

THE AUSTRALIAN MINING REVIEW

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ISSUE 119, NOVEMBER 2017

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GOOD AS GOLD

After a strong campaign, the WA gold industry can breathe easier – the threat of a 50 per cent gold royalty hike has been KO'd by the State Opposition. But what will this Budget black hole mean for the State's finances?

ANALYSIS **p10**

WA Treasurer Ben Wyatt speaks at the rally at Parliament House.
Image: The Chamber of Minerals and Energy WA.

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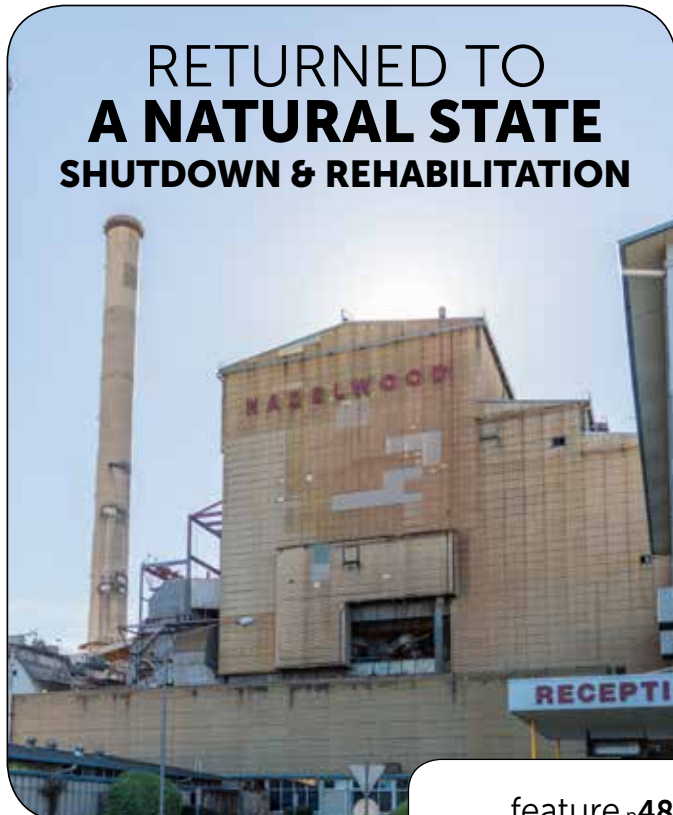
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PUBLISHED BY
ABN 28 112 572 433A product of
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MAJOR COMMODITIES

SNAPSHOT

WATCHLIST

Iron Ore Juniors

Atlas Iron

ASX:AGO

After almost collapsing in 2016, Atlas Iron has bounced back into the black after posting a full year profit of \$48m for FY17 on the back of improved iron ore prices.

BC Iron

ASX:BCI

The iron ore junior has also swung back in to profit, posting a \$7.1m after tax profit for FY17 compared to a \$43.9m loss for FY16. BC Iron readying a development play for its Buckland project near Cape Preston East.

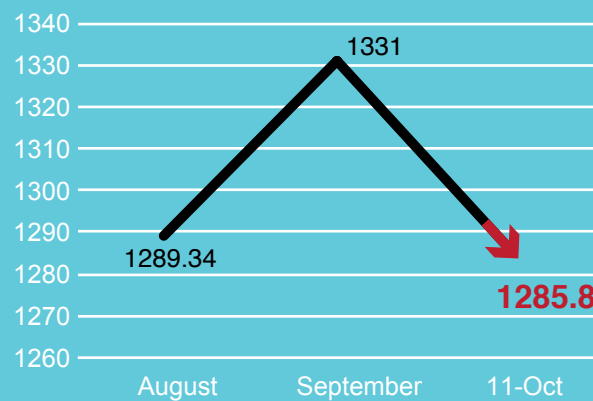
Mount Gibson Iron Ore

ASX:MGX

When a seawall collapse suspended operations at the company's Koolan Island operation, it looked unlikely the project would ever get back on track. However a large insurance payout has given Mount Gibson the funds to get the high grade iron ore project back on track.

GOLD

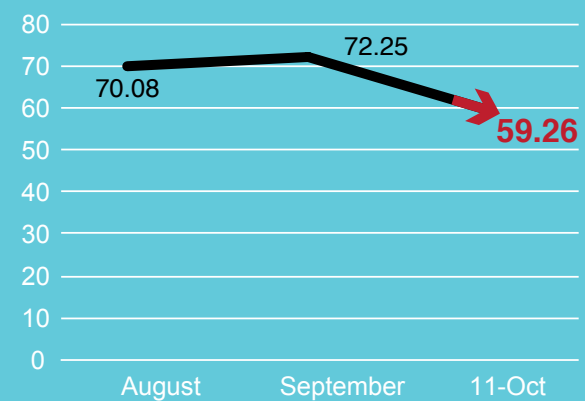
\$US/oz



IRON ORE

\$US/t

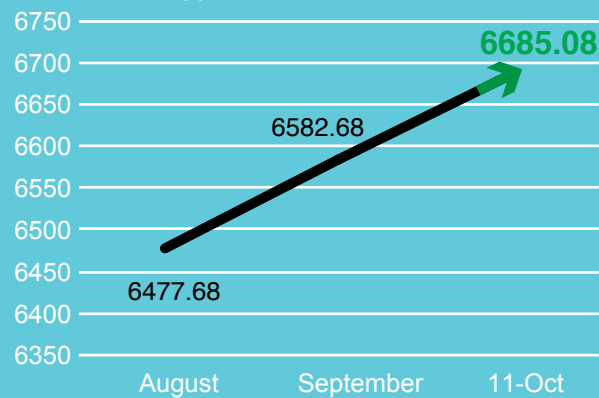
62% Fe CFR China



COPPER

\$US/t

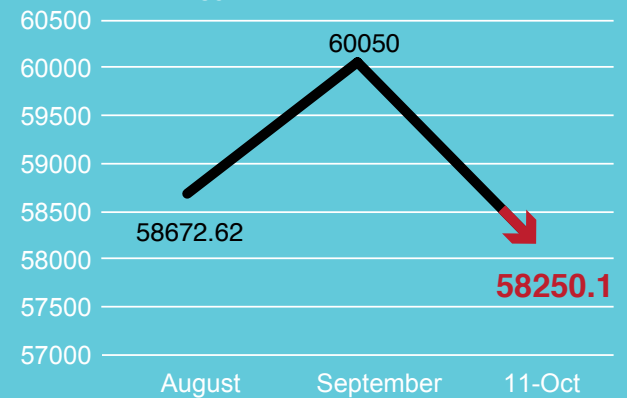
LME Price



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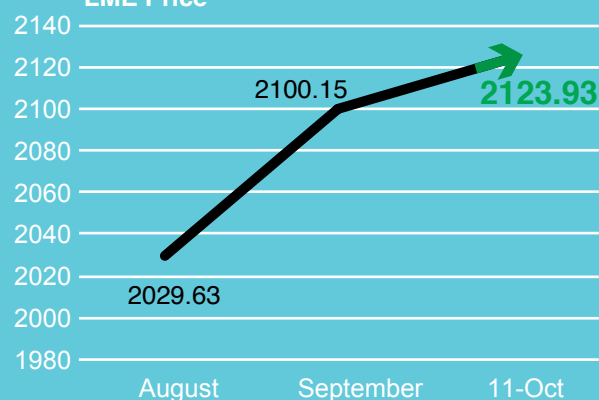
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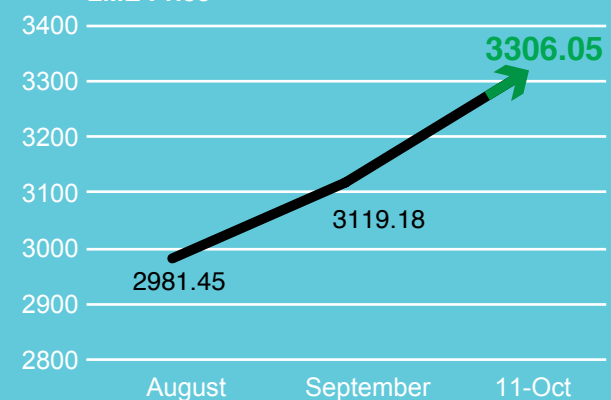
LME Price



ZINC

\$US/t

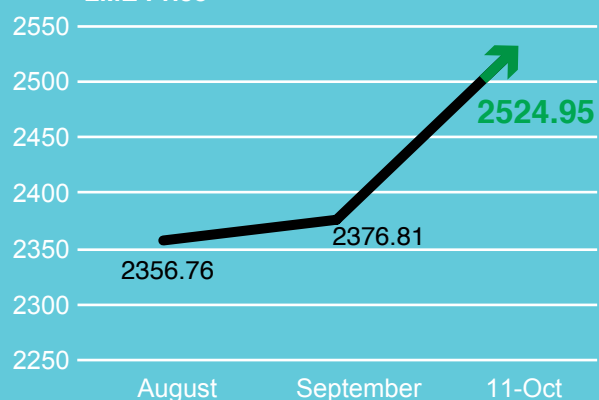
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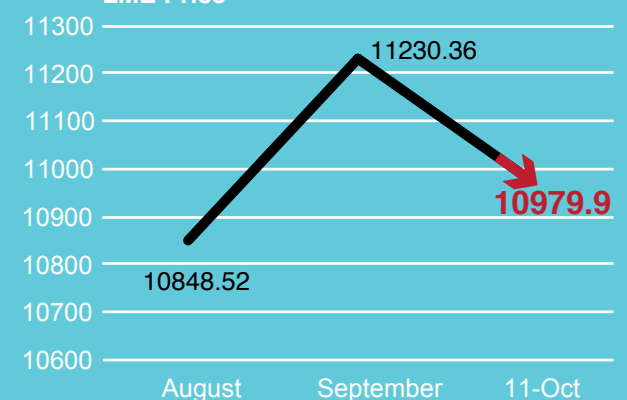
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IN BRIEF

Gold Road inks JV deals

GOLD

MID-TIER Gold Road Resources has entered into two earn-in JV arrangements with Cygnus Gold to explore acreage in South West WA.

Gold Road can earn up to a 75 per cent interest in two large tenement holdings covering 3400sqkm in the Wadderin and Lake Grace greenfields exploration projects.

“We believe this a potentially new gold district in an area of WA which has been neglected for many years,” Gold Road exploration and growth executive Justin Osborne said.

Gold Road would also subscribe for \$750,000 in shares in Cygnus’ upcoming initial public offering (IPO) later this year.

Altura raises \$26m for Pilgangoora Stage 2

LITHIUM

ALTURA Mining has raised a further \$26 million to develop a feasibility study for a Stage 2 expansion of its Pilgangoora lithium project.

Stage 2 would upgrade the processing plant to 4 million tonnes per annum with an expected annual output of 450,000 tonnes of spodumene concentrate.

“We received a strong level of interest from international investors in how advanced the Altura lithium project already is and how the project could be expanded to meet growing global demand for lithium,” Altura managing director James Brown said.

“Construction of the project is already more than 50 per cent complete and is fully funded following the recent finalisation of the \$US110m senior secured debt facility.”

\$US45m restart for Century

ZINC

NEW Century Resources has signed a \$US45 million debt facility to fund a 2018 restart of the Century zinc mine in North West QLD.

“This facility will allow the team to expedite its activities for the targeted restart of the Century zinc mine, with the funding used for the commissioning process and achievement of first production in 2018,” New Century executive Evan Cranston said.

During its 16 years of operation, the mine – previously owned by MMG – was one of the world’s largest zinc operations, producing an average of 450,000 tonnes per annum (tpa).

New Century said a restart feasibility study for the project remained on track and is targeted for completion in November.

Off the Wall
Auto maker drives into lithium supply

Image: Pilbara Minerals.

“It highlights the strategic importance for the global automotive sector of securing access to large scale, consistent, high quality sources of battery raw materials in low-risk jurisdictions.”

Pilbara Minerals expects its Stage 2 expansion to make it one of the largest lithium producers in the world.

CAMERON DRUMMOND

CHINA’S Great Wall Motor Company will accelerate into WA’s lithium sector after landing an offtake agreement with Pilbara Minerals for 75,000 tonnes per annum (tpa) of the miner’s Stage 2 production.

As part of the deal, Great Wall has committed \$28 million upfront to receive 56 million Pilbara Minerals shares, effectively giving it 3.5 per cent ownership of the company.

The automaker also has the option to secure a further 75,000tpa by providing Pilbara Minerals with \$US50m of debt financing for the Stage 2 expansion.

Pilbara Minerals managing director Ken Brinsden said the deal was significant for company and the rapidly evolving lithium supply chain.

“It highlights the strategic importance for the global automotive sector of securing access to large scale, consistent, high quality sources of battery raw materials in low-risk jurisdictions,” Mr Brinsden said.

“Attracting a company of Great Wall’s size and calibre as a long-term off-take and funding partner is a strong endorsement for the Pilgangoora project and the company.”

Together with the offtake, Pilbara Minerals, “in response to market demand for lithium and the strong appetite for spodumene concentrate globally”, said it would upgrade its Stage 2 plan to encompass a nameplate capacity of 5 million tonnes per annum (mtpa) up from 4mtpa announced in the pre-feasibility study.

This would give Pilgangoora the ability to produce more than 800,000t of spodumene concentrate each year, making it one of the world’s largest lithium mines.

Evolving with the times

Great Wall, with its 60,000 strong workforce and \$US18.1 billion market cap, is China’s largest manufacturer of SUV’s.

As the Chinese Government’s new cap-and-trade energy policy comes into effect in 2019, its car manufacturers will be required to obtain a new energy vehicle score of at least 10 per cent zero or low-emission vehicles, rising to 12 per cent in 2020.

It has so far produced only one electric vehicle – the C30EV sedan.

If the company doesn’t adjust its product line, it will be forced to purchase energy credits or pay hefty fines.

Investing into the WA’s lithium supply may be a sign Great Wall is shifting from its SUV strategy to ‘greener’ pastures.

Big potential at Mt Thirsty

REUBEN ADAMS

JV partners Conico and Barra Resources have unveiled a scoping study with “a robust set of financial metrics” for the Mt Thirsty cobalt project near Norseman in WA.

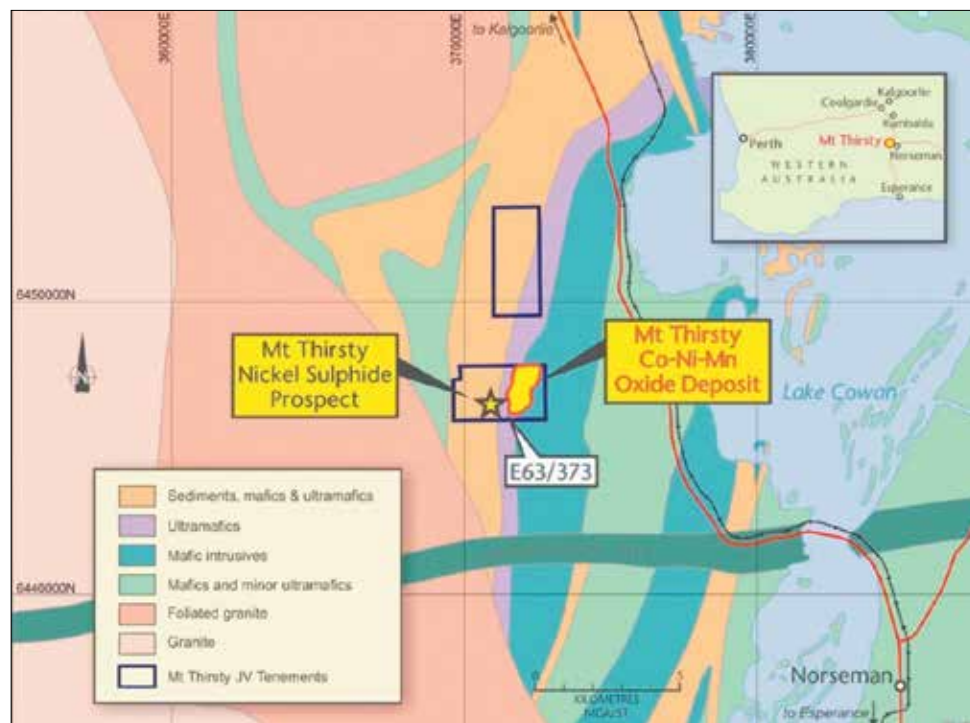
The Mt Thirsty Joint Venture (MTJV) was looking to push the project towards development in the face of strengthening cobalt fundamentals and a rebounding nickel market.

The study estimated low capital and operating costs of \$212 million and A\$43 per tonne of ore treated.

A total of up to 27,000 tonnes of cobalt and up to 35,000 tonnes of nickel could be produced over the initial 21 year mine life.

The MTJV stated that results confirmed its view that Mt Thirsty represented a “long mine life, low capital and operating cost mining opportunity in a stable jurisdiction with excellent logistics”.

There was also potential to extend the mine life through the inclusion of additional tonnages from other prospects



The location the Mt Thirsty cobalt project near Norseman in WA.

in the region, with The MTJV recently discovering a small cobalt deposit about 3km to the north.

Partners and funding were now being sought to progress to a pre-feasibility and feasibility study “as soon as possible”.

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Win-win for QLD cities

Adani names Rockhampton and Townsville as FIFO hubs

CAMERON DRUMMOND

A TWO horse race has ended in a dead heat, with both Rockhampton and Townsville to become FIFO hubs for Adani's \$16.5 billion Carmichael coal development.

The cities both put in strong individual business cases, and Adani decided to utilise twin marshalling points for the massive mine, rail and port project.

Adani Australia chief executive Jeyakumar Janakaraj said the first order of business would be the construction of an airstrip close to the mine to deliver construction workers from Townsville and Rockhampton.

"Then we can start construction of the Carmichael thermal coal mine and the western sections of the Carmichael Rail Network," Mr Janakaraj said.

He said that while the FIFO decision had been difficult, he was pleased that both cities came out winners.

"Rockhampton and Townsville put in commercially strong and competitive bids to be the single FIFO hub for the Carmichael project," he said.

"The bottom line for Adani was the size of the workforce needed, both in the construction stage and the operational stage, as well as our commitment to generate jobs across regional QLD.

"I wish to thank the respective Mayors – Jenny Hill, from Townsville, and Margaret Strelow, from Rockhampton – for their unwavering support of our project and for leading their respective communities' professional bids.

"I also wish to thank the Rockhampton and Townsville business organisations and their State and Federal political representatives who have all promoted their cities and regions."

Adani said it would be further updates soon relating to mining machinery.

Cause for celebration

The Palaszczuk Government has welcomed Adani Australia's decision to pick both Townsville and Rockhampton as the cities to host FIFO hubs for the project.

QLD Agriculture minister Bill Byrne said the State had previously called for Adani to select both cities as FIFO hubs.

"When the Premier met Adani Chairman Gautam Adani last year, she secured a series of commitments about its workforce," Mr Byrne said.

"At that time, Adani confirmed the shortlist for a FIFO hub was Rockhampton and Townsville, with a decision due this year coinciding with the start of early works."

Member for Mundingburra Coralee O'Rourke said it was welcome news for Townsville locals that Adani had selected their city as one of the projects FIFO locations.

"The rivalry between Townsville and Rockhampton is long-standing, and both Councils have worked with Adani making their case to be a FIFO Hub," Mrs O'Rourke said.

"Our focus has been to maximise the jobs it will generate, directly and indirectly, and see the benefits from this project spread right across regional QLD."

Rockhampton Mayor Margaret Strelow said the agreement with Adani guarantees a third of the construction jobs and half of the



Utilising both cities as FIFO hubs would minimise unforeseen travel risks and downtime.



The Adani decision is a defining moment for Rockhampton.

ongoing operational jobs will be sourced from Rockhampton.

"This is a defining moment for Rockhampton that will change the face of our region for generations to come," Mayor Strelow said.

"The influx of more than 1700 new jobs will be a massive driver for our local economy and the benefits extend to more than just employment – it's more money being spent in our shops and more people living in our region.

The deal secures a third of the project's construction force – more than 1100 jobs – to be based out of Rockhampton, with another 625 positions based in the city once the mine entered its operational phase.

"It's up to us a community now to make sure that we make the most of this opportunity," Mayor Strelow said.

PROGRESS TO DATE:

- **\$150M+** contracts awarded for rail lines and sleepers
- **Downer Mining** awarded Carmichael construction and operation contract
- Start of pre-construction works and mining camp refurbishment
- **Established Adani Mining HQ** in Townsville
- **Townsville and Rockhampton** named FIFO hubs
- **Deployed field staff** for surveying, soil test drilling for the rail project



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All images: The Chamber of Minerals and Energy WA.

Hundreds of industry workers descended on WA State Parliament on 10 October to protest the royalty increase.

ELIZABETH FABRI

THE WA Labor Government is licking its wounds after WA Liberals announced it will block its controversial gold royalty increase proposed to fix the State's finances.

Announced in the September State Budget, the royalty involved a 50 per cent increase from the current rate of 2.5 per cent to 3.75 per from January next year, when the Australian gold spot price is above \$1200.

The royalty increase received strong opposition from companies and industry groups such as the Chamber of Minerals and Energy WA (CMEWA), which launched a hard-hitting advertising campaign claiming the tax would hurt WA families and result in 3000 job losses.

On 29 September, the Labor Government lodged a notice with the *Government Gazette* to effect the change.

Gazetted items, however can be torn up by a disallowance motion in the Upper House by WA Liberals.

On 10 October, hundreds of mining bosses and industry workers assembled outside WA parliament to protest the royalty increase, ahead of the WA Liberal's party room meeting on the matter.

WA Liberal leader Mike Nahan announced the Government's proposed tax hikes would "destroy jobs" and the party had decided it will proceed with a disallowance motion.

"The WA Liberal Party made a decision to protect WA jobs," Mr Nahan said.

"We will block Labor's 50 per cent increase in the gold royalty, standing up for jobs."

WA Treasurer Ben Wyatt described WA Liberals decision as a "complete disregard" for the State's finances, labelling the party as "financial wreckers".

"Opposition leader Mike Nahan has today cast off any remaining shred of financial credibility," Mr Wyatt said.

"Clearly not satisfied with the damage he caused while destroying the State's finances as Treasurer, Mike Nahan has now added nearly \$400 million back onto the State's debt while opposition leader.

"The idea that the Government should simply find an alternative revenue source, arguably one that impacts on no-one while also raising billions of dollars is quite simply laughable."

In the days leading up to the decision, WA Mines minister Bill Johnston told *The Australian Mining Review* there was no Plan B if the Upper House proceeded with a disallowance motion, and the Government would have to go back through the Budget.

"It is a very difficult budgetary situation. We knew that the Budget had been completely ruined by the former Government; that was not a surprise to us," Mr Johnston said.

"Unfortunately on top of that we have had \$5 billion write downs off our revenue so we

have to respond.

"We have to do what we can to get the State's finances back under control."

Mr Johnston said given the price of gold was nearing \$200 higher than it was two years ago in Australian dollar terms, he did not think it was "unreasonable for the gold sector to pay more for the gold that belongs to the people of the State".

"It's important to remember the gold in the ground belongs to the Government not to the mining company," he said.

"All we're doing is asking the company's to pay \$20 extra per ounce.

"I don't accept this idea that a \$20 royalty is the different between a project proceeding and not proceeding.

"What I do accept is that the \$20 makes the risks of the project higher, but it simply can't be true that a \$20 change in the royalty makes the project unviable."

CMEWA chief executive Reg Howard-Smith was one of many who welcomed the WA Liberals decision it would block the royalty.

"Our modelling clearly showed the direct and flow-on economic impacts of this proposal were too much to bear," Mr Howard-Smith said.

"The reality is there are gold mines which are too marginal to absorb the 50 per cent increase in costs and jobs would have been lost."

INDUSTRY VOICES

"All of our projects are high margin projects so the addition of the royalty is not going to change the business and how the business is run; that's a reality.

But this is an impost on the gold mining industry.

It's a breach of promises that the Labor party made during the campaign period."

Independence Group
Chief executive and
managing director
Peter Bradford

"The WA gold industry is quite segmented and the scale of operators is really broad, from junior explorers to global major producers.

[Increased costs] always goes through to discovery costs and exploration; the discovery of new deposits is becoming increasingly more challenging and any increase in the royalty will materially impact people's decision to invest."

Northern Star
Chief executive
Stuart Tonkin

"It makes no economic sense that the WA Government would want to damage one of the engine rooms of our economy by hitting it with a 50 per cent increase in a major cost, when that only represents 0.2 per cent of the 2017/18 Revenue Budget."

How is that Budget repair when 60 per cent of the revenue raised will go to Canberra and be re-distributed through the GST process?

The opposition parties have all stood up for Western Australia as one of the world's leading mining jurisdictions, and to stop job losses and prevent lost opportunities."

AMEC
Acting chief executive
Graham Short

"For our business that [would have been] a \$6 million hole into our free cash flow.

To think [the gold royalty] is not going to have an impact on WA jobs is unrealistic, and I suppose the biggest disappointment out of all this is that this is the third time this has been floated up.

The previous two times it has been in consultation, and we've been able to engage with Government. This one has had no engagement whatsoever."

Saracen
Managing director
Raleigh Finlayson



WA Liberal leader Mike Nahan said the tax would "destroy" jobs.



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The SkyHook is a unique truck mounted mobile fall arrest system, the first of its kind to be designed and built.

Designed and manufactured to AS1891 and AS5532, the SkyHook

has a reach of 25 m high and 13 m radius. In a scenario where there is no WAH and/or rescue equipment installed on an asset or the available equipment is deemed inappropriate for use, the SkyHook MKIV provides a rated overhead anchor point for 2 persons (272 kg). The SkyHook has two 10 m LinQ Self-Retracting Inertial Reels attached to enable WAH in limited free fall at all times.

In addition to rated WAH anchor points, the SkyHook also provides a rated overhead anchor point suitable for rescue recovery of an injured person. This anchor point can be used with the factory installed Harken Lokhead INLH500 rescue winch built into the SkyHook, or alternately can be used to attach a RescueMaster or similar device. The SkyHook anchor point can be used to both rescue an injured person.

Work area lighting is provided at the attachment point along with cameras providing a live video feed to the operator via a monitor located on the trucks control panel.

TLC believe the SkyHook breaks new ground for innovation in an area where there is potential to prevent a significant number of injuries or deaths. The project has required extensive engineering and problem solving to reach the point of final delivery.

The truck mounted system is suitable for use even on uneven surfaces due to the hydraulic stabilisers that allow the SkyHook MKIV to be appropriately leveled in all situations encountered.

The 25 m height and 13 m radius of the boom enabled the equipment to be operated without

positioning the vehicle in close proximity to the asset being inspected.

The additional applications for the SkyHook MKIV are almost endless. Wherever there is a need to work at height and appropriate rated anchor points are not available the SkyHook can be used to offer a safe, effective and practical solution. We see application for this particularly in industries such as roofing and tilt up panel construction where there is a need to work at height in ever changing locations. Additionally the SkyHook can be used following damaging events such as severe storms or cyclones to safely inspect the integrity of a structure without compromising safety.

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IN BRIEF

Aspire step closer to Nuurstei production

MONGOLIA

WA-based metallurgical coal explorer Aspire Mining has been granted a 30-year mining lease for its Nuurstei coking coal project in northern Mongolia.

The news followed Aspire's increased ownership interest in July, from 50 per cent to 100 per cent in the corporate entity which holds a 90 per cent interest in the project.

Aspire managing director David Paull said securing a mining license was an important milestone and reflected the Mongolian Government's continued support for the company and the coal industry in general.

"The company is now working very hard on commercialising this high quality coking coal project as soon as possible," Mr Paull said.

Tiris uranium green lit

MAURITANIA

AURA Energy has received environmental approval for its \$US45 million Tiris uranium project in Mauritania, West Africa.

Aura Energy executive chairman Peter Reeve said the approval marked a major milestone for the company as it worked towards its production goal.

"This step is pivotal as the main project precursor to pursuing production offtake and project financing arrangements," Mr Reeve said.

Aura will now be required to set up a radiation monitoring system under the supervision and control of the National Radiation Protection, Nuclear Safety and Security Authority (ARSN).

Lucapa secures finance for diamond mine

LESOTHO

LUCAPA Diamond Company has secured a \$US15 million financing facility to develop Phase 1 of its Mothae kimberlite diamond mine in Lesotho, Southern Africa.

The debt facility has been entered with Singaporean company Equigold and is repayable in eight quarterly payments from December 2018, when Lucapa plans to be in "steady state" production.

"This facility ensures that the company, together with the Government of Lesotho, will bring Mothae on stream in 2018, adding a second cash producing asset and high-value producing mine to the group that will complement the top-quality diamond production from Lulo," Lucapa managing director Stephen Wetherall said.

Gold boost on NK tensions



US President Donald Trump.

ELIZABETH FABRI

GOLD prices are on the rise again amid growing tensions between the US and North Korea.

On Monday 9 October, following a four-week dip, the gold price rose by more than \$US10 up to \$US1285, following the weekend's war of words between Washington and Pyongyang.

Reports from Russia, which claimed North Korea was preparing to test a long-range missile that could reach the US, impelled a flurry of investors to turn to the safe haven asset.

A series of tweets made by US President Donald Trump on 7 October also caused a stir.

"Presidents and their administrations have been talking to North Korea for 25 years, agreements made and massive amounts of money paid hasn't worked, agreements violated before the ink was dry, makings fools of U.S. negotiators. Sorry, but only one thing will work," Mr Trump tweeted.

What that "one thing" Mr Trump refers to remains unknown, but nonetheless, investors took the bait.

North Korea's leader Kim Jong Un,

in a speech to the North Korea's Central Committee of the ruling Workers' Party, described his nuclear weapons program as a "treasured sword" protecting the country's independence.

On 12 October gold prices swelled further to \$US1297.40, the highest since 25 September, as minutes released from a September Federal Reserve meeting turned attention to US inflation figures.

"The market is looking for a little direction and there's not much on the horizon until we get more geopolitical conflict or we see interest rates pick up," U.S. Bank Wealth Management senior investment strategist Rob Haworth told *Reuters*.

First gold at 400koz Fekola

CAMERON DRUMMOND

CANADIAN miner B2Gold has poured first gold at its flagship Fekola gold mine in Mali three months ahead of schedule.

The mid-tier gold miner said commissioning of the mill was ongoing and commercial production on track for the end of 2017, with gold production for the December quarter expected to be between 50,000oz and 55,000oz.

B2Gold flagged its first full year of production at Fekola to yield between 400,000oz and 410,000oz, representing a 70 per cent increase in overall gold production to between 925,000oz and 975,000oz per annum.

Based on an updated life of mine plan announced in September, Fekola is expected to maintain a run rate of 400,000ozpa for the first three years at an AISC of \$US664/oz.

B2Gold believed there was significant potential to increase the current mine life of 10 years through further drilling, upping its exploration budget from \$US11.6m to \$US15.8m.



Fekola will be B2Gold's largest gold operation to date.

The miner has four other operating mines, two in Nicaragua, one in Namibia and another in the Philippines, along with

numerous exploration and development projects in various countries including Finland and Burkina Faso.



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Rio trains ride solo

ELIZABETH FABRI

RIO Tinto is a step closer to its goal of running a network of fully autonomous trains across its Pilbara operations, after completing its first unmanned train journey in October.

The 100km pilot journey between Wombat Junction and Paraburdoo was the first fully autonomous heavy haul train run in Australia, and a significant milestone for the WA iron ore miner as it works towards full commissioning of its AutoHaul technology in late 2018 once regulatory approvals have been received.

Rio Tinto Iron Ore chief Chris Salisbury said the pilot was closely monitored by teams on ground and at its operations centre in Perth.

"Rio Tinto is proud to be a leader in innovation and autonomous technology in the global mining industry which is delivering long-term competitive advantages as we build the mines of the future," Mr Salisbury said.

"This successful pilot run puts us firmly on track to meet our goal of operating the world's first fully-autonomous heavy haul, long distance rail network, which will unlock significant safety and productivity benefits for the business.

"Gains from AutoHaul are already being realised including reduced variability and increased speed across the network, helping to reduce average cycle times."

Bowen Basin innovation cluster opens

ELIZABETH FABRI

THE Queensland Government has launched its METS Ignited Bowen Basin Cluster Program set to create more than 3000 additional mining technology jobs in the next decade.

The Mackay pilot program was announced earlier this year as part of the State Government's Roadmap and Action Plan, part of its \$420 million Advance Queensland initiative.

The program is a joint initiative with METS Ignited, and aims to promote collaboration to solve real business problems and in turn deliver more jobs and business opportunities.

"Local miners will identify their challenges, and local mining technology companies will collaborate on innovative solutions to bolster the North Queensland economy," Member for Mackay Julieanne Gilbert said.

"We want to make it easier for companies to turn their ideas into commercial products for market."

Member for Mirani Jim Pearce said the Bowen Basin was selected for the program because it was home to world-leading mining, equipment, technology and services companies (METS) with a long history of finding the solutions to the problems faced by miners both locally and internationally.

"Our companies are international market leaders in exploration, mine design and construction, mine safety, minerals processing, remediation and rehabilitation," Mr Pearce said.

"This successful pilot run puts us firmly on track to meet our goal of operating the world's first fully-autonomous heavy haul, long distance rail network."



Rio Tinto's driverless AutoHaul train.

Rio Tinto currently operates about 200 trains in the Pilbara transporting ore from 16 mines to four port terminals, across more than 1700km of track.

Mr Salisbury said new roles were being created to manage its future operations,

and the company was preparing its current workforce to ensure they remain part of the industry.

A new wave in blasting tech



"Shockwave Power Plasma has the potential to revolutionise the global and Australian blasting industries."

According to Blastboss, Shockwave creates a hydraulic shockwave effect that increases rock fracturing using fewer explosives.

REUBEN ADAMS

AN INNOVATIVE blast decking system, designed to boost rock fracturing using less explosives, will be launched to market by Australian blasting tech company Blastboss.

Developed over three years, the Shockwave Power Plasma is an ultra-high viscosity plasma gel which is loaded into a blast hole as decking.

When detonated, it creates a hydraulic shockwave effect "that attenuates, redirects and extends explosive energy during the

blast pressure event", according to Blastboss.

This shockwave effect reduces cap rock issues and increases rock fracturing using fewer explosives.

Improved rock fragmentation could also mean lower excavation and haul costs, lower crushing costs and increased mining advance and processing volumes.

"Throughout my 30-plus years as a director of a leading global fine particle management company, I saw that the mining, quarrying and civil engineering industries continually faced blasting challenges," Blastboss chief David Handel said.

"Old-fashioned blasting methods can cause increased costs and adverse environmental effects including exposure to dangerous fumes and excessive dust, noise and vibration," he said.

"Shockwave Power Plasma has the potential to revolutionise the global and Australian blasting industries by providing an advanced and efficient blasting solution that lowers costs, boosts productivity and enhances safety while being environmentally friendly, and we are genuinely excited to introduce it to the market."

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Thiess locks in Jellinbah extension



Image: Thiess.

Thiess is extending its contract at Jellinbah until 2020.

CAMERON DRUMMOND

CIMIC Group subsidiary Thiess has been awarded a \$189 million contract extension at Jellinbah Mining's Jellinbah

East coal mine near Blackwater, QLD. The contract is a 30-month extension that will see Thiess continue to deliver mining services at the mine until September 2020.

"This extension reflects the successful relationship between Thiess and Jellinbah

Group, which dates to the establishment of its Lake Vermont coal mine in 2007," CIMIC chief executive Adolfo Valderas said.

Thiess managing director Douglas Thompson said the company was delighted

to extend the partnership with Jellinbah.

"We are pleased to continue our long-standing involvement with the Blackwater community, where we launched our Sisters in Mining program, and support a series of community initiatives."



Image: Whittens Group.

Whittens civil construction contracts have been flowing in this year.

Whittens continues winning streak

REUBEN ADAMS

PERTH-based contractor Whittens has locked down its sixth major contract for 2017 on the Pilgangoora lithium-tantalum project in WA.

The contract is valued at an estimated \$10m, and includes installation of 5800 cubic metres of concrete from September 2017 through to January 2018.

Whittens' scope of work involves concrete construction of primary and secondary crushing, tertiary crushing (wet screening), wet processing, spodumene concentration dressing, and processing plant services.

"We are very pleased to be part of such a significant project; this contract award validates the commitment of our people and further cements our position in Western Australia as the leading self-perform construction and services partner to the mining industry," Whittens chief executive Louise Whitten said.

\$220m win for Monadelphous



Image: Monadelphous.

Perth-based Monadelphous has grown to one of WA's largest mining services providers.

CAMERON DRUMMOND

MINING services group Monadelphous has secured \$220m in new resources sector work across Australia.

Contracts include a two year contract to supply fixed maintenance services at Rio Tinto's Pilbara operations.

The company has also been awarded a one year extension at Woodside's

Karratha gas plant expansion which includes the delivery of mechanical electrical and other infrastructure services.

A construction contract was also awarded to the group to provide electrical and instrumentation construction work at Rio's Oyu Tolgoi underground operation in Mongolia, the second work package it has secured at the project.

Monadelphous' China-based fabrication

subsidiary SinoStruct won a contract at Santos' coal seam gas development in northern QLD.

"We are pleased to have been awarded new and extended contracts with a number of existing customers, which reflects our focus on building and maintaining long-term customer relationship through continuous improvement in service delivery," Monadelphous managing director Rob Velletri said.

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IRON SHARPENS IRON

Miners are confident that China's unprecedented \$US1.3 trillion infrastructure investment program, the Belt and Road Initiative (BRI), is the vehicle to drive massive medium to long term demand for iron ore. Short term forecasts, however, paint a less-than-rosy picture.



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Image: The Russian Presidential Press and Information Office.

REUBEN ADAMS

“AMONG the range of possibilities we consider, our base case remains that Chinese steel production is yet to peak,” BHP Market Analysis and Economics VP Dr Huw McKay wrote in September.

“The most likely timing of the peak is the middle of next decade.”

Australia's iron ore majors have a consensus positive outlook – and a key driver is the Belt and Road Initiative (BRI), a China-led strategy to increase connectivity and cooperation along trade routes encompassing 68 countries.

It is an unprecedented undertaking, and one that would need a lot of steel – up to 150 million tonnes (mt) of incremental demand, according to Dr McKay.

“Spread over a 10-year period, this amounts to an additional 15 million tonnes per annum (mtpa), or 3 per cent to 4 per cent incremental demand growth for steel in BRI regions,” he said.

“This is considerable, as it would double the growth rate of local steel demand observed since 2011.

BRI has the potential to make a direct and indirect economic contribution of historic significance, and one whose benefits could last for generations, Dr McKay said.

“In our view, long run positions on Chinese steel that do not explicitly reference BRI are incomplete.”

Rio Tinto has also noted the potential for growth through the BRI, and ahead of the Bao Asia Forum in March this year, Fortescue Metals Group boss Nev Power



said that as the One Belt, One Road initiative continued to grow “the openness and mutual understanding established by our bilateral trade relationships will be critical to its success.”

“In our view, long run positions on Chinese steel that do not explicitly reference BRI are incomplete.”

Not everyone agrees. The news cycle quickly picked up an October note from Morningstar analyst Mathew Hodge, who urged caution stating that “much of the overwhelmingly positive commentary lacks context and is wide of the mark”.

“Major iron ore miners such as BHP, Rio Tinto, and Fortescue all expect BRI to drive further growth in steel demand in China, and in turn support growing demand for iron ore,” he said.

“BHP expects China's steel demand to continue to grow at about 1 per cent, per

year until the middle of the next decade.

“However, we think the likely spend on BRI, and its consequent boost to steel and iron ore demand, is small in context of China's already heady spending on fixed asset investment.”

And the consensus outlook for 2018 and 2019 isn't rosy. The September instalment of the *Resources and Energy Quarterly* report noted recent positive trends – namely, that Australia's iron ore export earnings increased by 32 per cent in 2016–17 to \$63 billion, driven in large part by higher prices.

But the value of Australia's iron ore exports is forecast to decline to \$54bn in 2018–19, as the impact of forecast lower prices offsets volume gains.

The iron ore price is forecast to decline to \$US49 a tonne (FOB Australia) in 2019, due to growing low-cost supply from Australia and Brazil and moderating demand from China.

China's winter curtailment policy – which takes effect from mid-November 2017 to mid-March 2018 – requires a 50 per cent reduction in steel production in

major steel producing cities to improve air quality.

“It is highly likely that steel production has been brought forward, in order to stockpile for winter when production will be affected,” *The Resources and Energy Quarterly* report stated.

“Steel inventories have increased in the first half of September 2017, following several months of drawdowns.

“If shortages do not eventuate in line with expectations, there may be additional downward pressure on steel prices and production.

“China's steel production growth is expected to remain strong ahead of November.”

Yet Australia's iron ore export volumes are forecast to rise from 819mt in 2016–17 to 887mt in 2018–19, as a result of ongoing productivity gains and new additions to capacity.

And these additions to capacity may continue for some time.

Rio Tinto approved an investment of \$30.9m to complete project feasibility for development of its Koodaideri iron ore deposit in May, and BHP approved initial funding for its \$3bn South Flank project in June.

Then there's the Roy Hill-esque dark horse – BBI Group's \$6bn, 45mtpa Balla Balla mine, port and rail project.

BBI is reportedly in early talks with Government over a concessional loan after signing a State Agreement with the former WA Government covering the rail line and port infrastructure in January, and a MoU with a heavyweight Chinese construction company in March.

SPECIAL FEATURES

MINING IN TASMANIA

19

THE ROAD AHEAD

Left behind during the mining boom while other State's prospered, Tasmania is on its way back with a string of mine reopenings signalling renewed confidence for the sector.

"The reopening of the Henty gold mine in late 2016, the granting of a mining lease to Stellar Resources for its Heemskirk tin project, and the sale of MMG's shuttered Avebury nickel mine to Dundas Mining in July were also encouraging signs, as was the imminent resumption of production at Copper Mines Tasmania's Mount Lyell mine."

Grange Resources' historic Savage River magnetite mine.
Image: Tasmanian Minerals and Energy Council.

ELIZABETH FABRI

AFTER battling tough, the Tasmanian mining sector is making a return.

Unlike its mainland counterparts, Tasmania was hurt by a resources boom side-effect; the strong Australian dollar.

With an economy heavily reliant on trade exposed industries, Tasmania felt the sting when the Australian dollar surpassed the US dollar in 2010/2011, and then when commodity prices tumbled.

"The high Australian dollar (we all remember when it hit \$1.10 U.S) was a drag on all export-exposed industries," Tasmanian Resources minister Guy Barnett told The Australian Mining Review.

But times were now looking up for Tasmania as rising international commodity prices improve business conditions for miners and other exporters, Mr Barnett said.

"That is reflected in improved profitability, which is highlighted by the sharp rise in royalty collections," he said.

In 2016-17, the State Government collected a \$39.4 million in mining royalties compared to \$15 million in 2015-16.

The reopening of the Henty gold mine in late 2016, the granting of a mining lease to Stellar Resources for its Heemskirk tin project, and the sale of MMG's shuttered Avebury nickel mine to Dundas Mining in July were also encouraging signs, as was the imminent resumption of production at Copper Mines Tasmania's Mount Lyell mine.



The Rosebery mine.

However, the State's active environment conservation community has delayed and blocked many mining proposals across its history, and continues to put pressure on new projects from entering the planning pipeline.

In June, Mr Barnett introduced legislation to reduce environmental 'red tape' which requires applicants for mining leases to provide environmental information, to reduce "unnecessary duplication".

Successful leases would still need to obtain environmental approvals from the

Environmental Protection Authority (EPA).

"This is one of a raft of changes we have developed over the past 12 months through consultation with key industry stakeholders, including the Tasmanian Minerals and Energy Council," he said at the time.

"We make no apology for backing mining by supporting new investment and new jobs – our number one priority."

All in all, Mr Barnett said he was pleased with how Tasmania's economy was performing.

"Mining and minerals processing account for more than 50 percent of Tasmania's export earnings, injecting more than \$2 billion into the Tasmanian economy," he said.

"The mining industry supports more than 2000 jobs in the State, with the majority of these located in rural and regional areas, so it is a very important part of the economy."

According to the Commonwealth Bank's *State of the States* July report, Tasmania now ranked third on unemployment with a 5.8 per cent jobless rate, and had the strongest annual employment growth at 3.8 per cent.

"Our population is growing at the fastest rate in years, more than 11,500 new jobs have been created in the past three years, and employment is the highest it has ever been," Mr Barnett said.

"New capital investment is running strongly and we have every reason for confidence that growth will continue."

Mine restarts

Henty

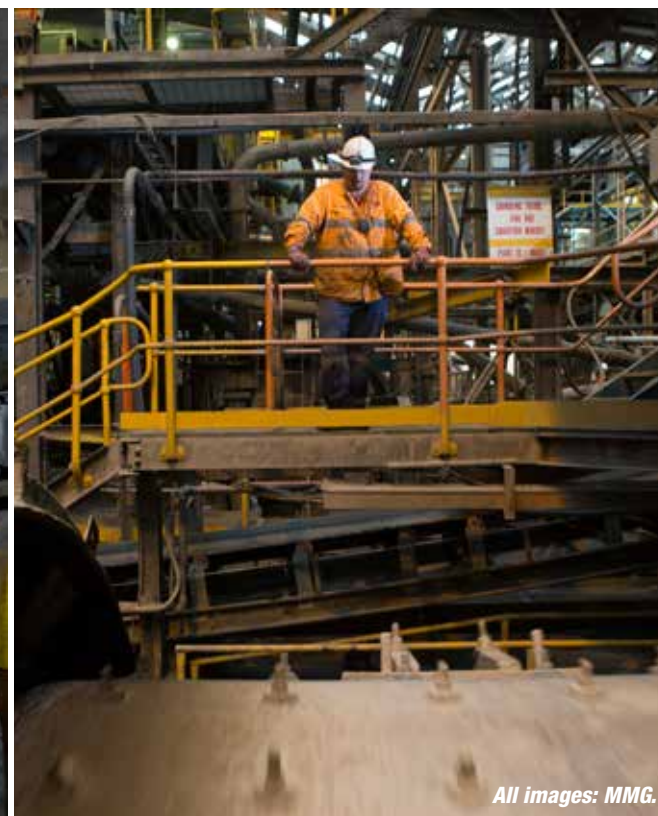
The first of the sequence of mine reopenings in Tasmania was Henty gold mine in August 2016.

The Queenstown mine was placed in care and maintenance in 2015 by the former owner Unity Mining.

The closure resulted in 150 job losses and was a huge blow for the State.

(CONTINUED ON PAGE 21)

Mining for progress at Rosebery



All images: MMG.

In 2016, the Rosebery mine celebrated 80 years of operation.

At the Rosebery mine in Tasmania, MMG mines for progress.

The team mine to build wealth through the development of its people; the investments it makes in improving local capability; and the value it delivers to shareholders.

With a long-term outlook, the team's pride in mining, commitment to shared international standards and care for people, land and culture underpins MMG's success.

"We provide employment to more than 400 people. We support local businesses and invest in local communities," MMG Tasmania operations manager Jenkins Kroon said.

"Our people make Rosebery a great place to work.

"The camaraderie and care within the Rosebery team is outstanding.

"We are continuing to grow our team, with a culture in which individuals are able to

thrive and work to their full potential."

Mr Kroon said the team's dedication to excellence has been reflected in the upgrade to its tailings storage facilities (TSF).

"The tailings facility upgrade has not only ensured a great future for the Rosebery operation, it has also provided the opportunity to mitigate a variety of legacy environmental issues," he said.

"The upgrade has resulted in a significant

measurable downstream water quality improvement."

The TSF work has recently been recognised by the Tasmanian EPA, which has named the project a finalist in the Tasmanian Community Achievement Awards.

The Rosebery team has also been recognised for outstanding safety improvements by being awarded the 2017 MMG CEO Safety First award.

WE MINE FOR PROGRESS

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First gold pour at the reopened Henty gold mine in Tasmania.

But last year hope resurfaced when PYBAR subsidiary Diversified Minerals purchased the project.

In January, Henty poured its first gold since returning to production with employment numbers expected to increase as the mine continues to ramp up.

Mount Lyell

Copper Mines of Tasmania's (CMT) shuttered Mount Lyell copper mine was also returning to production.

The mine has been in care and maintenance since 2014, after it made headlines following three fatal accidents.

Since then, the company has spent \$100 million maintaining the mine, and a further million on a feasibility study investigating mine modernisation.

While a start date has not yet been confirmed, in April, the Tasmanian Government announced a \$9.5 million investment with CMT to undertake a range of projects needed for the restart of mine operations.

The projects included: \$1.5 million to reopen the North Lyell Tunnel, a project to help CMT properly manage water flows; \$4.5 million for the access decline refurbishment and preparation; \$2 million to replace the 100 year-old West Queen water supply pipeline; and \$1.5 million towards crushing mill upgrades.

Mr Barnett said a decision to reopen was "still pending" but they remained optimistic.

"A restart of production at Mt Lyell would create up to 300 direct jobs, which would be great for Queenstown and the West Coast region," he said.

"The company has indicated a decision will be made this year."

Avebury

In July, the good news continued when MMG completed the sale of its Avebury nickel mine to Dundas Mining for \$25 million.

The Avebury mine, near Zeehan, has been on care and maintenance since 2009, but the upturn in nickel prices this year sparked interest in reopening the project.

According to MMG, Dundas Mining plans to bring the Avebury operation back into production "as soon as possible", which will deliver further jobs and economic benefits for the State.

When asked when this could be Mr Barnett said he looked forward to a restart of the mine, but the opening date would be a "decision for the company".

Cleveland

Elementos aims to resume production at the old Cleveland tin, copper and tungsten mine near Savage River in mid-2019, to tie in with the forecast increase in tin prices.

The company plans to develop the mine in three stages: tailings reprocessing, open pit mining, and the redevelopment of the existing underground mine.

Two deposits are accessible from the same underground infrastructure; a large tin and copper deposit and a world class, long life tungsten porphyry deposit.

In September, Elementos announced its diamond drilling programs on site were "progressing well".

Industry rebound

Acknowledging Tasmanian mining had been through a difficult period, Mr Barnett said the industry was "rebounding strongly".

"The Government is committed to help maintain this positive momentum by creating the right conditions for investment and growth," he said.

"Confidence is vital. Without investment no industry can flourish, so it is tremendous to see renewed confidence in the industry."

One of its most notable announcements was in February when it approved a mining lease for Stellar Resources subsidiary Columbus Metals' to develop its Heemskirk tin project.

"The company has indicated its intention to develop an underground mine employing up to 180 people at full production, with a mine life of seven years on the Queen Hill/Severn/Montana deposits," Mr Barnett said.

"Stellar has advised that exploration drilling is underway and weather-permitting is expected to be completed by mid-2018."

From a political standpoint, Mr Barnett said he did have some concerns, and aired his views on a campaign launched by the Greens to lock up an additional 10 per cent of the State through an extension of the World Heritage Area.

"Around half of Tasmania is already protected in formal or informal reserves and the Liberal Party will resist any further encroachment on our productive potential," he said.

"The mining industry needs to heed the warning of what happened to forestry, which lost two out of every three jobs in the industry in the last great conservation land grab.

"Miners need to get informed and get active."



TasTAFE Certificate II in Resources and Infrastructure students at a site visit at Bluestone's concentrator (mill) plant.

TasTAFE to train Bluestone Mining's underground workforce

TasTAFE will train Bluestone Mines' underground workers as part of a major training investment by the Renison Bell based company.

Bluestone Mining's Safety Systems and Training coordinator Derek Pearl said the training had many benefits for employees and the company as a whole.

"Bluestone Mines Tasmania Joint Venture (Bluestone) is committed to active, regular and appropriate training of its employees in the workplace," Mr Pearl said.

"Bluestone encourages and provides self-advancement programs to ensure all employees are properly skilled and trained in any task they are asked to perform, this is achieved by aligning its training policies with those of nationally accredited qualifications and competencies.

"Ensuring our employees have the latest training is also vital in assisting us to meet our obligation of Work Health and Safety requirements."

TasTAFE construction north/

north-west and mining education manager Sean Crane said the qualification covered work health and safety policies and procedures, risk management, assessment of ground conditions and maintenance and monitoring of site quality standards.

"We've been training Bluestone employees for a number of years and look forward to working with them to deliver this qualification to their underground workforce," Mr Crane said.

The training is an extension of an already strong existing partnership between TasTAFE's construction and mining team and Bluestone Mining.

About 40 staff have completed a Certificate III in Resource Processing, and TasTAFE has also delivered other training for the company including High Risk Work licensing such as Forklift and Elevated Work Platform Training and machinery assessment.

More information on how TasTAFE can help meet training needs can be found by calling Sean Crane on (03) 6477 7525.



TasTAFE offers a number of nationally recognised qualifications for Tasmania's mining industry. Our flexible approach aims to customise training to suit individual client needs and is delivered when and where it suits you. All training complies with national licensing requirements.

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- RI130415 Certificate III in Resource Planning
- RI130615 Certificate III in Small Mining Operations
- RI130315 Certificate III in Underground Metalliferous Mining

We also deliver a range of High Risk Work licenses and short courses such as:

- Forklift
- Elevated Work Platform
- Dogging
- First Aid
- Plant and Equipment
- Mining induction

See our website for details www.tastafe.tas.edu.au or to discuss your training needs contact: Sean Crane, TasTAFE Education Manager, Construction North/North-West and Mining; Phone 0439 367 517 or 03 64 777 525 or email Sean.Crane@tastafe.tas.edu.au

Family business continues to deliver

WITH three generations of the Treloar Family involved in the quarry and civil construction industries dating back from the late 70s, Treloar Transport has been involved in a vast array of projects, from road building to dam construction and material supply.

From simple beginnings in 1978, Treloar Transport has grown into a business that is modern and diversified.

As growth has demanded it, the business has added boiler making services, an industrial paint shop, a full service mechanical workshop, along with a fleet of modern truck and trailers, excavators, rollers and graders.

In addition to the above, the team has also grown and developed its material supply division with seven quarries now operating.

Its quarries are spread across differing geographic areas to assist in being competitive for campaign/material supply based work.

To enable class leading performance and dependable outcomes, Treloar Transport has adapted various technologies to assist them.

TopCon GPS ensures that its team stay within design specifications and on budget every job, while Navman GPS aids them in maintaining maximum use of all equipment and keeping equipment maintenance within specification.

"With many staff having more than 10 years' service and some with more than 20 years, experience is more than catch phrase here," Treloar Transport managing director John Treloar said.

"Engineering, estimating, quality control, and OHS is all managed in-house.

"We operate our own labour hire company and have more than 60 Staff.

"Our staff are motivated to create the right



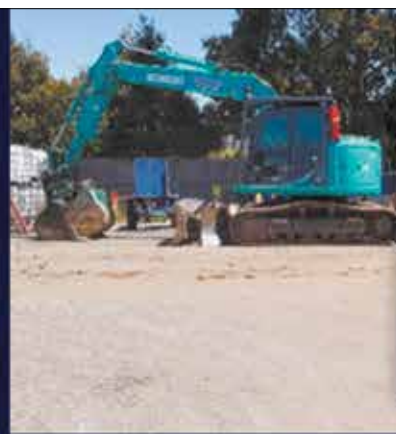
More information can be found at www.treloartransport.com.au.

solution for the project budget."

The team has also snapped up a number of industry awards, including the Civil Contractors Federation (CCF) Earth Awards for its rehabilitation of the Corinna silica mine, among others.

With a commitment to keeping its fleet as up to date as possible, in the last 12 months, the business had added a new Drake quad axle float, a bottom spreading semi-trailer (first and only one in Tasmania), a new 30 tonne Kobelco excavator (first of

its kind in Australia), two new 16.5 tonne Kobelco excavators with six-way blades for use in the forestry sector, a 13.5 tonne Kobelco excavator, 12M CAT grader, and a new Prostar truck (also first of its kind in Australia).



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- Dam building and repair
- Wet Hire (Machine and Operator)



A proud history

BELL Bay Aluminium holds a unique place in Tasmanian and Australian history, becoming the first aluminium smelter in the southern hemisphere when it began production on 23 September 1955.

Located just south of George Town in Northern Tasmania, near the mouth of the Tamar River, the smelter began operation as the Australian Aluminium Production Commission, a joint venture between the Tasmanian and Australian Governments.

Planning began in the 1940s and the ambitious construction project took more than six years to complete.

At a time when Tasmania was better known for its apples than large industry, the venture was initiated primarily to overcome the difficulties of importing aluminium during wartime.

The Bell Bay site was chosen because of its deep water port facilities, Tasmania's clean hydroelectric-generating capacity and competitively priced electricity.

In 1960 Comalco purchased the smelter, and in 2000 Rio Tinto purchased Comalco.

Some 62 years later, Bell Bay Aluminium is now operated by Rio Tinto's Pacific Aluminium division.

Bell Bay Aluminium directly and indirectly employs more than 1500 Tasmanians and contributes \$690 million per annum to Tasmania's Gross State Product.



Image: Rob Burnett Images.

Bell Bay Aluminium smelter.

The smelter produces primary aluminium in the form of ingot, block and T-bar.

The majority of metal is cast to customer requirements, as either pure aluminium or aluminium alloys.

More than 90 per cent of the metal produced at Bell Bay Aluminium is exported.

Some metal is sold directly in a hot state for the production of aluminium powders and pastes.

Over the past six decades through collaboration, innovation and investment, the operation has grown from producing just 1200 tonnes in its first year to about 190,000 per annum today.



Opened in 1955, Bell Bay Aluminium was the first aluminium smelter built in the Southern Hemisphere. Since then we have worked closely with the Tasmanian community to generate economic and social benefits for the entire State.

Today, Bell Bay Aluminium employs 1500 Tasmanians directly and indirectly. In 2016 we injected more than \$159 million into the Tasmanian economy, purchasing goods and services from 313 Tasmanian suppliers and paid \$47 million in salaries to our employees. Independent studies show that the smelter contributes \$690 million* per annum to Gross State Product.

Bell Bay Aluminium has a long and proud history of supporting the Tasmanian community. Our initiatives in education, environment, health and wellbeing and the arts are designed to make a positive difference and create quality outcomes.

We are proud that the success of the smelter and our employees continues to drive Tasmania's economic and social prosperity for future generations.

BELL BAY
ALUMINIUM

*Professor John Mangano (2002) "A Socio-Economic Analysis of the Rio Tinto Aluminium smelter at Bell Bay in Northern Tasmania", UQ Business School Commercial 20 April, 2010.

ARE THE 'GLORY DAYS' OVER?

As aging operations near the end of their natural lives, economist **Saul Eslake** highlights the importance of fresh exploration spending for the future of Tasmanian mining.



ELIZABETH FABRI

THE mineral deposits discovered in Tasmania more than a century ago, have been either “fully or largely exploited”, leaving the State in a tough position as it looks for new ore-bodies to bring into production, leading economist Saul Eslake has said.

“The sector has been declining for most of the past four decades,” he said.

“Very little has been spent by way of exploration and development expenditure in Tasmania: \$466 million over the last 25 years, or 1.25 per cent of the national total excluding petroleum and gas.”

To put this into perspective, in the mid-1970s mining accounted for a healthy 5.5 per cent of Tasmania’s gross state product at a factor cost, compared to a meagre 1.2 per cent in 2015-16.

“Back in the 1970s mining contributed a larger share of Tasmania’s economy than it did to Australia’s as a whole,” Mr Eslake said.

“However that hasn’t been the case since the early 1980s; and today mining represents a smaller share of Tasmania’s economy than of any other jurisdiction except the ACT.”

The sharp decline can be largely attributed to the lack of new projects being brought into production.

“By comparison with the rest of Australia there have been no major new mines brought into, and remaining in, production in Tasmania since then [the 1970s]. [This is] in contrast with the expansion in coal mining in Queensland since the mid-1970s, the massive expansion in iron ore mining in WA over the past decade, as so on,” he said.

“New ventures which have started in Tasmania during this period (including nickel, tin, iron ore and gold) have for the most part come and gone; while some older operations have been scaled back or closed down.

“In that sense Tasmania’s mining industry is a lot like Broken Hill’s – it still exists, but its ‘glory days’ are well behind it.”

Since 2012-13 mining employment has fallen by almost 40 per cent in 2015-16 the Tasmanian Government collected just \$15 million in mineral royalties; less than 0.2 per cent of the total collected by all State and Territory Governments, and just 0.3 per cent of total Tasmanian Government revenue.

“The decline in mining industry activity and employment over the last few years largely reflects the cessation of operations at the Mount Lyell copper mine at Queenstown after a serious industrial accident in January 2014, and the closure of some nickel mines that were only ever viable at the very high prices of earlier years,” he said.

“The longer term decline reflects the exhaustion of deposits originally discovered in the latter part of the 19th century, and the high cost of maintaining small-scale mining operations in competition with newer and larger deposits elsewhere in the world.”

Exploration

While a number of mine reopenings were promising for the sector, greenfields exploration was on the decline, sparking concern from all corners of the industry.

According to the Australian Bureau of Statistics (ABS), mineral exploration expenditure (other than for petroleum) spent in Tasmania has been falling; declining from \$19.9 million in 2014-15 to \$13.2 million in 2016-17.

In a recent interview with the ABC, University of Tasmania Professor of Geology Ross Large said with exploration expenditure decreasing, Tasmania’s mining industry could end in a decade if action wasn’t taken.

“We need to ask the question in Tasmania. Is this a trend we want to see continue? Because mining will really go out the back door in the next 10 years if this does continue,” Mr Large said.

“We always used to think mining was going on and on, they just keep mining and adding to their reserves and that’s what’s happened at Rosebery [mine in the state’s west].

“But it’s not going to continue, I don’t think, indefinitely.”

Mr Large urged mining companies to focus more on exploration to uncover new deposits.

“They’re taking our resources but they’re not putting money back into serious continuous exploration.

“So I would say the companies have a fault, the Government has a fault because they’re not supporting the industry enough in terms of exploration again.”

Tasmanian Resources minister Guy Barnett however, said the Government remained “very confident” about the future for mining in the State.

“Tasmania is one of the most highly mineralised regions in the world, with high grade deposits of a wide range of minerals,” he said.

“While a number of our mining fields have been around for a long time, the Mt Lyell restart project shows there can be considerable potential even on our oldest fields.”

Mr Barnett said the Government would also be pursuing new mines in line with its target of achieving a 50 per cent increase in new mining ventures over five years.

“We are doing so through our Minerals Exploration Investment Attraction Plan and Geoscience initiatives,” he said.

“These initiatives promote mining and exploration in Tasmania on a national and international stage.

“Our \$1 million Mining Sector Innovation Program will help develop an increasingly high-tech industry at the cutting edge of innovation and best practice, which is important for the environment and for mine safety.”

Barriers to investment

Perceived risks associated with mining in Tasmania were believed to be the biggest hurdle in luring new investment.

Mr Eslake said there was a view that minerals exploration in Tasmania was much riskier and more expensive than other States given the nature of its rugged topography, wet climate, and dense vegetation.

“There may also be a view that since a relatively large proportion of Tasmania’s land mass now has national park status, and because Tasmania has a well-established and active environmental movement, that it is more difficult for mining companies to obtain a ‘social licence’ to operate in Tasmania than in other states – which in turn acts as an additional disincentive to undertake exploration activities,” he said.

“I’m not sure that perception is accurate (given the bans on ‘fracking’ in most mainland states other than Queensland, WA’s on-and-off bans on uranium mining, and the increasing opposition to coal mining from agricultural interests as well as environmental groups in Queensland and NSW) – but there’s no doubt that the perception exists.”

Mr Eslake said more exploration was vital to the future of Tasmanian mining.

“Mining in Tasmania hasn’t become extinct, as yet, so it would be unfair to call it a ‘dinosaur’ (or even a thylacine), but like the Tasmanian devil, it is in serious long-term decline,” Mr Eslake said.

“It is likely to decline further unless some major new ore-bodies are discovered and brought into production.”

A growing FORZE in Tasmanian mining

IN early 2018, FORZE Explosive Services will celebrate 18 years of operation within the Tasmanian explosive industry.

FORZE commenced operations in the south of the State primarily in the forestry and quarrying industries, and has since successfully expanded to become the largest privately-owned blasting company within Tasmania operating three depots State wide.

FORZE has grown to service all areas of mining, civil construction, industrial and specialty blasting that deliver niche explosive solutions.

FORZE has not strayed from the basics of undertaking traditional drill and blast works; in which FORZE has a reputation for delivering exceptional customer service and maintaining a high degree of flexibility.

These features achieve rock on ground safely, at a competitive rate within the desired time frame for the customer.

FORZE was contracted by Hazell Bros Group to undertake the blasting of source rock and spillway areas during the construction of the MMG 2/5 Tailing Dam at the Rosebery mine site.

Electronic detonators and computer modelling were utilised throughout the project to ensure the adherence to strict environmental limits within close proximity to existing infrastructure and the community.

At Renison Bell Tailings Dam construction, FORZE was engaged by Shaw Contracting to blast the rock borrow pits within close proximity to existing tailings dams.

During the construction of Tasmania Mines' Kara Mine new tailings facility, FORZE undertook blasting within the spillway area at short notice to improve the project efficiency.

Through conducting these works and more, FORZE has become a member of the mining



FORZE Explosive Services is across all areas of the mining industry.

community on the rugged West Coast of Tasmania.

FORZE also has involvement at the end of the line for ore at the Nyrstar Hobart Smelter, where FORZE supplies on an ongoing basis, specialist shotfirers to Online Cleaning (Aust).

The nature of the work at Nyrstar involves safely initiating explosives in extreme temperatures to maintain gas pathways within the waste heat boilers and other areas of buildup; this work dramatically improves the plant performance and production levels.

FORZE wish to extend its appreciation and thanks to all customers and suppliers who have worked with the company over the years to date.

FORZE could not have gone the distance without the strong commitment and hard work of all current and past employees – it is these people that have enabled the company to continue to provide a timely and quality service to its loyal and expanding customer base.



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SAFETY INTEGRITY TEAMWORK EXCELLENCE ACCOUNTABILITY

Programmed people, doing it safely

MANAGING occupational risk is an essential element of any safety management system, especially in the mining industry where high risk activity is inherent.

Programmed Skilled Workforce (PSW) has been providing skilled and safety focused workforces to the mining industry in Tasmania for more than 50 years, and has safety management system trained personnel in each of its branches.

PSW was also the first service provider in the industry to be AS/NZS 4801 certified.

A continual investment in its people and systems has ensured Programmed provides the safest possible staffing solutions to its mining clients.

Programmed employs permanent teams of OHS professionals, and delivers innovative and effective risk management programs and strategies.

This ensures employees are work-ready when they arrive on site, assisting mining clients to achieve their key safety and production objectives.

"Service like this doesn't come without clear focus, hard work, ability to deliver and a strong safety commitment to our people working in the mining industry," PSW Tasmania regional manager Greg Butterworth said.

"With more than 100 years of collective mining experience in our Tasmanian branches, our depth of knowledge and insight into the industry allows us to effectively contribute to incident prevention and improved safety cultures."

PSW is also looking to the next generation of workers in Tasmania.

Through Programmed's Group Training Organisation (GTO) it currently manages more than 50 apprentices across all mining sites in



PSW Tasmania regional manager Greg Butterworth.

Tasmania.

"We are passionate about developing the skills of local people so that we create both a generation of safer workers and a safer

community," Mr Butterworth said.

"We want the next generation of workers to be exposed to a culture of safety and zero harm as soon they kick-start their careers."

More information about Programmed and the staffing solutions it provides to the mining industry in Tasmania can be found at: www.programmed.com.au.

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with skilled and safety focused workforces for
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COLLABORATION AND INNOVATION

Mining is out of the doldrums – and IMARC 2017 is going all out. It isn't just the big name speakers, either, because the exhibition floor is shaping up to be quite spectacular. And then there's highlights like the KPMG Investment Arena Investment Battles, where emerging mining, renewable energy and technology companies go head to head in front of leading investors, pitching for feedback, investment and prizes – Shark Tank style. Reuben Adams gets the details from event director Anita Richards.

Q. 2016 was a rollercoaster for mining, but finished on a high note. How would you characterise 2017?

We are definitely seeing signs of growth in the market. We are seeing a resurgence in exploration and discovery in Australia, which is a great sign for the industry.

The event is showing record attendance already, which is a healthy sign that the industry is recovering.

Q. Can you explain the origin and significance of the conference theme 'Creating Value through Collaboration'?

Collaboration is the bedrock of this industry.

Whether it is with geologists, miners, METS companies, contractors or investors, collaboration is the only way to innovate and find true value.

This theme was created by the IMARC advisory board understanding that by collaborating and working together we are all able to achieve more with less.

Q. What exhibition highlights or demonstration highlights can attendees look forward to?

Liebherr will have its newly launched and award winning D 98 engine series on show for the first time in Australia. As the most technically innovative engine yet, the D 9812 will be complemented by a selection of the German company's advanced technology for mining.

Insitu Pacific (Boeing) will have one of its fixed wing Remotely Piloted Airborne Services (RPAS) planes hanging from the roof of IMARC.

BHP and METS Ignited continue their ongoing support for IMARC hosting the two delegate lounges at the event.

This year event includes the launch of the KPMG Collaboration Arena, an open-air theatre on the IMARC exhibition floor which will feature complimentary seminars for all pass types. Thursday's free content will see a number of emerging mining, renewable energy and technology companies go head to head in front of leading investors, pitching for feedback, investment and prizes, in a *Shark Tank* style investment battle.

Q. What are the benefits of the One-on-One Meeting Planner App?

The one-on-one meeting planner enables attendees to make the most out of their time at IMARC.

Delegates are given access four weeks prior to the event so they can make contact with speakers, sponsors, exhibitors and other delegates in the lead up to the event.

The meeting planner not only allows delegates to see who else will be in attendance, but they can also filter by industry, region, typical size of investments as well as investor's preferences and send direct messages and meeting requests.

This enables attendees to maximise their time and arrange high value meetings with who they want, when they want.

Q. Why is IMARC a must-attend event for mining professionals in 2017?

As Australia's largest mining event, it is the only place where you can connect with the entire industry under the one roof including mining leaders, policy makers,

investors, commodity buyers, technical experts, innovators and educators.

IMARC is a truly international event, drawing attendance from over 60 countries including mining ministers and senior government officials from over 25 significant and emerging mining jurisdictions such as Ecuador, Iran, Mongolia, Greenland and Saudi Arabia to name a few.

The conference covers all aspects of mining from exploration to investment, production to optimisation through to new technology, future energy, as well as mining infrastructure.

There are over 45 hours' worth of networking opportunities at this year's event including the flagship gala dinner (sold out last year), round table discussions, and daily cocktail receptions for delegates.

The free exhibition features over 100 leading companies showcasing the latest innovations, technology and services the industry has on offer and includes some of the biggest names in the industry such as BHP, Liebherr, Caterpillar, HATCH, Sandvik, Snowden, Mineware and Microsoft.

At IMARC 2016:

- **56 per cent** of attendees generated new business and **14.5 per cent** reported **\$500,000 of revenue generated** as a result of attending IMARC.
- **A mining company did a JV deal for \$7m**, walking away with an immediate payment of **\$1.25 million**.
- One exhibitor made an **immediate sale of \$385,000 on their stand** with an order in excess of **\$2 million**.

DOING A DEAL?

WHO ARE 2017'S BIG NAME SPEAKERS?

This year's line-up of speakers is truly remarkable. With 100 speakers already confirmed there are far too many to name – but here's a shortened list of who not to miss.



Robert Friedland
Executive chairman and founder,
Ivanhoe Mines.



Diane Jurgens
CTO, *BHP.*



Rick Rule
President & CEO, *Sprott US Holdings.*



Nev Power
CEO, *Fortescue Metals Group.*



Jeyakumar Janakaraj
Chief Executive & Australian Head, *Adani.*

New global marketplace for mining equipment

INDUSTRIAL equipment auctioneer Ritchie Bros. is raising the stakes in Australia with the launch of its new online-only brand, IronPlanet.

The IronPlanet website has seen \$1 billion of equipment sales across America and Europe in the past year and will debut in an Australian market with a growing appetite for digital trade.

The online marketplace will perfectly complement the company's established auctions in Brisbane and Geelong, according to Ritchie Bros. Asia-Pacific director of operations Richard Tucker.

"We are excited to bring the IronPlanet marketplace to Australia," Mr Tucker said.

"Since launching in North America 18 years ago it has grown to become a leader in online auctions and marketplaces, with 1.9 million users globally.

"IronPlanet will allow out Australian customers to sell, buy and list equipment when, where and how they want, whether onsite or online."

Ritchie Bros. has been helping Australians sell construction, mining and transport equipment for more than 20 years.

So far this year, the company has sold more than 8000 items in Australia and the volume of sales made to online bidders continues to grow.

"Last year 49 percent of the equipment sold in our onsite auctions was sold to online buyers," Mr Tucker said.

"We are dealing with customers who are much more comfortable with the online sales



More information can be found at ironplanet.com.au.

experience."

Through IronPlanet, buyers can inspect items online and review detailed inspection reports completed by qualified Ritchie Bros. inspectors.

Equipment sold through IronPlanet is backed by the company's IronClad Assurance,

guaranteeing the accuracy of its inspection report.

The site offers sellers the ability to sell items for a fixed price, negotiate offers or set a reserve.

They can sell equipment wherever it stands, without transporting it to an auction

site hundreds or even thousands of kilometres away.

"We already know this marketplace delivers great results," Mr Tucker said.

"IronPlanet is already tried, tested and trusted and its potential in Australia is huge."



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POUR ON THE COAL

Whitehaven Coal hasn't just weathered the multi-year commodity storm – it has emerged stronger than ever.

"The past decade has seen us grow from a relatively small mining company to a major coal player in the Australian and international markets."



All images: Whitehaven Coal.

REUBEN ADAMS & CAMERON DRUMMOND

FROM excellent FY17 results for Australian coal producers Whitehaven was a clear standout – posting an enormous jump in net profit from \$20.5 million to \$405.4m year-on-year.

There was encouraging news across the board for Whitehaven, together with record production year of 23 million tonnes per annum (mtpa) of ROM coal.

The record breaking run continued in Q3, as ROM production increased 5 per cent to 5.7mt, and best-ever coal sales of 6.1mt was 21 per cent higher than the previous corresponding period.

Whitehaven Coal chief executive Paul Flynn said the company had delivered on its promises to ramp up Maules Creek, meet production guidance and continue to repay debt.

"Our investment in the development of Maules Creek at the bottom of the coal price cycle, the ramp up of Narrabri underground and the productivity improvements exhibited at the Gunnedah open cuts meant we were confident it would be a strong year," Mr Flynn said.

"It has also provided a solid platform for the business and ensured that the group has been and continues to be well positioned to capitalise on an improved environment for thermal and metallurgical coal."

Mr Flynn said improved coal prices were a catalyst for the company to improve debt levels.

"The past year provided a great opportunity to fulfil this imperative and focus on reducing debt levels.

"Overall, we reduced our net debt reduced to \$311.1m at 30 June 2017 with gearing at 9 per cent."

FY17 marked Whitehaven's 10 year



anniversary since listing to the ASX and capped off an outstanding decade of progress.

"The past decade has seen us grow from a relatively small mining company to a major coal player in the Australian and international markets," Mr Flynn said.

"This is something I am extremely proud of and it just would not be possible without the support of the local communities in which we operate.

"More than 75 per cent of our workforce live in the areas of our operations.

"Our commitment has always been to ensure to the towns of Narrabri, Gunnedah and Boggabri feel the benefits of our presence."

Maules Creek

Maules Creek (Whitehaven 75 per cent) continued to break ROM and saleable production records in Q3.

ROM production for the quarter was 2.6mt; a 37 per cent jump on the previous corresponding period.

The company said that the next step up in production would occur in early FY19, when additional mining equipment was

added to the fleet.

At Narrabri, mining in panel LW107 "progressed successfully" through the fault zone with production exceeding expectations.

ROM coal production for the quarter was 2.237mt, within 5 per cent of the previous corresponding period.

Roadway development for the September quarter was 5458m, and construction of the new ventilation shaft construction was progressing with the pilot hole for the shaft completed during the Q3.

The three Gunnedah open cuts – Tarrawonga, Rocglen and Werris Creek – produced 0.899mt for Q3, lower than the previous corresponding period as shift rosters returned to normal following the strong finish to the previous financial year, the company said.

Saleable coal production was 1.312mt, up 12 per cent, and sales were 1.374mt, up 20 per cent on the previous corresponding period.

Mining also restarted at the Sunnyside open cut, which had been on care and maintenance for an extended period.

Whitehaven plans to mine 0.8mt over the next two years as part of rehabilitating

the site. Blasting at the mine commenced in late September and coal production will recommence during the December quarter.

Vickery Extension Project

At Vickery, work on the Environmental Impact Statement (EIS), required for Government approval of an expanded Vickery mine to 10mtpa, was "substantially complete" by the end of Q3.

"The EIS document and supporting documents are due to be lodged upon completion of some final optimisation work," Whitehaven stated in its Q3 report.

"It is anticipated that the EIS will be lodged shortly.

"Discussions with numerous parties who have expressed interest in becoming joint venture partners will commence following the lodgement of the EIS."

Timing for start-up of the Vickery project remains market dependent, but would likely occur once Maules Creek had been fully ramped up to its 13mtpa capacity.

Mr Flynn said the Vickery extension was one of the most significant investments currently underway in North West NSW.

"The project, if approved, will cement our standing as the single largest private sector employer in the area," Mr Flynn said.

"It will generate around 500 jobs during the construction phase and roughly 450 jobs during operations, the majority of which will come from the local communities of Gunnedah, Narrabri, Boggabri and surrounding areas.

"It will also create fresh opportunities for Whitehaven to support local businesses and contractors, and generate more than \$700m in royalties for the people of NSW to help provide important services like education, health and transport infrastructure."

(CONTINUED ON PAGE 32)

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HCA's Gunnedah branch has gone from strength to strength with the success of Whitehaven Coal's Maules Creek project development.

Hitachi lauds Maules Creek success

AS a major mining equipment supplier to Whitehaven Coal, Hitachi Construction Machinery Australia (HCA) would like to congratulate the heavyweight producer on its success of the Maules Creek project.

Maules Creek has been a project close to HCA with involvement from the early planning stages and tendering mining equipment, before its eminent opening in 2015.

HCA are a proud supplier partner to Whitehaven for mining equipment and the associated products along with the supporting services.

To date, HCA has delivered to Whitehaven 50 pieces of Hitachi Mining Equipment which are now being operated on site, consisting of 42 rigid-frame dump trucks and 8 excavators.

The fleet is also monitored and managed using Hitachi's Wenco Fleet Management System.

In support of operating Hitachi machinery and to enhance operator training, the EH5000 truck simulator is accessible on site for Whitehaven operators to gain maximum confidence before graduating into the mines.

To ensure a safe work place is provided, HCA and Whitehaven have together nurtured an enriched safety culture ensuring the project provides a safe work environment from assembly, commissioning through to operational stages.

The Maules Creek project has greatly assisted HCA with future development to support the mining business in New South Wales.

Currently, HCA's Gunnedah branch provides ongoing parts and service support and in light of the growing success of Maules Creek, HCA plans to build a new facility in Gunnedah to ensure this development has the foundation to instil growth well into the future.

HCA has had the privilege to be a part of the major ongoing development, providing leading mining solutions to make the Maules Creek project a continued success.

(CONTINUED FROM PAGE 30)

DURING FY17 WHITEHAVEN AND ITS JV PARTNERS:

Paid \$171.9m to the NSW Government in mining royalties

- **Spent \$237m** in the Gunnedah, Narrabri, Tamworth, Liverpool Plains regions

- **Made 90 donations** to local community groups

At the end of FY17, Whitehaven's FY18 production guidance was in the range of 22mt to 23mt.

Costs for the year were likely to increase slightly as production of metallurgical coal increased and the strip ratio at Maules Creek moves towards the life of mine ratio.

The outlook is positive, as the higher quality end of the thermal coal market experienced stronger demand from end users changing their quality requirements due to a greater focus on environmental and generation efficiency.

"The outlook for the high quality coal we produce is positive, as more HELE technology coal-fired power plants are being deployed into the Asian region," Mr Flynn said.

"Our high-quality, clean coals continue to attract strong demand from a growing customer base in over ten countries.

"Whitehaven has attracted a number of new customers during FY17 in countries such as China, Taiwan and Vietnam for semi soft coking coal sales and Malaysia for thermal coal sales."

In China, the coal burn for electricity generation was up 8 per cent year-on-year, due to hydro electricity supply constraints and strength of underlying electricity demand, Whitehaven stated in its Q3 report.

These factors have led to a larger than expected draw on the seaborne market.

The Future is HELE

"Over the past decade, the public policy process has failed to produce outcomes that

create certainty for investors or security for energy consumers," Mr Flynn told the Brisbane Mining Club in June this year.

"We are now arguably experiencing a boiling frog moment. The dire warnings of the past 10 years are coming to pass, and once again, we look to the Federal Government for leadership, for solutions.

"And while Whitehaven is not looking to develop or fuel an ultra-super critical coal-fired plant in Australia any time soon, the atmospherics around that discussion, and whether this nation could – or should – emulate the pragmatic position adopted by most of the countries Whitehaven exports to, is of real interest to us."

Mr Flynn said countries around the world were relying on HELE coal generation to meet their Paris targets while ensuring low cost, reliable energy – there were more than 1100 HELE plants under construction, or planned, in East Asia alone.

The current 33 per cent global efficiency rate of coal fired power plants could be improved to 40 per cent by deploying more advanced "off-the-shelf technology", cutting two gigatonnes of CO2 emissions now, while allowing affordable energy for economic and social development, he said.

"Which raises the question: if countries around the world are investing so heavily in new coal technology to provide reliable and affordable electricity while making material carbon emissions reductions, why should Australia discourage this investment, or indeed rule it out?"

"Unfortunately, HELE has become tied up in the broader energy and resources policy debate that has lumped this new technology

into the imaginary binary decision between meeting our climate change commitments and delivering affordable and reliable energy solutions.

"The reality is, Australian businesses require long term investment certainty, without it, investment will not occur.

"What Australian governments need to focus on is coming together and providing the policy level playing field for all technologies to compete.

"There are a multitude of solutions to our current energy issues, and HELE is one we should properly examine."

In Australia, the push to build HELE coal-fired power plants is gathering some momentum.

Proponents from Japan, Thailand and China have purportedly approached the QLD State Opposition after it pledged to fast-track approvals for a HELE plant in the North within 100 days, if elected to Government.

The project, which would take three to five years to build, would create up to 750 jobs during construction and maintain 150 full-time positions.

In NSW, recent research suggested that a strong majority of people in the Upper Hunter would support the construction of a HELE coal-fired power station in the region.

A survey of 2000 people across the state electorates of Cessnock, Maitland and Upper Hunter and found 67 per cent support for the construction of a new coal-fired power plant if it could produce lower emissions than existing power plants.



Underground at Narrabri.



It's been tough – but things are looking up for the Pilbara mining region, as iron ore continues to rip higher on steady Chinese demand and exciting opportunities in lithium and gold come into play.

Rio Tinto's Silvergrass iron ore operation.
Image: Rio Tinto.

CAMERON DRUMMOND

KNOWN as the engine room of Australia, the WA Pilbara is the largest iron ore producing region in the world, accounting for almost 37 per cent of global production and 52 per cent of seaborne exports in 2015.

Iron ore mining in the Pilbara commenced in the 1960s, after the Australian Government lifted an embargo on iron ore exports in 1938 in the lead up to World War II.

By the 1970s, pioneering companies such as BHP, and Rio Tinto-owned Hamersley Iron and Robe River Iron, had established the towns of Tom Price, Newman, Paraburdoo, Karratha and Dampier; including investment in community infrastructure, power and water supply, roads and suburban street lighting.

BHP and Rio constructed hundreds of kilometres of railway – forming two of the biggest privately-owned rail networks in the world – to link the Pilbara's iron ore to the coast for export.

Rising output

In response to Chinese growth in steel production over the last 15 years, billions of dollars have been invested in the region, growing iron ore production three-fold at an average rate of 12 per cent per annum, from 243 million tonnes per annum (mtpa) in 2004-05 to 757mt in 2015-16.



WA Mines and Petroleum minister Bill Johnston with Sino Iron's Zhang Jijing at CITIC Pacific's opening of the Cape Preston aerodrome.

China's increase in demand over the years resulted in the iron ore price rising from about \$US30/tonne (t) in 2003-04, to more than \$US150/t by 2012.

However, by the start of 2014 increased iron ore production started to displace

higher cost production in China.

This, combined with lower demand from Chinese steelmakers, caused the iron ore price to fall by 42 per cent in 2014-15, and a further 28 per cent in 2015-16.

The commodity bottomed out at a low of \$US37/t in December 2015, and the effects rippled through the Pilbara as projects stalled and miners tightened their belts, resulting in job losses and a concern for the future of WA's north west.

Iron ore bounced back during 2016, and by February this year reached a high of \$US89/t.

During FY17, WA produced a record 790mt of iron ore, an increase of 6 per cent year-on-year; 92 per cent of which was produced in the Pilbara.

These higher sales volumes and stronger prices delivered a 31 per cent increase in sales value from \$48.8 billion in FY16 to \$63.7bn in FY17.

The WA Treasury's *Financial Projections Statement* forecasts iron ore sales to increase to 830mt by 2019-20.

While sales of iron ore from WA are expected to continue to rise as mine construction and expansions are completed, it is expected that the rate of increase will be slower than the past 10 years.

Lifting Australia's prosperity

WA Mines and Petroleum minister Bill Johnston said that sustaining a globally competitive Pilbara resources sector was an important part of the economic benefits to WA and the nation.

(CONTINUED ON PAGE 36)

WA's largest metal recycler

SIMS Metal Management (Sims) is proud to be WA's largest metal recycler, with five facilities located in Kwinana, Welshpool, Malaga, Karratha and Port Hedland.

Founded in Sydney in 1917, Sims is celebrating its centenary this year and has grown to become the world's largest publicly listed collector, processor and supplier of recycled metal.

This is made possible through more than 230 facilities on five continents, including more than 50 subsidiaries and joint ventures, and its extraordinary staff of more than 6000 people.

Its WA operations currently employ more than 150 talented and dedicated employees, some with service records of 20, 30 and even 40 plus years.

Focusing on safety, the environment and commercial transparency, Sims leads the way by implementing industry best practice.

Its facilities have a large range of processing equipment, including the latest material handling excavators with grab, shear, rail breaking and magnet attachments.

Sims operates the largest fragmentiser in WA that has the capacity to process end of life vehicles and the full range of post-consumer recyclable metals, such as white goods, fencing, roofing and bicycles.

Furthermore, Sims operates a car compactor and Enviropactor (light gauge steel baler), which travel throughout the State, diverting metal from being disposed of in landfills.

The company also operates a comprehensive transport fleet which includes semi tipper, semi flattop, hook lift, marrel, and hiab flattop trucks.

Sims services customers right across the



SMM has a global network of recycled metal trade and supply.

entire state from the Great Southern region, to the Goldfields and Gascoyne, through to the Pilbara and Kimberley in WA's far north.

Customers include large mining and

resources companies such as BHP, Rio Tinto, Chevron, Woodside and Alcoa; as well as major infrastructure operators such as Western Power, Brookfield Rail and Aurizon.

Customers can expect to receive globally competitive pricing, great service and an adherence to best practice in terms of safety, chain of responsibility and work planning.

GREAT SERVICES GREAT PRICES



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PRICE

- Our global footprint gives us the best possible sales outlets, passing those financial benefits onto you.



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A Partner to the Pilbara

ATLAS COPCO; you'd be hard-pressed to find anyone on site that doesn't recognise its iconic grey and yellow colours.

Whether you've seen the Atlas Copco logo in your compressor room, outdoors on one of its portable generators, or even in your hands working on the tools – one thing is for certain: Atlas Copco has been delivering efficiency and reliability to Australian industries for well over half a century.

What you may have missed is the Atlas Copco Rental division.

Established in 1994 and brought to Australian shores a short time later, the Rental division was Atlas Copco's response to the growing demand for temporary air and long-term rental solutions.

Clients now had solutions that allowed them to continue using the Atlas Copco machines they had come to rely upon during periods of increased workload, maintenance or breakdowns.

Today, Atlas Copco Rental has built a fleet specifically tailored to Australian conditions.

With eight branches across Australia and New Zealand positioned in key industrial sectors, rental solutions to client applications are never far away.

One of the company's most prominent facilities, the Karratha branch, has just relocated to a new, modern facility.

The branch was established in the Pilbara



Atlas Copco has a new, modern Karratha branch servicing the Pilbara.

fifteen years ago to accommodate the growing mining and LNG projects in the region, and since its inception has been a key player in

supplying temporary air, power and nitrogen to the region.

Staffed by experts that know their area

and industries, the new Karratha branch reaffirms Atlas Copco Rental's commitment to the continued development of the Pilbara.



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Sustainable Productivity

Atlas Copco

(CONTINUED FROM PAGE 33)

"The Pilbara will undoubtedly continue to be the nation's economic powerhouse, however there is no denying the Pilbara is in a transition, and the region is increasingly confronted by changing global mega trends."



Image: Pilbara Development Commission.

Pilbara Development Commission chief executive Terry Hill (left) with chairman Brendan Hammond.

"A healthy mining industry in the Pilbara is essential to the WA economy, it underpins all other activity in the State and indeed carries the nation's exports and allows us to have a very high standard of living in Australia," Mr Johnston said.

Mr Johnston also believed the Pilbara did not receive the national attention it deserves to ensure industry in the region remained prosperous.

"There's no question that politicians on the east coast and in Canberra overlook the Pilbara constantly and don't properly appreciate how important the region is," he said.

"You often hear debate about Sydney Airport and how important it is for the national economy – however Port Hedland is actually more important yet gets virtually no discussion.

"There's never any debate on how the Commonwealth Government can assist in maintaining and expanding the infrastructure for the iron ore sector.

"Our national wealth would be much lower without it and we wouldn't be able to import all the luxuries that we enjoy today."

Pilbara Development Commission chief executive Terry Hill said that the Pilbara should not rely solely on iron ore and attempt to future proof the region against another downturn.

"The Pilbara will undoubtedly continue to be the nation's economic powerhouse, however there is no denying the Pilbara is in a transition, and the region is increasingly confronted by changing global mega trends," Mr Hill said.

"The role of the commission will be

to ensure the Pilbara captures and actively pursues transformational market opportunities."

Mr Johnston said the WA Government was aware of the importance of injecting revenue back into the communities in which industry operates.

"One of the things the Labor Government has done recently is encourage mining companies to hire more local apprentices and review their contracting arrangements to ensure that local businesses in the Pilbara can benefit from the opportunities provided by the massive mining sector," Mr Johnston said.

"We are also investing in important road infrastructure and putting regional services on a sustainable basis, such as the Patient Assisted Travel Scheme (PATS) scheme to make sure health services are

available to regional people.

"We are also looking at each of the Indigenous communities and see what the government can do to make those communities more sustainable.

"We want to make sure that the money we spend in Royalties for Regions is done on a value for money basis."

Iron ore development

Today, the Pilbara's three major iron ore producers, BHP, Rio Tinto and Fortescue Metals Group are responsible for the lion share of production and development in the region.

All have recently pledged massive capital outlays to maintain output as older operations reach the end of their production lives.



Image: BHP.

The three iron ore majors have built an extensive Pilbara rail network.



Image: FMG.

Iron ore exports for FY18 are expected to break 800mt.

(CONTINUED ON PAGE 38)

Multotec enhances Pilbara footprint

MULTOTEC has built a reputation as a high-quality supplier of specialist minerals processing equipment to the Pilbara since it established itself in WA in 2003.

The company supplies iron ore, gold and lithium customers with a range of screen media for wet and dry applications and dense media cyclones and scrubber lining solutions, complemented with a large field service capability in the region.

Multotec has skilfully operated from its Wangara base in Perth for many years, yet in September – due to increased demand for the company's services – it opened a brand new, permanently manned sales and service branch in Newman to service the Pilbara more effectively.

"We have always tried to place our facilities and staff as close to the customer's mine sites as possible," Multotec operations manager Wayne McCulloch said.

"We wanted a permanent base in the Pilbara to allow easier mine access for our staff, and have parts and equipment readily available for this important area of our business.

"It is equally important that our customers know that we are close at hand



Multotec's new service branch in Newman, WA.

when required and we have a permanent presence in the local area."

In addition to its WA branches,

Multotec covers Australia's mining hotspots and is headquartered in Brisbane, with satellite facilities in

Newcastle, Mackay and Emerald.

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

Expanding Pilbara operations

ALL West Engineering (AWE) recently expanded its operations to Newman and established an offsite refurbishment and fabrication facility to further support its Pilbara based mining partners.

Together with its Tom Price headquarters, AWE is able to provide a raft of specialised services to the mining industry; from turnkey maintenance, manufacturing, to scalable labour hire to deliver, reliable, cost-effective solutions for major projects throughout Australia.

Its team of qualified professionals are fully equipped to manage short and long term maintenance projects; from planning and design, to logistics, management and implementation.

As part of its commitment to the Pilbara, AWE recently introduced an apprenticeship program to provide employment opportunities for young people.

"In 2017, we established an apprenticeship program in which we now have one young indigenous and one mature age apprentice, and in 2018 we will have our first female indigenous apprentice who has just finished year 12 at Tom Price High School," AWE managing director Paul Harris said.

Over the last four years, AWE has grown to become one of the region's most dependable mining services companies.

Mr Harris said the exceptional growth of the company was due to AWE providing the service of a multi-national with a small company serviced approach.

"The customer service and experience they get when working with AWE, from our ability to respond with quotes and supporting services on breakdowns, to our ability to take a project from cradle to grave, through design/drafting, manufacturing, installation with back up maintenance – all within WA, is second to none."

More information on AWE's services can be found at: www.allwesteng.com.au.

New facilities to service WA north



thyssenkrupp is a global industrial services provider.

OVER the years, thyssenkrupp Industrial Solutions has been committed to providing engineering excellence to customers, with service solutions throughout the life cycle of its equipment.

With its 360 degrees service, the company seeks to also further enhance the competitiveness of customers.

Working alongside customers to ensure their equipment is operated and maintained in the most efficient manner possible, and adapting to meet changing demands

for production, safety and environmental performance has always been critical to the company.

Driven by the importance of meeting its customers' needs, thyssenkrupp Industrial Solutions has invested heavily in Port Hedland with the acquisition of a locally based engineering company in 2015, the development of new workshop and premises in 2016, and the recent completion of the Rail Capability Expansion (RCE) project.

thyssenkrupp Industrial Solutions,

through its local offices, provides its customers with a large portfolio of products and services including the provision of spare parts, the overhaul of large and small machine components, site support, urgent and emergency breakdown support, local engineering and optimisation services, as well as the capability to offer full turnkey shutdown service and maintenance teams.

More information can be found at: www.thyssenkrupp-industrial-solutions.com, or by contacting the local offices.

ACTIVE PILBARA IRON ORE PROJECTS

- **BHP** – Mt Whaleback, Yandi, Mining Area C, and Jimblebar
- **Rio Tinto** – Mt Tom Price, Robe Valley, Greater Paraburdoo, Brockman 2 – Nammuldi, Brockman 4, Yandicoogina, Marandoo, West Angeles, Hope Downs, Hope Downs 4, and Silvergrass
- **Fortescue Metals Group** – Cloudbreak, Christmas Creek, Kings and Firetail
- **Hancock Prospecting** – Roy Hill
- **Atlas Iron** – Abydos and Mt Webber
- **CITIC Pacific** – Sino Iron

(CONTINUED FROM PAGE 36)

Rio Tinto recently celebrated the opening of its \$US338 million Silvergrass mine, adding an extra 10mtpa of high-quality ore to raise total production up to 340mtpa creating 500 jobs during construction.

“The additional low-phosphorus tonnes that Silvergrass delivers will sustain the long-term viability of our Pilbara blend, ensuring continued premium pricing, whilst also lowering our operating costs through infrastructure improvements,” Rio Tinto chief executive Jean-Sebastien Jacques said.

BHP is creating hundreds of job opportunities after ‘The Big Aussie’ approved \$244m of initial funding to develop its \$US3.2 billion South Flank project in June.

The move would help the miner maintain its WA iron ore production when its Yandi mine reaches the end of its mine life in the early-to-mid 2020s.

BHP said the Mining Area C hub was its preferred option to replace production from the 80mtpa Yandi operation.

FMG too expects it will spend about \$US1.5 billion to replace exhausted production from its Firetail mine.

Gold rush

Excitement is brewing in the Pilbara, albeit from an unlikely source – gold.

The news kicked off this year when Canada-based Novo Resources and JV partner Artemis Resources discovered surface-rock gold at its Purdy’s Reward prospect south of Karratha.

Both went to market for funding to begin exploration work, with Artemis quickly raising \$12m to advance the project.

Kairos Minerals – previously lithium



Image: De Grey.

The Witwatersrand-style discovery has sparked a mini gold rush into the Pilbara.

focused – jumped on the news, confirming to the market field assay results similar to Purdy’s Reward at its own nearby tenements.

De Grey Mining also dusted off its Pilbara Gold project tenements, uncovering 91 shallow lying nuggets.

Significantly, they were of a smooth yet pitted appearance comparable to the Witwatersrand mineralisation style – a geological formation near Johannesburg, South Africa, that now holds the world’s biggest gold reserves.

The discovery attracted growing mid-tier Canadian gold producer Kirkland Lake Gold, which invested \$5m into the junior to further exploration activities.

All three ASX-listed companies finished September with more than triple their value before the finds.

In a note entitled *Watermelon Nugget Patch*, Argonaut analysts raised caution that “nuggety” gold occurrences were commonly isolated and uneconomic for large-scale exploitation.

“Speculative activity and nearology will continue to drive volatility and high trading volumes until drilling and sampling prove or disprove an economic discovery,” they said.

Other exploration juniors that have revealed prospective results in the region include Calidus Resources, Kalamazoo Resources and Castle Minerals.

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Altura Mining and Pilbara Minerals, with their neighbouring Pilgangoora projects, are transforming the Pilbara into one of the world’s global lithium hotspots.

Image: Altura Mining.

Altura Mining’s Pilgangoora lithium pit.

Lithium

However, it is not only gold that has got the Pilbara region buzzing. Near-production lithium developers Altura Mining and Pilbara Minerals, with their neighbouring Pilgangoora projects, are transforming the Pilbara into one of the world’s global lithium hotspots.

Pilbara Minerals is on track for Stage 1 production of 314,000 tonnes of 6 per cent lithium spodumene concentrate in Q2 2018. Similarly, Altura expects to output 230,000t starting in Q1 2018. Rather than in direct competition, the companies seem to be working together to help their projects come to fruition. In August last year, Altura and Pilbara

Minerals struck a joint access agreement to remove any objections from either company’s tenure and share joint access roads and pipeline locations. The MoU also provides frameworks to exploit lithium-rich zones that cross through each other’s tenements. “We are pleased to have entered into these arrangements with Altura, which demonstrates a positive and collaborative

approach to the development of valuable resources in this State which will ultimately benefit a wide range of stakeholders.” Pilbara Minerals managing director Ken Brinsden said. Both miners are working on Stage 2 expansions, which would bring their combined output from the region to more than 1.25mtpa.

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Leader in corrugated steel

THE WA Pilbara is going through a renaissance since the recent mining downturn, with iron ore, lithium, and now a fledgling gold rush providing a plethora of project developments in the region.

As Australia's leading manufacturer of corrugated steel pipes and bolted, corrugated steel structures, Roundel Civil Products has been providing material to miners in the Pilbara for more than 15 years.

The company has been closely involved with all the major mining developments, specialising in the on-site manufacture of corrugated steel drainage culverts and successfully manufacturing 15,000 tonnes of steel culverts on-site for projects with Rio Tinto, BHP, Fortescue Metals and Hancock Prospecting.

There are unique challenges imposed on operating in the Pilbara which Roundel has met with its team of highly skilled, experienced and committed personnel, without incident.

Contractors and mine-owners alike trust Roundel's experience and ability to deliver even in the most difficult conditions.

In addition to the steel culverts, the company designs and supplies corrugated steel arches used on mine sites for stockpile conveyor tunnels and haul road underpasses.



Roundel's bolted, steel arches are highly cost-effective and are quick to assemble.



For instance, FMG's Solomon Mine arch was assembled in less than three weeks without issue.

In addition to Roundel's on-site manufacturing facilities, Roundel provides Australia-wide factory-based manufacturing services from its NSW, QLD and WA locations.



The Trinity Drive Overpass at FMG's Solomon mine was assembled in less than three weeks without issue.





Australia's leading supplier of corrugated metal pipes and corrugated plate structures for use in road and rail infrastructure projects, as:

- Drainage culverts and stormwater systems
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All images: Saracen Minerals.

CAMERON DRUMMOND

THE June quarter was quite a milestone for Saracen, and there's cause to celebrate – the gold miner posted record production during the quarter and achieved its goal of doubling annual production to 300,000 ounces (oz), while also delivering impressive exploration results.

Production rose 23 per cent quarter-on-quarter to 79,985oz, driven by rising mine grades.

This, together with a 25 per cent reduction in all-in sustaining costs (AISC) to \$1127/oz, underpinned a quarterly revenue of \$127.3 million.

Saracen managing director Raleigh Finlayson said achieving the 300,000oz per annum production target was very significant.

"Saracen has now cemented its position in the ranks of Australia's leading mid-tier

gold producers, with a production profile and growth outlook over the next few years which puts us in an enviable position in the ASX-listed gold sector," he said.

\$7.8m was spent in the three months to the end of June, with drilling concentrated at Karari and Thunderbox.

"During the quarter, we began to reap the rewards of our substantial recent investments in growth," Mr Finlayson said.

"At Carosue Dam, the investment in twin declines at the Karari underground mine is now paying off with multiple stoping fronts established, helping to drive an increase in mine production and grade.

"At Thunderbox, mill throughput and recoveries increased markedly as a result of improvements to the plant and a higher grade feed – which together drove record gold production.

"Meanwhile, our strengthening balance sheet means we can continue to fund

our ongoing commitment to aggressive exploration across our portfolio – which is delivering impressive results.

"Recent drilling at the Karari underground mine at Carosue Dam is beginning to show the true potential of this large and growing gold system, while at Thunderbox drilling has extended the thick A Zone mineralisation at depth – highlighting the potential for a multi-year underground mine."

Ore reserves by the end of FY17 grew a whopping 40 per cent to 2.1 million ounces, despite the depletion of 293,000oz during the period.

This was largely due to a maiden reserve estimate of 518,000oz at Thunderbox underground.

Based on the results, Saracen's operations have a combined mine life of at least seven years and highlighted the potential to be mining for more than a decade.

"Karari is rapidly proving to be one of Australia's fastest growing mines," Mr Finlayson said.

"After ramping up production to more than 100,000ozpa, we have now almost quadrupled the Reserves after accounting for depletion.

"At Thunderbox, we have delivered a maiden reserve for what is shaping up to be one of Australia's larger and more productive underground mines.

"The results show that last year's record exploration budget was money well spent, supporting the Company's strategy to grow production and mine life at its existing assets."

Production guidance for FY18 remained at 300,000oz at an AISC of \$1150/oz, however Saracen said it would update its five-year outlook in December after the completion of further drilling at Karari and Whirling Dervish.



Saracen said it has experienced outstanding growth at Thunderbox.



Underground at Karari.

(CONTINUED OVER)

(CONTINUED FROM PAGE 41)



The Carosue Dam mill will process ore from all of Saracen's core assets.

Divestment

Saracen recently divested its King of the Hills and Red October mines, pocketing a total \$18m in cash and shares.

On 3 August it offloaded its King of the Hills gold project to ASX-listed Red 5 in a cash and scrip deal worth \$16m.

As part of the deal, Red 5 paid \$7m upfront; issued Saracen 90 million Red 5 shares – escrowed for 12 months; and will pay a further \$4.5m in cash or Red 5 shares a year after the deal's completion.

King of the Hills is an underground project with 402,000oz grading at 4.6 grams per tonne (g/t).

"Red 5 is aiming to bring it into production as part of a wider consolidation strategy, and Saracen will retain ongoing exposure to this through its shareholding – a good outcome for both parties," Mr Finlayson said.

In late September Red October was offloaded to neighbouring tenement holder Matsa Resources for \$2m in cash and shares.

The mine – mothballed by Saracen in June – contained 99,000oz grading at 6.9g/t at the time of sale.

"Saracen will retain ongoing exposure to the asset through its shareholding in Matsa, making this an excellent outcome for both parties," Mr Finlayson said.

Mr Finlayson said while both King of the Hills and Red October were high quality assets, their "potential as a source of ore is being displaced by the abundance of higher margin ore closer to [existing] milling infrastructure", and the sales were opportunities to crystallise value from non-core assets.

**A
MILESTONE
YEAR**

SOLD

King of the Hills \$16m

SOLD

**Red October
\$2m**

**300,000oz+
PRODUCTION**

**2017
EXPLORATION
SPEND:
\$42M**

"We are experiencing outstanding growth at the Karari and Thunderbox mines, located immediately adjacent to the Carosue Dam and Thunderbox mills respectively," he said.



Quality equipment servicing

ESTABLISHED in 2007, SMS Rental (SMS) specialises in the rental earthmoving equipment, onsite maintenance and support services, and Maintenance and Repair Contracts (MARC) solutions to the mining and civil industries throughout Australia.

SMS has built a reputation for its ability to provide effective solutions to all equipment requirements.

The company's mission is to maintain high fleet utilisation and availability, ensure fleet quality to deliver high reliability to customers and partner with its clients to deliver long term goals.

SMS exists to facilitate growth and achievement in the Australian mining industry; striving to nurture strong and dependable relationships with customers and suppliers.

Company success is strongly attributed to these long-term relationships by providing the highest level of professionalism and adding value through honesty, integrity and innovation.

SMS Rental is well positioned to take advantage of the growing demand for its services, and is committed to exploring and developing opportunities with its clients.

More information on SMS Rental's innovative mining solutions can be found at: www.smsrental.com.au.



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ILUKA-ING GOOD

After consolidating its Australian processing operations, Iluka is looking to restart zircon production in Australia and progress a major development of its newly acquired Sierra Rutile operation.

Iluka's 300,000tpa Jacinth-Ambrosia zircon operation is expected to commence production in December.

All Images: Iluka Resources.



Hamilton plant operations were suspended in October 2016.



The Narngulu separation plant is now Iluka's sole Australian processing facility.

CAMERON DRUMMOND

PERTH-based Iluka Resources is a major international mineral sands producer and marketer with a major production base in Australia, as well as mining and processing operations in Sierra Leone.

It is the world's largest producer of zircon sand and a major producer of high-grade titanium ores, natural and synthetic rutile.

Iluka has recently gone through a transformational period, consolidating its Murray Basin plant to process all its Australian material at its Perth Basin operation.

The miner is ramping up development of its \$393 million Sierra Rutile operation in Sierra Leone with a planned \$US300m spend staggered over four years.

The company is also eyeing off a December restart of its Jacinth-Ambrosia zircon project in the Eucla Basin, South Australia, which is capable of producing up to 300,000 tonnes per annum (tpa) from two contiguous deposits.

Highlights

During September, Iluka announced an increase of its zircon reference price \$US130 per tonne (t) to \$US1230/t, effective 1 October for a six month period.

This was higher than its previous increase to \$US1100/t that was effected from 1 July.

As one of the world's largest producers of zircon, the news rippled through the market, leading other producers to also increase their prices, including Rio Tinto – another large producer of the product.

"This increase in pricing reflects a continuation of Iluka's approach to balancing the needs of its customers and downstream industries for pricing which enables sustainable operations with the requirement to generate satisfactory returns for its shareholders," the company said in a statement.

Iluka revealed a \$201m impairment in January, largely due to shuttering its Murray Basin operations.

90 jobs were axed due to the decision, as the company reported an operating loss of \$230m for 2016.

The losses did not stop during the first half of this year, as Iluka consolidated its Australian processing to one location.

Iluka recorded an after tax loss of \$82m for H1 2017, largely due to a \$106m impairment of the Hamilton mineral separation plant the company placed on care and maintenance last month.

The company said moving forward it would utilise the Narngulu plant to process all expected Australian heavy mineral concentrate.

Restructure and rehabilitation costs for the Hamilton plant were expected to total \$14m.

However, the financial impact of

the impairment charge was softened by improved sale prices, as underlying earnings before interest, tax, depreciation and amortisation (EBITDA) for the half year increased to \$155m; a \$92m increase from H1 2016.

While total zircon, rutile and synthetic rutile (Z/R/SR) production for the June quarter decreased 11,300t compared the previous quarter, it was offset by a 13 per cent price increase for Z/S/SR.

This produced a \$265.7m revenue from Z/R/SR for the three months to the end of June, an increase of \$61.4m.

"These results reflect improved market conditions for both zircon and titanium dioxide products," Mr O'Leary said.

"Iluka's cash flow generation was a highlight for the half, with operating cash flows up \$209m to \$194m, and free cash flow of \$180m.

"This enabled a significant reduction in net debt and a return to moderate gearing levels of 23 per cent following the acquisition of Sierra Rutile in December 2016."

The improvement in the underlying result enabled Iluka to provide shareholders with an interim dividend of 6 cents a share, fully franked.

Mr O'Leary said the profit result and dividend payout reflected Iluka's decision in June to consolidate its Australian processing operations and idle the Hamilton plant.

Sierra Rutile

In December 2016, Iluka completed a \$393m acquisition of the Sierra Rutile operation in Sierra Leone.

As part of the agreement Iluka assumed Sierra Rutile's net debt of \$80m, which the company repaid through its own funding.

The company said it would immediately start evaluating and developing a four year, \$US300m development plan for the project.

"Iluka plans to commit progressively to expansion opportunities that, in aggregate, could see a significant increase in rutile production and a material improvement in unit cash costs production," Iluka managing director Tom O'Leary said.

Iluka said it would focus on expansion work, including drilling programs to improve the resource and support mine planning; implementing initiatives to improve productivity; and developing the Lanti deposit to an in-pit mining operation by the end of the year.

These developments – outlined by Iluka at the start of the year – would double production from both the Lanti and Gangama rutile mines from 500 tonnes per hour (tph) to 1000tph.

Further improvements to the Lanti wet concentrator plant would also enhance throughput capacity levels and reduce production costs.

Iluka also flagged the development of



"Iluka plans to commit progressively to expansion opportunities that, in aggregate, could see a significant increase in rutile production and a material improvement in unit cash costs of production."

the Sembehun deposits – 20km north of existing operations – into a new 1000tph mine.

Sierra Rutile produced 43,000t of rutile during the June quarter, a 21 per cent improvement on first quarter production of 36,000t, reflected by improved grade recovery and ongoing operation developments.

Those figures were in line with a 2017 production guidance of 150,000t.

Outlook

Following revisions to its mineral separation plant setup, Iluka upgraded its 2017 full year production guidance from 720,000t to 795,000t.

Expected zircon production was upgraded to 310,000t and rutile 280,000t; while synthetic rutile remained unchanged at 205,000t.

Spending guidance for the year was

reduced from \$260m to \$135m, mainly a reflection of construction of the Cataby project being pushed into 2018 as the company continued to cement offtake agreements.

"Looking at Iluka's projects, the feasibility studies for the three Sierra Rutile expansion projects at Lanti, Gangama and Sembehun are progressing well," Mr O'Leary said.


"Once executed, these projects will contribute to higher production and a lower unit cash cost of production, resulting in a

more robust business through the cycle.

"In addition, we are also restarting mining at Jacinth-Ambrosia in December 2017, as planned, given improved supply and demand fundamentals."

Iluka said production from its Australian operations were expected to be first half weighted while quarterly variations in production levels reflected campaign and process timing of the plants across the quarters.





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COUNTDOWN TO PRODUCTION

Dacian Gold is on the cusp of becoming Australia's next mid-tier gold producer, after a transformational 2016 which saw a 90,000m drilling program increase the Mt Morgan resource by 176 per cent.

Underground at Beresford.

Image: Dacian Gold.

CAMERON DRUMMOND

GOLD developer Dacian can see the light at the end of the tunnel after almost six years of exploration and development at its near-production Mt Morgans gold project near Laverton, WA.

Gold production will be principally sourced from two mining areas, Jupiter and Westralia, for expected annual production of 200,000 ounces per annum (ozpa).

At the company's IPO to the ASX in 2012, Mt Morgans had a resource base of 840,000 ounces (oz) of gold.

By the time Dacian released a definitive feasibility study in November 2016 that resource base increased almost four times to an ore reserve of 1.2 million ounces (moz) and a resource of 3.3moz.

After securing \$150m in project debt funding, Dacian began construction works in early 2017.

In tandem with mine development, an expansion study at the Westralia mine area outlined a potential ore reserve increase to 21.4 million tonnes (mt) at 2.4 grams per tonne (g/t) for 1.65moz, which would increase the mine life from eight to nine years and reduce all in sustaining costs (AISC) to between \$970/oz and \$975/oz due to higher grade ore finds.

In a September update the company revealed that construction of its 2.5 million tonnes per annum (mtpa) treatment plant was more than 25 per cent complete, and underground mining at the Beresford deposit had passed the 1000m mark, ahead of schedule.

Then, on 4 October Dacian intersected first ore at the Beresford underground mine, four weeks ahead of schedule.

Beresford is one of two mines that make up the 1.6moz Westralia resource at Mt Morgans.

Total capital costs for the Mt Morgans were estimated at \$197m, made up of a reduced infrastructure spend of \$149m and mine establishment costs of \$48m.

"Project construction at Mt Morgans is on time and on budget, ensuring we

"The size of the anomaly is consistent with a large deposit at depth and we are spending \$1m a month working aggressively and in parallel with the development of Mt Morgan's to realise its potential."

The historic Westralia deposit was first discovered in 1896.

remain firmly on track to start production from March next year," Dacian executive chairman Rohan Williams said.

"It is remarkable that it was less than five years ago that we completed our IPO as a junior explorer and now we have mined the first ore from the two 1 million ounce discoveries we have made since then. In less than six months, we will be Australia's newest mid-tier gold producer.

"Dacian's success is due to the exceptional skills and work ethic of our employees, consultants and contractors, including RUC Mining.

"I would like to thank them all for getting the company to where it is, and to where it is going."

Exploration

Unlike most other miners to develop their first producing asset, Dacian Gold is undertaking a simultaneous exploration program at its Cameron Well prospect, 9km northwest of where Dacian's 2.5mtpa

treatment facility will be located.

In August, the company intersected gold in all six diamond drill holes at Cameron Well, confirming the shallow dip of a mineralised, 1.5km long structure.

Mr Williams said progressing exploration in tandem with ramping up Mt Morgans underpinned the company's confidence in an asset which could become the company's third major gold system.

"We have four exploration drilling rigs operating, three of which are at the highly promising Cameron Well prospect, as part of our strategy to continue growing the mineral resource base and mine life," Mr Williams said.

"Cameron Well is an emerging discovery with a clearly defined very large zone of near surface gold.

"The real prize there will be finding a large resource to turn into an underground mine.

"The size of the anomaly is consistent with a large deposit at depth and we

MT MORGANS

Initial production of
~200,000ozpa

•
8 year
mine life

•
3.3moz
resource

•
\$15m exploration
spend
in full swing

•
Maiden
52,000oz Hedge
contract at **\$1782/**
oz

•
Westralia
underground
mining commenced

•
Drilling underway at
Cameron Well

are spending \$1m a month working aggressively and in parallel with the development of Mt Morgan's to realise its potential."

Mr Williams said the team at Dacian was looking forward to the 2018 March quarter as they counted down to production, increase cash flow and continue exploration drilling.

"Our plan is to put half a million tonnes of high grade ore on the ROM pad ready for when we turn the plant on to have quite a fast ramp up of production."

Providing global mineral processing solutions

GR Engineering Services (GRES) is a market leading ASX-listed process design, engineering and construction company providing safe, quality, cost competitive and timely engineering solutions to the global mineral processing industry.

GRES is currently delivering the Mt Morgans gold project for Dacian Gold and the construction for the 2.5mtpa plant has commenced.

The Mt Morgans gold project is scheduled for completion in Q1 of 2018 and GRES is proud to have been selected by Dacian to construct its flagship project.

The innovative engineering solutions developed by GRES enable its clients to achieve project success at the earliest opportunity.

GRES has an established track record in the provision of high quality technical and feasibility study work for a broad range of clients.

GRES has successfully completed the process and engineering designs and construction for projects of various scale and covering a diverse range of mineral commodities and geographic locations.

It has delivered processing facilities and infrastructure for gold, base metals, mineral sands, tin, tungsten and iron ore projects for a range of clients in Australia and internationally.

GRES also has a presence in the hydrocarbons industry via its wholly owned subsidiary, Upstream Production Solutions, which is a leading provider of operations, maintenance and well management services to the oil and gas industry in Australian and South East Asia.



GRES is a proud construction partner of Dacian Gold's Mt Morgans gold project.

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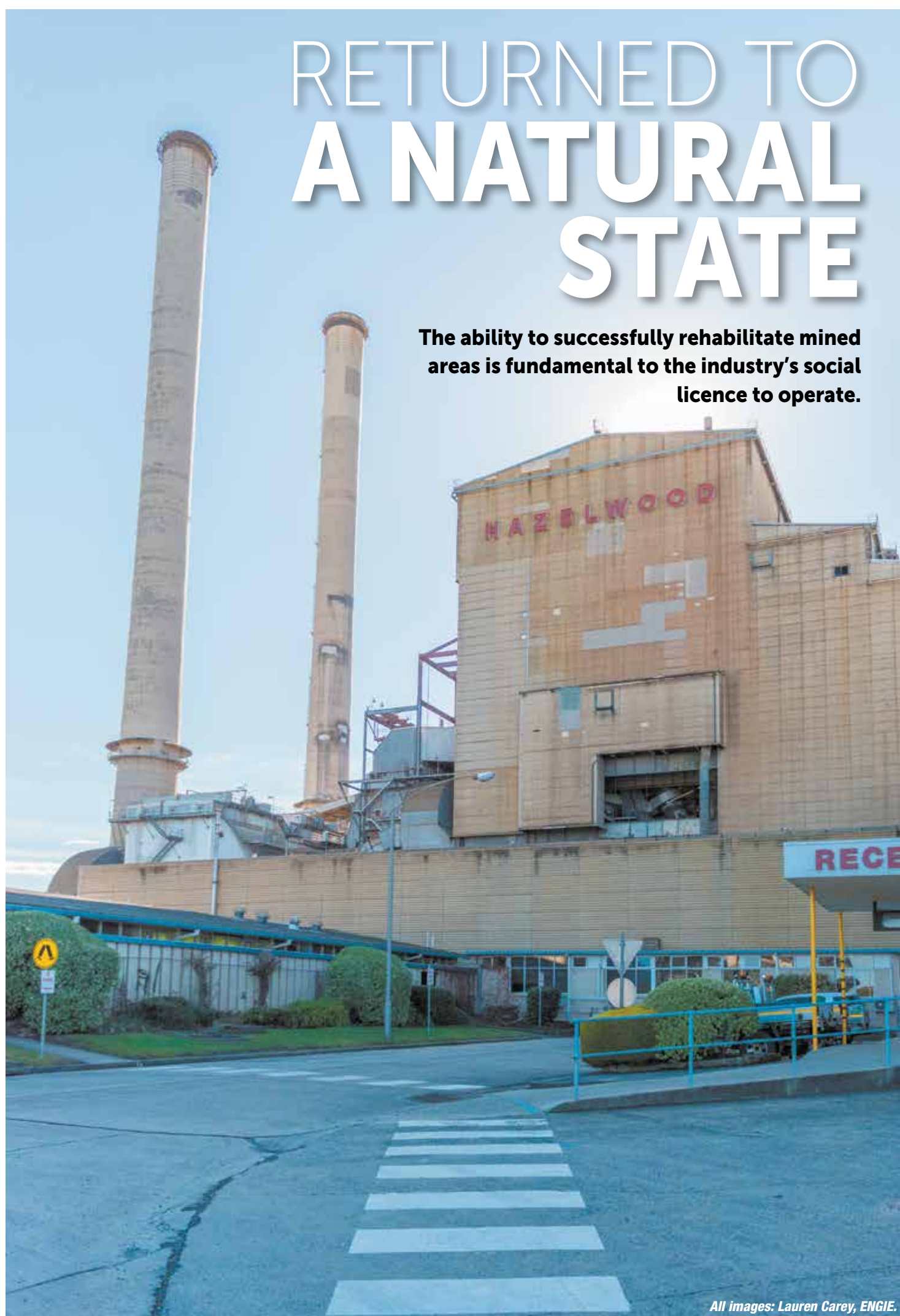
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RETURNED TO A NATURAL STATE

The ability to successfully rehabilitate mined areas is fundamental to the industry's social licence to operate.

All images: Lauren Carey, ENGIE.

CHRIS FOLEY

THE USE of land for mining stretches back to the 1840s in Australia.

From the early silver discoveries in South Australia to the gold rushes of Victoria and the recent WA boom – mining has always been a feature of the country's economic landscape and a significant contributor to its wealth.

Mining continues strongly today, however one element has only recently achieved prominence: the issue of how to rehabilitate the land.

In February this year, research by a Melbourne public policy think tank suggested that there were more than 60,000 abandoned mines in Australia,

with only a handful ever being completely rehabilitated.

As the recent mining boom draws to a close, environmental issues become further entrenched in political agendas and the everyday lives of people and business.

Mining companies are increasingly beginning to factor in both the necessity and costs how to restore the land to an acceptable standard once all resources have been extracted.

Although most States have their own legislative requirements that encourage this aim, no uniform laws exist at present and this can result in uneven restorative outcomes.

According to an industry report commissioned by the Minerals Council of Australia last year, the ability to successfully

rehabilitate mined areas is fundamental to the industry's social licence to operate and a foundation for demonstrating the industry's commitment to operating responsibly.

"During development and operation, mines bring significant benefits to regional areas through economic development, capacity building and infrastructure.

However, mining operations are finite in nature and mining is only one of many alternative land uses over time," the report stated.

"The Australian minerals industry recognises its responsibility as a temporary custodian of land to contribute to sustainable land use outcomes.

"It is the industry's goal that previously mined land is available for future economic activity, conservation or community use."

Similarly, according to the Federal Government’s Mine Rehabilitation Handbook, mine site rehabilitation should now be viewed as an integral component of a mining company’s sustainable development strategies and considered a key performance indicator against which the company’s environmental performance is judged.

The handbook states any mine site rehabilitation plan should be designed to meet three key objectives:

- 1) the long-term stability and sustainability of the landforms, soils and hydrology of the site.
- 2) the partial or full repair of ecosystem capacity to provide habitats for biota and services for people.
- 3) the prevention of pollution of the surrounding environment.

Engagement with landholders, local communities and other stakeholders is essential in the development, implementation and review of mine closure and rehabilitation strategies for mining companies.

Community input helps shape final land use objectives for closed mines.

From site closure to rehabilitation

According to the Fraser Institute the mine closure process typically consists of several steps:

Shut-down:

Once production stops, the number of workers is reduced, and only a small labour force is retained to permanently shut down the mining equipment.

In some cases, the mining company may provide re-training or early retirement options to their workers before the mine is closed.

Decommissioning:

Small crews or contractors decommission or take apart the mining processing facilities and equipment.

Pipelines are drained, equipment and parts are cleaned and sold, buildings are repurposed or demolished, warehouse materials are recovered, and waste is disposed of.

Remediation/reclamation:

The objective of reclamation is to return the land and watercourses to an acceptable standard of productive use, ensuring that any landforms and structures are stable, and any watercourses are of acceptable water quality.

Reclamation typically involves a number of activities such as removing any hazardous materials, reshaping the land, restoring topsoil, and planting native grasses, trees, or ground cover.

Post-closure:

Monitoring programs are used to assess the effectiveness of the reclamation measures and to identify any corrective action that may be needed.

In addition, mines may require long-term care and maintenance after mine closure such as ongoing treatment of mine discharge water, periodic monitoring and maintenance of tailings containment structures, and monitoring any ongoing remediation technologies used such as constructed wetlands.

Perth-based Griffin Coal follows a four step process that involves “returning the land to its natural state post-mining through strict, well researched strategies of

revegetation and the regeneration of natural ecosystems”.

Work to restore disturbed areas is carried out progressively as soon as practicable with the objective to create a structurally stable landform capable of future productive use.”

Rehabilitation involves a comprehensive process of classifying overburden material; land recontouring, seeding and regeneration as follows:

Overburden Material Classification:

Overburden material is classified according to its potential to cause geochemical impacts (acid rock drainage) on the environment.

Dumping of waste material is undertaken so the best materials end up near the surface of waste landforms and the other material is encapsulated in the middle.

Land Recontouring:

When landforms are no longer needed for mining or dumping purposes the slopes are recontoured to around 10 degrees to control surface runoff and to ensure a stable slope.

Topsoil is then spread to a depth of 150 millimetres before the area is contour ripped, fertilised and seeded with local natives.

Seeding:

Rehabilitation areas are seeded at the break of the winter rainy season, and can initially be susceptible to erosion damage until germination and root development occurs.

Regeneration:

As native species do not germinate and develop until the following spring, native bush species comprising grasses; groundcovers, shrubs and trees, are sown

together with a “nurse” crop of cereal rye.

The cereal rye germinates quickly and stabilises the surface through the winter and the natives then emerge the following spring.

The seed mix includes Jarrah, Wandoo, Flooded Gum, numerous Acacias and understorey species.

Hazelwood Rehabilitation Project

The owner of Victoria’s recently closed brown coal Hazelwood power station and mine in the La Trobe Valley – French global energy provider ENGIE – has revealed the rehabilitation of the mine is expected to cost \$439 million, with the cost for remediation on the power station site \$304m.

It will be the first mine in Australia of its type and size to be rehabilitated and is expected to take a number of years to complete.

Current rehabilitation work at the site includes continued overburden stripping in the Northfield with the bucket wheel excavator, Dredger 25.

This overburden is being relocated to cover coal and also to place up against the existing batters to assist the long term stability.

Dredger 25 is operational and rehabilitation of the eastern batters is continuing with the cutting down of the coal batters, reshaping and re-profiling them to a 3:1 gradient.

The company is also in the process of removing redundant infrastructure and erecting new infrastructure, which includes relocating roads and powerlines.

ENGIE will be providing an exclusive update and interview in *The Australian Mining Review* in the first half of 2018.



Lanyonscapes’ Blackwater Creek Diversion project.

Trusted environmental contracting services

LANYONSCAPES is passionate about environmental sustainability and achieving this through the rehabilitation of degraded landscapes from mining or construction activities.

Established in 1990, over the years the company has developed a strong reputation for providing high-quality, reliable services.

Working with its clients, the team develop tailored solutions to ensure effective, long term results, and provide a variety of environmental contracting services, including: civil works, including ground preparation and topsoil replacement; soil sampling and analysis; development of soil and environmental management plans; revegetation, through hydromulch, organics

blanket, or hydrostolonising and specialty products like hot pods.

The company also specialises in erosion control, with innovative products like Flexterra or erosion control matting; and commercial landscaping with ongoing maintenance.



The team have the experience and capacity to manage projects of all sizes, including multimillion dollar projects spanning several years.

The company is also a remote area specialist, focusing on Queensland and the Northern Territory.

Lanyonscapes is proud to hold AS/NZS 14001:2015, 9001:2015 and 4801:2001 accreditations.


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A 'big tick' for the environment

ENVIROSTAY offers a range of revegetation, sediment control and dust suppression solutions for the mining, civil and construction sectors.

Specialising in the application of hydromulch, dust suppressants, soil veneers, and soil binders, the company has the expertise to ensure the right product or service is used to ensure a satisfactory outcome.

Envirostay are certified installers for Enviromatrix (Erosion Control Matrix); a revolutionary product in the hydromulching and revegetation industry, that is turning heads in the mining and civil sectors with outstanding results.

"I can grow grass in areas where traditional hydromulching methods just doesn't work," Envirostay manager Doug Reardon said.

Enviromatrix is tailored to each project and the site is assessed by Envirostay, soil is lab tested, and then a recommendation is made to ensure a result.

Its unique blend of heat-treated straw mulch, blended with special binders and interlocking fibres, are added to a site-specific blend of nutrients and soil microbes to form a resilient mat on the surface of the soil.

This prevents erosion and provides a perfect growing medium for plants to thrive using only the natural climatic conditions to germinate seeds, without the need for artificial watering.

Steep slope stabilisation and sediment control are another specialist area where Envirostay can help.

Envirostay is an installer of Geospray; a highly effective soil stabiliser that forms



More information on Envirostay's services can be found at www.envirostay.com.au.

a flexible coating that is best described as a spray-on geofabric.

Its uses range from lining drains to eliminate soil erosion and sediment, stabilises embankments on slopes, and prevents erosion

of the surface, while allowing for germination of plants through the membrane.

"Geospray has been used to stabilise and retain freshwater diversion drains in and around mine sites with great success," Mr

Reardon said.

"Not only does it retain the embankments, it effectively stops any sediment generating from the drains, which is a big tick for the environment."



Applying Enviromatrix



Applying Geospray



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Cost-effective environmental solutions to meet clients' needs and challenges

Soilwater Group is an Australian environmental and mining consultancy with industry leading experience across all areas of government policy, mining securities, stakeholder engagement, mine planning and design, rehabilitation and closure planning implementations.

The company has extensive experience in geotechnical testing, environmental, hydrogeological, hydrology, soils, decommissioning and monitoring, and technical capacity to provide solutions across all aspects of rehabilitation and closure, and importantly, better mine design to ensure closure objectives can be achieved.

With this experience, we can prepare targeted strategies to ensure all aspects of its client's projects are successfully delivered to meet the expectations of stakeholders and clients in a cost effective manner.

With a strong and proven focus on achieving cost effective, sustainable and environmentally responsible outcomes, Soilwater Group has the right team to plan, design and implement environmental solutions for its clients.



“We deliver total package solutions from approvals to closure, managing each step of the process to ensure efficient, quality outcomes”

FIND OUT MORE
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Before



After



After

Before and after rehabilitation works for the Black Diamond project.

Rehabilitation and closure for the mining industry

MINING and its derived products are essential for the continued growth and development of our society, but there is a need to balance the economic and technological benefits of mining and the long term environmental sustainability of the land and our communities.

Mining companies, as part of their social licence to operate, need to recognise that the community has changing expectations and that what was acceptable in the past may not be acceptable now or in the future.

This represents a significant challenge to the mining industry as the financial liabilities of rehabilitation and closure to meet community expectations are considerable, as highlighted by the \$743 million price tag to rehabilitate the Hazelwood Power Station.

To ensure cost-effective rehabilitation and closure of mining assets requires a consultancy that is well versed in government policy, stakeholder engagement, as well as technical aspects of the environment, rehabilitation and closure.

"The Soilwater Group is that consultancy

and we have a proven track record in engaging with regulatory agencies, working with local communities and mining companies to provide a one-stop-shop for rehabilitation and closure of mining assets," Soilwater Group director Adam Pratt said.

Soilwater's in-house capabilities cover government policy and mining securities (including Mining Rehabilitation Fund), community and social planning, State and Federal environmental approvals, technical studies (soil and waste characterisation, hydrology, hydrogeology, geotechnical engineering, contaminated sites and landform design and modelling), as well as rehabilitation and closure planning and implementation.

"We also have strong alliances with specialists demolition and auction providers to close the closure loop," Mr Pratt said.

The Soilwater Group therefore has the capacity to provide cost-effective and environmentally and socially sound operation, decommissioning, rehabilitation and closure of any mining project.

To illustrate Soilwater Group's expertise in mine rehabilitation and closure, the company recently completed the rehabilitation and closure works for the highly successful Black Diamond Project, which was selected as the first pilot project to be rehabilitated using funds from the Mining Rehabilitation Fund in WA.

Given its history and proximity to the coal mining town of Collie, the Black Diamond Project was highly sensitive with a range of conflicting political, government and community expectations.

"To overcome these challenges, we worked closely with the various government agencies and communities groups to deliver a rehabilitation and closure solution that was within budget, accepted by the community and was technologically feasible," Mr Pratt said.

The Soilwater Group completed all site assessment work in-house to assist and inform the government agencies and community groups of the likely outcomes that could be achieved, with the technical data incorporated

into the stakeholder consultation strategy which provided the basis for the accepted decommissioning plan to support the desired end land use.

The Soilwater Group understands that for any mining project to achieve successful closure, there is a need to integrate the technical aspects with the social.

The long term viability of the mining sector is dependent on its social licence to operate, and every failure to consider and incorporate the needs and expectations of the community into the planning and closure process adds risk or delays to the approvals process, and tarnishes the reputation of the industry as a whole.

Given this understanding, the Soilwater Group can support its clients through the full life cycle of a project to ensure community support and project approval and to prevent mining assets from becoming community liabilities.

The Soilwater Group is the consultancy of choice for the rehabilitation and closure of mining assets.



Less than a month since the official opening of the Nova project, Independence Group — in the hunt for the next Nova-style deposit — has again increased its footprint in the Fraser Range region through a new Joint Venture deal.

All images: IGO.

ELIZABETH FABRI

INDEPENDENCE Group (IGO) is on the rise again in FY18.

After bringing its \$443 million Nova nickel-copper-cobalt mine into commercial production on 1 July, the mine’s balance sheet is set for a turnaround year as it adds an extra 26,000 tonnes of nickel, 10,000t of copper and 800t of cobalt to its annual production.

Over the last two years, the company’s focus has been developing Nova. But now the project is up and running — having reached nameplate capacity in September — IGO is free to focus on the next great discovery.

Through an acquisition and various joint venture agreements, IGO has consolidated more than 12,000sqkm of tenure in the Fraser Range, the largest ground position of any listed company.

The region is appealing because it is widely under-explored, but going by the limited exploration undertaken it is considered highly prospective for nickel, copper, and cobalt sulphide mineralisation.

“But layered on top of all that is we have got this emerging story about the importance of base metals in the electric vehicle market.”

Fresh out of signing a new joint venture in October, IGO managing director and chief executive Peter Bradford spoke to *The Australian Mining Review* about his plans for Fraser and direction for the company on the back of Nova’s success.

“With building Nova and ramping it up all behind us now, and the period of cash flow to build Nova done, we’re now looking

FY17 PRODUCTION	FY18 GUIDANCE:
NOVA 3502t Ni 2106t Cu	NOVA 23,000t – 27,000t Ni, 10,000t – 12,000t Cu, 800t – 1,050t Co
TROPICANA JV 128,601oz (IGO share)	TROPICANA JV 132,000oz – 147,000oz Au (IGO share)
JAGUAR 32,638 Zn 4,565 Cu	JAGUAR 29,000t – 33,000t Zn 2600t – 3000t Cu
LONG 8433t Ni	LONG 5400 – 6000t Ni

ahead to a very exciting FY18,” Mr Bradford said.

“This is our first full year of production for Nova so we’ll see first cash generation there.

“We are also going to have higher than normal cash generation from Tropicana with two of our higher production years in 2018/2019.

“Very quickly, IGO will be transitioning from a net debt balance sheet to net cash going forward.”

Mr Bradford said Nova, the main prize secured out of its \$1.8 billion takeover of Sirius Resources in September 2015, was performing well, with a number of drilling campaigns underway ahead of an ore reserve

update in December.

“We finish our grade control drilling in December this year and then from January 2018, we’ll be starting to drill some of those extensions around the Nova and Bollinger ore body which would expect to add some years of mine life,” he said.

“In parallel to that, right now we are doing exploration on the surface at Nova looking for continuations of the trend, with the aim of trying to identify repetitions of Nova and Bollinger further along strike.”

On top of brownfields drilling, in FY18 IGO will be doubling its greenfields exploration budget to more than \$31 million, which will be largely focused on the

substantial ground position it has built up on the Fraser Range around Nova.

Fraser exploration

On 2 October, IGO inked its latest Joint Venture agreement with Rumble Resources to earn a 70 per cent stake in the company’s Fraser Range 500sqkm tenements.

Under the terms of the deal, IGO will be required to spend \$1.5 million on exploration across three years.

Mr Bradford said the announcement flowed on from the deals IGO had signed over the last 12 months, including an acquisition of Windward Resources, and Joint Ventures with Orion Gold, Sheffield Resources, and Buxton Resources.

“Over the last 12 months or so, we have pursued a strategy of consolidating the land on the Fraser Range around Nova so we can increase our chances of finding the next Nova or Bollinger on that belt which is prospective for Nova-style discoveries, and underexplored,” Mr Bradford said.

“The reason I say underexplored is because Nova was only discovered back in July 2012, just five years ago, and since then the majority of the land has been held by junior exploration companies who have not been able to access the finance they needed to invest significantly in ongoing exploration on the Fraser range.

“We are actually doing some of the first systematic exploration work on those tenement areas and most of the work we will do this year will be geochemical sampling of bedrock geochemistry, and big geophysical programs including an aerial program using the spectrum technology out of South Africa.”

Mr Bradford said he believed there was opportunity and geological merit to suggest there were further Nova’s to be discovered.

(CONTINUED ON PAGE 55)

Leading underground contractor

CPC Engineering has provided engineering design, construction and maintenance services to the minerals resource sector since 1970.

CPC has carried out a wide range of projects for Independence Group (IGO), from underground infrastructure, surface and underground shutdowns and maintenance, design and construction of capital works, to custom engineered solutions; delivering all projects safely, on time and on budget.

The company has been involved in both the operational readiness and operating development of the Nova nickel mine, and was responsible for mine dewatering services (rising mains, pump stations, settlement dams and raw water reticulation), ventilation infrastructure (fans, evases, DBR's and airlock door systems), monorails, escape-way ladders, overhead protection walkways, and paste plant reticulation (including specialty services and products).

CPC also works with IGO on the Jaguar and Long Shaft mines, completing shutdowns and maintenance, labour backfill through its labour hire division, fabrication and rotatable spares refurbishment, engineering design and customised solutions.

The team also has the capability to deliver portal sets, crushing and loading stations, mobile plant and equipment.

CPC has completed major projects for companies including, First Quantum Minerals, Newmont Asia Pacific, Syrah Resources, St Barbara, Gold Fields Australia, OceanaGold, AngloGold Ashanti, Saracen Minerals, Fortescue Metals Group, BHP, and CBH.

The company's success is driven by a commitment from its people to add value in everything they do.



CPC Engineering completed underground infrastructure for Nova nickel mine.



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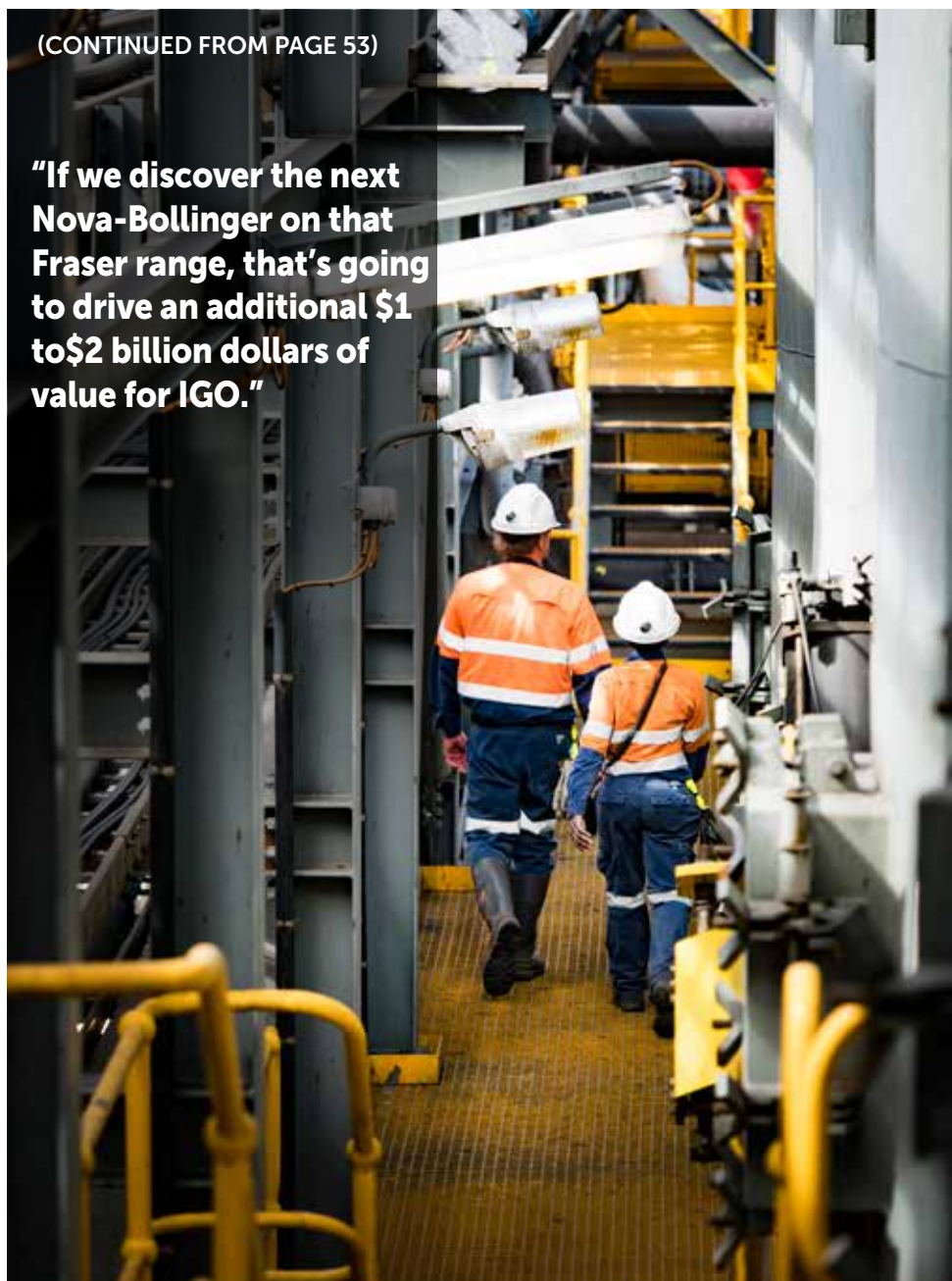
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(CONTINUED FROM PAGE 53)

“If we discover the next Nova-Bollinger on that Fraser range, that’s going to drive an additional \$1 to \$2 billion dollars of value for IGO.”



“The big question is whether we’ll discover it or someone else,” he said.

“If someone else discovers it than that is a great outcome and proves that the Fraser Range remains fertile, and we will get some benefit and recognition in our stock price because people will realise that straight away there is greater prospects in our land holdings.

“If we discover the next Nova-Bollinger on that Fraser range, that’s going to drive an additional \$1 to \$2 billion dollars of value for IGO.”

Tropicana

IGO and its JV partner AngloGold Ashanti were also busy increasing production and capacity at the nearby Tropicana gold mine.

IGO (30 per cent) and AngloGold Ashanti (70 per cent) were currently in the final stages of their Long Island study to assess potential to extend life of mine (LoM) through to 2027-2030.

“A large part of the study work is finished,” Mr Bradford said.

“We’re now at the final stage where the internal vetting by AngloGold Ashanti is being done, and we expect to complete the project and obtain the necessary board approvals at the AngloGold level and IGO level in November/December this year.”

The JV partners were also planning to increase production through the introduction of grade streaming and strip mining, plant improvements, and a pre-feasibility study to lift throughput to up to 8.2 million tonnes per annum (mtpa).

“We’ve been successful in increasing throughput from the original nameplate capacity, and by late 2016 had increased that by 30 per cent up to 7.5 mtpa but we’re planning new work and doing the final stages of design and approvals around an additional mill which would lift processing capacity by another 10 per cent to around



IGO exploration works in the Fraser Range.

8.2mtpa,” Mr Bradford said.

Increasing capacity would cost the JV \$25 million, but was expected to deliver a payback in less than 12 months.

On the mining side, IGO and AngloGold have also increased the mining rate from about 50 million tonnes two years ago to above 90 million tonnes in 2017.

“The reason we have done that is to accelerate the exposure of the ore at the bottom of the pits in Tropicana and Havana... which is going to allow us to put the highest grade material, through the processing plant, and stockpile the low grade,” he said.

“This means gold production over the next two years will be some of the highest gold production for the project’s life to date.”



very important to the high performance batteries that are needed for these vehicles.

“Then of course there is copper which is used to move the electricity around.”

Mr Bradford said it was a very exciting phase for IGO across its Nova, Tropicana, Jaguar and (in the short term) Long operations.

With a current mine life out to the June quarter next year, Long’s reserves were almost depleted, but Mr Bradford said he didn’t believe this was the end just yet.

“We still have a continuing exploration program at Long to identify additional mineralisation and we’ve spent \$1.5 million in the current financial year towards that,” he said.

“After the June quarter next year, we’ll continue that on a care and maintenance basis and would likely do that for one to two years, and if we’re not successful in that extended period then we’d likely move to closure.”

Jaguar too had some highly prospective new deposits under exploration, Mr Bradford said.

“We have been doing work to look at how we can maximise revenue generation through the process plant, and we have completed a study around the production of a third concentrate stream (gold and silver) at Jaguar which would increase overall revenue and improve operating margins,” he said.

Further ahead, Mr Bradford said he will be looking for the next deposit to bring into production.

“We will be looking for the next set of business we need to do to grow the company and to identify that next project for the portfolio – whether that be through organic growth or identifying a project that someone else has discovered and taking it through feasibility study, permitting and development,” he said.

The big picture

Looking ahead, Mr Bradford said the company was well placed to capitalise on increased commodity prices.

“Certainly the market is shifting,” Mr Bradford said.

“There is a lot of interest there; for instance on the nickel side there has been good fundamentals with strong demand and strong demand growth from nickel into stainless steel.

“But layered on top of all that is we have got this emerging story about the importance of base metals in the electric vehicle market, and obviously the two key ones there are nickel and cobalt which are

IN THE FAST LANE

Australia's third-largest gold producer Northern Star Resources is continuing its upwards trajectory, capping off FY17 with record results and a clear pathway to push annual production above 600,000 ounces.

All images: Northern Star Resources.

ELIZABETH FABRI

THE next few years will be game changing for Northern Star Resources.

After growing its resources and reserves base through exploration, the race was now on for Northern Star to hit its new production milestone.

The miner, which currently operates the Jundee, Kalgoorlie and Paulsens gold projects in WA, has some exciting plans on the table, with development moving forward at its Central Tanami project in the Northern Territory, expansions underway across its Goldfields operations, and a revitalisation program planned for Paulsens.

In August, the company flagged an annual spend of \$100 million towards exploration and project expansions.

"The split is \$35 million in exploration, and \$65 million in expansionary capex to lift our production profile to 600,000ozpa

from where we currently are; primarily out of Jundee and Kalgoorlie operations," Northern Star chief executive Stuart Tonkin said.

With extended mine lives now out to 10 years, the company ticked all the boxes required by global investors, with an expanded inventory to drive production growth.

Both Jundee and Kalgoorlie would soon be capable of producing 300,000ozpa, which would make Northern Star part of an 'exclusive global club' comprising just 23 mines in Tier-1 jurisdictions.

In FY18, Northern Star expected to produce between 525,000oz and 575,000oz, and between 550,000oz and 600,000oz in FY19.

The miner was off to a great start, selling 138,459oz of gold in the September quarter.

Northern Star executive chairman Bill Beament said superb performances from the Jundee and Kalgoorlie operations was a direct result of investment the company

had made in the exploration and production arenas.

"We have invested \$180 million over the past three years to grow our mineral inventory.

"This will fall to \$35 million in FY18 as we believe the visibility across our Tier-1 assets has been achieved.

"It's been very pleasing to see the business grow organically and produce a sector leading return on invested capital in what has arguably been the most capital intensive phase of the company's history."

WA expansions

An \$18 million mill expansion at the Jundee project in the northern Goldfields, designed to boost production, was effectively complete.

"Commissioning is underway at the moment," Mr Tonkin said.

"This takes us up to 1.7 million tonnes per annum, and that allows us to achieve

about 300,000ozpa which reaffirms Jundee as a Tier 1 asset."

Further south, the company's Kalgoorlie operations, encompassing the Kundana, Kanowna Belle and new Millennium mines, had improvements and upgrades pending.

"We're still completing studies on all our options," Mr Tonkin said.

"We're aiming to return that to a 300,000ozpa producer, but the current bottleneck is the processing capacity."

One solution was a recent deal inked with Poseidon Nickel to potentially process ore at its unused Black Swan operations.

On 28 August, Northern Star entered a non-binding Memorandum of Understanding (MoU) with Poseidon to explore the option.

"That's related to our Kanowna or Kalgoorlie processing bottleneck," Mr Tonkin said.

"The ore for that would come from our Paradigm deposit which is closer along the haul road and could feed into Black Swan easily.



"Millennium is now in production, and that project has demonstrated Northern Star's capability to rapidly develop all the way from discovery to production quite efficiently."

“Works are currently underway to evaluate that scenario against our other options.”

Mr Tonkin said since the processing facilities was currently tailored for nickel, it required a significant infrastructure upgrade to convert to a gold free-milling processing plant, and the study would take a few months to complete.

“There’s a bit of work to do,” he said.

The company also continued to make headway in developing new sources of production, including its brand new Millennium underground mine in Kalgoorlie.

“It’s been essentially the first new mine for Northern Star across its history,” Mr Tonkin said.

“Millennium is now in production, and that project for us has demonstrated Northern Star’s capability to rapidly develop all the way from discovery to production quite efficiently.

“That mine initially delivers 50,000ozpa but that, with adjacent production fronts, will grow to 100,000oz in the next couple of years.”

Meanwhile, at Paulsens in the Pilbara, exploration will take priority in an effort to return the asset back to its historic production rates.

Mr Tonkin said over the next 18 months, the company will spend about \$10 million drilling out a parallel system to bring into its plan in 2021.

Tanami

The Central Tanami project in the Northern Territory was another growth opportunity for the company.

Only in its early stage of exploration,



the possibilities for Northern Star were huge.

In 2015, Northern Star acquired a 25 per cent interest in Tanami Gold’s 2.7moz project, which will increase to 60 per cent pending the refurbishment of the existing plant infrastructure.

Mr Tonkin said the JV partners were currently evaluating a plan to redevelop the processing centre with multiple feeds up and down the belt.

“We love the Tanami geology wise, and we have got a significant land holding there so it’s really about doing that grassroots work and making the right



decisions on redeveloping that asset,” he said.

“It was one of the first redevelopment assets we acquired.

“Everything else we purchased was already in production, so for us it’s about the longer term play.”

Northern Star also held an interest in Tanami Gold’s shelved Western Tanami Project in WA, which comprised a 350,000tpa carbon-in-leach treatment plant, and associated site infrastructure and accommodation.

The project was placed in care and maintenance back in 2013, following

disappointing drilling results on the Kavanagh lode at the Coyote gold mine.

In October, Northern Star entered a binding deal with Tanami Gold to purchase the remaining interest in the project for \$4 million.

Forward thinking

With Northern Star’s current projects soon to deliver 600,000oz each year, Mr Tonkin said the next step would be growing annual production to 750,000oz, based on returning Paulsens back to its former glory and redeveloping the Central Tanami operation.

Beyond Jundee’s 10 year mine life, Mr Tonkin said he also viewed the latest discovery, Zodiac, as a strong production source for the project.

“That discovery we drill tested in June initiated from a 3D seismic survey,” he said.

“For us it’s an exciting early stage find and that can be game changing for the life of Jundee.

“Kalgoorlie operations have also got plenty of numerous targets in our pipeline that we will progress through the drilling over the next few years.”

Mr Tonkin said the principal strategy for the team had always been to leverage off its core disciplines, including underground geology, mining, and processing, to drive productivity through its mines, especially since globally gold reserves and discovery were declining.

“The focus for us is looking at underground development of mines,” he said.

“We think we position ourselves pretty well to leverage our skills onto that space.”

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ACTION PLAN

Newmont's strong second quarter, which included \$US698 million in adjusted EBITDA, has set it up for a big second half.

All images: Newmont Mining.

AHEAD of Newmont's Q3 earnings call in late October the outlook was good; attributable global production guidance improved to between 5 million ounces (moz) and 5.4moz, AISC guidance improved to between \$US900 and \$US950 per ounce; and capital guidance was lowered to between \$US890 million and \$US990m.

The large multinational also reduced net debt to \$US1.5 billion, ending the quarter with \$US3.1 billion cash on hand, and an industry-leading, investment-grade credit profile.

In July 2017, it further deleveraged and simplified the balance sheet with the full repayment of \$US575m convertible senior notes.

"Operations across the portfolio outperformed, reducing all-in sustaining costs to \$US884 per ounce and producing 13 percent more gold on an attributable basis," Newmont chief Gary Goldberg said in the Q2 report.

"We expect to sustain this performance through strong technical fundamentals and ongoing investment in value-adding technology, and have improved our cost, capital and production outlook as a result."

In 2017, Newmont's Australian operations – comprising KCGM, Tanami, and Boddington – were expected to produce between 1.5moz and 1.7moz of gold.

Boddington was also expected to produce between 30,000 tonnes (t) and 40,000t of copper.

Production guidance for Newmont's Australian operations for 2018 remained at between 1.5moz and 1.7moz, and between 1.4moz and 1.6moz for 2019 as Boddington stripping resulted in lower grades before returning to higher production levels in 2020.

A strong first half saw Australian cost guidance per ounce improve to between \$US640 and \$US690 on improvements to mining costs at Boddington.

AISC per ounce guidance for 2017 also improved to between \$US795 and \$US855 on lower cost guidance and sustaining capital improvements.



Newmont has been selected for DJSI World for the 11th consecutive year.

Community Focus

In September, Newmont Mining was ranked overall mining leader by the Dow Jones Sustainability World Index (DJSI World) for an unprecedented third year in a row.

2017 also marked the 11th consecutive year the company had been selected for the DJSI World, which evaluates and ranks the highest-scoring companies on the DJSI – one of the most rigorous and highly regarded sustainability indices in the world.

"This recognition reflects our team's deep commitment to sustainability and continuous improvement, which translates into safe working conditions and good jobs for employees; sustainable economic development for our host communities; responsible environmental management; and strong returns and growth prospects for our stakeholders," Mr Goldberg said.

In addition to being ranked the overall industry leader in the metals and mining sector, Newmont received the highest score (100th percentile) in a number of areas including impact measurement and valuation; policy influence; biodiversity; environmental policy and management systems; water-related risks; asset closure management; corporate citizenship and philanthropy; and labour practice indicators.

Newmont also achieved the metals and mining industry's best overall scores in the economic, environmental and social dimensions.

The Boddington operation alone paid \$40m in WA State taxes and royalties in 2016, and spent \$178m on wages and benefits for more than 1039 full time workers and 838 contractors.

It also invested in community initiatives, including a partnership with the Shire of Boddington to support

NEWMONT AUSTRALIA IN 2016

Produced 1.641moz gold & 77mlb copper

Represented 31% of NEWMONT'S global gold production

Donated \$2.7m to community programs across Australia

Contributed \$2.2 billion to the Australian economy via goods, services, taxes, royalties and salaries.

the resourcing and operations of the community Early Learning Centre and vocational traineeships through the Boddington Community Resource Centre.

Across Australia, Newmont's local procurement target across all operations was increased to \$96 million for 2017, reflecting a re-evaluation and reassessment of the insourcing at Boddington based on opportunities identified within the context of the 2017 regional business plan.

Each site has an individual target to increase its Indigenous workforce in 2017, with Boddington including a commitment to establish a vocational pathway for an Aboriginal apprenticeship in 2018.

As the Moorditj Booja Community Partnership Agreement at Boddington reaches the midway point of its 20-year term, Newmont will begin a comprehensive audit of the agreement's outcomes in 2017 to inform the development of an action plan for the remaining 10 years.

‘Mine to Mint’ tours at Boddington

GO West Tours is WA’s leading supplier of modern charter, rental and tour vehicles, servicing the mining, education, tourism and government sectors.

A safe, reliable service and first class safety record has made Go West the integrated transport provider of choice for Australia’s leading companies; including Newmont Asia Pacific, Rio Tinto, BHP, Fortescue Metals Group, South32, Roy Hill and Minara Resources.

Go West employs 149 staff across eight depots and specialises in mine site transfers, mining employees transfers to airports, wet and dry hire, labour hire drivers and maintenance services.

Company staff establish strong relationships with clients and work with management teams to develop tailored transport solutions to help achieve their business goals.

Go West believes that its success is also its clients’ success, so the company is committed to investing in innovation and growing employees’ capabilities to be at the forefront of industry leading practice and to deliver superior business results.

Newmont Boddington Gold has partnered with Go West Tours to offer “Mine to Mint” Gold Mine Experience Tours, taking people up close to a working gold mine.

Visitors don ‘high vis’ clothing and are taken on site to watch haul trucks in operation from the South Pit lookout, ore being crushed and processed, and to try panning for gold in the Boddington town site.



More information on Go West Tours can be found at: www.gowesttours.com.au.

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INDUSTRY PROFILES

COMPANIES GEARING UP

TED:

Boosting productivity at HVO

Paul Bullock, Maintenance Supervisor at Hunter Valley Operations (HVO) in NSW was so impressed with their first Tracked Elevating Device (TED) purchased in 2014 that a second was delivered in 2016. A third is now awaiting procurement approval for delivery in 2018.

"On a simple belly guard removal in the shop it saves approximately 25 per cent of job time."



The remote-controlled, tracked, elevating device provides safer and faster under-machine maintenance procedures such as this belly plate removal.

HVO, 24km north-west of Singleton in the Hunter Valley region of NSW, began production in 1979. In 2000, Coal & Allied merged the Howick and Hunter Valley mines to create HVO, which now supplies international markets with more than 13 million tonnes per annum of thermal and semi-soft coking coal.

The company's large fleet of 180 includes 34 dozers, over 100 Komatsu 830 dump trucks, and many other ancillary mine site vehicles. This means HVO's mobile plant workshop usually has several dozers in at any one time; the truck workshop sometimes has twice this amount.

Two of the key issues constantly on the improvement 'radar screen' for HVO at its workshops, as well as worksites, are raising productivity and improving safety.

For example, a traditional procedure to remove and replace a belly plate on a dozer required the mechanic to crawl underneath the giant machine to line up the bolt holes by loosening the plates, which can weigh hundreds of kilos - even more with accumulated debris.

This makes it a tricky job and one fraught with physical danger.

But HVO Maintenance Supervisor Paul Bullock, believes he's found part of the solution for both the safety and productivity problems with Nivek Industries' Tracked Elevating Device (TED).

"On a simple belly guard removal in the shop it saves approximately 25 per cent of job time. But it's out in the field that TED really comes into his own, possibly saving up to 4 shifts of down time," he said.

"Just yesterday I witnessed TED undertaking a difficult task that previously the pushing force had to be physically generated by a maintainer.

"They have made a massive difference to our day to day operations. In addition, many machines in the pit that would normally have been down for multiple shifts have been dealt with in a timely, safe manner.

With TED saving up to 25 per cent of time on the ground, maintenance teams can focus on more projects at once, as well as having a faster turnaround time and thus increasing production."

Mr Bullock said TED's main safety contribution was removing employees from the "line of fire" while removing and replacing belly guards, but the air operated jacks are also physically demanding and using TED had dramatically improved this.

Paul was also looking forward to delivery of HVO's third TED next year.

"The main motivation for getting the second TED was purely because when the first unit was away or out of service we had to revert to using the pneumatic units which highlighted the need to have more TED's available," he said.

"I'm just waiting on approval for TED 3 next year which would eliminate the pneumatic units completely."

TED really shines during the removal and replacement of machine belly guards in the field, a task which is often undertaken using hooker rod, slings and cumalong; a manual handling exercise. Eliminating the human element from this critical lift stage underneath equipment, thanks to TED's remote control, significantly decreases the risk of injury.

The machine can travel across any terrain and can safely lift up to 800kg. It features a 360 degree turntable on top which makes lining up belly plates and ball joints safer, quicker and easier than the conventional methods using slings and chain block.

TED can also be used for equaliser bars, cutting edges, steering cylinders, load rollers, sound suppression equipment, engine sumps and many other applications.

The machine is designed and manufactured in Australia and built to withstand the harsh environments that heavy equipment often works in.

Total compliance to Australian and New Zealand mining standards (AS/NZ 4240) comes with each machine. A range of attachments is offered including a specialised trailer which can easily carry TED, along with multiple tools, spares and hoses to any break down site or remote workshop.



Broons' Impact Roller has been used on major projects worldwide.

Making an impact for over 30 years

AS the latest and largest Square Impact Roller prepares to leave Broons' Gillman factory, it seems the time is right to reflect on the 30th anniversary of this 'ground breaking' machine.

The concept of creating a square roller in the 1980s certainly had its sceptics, but 30 years on it is clear nothing comes close for penetration, productivity, and performance.

Used on some of the largest civil engineering projects on earth, Broons' Square Impact Roller remains without equal to this day.

From Olympic stadiums in Sydney and London, all three Palm Island projects in Dubai, to massive international airports in Hong Kong and Qatar - all have benefited from the giant "thumper" developed and perfected right here in Australia.

The Broons Square Impact Roller is a proven performer in reducing costly tyre damage in the mining industry by eliminating sharp destructive rocks and for improving haul roads, tip heads, waste dumps and the construction of tailings dams.

Built with more than 50 years of manufacturing nous from this South Australian firm, all Broons rollers are tried and tested in the field and backed up with vigorous stress analysis software from concept to delivery.

Going through final checks is Broons' massive BH-1950MS Square Impact Roller, destined for a mine in Far North QLD.

With a module width of 1.95m, this unit is 50 per cent wider than the standard machine and has a ground pounding operating weight close to 20 tonnes.

Nothing else on the market is as fast and effective at rubbilising sharp loose rock.

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THE AUSTRALIAN
MINING REVIEW

Mines under cover

CORROSION control is a major cost factor in mine maintenance, with valuable equipment subject to adverse weather conditions and environmental degradation.

A revolutionary product, Envelop protective covers, were originally developed by NAVSEA for the US Navy and are now available for mine equipment.

Australian Pump Industries (Aussie Pumps), authorised distributors for Envelop covers, offer a complete cover solution that will protect these key assets from moisture, dust, UV light and heat.

The result is a massive reduction in maintenance hours spent cleaning and “rust busting”.

“Traditional waterproof tarps and plastic covers often trap moisture with devastating results,” Aussie Pumps chief engineer John Hales said.

“The Envelop covers’ unique design creates a micro climate that slows corrosion reducing maintenance and improving equipment readiness.”

Aussie Pumps has started supplying Envelop covers to big iron ore mines in the WA Pilbara, where monsoonal rain and frequent dust storms contribute to the corrosion of key assets.

Aussie Pumps also supplies Envelop protective covers to the Royal Australian Navy, leading to huge maintenance cost reductions on Australian ships including FFGs, Anzacs and Mine Hunters.

The company points out that there are big savings to be made on commercial assets, even those held in long term storage, where corrosion can be an issue.



Envelop covers have started rolling out to big iron ore projects in the Pilbara.

Envelop covers use a unique and patented system that literally absorbs moisture from under the cover by “wicking” damp into absorbent layers which then sweat the water droplets through the outside cover.

The outside layer is waterproof and acts as a rain shield, resulting in a controlled environment that keeps the asset dry and corrosion free.

That same technology has been applied to covers for the offshore drill rigs in the Gulf of Mexico, with substantial cost

savings made.

Covers have been created for electrical control boxes, engines, hydraulic motors and pumps.

These high cost assets, critical for automated control and monitoring, are susceptible to corrosion caused by water intrusion, either from the elements or from periodic wash cycles required by adjacent power equipment.

Envelop covers shield equipment from the elements, keeping it dry, corrosion

free, and eliminating the moisture build up underneath the cover.

“Laboratory testing and field evaluations have resulted in up to 90 per cent reduction in corrosion,” Mr Hales said.

“Field tests also showed substantial gains in protection of electrical components, optics and delicate navigation aids,” he said.

More information on Envelop covers and Aussie Pumps’ range of products can be found at: www.aussiepumps.com.au.

Hagstrom tackles all drilling projects

FOR more than 25 years Hagstrom Drilling has been recovering rock and soil samples from the most challenging materials nature can provide, delivering exploration, construction and civil programs on land and over water.

Founded in WA, the company has successfully expanded on the quality results and the services it provides and is now delivering drilling projects nationwide.

The diversity of geographical locations and project requirements certainly is a challenge, from drilling coal feasibility studies in northern NSW, to providing geotechnical drilling on Koolan Island in WA.

Hagstrom Drilling has just completed more than four months of geotechnical drilling investigation as part of Sydney’s major Western Harbour Tunnel and Beaches Link project.

As one of NSW’s priority infrastructure projects, this proposed large scale motorway is expected to deliver time savings of up to 45 minutes for motorists travelling from the Northern Beaches to Sydney’s CBD, North Sydney and will take pressure off Sydney Harbour Bridge.

Overwater drilling in Australia’s busiest waterway brought unique challenges that required the team to operate 24 hours a day, seven days a week in order to meet project deadlines and accommodate stringent operating restrictions.

In busy shipping and recreational channels, working at night was often the only option.

With investigations almost complete and the project successfully and safely managed within time, budget and zero injuries, Hagstrom Drilling team will



The Hagstrom Drilling team has the experience and skills to complete the toughest of drilling jobs.

soon be packing up and moving on to the next drilling program.

Hagstrom is proud of its drilling personnel and their ability to achieve results where others fail.

Not only is it the skills of its workforce, but the investment by management to consistently achieve high results and succeed whatever the challenge.

Hagstrom has invested in Aircore,

RAB, Mud Rotary, Diamond, CPT and overburden drilling systems to meet the demands that nature provides.

The company is also the only drilling contractor in Australia that owns and operates drill rigs, CPT equipment and jack up barges.

This unique combination of assets eliminates the requirement for multiple contracts, duplication and review of HSE

management information, providing a cost saving on any project.

Poor methodology and techniques can be costly and time consuming, so by engaging Hagstrom Drilling, clients can be assured they will receive more than 25 years of industry experience.

Hagstrom’s maintains a track record of delivering, while remaining true its “Quality Service Safely” motto.

Mine Cooling Solutions



Gordon Brothers are leaders in Natural and synthetic Refrigeration Cooling solutions for a wide range of industries. We offer the latest technical innovation incorporating technology from all around the world to provide the most environmentally friendly, safe, cost effective and energy efficient refrigeration systems.

Our extensive experience in providing solutions to complex refrigeration problems across many industries and our extensive experience in a variety of mine applications allows us to engineer a customised solution to solve any mine heat problem, with due consideration of factors specific to each site.

The company operates throughout Australia with offices in Melbourne, Sydney, Brisbane, Adelaide, Perth, Bendigo, Griffith and Townsville. Various solutions and installations have also been provided and completed at numerous overseas locations.

Manufacturing facilities are located at Bendigo and the national workforce employed by the company includes experienced design and project engineers, CAD design personnel, installation and technical services staff, fitters and welders.

Gordon Brothers operates the largest industrial refrigeration service support and maintenance team in Australia from each of our eight locations. As part of the service offering, Gordon Brothers encourages the adoption of programmed maintenance service contracts, which together with careful plant design, high quality equipment and remote monitoring, maximise reliability and plant up-time.

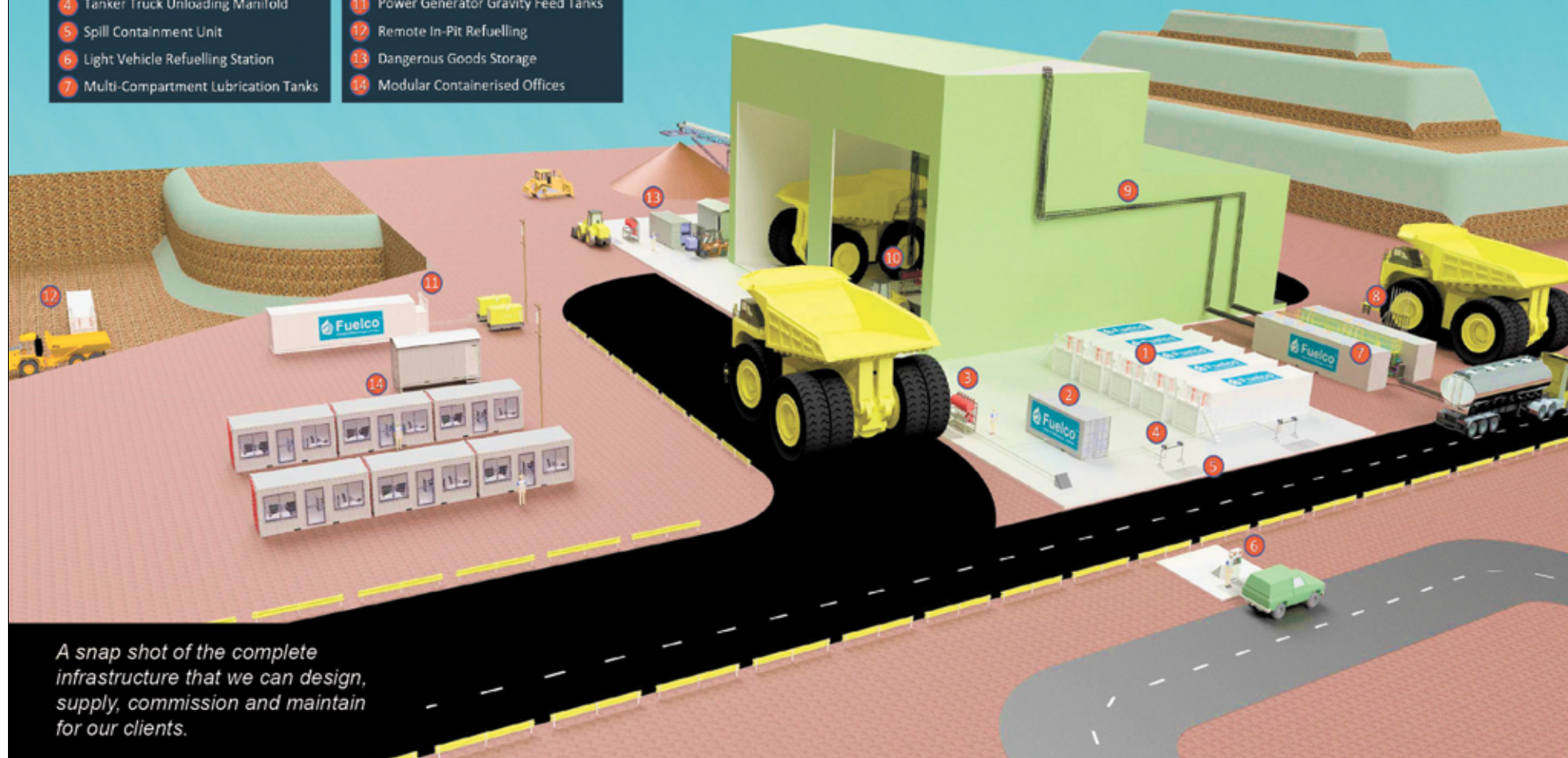
Gordon Brothers also has comprehensive stocks of refrigeration and system components, spare parts and lubricants.



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Our systems are easily upgradable to cater for increased storage needs or can be separated to create multiple points of distribution as required.

Utilising a modular containerised approach, minimal civil works are required for the installation of our fuel storage solutions.

Systems are pre-assembled and fully wet-tested to ensure complete fit and function to customer requirements prior to shipping to site.

This translates to a reduced cost and risk profile to our clients.

Fuelco undertake a Zero-Harm approach to ensure that people and environmental safety is paramount in our solutions.

We provide turnkey solutions for:

- Bulk diesel fuel storage systems
- Bulk lubrication oil storage systems
- Aviation fuel storage systems
- Power Generation systems
- Dangerous goods storage systems
- Chemical storage systems
- In-pit refuelling systems

If you want any more information on our service and capabilities please visit fuelco.com.au or email sales@fuelco.com.au.



Modular Bulk Fuel Farm.

Fuel storage challenges in a crowded market

THE mining industry poses a range of challenges to service providers – these include, climate, environment, accessibility and programming.

Tanks for fuel and lube oils (static and transportable) are no exception — large and small mining operations have distinct and exacting requirements to ensure seamless around-the-clock operation.

Should a constant and dependable supply of fuels and lubricants fail in the field, a mining operation could come to a stand-still.

Petrolink Engineering has a long and successful association with the mining industry going back to the early 1990s with specialist engineering, supply and installation, which paved the way for today's above ground on-site fuel systems.

The company's experienced engineers and technicians can recommend a range of options for tank supply and delivery systems – not just locked into a single 'solution' – with options including static or mobile, base tanks or remote satellite tanks or housed in containers.

Mining operators are faced with a raft of choices so it is important that an independent appraisal is completed to ensure the right decision is made.

Petrolink supply a fully functional, environmentally responsible unit, including pumps, filtration, fuel management system and a planned maintenance schedule to ensure the unit operates at peak efficiency with no downtime.

Sizes vary from 2500 litres for small gensets or satellite tanks, to 100,000 litre single units or multiple connected units to 600,000 litres.



Fuel and lubrication delivery for the resources industry is a critical component for ongoing operation.

The storage, delivery and management of petro-chemical products is governed by a range of Regulations, Standards and EPA Environmental Rules and Guidelines.

Petrolink's engineering division offers a high level of service in explaining the requirements to ensure compliance with the regulations which is backed up by experience and expertise in the field.

To ensure maximum performance, Petrolink has developed a suite of maintenance programs to cover the various mechanical servicing requirements to ensure an ongoing and reliable service for fuel on demand.

Purchasing quality, compliant fuel facilities is an important investment for any mining operation.

Petrolink Engineering now offer short and long-term finance options that are 100 per cent tax deductible from day one, including a service and maintenance program over the term of the agreement.

Further information on the services and products provided by Petrolink Engineering can be found via phone on 1300 738 075 or by visiting: www.petrolink.com.au.

petrolink.com.au

Experience. Expertise. Safety.

These three words are constantly associated with one of Australia's leading providers of petro-chemical storage, handling systems & environmental support services - Petrolink Engineering.

Whether your operation requires an above or below ground tank and fuel delivery system, mobile or workshop lubrication system or planned service and maintenance program, with Petrolink on your team you can be assured of the highest level of experience, expertise and safety.

We provide:

- Onsite fuel storage tanks & piping infrastructure
- Fuel Management Systems
- Fuel pump installation and maintenance
- Legal decommissioning & removal of all tanks
- Engineered lubrication systems & storage facilities

Call 1300 738 075

Follow us sales@petrolink.com.au

The mining industry offers a range of challenges - climate, environment, accessibility and programming. Since the early 1990s Petrolink Engineering has worked with Australia's leading mining companies providing innovative engineering solutions for petro-chemical storage and handling.

The Pentair difference

PENTAIR Southern Cross specialises in the design, manufacture and installation of bolted steel tanks that comply with the relevant Australian and international standards.

Pentair also understand the importance achieving the maximum return on an investment, which is why Pentair offer a comprehensive inspection and maintenance service, making sure that client assets not only reach, but in many cases exceed their nominated design life.

Tank inspection

Pentair Southern Cross offers comprehensive tank inspection services on all water and wastewater tanks to ensure the safe and reliable storage of water.

The team can conduct detailed internal inspections of all types of water tanks using an unmanned remotely operated vehicle (ROV).

This method negates the risks associated with using commercial divers or lowering people into emptied tanks, allowing inspections to be conducted quickly and with minimal impact on water services.

Site checks of existing tank installations can be conducted and detailed including structural integrity and internal inspection with reports provided on completion.

Pentair's experienced maintenance personnel can conduct inspections and basic maintenance with little or no disruption to water services.

Cleaning and maintenance

The company also offers programmed



Maintenance works recently completed for a municipal council in Victoria.

tank cleaning and maintenance contracts on all new and replacement fire tanks in accordance with AS1851.3.

This standard calls for fire tanks to be inspected annually and maintained every

three years, which Southern Cross can do using specially trained and certified tank maintenance personnel.

Pentair remains committed in supplying the highest quality and most

reliable pumping and storage equipment.

Its customers can rely on the company for its expertise and sound advice as it remains committed to delivering the best solution combined with exceptional service.

PENTAIR
SOUTHERN CROSS®



Inspection (pre-works).



Service maintenance in progress.

Pentair Southern Cross tank inspection and maintenance services comply with Australian & International Standards to ensure safe and reliable water storage for a wide variety of applications.

Services we offer:

- Structural Upgrades
- Tank Cleaning
- Tank Refurbishment
- Coating
- Relining
- Tank Maintenance & Inspection Systems
- Tank Demolition / Deconstruction
- Tank Relocations

For more information, call the team on **131 7867** or visit us at:

www.southerncross.pentair.com.au



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QUALITY TANK SPECIALISTS

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All our tanks are custom designed, fully fabricated to the highest standards offering up to 25 Years Design Life.

We also offer an extensive range of CNC routing capabilities.

We offer design, construct and site installation services for all types of industrial equipment.

We are the premier plastic fabricator in Western Australia since 1981.

Applying the Outstanding Benefits Of Modern Industrial Plastics To The Business Needs Of Our Customers



When Thinking industrial Plastics, Think PFWA.



Expert analysis adding value

MICROANALYSIS Australia is a leading analytical consulting laboratory, providing in-depth industry expertise to clients throughout Australia and around the globe.

Through a variety of comprehensive analytical techniques, Microanalysis Australia enables clients to define issues, satisfy compliance legislation, fully characterise their material and most importantly, add value to their products.

For many businesses, this involves cost savings, enhancing productivity, further developing their product and solving specific problems with Microanalysis' rigorous scientific methodology.

Microanalysis offer a wide variety of in-house instrumental techniques, including scanning electron microscopy, x-ray diffraction, particle sizing/counting/morphology, GC-MS, petrography, hazardous goods testing, surface profilometry, and FTIR.

"We are committed to providing accurate and timely reporting every time and offer a set of standard tests for quick turnaround," Microanalysis strategic development director Debbie Hughes said.

"We can also work with clients on more detailed projects, helping to probe the micro, to understand the macro."

From lithium to heavy metals, Microanalysis also offers customisable mineral liberation and association analysis for ores and concentrates of all kinds.

Complementary to its petrographic capabilities, the company can analyse a range of particulate sizes up to 3 mm and provide additional manual analysis for particles greater than 3mm.

Microanalysis lead consulting scientist



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

Nimue Pendragon said the team were using INCA Mineral to emulate mineral liberation and association analysis by QEMScan.

"Lithium is too light to be detected by EDS, so usually this technique isn't used for lithium minerals," Ms Pendragon said.

"Using image contrast and Si:Al ratios we differentiate spodumene and petalite from non-lithium aluminosilicate minerals, such as mica and clay, allowing us to determine the

liberation and association of lithium bearing minerals.

"Usually QEMScan only analyses particles of up to 500 micrometre (μm), our automated electron microscopy technique can analyse particles up to 3 mm.

"We have also developed an equivalent, manual, technique for particles larger than 3 mm."

The Microanalysis Australia team has more

than 60 years' combined industry experience, and believes in providing scientific excellence and empowering clients with knowledge.

It's in the interpretation and analysis of results where the company adds the most value and assistance.

If clients require inspections, certification, forensic testing, verification or training, the Microanalysis scientists are experts in a variety of fields.

We specialise in:

- Automated mineralogical analysis
- Petrographic analysis
- Transportable Moisture Limits (TML)
- Airborne fibre ID and contaminant fibre ID
- Dangerous Goods Testing:
 - Corrosivity
 - Self-heating
 - Flammability
 - Crossing point temperature
 - Evolution of gasses

Microanalysis enables you to use accurate and robust data to fully understand your ore deposit and monitor occupational risk exposure.

Commercial characterisation consulting laboratory Microanalysis is dedicated to providing scientific excellence and exceptional customer service to Australian and global industries.

Be confident we see more.

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Hidden benefits of ‘good’ laboratory engineering

MARC Technologies is a unique business specialising in the design and manufacture of niche laboratory equipment and laboratory-related systems.

For decades the business has had a reputation as the “go-to guys” for a solution to mine site laboratory needs.

The team’s experience handling many crucial components of a functioning mine site laboratory allows them to design laboratories (and also equipment) that factor in solutions to problems that will most likely cause headaches later on.

“However, worryingly, many businesses claim to be able to design a laboratory but very few accept they are then responsible for the creation of a structure that may potentially expose end users to some of the most harmful chemicals used in industry,” MARC Technologies general manager Greville Camp said.

“Classic examples we come across regularly are the unwitting exposure of lab staff to harmful mineral acid vapours because no relief air is supplied into a room with a fume cupboard.

“Here’s a tip: if your steel door hinges in your lab are showing any surface rust you are probably breathing in carcinogens on a daily basis.”

Mr Camp said the team regularly see examples of non-compliances with Australian Standards, such as the presence of a door



A recent lab project MARC Technologies completed.

between a fume cupboard — where aggressive mineral acids are going to be used — and the only safety shower.

“This shows a lack of real-world understanding of the risks involved in working with aggressive mineral acids during

the design phase of the laboratory supply package,” he said.

“There are many engineering tricks we have learnt along the way that will reduce your lab’s energy consumption, reduce capital costs, reduce maintenance costs and at the

same time ensure you get a safe and efficient laboratory.”

More information on how MARC Technologies can help ensure lab safety can be found at its website: www.marctech.com.au, or by calling (08) 9232 0430.



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* Depending on operator experience.

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Super strength mesh

AUSTRALIAN Steel and Wire (ASW) is a local producer of high-quality wire mesh for use in underground strata support.

Mesh, which is an extremely important of the total structural support system for underground mines, requires stringent quality controls and absolute adherence to specification.

ASW has very tight control standards for its mesh and ensure that weld strength and material tensile strengths are constantly monitored to give miners peace of mind regarding the integrity of the mesh component of the support structure.

The company is constantly striving to find better alternatives for difficult ground conditions and has recently launched its SuperShield strengthened mesh.

This is a high strength mesh with additional elements in larger diameters with improved spacing to provide additional strength at the bolting points.

The SuperShield sheets are offered in a variety of sizes to suit mine conditions and cut sizes, and are also offered in either galvanised or bright configurations.

ASW maintains high levels of stock and is able to provide quick delivery for standard sheets.

Special sheets or designs are also quickly accommodated to fulfil special customer requirements for specific conditions, and ASW are happy to work with customers to find a suitable solution.

The team pride themselves on being partners to their customers and not simply suppliers, and will always do whatever is required to ensure the best possible outcome for their customers.

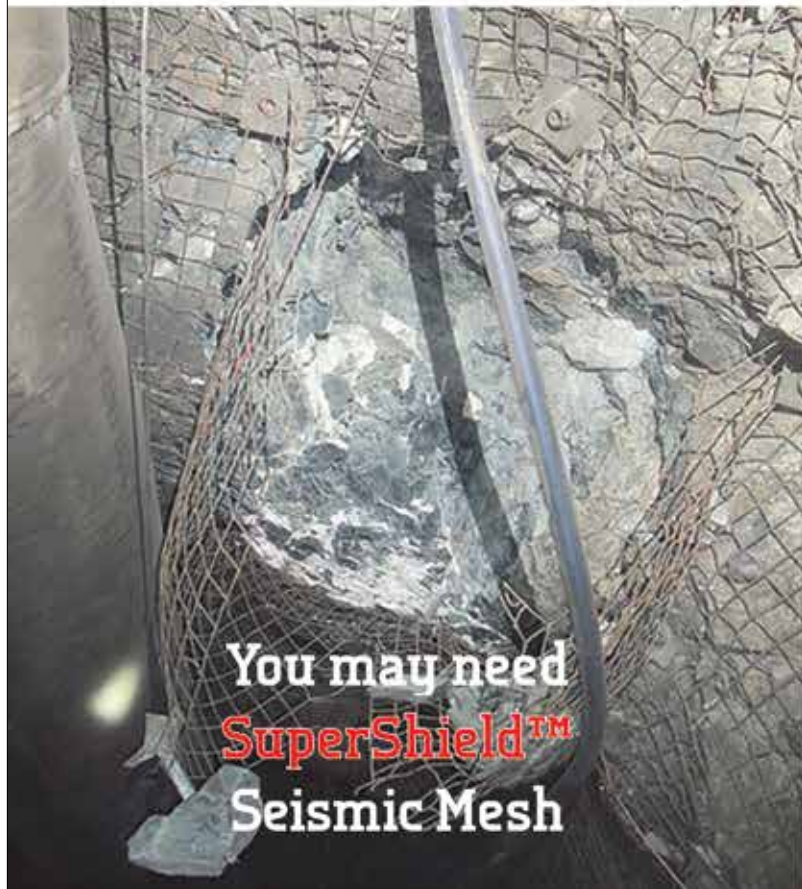


More information on Australian Steel and Wire can be found at: www.aswhome.com.

ASW

Australian Steel & Wire Pty Ltd

**Is Your
head well covered?**



**You may need
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ASW Mesh - *Not "Just Mesh"*



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sales@aswhome.com
www.aswhome.com
www.aswonline.com.au

CGGS scholarships open for 2019



The Canberra Girls Grammar School boarding house.

CANBERRA Girls Grammar School (CGGS) has welcomed boarders through its doors since 1926 and offered scholarships for 85 years. Applications for the 2019 Gabriel Boarding Scholarship are now open. The scholarship provides up to 50 per cent remission of boarding fees until the completion of Year 12 and is open to full-time boarders in

Years 7 to 11. CGGS Head of Boarding Tina Twigg said life in the CGGS boarding house, affectionately known as the 'BoHo', was not all that different from a typical family environment. "Children develop important skills and values in a family environment, parents encourage their children to be creative and

innovative thinkers all within the security and structure of their family unit," Mrs Twigg said. Year 11 boarding scholar Bella O'Hara from Moree, NSW, joined the CGGS boarding family in Year 7 and said "At first things seem strange and different, but...over time you come to love the quirks of this new strange

place, and the people you never would have met if you didn't venture far from the comforts of your home". Canberra Girls Grammar School prides itself on understanding the needs and aspiration of girls. Explore the possibilities by contacting CGGS on (02) 6202 6423.


Be part of our global family

AT CANBERRA GIRLS GRAMMAR SCHOOL WE WELCOME GIRLS TO OUR BOARDING HOUSE ALL YEAR ROUND.

T 02 6202 6423
E admissions@cggs.act.edu.au


The transient nature of Canberra's defence, government and diplomatic families means places in our Boarding House often become available throughout the year. We encourage you to contact our Admissions Office to discuss your daughter's future as part of our lively boarding family.

Apply now for our 2019 Gabriel Boarding Scholarship. Check our website for more information including eligibility criteria and application process.



Explore the possibilities

CRICOS Provider No. 01294F



CANBERRA GIRLS GRAMMAR SCHOOL

CGGS.ACT.EDU.AU



Students at St Stanislaus College.

A STEM forward for St Stanislaus

IN August this year, St Stanislaus' College was selected to be a partner school for the 2017/18 STEM Teachers Enrichment Academy Central West program.

The initiative, developed by Sydney University, brings together expertise from the University's faculties of Education and Social Work, Science, and Engineering and Information Technologies to help build the nations capacity in science, technology, engineering, and mathematics (STEM).

The College joins the sixth cohort of secondary STEM teachers participating in the Academy, with each school selecting a designated STEM Academy project leader and team representatives.

St Stanislaus College head teacher TAS / Computing Studies and STEM Academy project leader Shane Thurston will take part in two sessions facilitated by the University's academic specialists and STEM leaders.

The first session will be held in November this year and takes the form of a three-day workshop, inviting participants to develop a draft plan for implementation of STEM strategies within and across disciplines for terms one and two of 2018.

Mr Thurston said the Academy was an opportunity to make a real change in classroom teaching while enhancing knowledge of content and expanding interests in STEM.

"The Academy is an exciting step forward for Stannies, enabling us to keep building our community of STEM practice with continued mentoring and support from the university as well as keeping abreast of STEM-related research and industry knowledge," Mr Thurston said.

The program will continue in 2018 with a follow-up session in June, where all participants will report on the outcomes of implementing these STEM strategies in their schools.



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With no power source necessary, suspended permanent magnets require no electrical maintenance and offer uninterrupted magnetic protection.

Eriez quality protection for recycling operations

RECYCLED aggregate operations face unique challenges during processing, including protecting equipment while processing materials in the most efficient and economical way.

Eriez specialises in designing and manufacturing equipment for this purpose, including suspended permanent magnets, Metalarm™ metal detectors and heavy duty conveyors and feeders.

Eriez' suspended permanent magnets are designed to remove large amounts of ferrous and work-hardened stainless steel from nonferrous materials conveyed in heavy burden depths, on almost any type of conveyor or chute.

With no power source necessary, suspended permanent magnets require no electrical maintenance and offer uninterrupted magnetic protection.

The magnetic circuit has been designed to project a deep-reaching field that can grasp even

the most elusive tramp iron from fast moving belts.

It has also been designed using field shaping principles which allow for efficient capture of ferrous material even in the most difficult of applications.

The design used in these separators produce the most outstanding commercial magnets ever manufactured.

Eriez suspended permanent magnets are available in Manual Cleaning (MC) and Self Cleaning (SC) models.

Both MC and SC models are offered in five magnetic strengths, enabling customers to select the ideal level of protection for their particular application.

Maximum benefit

The permanent magnets can be combined with Eriez' Metalarm™ 3000-3500 series of metal

detectors which are used in many recycled aggregate operations to protect a broad range of machinery from the damage which can be caused by errant tramp metal.

Different configurations are available to optimise sensitivity and to suit specific types of conveyor systems.

Eriez' unique Hi-Vi Magnetic Drive Circuit provides a simple yet powerful solution to difficult material feeding applications in aggregate operations.

These feeders allow for up to 20 per cent greater capacity which equates to greater productivity at a lower cost.

In addition, clients receive all the features that for years have made Eriez feeders the leaders in quality and dependability.

For the AC operation, no rectifiers are required and feeders are simply wired into AC lines.

Compact variable transformer-type

controls regulate feeder rates by varying voltage, and control is stepless from 0 to 100 per cent capacity, has excellent linearity and almost no heat generated.

Single feeders or groups of feeders can be remotely controlled from one station and controls with solid-state components are available for all units.

To reliably move materials and protect expensive equipment from costly damage caused by tramp metal, look no further than Eriez.

Eriez is recognised as world authority in advanced separation technologies for magnetic, vibratory, inspection and flotation applications, and manufactures a wide range of quality equipment to meet the rugged demands of aggregate operations.

More information can be found by either calling (03) 8401 7400, emailing sales.au@eriez.com, or visiting www.en-au.eriez.com.

What customers are saying about TED®...



"On a simple belly guard removal in the shop TED® saves 25% in time. But it's out in the field where he comes into his own, possibly saving up to 4 shifts of downtime"

*Paul Bullock, D Crew Relief Asset Health Advisor,
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Whether you're replacing wear plates, removing a belly guard or any of a host of other under-equipment and /or suspended load jobs in the workshop, pit or field, TED® will increase your efficiency while enhancing your safety.



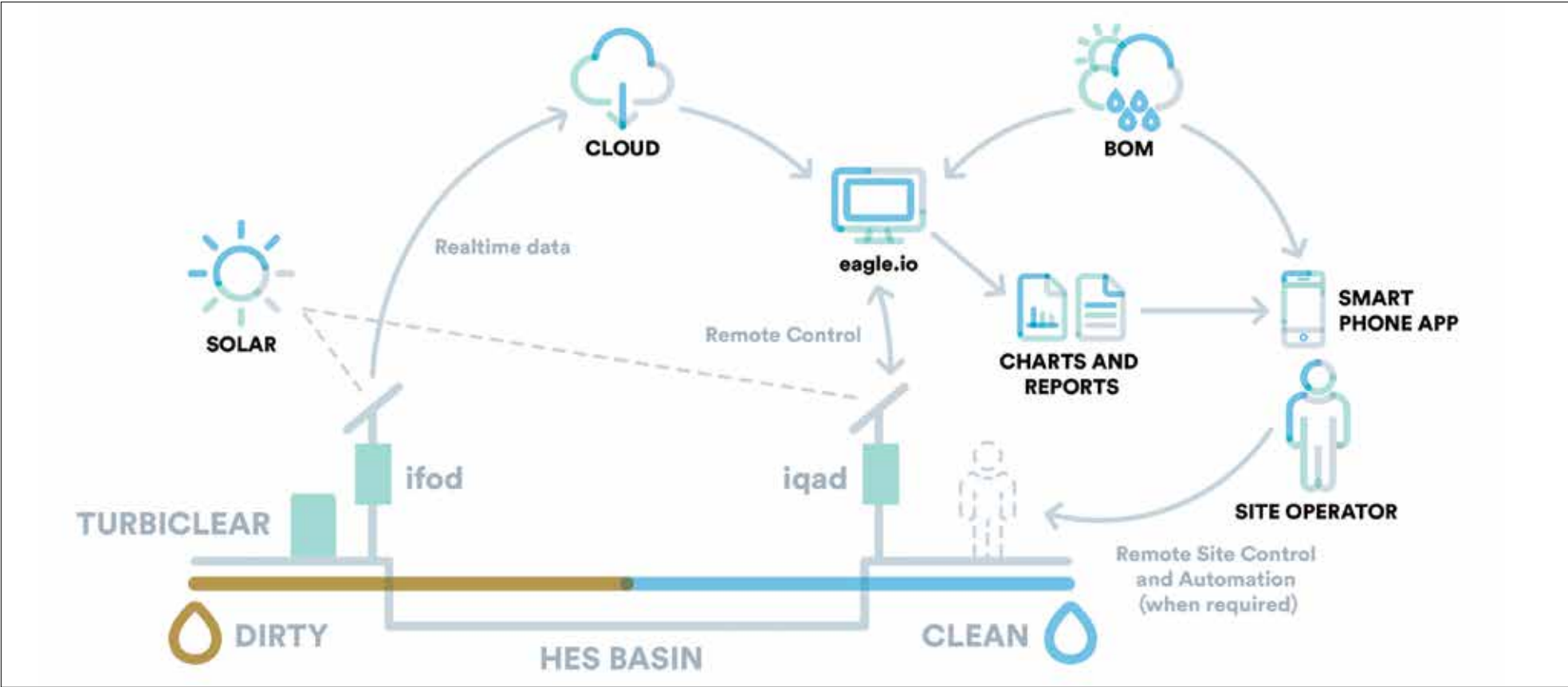
Remote-controlled, all-terrain, wide range of accessories and custom built trailer options you won't believe the difference in efficiency and safety it will make to your operation. Get in touch soon with Nivek – TED's® designer, manufacturer and distributor to find out how it will improve your operation.



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TURBID water solutions provide hassle-free compliance for mining and construction sites through innovative solutions that manage water and protect waterways from sediment. Turbid can design, build and operate (or any combination of) various sediment control solutions, taking into account the site's variability in rainfall and the use of stored

water as a resource, site specific constraints and assets, and operational ability to achieve water quality targets. Its team of innovative engineers and scientists can help easily and efficiently achieve the site's water quality discharge criteria, and provide the satisfaction of knowing that a project's activities are not harming waterways.

Working with developers and contractors, Turbid will design the most effective solution prior to any groundworks occurring. Any temporary designs need to anticipate the final water management strategy for the site to ensure a seamless transition between the construction and operational phases of the development.

That's why Turbid offers the complete solution with innovative designs, treatment and monitoring processes to ensure only clean water is leaving site without hassle or restraints to a project's operation. More information on Turbid's water management systems can be found at: www.turbid.com.au.

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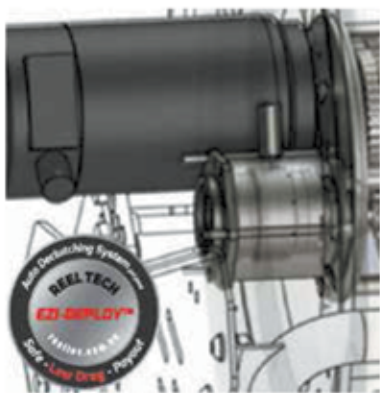


TO FIND OUT MORE CONTACT THE TURBID TEAM ON 07 5471 2290 or info@turbid.com.au

PitBull - Australia's toughest locally made Mining Hose Reels with NEW add-on technology

Easy to bolt on accessories for safety and productivity

Local industrial reel users are turning to PitBull for the toughest reels known for its unique design construction and versatility. PitBull Reels can now be optioned with outstanding easy to bolt on accessories to make them even safer and more productive.



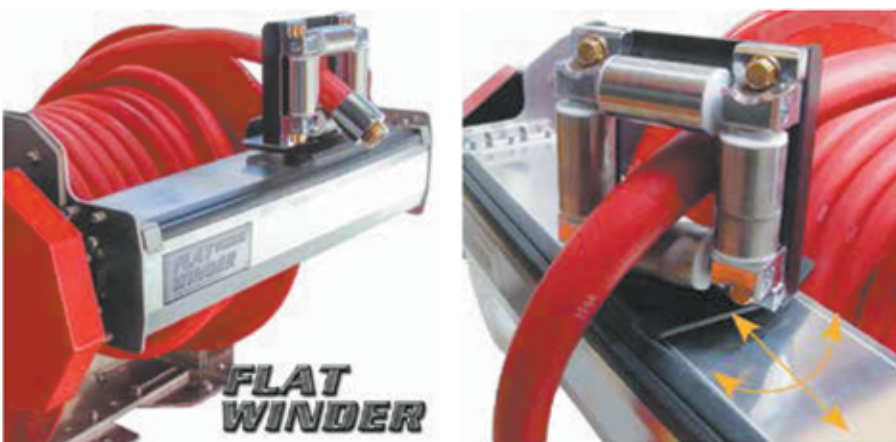
With big PitBull orders with added Ezy-Deploy™ lined up, Reel Tech Team reported the demand for this accessory would be sky-rocketed. When designing new innovations, Reel Tech's core focus is on the ease of use and handling safety. Ezy-Deploy™ is an Auto De-clutching System. With no levers, buttons or electronics required, operator can simply pull and go with the lowest resistance. According to Reel Tech, Ezy-Deploy™ clutch system offers

smooth reel operation to minimise operator strain injuries and reduce excessive force that can prematurely damage equipment.

To improve productivity, consider adding Reel Tech Reel-In-Control™, the long range wireless remote control system. With Adaptive Frequency Hopping, it prevents interference and offers reliable performance across undulating terrain. In single driver/operator set-ups, Reel-In-Control™ allows for safer and simpler **one-person hose handling**. Eliminate dual handling and get the job done faster.



Most PitBull Reels come with integrated auto speed rewind system, Safe-R-Reel™. It helps minimise the chance of employee and equipment damage due to excessive hose 'speed whip' during rewind. This patented maintenance free Non-Belt/Chain Direct Drive System ensures a controlled speed during rewind to reduce hose handling injuries. For PitBull Spring Reels, you can add Safe-R-Reel™ in full stainless steel that is chemically resistant, robust, durable and offers a high level of safety.



An increasingly important industry focus is improving safety while minimising downtime. FlatWinder™ - easy automatic layering hose storage solution; and Follow Me Hose Guide - the flexible swivelling hose guide, are other add-on options to reduce injuries, hose damage and hose jam; and improve productivity.

For information about custom mining reels, contact Reel Tech. Phone: +61 3 9583 2368 or email sales@reeltech.com.au.



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As a single source provider, all enquiries are handled exclusively by a team of professional sales people, industrial designers and automotive fitters in cutting-edge facilities, ensuring consistency and repeatability of the build, quality workmanship and speedy delivery.

Manufactured components are engineered and tested in-house for structural stability, ensuring they are built to comply with all design rules and standards, while maximising load capability.

The company works in partnership with its clients to truly understand the needs of their industry, meeting journey and vehicle management policies to ensure builds are done right the first time.

Superior quality components and full compliance to industry standards means all vehicles are robust and efficient, translating to fewer repairs and refits down the track.

Minecorp is proud to be part of the RMA Group of Companies, a global supplier of automotive components and modification.

The RMA Automotive Group division is a world leader in design, manufacture



Minecorp is the only Australian auto business to join global modified vehicle supplier RMA Group.

and installation of light and heavy duty vehicles, purpose-built modified vehicles and fleet solutions.

For more than 25 years in the industry, RMA has supplied more than 45,000 vehicles to a diverse global customer base, including major mining sites, NGOs, the US Government and corporate clients.

Based in Thailand, RMA employs more

than 6000 people in more than 70 countries.

Minecorp is the only Australian automotive business to join RMA Group, putting it at the cutting-edge of worldwide innovations and industry trends.

As one of the world's largest suppliers of modified vehicles, RMA Group offers Minecorp the benefit of exciting new routes to global markets, providing opportunities

for progression as a successful enterprise.

This also brings advantages for its clients in terms of vehicle consistency across international operations and global access to the latest technological advances and fleet vehicle solutions.

Minecorp is committed to driving value and compliance through quality modifications.



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N-Connex for harsh environments

SINCE launching the N-Connex system late 2016, NLT has continued to roll out this new, innovative solution.

N-Connex provides underground hard rock mines with a reliable and powerful alternative to the incumbent Leaky Feeder radio system, or expensive and typically unsuitable WiFi and network solutions that are patched together from a variety of vendors.

Since installing the first system at De Bais mine in Mexico — where they use N-Connex for all voice, data, networking and now tracking — NLT have rolled out systems in Canada, the USA and most recently, Australia.

The largest solution to date is currently being supplied and installed at MMG's Dugald River mine in QLD.

The third system in Mexico is also now about to be deployed, based on the success achieved at De Bais.

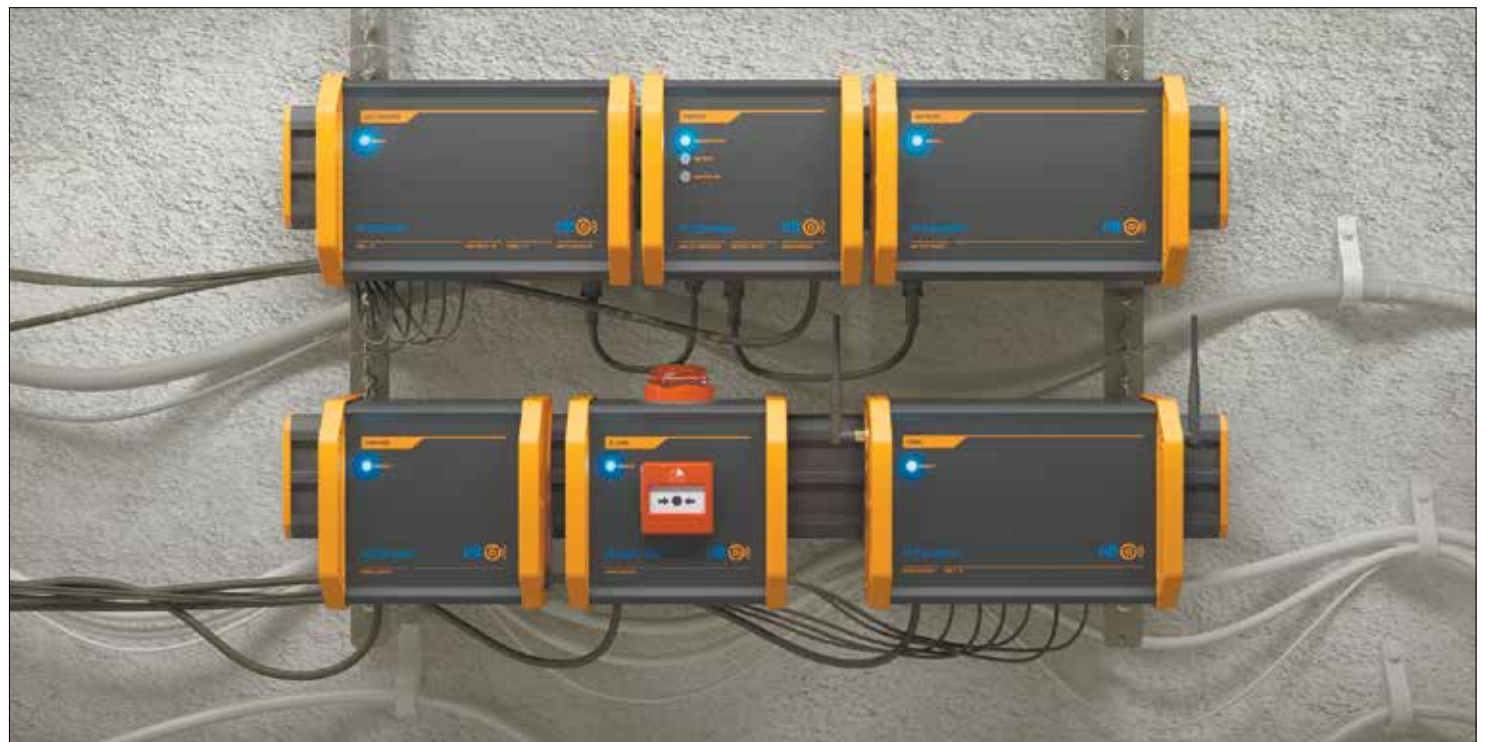
Leaky Feeder systems have historically had an advantage over modern, IP-based solutions: cost effective, mine-wide voice communication.

This, however, is no longer the case and thanks to NLT's partner Icom, NLT now offers a handheld and vehicle-mounted IP radio that looks and functions similarly to traditional two-way radios.

Additionally, performance of the IP radio terminals is superior to their two-way counterparts, so the critical component of voice communications over IP networks (VoIP) is finally a reality.

NLT has supplied Wi-Fi and data systems for more than a decade, and were the first in the world to deploy intrinsically safe Wi-Fi solutions to an Australian coal mine.

But N-Connex isn't just another typical Wi-Fi network; it's a modular, IP67-rated system that can easily be modified and



NLT's N-Connex system is currently being installed at MMG's Dugald River mine in QLD.

expanded to suit the changing needs of a mine, and specifically designed to simplify the installation and maintenance of a network.

The N-Connex also overcomes Leaky Feeder's bandwidth limitations for data applications.

With a one-gigabit backbone capability, N-Connex supports the high-data demands of today's modern mine, while providing essential needs like voice communications.

With voice communications, data, and Wi-Fi networking all supported by a single system, N-Connex eliminates the need to

install a fibre system and a Leaky Feeder system in tandem.

The system's Wi-Fi network enables two-way voice communications, video monitoring, and a platform for tracking personnel, vehicles, and assets — plus full high-speed connectivity for Wi-Fi enabled devices.

N-Connex takes the complexity out of networking, enabling a mine to expand at its own pace through the addition of true plug and play modules.

The installation at Dugald River is seeing

all of these solutions being installed and commissioned.

The integration of all of these requirements into one, simple, modular system that achieves the same level of coverage (with a low-cost premium) as a Leaky Feeder system was the catalyst for NLT's international award winning design of N-Connex.

NLT's N-Connex is evidence that future-proofing a mine's technology and data requirements can be affordable and achievable, making reliance on outdated, legacy technology a thing of the past.

N-Connex

Transition to a more connected mine

Discover the N-Connex Digital Network

Relying on incumbent and outdated solutions such as Leaky Feeder and single purpose networks will restrict your mine's performance. Voice communications, data networking, monitoring and control systems, video, personnel and vehicle tracking and all of today's modern applications demand an advanced and connected mine. Take the smarter, integrated approach to your mine's connectivity.

- Plug n' play, high speed modular network
- No need to splice fiber underground
- No installation specialists required
- A true, turnkey data and communications solution
- Install the modules you need as required
- **Connect and future proof your mine with NLT N-Connex**

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Mike Rosenstreich

Managing Director Hexagon Resources

Graphite is an often overlooked ingredient in battery manufacture, and juniors like Hexagon Resources are readying to take advantage of future demand. **Cameron Drummond** spoke with Hexagon managing director **Mike Rosenstreich** about his experiences in the mining industry and graphite as an emerging product.

Q. What is your educational and professional history?

I consider myself to be a specialist generalist; starting from a strong technical background I then gained credit skills as resources banker and then merged that experience to building mining businesses.

In the early 1980s I fell into geology almost by accident, pushed by a love of the New Zealand wilderness and an introduction to the head of Otago University's Geology Department.

In NZ it wasn't seen as much of a career path unless you liked coal or were prepared to travel. I travelled – about 100km north of Dunedin, when US major Homestake Gold offered me my first job at the Macraes gold project, I think DDH 3.

Homestake shaped my early career with terrific opportunities in WA and Queensland in exploration, advanced projects and production over eight years.

I completed a Masters of Mineral and Energy Economics and joined Rothschild, a boutique lender and investor in the Australian resources sector.

I covered technical and credit issues, working on projects all over the world, across a wide range of commodities. That was a pretty pivotal point in my career.

In 2004, I joined Bass Metals as CEO. We acquired projects in Tasmania and defined high-grade polymetallic resources, made exciting new discoveries and had five years of Cu-Pb-Zn-Au-Ag production.

After leaving Bass in late 2013, I set up a boutique consultancy, linking technical and financial aspects of resources projects.

Q. Tell us about your current role.

In early 2017, I was asked to join Hexagon as managing director to bring a more commercial, development-focused skill set to commercialise the McIntosh flake graphite project located in the Kimberley region of WA.

Graphite isn't so much a commodity as a product, and our challenge is to ensure that we understand what customers want and then determine through our test work and process designs how we can meet those specifications.

My role includes developing a definitive feasibility study and secure offtake and project financing so that we can get into production as soon as practical. We are focussed on being part of this current energy and technical materials revolution, and graphite is a core component of that.

Q. How is development work at Hexagon tracking?

It's important to emphasise that our success largely depends on meeting key technical milestones on the commercialisation path. This year we have completed the first PFS level study for a



"We are focussed on being part of this current energy and technical materials revolution, and graphite is a core component of that."

start-up phase of the project; with NPV of \$260m and IRR of 46 per cent from an annualised production rate of 100,000tpa of high-grade flake concentrate; and preliminary battery related test work on secondary processed battery anode feedstock – all of which came up positive.

We're also developing our marketing strategy.

Our advantages are a clean ore-type and a natural coarse flake endowment which should enable us to diversify our product mix from the PFS defined "one product for battery anodes" to potentially two products with the second, large flake product aimed at the expandable graphite market.

Q. Where would you like to see Hexagon in five years?

Established as a vertically integrated supplier of high-purity, premium battery

related minerals, obviously graphite, maybe extending to cobalt and other metals.

McIntosh gives us leverage to get into production, then develop down-stream value-add opportunities.

Q. How important is graphite to the new strategic metals boom?

Vital. "Lithium ion batteries" is a misnomer! They are "graphite-nickel-lithium ion cobalt" batteries. While the technology is changing fast, graphite is the dominant anode material and there is 5 to 10 times more graphite than Li and Co in a lithium ion battery.

The demand in this sector is huge and, in my view, underestimated.

There is a strong price imperative for manufacturers to increase the proportion of the cheaper natural flake graphite to synthetic graphite in anodes

from the current level of 30 per cent, and our belief is that this will increase demand significantly as natural flake has enhanced electro-chemical attributes.

As upstream producers, our challenge is to demonstrate reliable production, at scale, of consistent high-quality natural graphite and from stable jurisdictions such as Australia to create a low-risk procurement chain for end users.

Q. What is the best piece of advice you have been given over your career?

I like to think that my "ears are not ornamental" so I have heeded numerous snippets of advice over my 34 year career.

In banking I learnt the concept of risk and reward, which is fine in exploration. But in developments and acquisitions I focus on risk and regret; seeking to minimise the potential for regret as much as possible.

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