide-spaced reconnaissance drilling, where justified, using a tractor-mounted RC drill rig.

Metro controls about 1900sqkm of exploration tenements in Western Cape York, and has 19 granted exploration permits for minerals, six granted mining leases and four mining lease applications.

All of Metro's tenements were on lateritic plateaus, which have a high potential to host

bauxite mineralisation.

Metro Mining also owned Bundi coal tenements in the Surat Basin in QLD, however it no longer planned to engage in any substantial exploration and evaluation activities there, instead planning to dispose of its interest in the thermal coal resource, either through a trade sale, farm-out or joint venture arrangement.

In the meantime, Metro's market strategy remained focussed on converting existing non-binding agreements into long-term agreements and developing a broad customer base to supply bauxite into long-term evergreen contracts.

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PREFERRED mining and civil contractor, SAB Mining Group, provides quality services in contract mining, haulage, crushing and screening, mine rehabilitation, workforce planning and contractor management to the resources and infrastructure sectors.

Established in 2006, SAB successfully developed its offering into a complete mining and civil earthworks service provider.

The company is committed to ensuring it would provide opportunities for all genders and cultural backgrounds.

SAB prides itself on its strong connections and engagement with Aboriginal and Torres Strait Islanders, focussing on ensuring Indigenous employment opportunities are a priority.

The group is experienced in achieving outcomes that exceeds its client's expectations across their projects, ensuring total transparency in their safety, teamwork and integrity, which has resulted in the successful completion of projects of more than \$30 million in value.

In 2017, SAB were engaged by Metro Mining to provide all civil infrastructure and land-based mining activities at the Bauxite Hills mine.

The scope of works included clearing and pre-strip mining bauxite; a dedicated project team and workforce; operation of all civil construction and mining plant; operation and maintenance of the Barge Loading Facility; rehabilitation of the



More information can be found at www.sabmininggroup.com.

mined areas; and maintenance of all plant and equipment across the site.

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Image: BHP.

RECORD HIGHS

BMA Coal has posted record production at several of its mines as metallurgical coal continues to strengthen. With construction of its Caval Ridge Southern Circuit project steaming ahead, BMA is set to continue production growth into FY19.

AMY BLOM

BMA Coal is set to accelerate growth and productivity with construction of its Caval Ridge Southern Circuit (CRSC) project on track to be completed by the end of the year.

When complete, the \$270 million project will result in an 11km overland conveyor system, which will transport coal from the Peak Downs mine to the coal handling preparation plant (CHPP) at the nearby Caval Ridge mine.

Caval Ridge is a high-quality, hard coking coal mine in the northern section of the Bowen Basin in QLD, about 6km south-east of Moranbah and 160km south-west of Mackay.

The mine is adjacent to Peak Downs, which is a large open cut coking coal mine about 31km south-east of Moranbah.

Peak Downs is also owned and operated by BMA Coal, the alliance formed by BHP and Mitsubishi Development.

Construction of the CRSC between Caval Ridge and Peak Downs began in mid-2017.

At the time, BHP Australia Minerals operations president Mike Henry said the CRSC formed the missing link between the two mines, and would accelerate growth and productivity.

"This investment furthers our productivity agenda, reduces costs, release latent equipment capacity, and strengthens our coal business' global competitiveness," Mr Henry said.

"We are committed to QLD's Bowen Basin and this project creates new employment opportunities during construction and locks in ongoing operational roles.

"The investment flowing from the project will help support the local community and State economy after what has been a difficult time in the region."

The CRSC's impending completion comes on the back of a bumper year for BMA, which saw several mines achieve production records in FY18, with an increase of nearly 1.5 million tonnes of coal produced on the prior financial year.

BMA is Australia's largest coal producer and supplier of seaborne metallurgical coal.

As well as Peak Downs and Caval Ridge, the alliance owns and operates Goonyella

Riverside, Broadmeadow, Daunia, Saraji, and Blackwater – all of which are in the Bowen Basin.

BMA also owns and operates the Hay Point Coal Terminal near Mackay, and was the former owner of the Gregory Crinum mine, 60km north of Emerald.

"Across our dramatically simplified portfolio of tier one assets, we see this year's strong momentum carried into the medium term as our leadership, technology and culture drive further increases in productivity, value and returns."

In May, it entered an agreement with Japanese-owned Sojitz to divest the mothballed Gregory Crinum mine for \$100 million after a detailed review concluded there was potential for another party to generate greater value at the project, which had been out of action since January 2016

In addition to BMA, BHP partners with Mitsui and Co to form BMC, which owns and operates two open-cut metallurgical coal mines in the Bowen Basin.

Together, BMC and BMA form Queensland Coal.

In BHP's full year results for FY18, it reported a 7 per cent rise in metallurgical coal production to a record 43mt.

BHP believed record stripping performance, increased truck hours and high wash-plant utilisation from low-cost debottlenecking activities offset lower volumes from Broadmeadow and Blackwater.

Despite the overall lower volumes at Broadmeadow and Blackwater, operational conditions improved at the mines significantly in the June 2018 quarter.

More generally, BHP chief executive Andrew Mackenzie said the company had announced a record final dividend for shareholders, which reflected strong operating performance, solid prices and capital discipline.

"Our relentless focus on safety and productivity has released additional volumes across our supply chain with 8 per cent volume growth for the year," Mr Mackenzie said.

"Our balance sheet is strong, with net debt now at the lower end of our target range, and our investment plans on track across iron ore, copper and petroleum.

"Across our dramatically simplified portfolio of tier one assets, we see this year's strong momentum carried into the medium term as our leadership, technology and culture drive further increases in productivity, value and returns."

Outlook

According to BHP, the metallurgical coal price performed strongly in FY18, with healthy demand conditions and relatively tight supply.

The average realised price for BHP's metallurgical coal, produced as part of BMA, increased 9 per cent from \$US163.30 per tonne in FY17 to \$US177.22 in FY18.

Altogether, Queensland Coal produced nearly \$US7.4 million in FY18 compared to about \$US6.3 million in FY17.

In the near term, the company expected supply constraints should ease with additional volumes expected from various regions.

The application of China's coal supply side reform, and its environmental policies, remained a source of uncertainty for BHP's BMA operations.

Over the longer term, emerging markets such as India were expected to support seaborne demand growth, while high-quality metallurgical coal would continue to offer steelmakers value-in-use benefits.

BHP's outlook for its BMA operations were largely shared by the Department of Industry, Innovation and Science, which found that Australia's coal exports would continue to grow over the next two years, although it predicted a softening of prices.

In the September *Resources and Energy Quarterly*, the Department found metallurgical coal prices had been supported by strong demand from both China and India.

China's imports were expected to remain elevated over the next couple of months as steel margins remained high.

The Department forecast premium hard coking coal would decline from an average

of \$US197 per tonne in 2018 to \$US145 in 2020 as the impacts of improved supply and weakening demand from China began to outweigh the impact of growing demand from India.

Despite the anticipated drop in price, Australia's export volumes were forecast to grow from 179mt in 2017-18 to 198mt in 2019-20, reflecting an expected recovery from supply disruptions and modest production growth.

Overall, Australia's metallurgical coal export earnings reached a record \$38 billion in 2017-18, driven by stronger prices.

Export earnings were forecast to fall to \$31 billion in 2019-20, as rising export volumes were partly offset by lower prices.

Planned expansions and productivity improvements at operations such as BMA's CRSC project were expected to support production growth over the outlook period.

Queensland Resources Council chief executive Ian Macfarlane welcomed the figures, despite the softer prices forecast, saying QLD was a premier coal producing State, which would benefit from the increase in production and exports.

"Met coal production is forecast to grow by 11 per cent between 2017-18 and 2019-20, driven largely by the resurgence in the QLD coal sector," Mr Macfarlane said.

"Metallurgical coal exploration is also on the way back up."

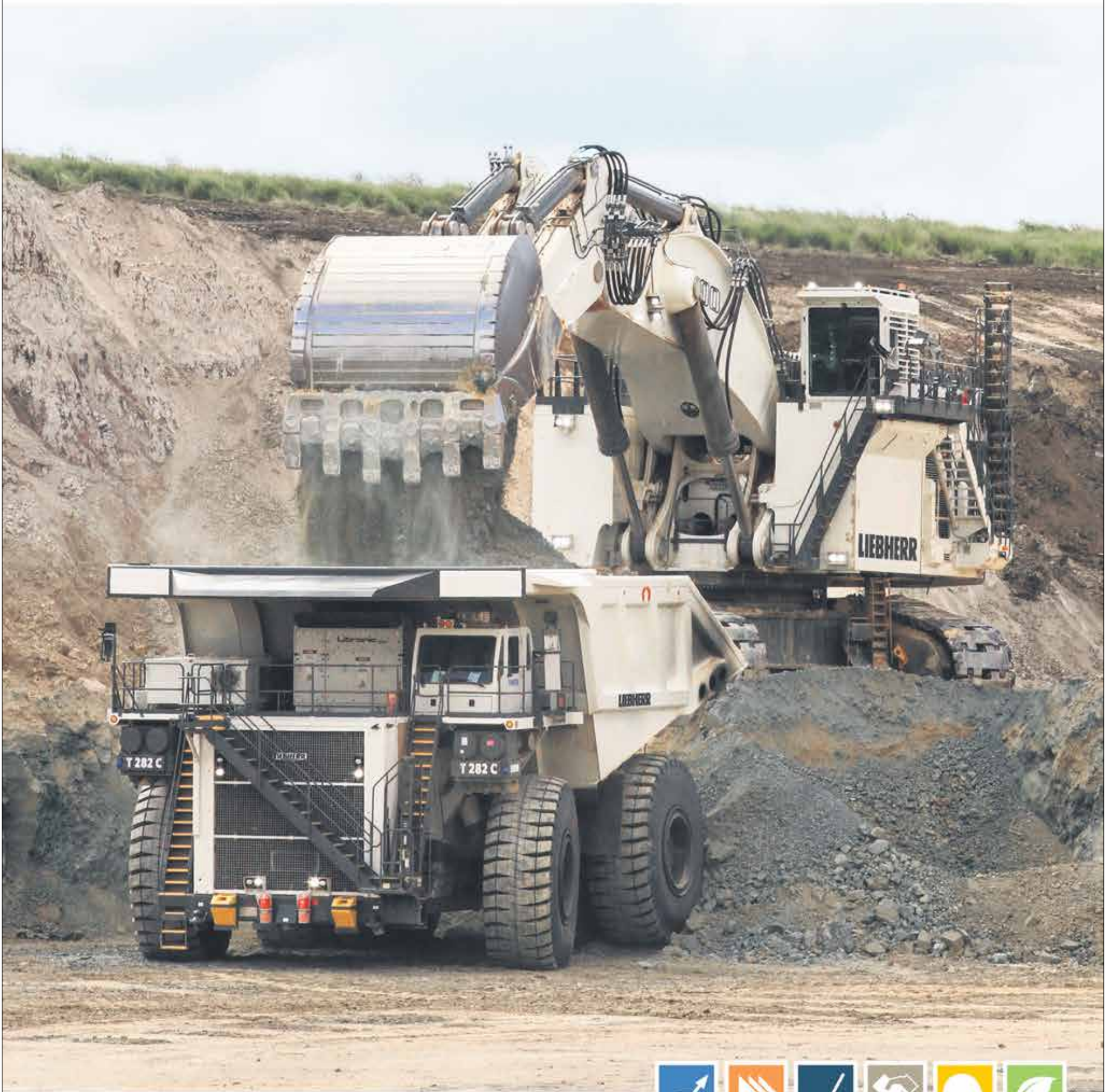
Mr Macfarlane said new projects, expansion projects and productivity improvements such as CRSC brought growth, economic development and re-population of regional areas.

"On the ground in the resources industry in QLD we're seeing a new job created every 40 minutes and \$1 million being invested every hour, and it's not all in metallurgical coal, it's been across the industry," Mr Macfarlane said.

"QLD has arguably the best metallurgical coal in the world, so that puts us in a very strong position in terms of export.

"Combine that with a very competitive and efficient mining and technology situation and it adds up to QLD being the biggest coal exporter in the world."

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THE Liebherr Group is an independent, third generation family run manufacturer with more than 43,000 employees in more than 50 countries.

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The Liebherr Group’s mining division supplies the international mining industry with large machines for the extraction of raw materials in open-cast mining environments.

These activities are coordinated by the division’s parent company, Liebherr International AG in Switzerland, with its mining excavators manufactured at the dedicated factory Liebherr-Mining Equipment SAS in Colmar, France.

The company’s off-highway haul trucks are manufactured in a separate factory, Liebherr Mining Equipment in Newport News, Virginia, US.

By offering the most extensive range of products for excavators with an operating weight of more than 100 tonnes, and dump trucks with a payload of more than 100 tonnes, its machinery can achieve high productivity rates hauling more tonnes per hour at a minimum operating cost.

Earlier this year, construction of the second of two new Liebherr R 9800 excavators was completed for National Mining Services, costing approximately \$16 million each and weighing about 800 tonnes.

“The machine moves about 80 tonne of



More information can be found at www.liebherr.com.

dirt in each pass and fills a 930E truck in four passes,” BHP media specialist Travis McNamara said.

“In total, each excavator will move about 15 million banked cubic metres (b.c.m) of dirt each year – roughly 30 million tonnes.”

QLD has been the home of Liebherr mining machines since the early 1990s, with the first T 282 off-highway haul truck delivered to the Bowen Basin region in 2011.

The Bowen Basin has recognised and embraced the competitive cost per tonne

benefits of using Liebherr ultra class equipment.

With 30 trucks delivered to the region in the years 2012-2015, the 100th (a T 282C) arrived in late 2015.

The T 282 C’s capability is truly impressive; it operates with reduced cycle times and has the highest payload-to-empty-vehicle weight ratio in its class.

Combined with the patented Liebherr Litronic electric drive system, the T 282 C has redefined the correlation between efficiency and productivity.

Strong, durable and lightweight, the T 282 C optimises its payload to offer the lowest possible cost per tonne.

Liebherr has pushed the boundaries to extend the T 282 C’s life beyond that of its competitors by developing and creating all the major components in the truck’s mechanics.

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Liebherr has enjoyed, and look forward to continuing strengthening its partnership with BHP.

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FINDING A FUTURE

All images: Resolute Mining.
Photography: Roslyn Budd.

Despite almost closing Ravenswood mine in 2016, Resolute Mining has now announced a 14-year mine life with staged plans to return to 5 million tonne per annum open cut mining. Along with Ravenswood, its operations in Africa and a dedication to increasing output through new technology, Resolute expects to grow annual production to 500,000 ounces by 2021.

AMY BLOM

INNOVATION and experience was the key to successfully extending the life of the Ravenswood mine in QLD, according to Resolute Mining chief executive and managing director John Welborn.

Just over two years ago, the Ravenswood gold operations were hanging in the balance, with the Mt Wright deposit expected to close in mid-2016 due to depleted resources.

Resolute has since been able to extend the mine life at Ravenswood to 2032 by going against the grain and transitioning away from underground mining to open pit mining.

Mr Welborn told *The Australian Mining Review* the move meant Resolute had found its way out of an uncertain time at Ravenswood, which was about 95km south west of Townsville and 65km east of Charters Towers.

"It's somewhat counter-intuitive because most mines go from open cut to underground as you get deeper and you exploit the surface material and then chase the ore body deeper, which is what we're doing at Syama, our main operation in Mali," Mr Welborn said.

"The Mt Wright ore body has been a wonderful and very successful operation for Resolute; we mine 2.5 grams per tonne (g/t) ore body to 900m underground at a cash cost across that timeline of \$850 an ounce, so that is a phenomenal achievement of our operating team.

"Unfortunately, geologically, the ore body pinches out at the depth we're now at; we've depleted it and in fact, as of today we've actually mined more gold than we ever defined in our reserved resources model, so



"I am convinced that mining, particularly underground mining is going both electric and automated as technology improves."

Mill 1 scats screen at Nolans processing plant.

in fact we're effectively over-drawing on our reserves at Mt Wright."

Finding a Future

Resolute readily acquired Ravenswood from Xstrata in 2006, which at that point was a 5 million tonnes per annum (mtpa) open pit operation based on the Sarsfield pit.

Mr Welborn said Sarsfield was a relatively large, but modest grade ore body.

Resolute found greater success at Ravenswood by building its underground mine 10km away from the Sarsfield pit at Mt Wright.

The gold miner ran its mill at 1.3mtpa, exclusively mining the Mt Wright deposit.

Its expansion plan would see a staged return to 5mtpa open cut mining, with the original plan to mine Nolans East, followed by Sarsfield and the relatively new discovery at Buck Reef West.

However, a successful approvals process with the QLD Government has allowed Resolute to prioritise operations at Buck Reef West, which is a higher-grade and less complicated ore body than Sarsfield.

Resolute now plans to open up and start mining the Buck Reef West deposit from July 2019, with plans to mine Sarsfield from 2025.

Mr Welborn said mining would continue at Mt Wright until the end of FY19, with mining already finished at Nolans East.

"What we've been able to do by maintaining our production at Mt Wright is find a future by going back to open pit mining at Sarsfield, Nolans, and the relatively new discovery immediately adjacent to Sarsfield, which is Buck Reef West," Mr Welborn said.

"We've managed to define a 14-year mine life for the asset based on the 4 million ounces of resources we've defined within a 4sqkm radius of our 5mtpa capacity mill, so that's quite exciting."

Mr Welborn said All-In Sustaining Costs at Ravenswood were now just below \$1100 an ounce.

"It's a significant margin with current gold prices and we believe there is again potential to increase that production to up to about 140,000 ounces a year," Mr Welborn said.

Automatic Success

Mr Welborn said the success of the expansion had not just been about innovative thinking, but also the support of the QLD Government and Resolute's embrace of new technologies.

"When talking about Ravenswood, Buck Reef West and Sarsfield, the ability to keep this mine going has been driven by a successful partnership with the QLD Government in achieving all of the mining, environmental and heritage approvals we require," Mr Welborn said.

"The second important thing not to miss is that the resources at Sarsfield and Buck Reef West have been known about for some time.

“The reason why the Ravenswood expansion project wasn’t defined earlier is that we’ve augmented the economics of the project through the use of technology, including beneficiation of the ore body, which allows us to process less tonnage and increase the mine head grade of what is a modest grade ore body, significantly improving the economics.

“The ability to get the environmental approvals we need has also been taking the QLD Government on a journey around new technologies and new ways of dealing with that material, so I think that’s the other aspect of the story.”

Mr Welborn believed Resolute’s embrace of new technologies would be repeated across the Australian mining sector as an effective way of increasing production and maximising profit without being overly reliant on market forces.

Among the technologies championed by Resolute has been automation, with Syama set to be the first purpose-build automated underground mine, which would allow Resolute to increase production and safety, while lowering costs.

“You can have more much control with automation because you can track and digitally manage every kilogram of ore with some degree of certainty, so we believe we’ll get better machine life and much better maintenance scheduling,” Mr Welborn said.

“One other aspect is that with the use of really high technology, innovative and adaptive automation allows us to train our local African workforce in a way that we haven’t been able to do before.

“I use the analogy of my 80-year-old mother who could never work out how to use a VHS video recorder for me in the 1980s when I was at university and wanted her to record a show for me, but she’s happy to surf the internet on her iPhone and send me text messages.



Resolute has staged a return to open cut mining from underground mining at Ravenswood.

“That’s because that technology has no instruction book; like automated technology, it’s intuitive and easy to use.”

Mr Wellborn said many of the benefits of automation could and already had been translated into the Australian mining sector.

This included tele-remote technologies Resolute pioneered at Mt Wright, including tele-remote bogging.

“I am convinced that mining, particularly underground mining is going both electric and automated as technology improves,” Mr Wellborn said.

“The training and control advantages are particularly relevant for remote operations whether they be in Australia or in Africa.”

Mr Welborn said if done well, automation could have no negative impact on workforces, while maximising benefits to shareholders.

“When we’re talking about automation technology, there’s a theme around what

Resolute has been able to do with its asset base over the last couple of years, which is very much the creation of shareholder value through the adaption of new technologies,” Mr Welborn said.

“At Syama, we have taken what was a \$US880 All-In Sustaining Cost mine down to less than \$US750, largely through three main areas of applying technology; automation in our underground mining, refinements and improvements to our processing infrastructure to get higher recoveries and efficiencies, and more environmentally powerful solutions in our power generation.”

Outlook

According to Mr Welborn, Resolute’s outlook for the future would be centred on growth.

“We’re a 300,000 ounce a year producer

on our way to 500,000, and we’ve been focussed over the last couple of years on the transformation of Ravenswood and Syama,” Mr Welborn said.

“I’ve said success there would allow us as a company to spread our wings and do even more exciting things; I think that’s the next phase of our growth.

“I think there are wonderful opportunities for us in Africa – we’ve been operating in that region for more than 20 years, and geologically, politically and economically I’m convinced it’s an area of huge opportunity for Resolute.

“Our portfolio investments in juniors, largely with exposure to emerging and growing resource positions on the African continent, is very much focussed on where our next mines are coming from.”

Mr Welborn said Resolute remained focussed on 10-year mine lives capable of producing more than 100,000 ounces in a year, and representing real value for shareholders.

Resolute has owned and operated Syama, originally owned by BHP, for about 10 years and expects it to have a 14-year mine life.

The company also operates the Bibiani gold mine in Ghana.

Bibiani, formerly operated by Anglo Gold Ashanti, is currently in care and maintenance, though Resolute’s plans to develop it were progressing well.

It has a 10-year mine life and an All-In Sustaining Cost of just over \$US750 an ounce.

Together, the three mines would push Resolute’s production to 500,000 ounces by 2021.

Shares in the company were continuing to track up sitting at \$1.06 as at 18 October.



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Woodfield Engineering is owned and managed by Gary Zollner.

From small beginnings, Woodfield Engineering now employed a permanent workforce of 35 tradesmen, many of whom were trained as apprentices by Mr Zollner.

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The number of Indigenous Australians working in the mining industry has more than doubled since the 1990s. *The Australian Mining Review* speaks with WA Aboriginal Affairs minister Ben Wyatt and PwC about the challenges and major developments that have shaped the sector.

Image: FMG.

JESSICA CUMMINS

GOVERNMENT initiatives such as the Federal Indigenous Procurement Policy and the WA Aboriginal Procurement Policy have played a key role in facilitating the prosperity of Indigenous businesses.

Comprising three main parts, the Federal Procurement Policy ensured a target of three per cent of Commonwealth contracts were awarded to Indigenous businesses; ensured a mandatory was set aside for remote contracts and contracts valued between \$80,000 and \$200,000; and a minimum Indigenous participation requirement in contracts valued at or above \$7.5 million in certain industries.

Within its first two years of operation from 1 July 2015 to 30 July, 2017, 4880 contracts were awarded to 956 Indigenous-owned businesses with a total value of \$594 million.

This cumulative figure included \$24 million in contracts awarded to Indigenous businesses in 2015–16 that was not reported until 2017.

The latest census data revealed a 22 per cent growth in the number of Indigenous Australians working in the mining industry – with numbers rising from 5435 in 2011 to 6654 in 2016.

The Prime Minister's 2018 *Closing the Gap* report confirmed that although the mining boom and bust cycle saw significant disparity in economic conditions across States and Territories, the mining industry itself was employing significantly more Indigenous Australians than in previous years.

PwC WA State director Kate George said Indigenous businesses had been on a trajectory since the 1990s after the first Aboriginal training program was formed – before Native Title and the Mabo decision was enacted.

"We have come a long way since those days of distrust – interestingly the first employment strategies came out of an enquiry that the Commonwealth government commissioned looking at the employment, training situation and need for Aboriginal employment in 1989," Ms George said.

"Rising out of the Commonwealth government's enquiry, the government began providing funding particularly for

major employers to assist with training Aboriginal people to apply for employment in the resources industry and out of those employment strategies the idea of contracting opportunities arose."

While it was not mandatory for mining companies to award contracts to Indigenous owned businesses, companies such as FMG, Rio Tinto and BHP were leading the way.

FMG recently awarded more than \$6 million in contracts to two WA Aboriginal businesses through its pioneering Billion Opportunities program.

FMG chief financial officer Ian Wells said the contracts showed the company was committed to supporting local businesses in part of its procurement process.

On 6 June, Rio Tinto entered into a partnership with Pilbara business North West Alliance (NWA) with a multi-million contract that will see the contractor undertake waste management services across 16 of Rio's mine sites.

Ms George said it was a "known fact" that Indigenous businesses have gained their largest opportunities from the resources sector.

"There is policy incentive now and encouragement like we have never seen before – the foundational building blocks have come out of the resources industry, which has exposed Indigenous contractors to the commercial world," she said.

"We didn't have any of that before the 1990s, it has really been quite phenomenal."

WA Aboriginal Affairs minister Ben Wyatt enforced the State Aboriginal Procurement Policy on 1 July this year, which aims to achieve three per cent of contracts awarded to Indigenous owned businesses by 2021.

"This policy creates the potential for joint-venture partnerships between Aboriginal and non-Aboriginal businesses to create scale and enable participation in some of the State's larger contracts," Mr Wyatt said.

Mr Wyatt said the government had seen several successful Aboriginal businesses emerge on the back of the mining boom, with the support of the sector.

One such business was leading WA

Indigenous contractor and winner of the 2018 Australian Mines and Metals Association (AMMA) *National Indigenous Employment and Retention* award, a joint venture between Njamal Services and Pilbara Resource Group (NPJV).

After initially starting with only three employees, the company had grown to more than 60, with \$15 million in contracts under its belt in two years.

The business has also helped to establish four other businesses run by Traditional Owner families with the aim of each company eventually being a standalone business.

"We have government policies such as the WA Aboriginal Procurement Policy which helps getting more Indigenous companies off the ground; they might get their first break through providing a service for the mining industry," Ms George said.

"But we also have regional policies such as the WA Jobs Act where the private sector has to release a local participation plan in their tender responses."

However, Mr Wyatt said while mining companies had paved the way in engaging with Indigenous businesses, challenges still existed.

"One of the challenges, both for government and for industry when engaging Aboriginal businesses is to provide adequate support and guidance to navigate their way through complicated tendering processes," he said.

"The McGowan Government has also committed to working with Aboriginal businesses to assist them in increasing their capacity and allowing them to compete for large contracts, both with government and the private sector."

Ms George said contracting opportunities were written within the legal agreements mining companies have with Indigenous groups for land access agreements.

"There is an incentive there for opportunities to be provided, but more importantly it has been demonstrated that Indigenous contractors are more likely to employ Aboriginal people," she said.

"It's a win-win-win situation — there is a snow ball effect in all of this."



Winners 2018 AEMEE National Resource Sector *New Indigenous Business of the Year* award, Moec.



Winners of the 2018 AEMEE National Resource Sector *Indigenous Business of the Year* award, Far West Coast Investments.

AEMEE CELEBRATES CONTRACTOR SUCCESS

WA

INDIGENOUS contractors from the mining industry rubbed shoulders at the 14th annual Aboriginal Enterprises in Mining, Energy and Exploration's (AEMEE) mining conference and inaugural awards dinner in October.

The two day event – which aimed to advance opportunities for Indigenous businesses – saw about 53 speakers present on individual business insights and experience.

Key note speakers included the 2018 *WA Australian of the Year* Dr Tracy Westerman, University of Melbourne Australian Indigenous studies foundation chair Dr Marcia Langton, and founder of The Liberators International Peter Sharp.

AEMEE chairperson Derek Flucker said the conference provided an opportunity for Indigenous businesses to gain new work, secure networking opportunities and provide learnings for best practice in engaging with Indigenous businesses.

"The resources sector is clearly a big spender in this space with more than \$10 billion worth of investment over the past 10 years," Mr Flucker said.

"There are a number of stories of Indigenous businesses doing well on the back of this huge investment and a number of great stories from resources companies that have supported and developed very successful Indigenous economic development programs."

Winners of this year's awards included Moec, Far West Coast Investments, and Rio Tinto.

Gumala Enterprises win \$15m in contracts

WA

ADOPTING a more commercially astute and sustainable business model has paid dividends for leading Indigenous contractor, Gumala Enterprises Pty Ltd (GEPL) with the company winning \$15 million worth of contracts in the past six months.

The WA-based mining and civil contracting specialist had been awarded competitive tenders with miners Rio Tinto and BHP Iron Ore, and secured maintenance and infrastructure projects with the Shire of Ashburton and the Department of Biodiversity, Conservation and Attractions.

GEPL had now achieved certification with Supply Nation – the national database of verified Indigenous businesses – which will create further opportunities with government and the corporate sector.

GEPL chief executive Tim Larkin said the company was firmly focussed on growth and diversification as it builds on its recent successes.

“Our aim has been to take financial, partnership and operational performance across the enterprise to new levels,” Mr Larkin said.

“We have strengthened our team, placed greater emphasis on training and safety and invested in better understanding the needs of our clients which has made us more competitive.

“The projects we have won include civil road works, major earthworks, rock sort for rock armour, shutdown works, fire



Gumala Enterprises chief executive Tim Larkin.

break clearing, road maintenance and upgrades.

“This shows our broad range of capabilities and our ability to respond to a variety of project needs.”

Mr Larkin said although GEPL had traditionally operated in the Pilbara, it was exploring opportunities to work with clients outside the region.

“As the WA economy continues to recover we are seeing new projects and developments happening across the State,” he said.

“Our experience and our capabilities position us well to take our expertise beyond the Pilbara.”

Mr Larkin said although GEPL is proud of its Indigenous heritage it also wanted to be known for its ability to win

projects on merit.

“The mining and civil contracts market in Australia has never been more competitive and GEPL wants to be recognised for its quality standards, dynamic approach and delivery,” he said.

“We believe we have the vision and the determination to create a new level of Indigenous contracting.”



Gumala Enterprises Pty Ltd (GEPL) is one of Australia's largest, 100% Indigenous-owned mining and civil contractors.

With a proud 20-year track record of delivering on competitively won tenders, we are a contractor of choice for government and major resource companies.

SPEEDING AHEAD

Less than two months after achieving mechanic completion at its \$56 million Browns Range Pilot Plant, Northern Minerals produced its first rare earth carbonate and followed it up with a plan to double production. The company is now on the hunt for more quality rare earth mineral deposits.



All images: Northern Minerals.

AMY BLOM

NORTHERN Minerals is speeding ahead with its flagship Browns Range project after producing its first final product in October, and announcing plans that could double output.

The announcements were followed by news that Northern Minerals had entered into a \$25 million subscription agreement with NRE Industrial Group on 15 October.

NRE is a subsidiary of Northern Rare Earth SYL High-tech, a specialist rare earth separation company based in China.

Northern Minerals also executed a further \$2 million subscription agreement with shares at 9c with an undisclosed “sophisticated investor.”

Funds raised under the subscription agreement will be used to progress development of Browns Range Pilot Plant and to accelerate the Northern Minerals enhancement initiatives for Browns Range, exploration efforts at Browns Range, as well as for general working capital.

Northern Minerals managing director and chief executive George Bauk welcomed the new investment by NRE, which followed an unsolicited approach to Northern Minerals.

“With Browns Range now in the commissioning phase and commencing the production of mixed rare earth carbonates, we are investigating ways of enhancing the project to deliver better outcomes for our shareholders,” Mr Bauk said.

The WA-based miner announced the first production of rare earth carbonate through its Browns Range Pilot Plant, 160km south east of Halls Creek, on 8 October.

Mr Bauk said it was yet another significant milestone for the company and the project.

“This is the first production of rare earth carbonate from xenotime ore outside China



Browns Range produced its first final product in October.

and represents a new global source of product,” Mr Bauk said.

“Commissioning is progressing well and we look forward to the next milestone being the first shipment of product to our customers.”

Doubling Output

On 11 October, Northern Minerals announced a \$4 million proposal to introduce ore sorting technology at Browns Range after conducting investigations on the five stockpiles there to improve beneficiation and feed to the processing plant.

In turn, this would result in an increase in the amount of rare earth oxides that could be produced by the recently commissioned plant.

The technology was previously tested on the Wolverine high-grade stockpile, which demonstrated the potential to double the mill feed grade.

Testing at Wolverine showed that about 80 per cent of the value of the ore could be recovered from 20 per cent of the mass, providing an upgrade factor of four times.

Alternately, 90 per cent of the ore’s value could be extracted from about 40 per cent of the mass by ore sorting ahead of processing, providing an upgrade factor of 2.25 times.

Northern Minerals managing director and chief executive George Bauk said the announcement had many positive benefits.

“Ore sorting technology is readily available through a number of providers and our studies on the five existing Run-of-Mine (ROM) stockpiles have shown

the potential for significant improvements in both processing plant efficiency and value recovery of heavy rare earth elements through its use,” Mr Bauk said.

“We believe the up-front capital cost of retrospectively installing ore sorting technology ahead of the existing Brown Range Pilot Plant circuit is justified in light of the head grade improvement demonstrated in the testwork to date, along with the forecast economic benefits delivered by greater production output – both of which will flow-through to additional medium-term value for shareholders.

“We are currently working on more testwork, approvals, planning and the funding required for ore sorting at Browns Range with a view to have ore sorting installation in Q2 2019.”

Northern Minerals has engaged Perth-based Nexus Bonum to undertake a feasibility study for the design, supply and installation of an ore sorting circuit ahead of the pilot plant at Browns Range.

The ore sorting circuit would be integrated into the existing pilot plant, directly behind the crushed ore stockpile and mill feed hopper.

Browns Range’ existing process plant had been built with a crushing capacity of 216,000 tonnes per annum (tpa), which was well in excess of the nameplate capacity of the downstream beneficiation plant of 72,000tpa, and would be suitable for the ore sorting circuit.

The ore sorter would divert the feed from the primary crusher ore stockpile over a screen.

It would then go through the ore sorting circuit to establish mill feed stockpiles of upgraded sorted ore, a separate fines stockpile, and an optional blended stockpile of fines and upgraded sorted ore.

Rejected, low grade ore would be conveyed to the stockpile for processing at a later stage.

New Discoveries

Through the development Browns Range, Northern Minerals aimed to be the first significant world producer of dysprosium outside of China.

Dysprosium is a key component in the production of dysprosium neodymium, iron-boron (DyNdFeb) magnets, which are used in clean energy and high technology applications including electric vehicles and wind turbine generators.

Northern Minerals also produces lutetium and terbium.

Terbium is used in the production of permanent magnets used in a number of applications including X-ray screens, televisions and hybrid cars.

Lutetium is one of the least abundant rare earth elements and is essential in the production of detectors used in PET scanners and catalysts in the chemical industry.

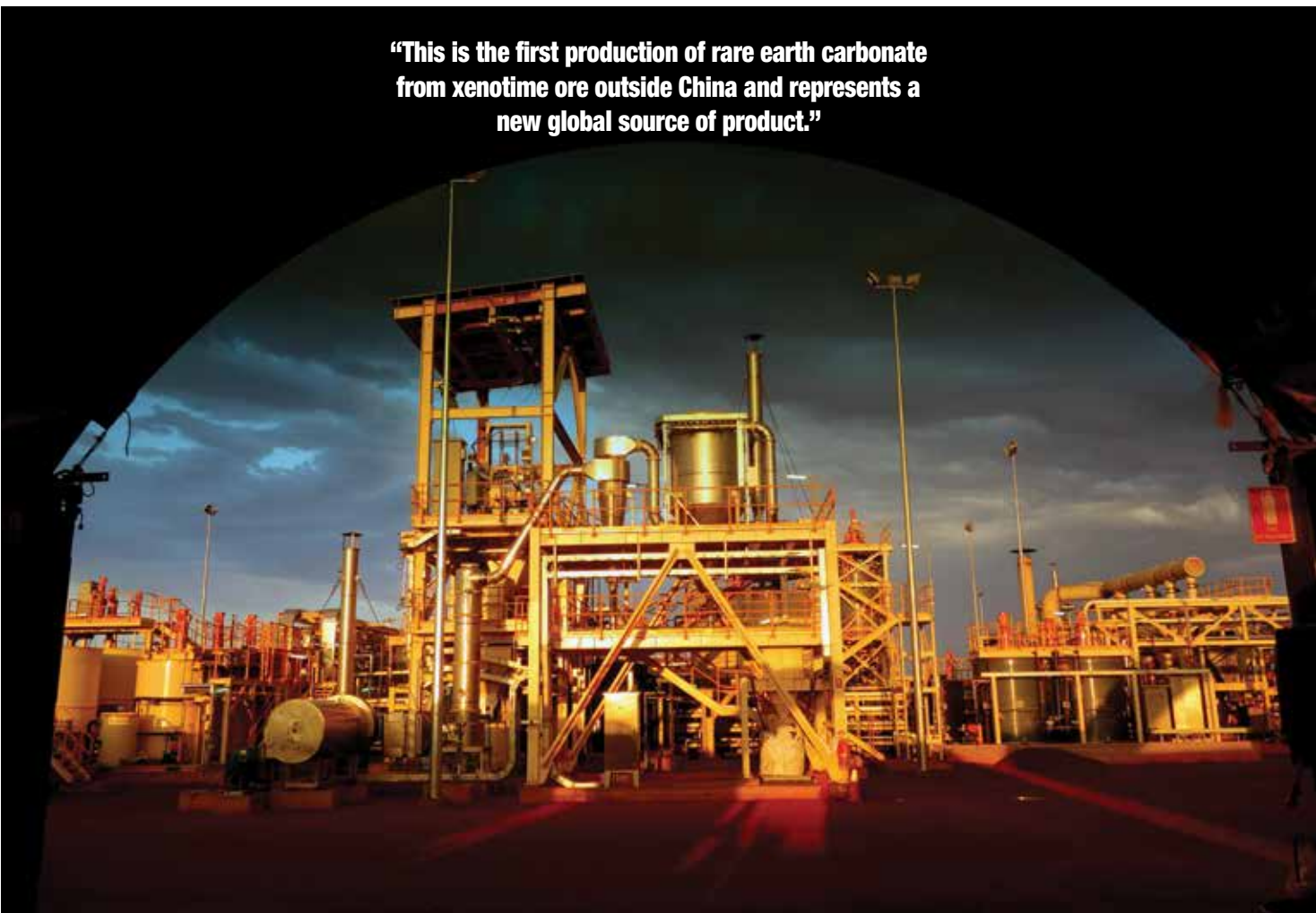
Proving its place as a future major rare earths producer, Northern Minerals announced an impressive discovery 15km south of Browns Range in WA's Kimberley region on 28 September.

New assay results from reverse circulation (RC) drilling at the Iceman and Dazzler prospects confirmed new high-grade rare earth discoveries, including high concentrations of dysprosium.

At Dazzler, intersections included 18m grading 9.1 per cent total rare earth oxide (TREO) from 25m down-hole, incorporating 0.86 per cent dysprosium oxide.

Shallow drilling at Iceman, 400m southeast of Dazzler, produced an 11m intercept grading 4.83 per TREO from 13m down-hole, including 0.45 per cent dysprosium.

Northern Minerals considered the results notable, considering Browns Range has an estimated mineral resource of nearly 9



Browns Range pilot plant is 160km east of Halls Creek.

million tonnes with an average TREO of 0.63 per cent, containing more than 0.05 per cent dysprosium oxide.

Mr Bauk said the high-grade assays confirmed the company's belief in having two new discoveries close to the Browns Range processing infrastructure.

"We will be mobilising as soon as practicable to follow up these results as well as other high priority areas targeting

the Gardiner Sandstone unconformity," Mr Bauk said.

Mr Bauk confirmed Northern Minerals would continue working to expand its resource base in FY19 and increase mine life at Browns Range.

"Following the change in status from explorer to produce, it is imperative that we continue to update our knowledge of the deposits and continue to expand our

resource base," Mr Bauk said.

"The recent high-grade discoveries at Dazzler and Iceman will be a major exploration focus over the coming year.

"With the three year Pilot Plant now operations, the exploration team has been charged with finding and delineating additional resources that can increase the full-scale mine life from 11 years to over 20."



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Four roles of the square roller

NATIONAL

IT is a fact that no other piece of mobile plant on any mine site has so many uses and can claim to be as effective as a Broons BH-1950MS Square Impact Roller.

Towed at about 10kph, the 1950mm wide square compactor module covers an enormous amount of real estate (around 3000sqm/hour) and imparts seriously deep impact force of up to 2m.

“Let’s look at the four main tasks for this single item of plant,” Broons said.

“Firstly, it can be used to underpin failing haul roads where grading is simply not enough; secondly it can rubberise loose rocky tip heads and pit floors thereby extending the tyre life on haul trucks; thirdly it builds strength and security in tailings dams by increasing density in walls and floors; and lastly it ensures the integrity of waste dumps during rehab works.”

Made in Australia, the Broons BH-1950MS ‘Mine Spec’ Impact Roller has a robust reinforced main chassis, heavy duty linkage, secure ball hitch and rugged 20 ply tyres intended for rocky work.

Patented wear plates and breaker bars on the module add to the durability and allow it to step up to the demanding workload.

Broons said unlike modern plants, this 18 tonne heavy hitting roller was



The multi-tasking Broons BH-1950MS Impact Roller.

free of sensors and computer life support systems.

“No error codes here – only a simple hydraulic raise and lower function for transportation,” the company stated.

“With minimal daily maintenance, it’s the essential mine maintenance roller.”

Available immediately Australia-wide for hire or purchase, a Broons Square Impact Roller can be at the top of the

capex list this Christmas.

More information can be found by calling (08) 8268 1988, emailing info@broons.com, or downloading a brochure at www.broons.com/impact.

Boost for switchboard industry

NATIONAL

STABILITY has returned to many Australian mining companies, with widespread optimism rising from the latest reporting showing the bucking of past trends.

Mining Equipment Technology Services (METS) companies shared this optimism following a long wait and many expect resulting improvements in market conditions.

Switchboard manufacturer DaRa has stood the test of time regardless of market volatilities, factoring in its relentless pursuit in innovation, capacity building and customisation as a hallmark to its growth recipe.

The recent addition of Cranbourne facility in Victoria stands testimony to its ever-growing customer base, with special emphasis on mining switchboards.

DaRa is an ISO 9001:2008 company with accreditation from leading switchgear OEMs.

As a switchboard manufacturer that values service, DaRa takes its order fulfilment dates very seriously so that its clients can plan their site works with



More information about DaRa can be found at: www.electricalswitchboards.com.au.

confidence that the switchboards will turn up on time.

“Unforeseen bottlenecks are part of our supply chain and manufacturing process

and we are ready ourselves to deploy all resources to ensure we do not miss a deadline,” DaRa operations manager Yoshan De Silva said.

DaRa’s mining duty grade switchboard installations in many WA mines speaks for itself regarding the trust customers place on its switchboards.



Tsurumi's new lightweight and slimline NK series submersible handles light slurries.

New sump pump for abrasive applications

NATIONAL

A NEW heavy duty single phase submersible pump has been released by Australian Pump Industries (Aussie Pumps).

Manufactured by Tsurumi – the world's biggest manufacturer of electro submersible pumps – the high head single phase pump is ideal for batch plant, construction sites or anywhere liquids or even light slurries are to be handled.

Called the Tsurumi NK3-22, the 3 inch port pump can handle flows of up to 525 lpm.

This heavy duty pump is lightweight enough to be moved around batch plants in an emergency to wherever there is a pump breakdown or extra capacity is required.

The high head performance means that heads of up to 24 metres can be handled with ease.

Its slimline design also allows it to fit into narrow locations, making it super versatile.

The pump's solids handling capability is based on a semi vortex impeller design fitted with a synthetic rubber ware plate.

"The vulcanised wear plate resists abrasion and provides long life and consistent pump performance," Aussie Pumps' chief engineer John Hales said.

The pump features a double mechanical seal of silicone carbide located in an oil chamber.

That oil chamber features a patented 'oil lifter', which provides forced lubrication into the mechanical seal.

The Tsurumi design helps extend seal

life substantially.

Mr Hales said the semi vortex impeller even allows the passage of large stringy solids.

The impeller's unique design also accelerates the water passing through the pump casing, creating a vortex that assists the smooth transit of solids in suspension.

Water incursion through the cable entry is the main source of failure in submersible pumps.

The Tsurumi NK pump is fitted with an anti-wicking cable entry block.

This feature protects the motor from moisture wicking inside the cable in the event of the cable being damaged onsite or the end being submerged.

Like all Tsurumi pumps offered by Australian Pump Industries, this pump comes with a unique three-year warranty and the company expect it to be a big success.

"Every batch plant, every construction site, for that matter every hire company servicing the heavy industries should be equipped with these super versatile but relatively light weight pumps," Mr Hales said.

Although the pump is built like a tank, it comes in with a weight of only 29kg and the maximum solids handling is 6mm spherical solids.

The pumps are designed by Tsurumi to have a maximum water depth of 50 metres, a unique feature found only in Tsurumi top quality pumps.

More information on Aussie Pumps' Tsurumi range can be found at www.aussiepumps.com.au or authorised Aussie Pumps distributors nationwide.

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World-class mining services

NATIONAL

IN 2018, CMI has been on a steady rise.

Growing interest for CMI's services, in both fixed and plant maintenance and onsite machining throughout the Australian and West African regions, has kicked up a gear, which is all too pleasing for CMI's managing director Zeb Ogilvie.

"Our clients' satisfaction has and is always CMI's focus," Mr Ogilvie said.

CMI's diversification into mobile line boring has also gone up a notch thanks to the professionalism, availability, and quality of workmanship shown to its Australian clients.

CMI has four line boring units available in Australia, and with a capability of 38mm (1.5") to 1400mm (60") bore diameters, there isn't much that can't be achieved.

"Our onsite machining division has really increased thanks to our men operating the line boring units," Mr Ogilvie said.

"Their professionalism is second to none, great quality of work and communication has thus helped foster client relations."

Mr Ogilvie added when clients saw its Climax BB7100 borer turn up to site, they were impressed by its layout and ease in which personnel can go about their work.

"We have custom designed bearing support mounts which enhance rigidity



More information on its services and products can be found at: www.cmitech.com.au.

thus allowing heavier cuts," he said.

"We're able to do the big stuff that only a handful of others can offer in Australia.

"In mining, typically its dragline swing bores or propel bores, or marine requirements during drydock works like stern tubes, tansom bores or winch

bores.

"Typically, anything over 500mm where the smaller 2 1/4" bar units will struggle."

Quality pumping solutions

NATIONAL

ANCHORED by strong values, Trufflo Pumping Systems forms close partnerships with its stakeholders, and as a team consistently meets client requirements.

Working across a range of industries from mining to construction, Trufflo has been a leading global pump manufacturer specialising in the development and engineering of pumping strategies and design solutions for mobile and permanent pumps for about 20 years.

Trufflo pump solutions have become synonymous with a guarantee for quality, sustainability and maximum performance at minimal costs.

Included among its many first-class products was the Vac-Assist C Series Pumps – most widely used by larger mining companies that demand extremely reliable high-performance pumping.

The company employs more than 70 skilled professionals and experienced support staff who collaborate with their global affiliates to bring world's best practices, methods, ideas and technologies on to the local arena.



More information about Trufflo Pumping systems can be found at: www.trufflopumps.com.au.

This has consistently resulted in meeting diverse client demands, assisted clients in achieving their goals and objectives and often surpassing expectations.

Trufflo's dedicated team of passionate employees have continued to guarantee excellent service and product support for its wide range of products.

All team members were specifically selected and brought together to manage

the creation of a broad range of pump packages.

Small, medium and large scale projects have all been resourcefully managed to reflect individual business objectives.

The highly qualified and cohesive team at Trufflo consist of mechanical engineers, design draftsman, production and QA managers, technical sales, and professional dewatering consultants who believe efficient design and high-quality

equipment could transform companies, improve people's lives and increase productivity.

Trufflo Pumps is headquartered in Bathurst, NSW with multiple service agents across Australia, Indonesia, South America and the US.

More information about Trufflo Pumping systems can be found at: www.trufflopumps.com.au.

Hagstrom Drilling reflects on 2018

PAUL MUSCA
HAGSTROM DRILLING MANAGING DIRECTOR

HAGSTROM Drilling has continued to deliver on our philosophy of “Quality Service Safely”.

2018 has been a year which has demonstrated Hagstrom’s capacity to maintain our performance in markets characterised by increasing supply of drilling contractors and a relentless drive across sectors to minimise costs.

Highlights

The company has continued growing across our four business units – Exploration, Geotechnical, Water and Environment – and is in a strong position looking forward.

Our client centric attitudes from all staff members continue to contribute to the success of the organisation.

Hagstrom continues to innovate and invest in new technology to remain at the forefront of drilling development with the recent purchase of our Schramm T685 to increase our exploration capacity and client



The Schramm T685 drill rig will arrive in 2019.

demand in this sector.

Hagstrom Drilling is very proud of the safety performance and the ongoing culture where our all our staff are committed to the well-being of everyone in the organisation.

Ensuring all our people return home safely at the end of each shift remains our highest priority.

Our people are our business and we continue to engage local employment, invest and develop our workforce for a safe and successful future.

Challenges for 2019

As demand for our services in the Exploration, Geotechnical, Water and Environment sectors increases, labour and equipment markets continue to tighten.

Lead times for new equipment continue to push out and securing build slots or good second-hand equipment is critical to the organisation competitive advantage.

Further, the competition for high-quality labour has increased, particularly in the last 12 months, as the drilling industry competes against the construction across Australia.

Operationally, 2018 has been challenging, with numerous long term contracts absorbing more resources than initially planned but the organisation remains focused on strategies to continue to deliver better services for our clients.

Looking Forward

Hagstrom Drilling is optimistic for 2019 as we continue to capitalise on opportunities across Australia and deliver on our long term strategy of being a truly diversified Australian drilling provider.

We would like to thank our customers, suppliers and employees for the ongoing contribution to Hagstrom Drilling and its success.



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Experts in structural steel

NATIONAL

HARD Bakka outstripped industry standard SME employment figures last financial year, with the size of its highly qualified team enabling it to enable full customer satisfaction.

Included among Hard Bakka’s 20 staff and tradesmen were welders, fabricators, riggers and boiler makers.

According to the Department of Industry, Innovation and Science, 94 per cent of Australian steel fabricating businesses had fewer than 20 employees in the same timeframe.

With more than 20 years’ experience in the steel fabrication and welding industry, Mona Hwalla and Aladdin Bakka, founded Hard Bakka just four years ago and have already established the business as one of the industry’s best and most reliable.

Hard Bakka tripled in size in 2018 and now operates from a 1000sqm, fully equipped warehouse in Fairfield East, NSW.

The extensive space enables Hard Bakka to fabricate and deliver more than 30 to 40 tonnes of structural steel to projects across NSW and QLD every week.

This amounts to more than 2080 tonnes per year.

The multi-disciplinary company provides quality services to the



Hard Bakka’s 1000sqm warehouse enables it to fabricate and deliver more than 30 to 40 tonnes of structural steel each week.

Australian mining industry, which is the third largest purchaser of steel fabricated products.

Hard Bakka also provides services the residential, commercial, industrial and agricultural markets.

The company offers a range of additional related services with its clients’ satisfaction as a priority.

These services include shop detail drawings using state-of-the-art software such as Tekla, which are then used to produce computer-aided 3D models.

Hard Bakka also provides finishes such as hot dip galvanising paint, powder coating and sand blasting.

The team at Hard Bakka not only specialise in fabricating mild steel structures, they are also experts in

fabricating a range of steel products to complement the project, including grates, stainless steel products, aluminium, handrails, balustrades, purlins and more.

For a free quote Mona can be contacted on (02) 9796 7888 or by email at projects@hardbakka.com.au.

More information about Hard Bakka can be found at www.hardbakka.com.au.

SIMEX twin header rotary cutters

NATIONAL

SIMEX twin header rotary cutters offer significant increase in yield and reduction in waste for mining and quarrying operators.

Where the traditional 'drilling and blasting' method used to quarry on fractured rock can be a time-consuming two-stage process, SIMEX twin header rotary cutters give excellent results when conventional digging systems are too weak and percussion tools have little effect.

SIMEX twin headers are designed to be used in quarrying, tunnelling and mining applications with a variety of rock including limestone, gypsum or schist of hardness of up to 85 mPa.

SIMEX's patented design ensures minimal vibration, low noise and high torque featuring 90 degrees cutter head rotation and a sealing system that prevents impurities entering the motor even when the attachment is submerged into the ground or operating in muddy conditions.

Replaceable anti-wear plates reduce maintenance costs, and double support bearings for each drum ensure longer service life as shaft transmits motion only and bears no load.

SIMEX twin headers can be mounted on carriers from 1.2 tonnes up to 70 tonnes with maximum cutting force varying from 13.5 to 114.5 kN.



More information can be found by contacting a local SIMEX dealer.

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Latest in road maintenance allocation

NATIONAL

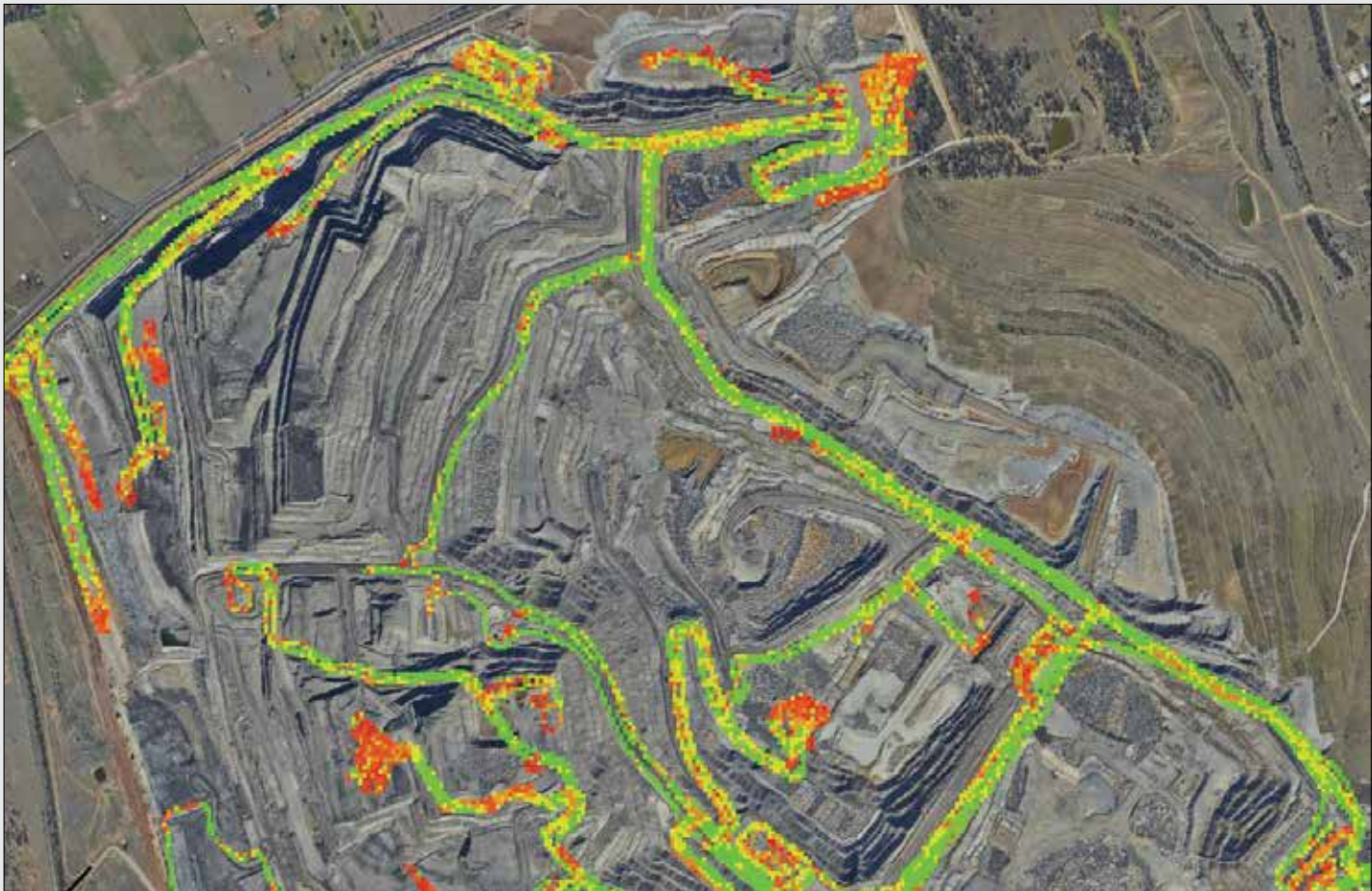
A GROWING number of mining companies are implementing state-of-the-art technology to gain an edge on haul road quality control and take the guess work out of road maintenance.

An on-board road monitoring system that records and translates road condition data, without the need for an expensive and comprehensive communications backbone at the mine site, has been developed by road haul specialists Proof Engineers.

The Road Condition Monitor (RCM) is an innovative system that collects in-detail data on road conditions and analyses the information to stream it back to the mine site in real time.

The RCM's advanced sensors map out the road quality, which is displayed in colour code, from green signifying good quality sections of the road, to red highlighting areas that need urgent maintenance.

Mine site operators using Proof Engineers' RCM are given a clear picture of road conditions, with the information used to prioritise maintenance works, improve operational efficiency and lower the cost per tonne hauled.



Road Condition Monitors collect in-detail data which is streamed back to mine operators in real time.

A recent study has shown that road maintenance scheduled as a result of data collected by Proof Engineers' RCM, resulted in 9.8 per cent improvement in haulage speeds.

Proof Engineers' engineering and technologies manager Jordan Handel said an increasing number of mining companies were seeking out new technologies to simplify processes and increase productivity while reducing maintenance

costs. "With growing pressure on mines to save costs and improve performance, operators are looking at the efficiency of truck haulage, which accounts for a significant proportion of the total operating costs of a mine," Mr Handel said. "The RCM is a compact device that can be quickly installed onto haul trucks, water carts and light vehicles for effective and ongoing measurement and monitoring of haul road performance with accurate up-to-the-second data reporting." Experts in haul road performance and optimisations, Proof Engineers is a QLD-based company delivering haul road engineering and performance monitoring on a global scale. More information can be found by calling Proof Engineers on (07) 5522 0855.

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Emergency Safety Showers & eyewash units are subjected to the harshest site conditions with aerated eyewash outlets continually being blocked by dust, and "open" bowls being contaminated with bird and vermin droppings rendering them unusable and unhygienic in many applications.

The Haws model 8300 SS with integral dust cover prevents dust ingress and automatically releases with water pressure, thereby offering a cost-effective solution to this ongoing problem.

LAMINAR FLOW EYEWASH WITH STRAINER

Using non-aerated laminar flow eye/facewash head. The use of aerators in many eye/face wash designs whilst originally recommended for comfort may also pose a potential risk to the user in poorly maintained systems due to the aerosols they may generate from contaminated water which may be inhaled and cause further hazard to the user.

A fully serviceable inline 50 x 50 mesh strainer filters debris from reaching the eye/facewash head.

316SS STANDPIPE

316 stainless steel standpipe supports the bowl and shower head.

COMPLIANCE

Model 8300 SS is fully compliant to AS 4775-2007 & ANSI 358.1-2014 requirements for simultaneous operation.



OPTIONS

- Fluoro or LED lights
- Flow switches
- Beacons / Alarms
- Scald Protection
- Wireless Monitoring
- AS1319 compliant signage
- Optional foot treadle

Intermodal supply chain solutions

NATIONAL

SCF is the leading supplier of intermodal containerised equipment in Australia.

Intermodal equipment differs greatly from standard shipping containers with design and manufacturing focussed on strength and functionality.

Strength is essential due to the harsh environment and remote locations that Australian transport operates.

Functionality is tailored to meet operator requirements and improve loading efficiency and restraint.

Being a multimodal product, containers can be used on road, rail or ship, allowing access to all transport modes and providing flexible supply chain options to meet changing time and cost demands.

A container can quickly transition from a storage unit, to a delivery vehicle, to an interstate rail product for moving freight across the country.

Containers are available in standard and 2 pallet-wide configurations that provided additional internal width to accommodate two Australian pallets side by side.

This unique feature differs from standard shipping containers and maximised efficiency in Australian supply chains.

Side door and curtain side containers offer the ability to side load standard and oversize freight.

The single or double side configuration enables fast loading and easy access to all product inside.



More information can be found at www.scf.com.au.

Refrigerated containers are used for temperature sensitive cargo and were available with both electric or diesel motors.

Bulk containers are available in a wide range of configurations and sizes for

storage and transport of any bulk cargo from grain to ammonium nitrate.

Various loading and unloading hatch arrangements enable compatibility with site plant equipment.

SCFs national depot network allows

for repairs, modifications and access to general stock.

When a custom solution is required, SCFs engineering and project team can design, manufacture and deliver on all containerised requirements.



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THE AUSTRALIAN
MINING REVIEW



Freestanding Counterweight Anchor with Evolution™ LEAP Post



Roof-Mounted Evolution™ LEAP Post

Stop using and replace Evolution™ LEAP Posts

in roof-mounted horizontal lifeline systems and rooftop freestanding counterweight anchor systems.

At 3M, customer safety and confidence are high priorities. In light of field reports of broken Evolution™ LEAP Posts (also known as Lead Energy Absorbing Posts) used in (1) roof-mounted Evolution™ Horizontal Lifeline Systems and (2) Rooftop Freestanding Counterweight Anchor systems, 3M voluntarily launched a global Stop Use – Field Service Action on May 17, 2017 to replace all LEAP Posts sold between 2005 and 2015. If you are an end-user of a system with an Evolution™ LEAP Post or the owner or manager of a building with such a system, stop using the system, lock the system out, and submit a claim quickly and easily online to have a certified installer replace your Evolution™ LEAP Post for free. Go to:

www.ReplaceEvolutionLEAPpost.com/claim

You can also find additional information, answers to frequently asked questions, the detailed service action notice, and other important materials at this dedicated Evolution™ service action website.




More information can be found at www.ReplaceEvolutionLEAPpost.com/claim.

Evolution LEAP posts

NATIONAL

At 3M, customer safety and confidence are high priorities.

In light of field reports of broken Evolution Lead energy absorbing posts (LEAP) Posts used in roof-mounted Evolution Horizontal Lifeline Systems and Rooftop Freestanding Counterweight Anchor systems, 3M voluntarily launched a Stop Use – Field Service Action in May last year to replace all LEAP posts sold between 2005 and 2015.

The roof-mounted Evolution HLL system is a permanent, low tension,

multi-span horizontal safety system that utilises a series of roof-mounted anchorage posts (intermediate and end-posts).

The posts are permanently installed on a roof or other structure and allow users to connect a self-retracting lifeline or lanyard to a shuttle that trails users along a horizontal cable supported by the anchorage posts.

As an end-user of a system with an Evolution LEAP post, or the owner or manager of a building with such a system, stop using the system and submit a claim online to have a certified installer replace the LEAP post for free.

Improving feeder and screen efficiency

WA

ROSTA Australia offers a perfect solution for mining and quarrying operations that utilise screens and feeders.

By combining a ROSTA motorbase with ROSTA oscillating mountings, a number of operational and safety benefits can be achieved in a screen or feeder assembly.

ROSTA motorbases (including the popular MB50 model) incorporate a self-tensioning element, which continuously compensates for belt elongation thereby improving drive efficiency, reducing belt and bearing wear and ultimately reducing downtime.

The ROSTA MB50 motorbase can be installed by one person using a flat 30mm wrench, usually in under 15 minutes, offering a considerable safety advantage with less exposure to risks.

With no belt realignment required, the ROSTA MB50 motorbase offers a significant reduction in belt related downtime, adding to the cost efficiency of an operation.

By continuously compensating for belt elongation, the ROSTA MB50 motorbase reduces belt slippage for electric motor efficiency.

ROSTA motorbases are commonly partnered with ROSTA Oscillating Mountings in mining and quarrying related material processing equipment, including vibrating screens, feeders and grizzlies.

The mountings offer the benefits of reduced downtime, isolation of sub-structures and resistance to impact.



More information can be found at www.rostaaustralia.com.au or by calling (08) 9248 1588.



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IN THE SPOTLIGHT

page
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WA

WHILE standard tanks are designed for potable water, a wide range of effluents, flocculents and reagents can also be accommodated.

Tanks West is WA's premier manufacturer of moulded fibreglass (FRP) tanks providing the best solutions for liquid storage and handling.

Supplying the WA mining industry for more than 20 years, Tanks West designs its tanks to requirement for a variety of mining and industrial applications.

The company works closely with clients to determine exact project specifications, supplying tanks with capacities from 450 litres to 65,000 litres for aggressive and non-aggressive liquids.

A restraint system certified for Region D, cyclonic wind loadings can be supplied

for tanks if required.

Fitting sizes up to 900mm in a variety of materials including FRP, brass, stainless and polypropylene, can be factory fitted using threaded or flanged connections to suit, reducing the need for onsite labour.

Tanks West can also assist with project designs, consult on chemical compatibility and area specific hazards related to temperature and UV exposure.

The tanks can be hydrostatically tested

on completion and QA inspections prior to despatch can be arranged.

Whether it is water storage, break tanks, chemical storage, dust suppression or process applications, Tanks West delivers a quality product with exceptional service.

More information about Tanks West can be found by calling (08) 9456 0677, emailing info@tankswest.com.au, or visiting www.tankswest.com.au.

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NORTH Australian Laboratories (NAL) is the only gold fire assay laboratory in the NT and has been delivering professional assaying services from its top end NT location for 20 years.

The company provides grade control, resource definition, exploration and mill process control assaying services to large and small operators throughout Northern Australia.

With a large laboratory facility equipped with fire assay, ICP-OES, ICP-MS & AAS, NAL is capable of offering rapid turnaround of quality data.

A recent sample prep facility upgrade allows for daily processing capability of up to 2000 samples.

The company is managed by an experienced team with decades of experience.

Chartered chemist Ray Wooldridge has more than 50 years' experience in mineral chemistry and more than 30 years of knowledge of the Pine Creek Geosyncline and Tennant Creek mineral provinces.

The management team of Kai Curtis, Dan Nicholson and Anastasia Wooldridge have been with NAL from day one and lead a committed crew of technically skilled and culturally diverse individuals.

Llyod Hambley is the senior ICP technician with more than 15 years



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ICP_MS experience under his belt so clients are in safe hands.

The company's technical knowledge, QC regime and unique location means

that clients get reliable results on time, which are some of the reasons why NAL has long established itself as the lab of choice in Northern Australia.

North Australian Laboratories, is 220km south of Darwin and 90km north of Katherine in the centre of the NT's Pine Creek Geosyncline.

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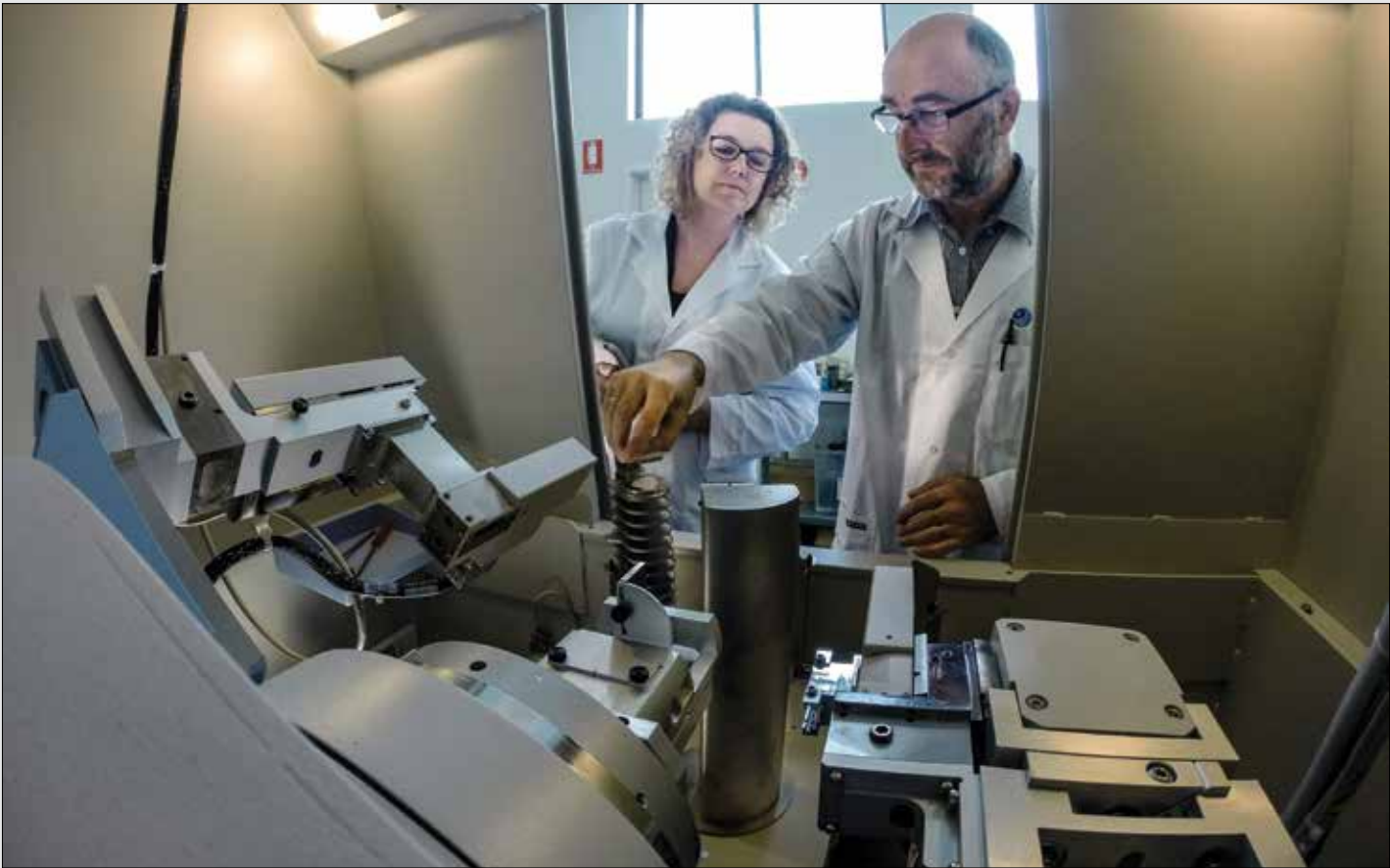
MICROANALYSIS Australia is a leading analytical consulting laboratory, providing in-depth industry expertise since 2008 to clients throughout Australia and around the globe.

The WA family-owned and operated business provides a niche service to the market, assisting in solving complex industry issues in addition to routine analysis.

Through various comprehensive scientific techniques, Microanalysis Australia enables clients to define issues, satisfy compliance legislation, fully characterise their material and most importantly, add value to their products.

For many of the company's clients, this has involved money savings, enhanced productivity, further development of the client's product and the solving of specific problems with Microanalysis Australia's exacting scientific methodology.

With more than 60 years' combined industry experience, Microanalysis Australia's scientific team have a broad and varied field of expertise ranging from errant particulate identification; asbestos and asbestiform mineral classification; and shipping declarations for dangerous goods and moisture management plans.



Microanalysis Australia's scientific team are experts in a variety of fields.

The team's expertise also include petrographic analysis of cores and concrete; metallurgical failure and corrosion analysis; materials fitness for purpose; particle sizing; and speciation of organic material.

Microanalysis Australia were recently assessed for National Association of Testing Authorities (NATA) accreditation for a number of testing including, SEM Fibre ID; petrographic examination; transportable moisture limit, AoR, bulk

density and moisture; and particle size distribution by laser diffraction and sieving.

The company was committed to consistently providing accurate and timely reporting, and offering routine analyses for quick turnaround.

Microanalysis Australia are also able to work with clients on more detailed projects, helping to examine the micro and understand the macro.

It is in the interpretation and analysis

of results where Microanalysis Australia's analysts added the most value and assistance.

For clients requiring testing, inspections, certification, forensic investigation, verification or instrument training, Microanalysis Australia's scientists are experts in a variety of specialist fields.

More information about Microanalysis Australia can be found at: www.microanalysis.com.au.



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Photon assay analysis technique gets accreditation

NATIONAL

AUSDRILL subsidiary MinAnalytical has received international acclaim for its Chrysos PhotonAssay unit; a chemical free alternative to the traditional fire assay process.

Developed by CSIRO, the technology reduces the time it takes to analyse a drilling sample.

The new process enables the sample to be tested repeatedly if required – unlike fire assay, which involves the destruction of the sample.

The National Association of Testing Authorities (NATA), Australia's national accreditation body for laboratories, has issued accreditation in compliance with ISO/IEC 17025:2018-Testing.

"For our customers, it means the system has been validated and fully tested, and they can rest assured they will receive accurate results which have been benchmarked against fire assay," MinAnalytical's general manager Gary Wheeler said.

"With installation, commissioning and validation of the PhotonAssay unit now completed, we are able to offer this service to our customers for the analysis of gold. In the near future we hope to offer simultaneous analysis of silver and copper as well."

In addition to the PhotonAssay machine at MinAnalytical's laboratory in Perth, MinAnalytical plans to commission two similar units in Kalgoorlie in the WA



More information can be found at www.minanalytical.com.au.

Goldfields in early 2019.

MinAnalytical is an Australian owned minerals laboratory based

in Perth, which primarily provides analytical services to the Australian market.

It provides a comprehensive range of high-quality geochemical laboratory techniques for most commodities.

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NATIONAL

COFFEY's experts are at the forefront of their specialisations in engineering, geotechnical, testing, environmental and project management services.

As one of Australia's largest construction materials testing providers, Coffey has been delivering testing services to the oil and gas, mining, and transport infrastructure industries for more than 50 years.

Coffey has continued to deliver technical excellence to manage complex risks and create innovative and exciting opportunities in collaboration with its clients, providing value throughout the whole asset lifecycle in these critical industries.

The company's material testing was designed to ensure materials meet quality standards, comply with regulations and exhibit the physical characteristics required for construction.

Coffey has long-considered quality to be an intrinsic component of the service it offers to its clients.

The company is fully compliant with



Coffey, a Tetra Tech company, has extensive experience across a range of sectors including material testing.

NATA regulations and has more than 20 laboratory facilities, including both project and base laboratories meeting NATA's standards.

With decades of experience, Coffey has had millions of tests under its belt and has an established network of permanent and site-specific testing facilities across Australia.

Its onsite or project laboratory services operate in some of Australia's most remote locations, improving accessibility and providing quicker results.

Coffey has continued its aim to exceed expectations in a number of ways including advancing the technology and practices of its industry to give clients the best possible results, as well as being actively involved in research and development through affiliations with universities and industry associations.

In 2016, Coffey joined Tetra Tech, a leading provider of consulting, engineering, program management, construction management, and technical services.

As a result of becoming a Tetra Tech company, Coffey was now part of a team of 16,000 people working in 400 locations across the globe, combining the resources of a global, multibillion dollar company with Coffey's reputation and deep expertise in the regions it operates in.

It has already proven to be a strong partnership that supported Coffey's growth and has created exciting opportunities.

More information can be found at: www.coffey.com/en.



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Niche laboratory expertise

VIC

WITH a 50-year pedigree in laboratory testing, inspection and engineering solutions, HRL Technology Group is the epitome of niche expertise.

Building a team of 80 of the brightest minds in science and technology dedicated to data extraction and interpretation services, the company provides industry-leading assurance to its customers.

HRL works closely with its clients to unlock latent value via an enhanced understanding of resource quality, performance and behaviour characteristics, plant optimisation and tuning as well as asset management and protection.

HRL managing director and chief executive Paul McPhee said most importantly, HRL provides unique, cost-effective engineering and materials testing services in a safe, reliable and timely manner.

"We share our clients' sense of urgency," Mr McPhee said.

HRL has expertise in the field of energy minerals and battery materials,



More information about HRL Technology can be found at: www.hrl.com.au.

including lithium/spodumene, vanadium, scandium, graphite, graphene, cobalt, nickel and copper; matching input quality parameters with emerging technology applications.

HRL's experience spans services to the power sector including coal, gas, and renewables technologies like solar, wind, hydro and waste-to-energy.

"We help clients manage risk, fine tune the performance of their assets and ensure safe, reliable operation, optimising both the returns from, and lifespan of,

plant, equipment and natural resources," Mr McPhee said.

"We have clients in bauxite, alumina, aluminium, mineral sands, silicon, iron ore, base metals, oil and gas, water and power generation all happy to explore how we can add value to process and performance."

HRL also provides outsourcing solutions for clients in laboratory and technical services.

The company boasts some of the

world's largest mining houses, industrial enterprises and research-focused organisations currently utilising these services.

Mr McPhee said laboratory outsourcing allows clients to reduce their capital investment and realise staffing cost savings, while providing instant access to world-class analytical expertise.

"It allows clients to focus on core components of their businesses while not missing a beat," Mr McPhee said.

A leading specialist testing, engineering and innovation services company.

hrl:



Photo courtesy of Rio Tinto.

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The intellectual property age is here.

Next generation patent entrepreneurs

WA

INTELLECTUAL property (IP) is a silver bullet that can guarantee a start-up nearly 75 per cent more funding than others in the same field, according to Patenteur director Neal Schutte.

“Protecting intellectual property can also halve the chance of going bankrupt and quadruple the chances of listing on the stock exchange,” Mr Schutte said.

“It can position a business as a leader in its field and make it attractive to investors and shareholders.”

Mr Schutte said the global financial crisis had left people poorer, but the good news was that the economy was being

reinvented.

“We’ve quietly slipped from the information age into the intellectual property age, creating an economy increasingly dominated by a whole new class of assets – intangible assets and the intellectual property rights that protect these assets,” Mr Schutte said.

“IP truly is a tool for business development, profit multiplication and wealth creation, but it's being used sub-optimally by the vast majority of companies and start-ups.

“Don’t get left behind – contact Patenteur today.”

More information about Patenteur can be found at www.patenteur.com.

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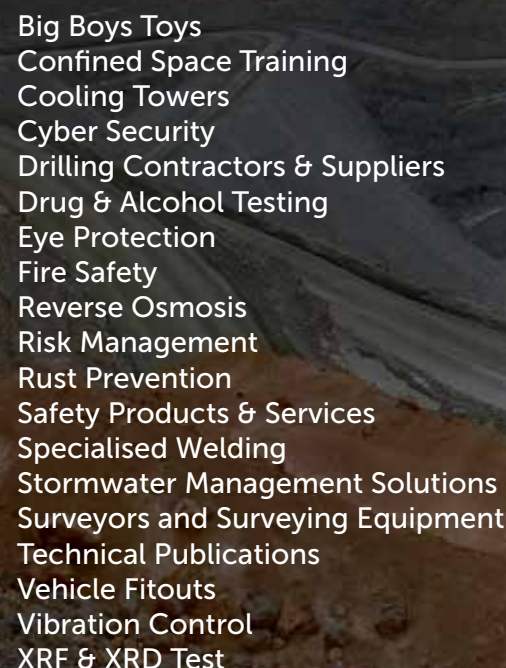
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More information about Goldfields Pest Control can be found at: www.localbugger.com.au.

No more pests with Goldfields

WA

GOLDFIELDS Pest Control has been the leading pest and weed management provider in WA's Goldfields region for more than four decades.

The locally owned and operated business was one of the original pest companies registered with the WA Health Department in 1974 and continues to provide innovative pest and weed management solutions to all industries throughout the vast Goldfields area.

Goldfields Pest Control provides services from Esperance to Warburton and all surrounding areas, including many mine sites such as Tropicana, Gruyere Gold, Nova, Carosue Dam, Cosmos, Jaguar, Kundana, Kanowna Belle, KCGM and Higginsville.

The company's work on mine sites includes regular pest maintenance programs to ensure pest free conditions are maintained in camp kitchens.

Camps can be treated for termites, ants, spiders and any other bug living where it shouldn't be.

When dealing with seasonal pests such as stink bugs, Goldfields Pest Control can be onsite within 24 hours to eliminate this problem pest.

Goldfields Pest Control has specialist vehicles and equipment to ensure mine sites can effectively eradicate noxious and declared weeds, such as Ruby Dock and Bathurst Burr.

The company also provides services to remote indigenous communities and shires.

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ContiTech



Mine Timber Technology



FEATURES:

- Sustainably managed government and private forests are the log source for component production
- Timber processed and graded to Australian standards
- Actual load testing completed and ongoing as part of QC/QA processes
- Precisely sized components
- Precisely machined interlocking notches
- Chamfered lead in edge

BENEFITS:

- Long-term sustainable supply of log resource as needed for the mining industry
- Adoption of Australian Standards for timber grading provide a benchmark for consistent quality
- Load testing provides real performance data
- Consistent course height of components provides a structure which will not have a period of "settlement" within itself as loading comes on
- Close tolerances on width of component and width of interlocking notch provide a secure fit which in turn produces a structure that is solid, stable and able to be constructed with minimal supervision
- Chamfered lead in edge assists in assembly at heights

CRIBLOC FEATURES AND BENEFITS

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Advancing mine timber technology

INTERNATIONAL

TIMBER has an exciting future ahead in the mining sector, according to Mine Timber Technology (MTT) operations manager Adam Gleeson.

Mr Gleeson has had more than 30 years' experience working with timber directly from the forest through detailed processing methods to a range of end products utilised globally.

From commencing with the Emerald Sawmill Central Queensland in 1993, products have gone into coal mines and large lifting projects such as the Olympic Dam project in South Australia, and a vast range of other uses.

Mr Gleeson said timber was the oldest product used in underground roof support and that MTT had the specialised knowledge and superior products to take it forward on a long-term sustainable basis.

"Timber is not an engineered product – it is 100 per cent manufactured by nature, which means the performance of it as a load bearing element relates to many factors such as species, grading, moisture content and configuration," Mr Gleeson said.

"You cannot say all timber performs the same.

"Through ongoing testing and development a range of advanced timber products are to be released to the market progressively, which will take full advantage of the unique and incredible



Mine Timber Technology's stock levels allow it to provide product aligned to a range of different specific applications underground.

load-carrying abilities timber has."

Mr Gleeson said timber as a product did not require significant investment in infrastructure and facilities.

"It can be instantly loaded and is not subject to sudden and catastrophic failure," Mr Gleeson said.

"Ironically the best product for

performance underground is a natural product and ultimately returns to nature in its underground state."

With MTT's stock levels, the company was able to provide product aligned to different specific applications underground.

"Whether it be for longwall take offs

or for seal and tailgate applications, there are selected products which are progressively going a long way towards mitigating issues of shrinkage, and it can be instantly loaded," Mr Gleeson said.

More information about Mine Timber Technology can be found at www.minetimbertechnology.com.



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N-Connex networks for harsh environments

NATIONAL

SINCE launching the N-Connex system in late 2016, NLT has continued to roll out this innovative solution.

N-Connex was designed to provide underground hard rock mines and other harsh environments with a reliable and powerful alternative to the incumbent Leaky Feeder radio system, or expensive and typically unsuitable WiFi and network solutions that are patched together from a variety of vendors.

Since installing the first system at De Bacis mine in Mexico, where N-Connex is used for all voice, data, networking and now tracking, NLT has rolled out systems in Australia, Canada, the US, and now has orders for South Africa and Europe.

The tunnel construction market was also adopting it in markets such as Sydney, Perth, Canada and Austria.

In Australia, the solution to date has been installed at MMG's Dugald River mine in QLD.

Subsequently, its sister mine in Tasmania, Roseberry, has also started to install N-Connex.

Similarly, a successful installation in Mexico has led to plans to install N-Connex at a sister mine in Bolivia in Q4 2018.

Leaky Feeder systems have historically had an advantage over modern IP-based solutions because they have enabled cost-effective, mine-wide voice communications.

However this was no longer the case and



NLT's N-Connex system is being rolled out globally.

thanks to NLT's partner Icom, NLT now offers a handheld and vehicle-mounted IP radio that looks and functions similarly to traditional two-way radios.

Additionally, performance of the IP radio terminals was superior to its two-way counterparts, so the critical component of voice communications over IP networks (VoIP) was finally a reality.

NLT has supplied WiFi and data

systems for more than a decade and were the first in the world to deploy intrinsically safe WiFi solutions to an Australian coal mine.

But N-Connex was not just another typical WiFi network – it was designed as a modular, IP67-rated system that could easily be modified and expanded to suit the changing needs of a mine, and it was specifically designed to simplify the installation and maintenance of a

network.

The N-Connex system also overcame Leaky Feeder's bandwidth limitations for data applications.

With a 1GB backbone capability, N-Connex supported the high data demands for modern mines, while providing essential needs such as voice communications.

A new module will be released in 2019, which would support a 10GB backbone.

With voice communications, data and WiFi networking all supported by a single system, N-Connex has eliminated the need to install a fibre system and a Leaky Feeder system in tandem.

The system's WiFi network has enabled two-way voice communications, video monitoring and a platform for tracking personnel, vehicles and assets, plus full high-speed connectivity for WiFi enabled devices.

N-Connex has taken the complexity out of networking, enabling a mine to expand at its own pace through the addition of true plug and play modules. N-Connex is simple, rugged and reliable.

The integration of all of these requirements into one simple modular system that has achieved the same level of coverage with a low cost premium as a Leaky Feeder system was the catalyst for NLT's international award winning design of N-Connex.

NLT's N-Connex was evidence that future-proofing a mine's technology and data requirements could be affordable and achievable, making reliance on outdated legacy technology a thing of the past.

N-Connex

Transition to a more connected mine

Discover the N-Connex Digital Network



Relying on incumbent and outdated solutions such as Leaky Feeder and single purpose networks will restrict your mine's performance. Voice communications, data networking, monitoring and control systems, video, personnel and vehicle tracking and all of today's modern applications demand an advanced and connected mine. Take the smarter, integrated approach to your mine's connectivity.

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Spraying Systems sales engineer Matthew Hayward specialises in dust management.

Spraying Systems' new facility in Melbourne increases its capabilities for product research and development for the mining sector.

Maintenance issues done and dusted

NATIONAL

MAKING sure mining operations operate efficiently, within legislative requirements while providing a safe working environment for their employees has always be a concern for companies.

Spraying Systems sales engineer Matthew Hayward, who specialises in dust management, explained how miners can achieve these goals by providing audits, spray analysis, engineering design and improved maintenance monitoring.

To meet these demands the company has three new facilities to streamline their business to extend improved services to their clientele.

Q. Spraying Systems has a new facility in Truganina Victoria, Forrestdale Western Australia and Sumner Brisbane. What do these new facilities have to offer?

Spraying Systems Co. headquarters is based in Melbourne, but because of the demand in the mining market we were finding increasing requests to see demonstrations of components locally, what equipment we have, and to understand how it fits in to the mining operations.

The new Melbourne facility manufactures our Spray Systems with a total area of 3630m2, this now allows us to construct more in house and deal with multiple large projects at any given time.

This results in faster deliveries to our clientele to accommodate their needs.

Our premises in Western Australia and Queensland allow us to provide improved services to the mining sectors locally.

We provide free learning workshops with mining companies and engineering firms.

This gives us the opportunity to invite clients into our premises, so we can present how our spray nozzles and equipment functions, then physically demonstrate how our technology fits into mining operations.

Q. How is dust an issue for mine sites, and what solutions does Spraying Systems have to offer?

The mining sector has a licence to operate within legislative requirements in which they need to keep dust below specified levels, to provide employees not only a safe working environment, but also not allowing dust to extend to local communities.

This is also to ensure mine workers are not put in harm's way with the inhalation

of dust, which long term can ultimately be fatal as lungs are permanently damaged.

Examples being coal causing black lung disease and iron ore resulting in silicosis.

Every worker has the right to come home safe to their families every night now and in the future.

Dust also causes increased wear and tear on equipment, increased maintenance, premature failure, all resulting in production losses which are costing mining companies hundreds of thousands of dollars, potentially millions every year.

Spraying Systems provides free site spray audits to evaluate the efficiency and effectiveness of the current spray system.

The most successful result in dust management control in the mining sector is tackling the problem completely rather than just a band aid fix, this is true root cause analysis.

Once information is collected on site we provide a comprehensive report outlining observations and recommendations on how to improve dust management to the maximum level without exceeding Ore moisture levels.

Once discussed with the client we then move onto engineering design and upon approval then to the manufacturing process.

Q. Describe the importance of maintenance for mining operations?

Maintenance is a requirement and the lack of maintenance is the root cause of spray equipment failure.

Companies often don't understand that their spray system is not working efficiently, and their nozzles are worn resulting in poor spray distribution, incorrect droplet size and increased water consumption.

To overcome nozzle failure Spraying Systems now supplies valve assemblies that have full feedback facilities to monitor the actual status of the nozzles, this indicating spray equipment failure, spray efficiency, nozzle blockages or if the nozzles are worn and need replacing.

Spraying Systems understands the mining industry and the role spray technology plays to reduce dust emissions, reduce water consumption and improve production efficiency.

We provide engineering spray design and maintenance that can be carried out easily without requiring a shutdown or loss of production.

More information about Spraying Systems can be found at: www.spray.com.au.

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Perth-based junior explorer Australian Mines has continued its stellar year with recent drilling increasing the nickel-cobalt resource at its flagship Sconi project and an announcement that the Northern Australian Infrastructure Facility (NAIF) was investigating providing support of up to \$5 billion in finance. Amy Blom spoke with Australian Mines managing director Benjamin Bell about the company's growth, the future of battery metals in Australia, and the necessity of research and development in the sector.

Q. You're a geologist and geophysicist who spent a decade in gold exploration, what led you into battery metals such as cobalt, nickel and scandium?

Evolution I guess.

When I started in the industry back in the 1990s gold was the focal point and largely over the last five years I've transitioned into battery metals.

For a company like Australian Mines, which was an exploration company at the time, it was a good opportunity to get into an emerging field.

Q. In October, Australian Mines received a nearly \$300,000 research and development grant in relation to work completed on the demonstration-size plant in WA. How important is it for mining companies to engage in R&D and for governments to facilitate those efforts?

It's absolutely crucial, particularly in the battery space.

If you compare it to gold as an example, gold has been around for such a long period of time and the processing technology has been honed and refined over decades by multiple companies.

When you move across into the battery metal space, because it's new, you're looking for technologies that may have been applicable to other areas that you're adopting.

Similarly, there's a lot of things that only apply to certain types of ore, so you can't necessarily take something and apply it to yourself.

In our case there's only a certain percentage of that technology that's

applicable, so when it comes to an emerging sector like battery metals there has to be a large R&D component to it.

Q. So what makes Australian Mines' WA plant special?

Only two companies in the world have ever done it.

It shows our ingenuity and our ability to take ore straight from the ground and then take it all the way to processing so that it's a final product.

Being able to capture the full value add is important and being able to show that the company has the expertise and knowledge to be able to, that is crucial to getting any sort of significant offtake partner.

Q. You do have that key offtake partner in SK Innovation, which has an agreement to buy 100 per cent of the cobalt and nickel from Australian Mines' Sconi project over the next seven years, with a further six year extension. How important was securing that early on?

It was necessary for the project because they underpinned the ability to get it financed.

You're talking project capital costs to the order of \$700 million to \$1 billion, which is three or times what a gold plant would cost you.

The ability to bring in a big brother with deep pockets is the reason we needed an offtake partner, so the first two years of our project was all about getting someone like SK on board.

If the offtake is a small company, you might have concerns about their ability to meet their financial commitments, or their longevity, so you might want to have a few

partners.

Whereas SK makes \$120 billion a year so we didn't have any concerns about them being able to meet their obligations in terms of the offtake.

What it does do is allow us to optimise our processing plant, specifically tailored to one purpose.

Again with a gold plant, you just make gold because gold is gold and everyone will buy it, but battery metals tend to differ depending on who you're selling it to.

So if you're able to make just one product for one customer, it keeps the cost down.

Q. Describe the significance of recent drilling results at the Greenvale deposit at Sconi in QLD.

This drilling takes the mineralisation that we knew was there into something that we can now announce to the market.

It effectively increases the life of the mine formally and quite significantly, and it also increases the head grade.

Q. Australian Mines recently acquired 100 per cent of the Flemington cobalt nickel scandium project in NSW. What was the reason for that decision and how does it impact Sconi?

The reason for the 100 per cent is that when we were engaged in the offtake discussion for Sconi, we had 13 companies involved, which means there were 12 companies that didn't get a partnership.

Some of those companies are gone now, but there's still a lot that we were talking to.

By having 100 per cent interest we can continue talking to whoever we want to and

enter into agreements without having to rely on joint venture partners to approve it.

Q. There's been a lot of talk in the past year about reaching peak lithium and whether or not the sector has any cause for concern. Do you buy the idea of battery metals reaching a peak in the next few years and where would cobalt, nickel and scandium fit into that?

I think peak oil was meant to be 1974, 1975 and it didn't happen then.

Everybody likes to pick a peak, whether it's for commodity pricing, the share price, whatever it is, and they always get it wrong.

The assumptions that are used to define what a peak are subject to change.

It may originally be a penetration of 10 per cent, and then you find that it's 6 per cent or 8 per cent and that changes it fundamentally.

Q. What does the future hold for battery metal mining in Australia?

Mining in Australia has traditionally been focused on iron ore and gold.

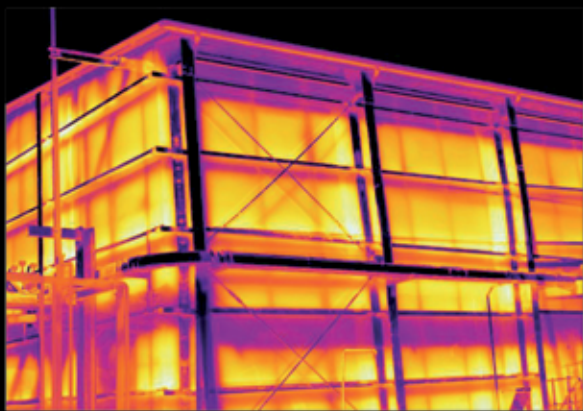
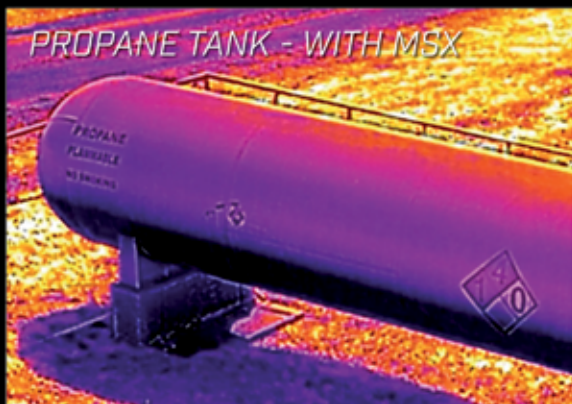
Identifying these battery metals mean that there are a whole heap of deposits or landscapes in Australia that may have been overlooked or considered exhausted from an economic point of view, which may now become significant.

In Sconi's case, what it means for Townsville is 300 jobs, and that will be replicated throughout other rural areas.

There are hundreds of jobs being offered in communities that haven't had them in the past.

There is a fundamental change coming out of non-traditional mining.

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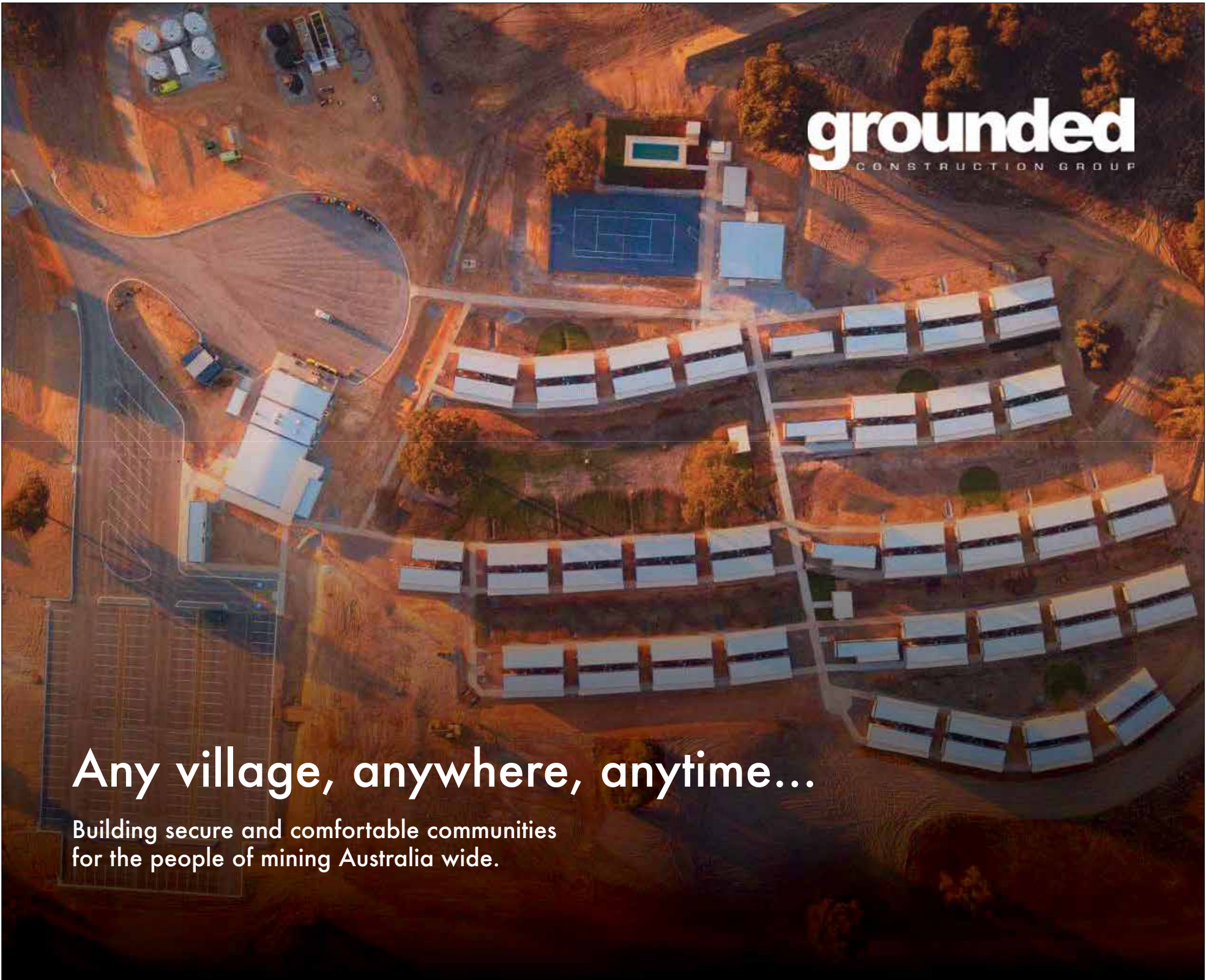
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