

THE AUSTRALIAN MINING REVIEW

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NICKEL MINES
IN
MASSIVE IPO

NEWS
p16



BRIDGING THE
GAP

MINING IN SOUTH
AUSTRALIA
p30



MARK THOMPSON
TALGA RESOURCES

IN THE SPOTLIGHT
p78



MAJOR COMMODITIES SNAPSHOT p4

BULLION HUNT

As domestic gold production looks set to plummet to generational lows in the coming years, a number of explorers are making headway at a cluster of promising, early-stage conglomerate gold projects in the Pilbara.

COMMODITY FOCUS: GOLD p18

Image: Artemis Resources.

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NEWS

1

Commodities Snapshot	4
The Contractors	10
Explorers on the Move	12
Technology & Innovation	14
International	16
Commodity Focus: Gold	18

FEATURES

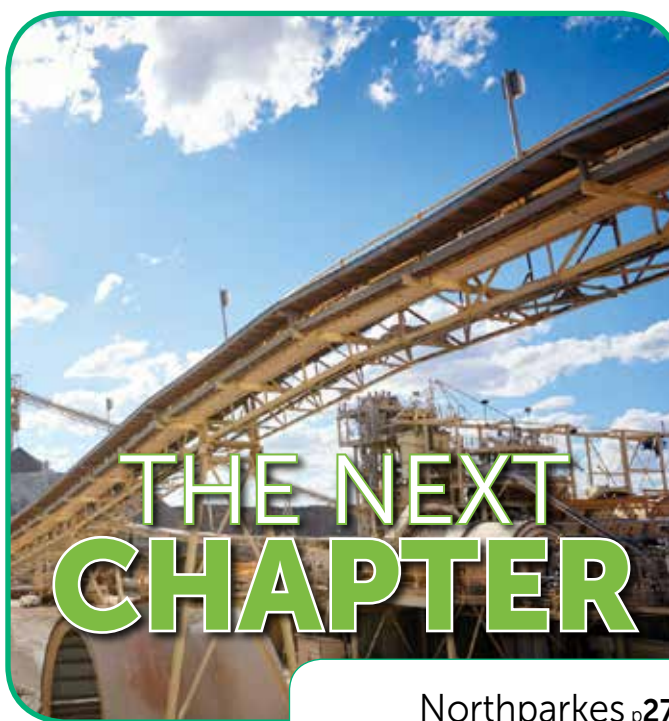
Mining Recruitment	20
Northparkes	27
Mining in South Australia	30
Mining & Mental Health	35
Pilbara Ports	38
Regis Resources	43
Northern Star	46
AngloGold Ashanti	49
Aus Tin Mining	52
Peabody Energy	56
OM Holdings	58

INDUSTRY FOCUS

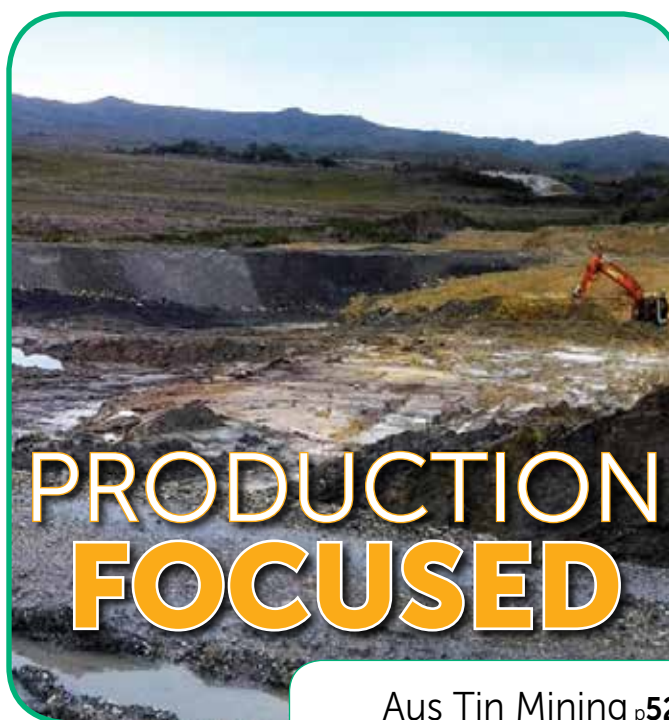
Companies Gearing Up	60
Conveyors & Belting	66
Cranes & Lifting	70
Rugged Laptops & Phones	71
Scaffolding & Formwork	73
Transportable Buildings	75
Water in Mining	76
Workshop Safety	77

**IN THE SPOTLIGHT:**
TALGA RESOURCES MANAGING
DIRECTOR**MARK THOMPSON** p78

Mining Recruitment p20



Northparkes p27



Aus Tin Mining p52

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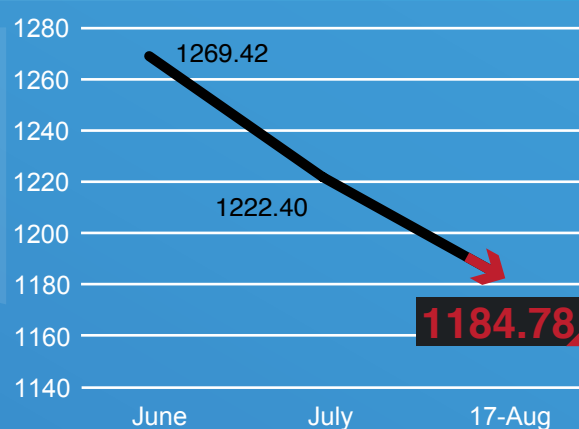
MAJOR COMMODITIES

SNAPSHOT

GOLD

\$US/oz

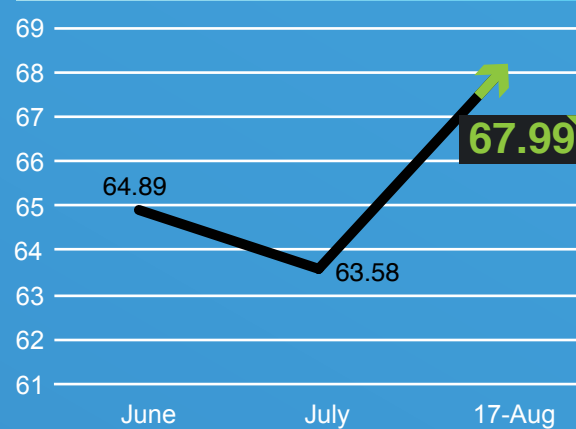
Gold prices plummeted to lows of \$US1176/oz mid-August, in line with the rising US dollar and US interest rates.



IRON ORE

\$US/t
62% Fe CFR China

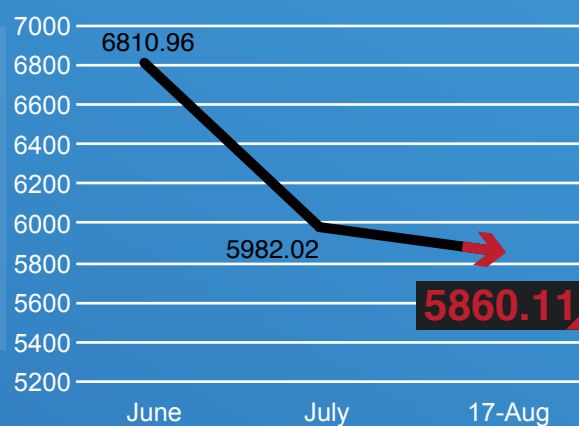
The iron ore price strengthened through late July and early August, almost hitting \$US70/t before retreating to the \$US67/t mark.



COPPER

\$US/t
LME Price

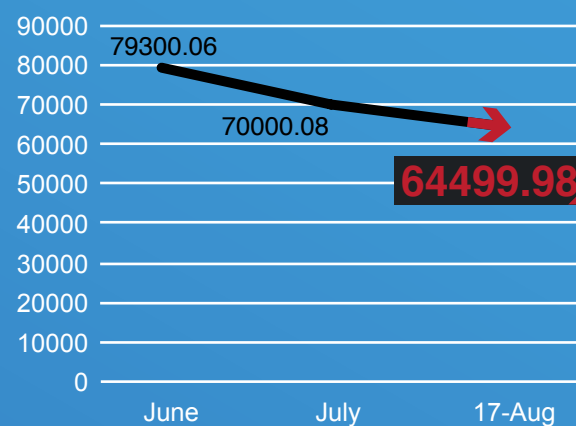
Copper prices have fallen by more than 20 per cent since the beginning of June, as increasing global trade tensions raise concerns for supply chains.



COBALT

\$US/t
LME Price

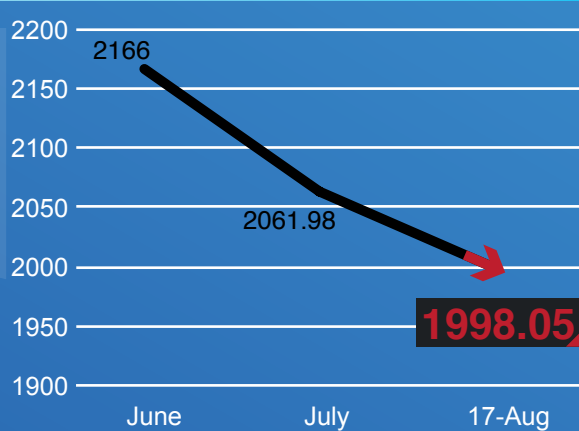
Cobalt spot prices weakened in August, but analysts remain optimistic that strong demand and limited supply will see prices rebound in coming months.



ALUMINIUM

\$US/t
LME Price

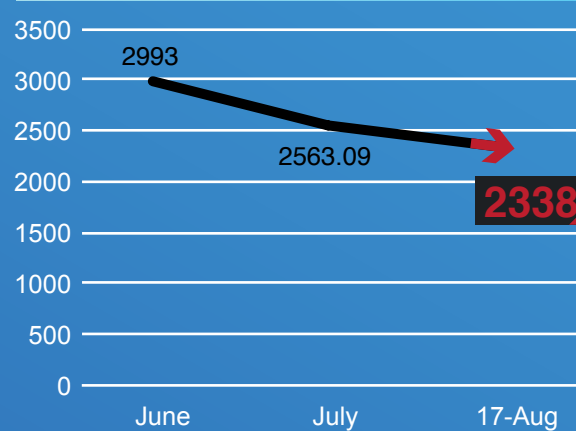
Aluminium prices have slumped again, hovering around the \$US2000/t mark during August.



ZINC

\$US/t
LME Price

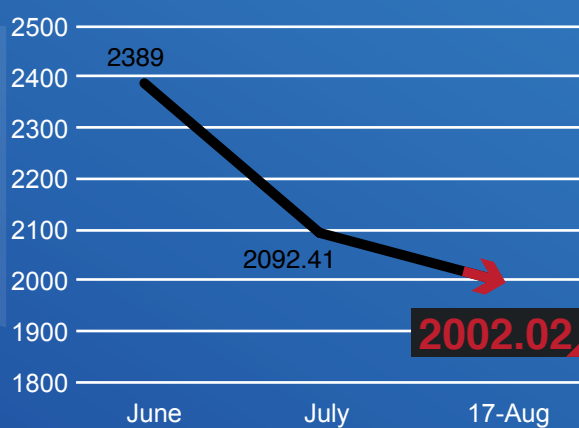
Zinc prices have seen a 33 per cent decline over the last six months falling from \$3595.50/t in February to a low of \$US2283/t in August.



LEAD

\$US/t
LME Price

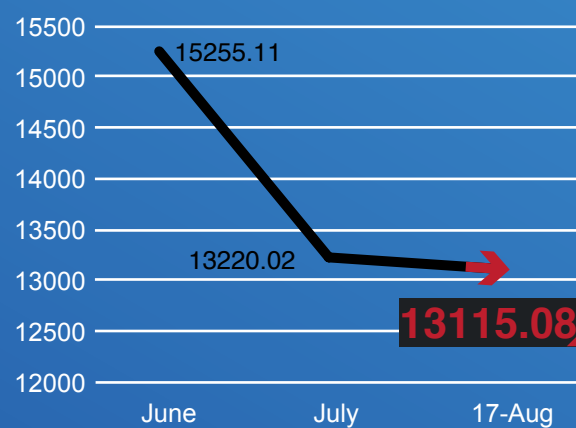
Continued trade war tensions between the US and China and concerns over economic growth pushed lead below \$US2000/t late August.



NICKEL

\$US/t
LME Price

Nickel prices continue to drift lower, falling below \$13,000 in August; its lowest level since February this year.



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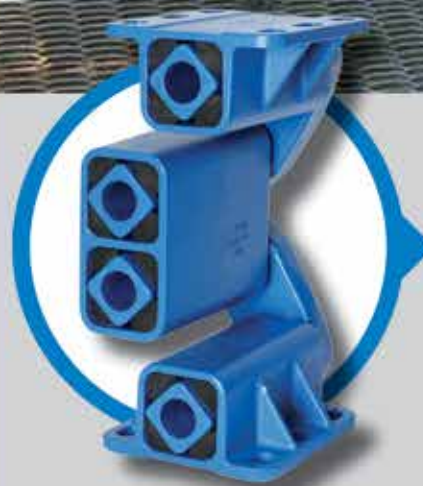
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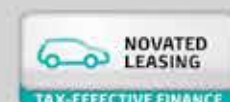


Image: Whitehaven.
Whitehaven Coal chief Paul Flynn.

Whitehaven, Yancoal dazzle with bumper results

REUBEN ADAMS
NATIONAL

AUSTRALIA's biggest coal producers continue to roll out record-breaking results on the back of global market price improvements and demand for high-quality coking and thermal coals.

Top independent producer Whitehaven Coal reported a record net profit of \$525.6 million for FY18, as production of 22.9 million tonnes (mt) and sales of 22.1mt were in line with and 7 per cent higher respectively than FY17.

This reflected the ongoing ramp up of Maules Creek (11mtpa, up 13 per cent on FY17) and strong performance from the Gunnedah open cuts.

Whitehaven's coking coal sales represented 17 per cent of total sales for the year.

Unit costs "remained in the best quartile" but increased to \$62/t due to higher fuel prices, increased contractor costs, and lower production from Narrabri during the year.

The company said FY19 guidance for saleable coal production would be in the range of 22mt to 23mt, while costs were likely to "increase modestly to \$64/t excluding royalties due to higher fuel costs and longer hauls at Maules Creek".

The Whitehaven Board proposed an unfranked dividend of 27 cents per share to shareholders, comprising a final dividend of 14 cents and a special dividend of 13 cents.

Australia's biggest coal pure-play Yancoal has completed its turnaround, reporting a before-tax profit of \$539m for the half year ended 30 June; a massive improvement on the \$18 million loss for the previous corresponding period.

This improved financial performance was driven by sustained high production rates at the tier-one Moolarben, Hunter Valley Operations and Mount Thorley Warkworth joint venture operations.

"The 2017 acquisition of Coal & Allied continues to prove Yancoal's strategic foresight in negotiating a commercially astute deal capable of strengthening our scale of operations, in preparation for the global coal market's eventual return," Yancoal chairman Baocai Zhang said.

The company announced a maiden interim dividend totalling \$130 million (unfranked).

New Hope bolsters Bengalla mine stake

REUBEN ADAMS
NSW

NEW Hope Corporation will buy out Westfarmers' 40 per cent interest in the lucrative Bengalla Joint Venture for \$860 million.

This represents a slight discount on the \$865m New Hope paid for its original 40 per cent stake at the bottom of the market in 2016.

New Hope's acquisition of the original 40 per cent interest in Bengalla from Rio Tinto in March 2016 – a few months prior to the start of the recent coal price surge – was perfectly timed.

New Hope ended months of speculation when it reached a binding commitment with JV partner Wesfarmers in August this year, with its share price rocketing from \$3.19 to \$3.54 on the news; its highest level since January 2014.

Following completion of the transaction – a combination of cash and new debt – which is anticipated to occur in late 2018, New Hope will own up to an 80 per cent interest in Bengalla.

"The acquisition of an additional interest in Bengalla demonstrates New Hope's long term commitment to the Bengalla mine and a positive outlook for the global export thermal coal market," New Hope managing director Shane Stephan said.

The highly profitable Bengalla thermal open cut mining operation, south west of Muswellbrook in the Hunter Valley region of NSW, has regulatory approval for up to 15 million tonnes per annum run-of-mine capacity.

Wesfarmers managing director Rob

Image: New Hope Group.
New Hope managing director Shane Stephan.

"The acquisition of an additional interest in Bengalla demonstrates New Hope's long term commitment to the Bengalla mine and a positive outlook for the global export thermal coal market."

Scott said the agreement to sell its interest in Bengalla finalised the conglomerate's exit from resources, following the sale of the Curragh coal mine to Coronado Coal in March this year.

"We believe this agreement with New Hope is in the best interests of our shareholders and ensures a smooth transition in the ownership structure of the Bengalla joint venture," Mr Scott said.

"Bengalla has made strong returns for Wesfarmers shareholders since our initial interest was acquired in 1991 and it is pleasing the extensive, disciplined and patient review of our coal businesses has

resulted in outcomes which reflect the value of these world-class assets".

Mr Stephan also stated that New Hope remained committed to securing approval for the continuation of its other key asset, the New Acland mine in southern Queensland.

New Hope is still seeking approvals to begin development of the \$900m New Acland extension, which is back in the Land Court for further consideration after the Queensland Supreme Court overturned an earlier ruling opposing the expansion in May this year.

Lithium supply set to explode

ELIZABETH FABRI
INTERNATIONAL

GLOBAL lithium supply is set to triple over the next four years with the lions share mined in Australia, according to GlobalData research.

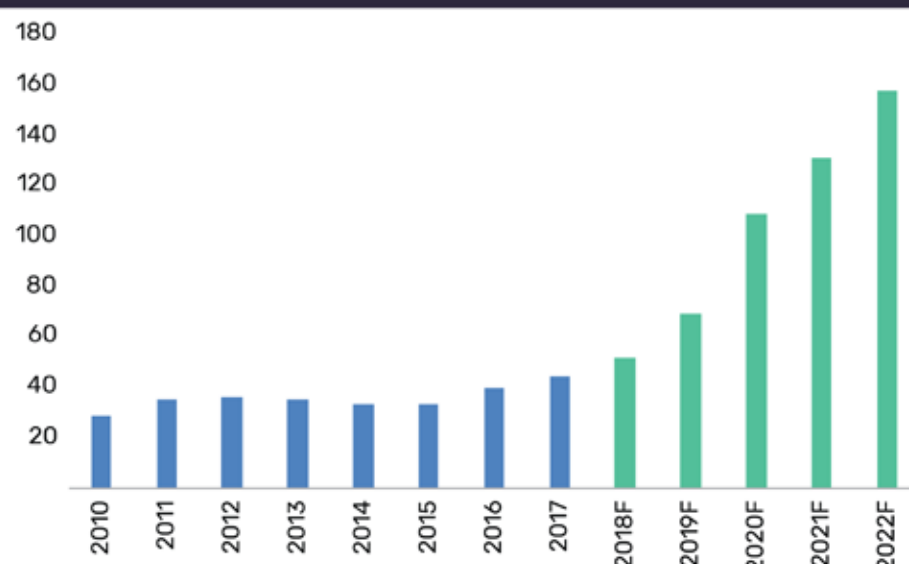
The data and analytics firm said 86,000 tonnes of new lithium capacity will come online until 2022, with Australia accounting for 37 per cent of supply followed by Argentina (29 per cent), Canada (16 per cent), Chile (9 per cent), the US (6 per cent), and Mexico (4 per cent).

"After moderate growth in lithium supply between 2010 and 2017 of 6.4 per cent per annum, global output is expected to triple between 2018 and 2022 to reach 154,000t (metal content), as 86,000t of new metal capacity comes on stream to meet the increasing demand for the metal for use in batteries in electric vehicles and smartphones," GlobalData mining analyst Sameer Chakravarthy said.

WA production is expected to explode in coming years with ramp up at Pilbara Minerals and Altura Mining's Pilgangoora projects and Tawana Resources' Bald Hill mine, an expansion at Talison Lithium's Greenbushes mine, and mine openings at Mineral Resources' Wodgina and Kidman Resources' Mt Holland projects.

Global lithium production (kt), 2010–2022

GlobalData.



Source: GlobalData, Mining Intelligence Center

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IN BRIEF

BCI to divest iron ore assets

WA

BCI Minerals is looking to divest its iron ore assets in the WA Pilbara.

The diversified miner's iron ore portfolio comprised the Iron Valley, Kumina, Bungaroo South projects and surrounding exploration tenements, and Cape Preston East port rights.

BCI said it has been approached by multiple parties that have expressed strong interest in acquiring the assets.

The company said funds realised through the divestments would enable it to rapidly progress its Mardie salt and sulphate of potash Definitive Feasibility Study, and maintain 100 per cent ownership through to a target final investment decision date in late 2019.

Century mine begins production

QLD

NEW Century Resources has commenced tailings flotation activities and production of rough concentrate at its Century zinc mine in QLD.

Over the coming months ramp up activities will focus on optimising concentrate product quality through the zinc cleaner circuit.

The mine is expected to produce 264,000 tonnes of zinc per annum and 3 million ounces of silver per annum over a six year mine life.

New Century said in-situ mineral resources also provided potential for a mine life extension, and the company was concurrently involved in active exploration across the 1800sqkm tenement package.

Pacton buys Pilbara Gold

WA

PACTON Gold has bought the remaining 49 per cent stake in Arrow Minerals' Pilbara gold project for \$C2 million in cash and shares.

In May, Arrow sold a 51 per cent interest in the project to Pacton and entered into a joint venture whereby Pacton could increase its interest to 80 per cent.

Arrow Minerals managing director Steven Michael said the agreement was a great outcome for both companies.

"The cash payment of C\$1 million will be used to fund Arrow's exploration activities at the Strickland gold project, where the recent drilling program has intersected considerable bedrock gold mineralisation and confirmed the gold bearing potential of this project," Mr Michael said.

Saracen's record breaking results

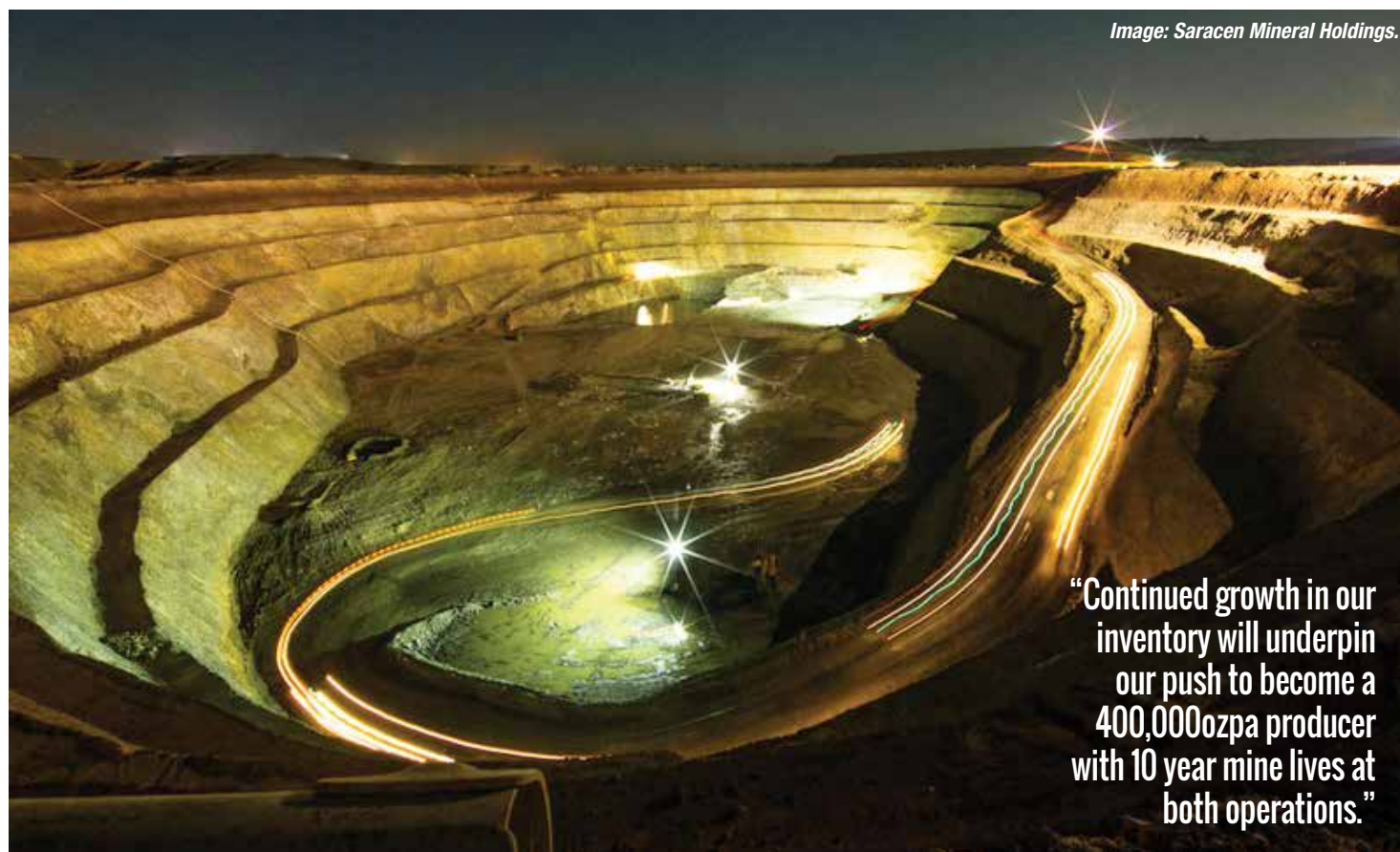


Image: Saracen Mineral Holdings.

"Continued growth in our inventory will underpin our push to become a 400,000ozpa producer with 10 year mine lives at both operations."

JESSICA CUMMINS
WA

SARACEN Minerals capped off FY18 with a net profit surge of 166 per cent to \$76 million; an increase from \$28.4 million a year prior.

Results stemmed from increased gold sales of 317,675 ounce and lower AISC of \$1139/oz.

Underlying NPAT – excluding the \$10.6 abnormal profit received from its sale of King of the Hills; doubled to \$67.3 million.

In early August, Saracen reported a 64 per cent increase in reserves at its Karari Dervish project to 1 million ounces, and an increase in reserves to 980,000oz at Thunderbox.

Saracen managing director Raleigh Finlayson said the strong results were particularly pleasing given the company was in the middle of a major growth phase.

"Profit and free cashflow surged as we grew production and reduced costs," Mr Finlayson said.

"This combination stemmed in part from our huge exploration success.

"This is the key to our ongoing growth and therefore we have committed \$60 million to exploration in FY19.

"Continued growth in our inventory will underpin our push to become a 400,000ozpa producer with 10 year mine lives at both operations."

Other significant FY18 results included St Barbara which posted a net profit after tax of \$227 million.

Molyhil to deliver economic boost



Image: Thor.

"Molyhil will be a very low cost tungsten producer on a global scale."

Thor's Bonya tungsten outcrop.

JESSICA CUMMINS
NT

THOR Mining's proposed \$69 million Molyhil tungsten mine in the Northern Territory could deliver net value of \$100 million and more than \$500 million in revenue over its seven year mine life, according to new findings from an enhanced Definitive Feasibility Study (DFS).

The project, 220km northeast of Alice Springs, would include a simple open-cut mining operation and conventional

mineral processing plant, and deliver an early payback within 18 months of first production.

Thor executive chairman Mick Billing said the upgraded Net Present Value in excess of \$100 million demonstrated the substantial value the project holds for the company.

"There is further significant upside at Molyhil from expanding into potential underground mining and open-pit mining the nearby Bonya tungsten deposits, 30kms east of Molyhil," Mr Billing said.

"Strategically, the results of the enhanced DFS are based only on Molyhil's known mining inventory and do not include the additional upside of either potentially going underground or mining Bonya.

"Molyhil will be a very low cost tungsten producer on a global scale."

Thor has already received environmental approval from the Northern Territory's EPA for the project to proceed and holds agreements with traditional owners.

The company said it hoped Molyhil would begin production by early 2020.

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Ausdrill moves to #2 with \$271m Barminto acquisition

REUBEN ADAMS
NATIONAL

AUSDRILL's "compelling" \$271.5 million acquisition of underground mining contractor Barminto would create Australia's second largest mining services company.

Ausdrill will acquire Barminto – its current partner in the lucrative African Underground Mining Service (AUMS) joint venture – in exchange for 150.7 million Ausdrill shares and \$25.4m in cash; equivalent to an equity acquisition price of \$271.5m.

Once the transaction is completed, Barminto vendors will own about 22.1 per cent of the enlarged Ausdrill, with experienced company director and current Barminto non-executive chairman Keith Gordon joining the Ausdrill board.

The acquisition announcement accompanied a set of outstanding full year results from diversified mining services company Ausdrill, including a year-on-year net profit increase of 95.7 per cent to \$61.1 million.

This strong result was underpinned by repeat mining clients and new contracts, with more than \$500m in contract extensions and new work secured over the past year.

"We have delivered operationally in FY18 and the Barminto transaction would broaden our strategic footprint to be Australia's clear #2 mining services company and set in place a balance sheet with the capacity to achieve sustainable and profitable growth," Ausdrill executive chairman Ian Cochrane said.

Based on the level of work currently in hand and expected contract renewals, Ausdrill was targeting 20 per cent to 30 per cent underlying profit growth for FY19, before taking into account the proposed acquisition.

The new-look, post-acquisition Ausdrill was expecting estimated annual revenue of \$1.8 billion across a more diverse range of

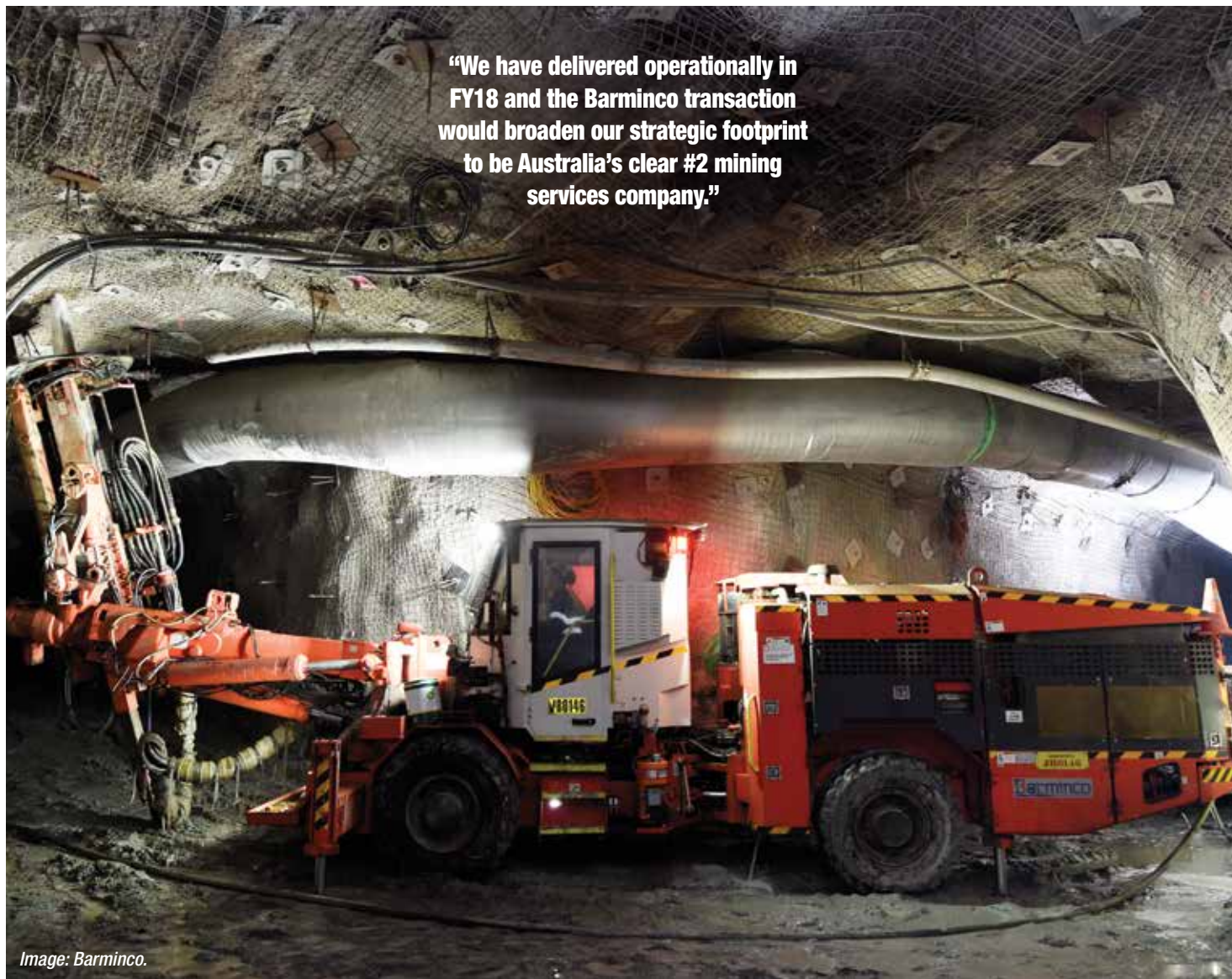


Image: Barminto.

"We have delivered operationally in FY18 and the Barminto transaction would broaden our strategic footprint to be Australia's clear #2 mining services company."

customers and geographies.

Barminto chief executive Paul Muller said Barminto and Ausdrill were a great fit, with the businesses providing complementary services and having worked together for a decade through the AUMS joint venture.

"By bringing these two businesses together and creating Australia's second

largest mining services company, we will be able to provide a broader range of services for our customers and generate additional opportunities for our employees," he said.

"Barminto had a strong 2018 financial year and our focus is to continue safely delivering results for our customers."

For the year ended 30 June Barminto

reported a \$50.665m profit; a huge turnaround from a \$93.771m loss the year prior.

The transaction is subject to several conditions precedent, including Ausdrill shareholder approval.

Completion is anticipated for 31 October 2018, but this date is subject to change.

Downer picks up CSA work contract

ELIZABETH FABRI
NSW

DOWNER EDI has won another three-year mining services contract at Glencore subsidiary Cobar Management's CSA mine in Cobar, NSW.

The \$120 million contract will include mechanised decline and lateral development mining and haulage, and ground support services including shotcrete and cable bolting.

Downer chief executive Grant Fenn said he was pleased to continue a strong relationship with Cobar Management at the underground copper mine.

"Downer has a strong track record providing mining services to Cobar Management and helping it to drive efficiencies across its operations," Mr Fenn said.

GR wins Carosue Dam work

ELIZABETH FABRI
WA

GR Engineering has secured a \$17.9 million engineering design, procurement and construction contract for a paste backfill plant at Saracen Gold's Carosue Dam operation in the WA Goldfields.

The contract involves process engineering, design, supply, construction and commissioning of the plant, which once completed will produce between 110 and 120 cubic metres of paste per hour to fill stopes in the Karari underground mine.

GR Engineering managing director Geoff Jones said works would begin immediately, with completion to occur in the second half of FY19.

"GR Engineering's team has a historical involvement with Carosue Dam, initially in 2000 when the original processing facilities were commissioned," Mr Jones said.

"We are pleased to have the opportunity to continue our involvement with Carosue



Image: Saracen.

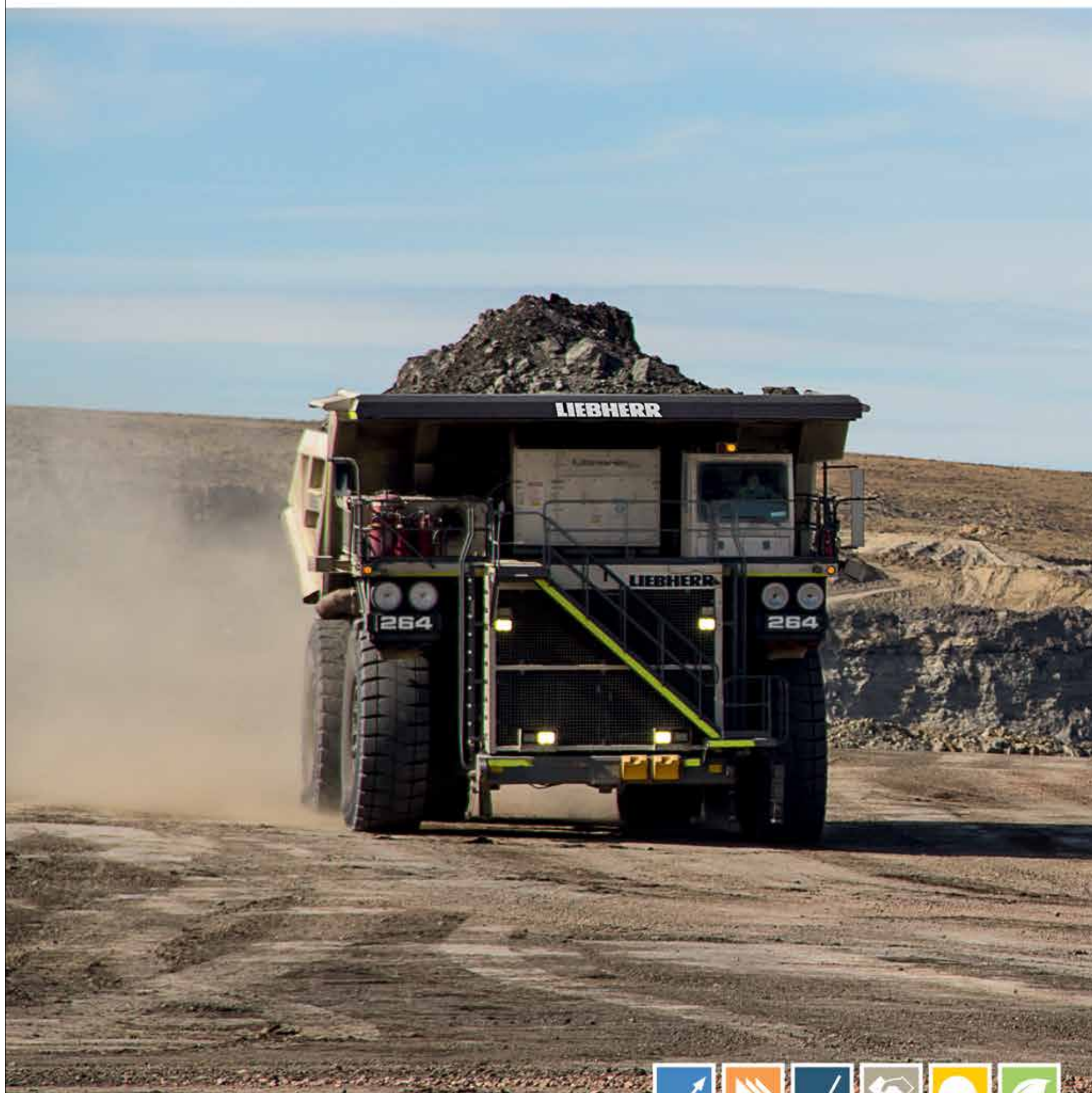
The entrance to Karari underground mine.

Dam and work with Saracen on the safe and successful delivery of the paste plant."

In early August, GR Engineering also received an \$8.3 million payout from

Eastern Goldfields after it launched proceedings in the Supreme Court over a dispute relating to its Davyhurst processing plant contract.

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IN BRIEF

High-grade results at Bellevue

WA

BELLEVUE Gold has revealed its highest grade drill results to date from its Bellevue gold project in WA.

Drilling across the Viago Lode delivered significant results, including 4.3 metres at 58.8 grams per tonne of gold.

Bellevue said it was pleased with how this new discovery was firming up and will upgrade its recent maiden resources estimate later this year.

"To have a second, high-grade gold discovery in such a short period of time points to the quality of the Bellevue Lode system," Bellevue executive director Steve Parsons said.

McArthur drilling begins

NT

TODD River Resources has begun a diamond drilling program at its McArthur copper-zinc project in the Northern Territory.

The drilling, partially funded by the Territory Government, will test three strong conductor plate targets identified during a SkyTEM survey last year.

Todd River Resources chief executive Will Dix said the company had looked forward to conducting additional drilling at McArthur for a while.

"A great deal of work has gone into the modelling of these conductors to ensure we give ourselves the very best chance of success," Mr Dix said.

Success at Cape Bedford

QLD

MINERAL sands producer Diatreme Resources has released a maiden mineral resource for its Cape Bedford project that confirms a high-grade silica deposit.

The north QLD project contains an estimated 21.6 million tonnes at 99 per cent silica.

"These results substantiate our previous exploration efforts and we are determined to advance this project as quickly as possible, working closely with traditional owners, Hope Valley Congress, to ensure maximum economic benefits for the local community," Diatreme chief executive Neil McIntyre said.

The company is targeting the potential export of between 350,000 and 500,000 tonnes of high-quality silica sand per annum over an estimated 20-year operating life.

Core eyes larger Finniss resource

REUBEN ADAMS
NT

CORE Exploration believes fresh high-grade drill results have demonstrated "significant potential" to grow resources at the near-term Finniss lithium project in the Northern Territory.

The emerging lithium developer has embarked on aggressive drilling this year to grow the Finniss resource base, ahead of a late-2018 Definitive Feasibility Study (DFS) and early 2019 Final Investment Decision.

The Pre-Feasibility Study (PFS) confirmed Stage 1 of the Finniss Project, mining the high-grade Grants deposit, would generate strong free cash flow; but with a mine life of just 26 months, further resources were required to underpin a potential long-life operation.

Latest results from the Carlton prospect, 1km from Grants, included 16 metres at 1.79 per cent lithium oxide (Li₂O) from 84m, while results from Hang Gong prospect 1.5km from Grants "highlights potential for shallow-dipping, multiple stacked pegmatites" and included 11m at 1.34 per cent Li₂O from 97m.

"These exploration results demonstrate the huge potential of the Finniss lithium project that we are yet to realise," Core managing director Stephen Biggins said.

"The remainder of 2018 is shaping up to be a very busy one for Core as we continue to progress Grants towards development, while continuing drilling to grow the existing resource base at Grants and BP33, as well as maintaining an aggressive exploration program to continue to identify prospects such as Carlton and Hang Gong."

The PFS estimated Stage 1 capex of just \$53.5 million, of which more than \$US20



Core managing director Stephen Biggins.

million was already committed by major lithium offtake partner, Yahua Group.

This, combined with a non-binding \$US35 million pre-payment facility with RiuFu, would fully fund Stage 1, the company said.

The PFS also flagged \$346 million in pre-tax revenue to be generated over the 26 month period, at a strong operating margin of 57 per cent based on average life of mine sale price of \$US649/t (FOB) (A\$865/t at 75 cent exchange rate) concentrate; and even more if sales prices move closer to current

spot prices.

The company said these strong operating margins provided for a rapid payback period of less than 12 months.

The strong free cash generation from Stage 1 was expected to help Core self-fund future development opportunities at Finniss, including any future development of the nearby BP33 deposit, which has potential to more than double the current mine life.

BP33 will be considered as part of the DFS later in 2018.

Unlocking the Tanami

JESSICA CUMMINS
NT

THE Northern Territory Government has begun an airborne geophysical survey in the Tanami Desert to help explorers find the next big mineral deposit.

One of the largest of its kind, the survey will involve two planes equipped with magnetometers flying a total of 275,000km over the Tanami Desert, 300km west of Tennant Creek.

The magnetometers will measure small changes in the earth's magnetic field and allow geologists to see what lies beneath the sand.

Northern Territory Primary Industry and Resources minister Ken Vowles said the survey would produce data that could help mineral explorers find commodities such as gold, copper, nickel and rare earths.

"We are developing Tennant Creek as a mining services hub and, as the Territory's premier gold-producing area, the Tanami region plays an important part in that," Mr Vowles said.

"Resourcing the Territory is opening up



An airborne magnetic survey plane flying over Prodigy Gold geologists in the Tanami.

new areas for exploration and reducing the risk of exploration investment, which makes the Territory a preferred destination for investors and supports local businesses."

Member for Stuart Scott McConnell said Tanami was a vast area with untapped resources that could be turned into viable projects to provide jobs in the region.

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IN BRIEF



Image: Mining3.

Mining3 to host innovation showcase

QLD

CSIRO Mineral Resources and CRCMining outfit, Mining3, will host a free innovation showcase in Brisbane this October that will provide insight into its new projects and technological advancements.

Attendees will hear from a group of high-profile speakers on innovation challenges and progress, with networking opportunities over lunch and Q&A sessions.

The event is open to researchers, mining companies, the METS sector, research institutions and Government agencies.

Interested parties can register online at www.mining3.com.



Image: Curtin University.

ARC training centre to improve productivity

WA

A NEW government-funded Australian Research Council (ARC) Industrial Transformational Training Centre will be built at Curtin University, WA that will use data science to transform asset maintenance for the Australian resources sector.

The centre, led by Curtin, will be run in partnership with the University of Western Australia, CSIRO, the University of Adelaide, and industry partners Alcoa, BHP, Roy Hill, CORE Innovation Hub and the Minerals Research Institute of WA.

ARC Training Centre for Transforming Maintenance through Data Science director Professor Andrew Rohl said maintenance practices had changed little in the last 20 years, and were due for a digital overhaul which will see new developments in computational methods, statistics, artificial intelligence and more.

Foley appointed CSIRO Chief Scientist



"Cathy is a great contributor, with a passion for turning excellent science into powerful solutions for Australia."

Image: CSIRO.

Incoming CSIRO Chief Scientist Dr Cathy Foley.

REUBEN ADAMS NATIONAL

THE CSIRO's new Chief Scientist will be decorated physicist and science leader Dr Cathy Foley.

Dr Foley is renowned for her work developing superconducting devices and systems, which have helped unearth more than \$6 billion in minerals worldwide.

She is credited with helping create the LANDTEM technology, which uses superconductors to detect minerals deep underground.

LANDTEM, a highly portable exploration tool for detecting highly conductive ores like nickel sulphides, gold and silver, uses highly sensitive magnetic sensors known as Superconducting Quantum Interference Devices (SQUIDS) to differentiate between ore and conductive material or overburden; even when the ore body is deeply buried.

The technology was developed and successfully commercialised in collaboration with BHP Billiton and former Canadian

mining company, Falconbridge.

Dr Foley, currently the Deputy Director and Science Director of CSIRO's manufacturing business unit, will start as Chief Scientist at the end of September.

She said her priority will be promoting science, STEM and women in science.

"Australia's future prosperity will be fuelled by science," Dr Foley said.

"Science which creates new industries, new jobs and shapes the minds and aspirations of our future leaders.

"We can't keep thinking about science as something which is locked away in a lab. It connects and drives everything we touch and do."

Dr Foley has been an advocate for women in science, for the communication of science, and science education for 30 years, the CSIRO stated.

"I'm looking forward to not just spreading the word, but helping shape the science agenda and raising the profile of the role of women in STEM," she said.

CSIRO chief executive Dr Larry Marshall

said Dr Foley was an incredible leader and scientist.

"Cathy is a great contributor, with a passion for turning excellent science into powerful solutions for Australia," Dr Marshall said.

"I am looking forward to seeing her make this role her own, and bringing the voice of CSIRO science to help Australia navigate a path to prosperity through global disruption."

Dr Foley joined the CSIRO Division of Applied Physics in 1985 as a National Research Fellow, before being promoted to Senior Research Scientist in 1991, Principal Research Scientist in 1996, Senior Principal Research Scientist in 2000, and Chief Research Scientist in 2008.

Dr Foley has won a number of awards, from a Public Service Medal and the *Eureka Prize* for the promotion of science in 2003 through to *Woman of the Year* honours in 2013.

In 2015, Dr Foley and her team were awarded the prestigious *Chunies Ross* award for the LANDTEM innovation.

Campoona graphite put to the test

JESSICA CUMMINS NATIONAL

ARCHER Exploration, in partnership with The University of New South Wales (UNSW), has developed full-cell lithium-ion batteries suitable for use in the electric vehicle and consumer electrical markets.

The batteries comprise three commonly used cathode variants: lithium-nickel-manganese-cobalt (NMC), lithium-iron phosphate (LFP), and lithium-cobalt oxide (LCO), as well as graphite from Archer's Campoona project on the Eyre Peninsula.

Archer chief executive officer Dr Mohammad Choucair said the speed at which the company delivered the technology was testament to the strong technical leadership culture at Archer.

"Collaboration with UNSW has greatly accelerated our advance in the battery space," Dr Choucair said.

"We are now able to demonstrate complete, functioning, and commercially relevant batteries with Archer's graphite.



Image: Archer Exploration.

Australian graphite successfully used in full-cell Li-ion batteries.

"We have reached a major milestone towards integrating our substantial graphite resource in the lithium-ion battery supply chain."

Dr Choucair said all synthesis, fabrication, characterisation and testing was carried out at UNSW.

"The work definitively shows that Archer's graphite can be used in conjunction

with different types of cathodes, making it suitable for multiple potential battery markets," he said.

The next steps for Archer involved addressing the trade-off between cost and battery performance and building off scalable proof-of-production as it continues to target partnerships with lithium ion battery manufacturers.



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Nickel Mines in massive IPO

REUBEN ADAMS
INDONESIA

INDONESIA-focussed Nickel Mines is officially the second biggest metals and mining initial public offering of 2018 after making its ASX debut on 20 August.

The Australian company, which holds an 80 per cent interest in the Hengjaya nickel laterite mine in Indonesia, raised \$200 million selling shares at 35 cents each.

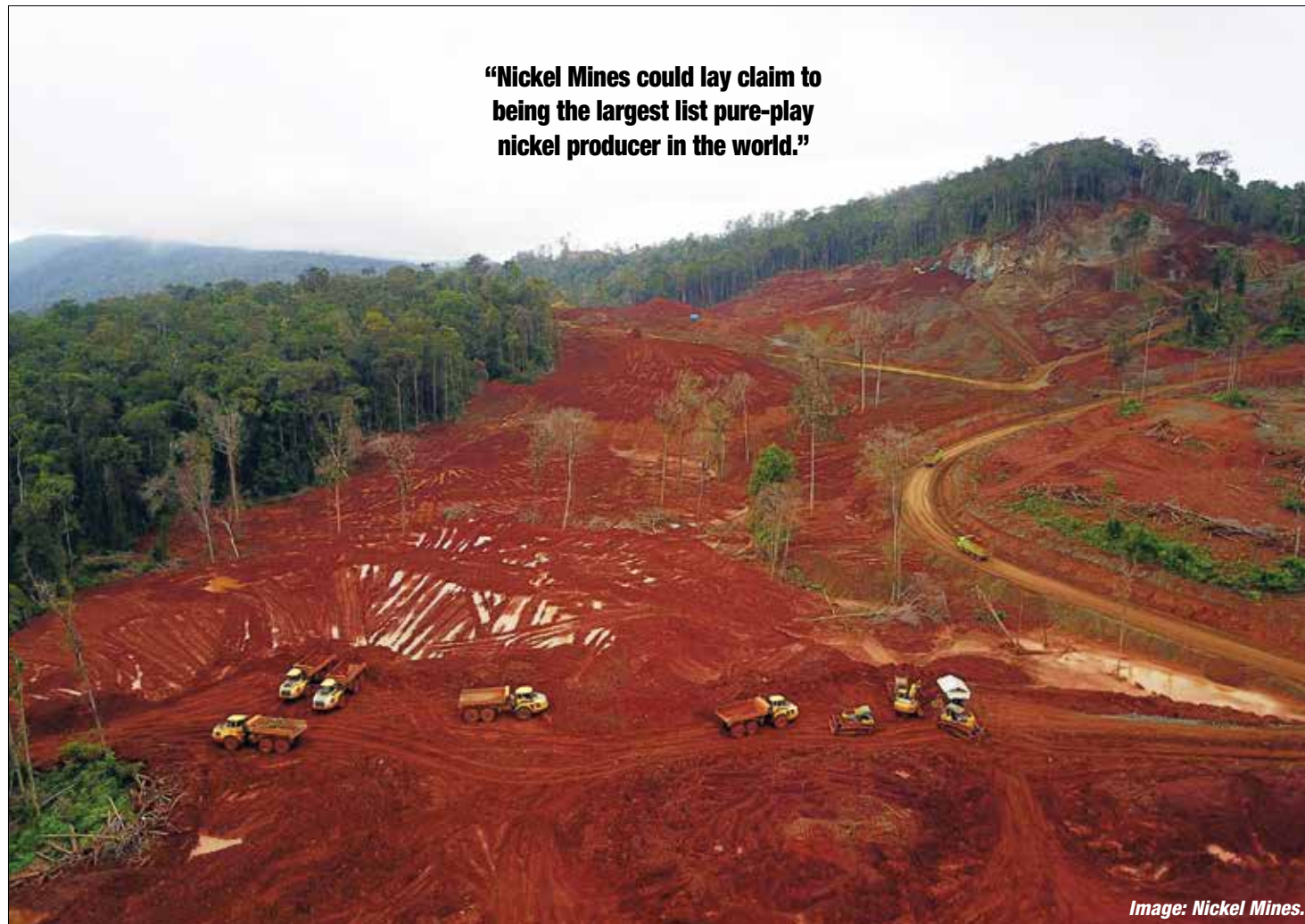
Nickel Mines will use the cash to diversify into downstream nickel pig iron (NPI) processing and production, acquiring a further 35 per cent interest in the Rotary Kiln Electric Furnace (RKEF) project to increase its interest to 60 per cent.

In September last year, the miner entered into an agreement (CSA) with Shanghai Decent, a subsidiary of the world's largest stainless steel producer Tsingshan Group.

The CSA included the terms on which a two-line RKEF plant within Tsingshan's neighbouring Indonesia Morowali Industrial Park (IMIP) operations and refining centre would be funded and constructed.

"Nickel Mines is now on the cusp of becoming a significant player in the global nickel industry having established a financial, operational and strategic partnership with China's Tsingshan Group, the world's largest stainless producer," Nickel Mines chairman Robert Neale said.

"Our collaboration will not only serve to contribute to Tsingshan expanding its stainless steel production at the IMIP to a targeted 3 million tonnes per annum, but will provide Nickel Mines with a platform to reap the significant economic benefits of becoming a downstream nickel producer."



"Nickel Mines could lay claim to being the largest list pure-play nickel producer in the world."

Image: Nickel Mines.

The Hengjaya nickel laterite mine in Indonesia, which is in close proximity to the Indonesia Morowali Industrial Park operations and refining centre.

Mr Neale said construction of the two RKEF lines were progressing well, with most foundation works completed by mid-August, and about 40 per cent procurement and 20 per cent of civil works now completed.

"We are optimistic our two RKEF lines will be ready to start commissioning early in the June quarter of 2019," he said.

The company also signed an MOU with Shanghai Decent in June to construct, own and operate two additional RKEF lines.

With the option of moving to 100 per cent of four RKEF lines with total output of about 33,000t of nickel metal per annum, "Nickel Mines could lay claim to being the largest list pure-play nickel producer in the world", Mr Neale said.

Tyranna acquires US Cobalt

JESSICA CUMMINS
US

TYRANNA Resources has inked a deal to acquire US Cobalt, owner of the Goodsprings cobalt and base metals project in Nevada, US.

The acquisition forms part of the company's diversification strategy aiming to capitalise on the battery minerals revolution, which saw an increase in the LME price of cobalt from \$US23,000/tonne to a high of \$95,000/tonne.

Tyranna managing director Bruno Seneque said this was an outstanding deal for Tyranna and its shareholders.

"Historical mining results suggests that this area holds some of the highest grade Cobalt mines that can be found in the district," Mr Seneque said.

"In the 1920s the mines in this area produced approximately 20 tonnes of cobalt rich ore from copper mining and historical grades were reported between six and 29 per cent.

"No modern mining techniques have been used here and we are confident that good exploration and mining methods will handsomely reward the company here at Goodsprings."

Testwork progress for Kogi Iron

JESSICA CUMMINS
NIGERIA

COMMERCIALISATION of Kogi Iron's Agbaja Cast Steel Project in Nigeria is moving forward after a successful test work program confirmed its viability.

Metals and mining consultant Tenova confirmed the iron ore concentrate produced was "suitable for the production of pig iron and a refined metal with a grade and composition suitable for the production of billet".

"We have not discovered any issue that would materially affect the economic viability of the project moving to the next phase," Tenova stated.

The consultant company was now preparing a formal report, which Kogi expected to receive in the coming weeks.

The Agbaja cast steel project was now in position to progress the financing of construction and continue with the definitive feasibility study, which included both the mine and the cast steel plant.

The Agbaja project, 15km northwest of Lokoja city in Kogi State, opened up the opportunity for domestic production of steel billets.

The project is on the Agbaja Plateau, which hosts an extensive, shallow, flat-lying channel iron deposit with an indicated Mineral Resource of 586 million tonnes grading 41.3 percent.



Image: Kogi Iron.

The Agbaja cast steel project, 15km north west of Lokoja City.

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All images: Artemis Resources.



ELIZABETH FABRI

IN January gold prices were hovering at a peak of \$US1362 per ounce on the back of a turbulent year for US politics and weakening US dollar.

Australian gold producers, which benefit strongly from the AU/US exchange rate, were widely optimistic for the year ahead.

But over the last eight months, gold prices have taken a dive, plummeting to lows of \$US1176/oz mid-August, in line with a rising US dollar and inflation-adjusted interest rates.

Australia's biggest gold players weren't complaining though; Saracen, Western Areas, Evolution Mining, and St Barbara all ended FY18 with record profits after a solid year of production.

At the August Diggers and Dealers conference in Kalgoorlie, Kirkland Lake also took up top honours, winning the coveted *Digger of the Year* award, for its recent achievements, including a 70 per cent increase in production at its Fosterville mine in Victoria, and increasing reserves by 210 per cent to 1.03 million ounces.

Perth Mint – often a barometer of the sector's strength – was in positive territory too, launching Perth Mint Physical Gold ETF (AAAU) on the New York Stock Exchange (NYSE) on 15 August.

AAAU, the first exchange traded fund (ETF) on the NYSE, will provide a direct pathway for Australian-mined gold to be sold into the world's largest financial market.

Perth Mint chief executive Richard Hayes said "Australian gold has an international reputation for purity and ethical sourcing, with investors integrally participating in the success of a great Australian story".

"In an increasingly uncertain and turbulent world, the case for gold remains compelling because it serves as a potential hedge against inflation, currency risk and stock market volatility," Mr Hayes said.

However, recent analysis by S&P Global Market Intelligence forecasts Australian gold output to slump to a "generational low"



in the mid-term.

S&P Global Market Intelligence analyst Chris Galbraith said while global gold production was expected to rise to new highs in 2019-2020, Australia's outlook wasn't as rosy.

"In the case of Australia, despite production being on track to hit a 26-year high of 10.2moz in 2019, we estimate that Australian gold production will start to decline thereafter," Mr Galbraith said.

"We are forecasting a 9 per cent fall year over year in 2020, and we expect country's production to reach a generational low of 6.8moz by 2022, a 33 per cent drop within only three years."

Mr Galbraith said the forecast decline in Australian production after 2019, could be attributed to the short mine lives of recent start-ups and some significant mines approaching the end of their lives.

In June, Northern Star Resources chief executive Stuart Tonkin told delegates at the WA Mining Club the view of the gold industry's future was seen through "rose-coloured glasses", and the sector needed to future proof itself through investment in exploration.

"Every dollar invested in exploration generates \$11.40 in revenues that come back

into the sector," Mr Tonkin said at the time.

Mr Tonkin also raised concerns on the 13-year average timeframe between discovery and development, and the fact that the average life of Australian gold mines was five years, with a third of those having only a 2.5 year reserve life.

But there were always exceptions.

Take Gold Fields and Gold Road's Gruyere JV; the mine is scheduled to produce 270,000 ounce per annum (ozpa) over a 13-year mine life, and once in production, would have a five and a half year gap between discovery and first gold.

At Diggers and Dealers last month, Gold Road's outgoing chief executive and managing director Ian Murray said construction was on track at Gruyere, with first gold expected in the June quarter of next year.

Pilbara: The Next Wave

A group of Pilbara-focused explorers were also making headlines.

In 2017, a gold rush began when Artemis Resources and its Canadian JV partner Novo Resources discovered near-surface conglomerate-hosted gold nuggets at

Purdy's Reward.

Conglomerate gold is a gold-bearing rock which contains rounded grey quartz pebbles and other minerals.

The flattened watermelon-seed sized nuggets found at Purdy's were a new-style of gold mineralisation in the West Pilbara, likened to the Witwatersand province of South Africa, which has significant Archean sedimentary conglomerates, and has produced more than two billion ounces of gold (or a third of all gold ever mined).

Within months of the news, more than two dozen resources companies flocked to the Pilbara in pursuit of the next big gold discovery.

Juniors currently exploring the region included Canadian-listed Pacton Gold; De Grey Mining which received a \$5 million investment from DGO Gold in July to advance exploration; Novo Resources; Kairos Minerals; Kalamazoo Resources; Arrow Minerals; Castle Minerals; Impact Minerals; Accelerate Resources; Marrindi Metals; and Calidus Resources which owns the Warrawoona project.

On 17 August, Artemis announced Novo Resources (the project manager for Purdy's) had recommenced exploration on site, with drilling to determine the depth and thickness of targeted conglomerate units.

Artemis and Novo said the JV aimed to have sufficient data for a mineralisation report by the end of 2018.

At Diggers and Dealers, Novo Resources president Dr Quinton Hennigh told reporters there seemed to be more scepticism surrounding the Pilbara conglomerate story than among the investment community in Canada, but many analysts and geologists had visited its Pilbara sites and were convinced.

Mr Hennigh added mining conglomerate ore was no easy feat.

"It is quite challenging, this is very hard rock but we are working through this," Mr Hennigh said.

"A lot of people think you can just take a D9 out and start mining this thing, that's not quite the way it works but we are moving this forward in the most expeditious and cost-efficient manner."

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thyssenkrupp Industrial Solutions (Australia) Pty Ltd has appointed Ben Suda as their new Head of Sales in Australia. Ben brings a wealth of sales management experience along with an extensive knowledge and deep understanding of the market and the key industries that we operate in. We are confident that Ben will be a valuable addition to the Company.

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An example of a rebuilt Caterpillar AD55B ejector truck by EMS Group.

When second-hand makes ‘cents’

NATIONAL

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SPECIAL FEATURES

MINING RECRUITMENT

A SKILLS REVOLUTION

Growth has returned to mining, with demand for workers once again rising as new or mothballed operations are given the green light, and existing mines expand. But how will the industry cope as labour demand exceeds supply?



Images: Supplied.

ELIZABETH FABRI

TEN years ago, getting a job in the resources sector looked a little different.

Dump truck tickets and other driver-operator skills were in high demand; the work was tough, but for those lucky enough to land a gig, a lucrative wage would await them.

Then came the downturn – everybody felt the sting – with many skilled workers leaving the industry for good during a jobs drain.

But commodity prices have now recovered, and a construction boom has returned, meaning companies were now looking for personnel to build and operate the next wave of projects.

In the WA Pilbara, Pilbara Minerals and Altura Mining's identically named Pilgangoora lithium mines have just entered production, while iron ore giants BHP, FMG and Rio Tinto are gearing up to build three new projects worth a combined \$9 billion – with 4000 jobs ready to be filled through the construction phase.

But where will these workers come from? That is the question many are asking, as competition runs high to secure the services of a depleted pool of skilled workers and top tier contractors.

The types of roles required to develop and operate the 'digital' mines of tomorrow have also changed with a new suite of skills needed.

Three storey high dump trucks – once operated by the eager green skin – were now driving themselves around many of Australia's iron ore mines, while the operators sit in air-conditioned offices

thousands of kilometres away.

Mining staff were also expected to have the skills to operate new technologies such as drones, wearables, and other automated devices employed in both open pit and underground operations.

Federal Jobs and Innovation minister Michaelia Cash said in the two years to May 2018, employment in the mining industry increased nationally by 16,700 or 7.7 per cent.

"Recruiters and miners are often looking for staff with experience in specialised equipment and systems," Ms Cash said.

According to Hays, jobs in demand included geologists, maintenance planners, drill and blast operators, heavy diesel fitters, dragline and excavator operators, computer numeric controlled machinists, boilermakers, and underground jumbo operators.

Australian Mines and Metals Association (AMMA) head of policy and public affairs Tom Reid said the rise in vacancies was "showing no signs of subsiding".

"The news is positive for job prospects in the sector," Mr Reid said.

"QLD and WA remain the hotspots for employment opportunities, with year-on-year growth in vacancies between 30 and 40 per cent.

"In most recent months, the biggest occupational growth has been in operational management, with the sub sectors of metal ore mining, and coal and mineral mining, showing large growth.

"We are also seeing great demand for labour in more regional areas, in particular skills shortages in the

Kalgoorlie Goldfields.

"It is an exciting time to be working in the Australian resources and energy industry."

Recruiting Staff

The process for recruiting personnel had noticeably shifted in the last few years.

While traditional recruiting methods were still utilised, apps and cloud-based software were being embraced by companies, large and small.

"With competition for labour around the country, many companies have turned to recruitment practices that are digitally led, and certainly new to the sector for some parts of the industry," Minister Cash said.

A group of technology companies have engineered Uber-like recruitment apps that streamline the process, providing efficiency for both the recruiter and end user.

There were also platforms that automated HR processes such as managing time sheets, payslips, invoicing, equipment and uniform orders, and work schedules.

Ms Cash said mining equipment and technology services (METS) providers were also using non-traditional methods to talent spot and recruit, including hackathons designed to solve mining problems.

"These events can attract talent, such as computer and data scientists, statisticians and programmers, that otherwise may not consider a career in the resources and related sectors," Ms Cash said.

"Mining solutions of the future will

be solved using approaches across many disciplines, so it is crucial to recruit people with varied skills."

For example, Perth-based company, Unearthed Solutions, runs mining and METS hackathons both domestically and internationally, and has received support from the Government via the METS Ignited Growth Centre.

Ms Cash said a number of hackathon participants received employment offers or were paid for targeted project work and research.

Overseas Workers

The pool of job-ready personnel was also evolving, with less international workers, for one.

In 2017, the Government announced it would scrap the 457 visa and replace with a new 482 visa scheme.

AMMA's Mr Reid said the biggest impact of the legislation was access to a more limited occupation list that qualified under the new visa.

"AMMA has worked with the government through the implementation of the new visa system to ensure those occupations in high demand and requiring the most assistance from overseas labour remain accessible in Australia's skilled migration systems," Mr Reid said.

Minister Cash said it was worth noting that the number of 457 visa holders in Australia sponsored by businesses in the mining industry steadily declined since its peak in September 2012 (when there were 8000 457 visa holders, compared to about 1600 in December 2016).

(CONTINUED ON PAGE 22)

blue tongue

WORKFORCE . STRATEGY . TRAINING

When it comes to finding a solution to skills shortages – Collaboration and Partnering outperforms Do-It-Yourself

We have heard it for decades. Skills shortage this, skills shortage that. Well.... I think we can all agree- it's back, and the flavour feels different this time. In the Australian mining services sector, there seems to be a universal appreciation that a longer-term approach is the way to secure career minded trades people. With improved retention and culture, performance is the prize.



So, what's the solution this time around?

From Blue Tongue's perspective, the answer is to partner. In 2009, we piloted a program to hire a group of 10 semi-skilled people from around the country to sign up as mature aged apprentices and complete 8 weeks of practical training in rubber belt (conveyors) splicing, followed by 15 months of on the job experience. The candidates went from earning \$45,000 per annum as a semi-skilled worker, to earning \$110,00 in their first year in mining.

Whilst we have made some mistakes, the results are impressive.

It was when we applied the same type of model to heavy mobile maintenance for our mining services clients that tangible success was proven.

To date we have successfully hired, trained, transitioned and managed more than 400 candidates to break into the Australian mining industry, working in heavy mobile plant. Of the employees hired through the program, 90% have completed 15 months with Blue Tongue (at our client's business) and 80% have then gone on to work for the client's business directly for 5 years.

We have demonstrated the success of our model with the Critical Skills Investment Fund in 2011. Blue Tongue was 1 of 6 projects selected by the Federal Government as being the benchmark of project success, out of a total of 56 approved projects.

But it isn't the government we try to win over, it's our clients. Blue Tongue are big

believers that solution-oriented thinking starts with understanding our client's needs, and we work backwards from there to build the solution.

Today we are also looking to apply this up-skilling model to other areas, where deep level skills shortages exist.

For employers looking to Do-It-Yourself, why invest in training from scratch only to risk losing the employee once they are 'skilled' (and productive)? Further to this, how do you know you are training the right person?

Our clients love that we bring something 'to the table' and risk our own time and money upfront to be able to hire and train a person that is client ready and productive from day one.

Executive leadership also plays a big role. The smartest and most dynamic companies are willing to look outside for partners that can provide unique value and capability. We believe the best companies have a HR culture that looks to collaborate, not reinvent the wheel with limited resources.

The results are clear. Today, Blue Tongue partners with some of Australia's leading OEM's and mining services companies.

The future is exciting as we look to use our up-skilling and workforce development model to pioneer into different heavy industrial areas where critical skills shortages exist.

blue tongue
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(CONTINUED FROM PAGE 20)

"It is an exciting time to be working in the Australian resources and energy industry."



However, in response to the call from businesses to deliver more flexible visa arrangements, a new Global Talent Scheme (GTS) was introduced on 1 July, 2018.

"It allows businesses, as well as start-ups, to sponsor highly-skilled and specialised workers not covered by the standard TSS visa," Ms Cash said.

"Mining companies may be able to access the GTS if they require, and cannot domestically source, a worker whose occupation does not appear on the

occupation lists."

Mr Reid said the GTS could potentially fill some of the gaps that arose when the more limited 482 visa took effect.

The resources industry operated in a "highly-globalised skills market", he added, with international expertise often required in Australia, just as Australian expertise was required overseas to develop projects in other parts of the world.

"This is made even more acute when Australia experiences peak demand cycles,

such as that in 2004 to 2014 period," he said.

"We are heading in that direction of acute skills shortages again.

"It's always important to have access to international skills to supplement and work with and bolster our local workforce.

"This a long-term reality of an international industry that requires long-term policy certainty to shore-up large numbers of skilled and experienced people."

Upskilling

This issue was again amplified because people who entered mining during the peak had moved onto other sectors post-2014.

Mr Reid said the challenge would be to attract these people back to mining.

"Anecdotally we are hearing of some reluctance among pockets of skilled people to return to the industry," he said.

"The other challenge is learning from the past and ensuring that as activity in the sector continues to increase, this translates into long-term sustainable employment that is less exposed to commodity price cycles or cyclical investment periods.

"Employers have certainly turned their attention to better managing the ebbs and flows of the labour demand in the resources and energy industry, so if and when the current cycle inevitably again starts to decline, we don't lose another generation of skilled, experience and valuable people.

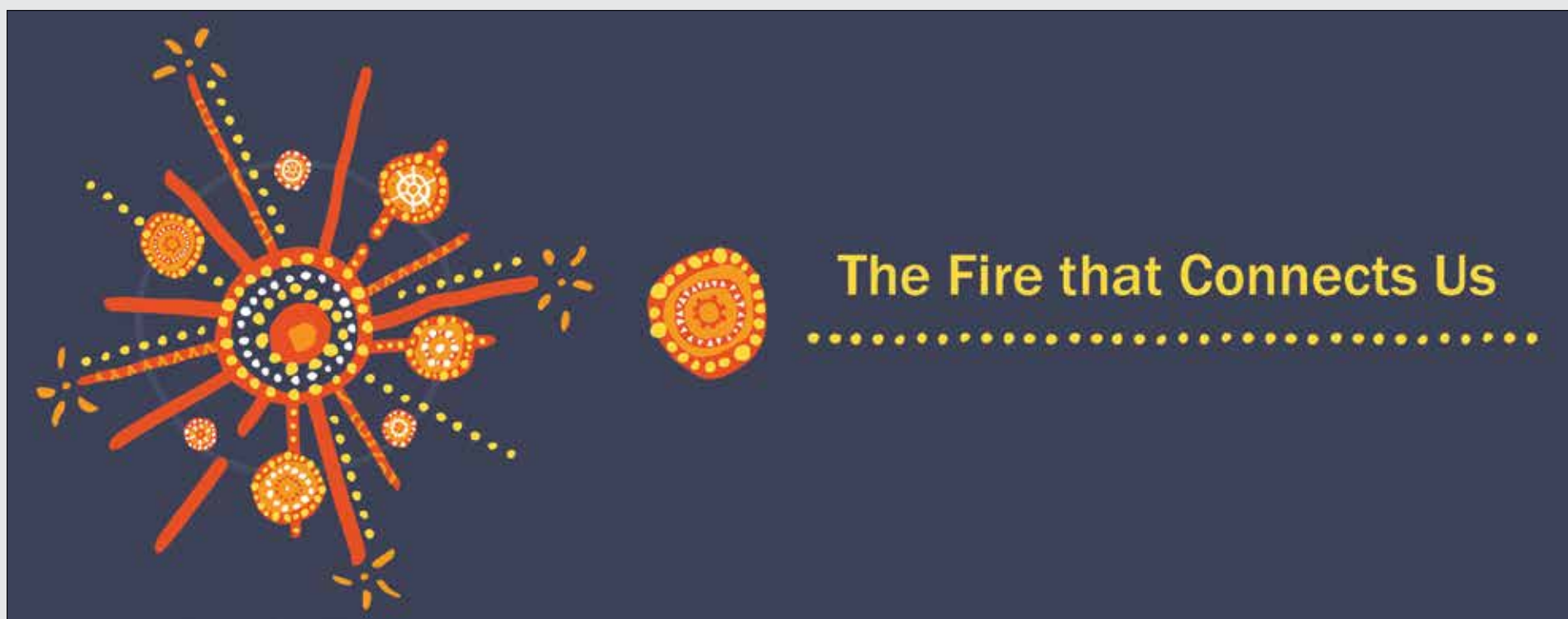
"We don't want to be facing the same repeated challenge of having to recruit and attract talent another wave of talent in another five to 10 years' time."

Furthermore, workers also had to be mindful of staying relevant amid the fourth industrial revolution – or Industry 4.0 – which will see technology become integral part of the mine's design and daily operations.

A recent Deloitte report highlighted the half-life of learned skills was now about five years, meaning upskilling needed be the 'new normal' in an increasingly mechanised world.

Companies and workers will share a joint responsibility in upskilling across automation, artificial intelligence, Internet of Things, and cloud computing.

Chandler Macleod recognised for Indigenous training



Chandler MacLeod's RAP focus is captured in its 'Energy Unleashed' motif.

NATIONAL

IN the past decade, Chandler Macleod has helped thousands of Aboriginal and Torres Strait Islander people achieve employment outcomes.

While being proud of its progress, the company acknowledges much is still to be done to close the gap in Indigenous employment.

As a leading Australian human resources provider, it has identified

a tremendous opportunity to help Indigenous Australians achieve sustainable employment to improve the lives of individuals, their families and their communities.

The staffing giant acknowledges that when individuals unleash their potential, they benefit, their teams benefit, organisations benefit and Australia benefits.

Reconciliation Australia has endorsed Chandler Macleod Group's 'Innovate' Reconciliation Action Plan (RAP),

which supports the embedding of organisational respect for Indigenous Australians, building and sustaining trusting relationships with Indigenous communities, laying the foundations for delivering real, lasting opportunities for economic participation and independence.

Its 'Energy unleashed' RAP motif, designed by Gilimbaa, explores the energy, passion and spirit within an individual, and how those surrounding them; families, Chandler Macleod Group and employers, support the unleashing

of potential and realisation of new opportunities.

Chandler Macleod created Solid Start which is an initiative that focuses on creating Indigenous pathways to employment through recruitment, training, and support.

More information can be found by contacting Chandler Macleod Indigenous Strategy general manager Kyra Bonney on (07) 3003 7727 or via email at: Kyra.Bonney@chandlermacleod.com.

“Regardless of what is happening externally, any successful individual working within any sector and across any profession should continually strive to upskill and develop their skill set and knowledge,” Mr Reid said.

“The concept of the ‘fourth industrial revolution’ continues to evolve within the resources and energy industry and see our sector open up extraordinary new opportunities for those already working within the industry and others who are new to it.

“Employers do have some responsibility to assist in the transition of their workforces into the future of work – a good example is Fortescue Metals Group, which has already redeployed a large number of truck drivers into other roles in its business in preparation for the impact of automated truck technology.

“This is just one of many examples of proactive employer initiatives to ensure people are not left behind as our industry evolves.”

Mr Reid said AMMA acknowledged there would be some people displaced by new technology and this was an ongoing challenge.

“It is incumbent upon society, government and industry to be ready to face these challenges and embrace opportunities that new technology offers,” he said.

Educating Schools

Mining companies and Government also shared a role in educating school students about the benefits of a career in the resources sector.

Studies conducted this year found there was declining level of students enrolling in and graduating from mining related degrees, and a knowledge gap in young



“Anecdotally we are hearing of some reluctance among pockets of skilled people to return to the industry.”

people about the career options in mining (Youth Insight).

Take pay; according to the Jobs minister, the average earnings for full time workers in the mining sector was \$2,684.50 per week; 40 percent higher than the average for all other industries.

Mr Reid said AMMA, through its representation on the Australian Industry & Skills Committee (AISC) and engagement with the Government in other forums such as the Resources 2030 Taskforce, was

pushing for new initiatives and programs to promote the opportunities of a career in the resources sector.

“It’s important to dispel any perception that the resources industry has run its course and that opportunities in the sector aren’t as attractive as they once were,” Mr Reid said.

“Of course, this is far from the truth – our sector is just getting started.

“The industry requires targeted promotional and educational campaigns to

primary, middle and high school students to promote the resources and energy industry as an exciting and diverse career option.

“This would start at the basic level with programs to engage younger students and instil excitement and pride within the industry, all the way through to sophisticated information for older students who are making decisions on which tertiary course to enrol in and where to begin their careers.”

(CONTINUED ON PAGE 26)

SolidStart
A CHANDLER MACLEOD GROUP INITIATIVE

Introducing Solid Start

In partnership with Aboriginal-owned and operated Registered Training Organisations, Chandler Macleod provides training, employment and upskilling opportunities for Aboriginal and Torres Strait Islander candidates to undergo a tailored traineeship.

The traineeships are tailored to our customers’ requirements but within the resources sector, typically include Certificate III Surface Extraction Operations or Certificate III Civil Construction Plant Operations.

Applicants to these programs are put through culturally-sensitive screening and assessment which identifies desired attitudes, values and potential.

Successful candidates are offered flexible engagement contracts, which include all the benefits of Full-Time employment, including a 4 week notice period and paid annual leave and personal leave entitlements.

In 2017, Chandler Macleod was recognized as atWork Australia’s Champion Employer and was a finalist in the National Employment Services Awards for Excellence.

To find out more about Solid Start , please contact Kyra Bonney, General Manager—Indigenous Strategy:



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GM - INDIGENOUS STRATEGY
07 3003 7727
0419 999 017
LEVEL 7, 120 EDWARD ST,
BRISBANE QLD 4000



Chandler Macleod are an employer with heart, who go above and beyond standard practice and are committed to making a difference to the lives of the most disadvantaged Australians via long-term, sustainable employment

Michael Kolomyjec,
GENERAL MANAGER atWork Australia



Kyra Bonney photographed with recent graduates of our Solid Start Program

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NATIONAL

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The company successfully supplies recruitment services to the mining, oil and gas, construction, manufacturing, Government and marine industries, both within Australia and globally.

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More information can be found at: www.applus.com.au.

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(CONTINUED FROM PAGE 23)



AMMA has previously delivered a Resource Kids Connect program in primary schools to promote careers in the sector, and said it was in the process of beginning a similar program that will be extended to high school and early university entrants.

Ms Cash said while there had been a decline in enrolments in tertiary level mining-specific courses, the Department of Education and Training recently reported that, in 2017, apprentices and trainees commencing in the mining industry increased to more than 5000; up from 3795

in 2016.

"The industry is also increasingly seeking solutions to its skills shortage concern," Ms Cash said.

"Rio Tinto is directly investing in initiatives with the WA Government and the South Metropolitan TAFE to develop courses in robotics and data automation, while Glencore is providing scholarships for Indigenous students to increase diversity in the mining-related workforce.

"TAFE Digital and Ribit, a digital student employment platform developed

and managed by CSIRO's Data61, are also currently collaborating to connect TAFE Digital students to innovative Australian STEM start-ups and companies.

"These companies are offering jobs and work experience in emerging technology areas such as big data and artificial intelligence."

Diversity

Mr Reid added the industry had come a long way, particularly in areas of diversity,

including Indigenous procurement.

"Indigenous opportunities, both through direct employment and through the awarding of contracts to Indigenous-owned businesses is an area where the resources and energy industry has had a long and proud history of success," Mr Reid said.

Ms Cash said the Government had a number of partnerships with Indigenous communities, and had its own privately-led initiatives to boost female and indigenous participation.

She added, about 3.8 per cent (or 6700) people employed on the mining industry identified as Indigenous; more than double the proportion of Indigenous in all industries (1.7 per cent).

"It is also important to highlight that many mining companies support Indigenous Australians by providing access to various educational programs, scholarships and training opportunities," Ms Cash said.

"For example, Rio Tinto's Indigenous Scholarship Program assists with tertiary studies, and the Fortescue Metals Group's Jawun Program places skilled workers in Indigenous organisations to support Indigenous leaders to gain know-how and expertise."

Ms Cash said older Australians, including those looking to get into the mining sector, would also be supported by the Government's 'More Choices for a Longer Life' package, with an investment of \$189.7 million on a range of jobs and skills measures.

"A \$19.3 million Skills and Training Incentive will also help mature age Australians enhance their skills and explore new career opportunities," she said.

"These initiatives are especially important for those whose job descriptions are changing and who may need to retrain."



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

Focused on being number one

WA

INDIGENOUS Managed Services (IMS) was founded by Garry Jaffrey and Terry Collier.

After discussions around Indigenous engagement and participation, Mr Jaffrey and Mr Collier feared that even though the culture of dealing with Indigenous business has developed, there was still a stigma or perception there wasn't "the same level of service" and that "you need to make allowances".

From that meeting, the concept of IMS was born around the premise that, not only could an Indigenous company compete on a level footing, it could also provide an all-round level of service equal

to, if not higher, than the competition.

Once the company structure was formed it was essential that IMS had a clear plan on what its service offering was going to be to utilise the key strengths of the core management team.

Recruitment and labour hire were the obvious focus point for IMS, with more than 50 years' experience within the team.

With exceptional feedback to date, IMS managing director Terry Collier said the team was "focused on becoming the number one Indigenous owned recruitment and labour hire company in Australia, and partner of choice with companies looking to increase their engagement and participation of Indigenous businesses and workers".



All images: Northparkes.

THE NEXT CHAPTER

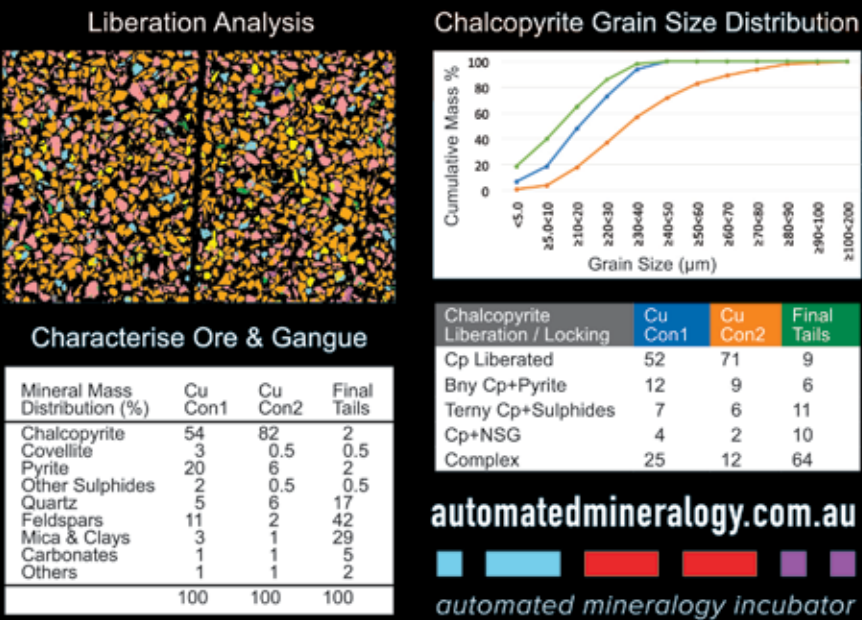
After achieving record breaking results at its mine and ore processing plant last year, Northparkes copper-gold mine expects to see similar results this year as it continues to work towards a “century of mining together”.

Northparkes achieved two production records in both the underground mine and ore processing plant last year.

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JESSICA CUMMINS

OPERATING for more than two decades, and with mine life now extended through to 2032, the Northparkes operation is well positioned to reach new heights in coming years.

Previously owned by Rio Tinto, the project sits on 6000 hectares with a 1630ha mining lease.

The joint venture between China Molybdenum and Sumitomo Group broke two production records in the underground mine (producing 6.46 million tonnes of ore) and the ore processing plant (processing 6.51 million tonnes of ore during 2017); a feat Northparkes managing director Jim Fowler said the company was proud of.

“We [also] gained government approval for the single flotation project and advanced our understanding of the expansion project and E26L1N, both of which are important to our future,” Mr Fowler said.

“These projects will assist with the longevity of Northparkes, while we work towards our vision of a ‘century of mining’ together.”

Mr Fowler said new technology employed had also increased the mines viability.

“Our driver-less loaders, controlled from the surface, load ore from the draw point and transport it to the underground primary crusher where it is crushed, conveyed and hoisted to the surface,” he said.

“This achievement has been five years in the making and takes people out from underground allowing them to control the loaders from an air-conditioned room on the surface.

“We’re also now seeing production records from our underground mine as one

operator can control three loaders at the same time.”

Project Updates

Mr Fowler said the company remained focused on working towards achieving zero harm operations by implementing improvements and new technologies.

Last year, Northparkes transported 134,114 tonnes of copper concentrate by rail and sea to customers overseas in Japan and China, which exceeded planned shipment volumes by 3 per cent.

Mr Fowler said the company also plans to construct a small open pit mine – E31N – near Rosedale.

“The benefit is the gold grade is quite high where we are building E31N. This will be executed in late 2018 or early 2019,” he said.

“Northparkes is having another great year from a production perspective and I remain optimistic that we will have another record breaking year in both the mine and the mill.”

Mr Fowler said E26L1N will also enable Northparkes to develop an additional underground mine area within the established E26 ore body while also providing for an appropriate operational flexibility as part of ongoing operations.

“The E26L1N Feasibility Study is nearing completion and we are working toward a final investment decision targeted for early 2019,” he said.

“Various upgrades and modifications have been proposed for Northparkes ore processing infrastructure, including the construction of an additional ball mill, relocation of supporting site infrastructure (power supply) and construction of a new secondary crushing building.

(CONTINUED ON PAGE 28)

At the forefront of mining services



Forefront Services general manager Anthony Redfern and director Michael Clout.

NSW

AUSTRALIAN engineering company Forefront Services has expanded operations, with newly established facilities in Parkes.

With workshops already in Sydney and Orange, Forefront recently committed further to regional development, opening the 3500sqm Parkes facility as demand for

mining services continued to increase.

"The Forefront Services workshop facilities are fully equipped with an extensive range of equipment suited to a wide range of engineering services," Forefront Services general manager Anthony Redfern said.

"The Parkes facility employs 20 local skilled professionals with plans to increase."

The facility is also estimated to secure

more than \$4 million in mining and construction income in its first year.

Forefront has established a strong relationship with Northparkes Mines, completing large-scale steel fabrication and installation, concrete and civil construction, and labour services.

"We've invested strongly in our people and, as a result, there is exceptional ability across the entire team," Mr Redfern said.

"Forefront is well situated to provide

innovative engineering solutions and personalised service to clients across Australia and overseas."

Specialising in mining services such as secondary-break operations, shutdown works, labour hire, underground and surface civil works and air-legging ground support, Forefront also provides services in steel and poly fabrication and installation, civil project management and construction.



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Northparkes mine.

“This will all be constructed within the current mining lease - we have completed an initial application and gained approval around the pathway forward from the Department of Planning and Environment,” he said.

“The additional secondary crusher will enable us to stockpile the optimal ore size to crush through the ball mills.

“We will need to offset 2.5 hectares as the land hasn’t been disturbed as of yet.”

The upgrades follow the commissioning of the Rosedale tailings storage facility in July 2016, which was engineered to safely contain tailings from operations.

The sturdy embankments surrounding Rosedale comprise 400,000 cubic metres of clay and a network of pumps and drains put in place to remove moisture, which is recycled into its ore processing plant.

It was estimated the facility would hold 5.6 million tonnes of tailings during stage one of the project.

Exploration

Surface drilling programs were undertaken on tenements EL5800, EL5801, EL5323, and ML1247, ML1367, ML1641 during 2017.

A total of 20,300m of surface drilling was completed during the period, comprising 65 holes of diamond core (14,122m), reverse circulation (RC) (5913m) and aircore drilling (265m).

Underground diamond core drilling was also completed in the E26 Lift 1N and the E26 SLC areas (ML1247), comprising 12 holes for 1388m.

A mix of regional drilling programs, near-mine exploration prospects and evaluation targets on the Northparkes mining leases were also undertaken.

The re-assay of historic aircore and RAB drill returns for a broad pathfinder element suite were also conducted; 10,720 residual samples were submitted for re-assay using



In 2017 Northparkes transported 134,114 tonnes of copper concentrate by rail and sea to customers.

the ALS 48 element suite (ME-MS61) plus fire assay gold (Au-AA21).

A Year of Change

While the mine performed strongly in 2017, it also experienced a number of complications with the underground equipment and surface infrastructure.

Mr Fowler said its dedicated workforce addressed the issues in a timely manner.

“I am very proud of our track record and ability to adapt to unforeseen challenges as a business,” he said.

“The hard work and dedication of our employees saw record production in the mine and mill again in 2017. “

According to Mr Fowler, 2017 was “a year of change” while the company focused on right sizing its business.

“We went through an organisational

restructure – the restructure or ‘right-sizing’ was aimed at making greater use of the assets and to carry Northparkes into the future.

“This involved a small reduction in our workforce numbers, where more than 50 per cent of the individuals affected were re-deployed to other parts of the business.

“These efforts have helped progress the vision of ‘A century of mining together’ and position Northparkes as a low-cost, long-term producer of copper and gold.”

This year Mr Fowler said Northparkes was focused on expanding its employee pipeline as well as ensuring its commitment to zero harm by caring for its people, equipment, environment and the community in which it works.

“We are having another strong production year and are on target to achieve full year copper ore production guidance,” he said.

Automated mineralogy: adding value



More information on the TESCANA TIMA can be found at: www.automatedmineralogy.com.au.

NATIONAL

NORTH PARKES Mines (NPM) is setting the benchmark for plant automation, with systems like the TESCANA TIMA automated mineralogy solution key to its success.

The TESCANA TIMA has helped the company integrate on-site departments and has directly contributed to greater

recoveries and plant efficiencies.

NPM ore processing technical superintendent Dylan Morgan said “since its installation in 2015, the Northparkes onsite mineralogy program, driven by data from the TESCANA TIMA, has advanced both its analytical ability and driven many critical business processes”.

“We use the data to understand the performance of future orebodies, predict the performance of changes to the plant

configuration and troubleshoot changes in plant performance,” he said.

“It has added huge value to our day to day operations and to our future Life of Mine.

“It is now an essential part of the technical teams’ tool kit.”

The TESCANA TIMA is the most advanced automated mineralogical analyser available boasting the fastest data acquisition speeds.

Its robust design is mine site capable for production environments.

Automated mineralogy is a sophisticated analytical technique that provides a detailed understanding of whole rock, plant products and tailings.

Critical knowledge of the ore body enables plant operators to optimise and improve their operations and consequently deliver improved and optimised flowsheets.

The Carrapateena mine will enter production in 2019.
Image: OZ Minerals.

BRIDGING THE GAP

The South Australian resources sector has had a strong year. But dwindling exploration points to a far greater issue for the State, as it looks to ramp up production and continue the search for the next Olympic Dam-style deposit.

ELIZABETH FABRI

MORE exploration is needed in South Australia: that is the message Association of Mining and Exploration Companies (AMEC) chief executive Warren Pearce had for delegates at the recent South Australia Resources and Energy Investment conference (SAREIC) in Adelaide.

“Greenfields mineral exploration, the heartbeat of mining, is flat lining in South Australia,” Mr Pearce said.

“Nationally mineral exploration has been rebounding since 2016, but the numbers out of the Australian Bureau of Statistics paint a concerning picture for the state of South Australian mineral exploration.

“The numbers have essentially been flat since March 2013.”

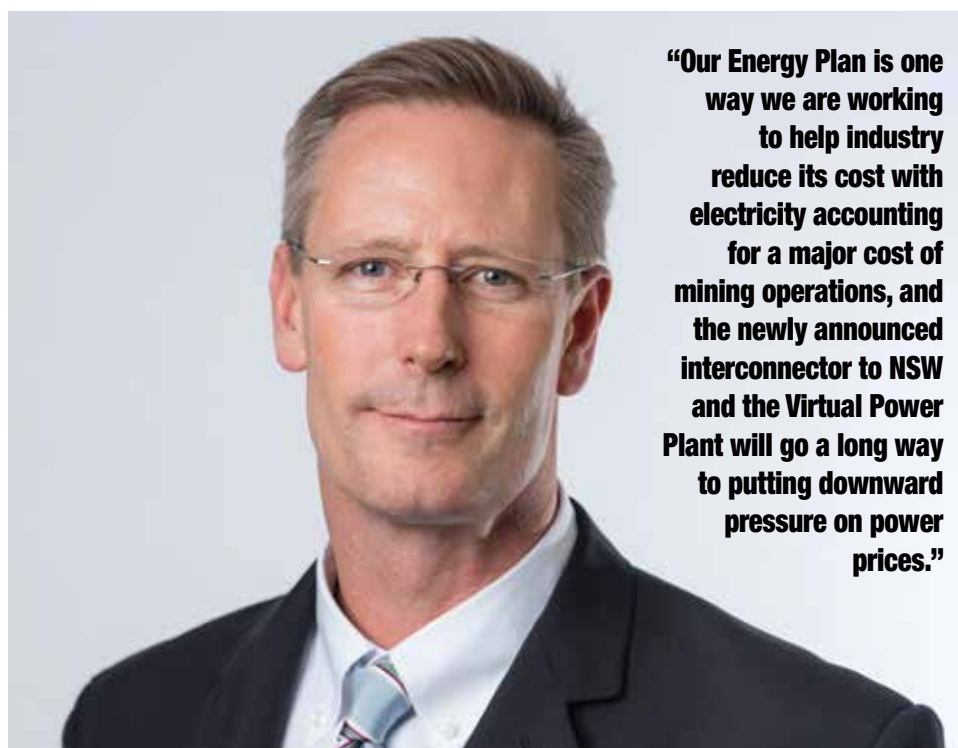
The copper-rich State, home to BHP’s mammoth Olympic Dam project and OZ Minerals’ Prominent Hill project, will next year welcome OZ’ Carrapateena mine to its ranks.

Carrapateena will add a potential 65,000t of copper per annum to State copper production, which totalled 261,684 tonnes in 2017.

But there was still a long way to go if South Australia was to reach the former State Government’s 2030 1mtpa copper target.

Newly appointed South Australian Mining minister Dan van Holst Pellekaan said the opportunities for developing copper projects in the State remained abundant.

“While exploration activity has declined in recent years, we are confident that exploration expenditure will recover in response to rising commodity prices and an expected pick up in copper demand in the next couple of years,” Mr van Holst Pellekaan told *The Australian Mining Review*.



South Australian Mining minister Dan van Holst Pellekaan.

“Our Energy Plan is one way we are working to help industry reduce its cost with electricity accounting for a major cost of mining operations, and the newly announced interconnector to NSW and the Virtual Power Plant will go a long way to putting downward pressure on power prices.”

“AMEC’s analysis partly reflects the wider downturn in the commodity prices that is now being reversed.

“South Australia is well positioned with a huge pipeline of precompetitive data and renewed interest across more than 400 mineral tenements to leverage the nascent recovery in commodity prices.

“Our expectation is that once this data being released by the Geological Survey of South Australia and CSIRO is carefully scrutinised for new targets, you will see an upsurge in exploration investment not just in existing prospects but in new greenfield targets.”

Currently, South Australia has a sizable gap between the largest (Olympic Dam) and second largest copper deposit (Carrapateena), and time will tell if another Olympic Dam-style deposit will

be discovered.

Mr van Holst Pellekaan said it was “absolutely” possible the State could host another deposit of this size and grade.

“We have the right type and age of rocks to host large mineralisation, and while there is a large gap between Olympic Dam and our next biggest deposit, international experience suggests that these gaps in our copper inventory are waiting to be discovered,” he said.

“The early results of the Gawler Craton Airborne Survey and the Auslamp Magnetotelluric survey are showing some areas of potential for explorers to search for these world-class deposits.

“The Department for Energy and Mining is working with industry and researchers to develop some copper prospectivity

models using the range of data collected in this highly prospective region.”

However, industry has urged Government to commit to increased funds under the Plan for Accelerating Exploration (PACE), which had been cut to about \$1 million per annum from 2018 through to 2021.

Total mineral exploration expenditure in the State was now sitting at about \$49 million, compared to a peak of \$328 million in 2011-12.

“It is important that the State Government reinvest in the highly successful Plan for Accelerating Exploration (PACE) program to attract greater investment in greenfields mineral exploration,” AMEC’s Mr Pearce said.

“Each new drill hole could lead to a future mine; and each new mine brings more jobs, royalties and revenues for local communities in regional South Australia.”

OZ Minerals’ \$916 million Carrapateena project was one example of the 182 successful projects discovered through PACE since 2004.

Minister van Holst Pellekaan said the State Government was steadily releasing data from the Gawler Craton Airborne Survey, which covered rich copper-bearing mineral systems including the IOCG deposits of Olympic Dam, Prominent Hill and Carrapateena.

At the recent SAREIC conference, Mr van Holst Pellekaan announced the first data release of rock depth from the survey, which will be one of 16 packages published in the next 12 months.

Mr van Holst Pellekaan said the Geological Survey of South Australia (GSSA) had worked closely with survey contractors during the process to ensure the highest possible levels of quality and integrity from the raw survey data.

(CONTINUED ON PAGE 31)

Turning solutions into client success

NATIONAL

AS a privately-owned mining and civil contracting company, Lucas Total Contract Solutions (TCS) has been in operation for more than 45 years delivering projects for some of Australia's leading resources, industrial, and Government organisations.

One of the projects delivered is SIMEC Mining's (formerly Arrium) iron ore mining operations at Iron Baron, South Australia.

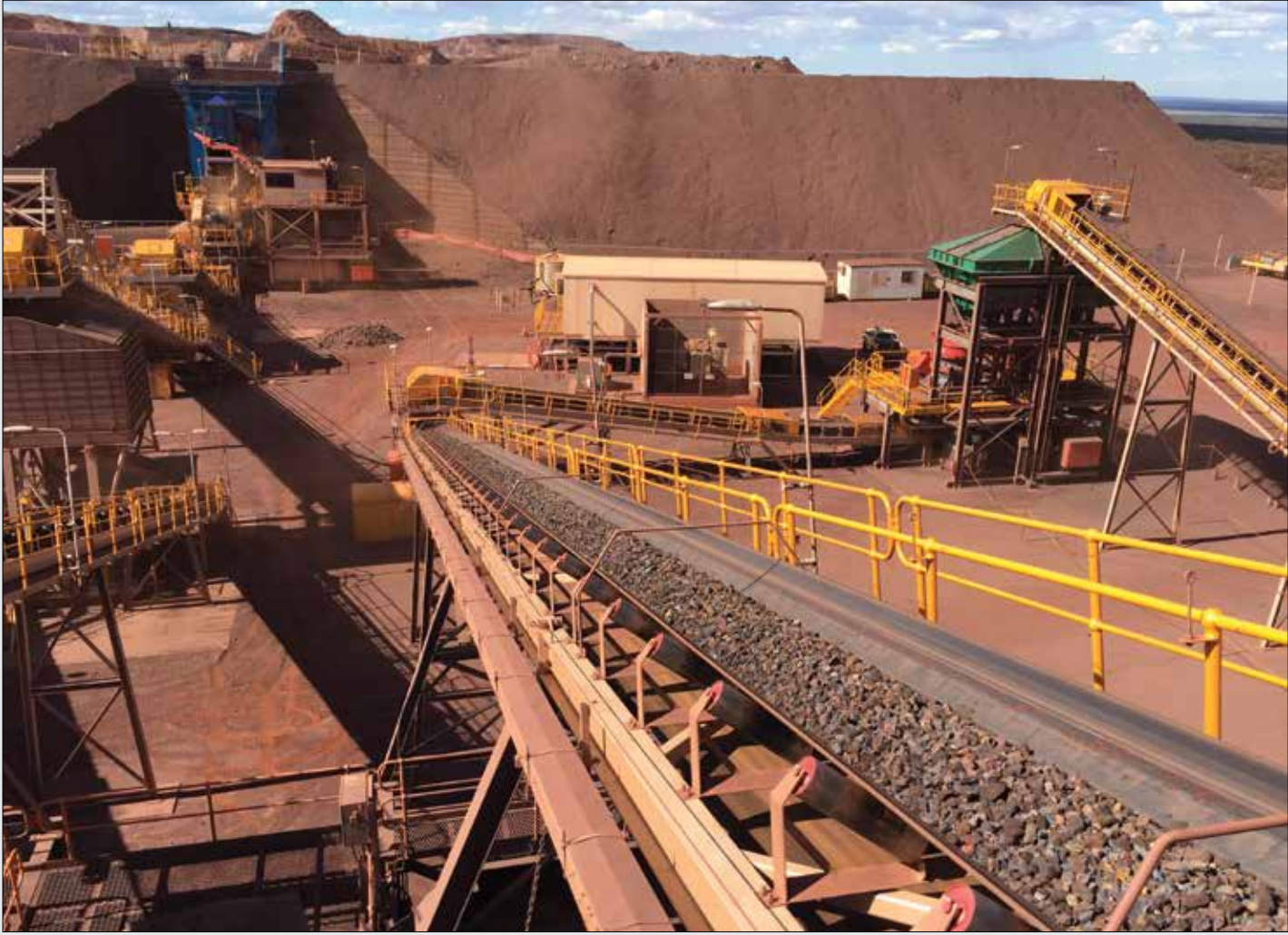
For this project, Lucas TCS was entirely responsible for transforming the brownfield site at Iron Baron into a first-class mining facility by re-establishing facilities, reopening pits and constructing haul roads, ROM pads, TSFs and train load out facilities.

As well as undertaking the ongoing mining and rehandle activities at Iron Baron, Lucas TCS built, owned and operated two purpose built crushing plants valued at \$35 million, which lifted production at Iron Baron from the initial 3.2 million tonnes per annum (mtpa) to a capacity of 6mtpa.

The Lucas TCS operations at Iron Baron contributed about \$34 million per annum towards South Australian employment, materials and supplies.

After forging a strong relationship with the company, Lucas TCS now looks forward to future projects with SIMEC and GFG Alliance as they transform and upgrade their operations.

Lucas TCS currently has a strong



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

pipeline of mining and construction projects, including the recent award of a major Australian wind farm project; a

bulk commodity storage facility on the Eyre Peninsula; crushing operations at a major South Australian mine; further

additions to The Bend Motorsport Park in Tailem Bend; and new work at McArthur River mine in the Northern Territory.



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For more information contact Lucas TCS on (08) 8179 4000

(CONTINUED FROM PAGE 29)

“With several major mining projects underway and the emergence of potential new developments, there will be a lot of opportunities for South Australians in this sector for many years to come.”



Image: OZ Minerals.

Prominent Hill mine.

“Undertaken over two years, this high-resolution data is being collected meticulously with low-flying planes and helicopters that will cover more than 1.8 million line kilometres of data across 320,000sqkm once completed,” he said.

“It doesn’t end there. We have partnered with CSIRO to use smart processing and heavy duty mathematics and modelling that has delivered reliable depths of target.

“You cannot underestimate the value to industry of this level of data and how it will save them time and money in developing exploration programs and better identify targets.

“Through this kind of ground-breaking value-added analysis, South Australia is ensuring that we are ahead of the game in attracting interest in our highly prospective geology.”

Mr van Holst Pellekaan said the Government was also releasing Coompana GeoScience through a New Frontier program in a previously underexplored region of the State, as well as the results of extensive AusLamp Magnetotelluric work carried out in collaboration with GeoScience Australia.

“In addition we are supporting innovation in exploration through the MinEx CRC and we look forward to the Commonwealth Government progressing the national Road Map for Exploration Under Cover, known as the UNCOVER initiative,” he said.

Attracting Investment

The next hurdle for South Australia was attracting investment into the region.

It hit the jackpot last year with global company GFG Alliance buying out Arrium’s struggling South Australian mining business.

Through the Arrium takeover, GFG Alliance inherited its 1.2mtpa Whyalla steelworks and 10mtpa iron ore mining operations in South Australia’s Middleback Ranges; Whyalla port and rail; the OneSteel



Image: BHP.

Olympic Dam is the largest copper mine in South Australia.

steel Scrap Recycling business; 4mtpa OneSteel secondary steelworks; Australian Tube Mills; and OneSteel Reinforcing, ARC and OneSteel metal centres.

GFG’s South Australian mines, to be operated under its SIMEC mining business, comprised the Iron Baron, Iron Knob and South Middleback Ranges mine sites, which collectively produce hematite and magnetite iron ore.

Earlier this year, the State Government also approved two new mining leases for SIMEC’s Iron Sultan and Iron Warrior mines in the Middleback Ranges.

Then, in June, SIMEC announced it had agreed to complete due diligence at Havilah Resources’ Maldorky and Grants iron ore projects, while advancing its various State-based renewable energy investments.

Minister van Holst Pellekaan said GFG’s purchase of the Whyalla steelworks and associated mining business has “been a great boon for the State, the confidence of the industry and for the people of Whyalla”.

needs,” he said.

“We are also exploring new opportunities for South Australia through the delivery of the Hydrogen Road Map and the developing a Battery Value Chain program.”

Outlook

All in all, Mr van Holst Pellekaan said his outlook was “optimistic” for the near and long-term.

“With several major mining projects underway and the emergence of potential new developments, there will be a lot of opportunities for South Australians in this sector for many years to come,” he said.

BHP was planning to develop the Southern Mine Area and increase production through a brownfields expansion; OZ Minerals has extended the life of Prominent Hill and will soon bring Carrapateena online; and GFG Alliance continues to seek out new opportunities in the Middleback Ranges, Eyre Peninsula and Braemar Province.

Iluka Resources has also resumed mining at Jacinth – Ambrosia; Boss Resources has initiated a three-stage strategy to resume production at Honeymoon uranium mine; and Hillgrove Resources remains positive about extending the life of the Kanmantoo operations.

Mr van Holst Pellekaan said there was also promising graphite projects from Archer Exploration and Renascor Resources on the Eyre Peninsula; copper-cobalt opportunities by Havilah Resources in the east of the State; and some gold proposals from Tyranna Resources and Marmota Energy continuing to progress through the development pipeline.

“Furthermore, the government continues to facilitate the development of the Mining Engineering and Technical Service (METS) sector that is a huge jobs generator and has the potential to emerge as an exporter of these services to an expanding global mining industry,” he said.

“Having heard GFG Alliance chief executive Sanjeev Gupta speak on a number of occasions, it is clear that South Australia will play a significant role in his vision for his business,” Mr van Holst Pellekaan said.

“To attract investment of this type, the Government has a plan to make South Australia exploration and mining industry competitive on the world scale.

“Our Energy Plan is one way we are working to help industry reduce its cost with electricity accounting for a major cost of mining operations, and the newly announced interconnector to NSW and the Virtual Power Plant will go a long way to putting downward pressure on power prices.”

The minister said the Government had also introduced amendments to the Mining Act to ensure it regulated the industry “in a contemporary way”.

“We also continue to provide world-class pre-competitive data such as the Gawler Craton Airborne survey and the Coompana Mineral Systems drilling program, while partnering with industry to understand its

Weathering the storm

NATIONAL

WHEN Arrium entered voluntary administration in 2016, Aquest Electrical had no idea what 2017 would hold for the company.

“It turned out to be a very adventurous year,” Aquest director Darren Hage said.

“We made the decision to knuckle down, adapt and survive.”

2017 began with a major fire on the Whyalla FOTB Barge, with Aquest working long hours, and enduring extreme temperatures to get the Barge back into operation for Arrium exports to get back on track.

Aquest then supervised Australian, Singaporean and Malaysian crews installing waterslides and Wi-Fi networks on the Pacific Dawn cruise ship located in Singapore Dry Dock.

“We also played the main role in the installation of the IPF for the Arrium/SIMEC mines,” Mr Hage said.

This was followed by the installation of an additional iron ore washing plant EVOwash at the OBP Baron for Mineral Technologies/ Downer Group, all while carrying out major electrical and air-conditioning upgrades to the pump stations Katunga and PS3 for critical supply water management required to operate SIMEC Mining Operations.

Furthermore, Aquest completed a major electrical upgrade of #1 RAM at Liberty



OneSteel's rolling mill converter install.

Onesteel iron making.

On the Santos Port Bonython Jetty, Aquest completed the Capstan winch replacement in hazardous area and upgraded the cathodic protection to the entire jetty structure for the Department of Planning, Transport and Infrastructure.

“We completed all this and much

more, while looking after our long term customers Lucas TCS, BIS, Olssons, Liberty Onesteel and SIMEC; not forgetting BMFS - Department of Planning Transport and Infrastructure,” Mr Hage said.

Mr Hage added, the Aquest management were extremely proud of their employees who put in massive efforts for the customer.

“Most importantly, we completed these important and often high risk tasks without incident or injury,” he said.

“The future looks bright for those willing to have a go and Aquest looks forward to providing ongoing support for the industry in 2018 and beyond.”

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With a large, economic resource remaining and on land already used for mining, LCK hopes to bring sustainability and prosperity to the town of Leigh Creek and surrounding region



Leigh Creek Energy Limited (ASX: LCK) is an emerging South Australian energy company on the cusp of commencing a large 30+ year project that will boost economic and community development of the struggling outback town of Leigh Creek and surrounding regions.

The town of Leigh Creek plays a vital role in the socio-economic fabric of South Australia's far north, but the closure of the Leigh Creek Coalfield in 2015 has since condemned the town to steep population decline and business closures.

Front and centre to the town's hopes of survival is Leigh Creek Energy's (LCK) in situ gasification project at the former coalfield, which is expected to yield its first gas extraction during the third quarter of 2018.

Part of the project's distinctive attraction is its huge resource, which at just under 3000PJ makes up almost 8 per cent of East Australia's 2C syngas resource.

A wide range of options for commercial opportunities include the supply of quality methane into the east coast pipeline, new electricity generation, and ammonia products.

But while an ultimate commercial direction is yet to be determined, an LCK-commissioned Independent Economic Impact Assessment of a scaled up commercial facility (500 MW, fuelled by syngas) estimates over 2500 jobs will be created during the construction

phase in SA, 380 long term jobs during operations and hundreds of millions of dollars injected into the SA economy. Bolstering confidence in the project's success is the unique combination between innovative and environmentally-compliant technology, and accessing the ideal site.

An expert independent review incorporated into the state government's environmental approval for PCD operations earlier in 2018 concluded, "the Leigh Creek site represents one of the strongest opportunities for low risk commercial UCG anywhere in the world". LCK Managing Director, Phil Staveley says the positive expert analysis bolsters the project's credibility, but LCK must still prove to the regulator, stakeholders and the market it can demonstrate it can produce commercial quantities of gas safely with minimal impact to the environment.

"Our current focus is on building, operating and decommissioning a small scale Pre-Commercial Demonstration to show we can produce commercial quantities and qualities of syngas and operate safely with minimal impact to the environment," Mr Staveley said.

"Data from the PCD will then assist in the design of a larger commercial facility.

"Subject to receiving regulatory approval, we plan to begin operation of the PCD during quarter 3 2018."



The site at Leigh Creek is one of the best in the world for an ISG operation and has been graded against key criteria outlined by the Lawrence Livermore National Laboratories (LLNL) in the US. Baseline testing (geology and groundwater) by LCK has confirmed this.



Points of difference to other ISG projects include the remote location and lack of land use conflict, a deep (between 500m and 700m) and thick seam (10-20m) coal resource, suitable geology (thick mudstone overburden with no faulting extending to surface) and hydrogeology (no aquifers or users of site adjacent groundwater).

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RAISING AWARENESS

Mental health issues have plagued the fly-in, fly-out workforce for many years. But with an emerging number of programs and resources available, mining companies have many avenues to facilitate those very important conversations with employees.



Dr Jennifer Bowers (left) led the Wellbeing and Lifestyle Study.

JESSICA CUMMINS

DR Jennifer Bowers, associate professor and managing director of Rural and Remote Mental Health (RRMH) in South Australia, has spent more than 10 years researching the prevalence of psychological distress in remote mining and construction workers.

Published in the Australian Medical Journal, Dr Bowers led the *Wellbeing and Lifestyle* survey, which sampled about 1124 employees at 10 construction, open cut and underground mine sites across remote South Australia and WA.

The study reinforced the most significant factors causing mental distress in FIFO workers.

“We know that relationships with partners and missing social events are significant factors, we know that social isolation is highly significant, [and] we know that their rostering and length of time that they work on site are all statistically significant,” Dr Bowers said.

“But one of the major findings was that 28 per cent of this cohort had a greater level of psychological distress compared to the general Australian population, which is 11 per cent.”

Dr Bowers said this statistic alone highlighted the importance of early intervention mental health and suicide prevention programs.

“In the past, mental health care at mine sites varied or were non-existent.

“It really is in more recent times – because of a number of Government enquiries, with very unfortunate and well publicised issues around suicide – that companies are now acutely aware of the issues and some are making great effort to remedy them,” she said.

“It is a very difficult starting point when companies call up saying they have dealt with a suicide.

“We would much prefer go on site with a prevention program leading to an early intervention if possible.”

(CONTINUED OVER)

Palelei leads Macmahon mental health program

NATIONAL

MORE than 1500 fly-in, fly-out employees working in some of Australia's most remote mines are benefiting from a new mental health program run by mining company Macmahon.

Launched in March, the *Strong Minds, Strong Mines* program was developed in conjunction with Rural & Remote Mental Health, specialists in the mental health space.

The program delivers monthly toolbox talks designed specifically to tackle the growing and often complex mental health challenges facing remote mining workers.

The program covers a range of issues including the stigma of mental health, anxiety, depression, suicide prevention, relationships and financial stress.

Macmahon has also engaged retired mixed martial artist, Soa "The Hulk" Palelei as an ambassador for the program.

Mr Palelei is well known for his UFC career and is a passionate advocate for mental health.

His personal story makes him a very credible speaker on depression, bullying, resilience and overcoming adversity.

Mr Palelei understands the pressures of working away from home, being one of the first Australians to compete in the Ultimate Fighting Championships in the US.

This experience enabled him to build a real connection with Macmahon's workforce very quickly.

As part of the *Strong Minds, Strong Mines* program, Mr Palelei visits Macmahon sites on a regular basis to talk about issues that affect mental wellbeing.

Macmahon employees also have the opportunity to have one-on-one and



Soa "The Hulk" Palelei is an ambassador for Macmahon's mental health program.

group personal training sessions with him during his visits, and in the near future Macmahon will offer this benefit to partners of employees using the gym at the company's head office in Perth.

Mr Palelei said he was very pleased to be working with a company taking a proactive approach to support the mental and physical health of its people.

"Just giving people the opportunity to talk with someone about depression and anxiety can be incredibly valuable in a FIFO setting, and the gym facilities at many of Macmahon's sites are set up to facilitate this," Mr Palelei said.

"Exercise itself can also be an effective treatment for some mental health issues."

Mr Palelei's presence has already had a positive impact on sites receiving standing ovations at toolbox talks.

"I've had guys come up and personally thank me for sharing my story and saying that they've now got the courage to talk about their mental health without fear of being labelled," he said.

(CONTINUED FROM PAGE 35)

Prevention Programs

The research conducted by Dr Bowers and her team has formed the foundation of 'Resource Minds', an evidence-based approach to mental health prevention.

The program, which runs for about a year, includes mental health training workshops for supervisors, and a package of 13 tool box talks complete with videos, a presenter's guide, a passport to mental health booklet, and various other promotional material.

"Each toolbox talk is designed to address the different risk factors identified in the Wellbeing and Lifestyle survey and aims to reduce stress once at site," Dr Bowers said.

"Those of highest risk are aged between 24 and 35 and they're the ones who are likely to have young families at home and experience financial stress.

"If internet access is not reliable on site it's very hard to pay bills and communicate – all of that needs planning and organisation.

"So we talk to them and teach them strategies to manage their life."

Dr Bowers said the talks may range from topics such as relationships, financial stress, the stigma associated with mental illness, and signs of suicide.

"A good prevention program actually addresses all of the issues involved – it's important to understand what the risk factors are so that people can understand how to manage their life better," she said.

"The critical issue is that mental safety is as important, if not more important than physical safety – if FIFO workers can't concentrate or make decisions properly, it becomes a safety issue."

Advancements Made

Dr Bowers believes awareness of mental health issues in mining had improved over

the last decade.

"There is a lot more awareness now from when I started researching 10 or 11 years ago," she said.

"People are much more aware of the issue, and companies are starting to put something in place – even if it is not as comprehensive as we would like."

When Dr Bowers first started researching within this area she said research at the time was mainly qualitative with small sampling sizes and biases.

"Clearly there was a lot of knowledge about indigenous communities but at the time I started researching there was virtually no information about those working in rural and remote areas in the mining industry," she said.

"And it was very hard to access mine sites to get that information."

Companies such as Macmahon have partnered with RRMH to implement Resource Minds under its brand *Strong Mines Strong Minds* across its operations

in Australia.

Byrnecut has also sponsored the RRMH vehicle in the R U OK? Conversation convoy, enabling RRMH to spread the mental health awareness message Australia-wide.

"We want to change the attitudes of the employers as much as the employees, and we want employers to have commitment – it needs to come from the top down to reduce the stigma, change attitudes and improve help seeking behaviour," Dr Bowers said.

"From our evaluation they tell us they want more information, they are receptive, appreciate the information and talk more to their families and mates.

"The critical issue is that mental safety is as important if not more important than physical safety – if FIFO workers can't concentrate or make decisions properly, it becomes a safety issue.

"We are generating that important conversation and they are more confident about speaking about the issue."



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GROWTH PROJECTS

Representing the world's largest bulk export ports, Port Hedland and Port of Dampier, Pilbara Ports Authority continues to lead with a pipeline of projects nearing completion.



All images: Pilbara Ports Authority (PPA).

JESSICA CUMMINS

THE Pilbara Ports Authority (PPA) ended last financial year with a record breaking annual throughput of 699.3 million tonnes.

Iron ore exports for the year totalled 508.9 million tonnes; up 14.3 million or 3 per cent from the year before.

Iron ore exports in June were 47.2 million tonnes, showing growth of 4.2 million tonnes or 10 per cent from the previous year.

The PPA currently accounts for about 50 per cent of the world's seaborne iron ore exports, 75 per cent of Australia's iron ore exports, and 9 per cent of global LNG exports.

Once Port Walcott joins its ranks, pending legislation, up to 90 per cent of Australia's iron ore exports would pass through the PPA.

The PPA, which holds the Port of Port Hedland, Dampier and Ashburton within its portfolio, could also add the proposed ports of Anketell, Cape Preston East and the Port of Balla Balla to the Ports Authority Act, pending legislation.

PPA chief executive Roger Johnston said for the rest of the year, the PPA would focus on lithium exports and ensuring its construction projects remained on track for completion.

Growth Projects

In July, the PPA was nominated by the International Harbour Masters as manager of the world's most efficient and safest ports.

Mr Johnston said over the last six years it had worked on implementing world-first innovations and technology.

"We started on a journey back in 2012

"The development will comprise new general cargo wharves, laydown areas and a logistics hub area to ease shipping congestion associated with growth of non-iron ore trade at Port Hedland."



The Pilbara Ports Authority remains on track to complete all construction projects this year.

when we weren't happy with the old spread sheet type models, which modelled the Port of Port Hedland to deliver 495 million tonnes," Mr Johnston said.

"We modelled the port based on our Dynamic Port Capacity Model and saw the capacity at 577 million tonnes...and proof to concept we delivered 520mt last year.

"Each year we have tested our theories and have slowly become better at pushing more product out."

The Dynamic Port Capacity Model feeds off live information and measures the time it takes for a ship to load, the load amount, and the number of ships capable of going on a tide.

"Our model isn't a spread sheet of algorithms – it picks up live data.

"We've been running it since 2015 and have become better and better at managing the channel because of it."

Other innovations included the Dynamic Under Keel Clearance system, which measured tides, wave action and wind action.

"The information is fed into computer systems given a ship's design, calculates how close to the sea bed we can sail the ship, and how much iron ore can be loaded," he said.

"Over the years we have been able to get ships that previously loaded 254t – like the Abigail N- [and] to load 264t; [about] 10,000t of additional iron ore going on a ship."

Integrated Marine Operations Centre

PPA was also constructing a new Integrated Marine Operations Centre (IMOC) at the Port of Port Hedland to assist with the movement of the increasing number of vehicles through the harbour.

The \$70.8 million project will replace the existing Shipping Control Tower, and house best practice vessel traffic service systems.

These included improved control capability, enhanced channel risk mitigation, dredging management, port security, and marine pilot briefing facilities.

The centre was only a few months away from completion, and would provide a facility for all marine operations including dredge managers, traffic officers and harbour masters to sit in one place.

Mr Johnston said the centre would be furnished in October with desks, chairs and carpeting.

"The project is on time and under budget and we will soon be re-training our traffic officers to learn about the new technologies and hopefully have it in operation by the end of the calendar year," he said.

Channel Risk Optimisation Project (CROP)

PPA's \$100 million CROP project includes improving the trade capacity through targeted dredging, enhancing the existing deep water refuge zone and delivering an emergency passing lane alongside the shipping channel.

Following the completion of the first phase of dredging works, stage two was set to begin later this month, with the final stage underway from mid-September to early December.

Lumsden Point

Development was also set to take place at one or potentially two berths at Lumsden Point, with the first stage scheduled to be completed in early 2019.



Aerial view of the Port of Port Hedland.

The multi user facility has been planned to meet the future growth of non-iron ore industries in the Pilbara, such as agriculture, general cargo and lithium exports.

“The development will comprise new general cargo wharves, laydown areas and a logistics hub area to ease shipping congestion associated with growth of non-iron ore trade at Port Hedland,” Mr Johnston said.

In May, land remediation works and stage 1 dredging works took place and the PPA was now evaluating response to the expressions of interest for general cargo facilities development.

Increasing Lithium Exports

The first trial of Spodumene Direct Shipping Ore (DSO) was shipped through Port Hedland’s Utah Facility at the end of 2016.

Mr Johnston said the shipment was “a huge leap forward” for the port.

“We met all demands as the market lifted from near zero to 3 million tonnes

in a year, which is a big lift,” he said.

“Some may have reservations, because people are doing 520 tonnes, but if I said that Geraldton shipped 3 million tonnes they would be dancing in the streets.

“It’s a big volume. It gets lost as a number against the huge numbers we do but it is a very good kick off for a new trade.”

In March, lithium concentrate was included as an approved product for export from the Port Hedland Eastside berths, and now Mr Johnston said the PPA was planning to accommodate an anticipated ramp up of the product.

Advancing Ashburton

Chevron’s Wheatstone project, which ships liquefied natural gas out of the Port of Ashburton, was forecast to achieve throughput of 6.7 million tonnes of LNG shipment during 2018 and 2019.

Mr Johnston said there would be further opportunities to increase import and export capacities once PPA accepted the transfer of the Port of Ashburton

facilities later this year.

The PPA for now would continue its marine operations to provide overwatch of port activities and vessel traffic services.

“Final handover will be later this year when second gas comes on, which is only months away,” he said.

Outlook

Mr Johnston said PPA’s focus for the rest of the year would be to complete its growth projects.

“There are some I have not mentioned like the replacement of the deck on berth 3, which will cost about \$30 million,” he said

“Apart from that, our second focus for the year is to keep an eye on the lithium concentrate exports ensuring they start up successfully.

“Thirdly, we are halfway through mustering season and I want to make sure we can facilitate live exports successfully for the second year in a row.”



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

Innovative marine solutions

WA

FREMANTLE-based maritime specialist TAMS Group continues to extend its reach across WA’s regional port services sector, expanding its diverse operations in a growth strategy that includes establishing local port services representation and capability at Onslow, Dampier, Port Hedland and Broome.

TAMS has a long term experience delivering a broad range of port services activities within larger marine project workscopes at Pilbara locations including Port Hedland, Dampier, Barrow Island, Onslow and Cape Preston.

Its customers have frequently identified TAMS for delivery of safe marine operations, development of innovative solutions and continuous improvement in challenging operating environments.

This extensive track record delivering services to resource industry ports and terminals now provides an ideal foundation for the roll-out of TAMS regional port services network.

In an increasingly competitive marketplace, TAMS understands the importance of being able to repeatedly exceed its client’s expectations and constantly strives to build on its reputation for operational excellence.

TAMS recognised the importance of combining landside and port services capability near its key clients to further enhance customer value and to always be ready to respond quickly and efficiently to changes in their requirements.

Regional personnel have extensive local knowledge and port services industry experience, supported by with the extensive TAMS capability enabling delivery of a range of tailored solutions across a diverse port services customer group.

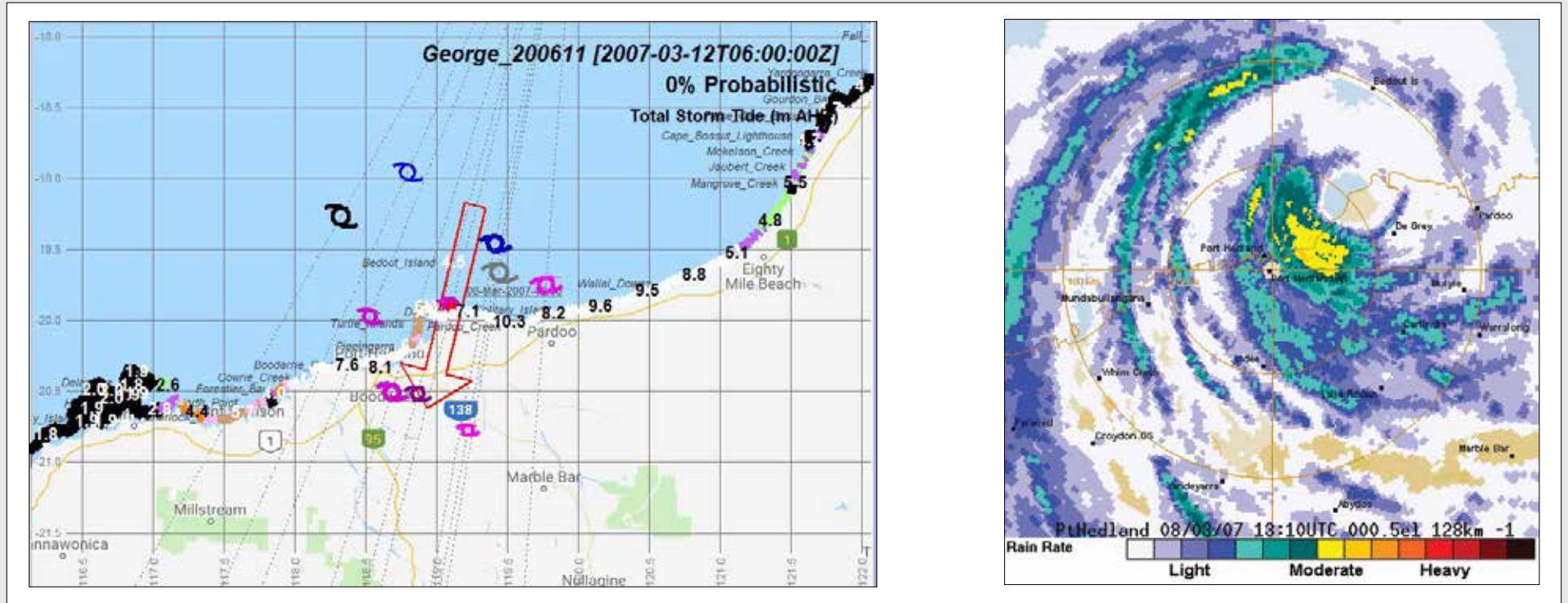
Founded in 1999 as a specialist mooring and marine maintenance contractor, TAMS capability has grown to include marine and port services, marine manning, specialised ropes and hawsers, diving services, backhoe dredging and port and marine construction projects.

TAMS Group is WA owned and headquartered in Fremantle.



Current and future ports.

Intelligent cyclone risk management



Bureau of Meteorology radar image of Severe Category 5 Tropical Cyclone George approaching the Pilbara coast in March 2007 (right) and SEAtide's ability to rapidly model uncertainty in track, size and intensity as well as the tidal variation, to provide statistical guidance on the peak storm tide impacts (left).

NATIONAL

SYSTEMS Engineering Australia (SEA) recently launched its Engineers Australia award-winning, innovative SEAtide storm tide and wind risk modelling software across Australia.

SEA principal Dr Bruce Harper, who worked as chief ocean engineer at Woodside in the late 1980s, established

SEA in 1996 to provide quantitative natural hazards risk assessment services to the insurance industry.

From there, Dr Harper became a leading international figure in tropical cyclone impacts, research and climate change adaptation planning.

SEAtide is a prediction and analysis system that enables operations and emergency managers to rapidly evaluate the possible impact of storm tide threats

to coastal facilities and communities.

The system has been in operational use by the Bureau of Meteorology in the Northern Territory since 2005, in QLD since 2014, and is now available Australia-wide for industry and local Government applications.

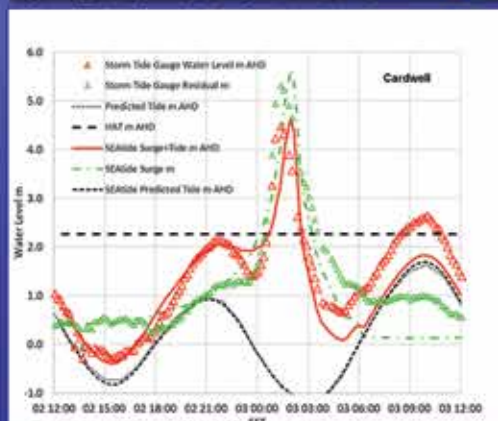
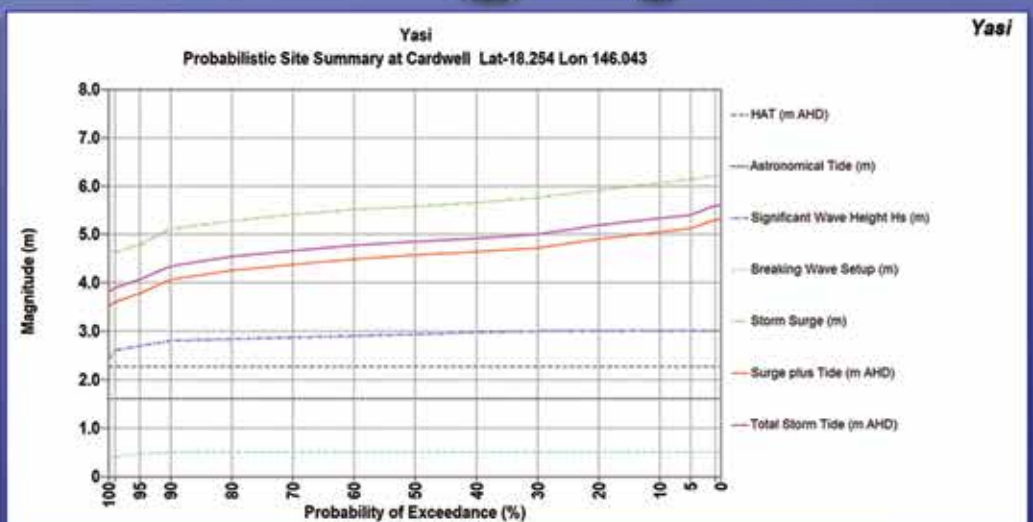
With SEAtide, decision makers can rapidly explore potential impacts during emerging cyclone events, adopt specific strategies around tolerable risk

avoidance, examine historically-possible impacts at their leisure, provide critical staff training and inform strategic emergency planning.

The system is especially effective in regions with a high tidal range, such as the WA Pilbara.

In addition, SEA offers a wide range of specialised natural hazards risk services.

SEAtide Probabilistic Storm Tide Modelling System



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Western Australian maritime industry leader TAMS Group is pleased to announce a new Port & Marine Services solution at the Port of Dampier Western Australia, and commencing August 2018 TAMS will operate from facilities at the TOLL Dampier Supply Base (TDSB).]

TAMS will satisfy the needs of Dampier port users with safety focussed locally managed port and marine services, or utilise the wider capability of TAMS for specialist services or projects.

TAMS is committed to delivering improved Port & Marine Services options at Dampier and we will work closely with our customers and stakeholders to deliver safe and efficient marine operations, and seek opportunities to create local employment and community/stakeholder engagement.

TAMS services and capability include:

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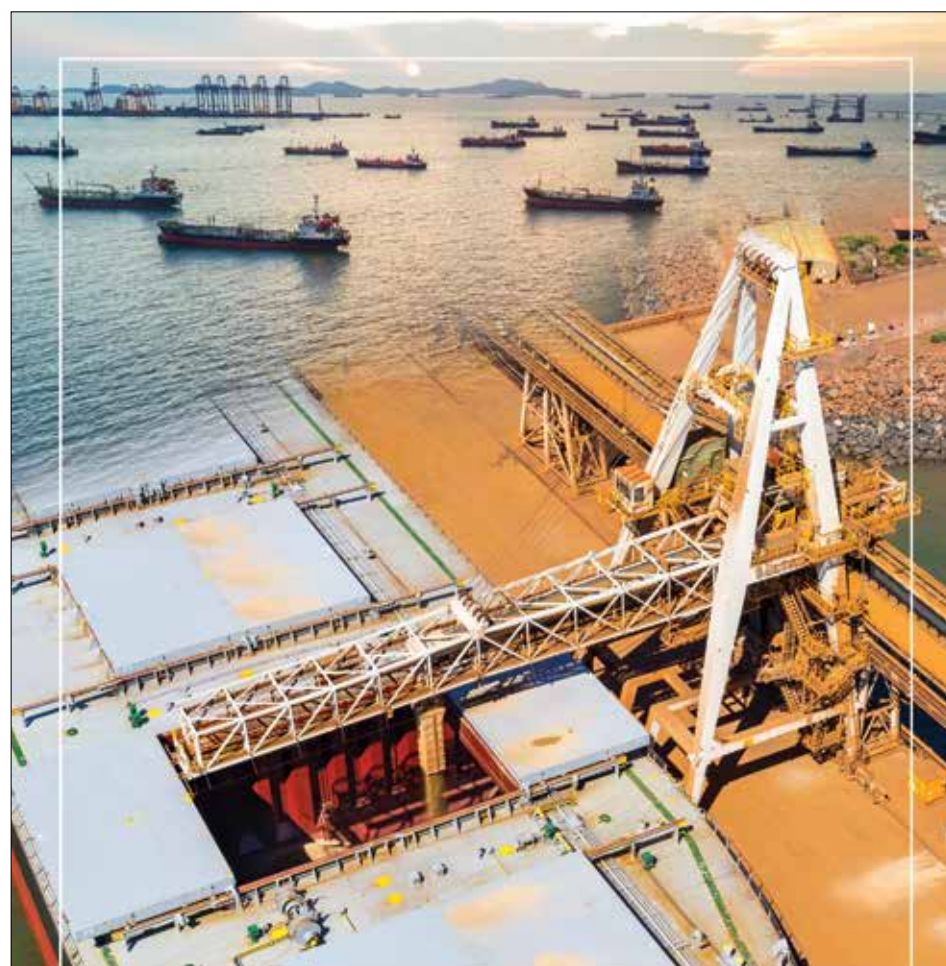


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ORGANIC GROWTH

Regis Resources capped off FY18 with record production and cash flow at its Duketon project. Moving into FY19, the good news is set to continue with an expansion underway at Rosemont and DFS work advancing at McPhillamys.

ELIZABETH FABRI

WA-BASED gold miner Regis Resources has a busy year ahead, with plenty of upside across its portfolio after a record June quarter.

For the final three months of FY18, the miner produced 92,008 ounces of gold, bringing its annual production up to 361,373oz at an all-in-sustaining cost (AISC) of \$901/oz.

Record quarter-end cash and bullion holdings of \$208.8 million were also a plus, and “testament to the quality” of the Duketon operations, according to Regis Resources executive chairman Mark Clark.

Duketon, the miner’s flagship operation, entered production in 2010 following the construction of the Moolart Well gold mine.

In 2012, Garden Well was added to the mix, which has its own standalone mill, and a year later, the Rosemont hybrid gold project was commissioned, which includes a crushing and milling circuit, with ore slurry pumped to Garden Well’s processing facility.

In FY18, operational excellence continued across the three mines; at Moolart Well, gold production was up 9 per cent in the June quarter as a result of an increase in throughput to a record annualised rate of 3.5 million tonnes per annum (mtpa); 11 per cent up from the prior quarter.

Moving into FY19, the company’s guidance signalled another good year for Regis.

At the end of July, the miner updated the market, announcing FY19 production guidance of between 340,000oz and 370,000oz at an AISC of between \$985-\$1055/oz.

While production guidance was higher than FY18 figures of between 335,000oz and 365,000oz, warning bells were triggered among the investment community due to the slight rise in AISC guidance.

On 31 July, Regis shares dropped 12 per cent on the ASX; a surprise even its executive chairman Mr Clark didn’t see coming.

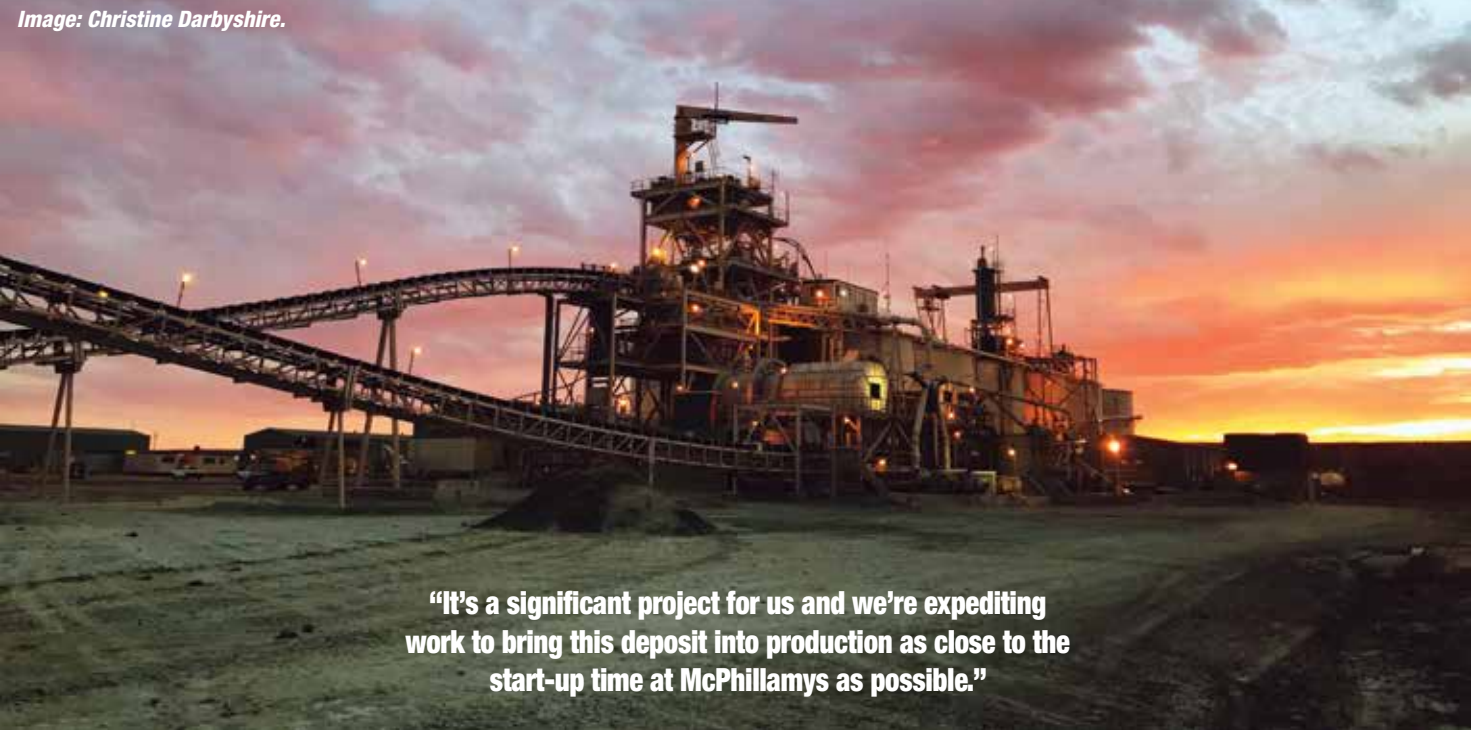


Image: Christine Darbyshire.

“It’s a significant project for us and we’re expediting work to bring this deposit into production as close to the start-up time at McPhillamys as possible.”

“I didn’t imagine that [AISC] was going to be perceived as a big negative,” Mr Clark told analysts in a conference call.

“Our costs are forecast to be marginally higher at Duketon this year because we’re cracking the top of some high-grade starter deposits.

“And I’ll just remind people for the last two years we have given cost guidance, and then our actual costs have been below the lower end of that guidance.”

Mr Clark said investors could expect “more of the same” from Duketon this financial year.

“Certainly, from our perspective, it’s looking like another really strong, robust, high cash generation type year that we’re facing at Duketon,” he said.

Rosemont Underground

One of the biggest growth drivers in the near-term will be an expansion at the Rosemont operation.

In early August, Regis gave the green light for construction to begin on an underground mine, directly below the

existing open pit.

Mr Clark said the decision to approve the first underground mine was a “very exciting step for Regis”.

“We believe that the approved Rosemont underground operation is a robust business in its own right; but just as importantly will see the infrastructure in place to grow that mine through exploration from an established underground footprint,” he said.

“This growth opportunity will be targeted both laterally between the two mining zones and at depth and along strike.

“There is also a very strong opportunity to replicate this development path at Garden Well in the near term and then at other Duketon satellite pits in due course.”

The combined open pit and underground mine at Rosemont is scheduled to deliver 10.3 million tonnes of ore at 1.72 grams per tonne for 570,000oz over a current five year mine life.

The underground component has a Mineral Resource Estimate (MRE) of 1.4mt at 5.1 g/t gold for 230,000oz of gold at a 2.0g/t gold cut-off grade.

Mr Clark said development work would begin in the current quarter with permitting, as well as the order of long lead capital items and an underground mining contract tendering process.

In the March quarter of next year, portal development in the southern end of Rosemont Main will commence with processing to begin in the December 2019 quarter.

Mr Clark said once the underground mine was at full mining capacity, the combined operation would produce at a run rate of between 120,000 and 130,000ozpa; an estimated 45,000ozpa uplift on production.

Advancing McPhillamys

Meanwhile, Regis was also working on plans to push forward its McPhillamys project in Central NSW.

The project is considered one of Australia’s larger undeveloped open pit opportunities, with a gold reserve of 2.03moz.

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A Pre-Feasibility Study was completed in 2017, which determined a planned 7 million tonne per annum mining and processing operation that would produce an average of 192,000ozpa over a 10 year life.

On 26 July, a Preliminary Environmental Assessment (PEA) was submitted to the NSW Department of Planning and Environment.

Regis said the PEA was the lead document in the development application phase, and the catalyst for the Government to provide the Secretary's Environmental Assessment Requirements (SEARS) for the project.

SEARS would then allow for the Environmental Impact Statement (EIS) to be appropriately focused to enable regulatory assessment of the project.

Over the next few months – once the EIS is complete – this will then allow for final elements of a Definitive Feasibility Study (DFS) to be signed off.

"We would hope to have EIS and DFS finished at the end of this calendar year, and then subject to the receipt of the final permitting, we would can then move into the development phase hopefully in the first quarter of calendar year 2019," Mr Clark said.

"We've always said it's between a 10 and 12 month construction period."

This would mean production could, in theory, begin as early as FY20.

In addition, Regis was examining Discovery Ridge, 32km south west of McPhillamys, as a potential satellite mine.

The Discovery Ridge deposit was acquired last year as part of the Blayney Gold purchase.

Mr Clark said the project represented "an



"We believe that the approved Rosemont underground operation is a robust business in its own right; but just as importantly, will see the infrastructure in place to grow that mine through exploration from an established underground footprint."

Image: Regis Resources.

Regis Resources is scheduled to produce between 340,000 and 370,000 ounces of gold in FY19.

excellent growth option for the company".

"It has a resource of just over 500,000oz," he said.

"We've had very strong results including 35 metres at 2.54g/t gold and 50.65m at 2.8g/t."

Mr Clark said in the current quarter the

team would be undertaking a 4000m diamond drilling program to test the down plunge extent of the eastern lode of the deposit.

"We expect to update the resource and quote a maiden reserve at Discovery Ridge later in the current quarter, and we're targeting a substantial satellite project with

minimal capital, higher grade and lower strip than the early years of McPhillamys project.

"It's a significant project for us and we're expediting work to bring this deposit into production as close to the start-up time at McPhillamys as possible."



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Northern Star's 600,000 ounce per annum production target rate was ticked off the list in June. Now, the miner's focus turns back to exploration to firm up reserves and – with luck – find the next big Goldfields deposit.

All images: Northern Star.

ELIZABETH FABRI

FOUR years ago, Northern Star was fresh from completing its landmark Jundee and Kalgoorlie operations acquisitions.

At the time the miner only had one producing asset to its name, the 100,000ozpa Paulsens mine.

In a few short years Northern Star has spent \$200 million on exploration, adding 5 million ounces of reserves and more than 9moz of resources; and its market cap has responded in kind, growing from \$424 million in January 2014 to \$4.4 billion in 2018.

In June this year the miner reached its 600,000oz run rate milestone, six months ahead of schedule.

Northern Star executive chairman Bill Beament said June quarter success – which saw it produce 183,949oz – was the culmination of a big year across its portfolio.

“There was a lot of material changes that were handled very well by the team throughout that 12 month period to deliver that full-year production,” Mr Beament said.

There was the wind down at Paulsens in the first half of FY18; the ramp up and first commercial production at its brand-new 50,000ozpa Millennium mine; and plant upgrades and optimisation at Jundee and Kanowna.

Then the big one; the \$80 million acquisition of Westgold Resources' Southern Kalgoorlie operations in a highly prospective area near the Kalgoorlie Super Pit.

Acquiring South Kalgoorlie

The strategic purchase of the South Kalgoorlie operations has increased Northern Star's Kalgoorlie processing



Northern Star's Paulsens mine in the WA Pilbara was now in care and maintenance.

capacity to 3.2 million tonnes per annum.

The acquisition included a 1.2mtpa processing facility, a 4moz JORC resource including 250,000oz in reserves, and an 842sqkm gold tenure.

The new asset would debottleneck processing capacity in and around Kalgoorlie for Northern Star, which had been an issue for the miner.

“We were considering the option of expanding our Kanowna Belle facility,” Mr Beament said in April.

“However, the South Kalgoorlie Operations purchase will enable us to achieve our organic growth target in a more timely and economical fashion and at the same time provide us with significant exploration potential, including a Resource

inventory.

“The facility is one of the best-run facilities in the district and is well within trucking distance of our Kundana Operations.”

Northern Star also had the option of utilising capacity it had access to through toll treating agreements in the Goldfields.

“We've got some secured there for the next 24 months – that's the buffer so if there is opportunities to keep margins strong, we can actually go above the 3.2mt of our own secured milling capacity and go up to 4mtpa,” Mr Beament said in a July conference call.

In August, the miner also confirmed the asset contributed to a 5.7 million ounce portfolio-wide increase in gold resources.

In FY19, production is set to grow to about 640,000oz per annum – with Jundee and Kalgoorlie each contributing 300,000ozpa-plus.

FY19: A Year of Exploration

Despite growing its resources, production and processing capacity, the work was “far from over”, Mr Beament said.

“We have already embarked on the next leg of organic growth,” he said.

“We've budgeted \$60 million toward exploration in FY19 and that is a record spend for the company, and an increase of a third on what was already a significant commitment last year.

“It reminds us of three years ago when we saw the visibility across the geology, and the ability to do a step change in reserves and resources, which we delivered last year.

“It's like ground-hog day for us.”

Of the \$60 million spend, about 65 per cent will be evenly split between Kalgoorlie and Jundee, converting a significant slice of the company's 15.9moz resource base to reserves. The remaining 35 per cent will be spent on regional activities, largely around South Kalgoorlie.

“We've had the South Kalgoorlie operations for only three months, so it's like a new car – it's getting a bit of love and care and attention, but we are conservative,” Mr Beament said.

“We've got a large exploration spend on the South Kalgoorlie operations.

“It's only 10-15km along strike from the great Super Pit and hardly had any money has been spent on it over the past 20 years; we see a huge geological upside of six major structural corridors ripping through the guts of the 1000sqkm tenement package.

(CONTINUED OVER)



(CONTINUED FROM PAGE 45)

Northern Star has budgeted \$60 million toward exploration in FY19.

“We’re quite excited about South Kalgoorlie and what it can bring for Northern Star.”

Mr Beament said the company expected to deliver a material upgrade to its current 10-year mine life in the middle of next year.

“Our recent exploration results in continued organic resource and reserve growth over the past few years have provided overwhelming evidence that there is a lot more gold to be found around and in our existing asset base,” he said.

“We look forward to growing our resource and reserve base in the coming years.”

In addition, a further \$74 million has also been budgeted for expansionary capital in FY19, including \$34 million on dual purpose drill drives to deliver significant

reserve/resource and production growth; \$20 million on ancillary projects for future years’ production growth; and \$11 million on a new 10-year capacity tailings facility for Kanowna Belle processing plant.

Drilling activities would also continue at its Tanami regional project (100 per cent), and the Central Tanami project of which Northern Star has a 25 per cent interest.

The Road Ahead

With a lot happening across its portfolio, Mr Beament assured the company would not chase production growth for growth’s sake.

“Northern Star is always a business first



Kanowna Belle underground operation.

and a mining company second,” he said.

“What matters is that we achieved that increase through organic growth.

“This means that the increased production translates directly to increased financial returns for our shareholders, and as [recent] results show, we produced gold last quarter at an all-in sustaining cost of \$982/oz, generating 50 per cent EBITA margins.”

Interestingly, Mr Beament said its shareholder range had seen some “radical” changes over the last two years, with an increase in foreign ownership.

“We’re now at about 56 per cent offshore owned versus 44 per cent domestic so that’s a huge change in the last couple of years,” he said.

“This is definitely predominately out of North America (our largest shareholder BlackRock is in London).”

Mr Beament said after attending a couple of major conferences in North America earlier this year, it was clear sentiment was strong across the Australian mining industry – whether that was for iron ore, gold, nickel, or coal.

“We’re [Australia] the best in breed across the resources industry, and that is well and truly recognised globally now. [That’s] why you’re seeing investors around the world looking at Australia’s great operations and [our] ability to maintain those operations and run them,” he said.

“We’re also in a tier one jurisdiction and that can’t be understated.”

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REUBEN ADAMS

SRINIVASAN Venkatakrishnan, who will be succeeded by Barrick president Kelvin Dushnisky in September, used his last AngloGold earnings call in August to celebrate some tenure highlights.

“As you know, this is my final presentation after around 72 quarters with this company, the last 22 as a CEO,” he said.

“I thought I’d reflect on some of the work we have done over that time, to reposition this company, to not only survive the gold price storms that came at us back in 2013, but to also thrive in a range of market conditions.”

Mr Venkatakrishnan said the business had been “significantly de-risked”, with net debt down almost half from its peak – despite the miner self-financing the entire construction of two new mines in Kibali and Tropicana.

“Either way, the stronger balance sheet makes the business more resilient,” he said.

“Over this entire period, we have been delivering a consistent operating and financial performance, meeting our guidance every quarter and every year, in a volatile business environment.”

AngloGold chief operating officer Ludwig Eybers called the last five years “a bit of a journey”.

“From 2013 to 2015, we were really restructuring the way we did business, stripping out waste and duplication, and engineering our CapEx numbers lower without sacrificing optionality,” he said during the August earnings call.

“2016 and 2017 were reinvestment years as we made positive improvements at our key international assets that we believe would yield systemic, long-term improvements.

“And this year, we started to reap the benefits of that long-term approach with the investments starting to yield results.”

A Strong First Half

Savvy inward investment is bearing fruit for AngloGold, which bounced back into profit of \$US85m for the first six months of 2018, compared with a loss of \$US93m in the first half of 2017.

The company’s balance sheet is also improving with falling debt – down 17 per cent to \$US1.786 billion from the same time last year – and ample liquidity of around \$US2 billion.

Total group production was lower in the first half – from 1.748moz in H1 2017 to 1.629moz this year – but this included those operations either sold earlier this year, or closed during 2017.

Production from its retained operations was strong at around 1.6moz, up 4 per cent year-on-year.

All-in sustaining costs (AISC) for the remaining assets fell 5 per cent to \$US1020/oz versus \$US1071/oz in the first half of 2017.

And Australia – which includes the Sunrise and Tropicana operations – was a major contributor to this performance, with a 20 per cent increase in production over the period.

“Australia is about a fifth of our production and is on a clear improving margin trajectory,” Mr Venkatakrishnan said.

Sunrise & Tropicana: Highlights

Sunrise and Tropicana produced 306,000oz for the half; a big jump on 255,000oz for the year-ago period.

This 20 per cent increase in gold production was largely due to a significant lift in the contribution from Sunrise Dam.

At Sunrise Dam, the strategy to lift mined grade and underground ore production resulted in an impressive 43 per cent increase in gold production to 153,000oz for the first half of 2018 compared to 107,000oz in the same period last year.

This increased production helped reduce total cash costs by 9 per cent to \$US888/oz for the half, from \$US977/oz in the first half of 2017.

In June, AngloGold successfully commissioned the Sunrise Dam Recovery Enhancement Project (REP) – involving the addition of a flotation and ultra-fine circuit – which is expected to deliver an estimated 8 per cent increase in gold recovery.

Tropicana’s production (AngloGold 70 per cent share) was 153,000oz for the six months ended 30 June 2018, a slight 3 per cent increase compared to 148,000oz in the same period last year.

On the downside, total cash costs at Tropicana increased by 14 per cent to \$US655/oz for the half, compared to \$575/oz in the same period last year.

This increase was due to “a lesser proportion of waste mining being allocated to capital in the first half of 2018, compared to the corresponding period last year”, the company stated.

During the first half of 2018, concrete works were completed for installation of a second, 6MW ball mill in the Tropicana processing plant; this project is on schedule for completion at the end of 2018.

Sunrise: Exploration Upside

About 20 per cent of AngloGold’s \$US130 million annual exploration budget is greenfields-focused; specifically, around Sunrise Dam (WA) and North Queensland in Australia, Minnesota and Nevada in the US, and in Argentina.

AngloGold EVP – Group Planning and Technical Graham Ehm said the remaining 80 per cent was an investment in replacing mineral resources and reserves at its current projects, with a strong focus on the sites with shorter mine lives, based on ore reserves.

“A good example of this is Sunrise Dam, where the reserve life is five years, but the expected mine life is much longer,” he said during the August earnings call.

“Sunrise Dam remains open in all directions to the south, the north and at depth. Aspect for a long life mine is clearly evident.”

Mr Ehm said the team has put in place a clear program to explore and progressively expand the mineral resource at Sunrise and bring these into reserves.

“In this context, one should not judge the mine life of Sunrise Dam by the [current] ore reserve, but by the resources and the endowment potential,” he said.

Q2 2018 RESULTS: GOLD MAJORS AT A GLANCE

BARRICK GOLD

Net loss: \$US94 million
Production: 1.07 moz
AISC: \$US856 per ounce
Full Year Guidance: 4.5 to 5 moz

NEWMONT MINING

Net profit: \$US274m
Production: 1.16 moz
AISC: \$US1024 per ounce
Full Year Guidance: 4.9 to 5.4 moz

KINROSS GOLD

Net profit: \$US2.4 million
Production: 602,049 ounces
AISC: \$US1018 per ounce
Full Year Guidance: 2.5 moz

GOLDCORP

Net loss: \$US131 million
Production: 571,000 ounces
AISC: \$US850 per ounce
Full Year Guidance: 2.5 moz



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GRES Sunrise Dam success

WA

GR Engineering Services (GRES) is an ASX-listed process design and engineering company providing fixed price EPC and EPCM project delivery services to the mineral processing industry internationally.

GRES recently delivered the Sunrise Dam gold recovery enhancement project for AngloGold Ashanti Australia (AngloGold), having previously completed the feasibility study work.

This feasibility study work established the viable pathway for development of the recovery enhancement project, which was delivered on time and within budget.

GRES is proud to have assisted AngloGold in the delivery of the recovery enhancement project at Sunrise Dam, where sulphide mineral recovery and ultra-fine grinding unit processes have been incorporated into the process plant to consistently increase gold recovery.

The High Intensity Grinding (HIG) mill installed is the largest unit of its type currently operating in Australia.

The innovative engineering solutions developed by GRES enable clients to confidently move into development with the knowledge that the outcomes from study work will be replicated in their projects.

GRES has successfully completed feasibility studies, process and engineering designs, and construction for projects of various scale, covering a diverse range of



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projects for a range of clients in Australia and internationally.

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PRODUCTION FOCUSED

Australia's second tin focused producer, Aus Tin Mining, remains focused on the delivery of high-value metals critical to the energy revolution, with three near-term projects and expansions underway.



Aus Tin's Granville Project, 20km north of Zeehan lies within the historic Heemskirk tin field.
All images: AusTin Mining.

JESSICA CUMMINS

AFTER resuming mining operations at the mothballed Granville project in 2016, the race has been on for Aus Tin to grow production.

Following an expansive approvals process, the company obtained the final green light in April 2018 to expand the operation.

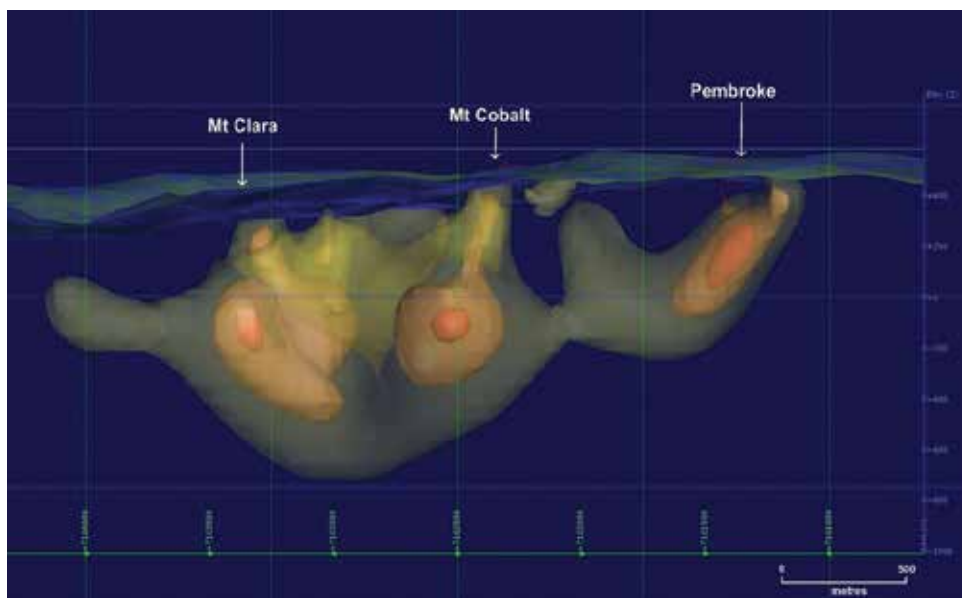
Once complete, this expansion will include the development of a tailings storage facility, the latest technology gravity equipment, and resumption of mining at the high-grade Granville East deposit via a cutback on the eastern wall.

The expansion will also enable Aus Tin to increase forecast production to a rate of 550 tonnes per annum (tpa) of contained tin.

Recent quarter results proved largely positive for Aus Tin, with significant advancements made at Granville.

“What’s notable about Taronga is that it is a world class asset with significant upside and it will be in production later this year or the beginning of 2019.”

In April, the company awarded Jemrock a contract to undertake mining activities at Granville East and begin construction of a new tailings storage facility required for Level 2 operations, set to be complete this quarter.



Mt Cobalt magnetic targets.

The company also entered into a new two-year tin purchase agreement with Traxys Europe, which it claims will be on “more favourable terms for the company”.

On the down side, forecast production cash costs at Granville increased from \$15,600 per tonne to \$17,300 per tonne.

“Incorporating the finalised contract mining costs and adopting a lower tin recovery of 60 per cent based on Level 1 operations, the forecast cash cost of production (C1) for the Granville Expansion has risen to \$17,300/t of recovered tin,” Aus Tin chief executive Peter Williams said.

“Based on the current tin price, the operating margin is estimated at \$9400/t of

tin in concentrate.”

The Granville expansion was also set to provide cash flow to underpin the company's other assets in its development portfolio; near term projects Taronga and Mt Cobalt.

Taronga Tin Project

Ranked fifth in the world for undeveloped global tin reserves, the Taronga project in NSW has been a priority for Aus Tin for some time.

Mr Williams said during the June quarter the project progressed various pre-construction work and regulatory plans.

“The design for the Tailings Storage Facility was finalised and submitted to the regulators for construction approval, and engineers were appointed to complete the preliminary design and cost estimate for the pilot plant,” Mr Williams said.

“To progress the Mining Lease Application, a survey of the lease boundary was completed and several technical reports were received for inclusion in the Mining Operations Plan.

“What’s notable about Taronga is that it is a world class asset with significant upside and subject to obtaining all regulatory approvals we are targeting ore product by the end of 2018.”

Results from recent preliminary test work also showed that the site was suitable for ore sorting.

“Analytical results for the standard static test indicate an overall 54 percent increase in head grade (0.56 per cent tin to 0.86 per cent tin) whilst achieving 96 percent tin recovery,” Mr Williams said.

Aus Tin will accelerate the next stage of test work with a two-tonne bulk sample through TOMRA's pilot facility in Sydney, and the results will provide information for scale-up to a full-scale production plant.

With the design of its new Tailing Storage Facility completed and waiting approval, a cost estimate was being reviewed for the pilot plant as well as a survey of the lease boundary to progress the Mining Lease application.

(CONTINUED ON PAGE 54)

Leading the way with innovative solutions

NATIONAL

JEMROK has quickly become a leader in underground and civil mining projects and is proud to be assisting Aus Tin with its expansion at its Granville project.

Built on a strong foundation of working with integrity, intelligent and responsible engineering practices, the national company offers an extensive range of modern surface and underground equipment.

It is also a highly respected multi-specialist mining provider, with expertise in mine development and rehabilitation, vehicle and heavy equipment maintenance, light and heavy auto parts procurement, mine production activities, and professional labour hire.

“Jemrok is part of the Kyda Group and currently have five operational sites throughout Tasmania, NSW and Victoria, along with mining and civil services Jemrok facilities include automotive workshops for maintenance and repair of service fleet and customer vehicles heavy equipment and labour hire,” the company stated.

“While based from our operational sites, our civil engineering and mining teams travel Australia wide, and we are dedicated to providing the highest possible level of service and customer satisfaction.”



Image: Jemrok.

More information can be found at: www.jemrok.com.au.



LEADING THE WAY BY DELIVERING INNOVATIVE SOLUTIONS

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jemrok.com.au

(CONTINUED FROM PAGE 52)



Mt Cobalt core.

Mt Cobalt

Drilling and substantial 3D modelling work has also been undertaken at Aus Tin's Mt Cobalt copper-cobalt-nickel project in QLD.

"We've received some very good drilling results in January this year from Mt Cobalt with results of up to 28 metres at 0.3 per cent cobalt," Mr Williams said.

"More recently 3D modelling of magnetic data generated three discrete targets with elevated magnetic susceptibilities of 0.2 SI and 0.129 SI iso-layer units were identified, the largest lying approximately 600m below Mt Cobalt.

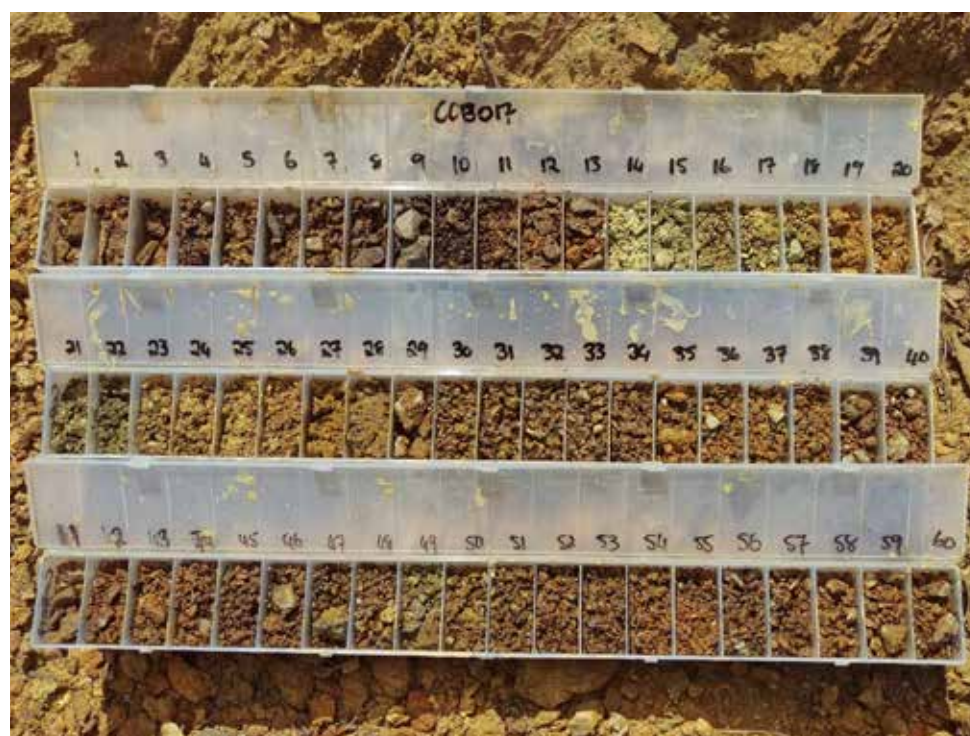
"Based on collective work to date, the zone of 0.2 SI magnetic susceptibility may

represent the sulphide source for cobalt and nickel mineralisation at Mt Cobalt.

"None of the targets have been validly tested by previous drilling and the Company is developing a program to drill test the target zones with a program of three holes up to 650m in depth."

A geological comparison between Mt Cobalt and Glencore's Koniombo nickel and cobalt resource in New Caledonia provides some direction for future exploration, supported by recent field work at Aus Tin's Jackson North.

Both Mt Cobalt and Koniombo are "unusual and almost unique" in that they were deposited in two episodes, firstly by hydraulic fracturing and mixing of meteoric waters, followed an indeterminate time



Reverse circulation drilling chips for the first hole of the program at Mt Cobalt.

later by supergene enrichment.

Both deposits also exhibit veins of distinctive red-brown, micro crystalline hydrothermal quartz breccia, which has undergone fracturing and resealing above the serpentinite.

Aus Tin said discussions were underway with drilling contractors, and it remained hopeful that pending all regulatory approvals, the next drilling program will commence during the September quarter.

Outlook

For the next three years, Mr Williams said Aus Tin plans to deliver sustainable tin and cobalt targeting low capital and low

operating cost projects in Australia.

Aus Tin said a new \$2.5 million funding package would help drive development across Granville, Taronga and Mt Cobalt.

"During the [June] quarter, shareholders ratified a new \$2.5M, 24-month convertible security with the Lind Partners on superior terms," Mr Williams said.

"Following the end of the quarter the Company received the balance of funding and currently holds its highest level of cash since 2013 when it merged with Taronga Mine Limited.

"Funds will be used will be used to meet exploration, development and working capital costs."

Highly-detailed ore sorting tech

NATIONAL

AUSTRALIA's leading ore sorting provider TOMRA offers the only full-scale, indoor test centre for prospective customers to get hands-on experience with TOMRA's unique ore sorting technology and sensors.

In the last few years TOMRA's XRT technology has evolved from being able to just scan rocks, to now scanning to an incredibly small detail of just 0.8mm.

To put this into perspective, just a few years ago 4mm was considered an impressive feat for the technology.

Ore sorting is an increasingly prominent way for mine sites to maximise recovery and improve processes.

In recent years, a wide array of sensor technologies has emerged, each tailored to a different mineral or sorting application.

TOMRA has a range of highly advanced and automated sorting machines that utilise a number of different sensor technologies such as LASER, X-ray, infra-red, electromagnetic and colour that are able to sort ore before entering a processing stream.

TOMRA's LASER and XRT technologies are able to achieve higher resolutions of material as it goes through the machine at higher and higher speeds.

These and other technologies are at the forefront of mineral separation technology.

XRT scanning, possibly the most common type of ore scanning technology

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

in mining applications, scans the internal mineralogy of the rock in minute detail, with X-ray penetration with the unique ability to show the makeup of particles within the rock.

LASER scanning is another popular method, particularly for the identification

and subsequent grading of quartz or gold-bearing quartz via the diffusion, dispersion and diffraction of the LASER light through the material.

When implemented and operated correctly, ore sorting machines can greatly improve plant efficiency, reducing

downstream crushing requirements and costs, and resulting in much improved grades.

It can even benefit the operator's carbon footprint since waste is rejected at an early stage, which in turn reduces the need to tailings treatment.



INCREASED MINING PRODUCTIVITY

TOMRA is proud to be associated with Aus Tin Mining. With ore sorting Aus Tin Mining will be more efficient, generate less waste and tailings, extend their mine life and improve recoveries.



ORE SORTING BENEFITS

- + Increased recovery
- + Reduced processing costs
- + Increased production
- + Reduced tailings
- + Increased productivity
- + Reduced energy consumption
- + Increased life of mine



All images: Peabody Energy.

GETTING RESULTS

Peabody is generating strong returns on the back of continued strength in seaborne metallurgical and thermal coal fundamentals – with the global miner's Australian assets doing much of the heavy lifting.

STAFF WRITER

PEABODY continues to lean heavily on the outstanding performance of its nine Australian thermal and metallurgical mines to drive the global miner's revival, as the US coal sector remains challenged.

Overall revenues for the second quarter increased 4 per cent over the prior year to \$US1.31 billion; driven by a 20 percent bump in Peabody's Australian metallurgical and thermal sales volumes, which more than offset lower US volumes.

The rise of natural gas and wind generation in the US are challenging domestic thermal coal consumption, while power plant retirements also weigh on demand.

But seaborne thermal demand remains "vigorous", according to Peabody, with Newcastle spot pricing reaching highs of approximately \$US116 per tonne in the second quarter.

Chinese thermal coal imports jumped 20 per cent, or 19 million tonnes, through June compared to the prior year on sturdy industrial activity and an 8 per cent increase in thermal power generation, driven by favourable weather conditions.

Peabody stated that its Australian exports rebounded from the prior year effects of Cyclone Debbie, increasing by an estimated 7 million tonnes through May compared to the prior year.

Second quarter 2018 seaborne hard metallurgical coal spot pricing also remained strong, fetching an average price of \$190/t.

And while the Aurizon rail and labour issues in QLD remained in the media spotlight, Peabody said it "has yet to be impacted by delays in rail services and continues to closely monitor the situation".

Australia: Driving Growth

Peabody's Australian operations continued



North Goonyella metallurgical coal mine.

to produce significant results, with total Adjusted EBITDA of \$US266.1 million for the quarter – a \$US88.3 million increase over the prior year, boosted by 45 per cent growth in metallurgical volumes and further strengthening in seaborne thermal pricing.

"Australian thermal led the company in adjusted EBITDA margins of 40 per cent, as higher volumes and elevated pricing mitigated the effects of higher costs associated with temporarily increased overburden ratios at the Wilpinjong Mine," the company stated in its Q2 report.

"The Australian metallurgical coal segment continued to lead the company in revenues of \$417.5 million, an increase of 45 percent compared to the prior year, largely due to sustained demand for quality metallurgical coal and healthy seaborne pricing levels."

After an extended longwall move at the Metropolitan mine in the second quarter of 2017, costs per tonne declined by \$US19.70/t to \$89.37/t in Q2 2018, compared with the prior corresponding quarter.

"As expected, second quarter costs improved relative to the first quarter of 2018 and are expected to be within the company's annual guidance range for the year," the company stated.

"The Australian metallurgical segment once again led the company in adjusted EBITDA contributions of \$US158.5 million, as adjusted EBITDA margins increased to 38 per cent."

Extensions & Upgrades

In 2017, Peabody was granted consent for the expansion of its Wilpinjong operations

until 2033.

In June this year, a NSW court ratified this favourable decision regarding Peabody's large Wilpinjong mine extension plans, clearing the last hurdle to allow it to move forward.

Then in July, Peabody confirmed the extension of its North Goonyella metallurgical coal mine, near Moranbah in Central QLD.

With an estimated 71mt resource across the mine, the North Goonyella South project will extend mine life at least until 2026.

To support the extension, Peabody President – Australia George J. Schuller Jr said the company was investing in a new longwall system, featuring a 300m face conveyor and advanced longwall technology including automated steering and the requirement for less maintenance.

"Not only does that improve safety for our operators, it enables faster haulage speeds of our high quality reserves," Mr Schuller said.

The mine extension will also secure employment for more than 230 employees.

"We are extremely pleased to be able to continue to provide employment for people in regional and remote locations.

"Any opportunity we have to support the local community through jobs and investment is a win for us, and we certainly feel we will be able to do this at our North Goonyella coal mine for many years to come."

Relative to the second quarter, Peabody expects the longwall move at North Goonyella to impact third quarter metallurgical segment adjusted EBITDA margins by about \$US15/t.

The North Goonyella longwall move has commenced and is expected to be completed in the current quarter.



END-TO-END DRILLING SERVICES

Hagstrom Drilling provides a range of exploration drilling and sampling services for major mining companies in the NSW coal regions. We understand the precision and rigour required for mineral exploration and we calibrate our equipment to deal with the toughest terrain and challenging conditions.

When you partner with us, we streamline the following exploration activities for you:

- Reverse Circulation Drilling
- Wireline Diamond Drilling
- Conventional Large Diameter Coring
- PCD Drilling
- Air and Mud Rotary Drilling
- Sonic Drilling
- Aircore Drilling
- Hydrogeological Drilling
- Mine Geotechnical Drilling
- Borehole Decommissioning

Quality

Delivering high-quality multidisciplinary drilling solutions nationwide as Australia's leading drilling services provider.

Service

Deliver value to customers across Australia by delivering high-quality services safely. We tailor each and every job to our client's specific requirements.

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We offer comprehensive support solutions, with in-house engineers, tradespeople and maintenance staff for all necessary repairs, fabrication, maintenance and rebuilds of our plant to streamline project execution.



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www.hagstromdrilling.com.au

BACK IN BUSINESS



All images: OM Manganese.

It's been 18 months since OM Holdings' Bootu Creek manganese mine reopened. Now, an \$8.2 million Tailings Retreatment Plan is under development which is expected to produce an additional 250,000 tonnes of manganese over the next eight years.

JESSICA CUMMINS

IN 2015, OM Holdings subsidiary OM Manganese's Bootu mine was placed into the hands of administrators as global market conditions for manganese deteriorated.

It was a tough time for the mine and surrounding Tennant Creek community; 140 jobs were lost when the mine was put into care and maintenance.

But once mining activities resumed in February 2017, positive sentiment and jobs returned to the region.

OM Holdings became one of the ASX's top performers for the year, rising from 15 cents a share in January 2017 to over a dollar per share by January 2018.

OM has its fingers in more than mining; with operations in smelting, trading, and marketing and trading of ores and ferroalloys, the company continues to focus on growth and generating value from its assets, including its Bootu Creek operation.

Bootu Creek

Manganese ore production for the June quarter of 2018 at Bootu Creek totalled 185,600 tonnes at an average grade of 35.67 per cent manganese, of which 149,762t was exported.

Mining activities during the quarter continued in the Shekuma 6B and the Chugga Far North A pits.

"Mining in the northern side of the Shekuma pit was hampered by numerous fault structures, ground water ingress and a footwall slip while Chugga Far North started to present continuous ore drill floors," the company said in a statement.

"Concentration of the mining fleets within the eastern limb of the Bootu Creek Syncline is expected to maintain mining efficiency and reduce unit costs further within the mining operations, given the



Bootu Creek is 110km north of Tennant Creek in the Northern Territory.

deposits relative proximity to the processing plant, mining workshop and associated infrastructure.

"Given the significant stockpiles of lower grade ore and heavy media reject material, the Tailings Retreatment Plant is expected to produce approximately 250,000 tonnes of manganese fines per annum for approximately eight years."

"Mining of the Gogo 5B deposit was completed in May and higher grade ores from the Chugga Far North and Shekuma deposits will form the basis of plant feed for the next two years with improved processing plant mass yields expected."

The mine's new tailings retreatment plant project, set for completion later this year, also aims to generate sinter feed for its Sarawak smelter in Malaysia.

Tailings Retreatment Plant

Metallurgical test works conducted earlier this year indicated the potential to utilise existing tailings stockpiles and HMS plant reject material to reprocess a saleable 36 per cent to 38 per cent manganese product.

The process involves feeding the tailings directly into a circuit, while the reject material is crushed through a two-stage closed circuit crushing plant.

"The existing Secondary Processing Plant crushing circuit is planned to be modified by adding an additional crushing/grinding stage and wet screening facility so as to further crush/grind the HMS reject material," the company stated earlier this year.

Based on the mine's March processing plant results, about 10.8 million tonnes of tailings with an average grade of 10 per cent manganese and about 3.4mt of HMS reject material are stockpiled on site.

Both tonnages are set to increase by

1.6mt respectively, and the total inventory estimate of 17.2mt was also expected to be processed.

OM Holdings said engineering design of the plant was nearing completion, but had been extended in order "to better comply with Australian standards".

"Delivery is still anticipated within 2018, and the plant is expected to be commissioned in the March 2019 quarter," the company stated.

"The capital cost of approximately \$8.2 million is expected to be funded from internal operating cash flows.

"Given the significant stockpiles of lower grade ore and heavy media reject material, the Tailings Retreatment Plant is expected to produce approximately 250,000 tonnes of manganese fines per annum for approximately eight years."

Exploration

The Bootu Creek project area contained a number of manganese deposits, including the abandoned Muckaty mine, worked from shallow open pits between 1955 and 1963.

While no exploration drilling was completed in 2015 or 2016, in 2017 drilling resumed; albeit limited to a small reverse circulation drill program consisting of 11 drill holes for 1230 metres.

An exploration program tested the potential of both the Gogo and Shekuma deposits, while a limited exploration program of six drill holes tested a shallow target located to the northwest of Masai deposit.

Both programs were located on ML24301 and returned encouraging results, but no significant increase in defined resources.

OM Holdings said exploration drilling of several untested geophysical anomalies (GAIP) for Renner Springs and follow up of a prospect located to the northwest of Masai was planned for 2018.

The railroad safety providers



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

NATIONAL

GENESEE & Wyoming (GWA), the country’s third largest rail operator, provides intrastate haulage services to NSW, South Australia and the Northern Territory.

With a strong focus on delivering

customer expectations and efficient above rail solutions, GWA’s goal is to become the point of contact for rail freight and supply chain decision makers.

By providing a reliable, innovative service to customers, GWA’s substantial experience and knowledge in greenfield and brownfield projects addresses issues around track compatibility, operational

sustainability, and whether current or planned intermodal terminals are in the right location with the right rail connectivity.

GWA teams can provide project management assistance and guidance on critical infrastructure components of any integrated supply chain outcomes.

OM Holdings has been a long-time partner, using GWA’s rail corridor since the mine opened in 2005.

By prioritising safety and maintaining an excellent performance record in the heavy haul bulk and coal sectors, GWA aims to continue meeting and exceeding customer export service demands.

GENESEE & WYOMING AUSTRALIA

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OUR EXPERTISE

- Greenfield and brownfield project specialist
- Improved logistic solutions for your supply chain
- Project management partner
- Infrastructure guidance



WHAT WE DELIVER

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CORE PURPOSE

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World-class mining services



INTERNATIONAL

IN 2018, CMI Technical Services has been on a steady rise.

Growing interest for CMI's services, in both fixed plant maintenance and onsite machining throughout the Australian, Middle Eastern and West African regions, has kicked up a gear, which is all too pleasing for CMI's managing director Zeb Ogilvie.

"The shimmering haze of the Middle Eastern division is now our strongest performing region," Mr Ogilvie said.

"It has been one of both patience and time from all our team members and management involved in the region, which has resulted in the positivity we see today.

"Our clients' satisfaction has and is

always CMI's focus."

CMI Technical Services general manager – Middle East Ron Hellberg has been instrumental in establishing relationships with major mining houses, which has resulted in ongoing services at five copper and gold operations in the region.

Mr Hellberg's focus on increasing machine reliabilities and fit-for-purpose recommendations and repairs has resulted in every operation seeing an increase in plant availabilities.

"The benefit we have over other maintenance service providers is that our team is very diverse; we have hand-picked professionals, all of which strongly hold the companies ethos high and consistently come up with solutions for our clients," Mr Hellberg said.

"Those solutions are leading to KPI's being exceeded and positively compounding the production throughput results."

CMI now has a consistent team of 20 men working in the region, with shared workshop facilities in Dammam and larger projects in the pipeline into 2019.

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 1500mm (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 thus allowing heavier cuts," he said.

"We're able to the big stuff that only a handful of others can offer in Australia.

"In mining, typically it's dragline swing bores or propel bores, or marine requirements during drydock works like stern tubes, transom bores or winch bores.

"Typically, anything over 500mm where the smaller 2 ¼" bar units will struggle."

Broons' broken road fix



Broons' Square Impact Roller secures haul roads fast.

NATIONAL

IF a haul road is failing, don't ever dig it up again.

Australian specialist compaction equipment manufacturer Broons has the answer to this underlying problem; stop looking down, its right up on top.

For 30 years, the Adelaide engineering company has been manufacturing the world's best flat drum roller; and its square.

While the rest of the world thinks a roller should be round, Broons has made

its mark upon the earth with its flat, four sided Impact Roller.

The Broons Square Impact Roller is a revolutionary deep down soil compactor with no equal.

While traditional vibrating rollers run out of energy at about 300mm layer thickness, the heavy hitting Broons' Impact Roller is still going strong at more than two metres in some cases; nothing else comes close for depth of influence and productivity.

Towed at 10kph, Broons' Impact Roller uses its significant force to compact the

most difficult materials.

Delivering more than 50kJ of energy with every blow – twice a second – the Square Roller operates across a wide range of moisture contents far better than the standard vibrating roller.

Output can exceed 2000 cubic metres per hour in loose fill (that's a lot).

Not only is the Impact Roller ideal for fixing failing haul roads, it has a proven track record on rehabilitation works compacting waste dumps and capping layers.

Ideal for big volume compaction on tailings dams along with rubbilising rock on tip heads and pit floors to minimise expensive tyre damage, this multipurpose roller can benefit on every mine site.

Every machine is MDG15 compliant and comes coupled up to a certified 4WD tow tractor all kitted up ready to go.

More information can be found by calling (08) 8268 1988, emailing info@broons.com or downloading a brochure at www.broons.com/impact/.

Mine truck clean-up made easy

NATIONAL

INNOVATIVE Australian cleaning equipment manufacturer and supplier, Australian Pump Industries, has come up with a unique 24 V compact wet/dry vacuum cleaner.

The Vac packs a lot of punch with a 1200W motor and an airflow of 20 litres per second.

The new vac was developed to be permanently installed in the cab of dump trucks working in mine sites.

"The idea is to clean the cab between shifts so the operator is protected from inhalation of coat dust," Aussie Pumps' Neil Bennett said.

The Aussie vac is powerful, but reasonably quiet, with an operating noise level of only 71.5 dbA.

The machine comes with a high tech Aussie Microweb 99.9 per cent filtration system.

This unique filter media is constructed from a homopolymer acrylic fibre.

It has a micro-porous membrane applied to the collection service, making it ideal for picking up coal dust and preventing it

re-entering into the atmosphere.

The membrane provides a low pressure drop causing the dust to "cake".

That means much better dust release than conventional filters, as one shake of the filter cleans it perfectly.

The Microweb is considered to be essential for any kind of fine dust from coal, limestone, cement dust, gyprock, or even pigments and fertilisers.

The vac comes with a handy set of professional tools, enabling the operator to clean up the cab at the end of the shift.

The tool kit includes a heavy duty 3 metre crush proof hose, crevice tool, carpet and floor tool, squeegee with swivel, 3 piece chrome assembly with handle and round brush.

It is a major step forward for coal miners to be able to operate the plant safely.

Aussie Pumps claim that this equipment used in cabins in coal mining, will make big gains in health and safety with this equipment.

Further information on Aussie's 24 volt cab cleaning vac is available from Australian Pump Industries or authorised distributors throughout Australia.



Aussie Pumps' new 24 volt wet/dry vac keeps miners safe.

Innovative radiator solutions with Adrad

NATIONAL

ADRAD manufactures industrial radiators for a variety of mining applications, from excavators, dump trucks and dozers, to underground mining equipment and even the utes and 4WD's used on site.

With six manufacturing facilities around Australia, Adrad's experience dates back over 33 years.

Adrad has built a strong reputation for manufacturing industrial radiators under the ISO9001:2015 quality accreditation.

Adrad's radiators are designed to withstand the unique conditions of Australian mines.

Trademark manufacturing technology designed specifically for Australian conditions includes AdFuse, AdSeal, AdShield, Ultra-T cores and extremely heavy duty Mechanical Bonding.

Adrad's industrial radiators are designed to resist corrosion, providing maximum strength to withstand vibration, high temperatures and pressures associated with heavy duty water and oil cooling applications.

Adrad's AdFuse precision-welded tube-to-header provide high strength,



More information about Adrad's industrial cooling range can be found at www.adradradiators.com.au.

robust construction and durability for large radiator cores.

AdSeal provides flexibility to absorb vibration, accommodate core expansion and contraction through temperature cycling in intercoolers.

Folded & Amoc Radiators and seals from Micon and Procore are designed to excel in harsh environments, with upgraded strength, durability and longer service life available.

With an extensive manufacturing and

distribution network of 17 warehouses across Australia, Adrad can provide the right parts fast to minimise downtime.

Adrad also supplies an extensive network of radiator specialist workshops across Australia.

NOW AVAILABLE FROM



FOLDED & AMOC RADIATORS & SEALS

For more reliable cooling and less downtime, choose radiator cores and seals with advanced design features.

These products are engineered to deliver maximum service life in the most demanding applications. If you're looking for superior performance, then you'll find it with these high quality Micon and Procore products.

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- SUITS CATERPILLAR
- SUPERIOR TO OE DESIGN
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Adrad is a Quality Accredited Manufacturer and Supplier.

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or contact Adrad

1800 069 610
adradradiators.com.au

Introducing the ROSTA MB50

NATIONAL

ROSTA Australia offers a range of self-tensioning motor bases (or motor mounts) that are extensively used by leading mining and quarrying operators.

Offering a safer, convenient and cost-effective option to traditional mounting devices, the ROSTA motor base range is also incorporated as a standard product by major screen manufacturers.

Maintaining proper belt tension is imperative in crusher, screening and fanning applications.

A tight belt can lead to early bearing wear and failure.

A loose belt can create transmission losses leading to costly downtime.

Similarly, significant downtime is experienced with traditional mounting devices that require constant tensioning of belts.

The ROSTA MB50 (and other ROSTA MB products) incorporates a self-tensioning device, which continuously compensates belt elongation thereby improving drive efficiency and reducing downtime.

The MB50 can be installed by one person using a flat 30mm wrench.

Similarly the changing of belts can also be undertaken by one person, usually in under 15 minutes.

With less workers required, and an easy to access tensioning system at the ready, the MB50 offers a considerable safety advantage with less exposure to



The ROSTA MB50 is a safe, hassle-free and cost-effective motor mount option.

safety risks.

With no belt realignment required, the MB50 also offers a significant reduction in belt related downtime, adding to the cost

efficiency of an operation.

It also reduces belt slippage and subsequent power draw by continuously compensation belt elongation.

More information on the MB50 Motor Base can be found by calling ROSTA at (08) 9248 1588, or emailing sales.aus@rosta.com.

On time, on budget every time



More information can be found at: www.hardbakka.com.au.

NSW/QLD

WITH more than 20 years' experience in the steel fabrication and welding industry, the founders of HARD BAKKA – Mona and Aladdin – have accelerated the growth of the company significantly in just four years.

The multi-disciplinary company is now one of NSW's recognised names in steel fabrication, specialising in heavy engineering and construction, with a solid reputation for problem solving, reliability, quality and an on-going commitment to safety.

In 2018 the company tripled in size, and now operates from a 1000sqm, fully equipped warehouse in Fairfield East, NSW.

"We are strategically located between all major growth areas in the Sydney Metro, which has enabled us to successfully deliver steel structures all around NSW," HARD BAKKA general manager Mona Hwalla said.

"We also supply steel structures and platforms for the QLD mines."

The team at HARD BAKKA are ready to take on all structural steel projects and are offering a free quote.



THE PREFERRED STEEL FABRICATOR FOR MINING

HARD BAKKA is an Australian steel fabrication company with a 30-year tradition. The qualified team pride themselves on delivering reliable, world-class steel services to the industrial and resource industries across Australia.

CONTACT US TODAY FOR A FREE QUOTE

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Next generation boom system drives productivity

NATIONAL

DEVELOPED specifically for hydraulic boom systems, BoomSafe represents a leap forward in remote operation technology, significantly improving uptime for operations.

Recent installations in the WA Pilbara have proven that BoomSafe is the most reliable and cost-effective rockbreaker boom automation and remote operation system available in the market.

BoomSafe combines automated movement sequences and collision prevention with true remote multi-operation capability for rockbreaker boom systems and in addition, it is inherently simple to maintain and customise by site personnel.

Safety

With military-grade position sensors mounted in heavy duty housings fitted to the boom, stick, and rockbreaker as well as a rotary encoder to determine slew location, BoomSafe is able to determine the precise orientation and position of the boom system at all times.

Together with the Automated Collision

Prevention System that monitors the boom's allowed range of motion, BoomSafe supervises and authorises all boom movement commands from the local radio control or remote operation system to avoid damage to the boom and surrounding infrastructure.

"BoomSafe's Operator Assist function provides a great advantage over other systems on the market because it can automatically correct and adjust the human operator-initiated movements to direct the boom back into the safe work area, instead of halting the boom operation and requiring further operator intervention to continue," Total Rockbreaking Solutions engineering manager Paul Ingleson said.

Automation

Automated movement commands such as 'Park', 'Deploy', 'Tool Replacement Position', 'Rockbreaker Change Position' or any other common or difficult movement sequences can be configured and modified by maintenance staff onsite via the intuitive touchscreen.

Operators can execute the automated movements with a single button press, improving speed and precision.



BoomSafe's technology improves uptime because maintenance can be completed on site without specialist technicians or TRS staff.

For example, when parking on a small platform, BoomSafe reduces the chance of equipment damage that could easily be caused by operator fatigue or error.

BoomSafe can also be integrated with other sensor systems on site, such as perimeter safety gates.

In addition, it has configurable inputs that can be set up to operate other plant equipment, for example, opening and

closing a crusher cover.

Mr Ingleson said the BoomSafe had also been designed with true multi-operation in mind, allowing a single Remote Module application to control multiple rockbreaker boom systems from a single central location.

More information on BoomSafe can be found at www.totalrockbreaking.com.au.



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With BoomSafe your site maintenance staff can set up and modify commands for common or difficult boom movements via the intuitive touchscreen and operators can execute the automated movements with a single button press. If maintenance is required any BoomSafe components can be replaced onsite in minutes using hand tools.

SAFETY

The TRS BoomSafe Automated Collision Prevention system supervises and authorises all commands from the local Radio Control or Remote Operation System to avoid damage to the boom and surrounding infrastructure.

EFFICIENCY

You can remotely control all your rockbreaker boom systems from a single workstation and integrate BoomSafe with other sensor systems on site, such as perimeter safety gates. In addition, you can set it up to operate other plant equipment, i.e. opening and closing a crusher cover. BoomSafe is available factory fitted on new Boom Systems or can be retro-fitted to your existing boom of any brand without making changes to hydraulic components.

Contact us today to discuss how BoomSafe's functionality can be customised to meet your boom automation requirements.



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Image: Poliberry Energy

Fenner Dunlop leads monitoring market



OptiLength in use on a mine site.

NATIONAL

SURPRISES are never welcome in a fast-paced mine operation.

Think about the cost to replace the most productive, highest performance belt, not to mention the loss in production while it is out of action.

Now imagine how much can be saved with an early warning monitoring system so that a repair or planned overhaul can take place instead.

Fenner Dunlop offers a complete set of belt monitoring and diagnostics tools for the detection of early splice failure, cord/strand breaks, cord corrosion and carcass defects.

In 2006, Fenner Dunlop was already ahead of the market with the rEscan technology – an automated system for early detection of cord breaks, corrosion and splice failure.

No longer after the success of rEscan, Fenner Dunlop released the EagleEye,

the most advanced combined rip detection and continuous belt monitoring system in the world.

Also, part of the Fenner Dunlop high-performance conveyor diagnostics suite is the RipRanger.

Developed to detect belt rips as soon as possible, the RipRanger has the ability to measure, monitor and analyse changes in individual loop condition and quickly isolate damaged or poor performance loops.

In applications where wiring is complicated and prone to failure, the ACE Wireless Conveyor Monitoring replaces the standard cabling method with wireless signals preventing unwanted downtime.

Fenner Dunlop also offers the iBelt, a cutting-edge solution allowing operations to track the location, lifecycle, and use of belts effectively.

RFID tags are placed in the conveyor belt at the time of manufacture along

with opportunities to be added during splicing, where all the variables are recorded and stored in the cloud.

As the belt passes the iBelt system, all changes are recorded and integrated with other technologies such as Belt Weighers, Online Thickness Tester and Belt Rip Systems so that a full belt history can be obtained along with accurate predictive life data.

Innovation is the backbone of continued improvement, and early this year Fenner Dunlop launched the pioneering Online Thickness Tester and the OptiLength to compliment the current offering of Monitoring System technology.

The Online Thickness Tester is a cost-effective belt cover thickness system that is safer with no access required to the belt, more accurate along with being more economical long term as the data is accessed and processed remotely when compared to hand-held readings of similar output.

The belt cover thickness is taken while

the conveyor is running at full speed providing an accurate full length and width belt map which cannot be achieved with hand held measurements.

Issues are easily identified with a belt carcass image being produced to show the wear profile.

This system runs independently, and regular reports are provided to the customer.

The innovative OptiLength is a laser belt length measurement system that has a compact and robust design, providing reliable results even under harsh conditions.

It can be installed on a running conveyor that provides access to accurate belt speed and belt length when installed up to 1000mm from the belt.

One of the benefits of this non-contact measuring system is the system interface – complete, multi-function system that enables access to quickly and easily display length, velocity, quality factor and gauge status.



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The company imports, manufactures and distributes from around the world to supply solutions to meet its customers' needs.

With high precision to bulk supply, Waminco are the industrial specialists, excelling in all areas with proven products.

Its experienced team endeavour to

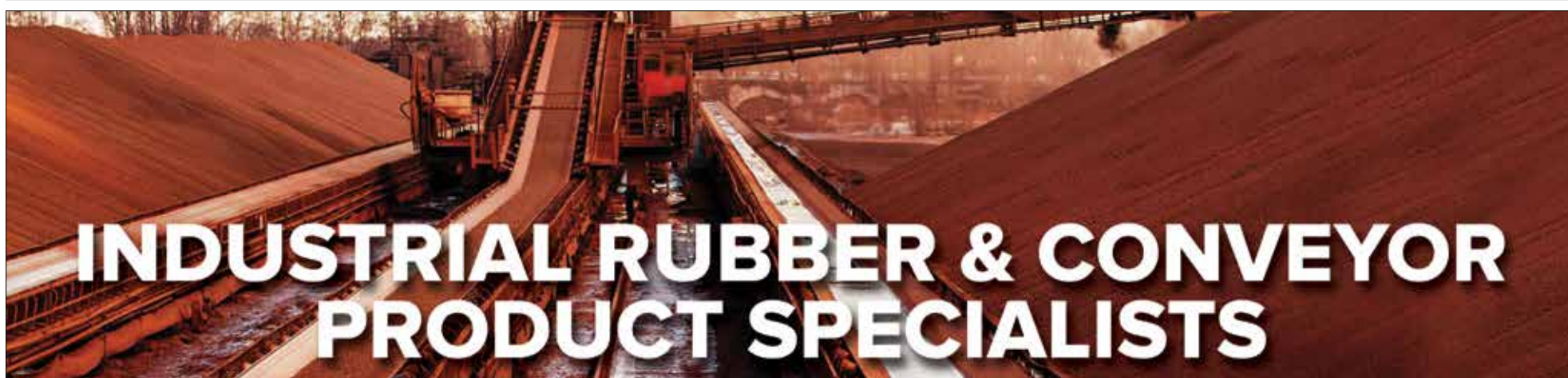
always have popular products in stock to alleviate delays in supply for its loyal customer base.

The team are always happy to discuss the special needs of existing and potential clients.

Centrally located in the Perth suburb of Welshpool, Waminco is a

preferred supplier in WA for the supply of Superscrew, and are also the leading supplier in quality skirting rubber.

The company's reputation speaks for itself in terms of customer satisfaction and service, with its team priding itself on offering the 'best of the best' in industrial rubber and conveyor solutions.



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IN THE SPOTLIGHT

TALGA RESOURCES MANAGING DIRECTOR
MARK THOMPSON

TURN TO PAGE **78**

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Liebherr HS 895 HD crawler crane performs well

VICTORIA

THE HS 895 HD is the largest heavy duty crawler crane in Australia.

Designed for applications such as dynamic compaction, casing oscillators, clamshell grabs, dragline, slurry wall grabs, plus standard lift and shift applications, this crawler crane can tackle the toughest jobs.

Arriving in Melbourne in December 2016, the 200 tonne HS 895 was a gamble for Liebherr and the customer as it was the first of its type.

Since commissioned on a site in regional Victoria, the HS 895 has proven itself time and time again by operating in a large sand quarry with an extensive area rich in horizontal sand deposits that were traditionally unavailable.

Previously, hydraulic excavators and articulated dump trucks worked together but only to a dig to a depth of 15m.

However, once the overburden was removed by the hydraulic excavators, the HS 895 HD had a dig depth of 40m plus; an enormous advantage.

Equipped with a 5.5 cubic metre mechanical clamshell grab, and operating

with a swing radius of about 180 degrees, each full cycle takes only 45 seconds to achieve a full payload.

Designed specifically with a rounded shape and special grab teeth to penetrate very hard soils or interlocked material, and fitted with a tagline winch contributes to quick and precise operation of the clamshell grab, the HS 895 HD is easily able to achieve a high-fill ratio.

Extraction forces of the clamshell were an initial concern of the site operator.

The 2 x 35 tonne single line pull, free-fall winches on the HS 895 allows the operator to have in excess of 70 tonnes of pull force, which ensures a full load in the bucket every time.

Customer feedback noted that the increase in production was an impressive 400 tonnes per hour.

The site operator had also been able to unload the HS 895's clamshell bucket directly into the waiting trucks which drastically cut down on labour and the need for additional excavators and loaders.

This, coupled with the production rate, more than covers the initial investment and running costs of the HS 895.

Liebherr-Australia said it looked forward to the continued success of this



Liebherr's HS 895 HD crawler crane.

equipment in Australia and New Zealand with more additions of this application planned for 2019/20.

A video of the HS 895 HD can be viewed online at Liebherr's YouTube channel: www.youtube.com/watch?v=Ep8KE7NoOkQ.

Top reasons to invest in rugged devices



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NATIONAL

RUGGED devices are the device of choice for many industries.

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laptop, tablet, or handheld product on site.

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Roaming Technologies, supporting the mining industry since 2006, has extensive product experience in rugged technology, carrying leading brands and the latest technology to boot.

With years of experience in the field, its

team can recommend the right product, the first time.

Its brands include global powerhouse Getac, which has been delivering industry leading solutions for more than 25 years.

The company is proud to have been a Getac reseller for more than eight years, and provide free ongoing warranty support for all products purchased.

With a design philosophy of rugged solutions built from the ground up, Getac is

the only manufacturer that offers a backlit membrane keyboard option that is crucial in demanding mining environments.

The Getac V110 and B300 models have been independently tested and certified to military standards MIL-STD-810G, IP65 and MIL-STD-461F.

More information on Roaming Technologies products can be found at: www.roamingtech.com.au.



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INTERNATIONAL

BRAND Energy & Infrastructure Services Australia is a BrandSafway Company.

BrandSafway is a leading single-source provider of specialised construction and industrial services with annual revenues of \$5bn and more than 30,000 customers globally.

Brand has operated in Australia for 40 years providing specialised services include scaffolding, insulation and cladding, and abrasive blasting and coating for asset preservation.

With a focus on industrial services Brand provides these services to many Australian mine sites, port facilities, power stations and other industrial sites to support daily maintenance and shut down activities.

Using a partnership approach, together with project management capability, enables Brand to work with clients to complete projects safely (zero LTI's over four years), achieve programme deadlines and adhere to budget targets.

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equipment such as Surelock (ring lock type) scaffolding, mobile insulation and blasting & painting containers.

Brand provides the broadest range of access and industrial services, products and solutions — with the greatest depth

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It has built a highly skilled team that fully understands what clients want.

Supervisors, engineers and tradesmen are experienced on the major infrastructure projects that have taken place in WA over the past 15 years.

Melchor's aim is to exceed all expectations in an industry where it believes a business must continually improve and impress clients.

The company's success to date has been built on an excellent safety record and a high-quality product, no matter the size or complexity of the structures.

Current work load includes the completion of 23,000 metres of structural concrete at the Tianqi Lithium Plant in Kwinana, a new bridge over the Fremantle Line in Claremont, the new Waste Water Treatment Plant at Beenyup and 12km of Noisewalls on the Northlink project.

The company understands the sensitivity around cost-blow outs, although these issues are usually realised after the wrong contractor has been awarded the work.

Melchor offers complete certainty on the agreed program and always values the job to finish it, not just win it.



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

THE AUSTRALIAN
MINING REVIEW

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Dacian Gold
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Tru-Flo pumping the better way



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NATIONAL

TRU-FLO Pumping Systems is a world-leader in dewatering pump and pontoon packages, providing cutting-edge mine dewatering and water transfer products for open cut and underground mines.

Headquartered in Bathurst, NSW, the company has branches operating near key mining hubs in QLD, WA, and Indonesia.

From these bases, Tru-Flo can service clients throughout Australia and abroad; even in remote international mining locations such as Papua New Guinea and the Pacific Islands.

"Tru-Flo is the benchmark for mine dewatering, you won't find a pump more reliable or efficient," Tru-Flo director Andrew Allbut said.

"We have an expansive range of mining and industrial pumps supplying solutions to global mining, oil and gas, civil and food markets.

"What's more, our extensive team of engineers and hydrologists take projects from initial concept all the way through to commissioning and client hand over."

Mr Allbut said the company's pontoon mounted pumps are a "must-have" in areas that receive heavy rainfall.

"Skid mounted pumps are often drowned in these situations due to limited access to operating pits once rain starts," he said.

"If you do drown your pump we have that covered also. We have rebuild facilities that can bring pumps back to 'as new' condition."

When building a pontoon pump, Tru-Flo's skilled in-house engineering team considers each location's particular specifications during the planning and design process, resulting in the delivery of a tailored pump that precisely meets our client's specifications.

Tru-Flo pontoons can be configured to suit a range of applications, including tailings decant, dewatering, leachate and

CHPP supply water pumps; as well as to underground or fire water supply and water evaporation projects.

"All our pontoons are manufactured to withstand harsh Australian and international open cut mining environments and are quality assured and pressure tested prior to painting," Mr Allbut said.

Pontoons come in various configurations depending on the application.

They can either be of steel construction or roto mould high-density polyethylene cells, with the option of foam filling for indestructible buoyancy.

Each pontoon is manufactured in either two or three module sections enabling easy transport in condensed shipping and sea freight containers.

Access to pontoons is available through various systems including floating and spanning walk ways.

"The diesel range can be fully customised to suit individual mine

applications, with engineering approvals available for compliance, displacements and weight carrying capacities; and are custom designed for safety, quality and ease of use," Mr Allbut said.

The range is capable of pumping against high head situations, large quantities of solids, and slurries; often encountered in mine dewatering.

"Our broad range of diesel and electric options span from 30l/s to 1200l/s, and can achieve heads of up to 200m in a single lift," he said.

Skid mounted pumps can be dragged across tough mining terrain, as they have a rugged design that is fitted with super heavy duty push bars enabling them to be towed or pushed by earthmoving equipment.

Tru-Flo pumps and pontoons are sandblasted, primed, and painted with high build, two pack epoxy paint in accordance with Tru-Flo's 'mine spec' coating and bake procedure to protect against abrasive mine water.

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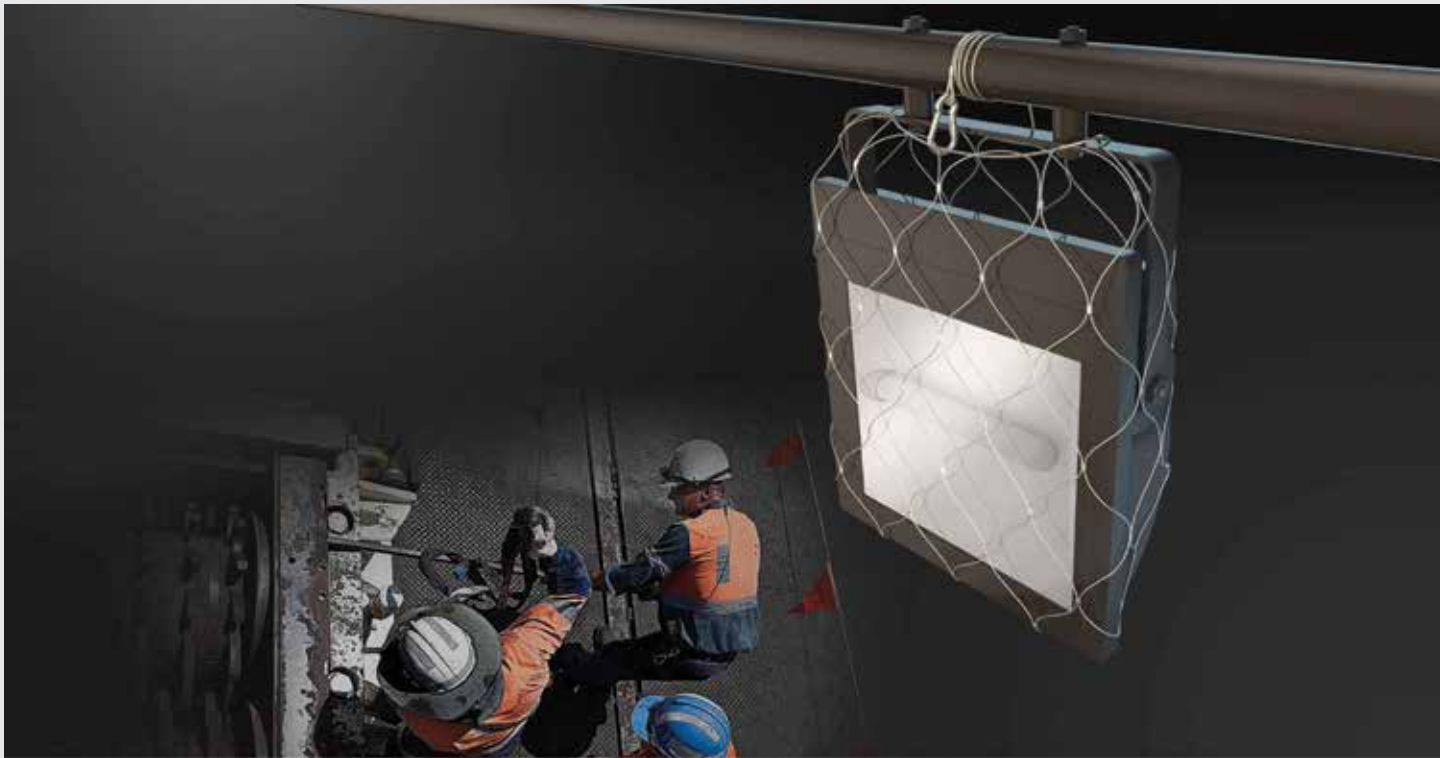
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NATIONAL

FALLING objects are a major cause of lost time injuries and fatalities in the global mining industry.

For more than 20 years, Dropsafe's innovative products have become the standard for securing overhead fixtures in the resources sector; one of the world's most hostile and hazardous working

environments.

Products such as patented mesh-security solutions are safety devices that securely enclose and tether overhead fixtures to prevent falling objects.

The nets are designed and tested to fit a variety of fixture types including flood lights, strobe lights, speakers, CCTV cameras, and pipe clamps and junctions boxes.

Other products include Dropsafe barriers

to prevent tools falling through open guard railings and elevated work platforms; Dropsafe pouches to secure handheld items while working at height; and Dropsafe padlocks with a security cable to ensure padlocks are kept safe at height.

The adoption and standardisation by industry of Dropsafe products reflect the commitment from customers and highlight the importance of workplace safety.

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TALGA RESOURCES MANAGING DIRECTOR MARK THOMPSON

Perth-based junior Talga Resources is looking to make its mark in the battery metal space with a vertically integrated business that starts with its large European graphite deposits. Elizabeth Fabri spoke with Talga Resources managing director and founder Mark Thompson about the company's recent success, new technologies in the works, and outlook for the graphene and graphite markets.

Q. You're a Perth-born, self-taught geologist. How did your idea for Talga begin?

Talga Resources was originally Talga Gold, which I founded to test a portfolio of high-grade gold projects in WA's Pilbara and Yilgarn regions in 2010.

Initial gold exploration results were encouraging but not revolutionary, and in looking to grow the company I saw the megatrend of increased electrification and battery demand. This was in 2011.

In looking deeper into the underlying materials, graphite stood out as having a large and incumbent role in many battery technologies, while still flying under the radar.

The potential was to be an early mover, gaining a world class asset that would be impossible in other battery minerals. After reviewing deposits all over the world I found some extremely high-grade deposits in Sweden.

We pegged our first graphite deposits in late 2011 and in early 2012, before moving on the purchase of a Teck subsidiary, which owned a portfolio of assets in north Sweden including the ultra-homogenous and high-grade Vittangi graphite deposit.

Vittangi still remains the world's highest-grade mineral resource of graphite under JORC or NI43-101 codes, and along with our other projects there we now control the largest graphite deposits defined in Europe.

Q. Was vertical integration always the end game?

No. When we started it was a straight forward raw material play, but a metallurgical breakthrough transformed the project.

This led us on the path of developing a new and wholly owned processing technology, making graphene alongside graphite but in an integrated way. Quickly thereafter we found that

potential graphene consumers need fit-for-purpose material, translating into particle engineering and chemistry fit to match manufacturing lines.

So, we created an in-house R&D team and now have a growing portfolio of graphene product technologies and intellectual property.

This level of vertical integration is a major advantage for us and to large end users, and our IP carries over into product lines and offers further value opportunities such as production royalties and licencing.

Q. Why did you establish a subsidiary—Talga Battery Metals AB—for your cobalt projects?

The Teck transaction included what is known as Sweden's largest cobalt deposit, Kiskama.

Being an IOCG system the deposit has some attractions in scale compared to other European deposits that tend to be in small veins.

Kiskama also has copper and gold co-products and extremely high metallurgical recoveries, making it attractive on a numerous levels.

However, our main focus is delivering the graphite-graphene project. As metal projects require extra demand for skills, processes and ways to finance development we decided to proceed with an internal restructure, splitting the assets to enable better resourcing for advancing the battery metals projects.

This includes a dedicated management team being appointed and exploration designed so as to increase value prior to deciding on the best path forward for Talga Battery Metals; a decision which may include options such as a spin out.

Cobalt prices have been off their peaks lately but in any scenario going forward the demand is there, and our potential supply is strategically located.

Q. Take us through the recent quarter highlights.

We announced breakthrough test results from our fully formulated Li-ion battery anode, finding a substantial (about 20 per cent) increase in power and energy. The anodes were prepared in commercial scale pouch cells, showing we can engineer a "super-graphite" to be anode ready.

This offers potential for us to enter the value chain at a much higher level and capture higher margins.

On the graphene front we found that the addition of our Talphene® could make concrete significantly electrically conductive, opening the possibility for heating applications such as snow/ice free roads, footpaths and driveways.

It could also potentially play a role in the dynamic charging of electric vehicles through induction.

Towards the end of the quarter we also completed an \$8.5 million placement providing funds to accelerate the battery grade graphite development, cobalt development and strengthening the balance sheet for advancing graphene developments.

Q. Talga has formed some strategic partnerships and commercial agreements in recent years with the likes of Jaguar, Landrover, University of Cambridge, CSIRO, Bosch, BASF, Heidelberg Cement, Tata and recently Haydale for conductive ink. What has been your strategy for collaboration?

The graphene products strategy is to invest in people, our own IP, and technology to make a prototype of a product and demonstrate how it performs.

This means you bring a lot of know-how and equity to the customer and offer more value in a collaboration, and can speed up the practical development of advanced materials directly with brand name end users.

Q. What is your outlook for the graphite and graphene markets, and where does Talga fit in?

The outlook for natural graphite demand is very strong.

China is cracking down on polluting graphite producers, but at the same time the world using more graphite in batteries, [so the] prices of natural graphite have started to rise strongly, depending on the grade.

Some report China will go into graphite deficit as soon as next year, as Government-legislated electric vehicle production creates overwhelming new demand, stranding much of the rest of world without supply.

Talga is well positioned to take advantage of this having developed, in addition to our graphene additives, breakthrough anode-ready graphite products.

The graphene market is in its infancy but accelerating, as more manufacturers work directly with customers rather than chase retail sales. No one doubts that it has a bright future.

Q. Final thoughts?

Our original thesis in taking Talga into industrial minerals and technology still holds.

I meet industrial conglomerates and global scale automotives regularly now and there is a tsunami of demand coming, emerging from the new market drivers and legislation towards cleaner air.

Likewise in graphene products, where it is earlier days but commercialisation of new breeds of materials is underway.

With our strongly integrated mineral resources, process technology and downstream advanced materials, I feel we have built an Australian business with a global and potentially powerful role in both our commodities and the energy mobility landscape. It is an exciting time.



WingtraOne

Aerial Data for Professional Mapping and Surveying

The Vertical Take-Off and Landing (VTOL) capability allows the WingtraOne to ascend and move like a helicopter. For the mapping mission it transitions into forward cruise flight and matches the endurance and speed of fixed-wing airplanes. In order to land, the WingtraOne switches back to hover flight and descends vertically.

- **Vertical take-off and landing** allows use in a far greater variety of situations, guarantees safety for the operator and offers much reduced wear and tear on the drone.
- **State of the art PPK system** allows for mapping with down to 1 cm absolute accuracy without using ground control points.
- The WingtraOne PPK system with **42 MP camera** produces brilliant resolution images with down to 0.7 cm/px GSD.



wingtra



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