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Cobalt on a tear

Base metal to overshadow lithium in 2017

CAMERON DRUMMOND

COBALT – one of the fastest rising commodities of 2017 – has attracted attention from a plethora of mining companies looking to take advantage of heightened demand for the strategic metal.

A key component in the production of lithium-ion batteries, cobalt flew 'under the radar' relative to commodity darling lithium in 2016.

However, in the past few months the spot price has more than doubled year-on-year, sparking a flurry of activity from opportunistic Australian mining juniors.

On 29 March, the London Metals Exchange (LME) cash price for cobalt was \$US53,500 per tonne (t), representing a 122 per cent increase for the commodity in the last 12 months and a 57 per cent increase since the start of 2017.

Historically produced as a by-product from copper and nickel mines, previously uneconomic deposits of cobalt are now seen as attractive development options in Australia.

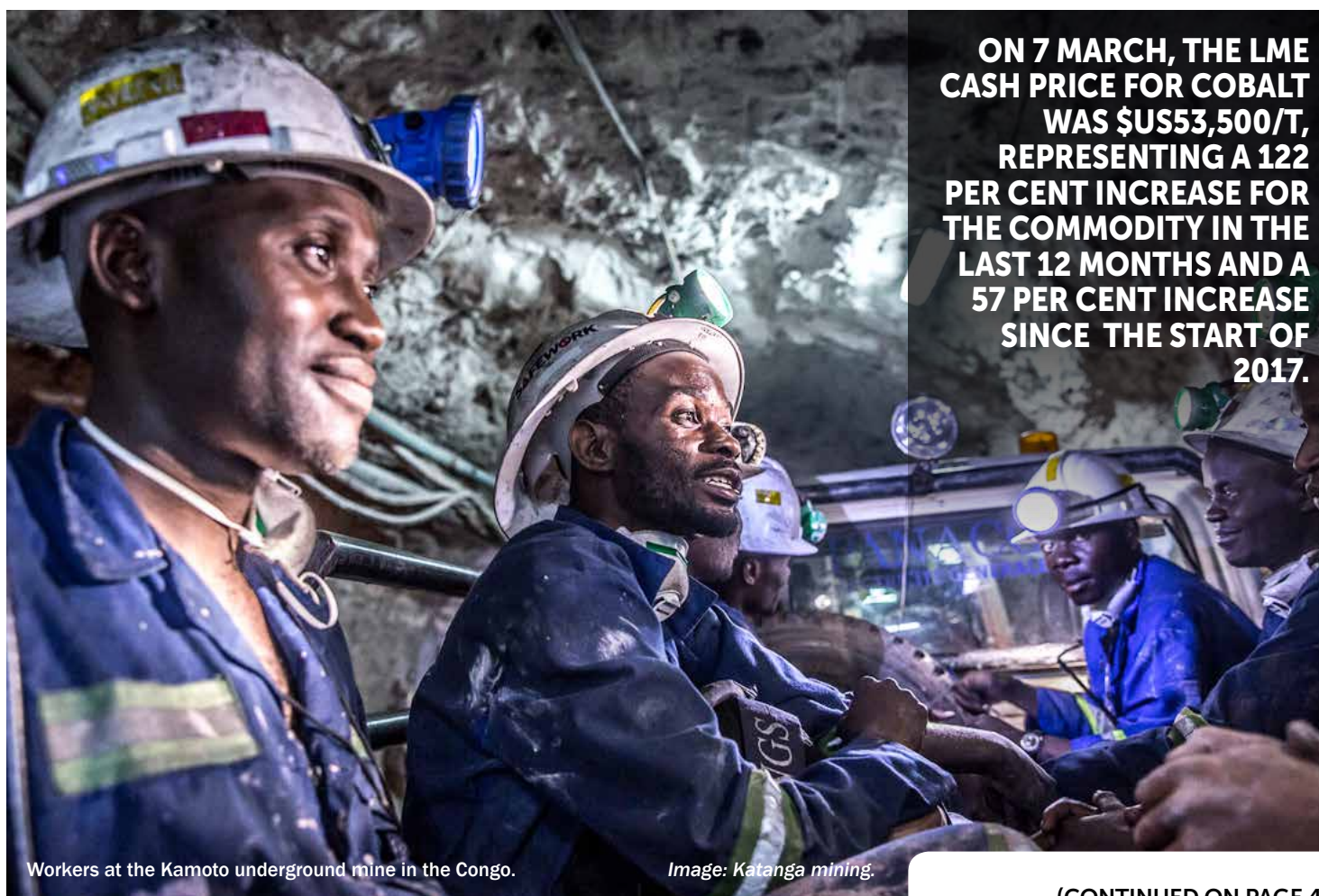
ASX-listed companies such as Ardea Resources, Clean TeQ Holdings, and Barra Resources have announced their interest in cobalt-bearing projects.

Unrest in the DRC

Global production for 2016 was estimated at 76,500t, according to figures from *S&P Global Market Intelligence*.

About 52 per cent of global cobalt production comes from the Democratic Republic of Congo (DRC), which has about 10 million tonnes (mt) of reserves and resources.

In 2016, DRC's Glencore-owned Mutanda copper mine alone accounted for one-third



Workers at the Kamoto underground mine in the Congo.

Image: Katanga mining.

(CONTINUED ON PAGE 4)

of annual global cobalt production (24,500t).

Earlier this year Glencore upped its stake in two of these mines, purchasing 31 per cent of Mutanda from Fleurette Group for \$US534m to fully own the project, and adding 10.25 per cent to its share (now 86.33 per cent) of Katanga for \$38m.

These acquisitions made have the Swiss-based miner the world's largest cobalt producer over other major cobalt producers such as China Molybdenum and Lundin Mining, both of which have stakes in Congolese copper mines that produce large amounts of cobalt as a by-product.

Apart from demand, one factor driving investment into cobalt production in mineral-rich regions such as Canada and Australia is the volatile political situation in the DRC, where President Joseph Kabila has refused to step down with an approval rating of just 7.8 per cent.

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INDEPENDENCE GROUP

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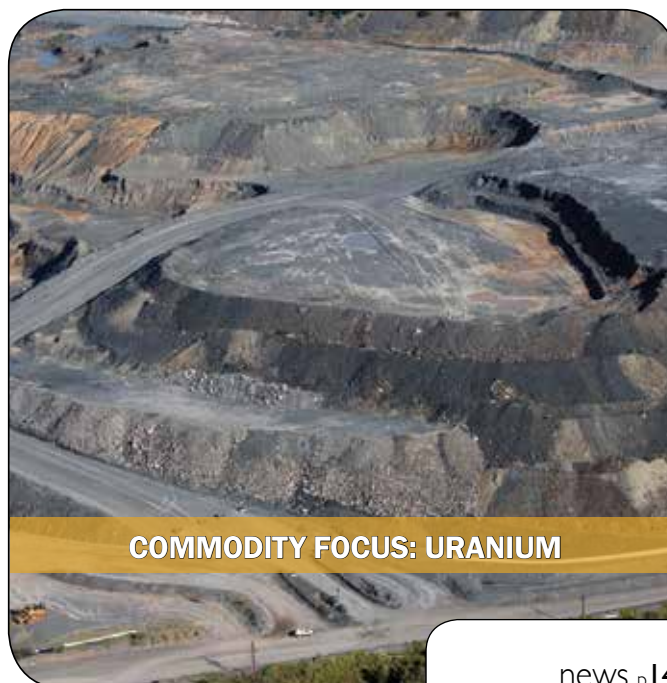
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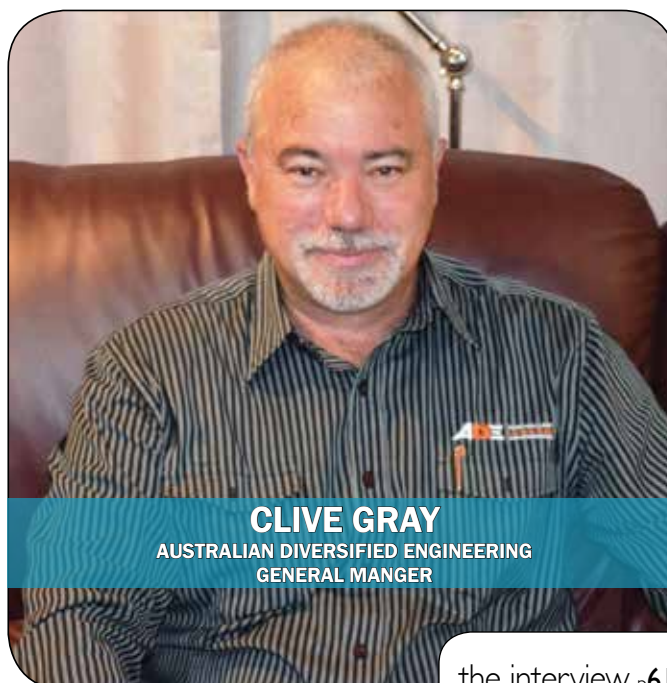
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CLIVE GRAY

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GENERAL MANGER

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IN BRIEF

Jan du Plessis
to retire as Rio
chairman

BOARDROOM

RIO Tinto chairman Jan du Plessis will retire after the completion of an orderly succession process, which commenced in June 2016 after J.S. Jacques was appointed chief executive.

A successor is expected to be announced before the end of 2017, with Mr du Plessis retiring as chairman by no later than the 2018 annual general meeting in Australia.

"It has been a great privilege to chair Rio Tinto over the past eight years, during which time I have worked with some outstanding people across the business," Mr du Plessis said.

"The company has withstood the challenges of a cyclical industry and performed well."

Mr du Plessis will join the BT Group board as a non-executive director on 1 June 2017 and become chairman of BT with effect from 1 November 2017.

Fortescue
celebrates arrival
of *FMG Grace*

PILBARA

FORTESCUE Metals has welcomed its second Very Large Ore carrier (VLOC), *FMG Grace*, into Port Hedland.

Following the arrival of *FMG Nicola* in December 2016, *FMG Grace* is the second of four VLOCs from the Yangzijiang Shipyard in China.

An additional four ore carriers are being built at Guangzhou Shipyard International, with the delivery of the final vessel expected in mid-2018.

The ships are designed to maximise the tonnage per ship, improve loading rates, and promote safe manoeuvring within the port and the channel. When fully operational, the fleet will provide approximately 12 per cent of Fortescue's total shipping requirements.

Rio awards further
Amrun contracts

CAPE YORK

RIO Tinto has awarded more than \$900m in contracts to QLD suppliers for the development of its Amrun bauxite project near Weipa on the Cape York Peninsula.

The spend makes up more almost two-thirds of the \$1.38 billion so far awarded for the project, with 509 QLD businesses engaged to supply goods and services to the site.

QLD Premier Anastacia Palaszczuk said Rio's investment in local and regional suppliers would provide a tremendous boost to the State's economy.

"The Amrun project will ensure QLD businesses and their employees will continue to reap the benefits of many development opportunities for years to come," she said.

Positive signs for M&A

REUBEN ADAMS

THE number of mining industry mergers and acquisitions (M&A) in the Asia Pacific was 25 per cent higher in 2016, but the value was down by a third year-on-year, according to the fourth annual Asia Pacific M&A Review from Herbert Smith Freehills.

Key drivers on M&A activity in 2016 included the divestment strategies of major miners – especially in thermal coal – and significant activity in gold and copper.

The bulk commodity price rally in the second half of 2016 also corresponded with an uptick in the number of deals done.

Herbert Smith Freehills reported that transactions fell into three categories; major miners divesting assets – particularly metallurgical and thermal coal – via private M&A auction processes; sales of mid or small operating copper and or gold assets; and sales of exploration assets or undeveloped mining leases.

Key deals includes South32's \$US200m acquisition of Metropolitan Coal from Peabody Energy; Mach Energy Australia's \$US224m acquisition of Rio Tinto's Mount Pleasant thermal coal mine in NSW; EMR Capital's \$US210m acquisition of the Golden Grove zinc and copper mine from MMG; and Evolution Mining's \$800m acquisition of a 30 per cent stake in the Ernest Henry copper and gold mine from Glencore.

However, the significant increase in metallurgical coal prices in the second half of 2016 adversely affected the ability to complete large scale M&A transactions, the report stated.

"The unexpected size of the price increase made it difficult for purchasers and vendors to reach agreement on price. The significant increase in metallurgical coal prices also made it difficult for large listed mining



Image: Peabody Energy.

Key deals in 2016 included South32's \$US200m acquisition of Metropolitan Coal from Peabody Energy.

companies to justify to the market their desire to sell."

Despite uncertainty surrounding the effects a new US administration, Brexit, and China's slowing economic growth will have on the industry, there are positive signs for M&A in the mining sector moving forward.

Predictions for 2017: growth on
the agenda

The Asia Pacific M&A Review stated that the 2016 price rally and lower production costs had increased confidence in the mining sector which would likely act as a catalyst for increased M&A in 2017.

"We anticipate more M&A activity as miners, having achieved significant cost and debt reductions and having improved

profitability (and in some cases being net cash), refocus their growth plans," the report stated.

"Confidence levels in long term pricing have improved but volatility is still a consideration, particularly in bulk commodities. We therefore expect that at least in the short term, this will drive miners to prefer growth through acquisitions of existing operations rather than organic growth through developing new operations."

Mining M&A in 2017 would continue to be driven in part of by the major's divestment programs, resulting in continued opportunities for smaller, single asset or pure play companies to acquire high quality assets.

M&A activity in coal and gold would continue, while activity was expected to increase in copper and bauxite as buyers look to gain exposure to current prices.

Cobalt overshadows lithium in 2017

(CONTINUED FROM PAGE 1)

Elections to be held in December last year were stalled until the end of 2017, and a report submitted to the United Nations by its DRC special representative Maman Sidikou in March outlined a high risk of politically motivated violence in the country.

Foundations for that claim lie in President Kabila's popular opponent Moise Katumbi – a onetime governor of the Katanga Province – where it's estimated 5 per cent of copper and nearly half the world's cobalt supply originates from, according to *The Economist*.

If the President were to continue to resist attempts to relinquish power, Katanga – where Mr Katumbi is highly popular – would likely to play a central role in any unrest.

Time for the juniors

While mining majors like Glencore currently harness a large proportion of the cobalt market, ballooning demand is driving junior explorers in Australia to search for viable nickel and copper projects with profitable amounts of the in-vogue base metal.

Australia is the second largest producer of cobalt, but currently accounts for just 6 per cent of global production with its 1.8mt of reserves and resources.

Enter newly-listed exploration company Ardea Resources, a recent spinoff of Heron Resources and owner of the Kalgoorlie Nickel Project (KNP) in the Goldfields region of WA.

The KNP has a contained resource of



Image: Ardea Resources.

Ardea Resources' Matt Painter (left) with Katina Law, at the company's February listing to the ASX.

about 360,000t of cobalt, which the company says is the largest known deposit of the strategic metal in the developed world.

Ardea managing director Matt Painter said past efforts by previous owners of the KNP meant the company could accelerate the project's development.

"We are extremely fortunate that a lot of the work has been done before, between Vale Inco and Heron – between them they spent \$50m on various studies prior to us getting involved, so we really are standing on the shoulder of giants," Mr Painter said.

"For a relatively small expenditure of about \$1m we are able to put together a

pre-feasibility study (PFS) on one of the world's largest cobalt deposits and it's coming together very nicely at the moment."

Mr Painter said cobalt's use in new energy storage technologies had brought the commodity to the fore in recent months.

"I think it's a fascinating area and potentially a new focus for large parts of Australia, and is something that will be of focus for us moving forward into the future."

Other cobalt focused explorers Archer Exploration, Barra Resources and Clean TeQ said that investigations into their own projects in South Australia, WA and NSW respectively were also underway.



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Steel sentiment rebounds in March

REUBEN ADAMS

CHINESE steel market sentiment rebounded in March, boosted by positive expectations for new orders of domestic long steel products, according to the latest S&P Global Platts China Steel Sentiment Index (CSSI).

The March CSSI rose by 23.98 points from February's 25.21 to a headline reading of 49.19 out of a possible 100 points, as the outlook for new domestic orders strengthened by 26.27 points from last month to 50.80 in March.

A reading above 50 indicates expectations of an increase/expansion and a reading below 50 indicates a decrease/contraction.

Expectations for long steel product prices increased by 4.17 points to 62.50 in March, while the outlook for flat steel prices fell to a 17-month low of just 12.50; down 7.29 from February.

The outlook for steel production rebounded to a 10-month high of 56.67, up by 18.03 from February.

Steel inventories held by traders were largely expected to fall in March, dropping 21.97 points from last month to 32.28 in March.

"Another round of steel production restrictions in China's Hebei province, along with closures of induction furnaces in Jiangsu province, are supporting the positive outlook for long steel product orders and prices, while end-user demand in the construction sector has improved due to the warmer weather," S&P Global Platts senior managing editor of steel & raw materials Paul Bartholomew said.

Stronger prices had incentivised uplift in steel production with output of longs, such as rebar, picking up, according to Mr Bartholomew.

"Steel inventories, which have been higher than usual since Chinese New Year, are expected to be drawn down, he said.

"It remains to be seen if domestic demand is strong enough to absorb the additional output as export opportunities are under pressure from lower-priced material from Turkey in particular."

The CSSI is based on a survey of 75 to 90 China-based market participants including traders and steel mills.

Major step for \$850m project



"THIS IS AN \$850M PROJECT WITH [THE] POTENTIAL FOR 500 JOBS DURING CONSTRUCTION AND MORE THAN 200 JOBS DURING OPERATION OF THE MINE, PLUS MORE THAN 1200 JOBS DURING CONSTRUCTION AND 400 JOBS DURING OPERATION OF THE REFINERY."

Vanadium is another 'strategic metal' used in new technologies.

Image: TNG.

CAMERON DRUMMOND

TNG has signed a key agreement with the Northern Territory government for the development of its \$850 million Mount Peake vanadium-titanium-iron project, 235km north west of Alice Springs.

A Project Facilitation Agreement (PFA) was signed for the agreed location of TNG's TIVAN processing facility near Darwin, providing the miner with more certainty over the development of the project.

The Mount Peake project would employ about 1700 people during construction and 600 ongoing jobs once complete.

TNG managing director Paul Burton said the signing of the PFA marked another exciting milestone for the project

as it continued to advance towards development.

"The project has already been awarded major project status in the Northern Territory, and this agreement is a further indication of the proactive and positive approach which the NT government is adopting to help facilitate the development of this major new Australian resource project," he said.

"The TIVAN downstream metal refinery is a key component of the overall project production and logistics chain which will see the application of state-of-the-art processing technology to cost effectively extract high-value vanadium, titanium and iron from the Mount Peake deposit and produce high-purity metals for export."

If completed, Mount Peake is expected

to produce 17,560 tonnes (t) of vanadium pentoxide, 236,000t of titanium dioxide and 637,000t of iron ore per annum for export.

NT Chief Minister Michael Gunner said the signing was a significant step forward to securing ongoing employment for hundreds of people in Central Australia and Darwin.

"This is an \$850m project with [the] potential for 500 jobs during construction and more than 200 jobs during operation of the mine, plus more than 1200 jobs during construction and 400 jobs during operation of the refinery," he said.

TNG said it would undertake a range of technical, engineering and environmental studies during 2017 to fully assess the project before making its final investment decision.

Greenbushes doubles production

CAMERON DRUMMOND

US lithium producer Albemarle has approved the expansion of lithium concentrate production at its Greenbushes spodumene mine in WA.

Greenbushes is currently the world's largest active lithium mine, owned in a 50:50 joint venture between Albemarle and Chinese producer Tianqi Lithium.

The proposed expansion is intended to more than double the lithium carbonate equivalent (LCE) capacity at Greenbushes from its current 80,000 tonnes per annum (tpa) output to more than 160,000tpa.

"This project is integral to our announced lithium expansion plans so that we can meet the growing needs of our customers," Albemarle Lithium and Advanced Material president John Mitchell said.

"The expansion of the mine and ore upgrading facilities is a key deliverable in our supply strategy to grow total combined LCE production to approximately 165,000tpa early in the next decade."

Commissioning of the expansion is expected to begin in the second quarter of 2019.



Image: Greenbushes.

The Cornwall open pit.

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Image: OZ Minerals.

OZ Minerals incoming chair Rebecca McGrath.

OZ Minerals board changes

ELIZABETH FABRI

FORMER BP chief financial officer Rebecca McGrath has been named OZ Minerals' incoming chairman to succeed retiring chair Neil Hamilton.

Currently Investa Office Management chairman and non-executive director at Incitec Pivot and Goodman Group, Ms McGrath has served on the OZ Minerals Board for the last six years and will step into her new role at the end of May following the company's AGM.

"This is an exciting time to be stepping into the chair at OZ Minerals," Ms McGrath said.

"Along with Prominent Hill and Carrapateena there is a growing pipeline of exploration opportunities in place, including West Musgrave currently in study phase.

"The resources sector though is not immune from the disruption affecting many businesses.

"As a board, maximising the opportunities and meeting the challenges in front of us will require both rigour and boldness."

The announcement coincided with the news that non-executive director Paul Dowd would retire, and two new non-executive directors, Tonianne Dwyer and Peter Tomsett, would be appointed.

Ms McGrath said the appointment of Ms Dwyer and Mr Tomsett would bring financial and international mining expertise and new perspectives.

Commenting on his departure, Mr Hamilton said now was an opportune time for a board renewal.

"Considerable change has occurred in the past 30 months under chief executive officer, Andrew Cole, culminating in the significant mine life extension for Prominent Hill and the development of the Carrapateena project," Mr Hamilton said.

"It is the right point for both me, and the company, that we make this change.

"OZ Minerals is now well positioned for the next chapter of its life and will benefit from a renewed board supporting Andrew and the team as they deliver the growth strategy."

Mining jobs rebound



"IF I COULD HAVE ANOTHER 500 QUALIFIED WORKERS LINED UP OUTSIDE OUR OFFICES ACROSS THE COUNTRY TODAY, I WOULD BE ABLE TO PUT THEM INTO GOOD RESOURCES JOBS TOMORROW."

Image: One Key Resources

REUBEN ADAMS

NEW resources sector job advertisements on SEEK have enjoyed the greatest growth of all industries across Australia, up 66 per cent year-on-year this February.

SEEK Australia and New Zealand managing director Michael Ilczynski said there was sustained demand for multi-skilled mining professionals that also possessed "softer skills" such as team leadership and communication.

"Hirers are looking for people that fulfil duties beyond the specific job requirements," Mr Ilczynski said.

"In WA and QLD, the largest mining states, job ads on SEEK for the Mining, Resources & Energy sector were up 57 per cent and 69 per cent respectively this February."

Mining engineers and mining operators were in the highest demand across WA and QLD. In WA alone there were more than 500 job opportunities live on SEEK for mining engineers in mid-March.

Mining labour hire and managed workforce services specialist One Key Resources was also seeing a rebound in demand for qualified mining personnel.

One Key Resources managing director Grant Wechsel said that along with an increasing demand for skilled mining workers he was also seeing an increase in wages.

"If I could have another 500 qualified workers lined up outside our offices across the country today, I would be able to put them into good resources jobs tomorrow," Mr Wechsel said.

"The demand is there from major mine owners across all commodities including

coal, iron ore and gold, as well as with major mining contractors.

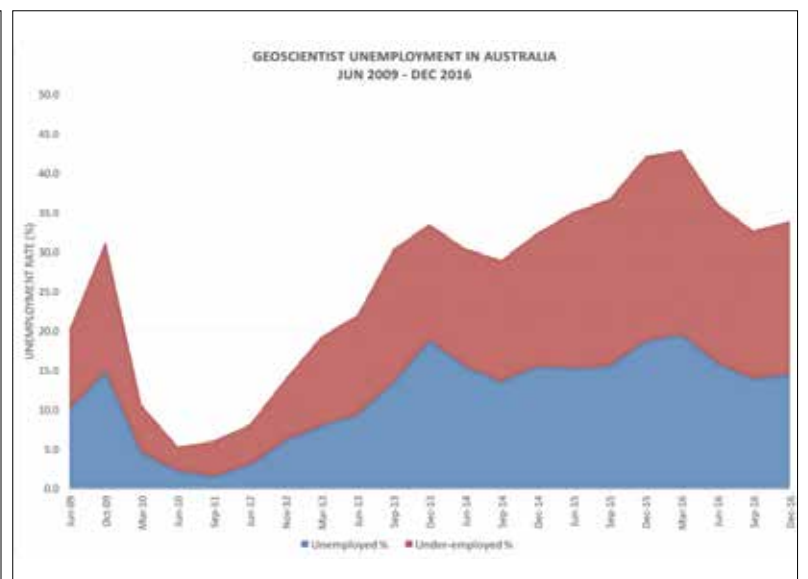
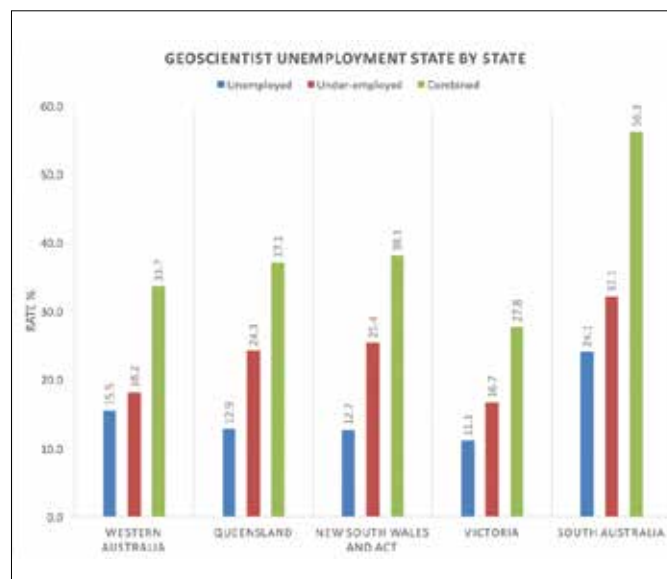
"We're talking the full range from open cut and underground operations, especially from the established mining areas in Queensland, New South Wales and Western Australia.

Mr Wechsel said a varied skill set was in demand, including dump truck and multi skilled operators, diesel fitters, auto electricians, underground miner drivers, operators and experienced trades people.

"Following the downturn many workers left the resources industry due to downsized operations or less mines operating, but we're now seeing the rebound first-hand particularly since commodity prices have lifted," he said.

"While there are a variety of opinions on how long commodity prices will remain buoyant, the demand for skilled workers can't be denied."

Geoscientist job growth stall



ELIZABETH FABRI

MORE than half of Australian self employed geoscientists struggled to find work in the December quarter, latest research from Australian Institute of Geoscientists (AIG) has found.

In a survey conducted in February, AIG reported the Australian geoscientist unemployment rate was 14.4 per cent and under-employment was 19.5 per cent as of 31 December 2016, marking a setback for the recovering industry following September green shoots.

While the results were higher compared to the 13.9 per cent and 18.8 per cent respectively at the end of September, unemployment was still lower than results collected in the first half of 2016.

"The improvement in employment prospects for Australia's geoscientists evident during 2016 came to an end in the final quarter of 2016," AIG stated.

Of the 485 respondents, more than half of self-employed geoscientists were unable to secure more than a quarter of their required workload resulting in a real unemployment rate of 24.5 per cent compared to 24.2 per cent in September.

South Australian geoscientists faced the highest rate of unemployment (24.1 per cent), followed by WA (15.5 per cent) and Queensland (12.9 per cent).

AIG council member Andrew Waltho said the results reflected a "seasonal pause in the gradual recovery of employment opportunities for geoscientists" and fragility of the Australian resources sector.

"The survey results clearly demonstrate that resource exploration in Australia remained flat through to the end of 2016, consistent with exploration expenditure figures reported by the Australian Bureau of Statistics at the end of February 2017," Mr Waltho said.

"The Fraser Institute annual survey of mining companies for 2016 saw Western Australia and Queensland featuring in the top 10 most attractive jurisdictions for exploration investment globally, but this isn't being reflected in actual investment needed to create jobs and sustain one of the most important sectors of the Australian economy.

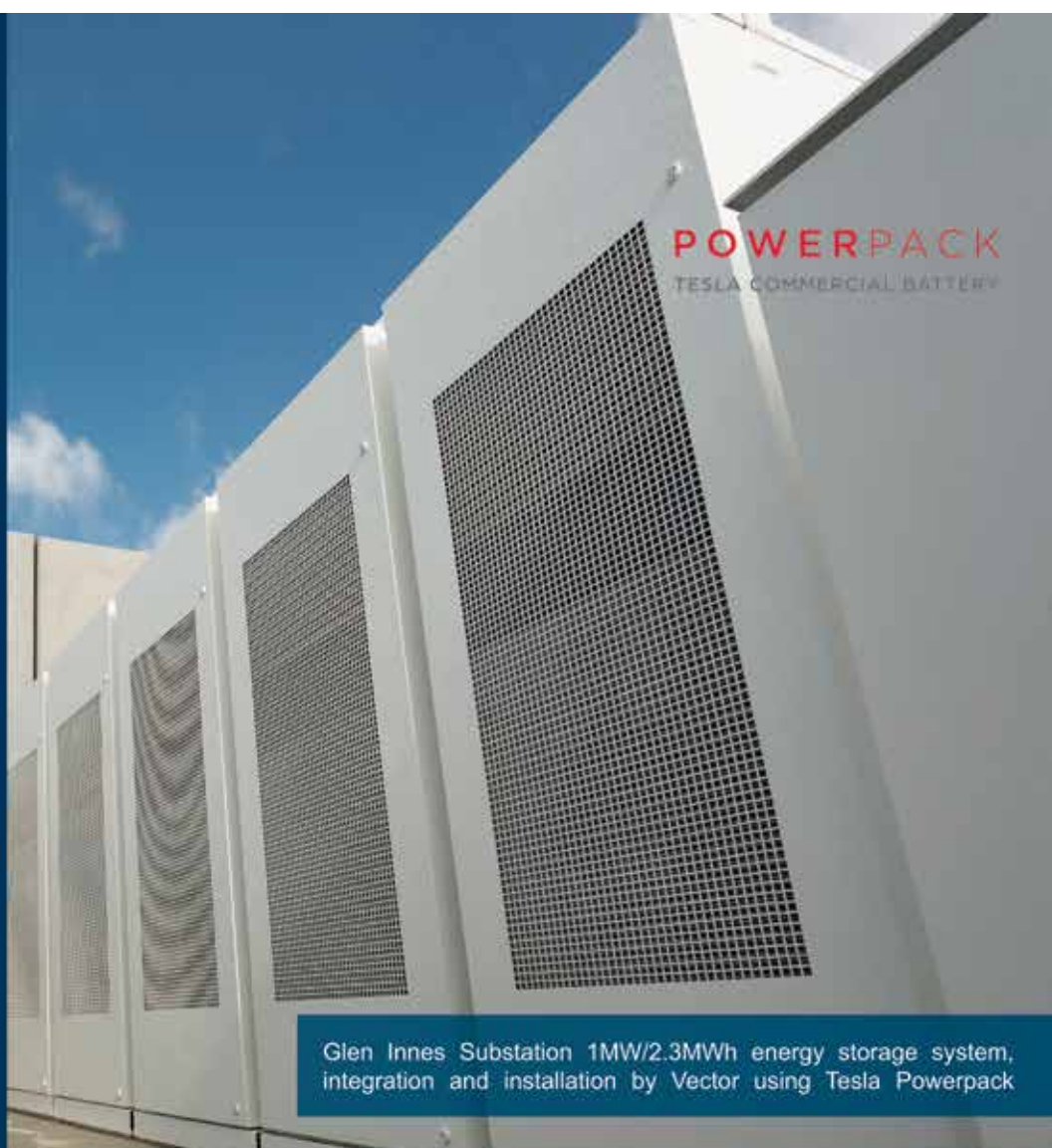
"Improved prices for mineral commodities during 2016 have not translated into increased exploration investment and project pipeline renewal."



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IN BRIEF

Curtin climbs
mining school
rankings

WA

CURTIN University has rocketed to second place in QS World University Rankings for engineering, mineral and mining; up 17 places from last year.

Australia also had two other universities in the top five, with the University of QLD ranking third and the University of NSW fourth.

Curtin vice-chancellor Professor Deborah Terry said the results reflected the University's long-standing reputation for innovation and high-quality research.

"Overall, the results are very positive with improved performance in a number of areas, especially in Engineering – Mineral and Mining through the Curtin WA School of Mines, an outcome that reflects the University's strong profile and performance in this important field," Professor Terry said.

KPMG support
for METS sector

QLD

NATIONAL advisory firm KPMG will launch a 12-week innovation accelerator program from July to provide support to Queensland mining equipment, technology and service (METS) companies.

Funded by the State Government and in partnership with METS Ignited, the program will offer companies financial, legal, marketing, technical advice, and mentoring to get their ideas off the ground.

The program was part of the QLD government's \$6 million, four-year commitment to METS Ignited to help facilitate jobs and growth in the State, and help any of the 800-plus State METS companies turn innovations into a commercial reality.

FMG university
collaboration

WA

FORTESCUE Metals Group (FMG) has partnered with universities from WA and China in a new program that aimed to promote increased cooperation and innovation in the resources sector.

The program would be made up of post graduate students from Central South University, Lingnan College, Sun Yat-San University, Curtin University and The University of Western Australia, and include a tour of FMG's mine sites, and infrastructure and remote operations control centre, followed by workshops and symposiums to discuss ideas and opportunities for improved productivity.

"FMG is delighted to be working with this group of universities who bring significant expertise across the fields of mining, minerals processing and business studies," FMG chief executive Nev Power said.

Tech giants join forces



The winning Digi-MIN team consisting of three Gekko representatives (graduate process engineer Eliza Craig, graduate metallurgist Barry Tuncks and mechanical designer Matt Kurtze) and Monash University student Daniel Bechaz.

ELIZABETH FABRI

GEKKO Systems has partnered with Rockwell Automation to develop a metallurgical software program that will account for metal content at various stages of ore processing and provide miners with analytic capabilities to audit and improve performance.

In late February the two companies signed a Memorandum of Understanding (MoU), and had now progressed to the development and pilot stage of the project.

Gekko global mining and processing services manager Renaldo Maras said the company was pleased to be collaborating with Rockwell Automation; a company it had worked with at length over the last 15 years.

"It is exciting for Gekko Systems to be associated with Rockwell Automation in what we believe to be a significant opportunity to assist the mining industry to

make sense from valuable data that is often lost or not easily accessible for analysis," Mr Maras said.

Rockwell Automation Gekko account manager Steve Simpkin said he was "delighted to have the opportunity to help co-develop this Connected Mine software solution with Gekko Systems".

"This is the culmination of our ongoing 15 plus year relationship and the exploitation of technology and industry trends towards the Industrial Internet of Things.

"This is a solution that ultimately will help benefit our respective clients."

In late March the Gekko team won the 2017 Melbourne Unearthed Hackathon, a 54-hour open innovation event which gathered software developers, engineers and designers into teams to develop prototype technologies to solve one of four challenges provided by Newcrest Mining.

The winning Digi-MIN team consisting

of three Gekko representatives and a Monash University student tackled unplanned downtime and rate interruption events within its Newcrest's concentrators at Cadia.

"We developed a tool that flags small variations in the correlation between two related variables," graduate process engineer Eliza Craig said.

"We demonstrated that the correlation between two variables in the HPGR changed several times before a single downtime event and our algorithm was able to flag this more than 24 hours in advance.

"The algorithm is robust enough that it can easily be applied to any two related variables across any piece of equipment or site.

"By flagging small changes in the correlation in real time, equipment can be inspected and downtime can be planned. This can drastically reduce the cost and impact of unplanned downtime on site."

Hazer and MRL eye JV

ELIZABETH FABRI

PERTH-based graphite technology company Hazer Group is in discussions with mining infrastructure service provider Mineral Resources (MRL) to form a joint venture after the company secured \$5 million worth of Hazer shares at the end of March.

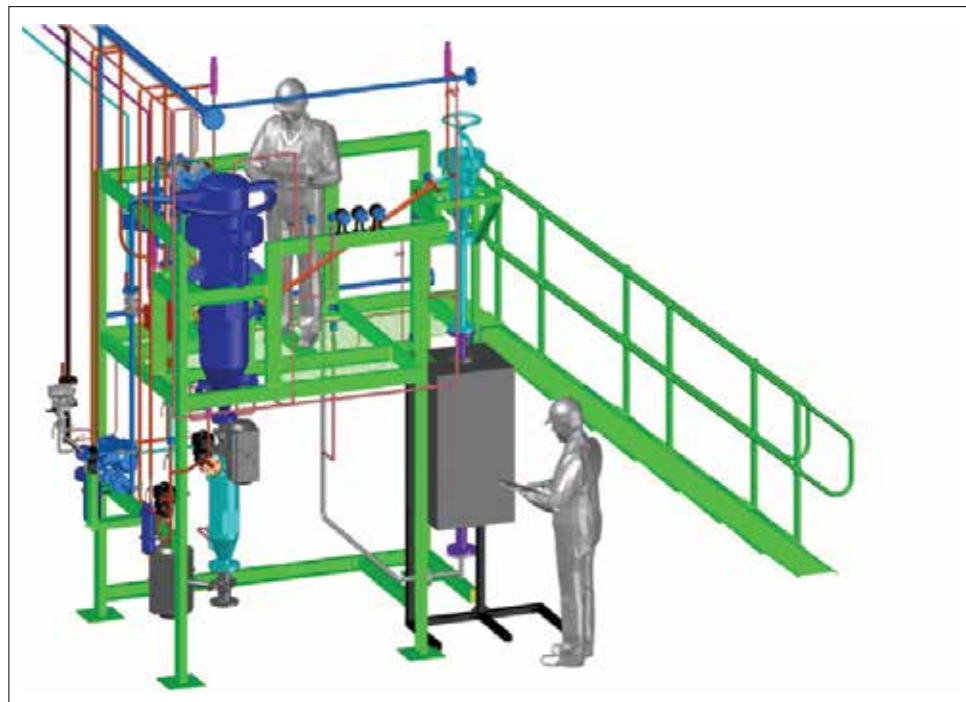
The partnership would see both companies develop a commercial-scale synthetic graphite plant, which would support Hazer's ongoing development of its Hazer Process technology.

The Hazer Process was Hazer's flagship technology that utilised unprocessed iron ore as a low cost catalyst to convert natural gas into hydrogen and high-quality graphite.

On 20 March, MRL purchased more than 8.3 million Hazer shares at an issue price of \$0.60 per share, which increased its stake in the company to 14 per cent.

The company was also issued 4.1 million unlisted options, with each option allowing it to subscribe for one additional share at a price of \$0.70 per share, by 31 December 2019.

Hazer Group managing director Geoff Pocock said MRL had been a significant supporter of the company since its IPO, and the capital raising had prompted



Hazer pre-pilot plant.

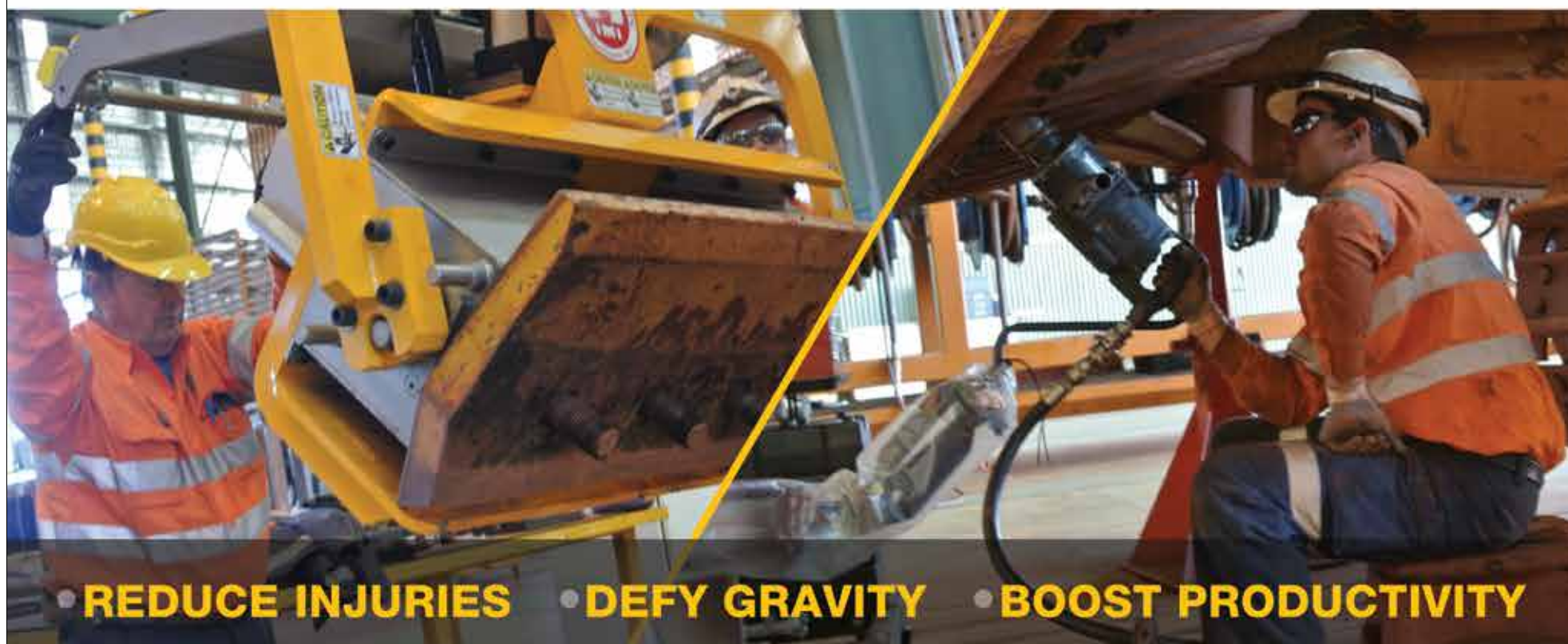
Image: Hazer Group.

both parties to enter formal discussions of establishing a joint venture.

"We are delighted to have secured the support of Mineral Resources and are looking forward to working with them to bring our first commercial scale plant to fruition," Mr Pocock said.

"We are pleased that Mineral Resources see Hazer as a key part of their ongoing energy storage materials business, and we see them as an invaluable partner for the ongoing development and commercialisation of the Hazer technology."

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IN BRIEF

Mod raises \$14m
for Botswana
copper project

AFRICA

WA-based Mod Resources has tapped investors for \$14.6 million to fund exploration work at its T3 copper project in Botswana.

The company received commitments for 235.2 million shares at \$0.062 per share – a 2.2 per cent discount to its weighted share price average.

Mod said the funds would be used to progress a pre-feasibility study for an open pit mine and expansion works at the T3 project.

“The board is extremely pleased to see such high calibre institutions support our growth strategy by participating in this placement,” Mod chairman Mark Clements said.

“We look forward to an exciting period of exploration and project development in this highly prospective region.”

Apollo acquires
majority interest in
Couflens

FRANCE

APOLLO Minerals has signed an agreement to acquire an 80 per cent interest in the Couflens tungsten-copper-gold project in the south of France as part of its deal to purchase Ariege Tungstene SAS.

Subject to shareholder approval, the transaction would include an upfront cash payment of \$250,000 and issue of 15 million Apollo Minerals shares, plus \$500,000 cash and 65 million performance shares pending on various performance conditions to Ariege.

The Couflens project area centred on Salau mine and covered a 42sqkm area within the Pyrenees region near Spain.

NSW-based Variscan Mines held the remaining 20 per cent share in the project.

Vale shuts 100yo
nickel mine

CANADA

VALE will put the historic Stobie nickel-copper mine in the Canadian province of Ontario on care and maintenance later this year, citing low ore grades, soft metals prices, and recent seismic activity.

Beginning as an open pit and going underground in 1914, the Stobie mine produced 375 million tonnes of ore over its long life.

Vale vice president of Ontario operations Stuart Harshaw said Stobie had a rich history and was integral to the company's success for more than a century.

“However, after more than 100 years of operation, the mine is approaching the end of its natural life,” he said.

“The low grades at Stobie are no longer economical to mine in today's challenging price environment.”

Glencore sells zinc assets



The sale of the two zinc mines gives Trevali a presence across three continents.

Image: Glencore.

CAMERON DRUMMOND

SWISS-based miner Glencore has agreed to sell Trevali Mining its share of two producing zinc mines in Africa for \$US400 million.

Under the agreement, Canadian-based Trevali will purchase Glencore's 80 per cent interest in the Rosh Pinah mine in Namibia, as well as its 90 per cent interest in the Perkoa mine in Burkina Faso.

\$US244m will be paid in cash to Glencore, with the remaining paid in \$US156m worth of Trevali shares.

Trevali will also pay Glencore an additional \$30m to repay an existing debt facility.

The transaction adds two African zinc mines to Trevali's portfolio of mines in Peru and Canada, creating the only global miner focused solely on zinc.

The deal also increases Glencore's ownership in Trevali from 4 per cent to 25 per cent, with two seats on the board.

When complete, Trevali will have an annual production of 230,000 tonnes (t) of contained zinc, with an operational presence in North America, South America and Africa.

Glencore head of zinc marketing Daniel Mate said the company was pleased to strengthen its partnership with Trevali as it embarked on the development of its zinc assets.

“Trevali has a proven track record in

the sector demonstrated by the success in opening up the Santander mine in Peru and the Caribou mine in Canada,” he said.

“We have been working together as partners since [Trevali's] first mine was built and we share the same vision for the future growth of the business through value-creating organic and inorganic growth opportunities.

“We are excited to form part of this unique global zinc vehicle, providing pure zinc exposure across a wide geographic footprint.”

Zinc was a strong performing commodity during 2016, rising 60 per cent in value as projects in Ireland and Australia closed down.

Mammoth diamond find in West Africa



Image: Lucara Diamonds

CAMERON DRUMMOND

A 706-carat diamond unearthed in Sierra Leone could be the 10th largest stone ever found.

The rock was found by Pastor Emmanuel Momoh, one of thousands of self-employed diamond miners who seek their fortune in

the diamond-rich Kono region famous for its manipulation by militias who swapped the rare stones for weapons during the country's decade-long civil war in the 1990s.

The discovery is the biggest diamond found in Sierra Leone for more than 45 years.

In an act of selflessness, Mr Momoh handed the diamond over to the

Government, saying he hoped it would help fund more development in the nation.

A recent spate of large diamond finds have frenzied miners in central and southern Africa, starting in November 2015 when Canadian-based Lucara Diamonds unearthed a 1111-carat stone in neighbouring Botswana, one of the largest in recent history.

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(17 Hours)



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THE AUSTRALIAN
MINING REVIEW

Cloud of uncertainty

11 March 2011 was the date of the Fukushima nuclear disaster in Japan and the beginning in uranium price decline. The industry took a huge hit with prices plummeting more than 50 per cent and established mines forced into permanent closure. Now, six years on, signs of a recovery are yet to be realised with many mines still struggling under strict government bans and decade-low prices stalling growth.

ELIZABETH FABRI

IT'S been a rocky road for uranium over the last few years, with Australian stats alone illustrating its struggle.

Australia, with its world-leading endowment of uranium resources, has three operating mines across the country and is the third-largest producer behind Kazakhstan and Canada.

While iron ore, gold, lithium and coal mines have been sprouting up across the country, the uranium camp has faced an uphill battle with a string of development projects still waiting for prices to rise, as well as that coveted tick of approval.

Project approval decisions rested on State government support; an unavoidable road block in some like Queensland, where a uranium ban was in full force.

A ban had also returned to WA following Labor's election victory in March.

The win had caused mounting uncertainty around uranium's future in the State.

WA Premier Mark McGowan, a relentless anti-uranium supporter, said prior to the election the Labor government would not support the development of new uranium projects, but if elected would allow uranium projects that had already received environmental approvals to continue development.

Vimy Resources' Mulga Rock project in WA was one of these four mines to recently receive approvals from the former Barnett Government.

A day prior to the State election, Vimy announced to its shareholders that it had commenced work on the Mulga Rock project, but on 14 March, Australian Greens co-deputy leader senator Scott Ludlam lodged a complaint with the Australian Securities and Investments Commission querying whether Vimy had made a misleading statement and were in fact allowed to begin.

"Vimy claimed to the ASX that they have a final approval to mine uranium at Mulga Rock, and that they have 'commenced work' at the Mulga Rock site," Mr Ludlam said.

"The company has received no such final approval, they have not been granted permission to begin construction at Mulga Rock and the company itself is yet to make a final investment decision on the proposed mine.

"Only initial conditional environmental approvals from specific state and federal bodies have been granted to Vimy Resources thus far."

Minerals Council of Australia's Uranium Forum executive director Daniel



Australia contains a staggering 31 per cent of the world's uranium resources.

Image: Energy Resources of Australia, Ranger Mine.

Zavattiero said mines that were approved should be allowed to go ahead.

"Since the ban on uranium mining in WA was lifted by the previous government, over \$300 million has been invested in exploration and development, four mines have moved through comprehensive environmental assessment processes and achieved state government approval to proceed," Mr Zavattiero said.

"Although current global market conditions are challenging for new uranium projects anywhere, these projects are well placed to move through to construction and operations as market conditions improve.

"These projects together could generate around 2000 jobs during construction and over 1400 ongoing jobs in operations."

Uranium has also been a hot topic in the energy arena, with 11 coalition MPs recently calling for nuclear power to be considered in the Australian energy mix; whether that will have any weight in reshaping Federal Government policy is unknown.

For the time being Australia would continue to export its uranium produced at its Olympic Dam, Ranger and Four Mile mines to countries such as India, America, Europe, South Korea, and China for peaceful purposes.

Outlook

2016 was a tough year for the uranium market, with decade-low prices sinking below \$US18 a pound in November.

The tumbling prices were a tough pill to swallow when compared to the \$US65/lb uranium was fetching in February 2011 and \$US136.22/lb in August 2007.

But in mid March, prices saw some signs of recovery when they reached \$US24.50/lb, with prices expected to recover to \$US59.1/lb by 2020, according to KPMG.

KPMG Global Commodity Lead - Uranium Derek Meates said the decade low prices had been driven by a number of factors, many of which were still present today including "the much longer than anticipated delay in Japanese restarts, the oversupply coming from the secondary market, all leading to a standoff between the suppliers and utilities".

"The utilities have not re-entered the long term contracting market in significant volumes and the majority of suppliers are not profitable at current spot prices," Mr Meates said.

"However, the long term fundamentals remain robust given long term demand from China nuclear expansion in particular offset by supply curtailment

and lack of exploration spend given today's prices."

Australian exploration had also fallen, with Australian Mines and Metals Association reporting in March that uranium exploration spending had dropped \$18.3 million to \$27.8m in 2016.

Mr Meates said 2016 and 2017 was about cost cutting and focusing on maximising the lowest cost operations and curtailing higher cost operations until the price incentive was there.

"Australia is competing with Canada, Kazakhstan and Africa in uranium production," he said.

"Uranium will remain a key energy source for some of the world's leading economies given the ongoing demands of energy security and reliability.

"In Australia nuclear power plants are not on the current energy agenda, however State and Federal governments can support the uranium industry by ensuring that existing approvals in place are respected and that similar to problems encountered by current constraints on gas exploration we consider optimising uranium exploration and development to maintain long term energy options for Australia and other parts of the world."

More finance woes for Paladin

CAMERON DRUMMOND

BELEAGUED uranium miner Paladin Energy is in more strife after its Chinese partner in the Langer Heinrich mine asked the company to provide a "fair market valuation" of its remaining 75 per cent share of the operation.

This was seen as the first step of a process that could lead to CNNC Overseas Uranium Holdings (CNNC) exercising an option to acquire the mine at a reduced price if Paladin is unable to meet solvency commitments.

CNNC owns 25 per cent of Langer Heinrich, which it bought for \$US190 million in 2014.

Paladin had hoped CNNC would pay \$US175m for a further 24 per cent share in the

mine to help it repay \$US212m in convertible notes due this month, but has instead resolved to enter into a proposal to restructure its balance sheet in a debt-for-equity swap with bondholders that are owed more than \$US360m.

Paladin said the move by CNNC had caused uncertainty over its restructuring proposal and was working to resolve the issue.



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SPECIAL FEATURES

GALAXY RESOURCES



"WE ARE VERY PLEASED TO BE WORKING WITH THE SOUTHERN PORT AUTHORITY AND QUBE LOGISTICS IN ESTABLISHING A LONG TERM AND MUTUALLY-BENEFICIAL PARTNERSHIP."

The Mt Cattlin project is located 2km north of Ravensthorpe, WA.

All images: Galaxy Resources.

Riding the wave

If there was one company that best exemplified the lithium boom of the last 12 months, Galaxy Resources would be it. In 2016, its share price rose 330 per cent, making it the highest performing stock of the ASX-200. This year, Galaxy maintains its position in the spotlight as production ramps up at its newly commissioned Mt Cattlin project.

ELIZABETH FABRI

THE Mt Cattlin mine has been operated by Galaxy Resources since 2009, but was put on care and maintenance in 2013; a huge blow for the nearby Ravensthorpe community with 37 staff and 65 contract redundancies.

But after more than three years, times were looking up for the WA mining town with the revival of Mt Cattlin injecting welcome jobs, investment and 'buzz' into the region.

On 11 November 2016 Galaxy began ore commissioning at the Mt Cattlin processing facility and on 2 January sent off its first shipment of lithium concentrate from the project via the Port of Esperance to China.

The 10,000 tonne shipment marked a significant milestone for the company after a demanding year gearing towards the next phase of production.

This was bolstered by the confirmed 2017 lithium concentrate sales volume of 120,000t at between \$US830 and \$US905/t FOB, for product grade of 5.5 per cent to 6 per cent lithium oxide.

The mine also recommenced 24 hour production and achieved improved grades and mica content specification below 5 per cent.



Galaxy's first shipment from Esperance.

First shipments

Galaxy worked towards securing key approvals to export product from the Port of Esperance ahead of first production.

On 26 October 2016, the Department of Environmental Regulations and Southern

Ports Authority gave Galaxy the green light it had been waiting for.

Galaxy had previously exported product from the SPA Port of Bunbury 483km from the project; but exporting through Esperance, 187km away, would cut the journey in half.

Galaxy also awarded Qube Holdings

the haulage and port services contract to facilitate the loading of concentrate via its rotabox container rotating frame system.

"Obtaining the Esperance port license is a major milestone achieved in the ongoing preparation ahead of the start of production at Mt Cattlin in time for the first shipment later this year," Galaxy Resources managing director Anthony Tse said at the time.

"We are also very pleased to be working with the Southern Port Authority and Qube Logistics in establishing a long term and mutually-beneficial partnership."

Two days into the New Year, the first 10,000t shipment was loaded on the *NY Trader1* bound for Lianyungang Port in China.

Valued at about \$US6 million based on 2016 pricing, the shipment signalled Galaxy's formal transition back to producer status.

"There has been a tremendous amount of hard work with some very long hours put in, under tight and challenging deadlines, to get the operations to the stage where they are at and to allow us to make our first shipment," Mr Tse said.

On 1 March a second shipment of 14,000t of product was loaded on the *MV Blessing* vessel bound for Galaxy's second customer in China, providing further confidence for investors.

Galaxy stated its spodumene concentrate was anticipated to exceed the 5.5 per cent lithium oxide specification, with about 2 per cent mica concentration and moisture levels below two per cent.

It said the Mt Cattlin processing plant redesign had been successful in producing a product specification that was exceeding expectations in both areas, and would now focus on further improving product quality with a target of 6 per cent lithium oxide and mica concentrations closer to 1 per cent.

BY THE END OF THE 2017 CALENDAR YEAR, THE COMPANY HOPED TO REACH A GUIDANCE OF 160,000 TONNES OF LITHIUM CONCENTRATE.

Production ramp up

Now the first round of shipments had been ticked off, Galaxy was shifting its attention to Mt Cattlin’s production ramp up.

In December last year, Galaxy awarded the mining contract to Piacentini to facilitate ramp up works.

By the end of the 2017 calendar year, the company hoped to reach a guidance of 160,000t of lithium concentrate, to fulfil both the outstanding balance of 2016 contracted volumes and new contracted 2017 volumes.

In its December quarter report, Galaxy stated it intended to continue working on various optimisation initiatives throughout the year to improve production recovery rates above the primary targeted 50 per cent level.

“Galaxy will look to place any incremental future production volumes with existing and/



Galaxy’s first shipment in January.

or new customers, with the company already having experienced strong interest from a range of potential new offtaker customers since the restart of production,” it stated.

On 10 February, Galaxy announced it had reached 90 per cent of nameplate throughout with a peak feed rate at 95 per cent of design.

Further developments

At a recent investor presentation, Galaxy said the company was “well positioned” with near term production from Mt Cattlin, and cashflow to support the development of its Sal de Vida project in Argentina.

“Overall the lithium sector has been undercapitalised to date, in terms of required funding to build out new planned capacity to meet demand,” it stated.

Over the coming year, Galaxy would continue to focus on production at Mt Cattlin, begin site works and advance project financing evaluation and discussions at Sal de Vida, and an exploration and development program at James Bay in Canada to upgrade the existing resource to reserves.

In February the company raised \$61 million to accelerate the development of its overseas projects and remained positive on the rapid growth in China’s demand from battery and energy storage segments.

It said China had a record breaking year in 2016, producing 517,000 new energy vehicles made up of 417,000 pure electric vehicles and 99,000 hybrids.

Mt Cattlin was the “only new independent supplier of spodumene to other lithium converters in China.”

Mr Tse said overall he was pleased with the progress that was being made at Mt Cattlin.

“We are now moving into a stable operations phase at the project,” Mr Tse said.

“This steadier state coupled with some key operational appointments, will allow for more focus on our other world class development opportunities.”





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Primero Group is a company that has strategically picked the wave of Lithium production. We have worked with various clients including Galaxy Resources to become one of the preferred sources of upstream and downstream processing of the mineral.

Primero offers complete end to end capability. From initial testwork phases and mineralisation characterisation through the critical phases of feasibility and project definition through to the detailed design, construction, commissioning and operation of a turnkey processing facility.

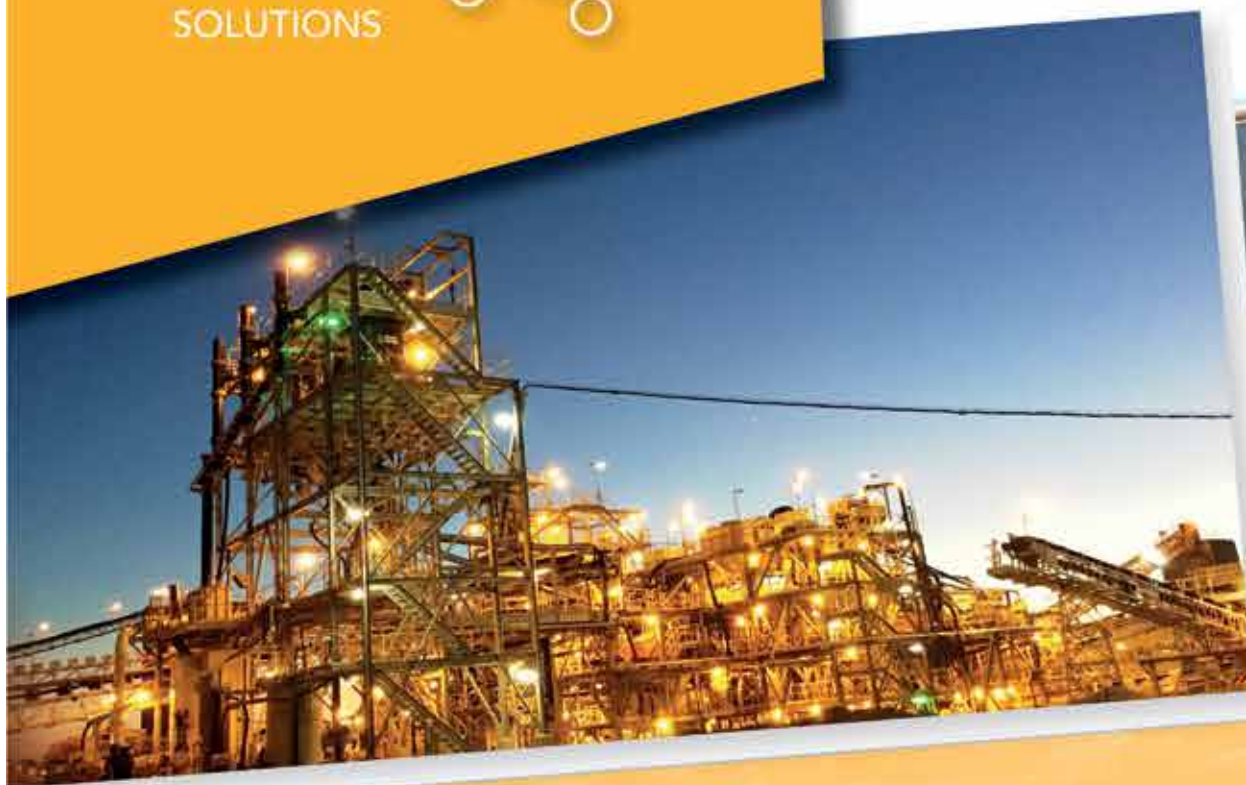
Clients have the comfort that Primero will own the project and ensure that fast track development and critical implementation planning and delivery will be through the one company that facilitates the complete development in-house.

Through experience Primero has developed intellectual property in and around the design, control and operation of minerals processing facilities. Our intellectual property is continually evolving with the changes that all our environments are experiencing in the new world of technology today.

The specialist process engineering and design principles and standards around the processing of pyroxene minerals has numerous complexities from the initial characterisation and separation of Spodumene's closely associated minerals through to the techniques of liberating the wanted mineralisation's from the host pegmatites. Through a number of test work programs and scaled up full scale processing facilities, Primero has the capability and experience to deliver hard rock Lithium processing facilities as a complete design & construct package – a 'turnkey solution'.

Primero's multidiscipline, in-house staff combines complete process/chemical, civil, structural, mechanical and electrical instrumentation & control engineering capability which ensures that interface issues that can be experienced from utilising several sub-contractors and different

MINERALS
PROCESSING
SOLUTIONS



consultants are eliminated. The in-house turnkey solution philosophy allows for seamless transition between the differing phases of design, construct and commissioning and allows knowledge gained to stay within the team and transfer throughout our business.

Our multidiscipline fabrication and construction teams ensure that procurement, fabrication and the installation and testing of equipment into the designed facilities is of a high quality enabling us to warrant the performance for the required contract periods. Our reputation has been built in the delivery of quality installations, that often exceed expectations, and the required performance criteria and specifications, whilst not driving costs to an unreasonable level. The key drivers for any clients around Lithium processing are reliability, and operability with low maintenance requirements and they are always considered and maintained in our solutions.

Along with the design and construction main portions of the process plant, the commissioning, handover and training of personnel in the operation of the facility is also key to the project itself. Primero has developed our own proprietary commissioning platform CHECKMATE© that utilises wireless 'toughbook' technology to provide a paperless, electronic commissioning system. The system ensures that seamless, efficient transition from construction verification and completion is then followed through the commissioning phases and into operational handover with minimal down time, ultimate professionalism, and speed to produce the required statutory documentation for handover.

From the commissioning phase Primero is now offering clients the next phase of ramp-up to production nameplate by continuing to operate and maintain the facility for contract periods to allow for training of client staff, implementation of maintenance procedures and inventory set-up,

and the vital and important ramp-up of the facility to full production rates.

Managing Director Cameron Henry adds:

'As a result of our close working relationships with our repeat and valued clients, Primero has continued our development into the operational phases of the delivery of our turn-key projects. Quite often our clients ask us to assist with the next stages following on from commissioning, as with Mt Cattlin, so on the back of the success of operational ramp-up and maintenance works we are currently providing for Galaxy, as a business we have made the move to expand our service offering in these areas. Galaxy has been an exceptional client to work with and the team dynamic that has been created between the businesses have been a credit to all involved, and we certainly look forward to delivering for the team into the future.'

PRIMERO

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WE INCREASED
PRODUCTION AND
REDUCED COSTS,
ENABLING US TO
TAKE ADVANTAGE OF
THE IMPROVEMENT
IN IRON ORE
PRICES."**

All Images: Atlas Iron.

Back from the brink

Atlas Iron has crawled back from near extinction after the price of iron ore plummeted in 2015, which subsequently forced the company to suspend its mining operations and restructure company debt after heavy financial losses.

CAMERON DRUMMOND

PERTH-based Atlas Iron listed on the ASX in 2004, and has since grown into a mid-sized iron ore mining and exploration company.

It currently operates three projects: Wodgina, Abydos and Mt Webber – all in the northern Pilbara region of WA – which ship at a run rate of about 15 million tonnes per annum (mtpa).

After a rocky 2015 when the company nearly went bust, Atlas is looking to be debt free by the end of the 2018 financial year.

All three operations had been suspended by April 2015 after the company posted a \$1.4 billion loss for the 2014 financial year due to drastic falls in the iron ore price.

Yet the company fought for survival, negotiating a deal with contractors that slashed its operating costs and completing a \$87 million capital raising which enabled all three mines to be restarted by July that year.

With debt looming large during 2016, Atlas pushed through a crucial debt-for-equity swap with its creditors, approved by shareholders in April that year.

Its debt went from \$257m down to \$109m, resulting in lenders holding about 70 per cent of shares and options.

Iron ore prices enjoyed a surprise lift during 2016, translating into increased revenues for Atlas, which enabled it to start paying down debt and look at options to continue and expand its mining operations.

With Wodgina due for mine completion by mid-2017 and Abydos by the end of the year, Atlas moved its focus to expand Mt Webber



The company is looking to write off its debt by the end of the 2018 financial year.

(which has a current mine life of six years) and develop its new Corunna Downs mine.

The expansion of Mt Webber, combined with the construction of the Corunna Downs project, would give Atlas a total export rate of 12mtpa of iron ore by the June 2018 quarter.

Mt Webber

The Mt Webber iron ore mine is located 230km south east of Port Hedland, and was opened in July 2014 following the completion of Stage 1 of the project, with a production capacity of 3mtpa.

Completion of Stage 2 followed a few months later, doubling capacity to 6mtpa.

Mt Webber had ore resources of 56.1 million tonnes (mt) and reserves of 47.6mt as of June 2016, for a mine life of between 7 and 8 years.

During the first half (H1) of FY17, Mt Webber completed a production capacity expansion from 6mtpa to 7mtpa, with Atlas targeting an additional expansion up to about 8mtpa by FY18.

Corunna Downs

On 16 February 2017, the Atlas board approved the development of the Corunna Downs iron ore project in the WA Pilbara.

Construction of the project was forecast

to cost between \$47m and \$53m, funded by operating cash flow from amendments to its loan facility.

It will comprise of four open pits, and be mined by conventional drill and blast, as well as truck and excavator mining.

It has a mineral resource of 64.1mt and reserves of 21mt, and once constructed, Corunna would add an initial rate of 4mtpa to the company's total iron ore production over a five to six year mine life at a cash cost of between \$37 per wet metric tonne (wmt) and \$43/wmt.

The company said it was investigating ways to reduce cash costs and exploring potential upside opportunities to extend the mine life by exploiting both the below water table resources and the Glen Herring mineral resource area.

Atlas managing director Cliff Lawrenson said it was a strong vote of confidence in Atlas by its lenders, some of whom were significant shareholders.

"Corunna Downs, together with Mt Webber, will rebuild our production rate to approximately 12mtpa after Wodgina and Abydos cease production in the first and second half of 2017 respectively," Mr Lawrenson said.

"The amendments to the facility will enable Atlas to capitalise on current and future opportunities provided by the stronger iron ore price."

First shipments of ore from the project were planned to commence in the March 2018 quarter.

(CONTINUED ON PAGE 22)

Turn-key design and build solutions

FOR more than 19 years, WA-owned design and construction company NWSM Building Group has been a leading specialist in cyclonic and non-cyclonic resistant steel building systems for the mining industry.

The company provides custom in-house turn-key design solutions and engineering, to full construction, project management and site supervision.

NWSM's custom designed structures are recognised across the State; one of which includes a laboratory building for IMP at Atlas Iron's Mt Webber mine.

IMP's fully automated robotic and analytic capabilities, combined with NWSM's expertise in steel building systems, produced the quality purpose-built facility as it operates today.

The company also supplies industrial and commercial roller door and roller shutter servicing, installation and maintenance and is an accredited B&D dealer.

NWSM has worked with and is accredited by some of Australia's largest companies and mine sites.

Recently completed projects include; FMG's Anderson Point Port Hedland construction warehouse, conveyor belt workshop, lubrication facility and metallurgical laboratory; FMG's Newman metallurgical laboratory; BHP's Finucane Island conveyor belt workshop; Roy Hill's Port Landside laboratory; Port Hedland Port Authority's Eastside maintenance workshop; Bristow's helicopter hangar in Karratha; Newcrest's Telfer mine power substation, metallurgical laboratory and bulk air conditioner building; Newmont



Atlas Iron's Mt Webber mine.

Mining's Boddington construction warehouse, light vehicle workshop, mill store and metallurgical laboratory; and several airport hangars at Broome International Airport.

All projects are engineered to provide excellent quality and value, and are locally made and manufactured.

NWSM's regional office based in Broome, and facilities in Port Hedland and

Karratha, enables a timely service to all locations within the Northwest regions of WA.

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

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NWSM Building Group provides quality engineered projects specialising in cyclonic and non-cyclonic steel building systems for the Civil and Mining sectors. Our portfolio also includes industrial warehouses, workshops, aircraft hangars and the servicing, installation and maintenance of industrial roller doors and roller shutters.

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(CONTINUED FROM PAGE 21)



**ALL THREE
OPERATIONS HAD
BEEN SUSPENDED
BACK BY APRIL 2015
AFTER THE COMPANY
POSTED A \$1.4
BILLION LOSS DUE
TO DRASTIC FALLS IN
THE PRICE OF IRON
ORE.**

Atlas shipped 8.1mt of iron ore during the first half of FY17.

Financials

Atlas shipped 8.1mwmt of iron ore in H1 FY17; an increase of 1.2m-wmt at all-in sustaining costs of \$52.30/wmt, \$3.45 less than the previous half year period.

A rise in iron ore prices saw the company's revenue balloon 34 per cent to \$498.2m for H1 FY17, giving an after tax profit of \$18.9m, a marked turnaround from an H2 FY16 loss of \$114.3m.

This left Atlas with cash on hand of \$134m at the end of the half which enabled it to pay down an additional \$54m of debt at the start of the year and reduce its term loan to \$118m.

Mr Lawrenson said the strong result marked a key turning point for Atlas on several levels.

"Importantly, we increased production and reduced costs, enabling us to take advantage of the improvement in iron ore prices," he said.

"The strong first half positions us well as we transition from the Wodgina and Abydos mines and commence the development of the recently approved Corunna Downs mine over the remainder of the 2017 calendar year."

Atlas retained its full year production guidance at between 14m-wmt and 15mwmt.

"The second half has commenced with challenging weather conditions, including rainfall levels around our mines well above those in recent years," Mr Lawrenson said.

"However, we retain our FY17 production guidance range of [between] 14m and 15mwmt.

"Increasing price discounts on lower-grade ores are impacting realised prices, particularly on those cargoes which are hedged and do not benefit from the overall increase in headline 62 per cent [Fe] prices.

"However, we anticipate discounts should reduce over time to levels that more accurately reflect the relevant value of the various ores to the end users."

Its full cash costs outlook rose \$2 from its August 2016 FY17 guidance to between \$50/wmt and \$54/wmt, a reflection of higher freight rates and increased revenue-linked payments.



Corunna Downs will supplement the tonnage loss from mine completion at Wodgina and Abydos.





“THE AUTHORITY HAS AGAIN HAD A SUCCESSFUL YEAR AND HAS RETURNED A SOLID PROFIT RESULT, DESPITE A CHALLENGING ECONOMIC ENVIRONMENT.”

All Images: Southern Ports Authority.

Southern Ports has a diverse trade including mining, agriculture and forestry.

A united front

When multiple entities join forces to combine their expertise and knowledge great things can happen. The Southern Ports Authority, an amalgamation of the Port Authorities at Albany, Bunbury and Esperance, has propelled further production efficiencies, safety measures and annual trade of more than \$15.6 billion since its formation.

ELIZABETH FABRI

THE merger between the three ports kicked off in October 2014 after much deliberation by the WA Government following a comprehensive review.

The 2010 review delved into all matters concerning port operations, performance and governance to ensure all of the State’s ports were able to keep up with the demands of the rapidly growing economy.

It was decided that port infrastructure would be optimised by consolidating the three ports and having one central authority connecting southern WA to the world.

There would also be reduced expenditure, improved investment decisions and corporate governance, and greater consistency of port views on regulation and safety.

The idea was for a single entity to provide and maintain the shipping channels, navigation aids, security systems, seawalls and road infrastructure, while each Port maintained different operational models that may see other common services provided, including emergency response, waste and property management, ship scheduling, berth allocation and marine pilotage.

On 20 May 2014, the legislation allowing the ports to merge was given Royal Assent, and together the three ports now shared a



Southern Ports FY16 exports.

catchment of 400,000sqkm, 14 berths, and annual trade of about 36 million tonnes from the mining, forestry and agriculture industries.

About 780 ships visited the Southern Ports each year, including 27 cruise ships, and it directly employed 220 people and supported a staggering 12,000 trade jobs across the region.

The Port of Esperance alone is the largest nickel concentrate exporting port

in the Southern Hemisphere, and will soon become well known for exporting spodumene – a source of lithium – to Asia.

Southern Ports Authority chief executive Nicolas Fertin said out of its trade, 30 per cent was iron ore; 30 per cent was alumina, and 10 per cent of trade or close to 4mt was various other mining products such as nickel, mineral sands and spodumene.

“We’re forecasting to more than double the spodumene export,” Mr Fertin said.

“At the moment it’s a small percentage of our trade and very important for the regions, and we’re very conscious that the WA catchment area of the three ports contains some of the richest deposits in the world.”

Port performance

In FY16, Southern Ports Authority trade came to 36.1mt; a 0.2 per cent dip from the previous year.

The minor slump was attributed to a 6 per cent decrease in the Port of Albany trade (13 per cent of the Authority trade) and flat results at the Port of Bunbury, which was offset by a 1 per cent increase in trade at the Port of Esperance (42 per cent of Authority trade).

Yet despite the shortfall, the Authority remained confident on its performance across the three operations.

“The Authority has again had a successful year and has returned a solid profit result, despite a challenging economic environment,” Southern Ports Authority chairman Robert Cole said in the company’s 2016 annual report.

“Total trade has remained largely in line with FY15, with a decline in revenue offset by a greater decline in operating costs, resulting in a modest improvement in profit on a full financial year comparative basis.

"In the past year, the Authority has continued to make strong progress on all aspects of the integration of its three Ports including improved commercial arrangements with customers, developing new trade and business opportunities and planning for future facilities and infrastructure."

In FY16 total revenue per tonne reduced by 3.9 per cent and total cost per tonne reduced by 6.9 per cent on a full financial year comparative basis.

The Authority also introduced a new Chart of Accounts to allow for automatic consolidation, enhanced IT architecture to boost communication, and an enhanced employment framework to reduce costs, improve the supply chain and increase safety and security.

"We've also been able to deliver \$2 million savings that's going to be shared across port users for Esperance and Bunbury," Mr Fertin said.

"I'm very confident in the savings that we have delivered internally in the business and confident in the future that we will continue to deliver efficiency and that's been reflected by the lowest price increase for our services for the next financial year will be 0.5 per cent, which is the lowest ever in the last five years."

At the Port of Esperance, the loading rate had improved by up to 20 per cent over the last three years, and Stage 1 of its access road upgrade and the enclosure of its last transfer tower had been completed.

In fiscal 2016, about 94 per cent of the Port of Esperance's tonnage was made up of iron ore, nickel and grain exports, while the remaining 6 per cent consisted of the import of sulphur, petroleum products and fertiliser.

At the beginning of January, Galaxy Resources exported spodumene from its recommissioned Mt Cattlin project, which marked the first time spodumene was exported through the Port of Esperance.

"The first shipment trial, where typically customers are sending a sample or finalising the factories overseas, was done between Christmas and New Year, and the first official shipment, which will be followed by monthly shipments would be at the end of March," Mr Fertin said.

"We're very optimistic with that; we are using sheds that have been unused since 2009 and we're using new technology."

Further west in Bunbury, Southern Ports completed Berth 3 anchor repairs,



Southern Ports chief executive Nicolas Fertin (left) with Captain Gary Wilson who has been appointed as Harbourmaster.

and conducted a trial export of 22,075t of leucoxene.

Alumina exports were stable with a total throughput of 10.7mt, accounting for 66 per cent of total port trade.

However, the Port of Albany trade was predominately made up of grain (60.3 per cent), and woodchips (30.9 per cent), and the recently returned log trade.

Commitment to safety

One of the most notable achievements over the last 12 months was Southern Ports' reduction of lost time injury frequency rate from 22.6 in July 2015 to zero in June 2016.

"We've been able to divide the number of injuries by three and then eliminate

all the LTI within the first year of the amalgamation," Mr Fertin said, attributing the success to a combination of factors.

"The first one is all the executives and myself are directly walking the talk and we're actually onsite on a regular basis," he said.

"We are showing our interest on safety and are ensuring people are talking about their safety."

"We're improving also the way that they operate; we have had a lot of initiatives to make staff talk about the things that they do every day that can make them safer."

The ports had also introduced a number of innovations that improved safety, including new technologies for loading freights into vessels.

Mr Fertin said the fact that they had no lost time injuries for several months was a "good result", but Southern Ports still had to continue its efforts.

"On safety, you are never finishing your journey," he said.

"We still have incidents and near misses that we continue to investigate so it's a never ending journey to make sure that the place is safe every day."

2017 outlook

With just a few months left to end of financial year, Mr Fertin said the ports were on track to achieve roughly the same tonnage as the previous fiscal period.

"We're also on track to achieve our key performance indicator for the financial year which is the rate of return. Our target is to achieve 9.7 per cent and we're very confident to achieve that," Mr Fertin said.

He said over the next 12 months, Southern Ports would focus primarily on its channels and road and rail access.

"We believe it's very important we have that well maintained and available so there's quite a bit of investments we're doing in that space, and because of the new executives we've been able to recruit, we've been doing a lot of work in planning for larger expansions in a progressive way," he said.

"I'm quite optimistic that 2017 will continue to see the growth in some of the mining commodities but Southern Ports is also diversified and good growth out of wood chips and grain which gives us a diversification and more resilience."

Southern Ports was also working to explore the opportunity for exporting bauxite out of Bunbury in the future, and Mr Fertin said it would continue to be on the pulse of global mining activity to ensure it was ready to take on added export capacity when the market required.

"I think that it's a very volatile time at the moment," Mr Fertin said.

"Some of the commodity prices in the past 18 months or two years have been divided by three or four, and some of them have been multiplied also during that time."

"I think that creates two things from a port's perspective; the first one is that we need to continue to reduce our costs wherever we can and the amalgamation is a great mechanism that allows us to do that."

Delivering results in the South West

GEOGRAPHE Civil is a civil construction company located in Bunbury, WA.

Established in 2003, the company has grown from one employee to a strong team of more than 50 full time staff and 75 items of plant and equipment.

It specialises in subdivision land development, water and waste water installation and maintenance, stormwater drainage, bulk earthworks, roadworks, bulk/heavy haulage, bridge maintenance, and raw material supplies.

Geographe Civil also offers customers a rapid response team for after hours emergency work and teams for planned shutdown repair works.

Some of Geographe Civil's major clients include Southern Ports Authority, Cleanaway, Water Corporation, Aqwest (Bunbury Water Board), Busselton Water, Talison Lithium and the majority of the local councils surrounding the City of Bunbury.

Geographe Civil has a well branded reputation in the South West for quality work output, commitment to safety, a "can-do" approach and easy to deal with attitude.

This philosophy has given it a competitive edge in a tight construction industry market over recent years.

The team pride themselves on offering cost effective solutions, for all size clients or



Geographe Civil earthworks.

projects.

Geographe Civil have been certified to ISO 9001, AS 4801, ISO 14001 and ISO

18001 for the past five years which gives customers reassurance the project will done to a global standard.

More information on Geographe Civil's capabilities can be found at: www.geographecivil.com.au.



**RECORDED SALES
OF 550,200T AT
AN AVERAGE SALE
PRICE OF \$107.90/T
DELIVERED REVENUE
OF \$59.3M FOR
THE FIRST HALF AS
MARKET DYNAMICS
IMPROVED.**

All Images: Stanmore Coal.

Perfect timing

When it snapped up the mothballed Isaac Plains mine for a nominal \$1 price tag in 2015, coal minnow Stanmore also acquired the perfect cornerstone asset on which to build and develop a solid portfolio.

REUBEN ADAMS

STANMORE Coal was admitted to the ASX on Friday 4 December 2009 with a promising portfolio of exploration projects in the Bowen and Surat Basins.

The company had ambitious plans from the get go, but was unable to get its high quality projects into development as the coal industry increasingly struggled with low prices and unsustainable costs.

Yet this industry malaise presented Stanmore with another opportunity.

In September 2014, Sumitomo and Vale shuttered its Isaac Plains mine in the Bowen Basin, QLD, as coal prices fell to unsustainable levels. By July the following year Stanmore had snapped up the mothballed mine for a nominal \$1 price tag.

Incredibly, just four years earlier the total value of Isaac Plains was an estimated \$630 million; in fact, Japanese conglomerate Sumitomo had bought its 50 per cent stake for \$430 million at the height of the boom.

Major acquired assets included a Bucyrus 1370W dragline; coal handling and preparation plant; dedicated train load out and rail spur facilities connecting to the Goonyella rail system; workshops; and assorted critical spares and workshop goods.

As part of the deal, Stanmore also became



responsible for mine rehabilitation and took over a number of contractual commitments, including rail haulage and port contracts; an accommodation services agreement; water supply and transportation arrangements; and power supply contracts.

Stanmore stated that it would be compensated by the vendors for some of the contractual commitments; these payments

would cover fixed infrastructure charges and working capital through to first coal and the ramp up of operations.

Stanmore ramped up quickly, restarting mining in February 2016 with first product coal in April and first shipment in May. Golding Contractors, which was appointed the principal contractor under a three year contract, is mining at a current rate of 1.1mtpa.

Latest results

Stanmore reported a loss of \$5.9m for the half ending December 31, partly driven by underperformance from – and wet weather impacts on – the open cut operations during the period. The company also said the average selling price of its export coal had lagged the rising spot price.

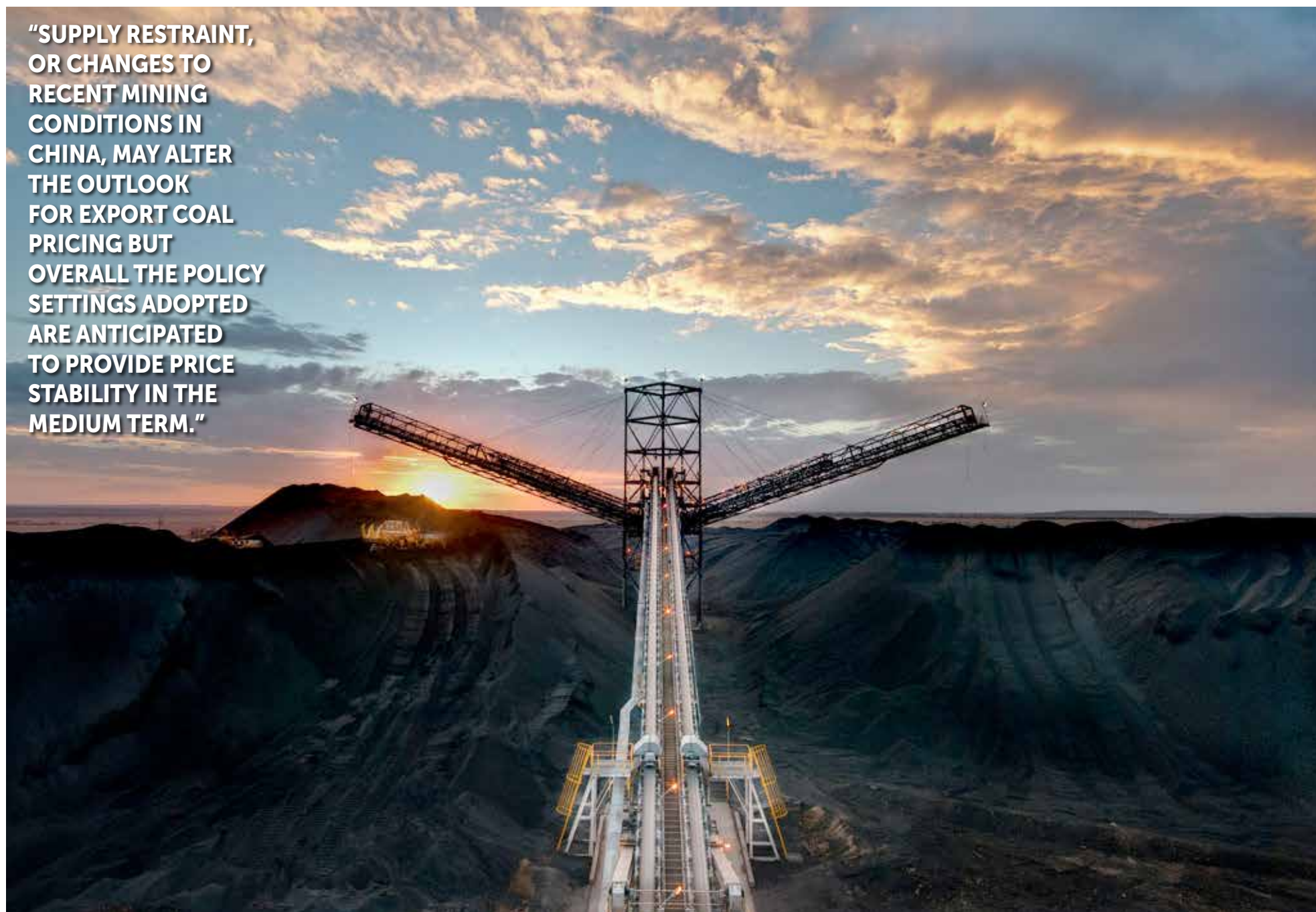
Yet the outlook was good. Recorded sales of 550,200t at an average sale price of \$107.90/t delivered revenue of \$59.3m for the first half as market dynamics improved.

“The materials increase to the pricing environment allowed the company to respond with an anticipated improved output for the company, with higher revenues and significantly improved margins anticipated to flow through the second half of FY17,” the company stated in its half year report.

Stanmore was also actively progressing approvals for its adjacent Isaac Plains East Project, aiming to have the necessary approvals in Q1 FY18 and, “subject to the approvals process and timeline risks”, potentially deliver first coal in Q3 FY18.

The company was also assessing options to fast track the feasibility assessment of the Isaac Plains Underground Project to underpin an investment decision in Q2 FY18.

"SUPPLY RESTRAINT, OR CHANGES TO RECENT MINING CONDITIONS IN CHINA, MAY ALTER THE OUTLOOK FOR EXPORT COAL PRICING BUT OVERALL THE POLICY SETTINGS ADOPTED ARE ANTICIPATED TO PROVIDE PRICE STABILITY IN THE MEDIUM TERM."



"The project schedule from an approvals perspective is in a crucial phase," the company stated.

"From January 2017 through to May 2017 resolution of key negotiations with landholders and overlapping tenure partners are targeted to be reached in parallel with the public notification process being managed through government departments.

"Pending the outcome of these processes, if successful, the mining leases and associated environmental authorities may be granted in Q1 FY18. Following approval the company expects first production in Q3 FY18."

With the reestablishment of open cut production in 2016 and the progressing of permits at its Isaac Plains Complex, the ball is rolling on company's strategy to produce from multiple sources through its existing infrastructure; capable of processing about 3.5mtpa.

"The company will [also] continue to monitor and assess the opportunities to develop or monetise its existing portfolio of assets in the Surat Basin and South Bowen Basin, particularly with respect to the Range and Belview assets," Stanmore stated.

Belview is a large scale, metallurgical coal project in the heart of QLD's Bowen Basin. Stanmore has already established a 330mt JORC Inferred Resource, and, according to its website, has submitted a Mining Lease Application and is targeting first coal in 2018.

In April 2013 the company completed the Feasibility Study for its Range Project in QLD's Surat Basin.

According to the company website, "sufficient work has now been completed around geology, mining and cost structures to confirm that the Range Project is an attractive 5mtpa high quality, export grade, thermal coal project ready for execution upon the delivery of the Surat Basin Rail linking the basin to the existing Aurizon Moura network via a 200km rail link".

Industry Outlook

With the index and benchmark measures for both coking and thermal coal surging in the first half of FY17, the company correctly anticipated a pullback which would hopefully see prices settle at a level that "encourages medium term investment decision for replacement production".

"Supply restraint, or changes to recent mining conditions in China, may alter the outlook for export coal pricing but overall the policy settings adopted are anticipated to provide price stability in the medium term," Stanmore stated.

On 7 March China indicated it would not reinstate the mine production limits that ignited last year's astonishing coal price rally.

China's top economic planning agency, the National Development and Reform Commission (NDRC), said Tuesday that it would not seek to lower coal output in large scale, even as it continued to rationalise supply; provided that coal prices remained in a "reasonable range".

NDRC said early January this year that "the reasonable price range for the domestic coal should be within 6 per cent basis on Yuan535/mt FOB for 5500 kcal/kg NAR coal" to ensure that its steel mills were not paying too much for coal, but also to ensure its domestic miners were not making losses.

"It is becoming increasingly clear that the policy makers in China want to have a 'Goldilocks price' for thermal coal and they have demonstrated last year that they can enact various policies to ensure that outcome," UBS commodities analyst Dan Morgan said via the *Financial Review*.

"The good thing for investors is that coal price range in China, which appears to be between 500 and 570 RMB (\$96-\$110) per tonne, that is higher than what market expectations were for thermal coal 12 months ago," he said.

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"THIS AGGRESSIVE EXPLORATION PROGRAM WILL TAKE PLACE AT THE SAME TIME AS WE BUILD THE MT MORGANS MINE INFRASTRUCTURE AHEAD OF GOLD PRODUCTION AT THE END OF MARCH NEXT YEAR."



A 3D image of the new 2.5mtpa CIL treatment facility.

All images: Dacian Gold.

The home stretch

With construction at Mount Morgans Gold Project (MMGP) off to a flying start, Dacian Gold is counting down to first production; a goal it endeavours to achieve by early 2018.

ELIZABETH FABRI

FIRST listed on the ASX in November 2012, Dacian Gold has big plans ahead for its flagship MMGP project in the North-Eastern Goldfields.

After five years of exploration and studies at the Westralia and Jupiter prospects, the WA-based gold development and exploration company will soon become Australia's next mid-tier gold producer.

In the 12 months ending 30 June 2016, Dacian's share price jumped by almost 600 per cent from \$0.43 to \$2.90, and its market capitalisation increased from \$41 million to \$380m.

"During this significant increase in both share price and market capitalisation, the only equity contribution made during this period was a \$25 million fully underwritten issue completed in November 2015 at a share price of \$0.69," Dacian Gold executive chairman Rohan Williams said.

"2016 was the most significant year of our company's short history; in every respect it was a transformational year."

"The excellent market performance of Dacian Gold is attributed to the market's growing recognition that the MMGP is a new, high quality gold project that has size, scale, significant exploration optionality and access to considerable existing infrastructure in Australia's

second largest gold district, at Laverton in WA."

In 2016 the company completed a 90,000m resource in-fill and extension drill program at the brownfields site, a feasibility study, and continued its exploration efforts.

"The 90,000m drilling program was all oriented diamond and RC drilling that was aimed at upgrading the Mineral Resource at our Westralia and Jupiter discoveries," Mr Williams said.

"2016 WAS THE MOST SIGNIFICANT YEAR OF OUR COMPANY'S SHORT HISTORY; IN EVERY RESPECT IT WAS A TRANSFORMATIONAL YEAR."

"The drill program was highly successful with a 176 per cent increase in the measured and indicated mineral resource categories at Westralia (now at 905,000 ounces) and a corresponding 69 per cent increase at Jupiter (now at 1.12 moz)."

The total measured and indicated mineral resource for the WA project now sat at 2.2moz, and the total mineral

resource inventory was 3.3moz; up almost four times from the 842,000oz resource base at the time of the company's 2012 IPO.

In Dacian's definitive feasibility study released in November 2016, it stated MMGP's eight year mine and treatment schedule would produce an average of 186,000oz of gold per annum for the first four years.

It also estimated infrastructure capital costs to come to \$172m, including a new 2.5mtpa carbon-in-leach (CIL) treatment facility and tailings storage facility to be built adjacent to the Jupiter pit and a 416-person accommodation village, as well as mine-establishment capital costs of \$48m.

Mining would be undertaken at two mining complexes 15km apart; the Westralia Mine Area comprising the Beresford and Allanson underground mines; and the Jupiter Mine Area Ore Reserve.

Westralia had an initial ore reserve of 492,000oz at an AISC of \$837/oz over an initial four year period, while Jupiter had an ore reserve of 643,000oz from a 1.8km long open pit at an AISC of \$1193/oz over an eight year life.

On 21 December upon completion of the study, Dacian Gold secured up to \$150m in project debt funding with three tier-one banks, taking advantage of the low interest rate environment.

"The lenders have conducted extensive

due diligence on Mt Morgans and their agreement to provide the Facility is a strong vote of confidence in the project," Mr Williams said.

"Our ability to secure project finance on such favourable terms from both domestic and international lenders also highlights the quality of Mt Morgans."

Construction timeline

After finance was secured, the company announced it had started construction at the project on 12 January following the receipt of key regulatory approvals from the WA Department of Mines and Petroleum Environment branch for the Mining Proposal and Mine Closure Plan, as well as the Project Management Plan by DMP's Resources Safety branch.

Construction works included earthworks for a new accommodation village as Dacian Gold was in the final stages of negotiating the purchase of a second-hand village from a site near Perth.

The team would also carry out earthworks at Westralia for a temporary power station, overhead power line, workshop and offices, and preparations for the installation of pumping infrastructure for dewatering.

The dewatering of the Westralia open pit ahead of underground mining was expected to begin in May once the company received the necessary approvals.



From L-R: Blueprint Environmental Strategies' Jill Woodhouse, James Cumming, Siobhan Pelliccia and Willian Fonseca.

Environmental Assessment Specialists

BLUEPRINT Environmental Strategies (Blueprint) is a boutique consultancy that provides environmental services to the mining, tourism and construction industries.

Compliance with statutory environmental requirements is a significant aspect of project development.

With operational experience combined with a background in environmental science and environmental law, Blueprint can guide companies through the environmental impact assessment and regulatory approval processes, from acquisition to operations to closure and rehabilitation.

Through a coordinated, multi-disciplinary approach, Blueprint aims to ensure environmental aspects of a project are

identified at an early stage of planning to allow the timely achievement of project milestones in a cost-effective manner.

Key past and present clients include Dacian Gold, Kidman Resources, Delaware North Australia, Panoramic Resources, and Talisman Mining.

The range of services provided by the Blueprint team includes due diligence reviews, feasibility assessments, environmental risk assessment, coordination of baseline studies (earth sciences, ecological, hydrological), stakeholder engagement, regulatory approval applications, environmental management plans and systems, compliance auditing and reporting, mine closure planning and costing.

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The project bordered many large-scale operating projects.

"We continue to make strong progress at Mt Morgans on numerous fronts and remain on track to be in production in the March quarter, 2018," Mr Williams said.

On 6 March, Dacian issued a conditional letter of intent for the award of the principal engineering, procurement and construction (EPC) contract to GR Engineering Services, following its announcement a week earlier of a fully underwritten \$110m equity raising to complete the funding arrangement for MMGP.

Once confirmed, the EPC contract would see GR Engineering deliver the new 2.5mtpa CIL treatment facility and other supporting infrastructure such as the tailings storage facility, raw water supply, workshops, site administration complex and a new section of haul road between the new treatment facility and existing Jupiter haul road.

Mr Williams said the GRES team knew the project well and had a strong understanding of its culture and values.

"We have enjoyed a long-standing relationship with GRES at Mt Morgans

which has included the metallurgical testwork and treatment plant design work for the MMGP Feasibility Study, as well as with previous EPC contracts with other organisations where some of our senior executives have been involved," he said.

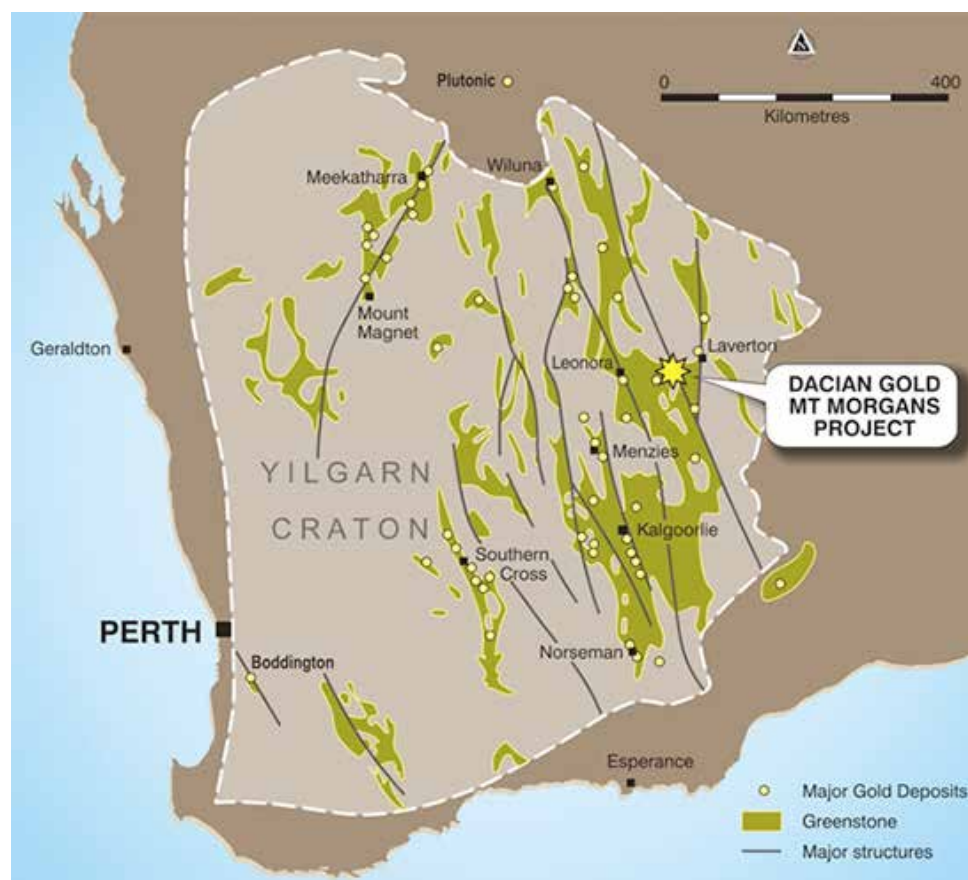
"They represent an excellent fit for us, and we are looking forward to working closely with them as we begin construction of the project."

Exploration activity

In the meantime, Dacian is continuing to make strong progress at Mt Morgans, including the recent commencement of exploration drilling at Cameron Well with two rigs.

"This should ensure that we can deliver strong news-flow over the coming months from both project development activities and organic exploration and growth initiatives – a great combination for any emerging gold company," Mr Williams said..

Planned activities for the March quarter included completing in-fill drilling at



Mt Morgan is located in the Goldfields, WA.



The Westralia pit now had a measured and indicated mineral resource of 905,000oz.

Cameron Well, and beginning RC drilling at new Jupiter targets.

On 23 January, the company announced it had uncovered two major new zones of shallow gold mineralisation next to the Jupiter deposit with “outstanding potential”.

Two weeks later, the news was followed by Dacian’s report it had discovered a highly promising gold target at Cameron Well that spanned 6sqkm, measuring 2.6km by 2.4km in size.

“Together with our recently announced success at the Jupiter Regional Prospect – where we have delineated two +1km long gold trends immediately adjacent to the planned open pit – Dacian Gold now has two outstanding exploration targets with strong potential to grow Mt Morgans’ Mineral Resource base this year,” Mr Williams said.

“We begin a 335-hole aircore/RAB drill program to infill the Cameron Well Syenite Complex ahead of a major RC and diamond drill program in the next quarter.

“WE CONTINUE TO MAKE STRONG PROGRESS AT MT MORGANS ON NUMEROUS FRONTS AND REMAIN ON TRACK TO BE IN PRODUCTION IN THE MARCH QUARTER, 2018.”

“This aggressive exploration program will take place at the same time as we build the Mt Morgans mine infrastructure ahead of gold production at the end of March next year.

“This means that, over the coming year, shareholders can look forward to

strong and consistent news-flow from both exploration drilling and project development milestones.”

Future growth

Once Dacian enters production and exploration efforts advance, an expansion at MMGP could be on the cards.

In November, in parallel with the feasibility study, the company released an expansion pre-feasibility study that showed potential future MMGP production increase to 1.7moz.

The PFS showed MMGP production could grow based on an increased ore reserve from 18.6mt at 2g/t gold for 1.20moz to 21.4mt at 2.4g/t gold for 1.65moz.

This included a potential increase of the Westralia Mine Area Ore Reserve of 492,000oz at an AISC of \$837/oz to 938,000oz at an AISC of between \$795 and 805/oz.

However the study did not include any changes to the Jupiter mine area and Transvaal ore reserves.

The company estimated an increased capital expenditure of about \$3m to increase the capacity of the tailings storage facility, and said mine life would extend to nine years with the first seven years of production averaging at 197,000oz per year.

“The 2017 year will undoubtedly be another busy year for the company,” Mr Williams said.

“I am hoping that, with the commencement of recently started exploration programs on prospects like Cameron Well, Callisto and Jupiter Regional, we will make new gold discoveries and deliver on our vision of turning Mt Morgans into a long life and highly prosperous Western Australian gold mining operation.”

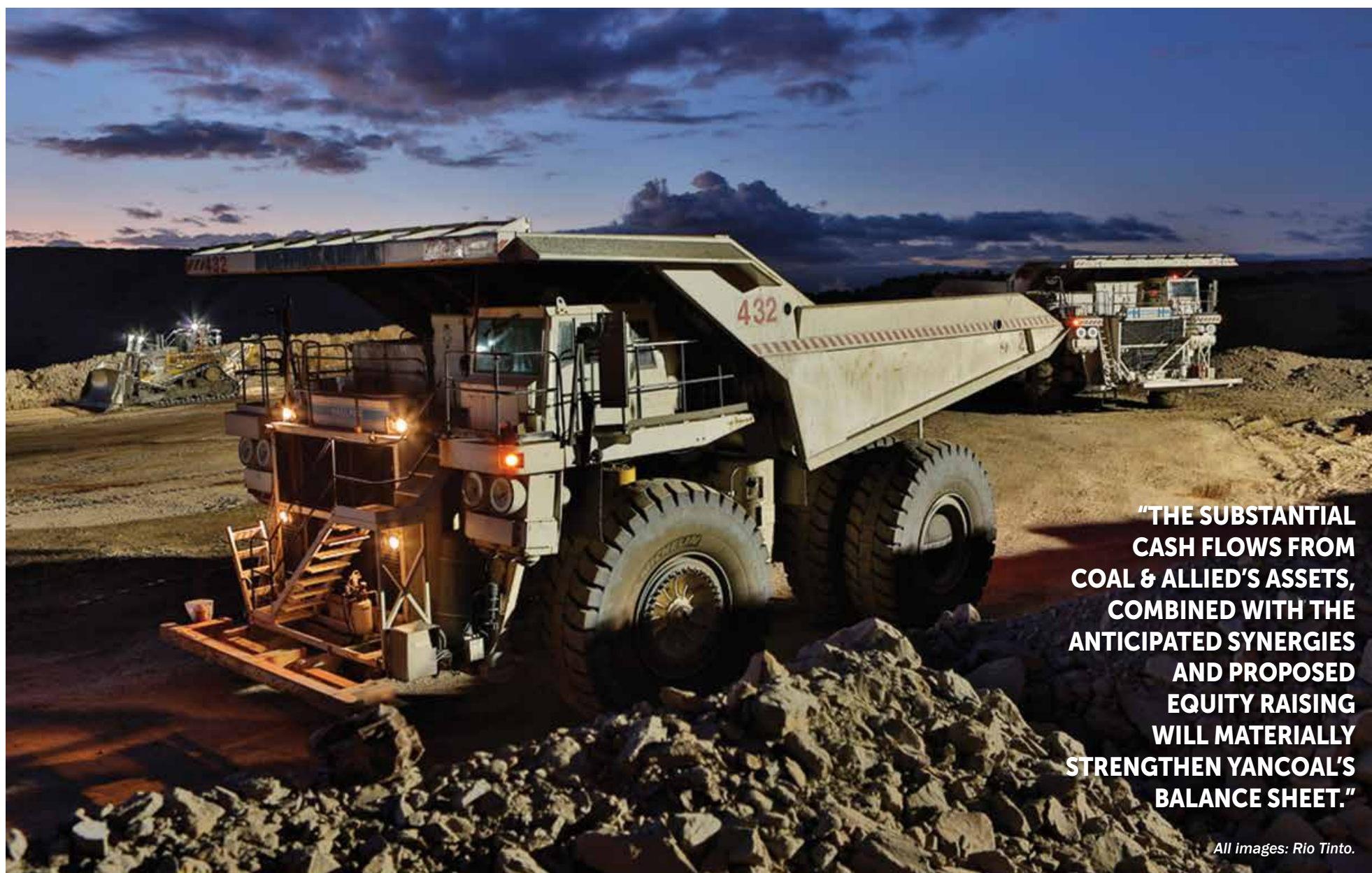




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"THE SUBSTANTIAL CASH FLOWS FROM COAL & ALLIED'S ASSETS, COMBINED WITH THE ANTICIPATED SYNERGIES AND PROPOSED EQUITY RAISING WILL MATERIALLY STRENGTHEN YANCOAL'S BALANCE SHEET."

All images: Rio Tinto.

Transformative acquisition

Yancoal Australia will become one of Australia's largest pure-play coal producers if its \$US2.45 billion purchase of Rio Tinto's Coal & Allied goes forward.

REUBEN ADAMS

SEVENTY-EIGHT per cent-owned by Chinese State-owned Yanzhou Coal Mining Co, Yancoal Australia currently produces thermal and metallurgical coal each year for export, operating four sites and managing five others across NSW, Queensland and WA.

After a healthy 2012, when it posted profits of \$404.6m, Yancoal has struggled along with the rest of its coal industry peers – posting annual losses of \$832m (2013), \$353.5m (2014), \$291.2m (2015), and most recently \$227.1m (2016).

Yet there could be light at the end of the tunnel; Yancoal is looking to snap its losing streak on the back of a healthier coal price and the Coal & Allied acquisition.

Coal & Allied

In February, Yancoal entered into a binding agreement to acquire all shares in Coal & Allied from wholly-owned subsidiaries of Rio Tinto for \$US2.45 billion in completion and deferred cash payments, plus a coal price linked royalty.

Rio Tinto stated that it had held extensive discussions with several potential acquirers but Yancoal provided the only offer that represented "compelling value" for the assets.

Coal & Allied, the holding company for Rio Tinto's thermal coal business, owns and operates multiple, multi-seam open cut mines in the Hunter Valley region of NSW.

It has a 67.6 per cent interest in the Hunter Valley Operations (HVO) mine, an 80 per



cent interest in the Mount Thorley mine, a 55.6 per cent interest in the Warkworth mine, a 36.5 per cent interest in Port Waratah Coal Services (which owns a coal export terminal located at the Port of Newcastle) and other undeveloped coal assets, including various landholdings.

The HVO and Mount Thorley Warkworth (MTW) mines together produced 25.9mt of saleable thermal and semi-soft coking coal in 2016 (17.1mt Rio Tinto share).

The net assets subject to this sale agreement had earnings before tax of \$102 million in the year to 31 December 2015, and a gross asset value attributable to them of \$1.895 billion as at 30 June 2016.

If all goes to plan the transaction was

expected to be complete in Q3 of 2017.

Parent company Yanzhou intended to subscribe for about \$US1 billion in the entitlement offer, and Yancoal was also in discussions with professional underwriters and third-party investors to underwrite the balance of the capital raising.

Yancoal chairman Xiyong Li said the deal would be a transformative and exciting acquisition for Yancoal shareholders and form the basis for the company's future growth and success as Australia's largest pure-play coal company.

"Via the acquisition of Coal & Allied's high quality asset portfolio, we will be delivering substantial cash flows to the company, quality coal products and long-term relationships

with end-users in key global markets," he said.

"The substantial cash flows from Coal & Allied's assets, combined with the anticipated synergies and proposed equity raising will materially strengthen Yancoal's balance sheet.

"The new Yancoal will be very well positioned to realise significant value for our shareholders in the years ahead."

Yancoal chief executive Reinhold Schmidt said that in addition to recapitalising the company, the transaction represented a significant expansion of Yancoal's operational portfolio at an attractive point in the coal price cycle.

"Yancoal has successfully restructured its operations and reduced costs throughout the past three years and established itself as a leading coal producer committed to investing in Australia, with the ability to realise ongoing value from its combined low operating cost portfolio."

On completion, Yancoal will have majority ownership of three world class thermal coal assets being Moolarben, HVO and MTW; JORC marketable coal reserves of 830mt (attributable basis); ROM coal production of 71mtpa (managed) and 47mtpa (attributable basis) expected in 2017; and saleable coal production of 53mtpa (managed) and 34mtpa (attributable basis) expected in 2017.

It will also give Yancoal a stronger position on the global seaborne thermal coal margin curve, and greater diversity in thermal and coking coal products which can be readily blended and tailored to customer requirements in order to achieve optimal pricing for Yancoal.

Moolarben Complex Stage Two

The world class Moolarben mining complex within the Western Coalfields of NSW comprises an existing open cut mine (Stage One) producing export quality thermal coal and an underground thermal coal development project (Stage Two).

On 3 September and 14 September 2015 the NSW Department of Industry, Resources and Energy granted the mining lease and mining operations plan, respectively, for the Moolarben Stage Two Project.

Once fully developed, the integrated Moolarben Coal Complex (Stage One and Stage Two) would produce up to 21mtpa of ROM coal for 24 years. Stage 2 included one open cut (OC4) and two underground mines (UG1 and UG2) and some additional infrastructure which would operate in conjunction with, and utilise, the approved Stage 1 infrastructure.

In its full year Financial results, released 28 February, Yancoal announced that development coal from the Moolarben Stage Two underground mine had commenced on schedule.

Mr Schmidt said throughout 2016 Yancoal has proactively strengthened its balance sheet, reduced operational costs, maximised blending, and moved forward with Moolarben Stage Two to benefit from significant global coal market price improvements and increasing customer demand.

“We have demonstrated our capacity and resilience within a challenging market via strong and decisive action to deliver the tier one Moolarben Complex’s Stage Two underground mine on time and budget,” he said.

In 2016, Moolarben production was up 35 per cent on the year prior due to the

realisation of the benefits of the Stage Two open cut 4 expansion and improved yields.

Outlook

Yancoal correctly predicted that coal prices would fall from their late 2016 highs in 2017, with China currently refusing to impose the same restrictions on its domestic coal mines provided coal prices remained in a reasonable range.

“Operationally, Yancoal will continue to maximise blending arrangements, operational efficiencies and cost saving strategies implemented throughout the year prior to support new market opportunities and production rate improvements,” the company said in its Annual Report.

“Yancoal continues to progress the Moolarben Stage Two underground and open cut mines in accordance with project and production schedules.”

2017 guidance for saleable production is between 12mt and 12.5mt (equity share), excluding production from the Middlemount joint venture and the Watagan assets. Guidance for saleable production is also exclusive of potential Coal & Allied asset tonnes. Forecast for 2017 capital expenditure is an estimated \$244 million (equity share).

“In the year ahead, we will continue to progress the development of our open cut operations, while pursuing new marketing and blending opportunities to maximise yields,” Mr Schmidt said.

“Renewed global demand buoyed by improved coal prices will continue to strengthen Yancoal’s performance, as we pursue our future growth initiatives and strategic acquisitions in the best interests of our shareholders.”

A proud history with Yancoal



More information can be found on the Reliable Conveyor Belt website.

RELIABLE Conveyor Belt is an independent, Australian-owned company that specialises in servicing conveyor systems.

It first began operations in 1973 with the express intention of servicing conveyors in regional areas of Australia.

As the company has grown, specialist conveyor services and preventive maintenance strategies have remained its core business.

The company provides innovative solutions in materials handling including but not limited to design, project management, component supply and turnkey constructions.

The team has a strong commitment to providing the highest levels of customer service, no matter the location.

The company offers a full range of

componentry such as idlers, belt cleaners, pulleys, transfer solutions, conveyor belt and wear resistant products and brings together world-class practice to deliver cost effect high speed quality balanced idlers suitable for today’s heavy mining practices that include large tonnage and high speed conveyors.

The company carries more than 3000 meters of stock to ensure swift turnaround on all orders, and its conveyor products range is accompanied by more than 150 staff throughout NSW and Queensland.

Reliable Conveyor Belt is regarded by many in the industry as a leader in the field of conveyor belt installation, maintenance and repair and has the largest footprint of any conveyor company in NSW.



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Experienced & Committed

Established in 1973, Reliable Conveyor Belt has an enviable reputation for excellence and is regarded as an industry leader with branch offices to serve the NSW area. We currently supply to Ashton Underground and Moolarben.

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Mr Richard Flanagan.

Safety focus

Minesafe International 2017 is the premier conference for resource industry professionals responsible for health and safety in the workplace.

Cameron Drummond spoke with **Richard Flanagan** FAusIMM(CP), conference chair of Minesafe International 2017 about what to expect at this year's inaugural event.

What makes Minesafe International 2017 different to other industry conferences?

Minesafe International 2017's focus on health and safety is the key differentiator compared to many of the AusIMM's other conferences.

While the importance of health and safety means that virtually all industry conferences touch on it in some way, Minesafe International brings health and safety to the forefront.

As the industry's premier conference for resource industry professionals responsible for health and safety in the workplace, Minesafe International 2017 will focus on the latest health and safety developments and innovations, and give delegates the opportunity to obtain practical new tools and gain insights that can be used to make the resources industry safer for all workers.

Occupational health and safety is now a specialist function in many industries and as such warrants a conference dedicated to that function.

I expect we will see a continuation of conferences catering for those in that function. This is one of the reasons for The AusIMM to establish the Minesafe conference series in our stable and it is expected to remain a significant one for some time.

Why is this event important to key players in the resources industry?

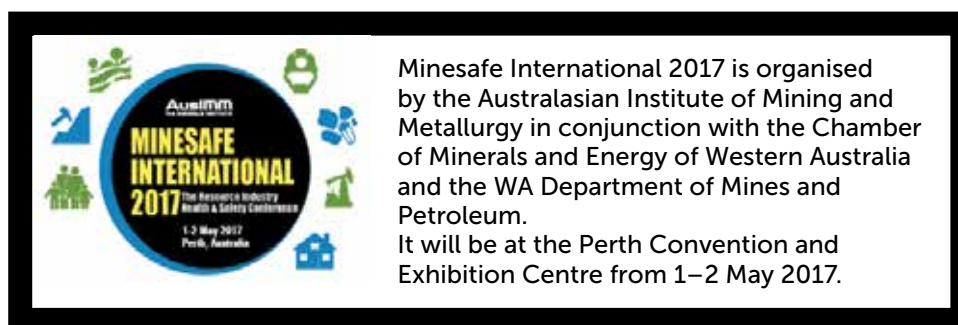
The health and safety of mining employees is of paramount importance to everyone involved in the resources industry.

Significant advancements in recent years have made the industry, which has traditionally been regarded as a dangerous one, safer than at any time in the past.

However, issues such as the mental wellbeing of FIFO workers, coal workers' pneumoconiosis (black lung) and corporate responsibility continue to present challenges to those of us within the industry.

Our duty of care is to our employees, their families and the general public and it is expected that this conference will assist us in that duty.

These issues and many others will be discussed and addressed over the two days of the conference, with the ultimate goal of making all resources industry workplaces as safe as they possibly can be.



The health and safety of workers in the mining industry is always a concern, especially with new technologies and practices being implemented constantly. What learnings can delegates expect?

Minesafe International 2017 will feature a comprehensive technical program that includes papers on the latest health and safety advances and innovations in the mining industry, best practice approaches to safety management and psychosocial hazard management, health and safety case studies specific to the resources sector and the latest developments in legislation and corporate responsibility.

In addition, the conference features an impressive line-up of keynote speakers that includes some of the leading figures in health and safety from organisations such as Rio Tinto, Newmont and Woodside Energy.

These speakers will provide delegates with a unique insight into the health and safety practices of some of the world's leading mining companies.

Papers and keynote presentations cover case studies and lessons to be learnt and include: the black lung review; open pit operation in Laos; open pit operation and shaft recovery in North America; neuroscience and the subconscious brain; structural failure; similarities and differences in the approach to health and safety by minerals, oil and gas; Deepwater Horizon oil field disaster; the globalisation of regulatory and legal action; International Organization for Standardisation's (ISO) relation to safety and corruption; corporate governance responsibilities; and crisis management and response with reference to international and Australian recent examples.

How can delegates benefit from networking at Minesafe International 2017?

As a conference that will bring together many of the leading health and safety practitioners in the resources industry, Minesafe International 2017 presents a fantastic networking opportunity for all delegates.

The conference will bring health and safety professionals, site managers, researchers, regulators, legislators, consultants, engineers and other resource industry professionals together to meet with their peers, discuss the latest developments in the sector, and learn about new innovations that could lead to important health and safety improvements in the workplace.

While the majority of authors and keynote speakers are drawn from Australia they have considerable international exposure and among all the authors and keynote speakers twelve are from other countries including: Netherlands, the US, Lao People's Democratic Republic, Finland and the UK.

This adds significantly to the 'International' aspect of the conference and to the networking value to delegates attending Minesafe International 2017.

Do you have anything else to add?

While the resource industry has made significant improvements to health and safety in recent years, there is still much work to be done to ensure that employees are always able to return to their loved ones at the end of the workday.

Conferences such as Minesafe International 2017 will help the industry to achieve this goal by allowing health and safety professionals to share knowledge, promote best practice and learn from the experiences of their peers.

Many of us have for some considerable time referred to safety as a 'way of life' and that applies equally to health.

This conference has made a significant step in promoting the health aspect in the themes for the conference.

That, coupled with the duty of care fits in with another phrase I have used extensively over the last fifty year which broadens the function (of health and safety) and compliments the way of life, it is: 'health & safety begins at home'.



The Tropicana processing plant.

Exploration ramp up

Development delays at Independence Group's Nova nickel project have overshadowed impressive results at its Tropicana JV gold project.

CAMERON DRUMMOND

KEY production and development milestones were achieved at Independence Group's (IGO) gold and metal projects during the last six months.

Record ore production was achieved at IGO's Tropicana JV in the December quarter, and the company's base metal projects all came in at lower than guidance operating costs for the first half (H1) of the FY17 financial year.

The company also utilised part of its \$33 million FY17 budget for exploration activities across its operations during the period.

Conversely, project setbacks at its \$443m Nova nickel project hampered production guidance and caused IGO to delay the mine's ramp-up to full production.

Nova

The Nova nickel project was acquired by IGO during its \$1.8 billion takeover of Sirius Resources in September 2015, and once completed, will comprise of a 1.5 million tonnes per annum (mtpa) underground mine and 1.5mtpa processing plant, with an initial mine life of 10 years.

Located in the Fraser Range, 120km east of Norseman, WA, the project was 93 per cent complete by the end of FY16 – on schedule and on budget – to produce first nickel concentrate by December 2016.

The company did so, and during that month's quarter had begun its first round of underground exploration as it continued a ramp up to full production.

First saleable concentrates were produced, with 2554t of nickel delivered to BHP Nickel West before period end.

"At Nova, the commissioning of the processing plant has proceeded extremely well but, as anticipated, is currently constrained by supply of ore," Mr Bradford had said at the



\$50m for exploration has been flagged for the 2018 financial year.

end of January.

"We expect that sufficient underground development will have been completed around mid-2017 in order to ramp up underground ore mining to a consistent 125,000 tonnes per month, at which point we will be able to consistently feed the processing plant," he said.

This, however, was not to be the case, as a shortfall in development progress had possibly pushed back Nova's production timeline a further six months.

"Over the past three to four month period to the end of January 2017, underground development rates at Nova had been lower than planned and this has deferred access to higher grade, larger stopes planned to be mined from [mid-year]," the company said in a statement.

IGO said it was working with its underground mining contractor Barminco to make up for the delay and would update FY17 guidance sometime in April once an updated schedule had been completed.

Plans to speed up development by

Barminco and IGO include the addition of a fifth Jumbo drill.

IGO said it would update guidance in early April 2017 once Barminco was operating at design development rates and the mine schedule could be updated to reflect progress, although it was unlikely to meet its original FY17 guidance and may be up to 5000t lower than originally envisaged.

Tropicana

IGO's (30 per cent) and AngloGold Ashanti's (70 per cent) Tropicana JV gold project enjoyed exploration success during the first half (H1) of FY17.

Progression of value enhancement studies at the project's Long Island deposit resulted in a 58 per cent increase in ore reserves and a more than 75 per cent increase in life of mine value.

This, combined with lower than guidance operational costs and record production levels has given IGO good reason to expect solid cash flow for future developments.

As at the end of 2016, the Tropicana gold mine – 330km north east of Kalgoorlie – had upgraded mineral resources of 148.1mt of ore at 1.68 grams per tonne (g/t) for 8.02moz of gold, and ore reserves of 60.1mt at 1.97g/t for 3.8moz.

A record 1.89mt of ore at an average grade of 2.24g/t of gold was processed during the quarter and average metallurgical recovery was 89.2 per cent for 121,195oz of gold produced.

The JV achieved better than guidance all-in sustaining costs (AISC) of \$1051/oz during the December quarter.

Tropicana's owners also commissioned a new 600t class hydraulic mining shovel in efforts to improve efficiency and cost of open pit material movement up to a mining rate of about 80mtpa.

The company said the JV would continue its Long Island study to deliver further mineral resource growth by the end of FY17, and increase plant processing from 7.7mtpa to a rate of 7.9mtpa.

"Tropicana continues to deliver excellent results, with gold production, cash costs and all-in sustaining costs all ahead of guidance, while the Long Island optimisation study continues to demonstrate significant upside to ore reserves and mine life," Mr Bradford said.

Production guidance for the rest of FY17 remained unchanged, with Tropicana targeting a financial year production total of between 390,000oz and 430,000oz at a higher end of guidance AISC of between \$1150/oz and \$1250/oz.

IGO said that capitalised waste stripping at Tropicana would increase \$7m to a revised forecast of between \$37m and \$43m due to accelerated mining rates and grade streaming.

Improvement capital would also increase, up \$5m to a revised forecast of between \$7m and \$8m in order to deliver an extra 200-400ktpa plant throughput by the end of this year.

Jaguar

300km north of Kalgoorlie lies IGO's wholly-owned Jaguar zinc-copper project, which it acquired in 2011.

Jaguar revenue was 49 per cent higher during the December quarter, resulting from higher zinc concentrate shipments.

The result included three 10 kilotonne (kt) zinc concentrate shipment sales for 12,197 payable tonnes – 208 per cent higher than the previous quarter. In addition, a 5kt copper shipment sailed in December.

8331t of zinc and 8689t of copper was produced during the December quarter, down from the previous quarter.

“At Jaguar, and as indicated during the previous quarter's results presentation, production was weaker during the December quarter, however we expect this to improve during the second half and have left full year guidance unchanged,” Mr Bradford said.

On the development front, in-mine exploration recommenced during the quarter at the Jaguar mine, with diamond drilling having completed at the Triumph prospect.

“The results from the resource definition drilling program on the upper lens of the Triumph deposit (the Stag Lens) are encouraging with strong zinc mineralisation encountered,” Mr Bradford said.

Mr Bradford said exploration would continue during the March quarter, with work under way to deliver a maiden mineral resource and pre-feasibility study by mid-year.

“The drilling has confirmed grade continuity with work commencing on delivery of a pre-feasibility study to capture the Stag Lens within the Jaguar life of mine plans.”

Long

Acquired from BHP Nickel West in 2002, the Long nickel mine 65km south of Kalgoorlie has since produced more than 128,000t of contained nickel.

Long has a current life of mine plan of 12 months and a reserve base to support between 2 and 3 more years of operation.



WITH A BUDGET OF \$33M THIS FINANCIAL YEAR AND A GROWING WAR CHEST, IGO ANNOUNCED IT WOULD ALLOCATE \$50M FOR EXPLORATION IN FY18.

The Jaguar zinc-copper project north of Kalgoorlie.

During H1 FY17, Long produced 4229t of nickel, exceeding both production and cash cost guidance.

Exploration drilling during the period had proved unsuccessful at the Victor West prospect, however IGO said it would continue exploration to increase mine life with a capital exploration expenditure of between \$1m and \$1.5m, testing targets near the existing mine development.

Financials

IGO's total revenue for the December 2016 quarter was \$128.5m – a 36 per cent increase on the previous quarter – primarily due to

higher zinc concentrates from Jaguar and increased gold sales from Tropicana.

Tropicana gold sales increased 47 per cent from strong production results combined with additional sales of gold doré that was unsold by the end of September last year.

Additionally, improved commodity prices saw the average sale prices of copper and zinc improve 12 per cent and 13 per cent respectively from the previous quarter.

With the knowledge of an expected bump in production and revenue, IGO repaid \$71m of debt during the period, reducing outstanding debt down to \$200m

and leaving cash on hand at \$109.2m.

Additionally, a fully franked interim dividend of 1 cent per share was paid to shareholders on 27 March.

With a budget of \$33m this financial year and a growing war chest, IGO announced it would allocate \$50m for exploration in FY18.

The company said it would increasingly focus on generative and greenfields areas, spending nearly half its kitty at provinces that could reap multiple gold and base metal projects.

It also planned further development of its Tropicana, Nova, Long and Jaguar mines.

The complete contractor

GR Engineering Services is an ASX-listed engineering design and construction contractor specialising in fixed price engineering design and construction services to the resources and mineral processing industry.

With its core team having worked together for more than 25 years, GR Engineering has a long history of successfully completing the engineering design and construction of projects for a diverse range of clients; including global mining houses, mid-tier miners and junior developers undertaking their first project.

Traditionally an engineering, procurement and construction (EPC) contractor, GR Engineering also has the ability to contract through a variety of models, including EPCM and hybrid arrangements.

GR Engineering also provides a diverse range of process engineering consulting services, including feasibility study preparation and management, process design, and peer review engagements.

These services have been delivered for projects globally and play a key role in providing organic growth opportunities through design and construction project execution.

Processing plant design and construction

GR Engineering's reputation has been built upon the reliable delivery of mineral processing plants – both on time and on

budget – with the consistent achievement of safe operating outcomes.

It has designed and delivered the majority of gold processing plants constructed in WA since 2007; including Higginsville, Randalls, Edna May, Andy Well and Deflector.

The company's expertise also extends to complex base metals processing plant design and construction, as well as facilities to process industrial metals and bulk commodities.

Relevant recent experience includes the engineering design and construction of the Nova nickel project, Wetar copper project (EPCM), Keysbrook mineral sands project, Hemerdon tungsten project and Paraburdoo moisture reduction project.

GR Engineering has also been involved in numerous brownfields expansions associated with significant mineral processing operations throughout Australia and across all major commodities, to deliver step change efficiencies to a number of assets.

Studies and consultation

GR Engineering has managed and delivered engineering studies for a range of projects across various commodities and geographic locations.

The company has a proven track record of managing projects from early stage conceptual phase, through all tiers of feasibility studies and into project execution.

GR Engineering has completed a large



GR Engineering can design and deliver on a variety of mining projects across Australia.

number of bankable feasibility studies; and, with the benefit of this involvement, can often progress projects into design and construction delivery with the offer of process design and performance warranties.

The company is highly regarded by leading financiers and lending institutions to the resources industry that require certainty in all project outcomes.



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A successful upgrade

New mill grinds down costs and boosts efficiency at Savage River in Tasmania.

GRANGE Resources Limited owns and operates Australia's largest integrated iron ore mining and pellet production facility and is the country's oldest magnetite producer.

Located 100km southwest of Burnie in north western Tasmania is the company's Savage River magnetite iron ore mine and concentrator.

An overview of the "from mine to metal" process at Savage river starts with the crushed, stockpiled magnetite ore being transported via a tunnel system and fed into the concentrator. Here the ore is initially ground in two Hardinge 9.75 x 3.66 metre autogenous (AG) mills, followed by two Nordberg 8.84 x 3.96 metre ball mills.

Magnetic separators then isolate the magnetite from the gangue (valueless adhering rock), with the fine-particle gangue being pumped to tailings dams.

The rich iron concentrate slurry is pumped via an 83km pipeline to the pellet plant at Port Latta.

The company ranks the reliability of product supply, quality, and volume, combined with aggressive pricing, as vital interdependent ingredients to successfully operate in the highly competitive iron ore market.

Wayne Peck, Grange Resources' Engineering Superintendent, explains: "From an operation perspective each of these factors have to be consistently met, with little margin for error."

"Starting from the pit, right through to the end of the ship loader, our customers' requirements are our focus – 'from mine to metal' as we say.

"Reliability of supply depends on the performance of our personnel and the processing equipment they use; whilst remaining price competitive depends on keeping our costs in check. Energy is our biggest cost, and an area where even small changes can have a big impact."

A need to upgrade

The two Hardinge AG mills were originally installed in the late 1960's, and by 2005 maintenance personnel noticed cracks starting to appear in their shells and cones. The mills required ongoing repairs which resulted in plant down time and there was always the risk of a catastrophic failure.

With the mine's operation expected to extend till at least 2034, Grange's management team decided that in order to ensure concentrator reliability and to improve output efficiency, these mills would need to be upgraded.

In 2011, the company awarded Metso an \$8 million contract to engineer, supply, install, and commission the first of two planned new mills.

The project scope involved increasing production volume with a new rotating element that would accommodate a charge weight of 344 tonnes, but with the requirement to use the existing footprint and some of the components from the original 1966 mill.

This specific requirement introduced a great deal of complexity to the design. A



"THE OUTCOME IS A NEW MILL, WHICH TOGETHER WITH THE NEW DRIVE SYSTEM, WILL PROVIDE THE PLANT WITH 19 PER CENT MORE CAPACITY."

high level of detailed analysis to assess the impact of increased stress due to the new larger rotating element was required. A key to the success of the project was the review of the bearing housing structure and ensuring adequate lubrication.

Contract Award

Metso's overall experience in mill design and manufacture has been accumulated from the companies that it acquired over the years. Hardinge was one of these acquisitions, so Metso had the original design drawings as well as extensive

experience and intimate knowledge of these mills. The plant's Nordberg ball mills are also a Metso product. The company's expertise held it in good stead to take on the project.

Tim Dunbabin, Grange Resources' Senior Project Engineer, comments on the decision to award the contract to Metso: "Our engineering team had done a great job of extending the mill's 20-year design life to over 45 years. So whilst there is no doubt that the mill was at the end of its life, we mainly needed better reliability and efficiency."

"Metso had been involved in many of

the repairs to the old mills, and so, we had first-hand experience of their expertise, capabilities and service levels. This, together with the Hardinge mill design being Metso's intellectual property, really helped to mitigate our risk."

Wayne Peck cites Metso's ability to offer a complete package as a key deciding factor.

"Whilst we were familiar with Metso's capabilities, for me the main decision lay in the overall package. Although other suppliers had the elements of good expertise or comprehensive equipment supply, when we looked at Metso we had the whole project covered. If we had an issue, we would only need to direct questions to one point of contact."

Unique design constraints

The original mill was based on a single shell design, and although it had lasted more than 45 years, the new design had to be stronger to ensure trouble-free operation beyond the mines expected lifespan of 2034.

So in the first instance, Metso's new design replaced the single cone-shell with a two-piece structure that was 3.6 metres wide (distance from feed to discharge) and featured long-life Polymet rubber liners.

To provide sufficient space for these liners, the new mill had to be 10 metres in diameter, 30cm larger than before. The larger shell, together with thicker stronger steel construction, meant that the new mill was 20 per cent heavier than the old one.

In order to avoid the need for additional civil works and to keep costs down, the new mill had to be installed in the same position as the old one. To ensure that the existing structure could accommodate the extra weight and size of the new mill, Metso had to perform extensive FEA's (finite element analysis) and carefully consider alternate designs.

Key to the successful design of the new mill was the ability of the mill's bearings to cope with the increased weight. A simple overview of the bearing components helps to explain how important this aspect was.

Starting from the centre and working outwards, first is the trunnion, the shaft that extends out on both side of the mill and which passes through its axis. The trunnion rests on a bronze bush that provides the bearing with its crucial lubrication. The bronze bush is supported inside the bearing housing by the rocker. As its name suggests, the rocker allows the mill very small lateral movements from side to side along its spin axis. Important to note is that the trunnion rolls in a 0.2-0.4mm film of oil that is pumped at high pressure through ports in the bronze bush.

Because no civil work could be considered, stiffening the bearing could only be achieved by thickening the rocker and the brass bush. The increase in load and reduction in bearing clearance meant that the force per unit of area (pressure) increases. Then of course there was the additional weight that also had to be taken into account.

John Aran, Metso's Grinding Product Manager, explains: "Making it strong enough was the easy part, next we had to design a lubrication system that would keep the trunnion suspended above the bronze bush with a 0.4mm thick oil film. There are no off-the-shelf designs for this, so designing an effective and reliable lubrication solution that included a custom-built cooling and filtering system, involved input from Metso's experts across the globe."

"Just imagine pumping oil at 10,000 kPa at a rate of 15 litres per second to achieve a 0.4mm thick film that needs to lift and support a rotating element 10 metres in diameter and weighing over 500 tonnes on each bearing. There are so many interdependent variables, providing a solution to this unique arrangement gave us all a great sense of achievement," he said.

The base plates that the mill's bearings sit on, also presented an engineering challenge; they had a flatness tolerance of 0.13mm over the entire surface, with a 0.025mm tolerance over an area of 300 x 300mm. The parallelism tolerance between the top and the underside surface was just 0.13mm.

Such precise tolerances are even difficult to achieve in a controlled environment like a machining workshop.

Brian Bunch, Metso's QA Engineer, explains: "Because all the work would be carried out in the field rather than in a workshop, I was keen to see how closely the team would achieve these tolerances in an operational site environment where the base plates had to be positioned using site surveying equipment."

"The attention invested into these fine details by the project team, resulted in an almost effortless installation. Once the sub-sole plates were aligned correctly, the base plates were lowered into position and



there was no need for any shimming or additional "tweaking" to attain the required flatness."

Engineering challenges

Dan Tonks, Grange Resources' Projects Design Engineer, was deeply involved in the design aspects of the plant's infrastructure upgrade which had to facilitate and perfectly match the new mill's design.

Talking about the design challenges he faced, Dan says, "It might sound straight forward, but the infrastructure upgrade consisted of components sourced from different manufacturers located all over the world."

"Together with Metso, we invested in a lot of interactive and iterative planning to make sure everything matched up. An

error in the most minor detail, for example bolt-hole sizes, could be a disaster for the project. So there was a sense of pride, and relief too, when everything came together and matched up so perfectly," he said.

Work space during the dismantling of the old mill and the construction of the new mill was a major challenge.

Frank Lovell, Grange Resources' Engineering Manager, comments: "Originally the mill was built first and then the building was built around it. So working on removing the old mill and installing the new mill within the existing building presented major restrictions."

"We had lifting weight and size limits, as well as difficult work access. The fact that the whole project was completed without a single safety incident is a credit to the way Metso's design addressed these construction complexities."

Big wins for efficiency and safety

Talking about the success of the project, Steve Searle, Metso's Regional Manager for Mining Services says, "Metso didn't just supply the components and technical expertise for the installation, we were an integral part of Grange's engineering team. This approach makes such a big difference on a project like this. We worked through all of the issues together to ensure that the installation ran smoothly and on time."

"The installation process was developed with the Grange team, and we performed each operation as a unified team. The outcome is a new mill, which together with the new drive system, will provide the plant with 19 per cent more capacity."

Wayne Peck also highlights how the close inter-company team work maximised efficiency and cost reductions.

He says, "Working so closely together on the project meant that Metso could assist us to look at the design of the project as a whole, not just to consider the quickest or lowest cost solution, but to look at improving quality and throughput, reducing running costs, and overall long term maintenance."

Dan Tonks, the Project's Design Engineer reviews the outcomes of the project: "Efficiency is a big benefit that has been gained from this project. The mill is now grinding more, using the same power."

"Equally as important for Grange, are the safety benefits that the new mill has provided. In particular, both our staff and contractors have praised the new mill's better overall access and larger size work area. The guarding on the rotating elements is greatly improved and easier-to-handle. In my view, the project receives big ticks for safety, efficiency, and cost reduction."

Minimising operating costs top of agenda

WHILE last year's iron ore price hike resulted in many Australian companies feeling more confident about their financial future, more prudent businesses are tightening their bootstraps in the shadow of the mining bust.

This mindset has led to more innovative ways of thinking across the resources sector, as well as associated industries like construction, civil works and manufacturing; particularly in the area of operational machinery and processes.

Long-term hire company, Axis Hire, has been at the forefront of this kind of innovation, working closely with clients to devise customised solutions for the provision of vehicles, trucks and plant equipment.

For the last decade, Axis has been providing out-of-the box thinking for clients in the mining, civil and construction industries and forming close partnerships with clients to anticipate their hire demands in an ever-changing economic climate.

"Right now, companies are looking for ways to reduce their operating costs and one of the most effective ways to achieve that, is to keep maintenance costs down," Axis Hire managing director Mark Cates said.

Axis Hire offers the latest fleet of vehicles and equipment in Australia.

By providing clients with the latest, purpose built equipment; and adopting industry-specific knowledge to its hiring solutions, the company has successfully helped clients reduce downtime and manage maintenance costs.

"Our business model is solutions based," Mr Cates said.

"Offering a fleet that's up-to-date is good, but the real value for our clients is in the custom builds.

"This means we're able to provide a



More information can be found at www.axishire.com.au or by calling (08) 9791 8330.

vehicle that's tailored to their project – in short, they are able to operate more efficiently."

As the market shows signs of

strengthening, it's just as important now as it was before to find ways to reduce operational costs; not just for the cost savings involved, but for the environmental

benefit too.

Axis Hire can help businesses optimise processes and reduce running costs with customised long-term hire solutions.

Cleaning under conveyors made easy

SPECIALISED handling electric vehicles developed by Movex Innovation in Canada have now started to doze their way into the Australian market.

Hasemer Materials Handling (Hasemer) is proud to be the exclusive distributor of these electric radio remote vehicles in Australia.

The Track-O base model allows for material handling in confined spaces, up and down stairs, and all rough terrain.

Track-O can carry loads of up to 500kg on a 40 degree incline, and allows for loads of up to 1000kg on flat terrain surfaces.

One of the most popular models brought into the Australian market is the Mini Dozer AL-48.

A common problem confronted by the mining industry is the inability to remove the overflow of solids and dust that occurs underneath pot lines and conveyors. The Mini Dozer AL-48 has removed this problem.

With its narrow width design of 1219mm and low height from the ground of 559mm, the AL-48 is able to be used in the most of confined spaces without the need to shutdown conveyor lines, thus increasing productivity.

One Australian location where the AL-48 is currently being successfully utilised is at the Tomago Aluminium smelter near Newcastle in NSW.

Tomago Aluminium services superintendent Shane Cook said the AL-48 had really increased productivity.

"We use our Mini Dozer machine to clean under the potlines and it does an excellent job on a daily basis."

More information on the MiniDozer AL-48 or any other Track-O models can be found by contacting Joe Johar at Hasemer Materials Handling on (02) 9771 9848 or 0427 395 175.



The Track-O mini dozer.

When low-quality fuel is not an option

FUEL Technology has been working within the mining and transport industries for more than 30 years.

Following a sole Australian distribution agreement with world leading filtration manufacturer DieselPure, Fuel Technology is set to drive fuel cleanliness to new heights.

"Poor fuel quality or contaminated fuel is a major cause of engine failures while also increasing fuel consumption and emissions," Fuel Technology stated.

"At Fuel Technology we are focused on helping industries achieve the best possible fuel efficiency therefore reducing operating costs and lowering emissions."

DieselPure filters were specifically designed to address the changes in today's ultra-low sulphur diesel (ULSD) and ULSD/Biodiesel blends, where a new hidden problem within storage and fuel systems has been identified; emulsified water.

Tested to industry standard SAE J1488 2010, DieselPure filters have been proven to remove not only contaminants down to 0.2 of a micron and free water, but also 100 per cent of harmful emulsified water from ULSD and 96 per cent from Bio-Diesel blends.

No other bulk diesel filter has been proven to achieve this.

"With modern engine fuel systems operating at high pressures and fine tolerances, diesel that is clean and moisture free is no longer an option, but a necessity," the company stated.

"DieselPure filters have a two-stage design, firstly allowing fuel to flow through internal core media to filter out large contaminants (dirt, microbial growth, etc.)."

"Fuel is then passed through the specially engineered layers of pleated media to remove



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

emulsified water and fine particulates."

Fuel Technology supply a range of DieselPure fixed systems to suit any bulk diesel application, while also providing

a mobile tank cleaning service to ensure storage tanks are clean and moisture-free.

Storage tank maintenance is critical to ensuring clean fuel.

Fuel Technology and DieselPure have set a new standard in diesel filtration and are recommended for all diesel storage tanks where fuel quality is paramount.

Innovative engineering solutions

AUSTRALIAN-owned and operated company Leverlink has been a household name in the design and manufacturing equipment industry for more than 30 years.

The Brisbane-based company provides world-leading engineering solutions for the mining, quarrying and associated sectors that are designed and manufactured in Australia to ensure the highest quality is maintained and customer deadlines are adhered to.

Leverlink's core business is in the creation of rubber torsion springs that are incorporated into products such as motorbases for tensioning vee belt drives, dynamic impact beds for conveyor load zones, and chain tensioners for large drives.

Some of its products also include suppression systems, conveyor guarding, screen supports, work platforms, tilt idlers, pump frames and support structures, and hybrid guards.

"Our manufacturing process is built with an emphasis on quality, not quantity," Leverlink managing director Richard Sharp said.

"Quality driven manufacturing, along with a passion to work closely with our customers, allows us to deliver superior products across Australia and throughout the globe.

"We provide products that improve safety to the most hazardous



A Leverlink dynamic impact bed in action.

environments in the world; safety is the foundation of our existence."

The experienced team work onsite and offsite carrying out a range of

services from product inspections and refurbishments, to installation and commissioning, engineering design and drafting, and custom fabrication.

"We also provide after-sales product support and do our best to ensure every customer is a returning customer," Mr Sharp said.

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Corrosive liquid mine pump

A new cast 316 stainless steel self-priming centrifugal pump has been introduced to handle corrosive liquids in mining applications.

The new range of mine pumps are close coupled electric drive and feature high efficiencies for both high and low head applications.

Introduced by Australian Pump Industries, the pumps are designed to answer a serious need in mining and chemical industries for cost efficient, ISO9001 quality products capable of handling contaminated and corrosive liquids.

"This product line has been developed for mine tailings and other difficult mine liquids including light slurries," Aussie Pumps product manager Neil Bennett said.

"We perceived a major market opportunity for a top quality stainless steel pump at a realistic price and built strictly in accordance with our quality culture."

The first pump to be introduced is a 5.5kW, 3" pump that delivers a maximum flow of 910 litres per minute, with the added ability to handle solids to 10mm.

Like all of the Aussie GMP range, the pump is self-priming with the ability to draft water from depths of 6 metres.

The maximum pump head is 40 metres making it ideal for high pressure water transfer or even machinery wash down.

Power for the machine comes from a 5.5kW TEFC 3 phase, 2 pole electric drive motor.

Pump and motor are installed from the factory on a heavy duty steel base for ease of installation, with optional stainless steel or hot galvanised steel



Aussie's new line of mine pumps are perfect for mine tailings and wash stand applications.

bases available on request.

"The pump's big advantage for miners is its ease of repair in the field and simplicity of operation. Even changing the seals is simple," Mr Bennett said.

"The pump is close coupled to the motor with a 316 stainless steel stub shaft. Disassembly of the pump body from the motor is a matter of minutes giving access to the pump chamber for clean out or service," he said.

The secret of the pump's excellent

self-priming characteristics are the big 'shoulders' in the priming tank incorporated in the unit's design.

The high mounted suction port also helps fast self-priming without the need for additional aids like vacuum pumps or compressors.

The new pump is available in nickel aluminium bronze as well with a semi trash version available in the cast iron configuration.

Its heavy duty mechanical style

seals come with Nitrile elastomers; with optional viton and silicon carbide available on request.

The first pumps are going to Kalgoorlie where they will be used for mine tailings and wash stand applications in high PH level liquids.

Further information – including a free data pack – is readily available from Australian Pump Industries or Aussie Pump Distributors throughout Australia, or at: www.aussiepumps.com.au.

THE AUSTRALIAN MINING REVIEW

HIGH VISIBILITY

www.miningoilgas.com.au

Turning night into day

Energy saving is only the beginning

While the energy saving benefits of LED lighting are widely known, new generation LED technology allows WADCO LED fittings to be completely reimagined and redesigned to client needs, giving rise to numerous advantages in addition to energy savings.

Directional lighting

One of the recurring frustrations of HID fittings is uncontrolled spill. New generation LED technology allows WADCO LED fittings to be tailor-engineered with superior cut-off capabilities to focus light on specific areas requiring illumination thereby eliminating unwanted spill and direct glare.

Colour consistency

HID and earlier generation LED fittings are notorious for the significant colour deterioration that occurs as they age. New generation LED technology, on the other hand, ensures WADCO LED fittings deliver consistent crisp clear light during the lifecycle of the fitting.

“Turtle friendly” solutions

Coastal environments are increasingly difficult to illuminate because of growing sensitivity around the impact artificial lighting may have on coastal areas. WADCO LED fittings ensure the correct wavelength of light is delivered in accordance with regulatory requirements.

Reduced maintenance

New generation LED technology delivers significantly improved reliability and longevity compared to HID light sources and earlier generation LED technology. Reputable manufacturers warrant their technology for



WADCO LED fittings deliver crisp clear white light in the background.

a minimum of 5 years. WADCO LED fittings correctly installed have a life span of at least 10 years and allow a “set and forget” approach to facilities lighting management.

Auxiliary lighting

WADCO LED fittings can incorporate an inverter and battery unit which provides auxiliary lighting for up to 3 hours in the event of external power loss.

Lighter smaller fittings

New generation LED technology is both much smaller and lighter than traditional HID light sources. Miniaturisation of technology allows WADCO LED fittings in stainless steel and aluminium to be less in size and weight than their HID counterparts. Reduced size and weight makes installation easier and imposes less fatigue on lighting support infrastructure.

HID Retrofit Options

The lifespan of HID fittings can be extended and improved by replacing the HID light

engine with a WADCO LED retrofit kit without having to replace the existing HID fittings.

Coal Ship Loader – A picture is worth a thousand words...

The photograph of a recently commissioned coal ship loader visibly contrasts the crisp clear white light of the WADCO LED fittings on the coal ship loader above in the background with the uncontrolled spill of the HID dock lights in the foreground.

The absence of spill or glare reflects the superior cut-off characteristics of WADCO LED fittings.

In addition, WADCO LED fittings deliver well-defined directional light distribution ensuring uniform illumination. Constructed from 316 stainless steel, WADCO LED fittings offer the owners of the coal ship loader superior performance, guaranteed longevity and the ability to future-proof their investment.

More information on WADCO Lighting can be found by visiting: www.wadco.com.au.



Blueprint Wealth financial advisor Brad Martin presenting at the Kanowna Belle mine site in Kalgoorlie, WA.

A blueprint for wealth generation

THE mining industry has experienced a slowdown for the past couple of years, and as wages and jobs become tighter many people in mining have used this period as an opportunity to make sure they are getting ahead financially.

Many people seeking advice from Blueprint Wealth complain that they do not feel like they are making the most of their current income.

They feel as though their time spent in mining earning high wages should have them in a better position than they currently are.

The team at Blueprint Wealth are big believers in not being able to change the past, but learning from it.

“Working in the mining industry can be lucrative and we see many high income earners establish large amounts of investments; these people work hard and don’t have a lot of time to spend in this area so they use a company like ours that specialises in building wealth,” Blueprint Wealth director David Baruffi said.

Financial planning is about looking at an individuals’ current situation, working out what is best for them, then helping that person put that best practice into place.

Every good financial plan needs to be regularly reviewed. Situations change – it could be a person’s job, income, house upgrades or having another child. All of these impact the original plan put in place.

Blueprint Wealth can assist people to make the most of their incomes and help them feel like they are getting ahead financially and not just “spinning their wheels”.

The company sits down with clients and puts plans in place to get them on track to maximising their financial position.

Over time, Blueprint Wealth can show people the benefit and reward of sticking to their tailored strategy.

Blueprint Planning Pty Ltd (ABN 78 097 264 554), trading as Blueprint Wealth, is an Authorised Representative and Credit Representative of AMP Financial Planning Pty Ltd, Australian Financial Services Licensee and Australian Credit Licensee.

This article contains information that is general in nature and does not take into account your objectives, financial situation or needs. Therefore, before making any decision, you should consider the appropriateness of the advice in regards to those matters.

Renewable energy solutions for mine sites



Vector Energy has one of the largest energy storage teams in Australia.

VECTOR Energy, part of the Vector group in New Zealand, is bringing its proven track record in the integration of energy storage solutions to the Australian mining industry.

Vector Energy has one of the largest energy storage teams in Australia.

Utilising their knowledge, experience and technology, they can design, install, commission and integrate robust and fit-for-purpose solutions for mining’s most stringent applications.

Delivering practical end-to-end solutions for its customers, Vector Energy has a

full service offering including energy storage integration utilising innovative battery technologies, renewable hybrid power systems and microgrids, solar power generation, virtual power stations, performance monitoring and control and project financing options for approved customers.

Vector Limited is leading the integration of disruptive technologies and has integrated one of the largest energy storage systems in the Southern Hemisphere utilising Tesla Powerpack.

In October 2016, Vector integrated a 1MW/2.3MWh energy storage system on a substation that could help to reduce peak demand, extend the life of the substation and provide supplementary power to improve reliability.

In terms of investment, it also allows Vector Limited to defer large-scale expenditure in conventional infrastructure that may in time become obsolete.

Vector Energy will work with individual clients to understand their businesses’ energy needs and offer a tailored solution.

Smaller, lighter, faster laser scanners



The new I-Site XR3 is ideal for large open pit survey, geological mapping, stockpile volumetrics, wall stability monitoring and design conformance.

MAPTEK'S I-Site 3D laser imaging systems are well known for ease of use, accurate results, and efficient data processing.

The latest models, released in March, are 30 per cent smaller and 25 per cent lighter; with 2.5 times faster data acquisition than the I-Site 8800 series.

I-Site laser scanners are protected to IP65 for reliable operation and Maptek is the only Australian developer of terrestrial mine survey equipment.

The extra long range I-Site XR3 acquires data to 2400m with accuracy of 5mm, and a new HDR panoramic camera creates better digital imagery, including

high resolution images for geotechnical analysis and visualisation.

Other new features include snapshot imagery and selectable multi-point returns.

The new I-Site XR3 is ideal for large open pit survey, geological mapping, stockpile volumetrics, wall stability

monitoring and design conformance.

Integrated software and hardware development keeps step with advanced applications for helping mining operations to improve overall productivity and site safety.

More information can be found at: www.maptek.com/xr3.

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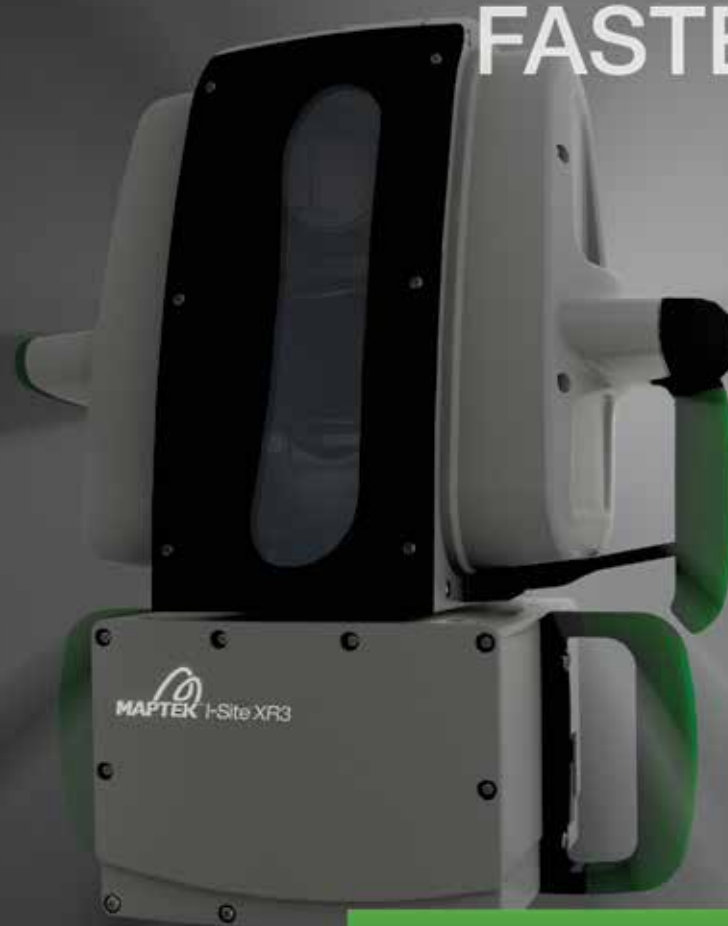
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With extensive industry background totalling more than 50 years, HES Winches Australia engineers know the right questions to ask and the right standards to apply before supplying a customer.

They make sure its winches are the optimum to meet and even exceed customer expectations.

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

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FOUNDED in Adelaide in 1911, Australian-owned Nobles is much more than a supplier of lifting and rigging equipment.

It provides world class services to ensure operations to the resources sector are safe, no matter how specialised or complex clients' requirements are.

Nobles provides testing and inspection, TechInspect, engineering, crane services and electronics to mining projects across Australia.

The company has a team of experienced test and inspection field personnel with the capacity to conduct regular inspections, on-site testing and ongoing maintenance and repairs to all types of mining projects.

It also ensures that heavy, complex lifting tasks are provisioned safely and in a timely manner to avoid costly delays to its customers.

Nobles TechInspect is a complete equipment data management system that enables customers to view their lifting equipment online via the company's secure access website.

The company currently tracks and manages more than 400,000 lifting and rigging products for about 1000 clients.

Nobles' crane servicing department covers a wide variety of projects with the flexibility to service larger and more demanding operations.

Its electronics division has been both designing and manufacturing load cells and load indicating equipment for more than 30 years, and is regarded as a leader in its field.

Nobles has been involved with some of the most advanced lifting projects in



Nobles has been involved with some of Australia's most advanced lifting and rigging projects.

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in-house at one of its 15 nationwide branches, or on-site at even the most remote of locations.



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Cleartech has the largest fleet of specialist waste and recycling vehicles throughout Australia, operating in complete compliance with all industry regulations and providing exceptional service.

Cleartech carries out each task to the highest standards of quality and safety, while striving to minimise costs and reduce client's impact on the environment by diverting material to recovery facilities wherever possible.

The company also provides unique, tailored, on-site solutions to minimise landfill impact at mine sites; in fact, Cleartech can offer options to completely remove existing deposits or the need for an onsite landfill all together.

Cleartech's waste management solutions are environmentally friendly and are designed to have as little impact on the natural environment as possible.

The company prides itself on making a difference to their customer's waste management and ensuring environmental safety.

More information on Cleartech's services can be found at: www.clear-tech.com.au.



Cleartech provides complete end-to-end waste management services.

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IT'S an exciting time for modern helicopter companies to be in business.

Gone are the days where just providing a helicopter and a pilot was sufficient to meet customer's expectations.

The industry demands a more complex environment requiring the integration of quality, health, safety and environmental principles into every aspect of a company's business.

This is where the team at United Aero Helicopters have responded to its client's changing needs by adapting to provide the complete package.

Focusing on servicing the mining, oil and gas industries, United Aero Helicopters has developed mature safety and quality management systems to manage the standards of its operations and ensure continuous improvement across the range of services provided.

As a result, United Aero Helicopters recently achieved BARS Gold Status with the Flight Safety Foundation and the company continues to be a member of the International Airborne Geophysics Safety Association (IAGSA).

Being one of the most experienced aerial work providers in Australia with one of the largest and most modern helicopter fleets ensures it can continuously meet and exceed



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

customers' expectations.

Company director and chief pilot Sam Borg further credits United Aero Helicopters' success to experience, hard work and dedication.

"It starts with years of experience and a sound understanding of the industry, add a careful pilot selection process, a comprehensive initial training program and then consistent check and training to ensure standards are maintained," Mr Borg said.

The range of services offered by United Aero Helicopters includes remote area operations, airborne geophysical surveys, seismic, camp resupply and cargo relocation, aerial construction, gas and utility inspections, emergency services contracts including firefighting using winch-equipped search and rescue helicopters and VIP IFR charter operations.

Complementing these services is United Aero Helicopters' in-house maintenance

organisation, Aerofix, and Part 141 Training School, United Aero Training, which provides ab-initio training for commercial and private helicopter pilots and provides students with a unique opportunity to learn within a commercial operation.

Additionally, United Aero Helicopters also operates the National media helicopters in all Australian capital cities for the Channel Seven and Nine TV networks.



- **MINING SUPPORT** • Drill, seismic, sling
- **MINING SURVEY** • Airborne geophysical, gravity
- **DISASTER RELIEF** • Search & rescue, winch, rappel
- **FORRESTRY** • Fire suppression, fire ignition, agricultural
- **CONSTRUCTION** • Longline Sling, difficult access
- **POWERLINE PATROL / STRINGING**
- **LOCUST SURVEY**
- **CHARTER** • Aerial photography, corporate
- **AVIATION MANAGEMENT** • Consultancy
- **AERIAL SURVEILLANCE** • Fixed wing, hell

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The partner of choice in engineering value

PROJECT Portfolio Management (PPM) has been providing professional project management services to the mining and heavy industrial sectors across Australia since its inception in 2006.

The PPM team of experienced, skilled and highly motivated project professionals partner with clients to identify opportunities and implement solutions.

PPM's capabilities include project management, asset optimisation, feasibility studies, automation and acting as the owners' independent engineer.

PPM believes that successful projects start and finish with the selection of an appropriately skilled and highly motivated team of key individuals.

The directors of PPM have more than a century of combined experience in project management, all having led integrated project teams.

PPM has grown impressively over the last decade by delivering high value specialist services to companies such as BHP Billiton and South32, Fortescue Metals Group, BlueScope Steel and BIS Industrial Logistics.

It has grown successfully despite challenging market conditions, and aims to continue to be the partner of choice by maintaining its low cost, high-value



PPM has delivered high value services to some of Australia's biggest miners.

offerings.

PPM is able to flexibly service client needs under a variety of delivery models,

and can leverage alliance arrangements with specialist partners for specific assignments.

More information on how PPM can deliver its services can be found at: www.ppm.com.au.

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A multi-faceted approach

WA Field Mining Services (WAFMS) is a major maintenance and construction company providing support to WA's mining, oil and gas industries.

As a result of its continued growth, WAFMS has developed individual divisions within the company to better service its clients and provide specialist management, fabrication, and maintenance solutions.

These divisions are led by experienced managers with vast industry knowledge and as a result, WAFMS is able to plan and execute with greater efficiency and attention-to-detail.

The field maintenance division specialises in mechanical and structural supervision personnel, boom welders, boilermakers, fitters, crane operators, trades assistants, and riggers.

Its diesel maintenance team provides ongoing support and maintenance servicing, including major planned shutdowns and mobile servicing, planning and execution, and project management.

The third projects division specialises in machine relocation and demobilisations, assembly and build, field and mobile outages, fixed and mobile plant, and project planning and management.

WAFMS has a strong focus on quality assurance, safety and environment and has corporate membership with the Welding and Technology Institute of Australia, thus strengthening its skill set and fostering continual growth and development.



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

MINING MAINTENANCE **AND** CONSTRUCTION



OUR SPECIALIST DIVISIONS:

Field Maintenance

- Mechanical and structural supervision personnel, boom welders, boilermakers, fitters, crane operators, trades assistants and riggers.

Diesel Maintenance

- Ongoing support and maintenance servicing, including major planned shutdowns and mobile servicing, planning and execution, project management.

Projects

- Machine relocation and demobilisations, assembly and build, field and mobile outages, fixed and mobile plant, project planning and management.



WA FIELD MINING SERVICES

The Park Business Centre, 45 Ventnor Avenue, West Perth, WA 6005
T. (08) 9429 8853 www.wafms.com.au

Skilled mine workforce supply

KCA Site Services (KCA) is a nationwide provider of engineering solutions to the Australian mining and civil industries.

It is an integrated mine services company with a focus on shutdown maintenance, scaffold solutions, labour hire and underground services.

KCA regards itself as a highly professional company that provides skilled services which meet the demands of quality workmanship and timely delivery.

The senior management team has more than 20 years hands-on experience within the mining industry and its expert scaffold teams more than 10 years' experience, combining to provide innovative and efficient outcomes for its customers.

KCA's shutdown labour capabilities range from mobilising 10 through to 180 personnel for any one shutdown.

It has developed a range of recruitment channels that can be utilised to ensure the company maximises its labour force in a streamlined approach, reducing the need for lengthy recruitment lead times.

The scaffold division uses multidiscipline scaffolders who hold accredited high risk qualifications and are subjected to verification of competency (VOC) prior any site mobilisation.

Labour hire has become a major part of KCA's business with multiple clients turning to the company to deliver quality candidates in a very timely manner.

This is due to the mining background of the KCA teams, and knowing what its clients' needs are.

KCA prides itself on providing the right personnel with can do attitudes.

The underground mine services team



KCA is building its reputation as a primary supplier of mining services.

has significant operational experience in underground cable bolting installation, drill hole grouting and white washing of magazines.

The company places extremely high standards on itself and its employees, seeking excellence in every aspect of the business as part of its vision to be regarded the preferred

supplier to the mining industry and an employer of choice.

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



KCA is a Perth based nationwide provider, offering engineering solutions to the mining and civil industry of Australia.

We provide options in:

- Shutdown management
- Scaffolding
- Underground services
- Labour hire
- Fabrication
- Equipment sales
- Wet / Dry hire

Established in 2016, KCA Site Services has quickly grown to be the company of choice in the mining industry.

Call us on 08 6252 9074 to enquire about your needs

KCA
SITE SERVICES

www.kcasiteservices.com.au
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Trusted labour-hire solutions

FOUNDED in Melbourne in 1979, Chelgrave Contracting Australia is one of the longest established labour hire companies in Australia.

As a family run and operated business, Chelgrave prides itself on developing close relationships with clients and employees alike.

It's this personal attention-to-detail, combined with extensive trade background, which gives the company an edge over its competitors.

For more than 37 years, Chelgrave has supplied experienced labour solutions to meet both temporary and permanent requirements, to a wide variety of clients and industries, including food, beverage, rail, oil and gas.

Chelgrave also boasts a technical department that provides professionals to clients across Australia in a variety of disciplines including project and design managers, supervisors, engineers and drafting.

Its experienced technical professionals can provide technical solutions to suit any needs.

Chelgrave specialises in mechanical and electrical trades, shutdowns, maintenance and construction.

At Chelgrave, the team is committed to ensuring clients and employees are correctly matched, and its experience gives clients access to industry experts who have the ability to hit the ground running.

Through its network of offices, Chelgrave has the capability to provide trade and professional people to projects anywhere in Australia.



Chelgrave Contracting is a specialist in supplying quality trades and technical staffing solutions.



Shutdown | Maintenance
Technical professionals
Labour hire | 24-hour service

Chelgrave have offices in Melbourne and Brisbane
For more information please visit
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www.chelgrave.com.au

A full turnkey approach

SINCE 1999, Australian owned Goodline has been specialising in the construction, maintenance and operational needs of the mining, marine, energy and construction industries, offering unique and innovative solutions to maximise the full lifecycle of assets.

With a proud and ongoing association with Australia's leading resources companies for more than 18 years, Goodline's success and reputation is built upon the maintenance, repair and replacement of all components associated with mine and port materials handling infrastructure.

The Goodline approach is to focus on the fundamentals, as it seeks to maintain operating facilities as they were designed and intended to operate.

Its shutdown managers ensure close communication with clients to schedule works, develop effective procedures and programs, engage experienced maintenance crews, and maximise pre-shut opportunities.

Goodline also offers a full turnkey approach to construction and maintenance.

As a true multidiscipline contractor, Goodline has the capacity and experience to complete civil, structural, mechanical, hydraulic, electrical and instrumentation installations and maintenance.

Its business functions continuously seek improvement, are supported by internationally accredited HSE and quality management systems, and its culture is driven by an open and honest relationship with both clients and suppliers.



Goodline prides itself on its reputation for quality mining services.



Specialists in Project and Maintenance Services

Services include:

- Shutdowns and Asset Maintenance • Structural, Mechanical, Piping • Steel Fabrication & Erection • Modular Steel Pre-Assembly
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- Project Management

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Shutdown Specialists

WorkPac has a reliable team of staff ready for your next shutdown project.

As a mining contractor, workforce manager and recruitment leader, WorkPac has over 20 years' experience delivering shutdown personnel.

We understand what is involved in shutdown maintenance from Iron Ore, Coal and Metalliferous mining, as well as in the heavy industrial sector.

From equipment to fixed plant, heavy industrial and manufacturing shutdowns, our ready to work and multi-skill level employees are available to ensure a smooth process, on time and on budget.

WorkPac has built reliable teams of staff across Australia including:

- Project managers
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- HSE managers
- Boilermakers
- Fitters
- Trade assistants
- Riggers
- Scaffolders
- Electricians
- Cleaners & more

Our network of business centres in over 35 regional and metropolitan locations are ready to help you on your next shutdown.



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IMPORTANT INFORMATION

FOR ALL PURCHASING OFFICERS,
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MINING DECISION MAKERS

www.minesuppliersonline.com.au

Contact: Brad Francis t. (08) 6314 0303 e. brad@miningoilgas.com.au

Mine Suppliers Online

Mining data goes mobile

PITRAM Connect software provides insight into what is happening within mining operations at a person's fingertips.

The mobile application allows users to retrieve information about their assets — including people, equipment, production, locations and time allocations — without directly impacting mine control personnel or being in the control room.

Released this month, Pitram Connect saves time, reduces radio traffic and the likelihood of misinterpretation; allowing the mine controller to focus on maintaining data integrity without interruption.

It is designed to ensure connections can be made to Pitram over a mines' wireless network or via a mobile carrier.

This flexibility allows users to access mine information while offsite, waiting at the airport for a handover, or for the dedicated personnel.

Pitram Connect provides piece of mind and allows controllers the visibility to see that operations are on track while away from site.

Mining software specialist MICROMINE does not believe in locking or obfuscating data collected, and as a result, Pitram specialists have developed Pitram Restful Integration Services (PRIS) to allow third party software



Pitram Connect provides mobile connectivity to operational mining data.

applications to submit and retrieve Pitram data without needing direct access to the database.

Based on current industry standard

integration technology, PRIS enables any organisation to easily incorporate Pitram data into its enterprise information systems.

Utilising this technology, systems can extract data from Pitram without the need for in-depth knowledge of how Pitram data is stored and without risking data integrity.



Pitram Connect allows your mining data to go mobile

Pitram Connect provides insight into your mine at your fingertips. The mobile application allows users to retrieve information about their assets; people, equipment, production, locations, without directly impacting mine control personnel or having to be at a workstation.

Pitram Connect saves time, reduces radio traffic and misinterpretation, allowing the mine controller to focus on maintaining data integrity without interruption.

MICROMINE 174 Hampden Rd, Nedlands WA 6009 Australia T: +61 (0)8 9423 9000 E: marketing@micromine.com micromine.com



Hose reels for harsh environments

FINDING hose reel solutions that will meet all expectations can be difficult, but REEL TECH has the answers.

“Can you control your hose reel rewind speed?” REEL TECH stated.

“We have released a complete range of PITBULL hose reels with a gearbox designed for ‘safer’ rewind speeds; rewind options include manual, pneumatic, hydraulic and electric.

“Do your hose reels suffer from corrosion? PITBULL’s range features hot dip galvanised frame and disc components with stainless steel hub assembly and hose guide as standard for maximum corrosion protection.”

Other features include patented quick-change hub technology to suit various hose sizes and diameters in minutes.

A multi-positional frame mounting design allows the reel to be easily mounted and adapted to some pre-existing footprints.

A stainless steel swivel can be easily added for aggressive or corrosive fluids.

Hose sizes range from ¼”ID to 2”ID and pressures up to 5000psi.

For smaller capacity or limited space requirements, the compact PITBULL model is ideal.

Customised add-ons include FlatWinder, an automatic hose layering system; remote control; a single channel remote control (915MHz) with adaptive frequency hopping preventing interference and offering reliable performance; and *Follow Me Hose Guide*, a multi-directional swivelling hose guide.



A PITBULL hose reel.

**SprayNozzleENGINEERING**
Total Spraying Solutions

VEHICLE WASH PAD FOAMERS, WATER CANNONS, WASHING & DUST SUPPRESSION NOZZLES
AU/NZ agents for BETE - inventors of the **Clog Free Spiral** nozzle



Washing & dust suppression nozzles in a wide range of flow rates & spray angles. BETE clog free spiral nozzles available exclusively by Spray Nozzle Engineering.

LAFFERTY offers a complete range of high volume foamers for both light and heavy vehicle wash pads. Both air and non-air operated units available along with SS Hose Reel Packages.



STANG offers standard product & custom skids for truck wash pads and dust abatement. Flow range 600LPM to 40,000LPM in manual, hydraulic or electric high pressure systems. Optional Remote Control operation. Available exclusively by Spray Nozzle Engineering.

Compact and reliable heavy duty hose reels available in hot dip galvanised for ultimate in outdoor corrosion protection. Designed & built to fit both fixed and mobile installations. Custom Hose Reel Packages available to suit all your needs.

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TOUGHEST HOSE REELS
FOR THE ROUGHEST CONDITIONS

Heavy duty galvanised, ultimate in outdoor corrosion protection

PitBull™ is Australian designed & manufactured by Reel Tech. Highest quality hose reels with robust construction and versatile features suitable for all Wash Pad, Mobile Workshop and Service Vehicle projects.

- Hot Dip Galvanised for maximum corrosion protection
- Gearbox designed for 'SAFER' rewind speeds
- Quick change Stainless Steel hub assembly & hose guide
- Heavy duty modular & compact design

- Hose size range - 1/4"ID - 2"ID
- Rewind - manual, pneumatic, hydraulic or electric
- Multi-positional frame mount base
- Customised options available:
 - FlatWinder™ - automatic hose layering system
 - Remote Control
 - Follow Me Hose Guide

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HEAVY VEHICLE WASH SYSTEM

FOR BULLDOZERS, HAUL PACK TRUCKS AND HEAVY-DUTY MINING VEHICLES

WASHMAN WASHING SYSTEMS

Using the WashMan concept to clean bulldozers, haul pack trucks and other heavy-duty equipment can easily reduce the cost of washing by more than 80%. The InterClean WashMan is fast - between 10 and 30 minutes and uses 100% recycled water.

AUTOMATIC DRIVE-THROUGH WASHES FOR HEAVY VEHICLES

Fully automatic drive-through packages for haul truck washing offer a much faster and more effective solution where employees are not permitted in the wash area.

LIGHT TO MEDIUM VEHICLE WASHING SYSTEMS

InterClean has designed and installed several light to medium vehicle wash packages all over the world. This type of wash is designed for

larger street legal vehicles such as dumpers, semi-tractors and other heavy vehicles, which can often leave the mine for public roads. These systems often are designed for moderate to heavy mud applications where the sides and chassis must be cleaned thoroughly.

PATENTED NOZZLE SYSTEM FOR DETAILED CLEANING

The InterClean Centri-Spinner high pressure system (300 psi / 20.5 bar) offers fantastic cleaning results while using recycled water for a more detailed cleaning of the vehicle after the heavy mud has been removed.

EQUIPMENT PLACEMENT – quality products for mining and industry



Office: 170 Kewdale Rd, Kewdale WA 6105

Contact: John Bondi

Telephone: 1300 309 137

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www.equipmentplacement.com.au

Wash system reducing costs and time

MINING vehicles work in extreme conditions and require regular cleaning to operate correctly and safely.

A full manual clean can take up to six hours and sometimes more, which is extremely time-consuming.

InterClean products greatly reduce the time required to clean these vehicles, which decreases equipment downtime.

InterClean offers several options for heavy, medium and light vehicle washing including automatic drive through, manual monitor, joystick-controlled and a fully robotic monitor. Although Equipment Placement can provide InterClean standard equipment, the company is willing to work with its customers to meet their specific needs.

Equipment Placement can offer a configuration with chemical wash; chassis wash packages; intensified side blaster; oil skimmers; ISO container plant rooms; and custom controls packages to meet the strictest international requirements.

InterClean system packages can be pre-wired, pre-plumbed and pre-installed in ISO container plant rooms for ready-to-use and higher system mobility for different sites.

The heart of the InterClean system is the patented anti-turbulent recycling and high pressure equipment module.

The system uses no chemicals or additives and is totally environmentally sound.

Each module is capable of producing up to 300 gallons per minute of recycled water continuously, and multiple modules can be utilised in parallel. The same module is used for all InterClean applications, from automatic military tank washing to manual hand gun



InterClean products allow vehicles to get back to work quicker through an effective wash system.

applications.

Haul truck wash systems are an important component for a mine operation

and need to be designed for trouble-free operation and low maintenance.

InterClean has standardised its wash

packages, offering high performance while maintaining an almost maintenance-free equipment package.

Environmentally friendly cleaning systems



Regardless of a client's location in Australia, Wheelwash takes a customer-focused approach to business.

IN small and large-scale mining operations, companies need cleaning solutions that are not only cost-effective and productive but sensitive to the environment.

For more than 25 years, Wheelwash Australia has manufactured and supplied quality cleaning products to the mining and construction sectors that achieve these three key outcomes.

Its product base encompasses a wide selection of cleaning products, from the Rhino Ecowash range designed for cleaning truck wheels, to the Rhino Agriwash range designed to reduce the spread of disease by vehicular movements.

All Wheelwash products are modular in design so they can use any combination of ramps, wash platforms, recycling tanks and pumps, and are manufactured in Australia by skilled and trained fabricators using the highest quality steel.

The products are automatically operated, require low or no power and are supplied with water recycling tanks whenever water is required for their operation.

Many design features such as inverter drives have also been incorporated to provide significant energy, water and operational cost savings.



Since 1999, Wheelwash Australia has manufactured and supplied a range of effective wheel cleaning equipment for use on any site that have vehicles or machinery tracking out dirt and debris onto public roads.

25 Years Experience | Quality and Durability | Flexibility | Environmentally Friendly Systems | Multi-sector | Professional Support

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wheel cleaning solutions

Bulldog formulation hits the mark

ESTABLISHED in 1942, Applied has more than 70 years' industry experience manufacturing and supplying quality industrial detergents.

ITW Polymer and Fluids (ITW) is one of Australia's leading manufacturers of quality consumable products for brands such as Applied, as well as Devcon, Epirez, Galmet, Rocol and Molybond.

Its comprehensive range of solutions can be used in industries such as mining, food processing, engineering, materials processing and manufacturing.

The Applied brand provides the best solution for chemical challenges found in the mining sector.

Specialised for wash bay areas at mine sites, the Applied range of products are continuously evolving through the improvement of existing products as well as new product developments.

Bulldog Premium has been developed to meet the modern day demands for a cost effective, high performance and safe product for both the environment and personnel.

It is a non-toxic, complex blend of surfactants, sequestering agents and water-soluble solvents that ensure thorough and effortless cleaning of vehicles.

Bulldog Premium is a non-phosphate formulation that does not contribute to algae growth in effluent containment ponds.

It has high foaming to allow longer contact time to remove dirt, grease, oil and stains, and is free rinsing.

More information about the Applied range can be found at: www.itwpf.com.au.



Bulldog premium is a high grade cleaning solution.



BULLDOG PREMIUM Heavy Duty Detergent

- Non Toxic
- High Foaming
- Biodegradable
- Rapid Emulsion Break



**REMOVES DIRT, SOILS, OIL
GREASE AND ROAD STAINS**

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Remote controls remove the risk of serious injury to personnel.

Making workshop jobs faster and safer

BELLY plates can weigh hundreds of kilos – even more with accumulated debris build-up – and are traditionally loosened by mechanics who then crawl underneath the machine to line up bolt holes. This can be a very dangerous operation.

In the past decade there have been more than 45 serious injuries in Australia – including one fatality – as a result of bottom guard (or ‘belly plate’) removals. And these are just the reported ones.

This risk prompted the development of Nivek Industries’ Tracked Elevating Device (TED).

It eliminates the human element from the critical lift stage underneath equipment by employing the remote control of a strong, agile lifting machine – TED.

TED can travel across any terrain and safely lift up to 800 kilograms.

It has a 360 degree turntable at the top, which makes lining up ball joints safer, quicker and easier than traditional sling and chain block methods.

As well as making belly plate removal safer, it also makes it significantly more efficient.

Customer data from Thiess, Peabody Energy and Glencore over a one-year period found using TED to remove and install belly plates had reduced work time by 73 per cent and generally required one less mechanic.

TED can also be used for equaliser bars, cutting edges, steer cylinders, load rollers, sound suppression equipment, engine sumps and many other applications.

Designed and manufactured in Australia, TED is built tough, fit for purpose, and has total compliance to Australian and New Zealand mining standards.

There is a range of attachments which are easily installed and removed including a rhino stand locator, cutting edges removal tool, a load roller cradle and tie-rod, and steering cylinder cradle.

Nivek Industries is a family-owned Australian manufacturing and fabrication company that prides itself on quality workmanship, providing durable and easily maintainable products to the mining sector.



Remotely moves axle stands safely and quickly into exact position

Many attachments, like a cutting edge stand, make it a one man job

Safely handles dozer belly plates in workshops or at breakdown site

25% job time reduction gives better productivity and higher profits

TED makes it so much safer

Our remote-controlled Tracked Elevating Device (TED®) has found great acceptance wherever customers are operating heavy mobile plant. Not only is TED® vastly safer it can also save around 25% in production time as it often means a one-man job, not two. An exceptionally low 315mm profile for getting underneath most machines extends to a surprising 1170mm reach height. And there are heaps

of accessories including a TED® Trailer to easily get to a machine breakdown site rather than having to float it back to the workshop for repairs. TED's® perfect for breakdown site repairs being all-terrain and remote-controlled. Get in touch soon with Nivek – TED's® designer, manufacturer and distributor to find out more. You'll be pleasantly surprised at TED's® very fair price and first class service back-up.

www.nivekindustries.com.au
admin@nivekindustries.com.au
+61 (0) 421 036 702



14668 AMR

The latest in premium protection

PIRTEK Fluid Systems (Pirtek) has partnered with US safety innovator Hexarmor to exclusively produce its fluid injection resistant safety glove.

A pinhole break in a hydraulic hose is enough to cause a fluid injection injury, as the velocity of fluid can be in excess of 250 metres per second, which is sufficient to penetrate regular personal protective equipment (PPE).

The toxicity of the injected fluid leads to necrosis of the affected area, causing compartment syndrome and possibly blood poisoning and bacterial infection.

Surgery is required in 100 percent of cases to remove the dead tissue and clean out the injected fluid from the wound; however, thanks to Pirtek, there is now

a solution.

The Pirtek 9030P Fluid Injection Resistant Glove – with its unique hydraulic injection resistant technology – is one of the only gloves available today that offers protection against hydraulic injection injury as standard.

Pirtek's glove is tested in accordance with standard EN388:2003, and is proven to offer protection up to 700BAR (10,150 psi) from apertures ranging in size from 0.05mm to 0.3 mm using standard hydraulic oil.

The patented technology in these gloves has resulted in a product with better cut, puncture, abrasion and tear resistance; while also improving dexterity and feel.

The comfortable, close fitting design

ensures hands can move freely making it an ideal choice for working on hydraulic systems in a number of industries, including mining, manufacturing, earthmoving, defence and marine.

The exclusive additional benefit of fluid injection resistance makes this a must-have PPE garment for all personnel working on or around hydraulic plant or equipment (Pirtek's aim is to ensure that safety is a top priority by reducing the risk of injury).

The Pirtek Fluid Injection Resistant Glove is available at all Pirtek Centres, ranging from size small to XXL.

More information on Pirtek products can be found at:
www.pirtek.com.au.



The Pirtek Fluid Injection Resistant Glove is available at all Pirtek Centres.

50% OF ALL INJURIES ARE TO THE HAND WEAR YOUR GLOVES

Fluid Injection Resistant Gloves 9030P by PIRTEK

Applications include:



Call **134-222**

24 HOURS - 7 DAYS
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Clive Gray

Australian Diversified Engineering general manager

After taking the reins at Australian Diversified Engineering in 2006, Clive Gray has seen his organisation transform through the mining downturn into an innovative engineering solutions provider to the mining sector. **Cameron Drummond** spoke to **Clive** about his vision for ADE and the drive for efficiency in the industry.

Q. What is your professional history?

In 1983, I started an apprenticeship as a diesel fitter heavy earthmoving with the local shire council. After completion of my apprenticeship in 1987, I went to work with Hastings Deering in Dalby. In 1993 Hastings sold the Dalby facility and we moved to Hastings Toowoomba. From here, in 1994, I moved to Hastings in Brisbane to run their night shift large machine equipment assembly division. After a couple of years, I moved to the day shift and continued to work for Hastings until 2004.

In 2004, I left to start my own machine build and machine-specification company targeting the mining industry.

Having several contracts with Australian Diversified Engineering (ADE), in late 2006 I decided, along with my now business partner Danny Irvine, to purchase ADE from the founding director Andy Igo.

Danny and I are currently concentrating our efforts into growing ADE into a sustainable innovation, design, manufacturing and distribution company.

Q. Describe your current role.

As general manager, my role is diverse; I carry out sales, customer relations, project management and on occasion practical hands-on work.

However, my main role is to focus on the overall direction and goals of the company, ensuring that we are dynamic enough to stay abreast of today's ever changing market.

Q. What developments have you overseen at the company?

In 2006, the company was focused on small repair, maintenance and project based jobs with around 10 employees. From 2006 to 2012, I oversaw the growth of the company to around 80 employees, with a focus on design, manufacturing and larger projects.

With the downturn of the mining industry in 2012, our focus became innovative solutions which provided our customers with safe, reliable products, which would also optimise and streamline standard operating procedures. The last five years has seen us at a steady state of around 25 employees.

Q. The mining and engineering industries go hand in hand, particularly in Australia. What are the benefits of an organisation that promotes this synergy?

The main benefit of this synergy is it allows us to design and manufacture products which are world class. I believe this is the reason why Australian METS companies have such a high reputation on the world stage.



Q. Where would you like to see ADE in the next 10 years?

I would like to see ADE as a stable company able to better manage the highs and lows of the industry.

To this end, we invest a great deal in documentation and recording of our IP. This will allow us to continue to support our products for its lifetime.

In 2006 and with no formal documentation process in place, we embarked on a project to change the way we design, collect and document, to a point 11 years on we can now accurately reproduce over 29,000 parts. As part of

this ongoing strategy, over the next 10 years, we look to expand this process and offer a service of documentation and management of other OEM product and parts.

Q. What is your outlook for the future of the Australian mining sector?

As our society is energy driven, we need energy to survive and prosper. Fads about energy will come and go, but the reality is that we consumed over 4000 PJ in 2014/2015.

210 PJ is equivalent to about 50 megatons of TNT which is the equivalent to about 1,570 times the combined energy

of the bombs that destroyed Hiroshima and Nagasaki.

This means that we consume enough energy to destroy Hiroshima and Nagasaki around 85 times a day, so I believe the mining sector will be around for a long time to come.

The last five years have been hard, but we have seen steady moderate growth driven by the need for the sector to become more efficient. There has been a cultural change in the industry over the last five years, which has seen the sector cut a lot of waste and become more efficient. This change I believe will continue to drive steady sustainable growth over the next 10 years.



IMPORTANT INFORMATION

FOR ALL PURCHASING OFFICERS,
MINE MANAGERS,
MINING DECISION MAKERS

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- BHP Billiton Jumblebar
- Bloomfield
- BMA Coal
- Exterra Resources
- FMG
- Glencore Integra and Collinsville
- Mining in Victoria
- Newcrest
- Newmont Tanami
- QCoal
- Saracen Resources
- Sibelco
- South 32
- Water in Mining

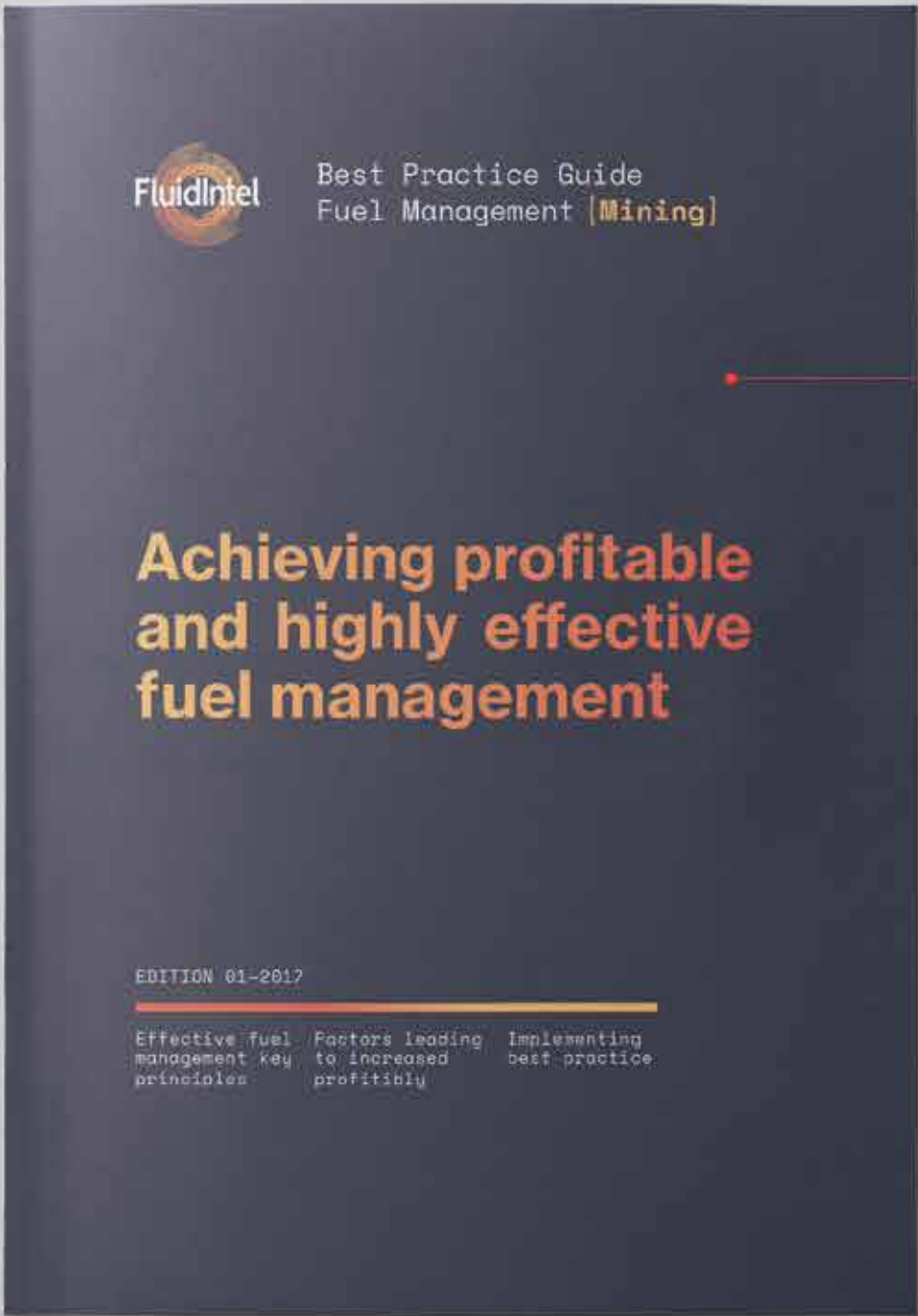
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