

THE AUSTRALIAN MINING REVIEW

PP100007123

Incorporating THE AUSTRALIAN ENERGY REVIEW

FEBRUARY 2018

australianminingreview.com.au

A product of
Publications & Exhibitions Australia Pty Ltd

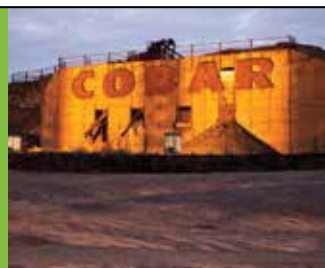
COMMODITIES
FOCUS:
MINERAL
SANDS

NEWS p21



A TOWN
DIVERSIFIED

MINING IN
COBAR p22



ALEX
STANOJEVIC
MESCA

THE
INTERVIEW p78



MAJOR COMMODITIES SNAPSHOT p4

Image: UNSW.

ROBOTS IN FLIGHT

Advances in drone technology have led to a massive uptake in the mining industry, with LiDAR mapping systems and automation leading the way.

FEATURE p52

 **KAEFER**



KAEFER, your partner for mining solutions

With technology and innovation the core of our business, our LEAN delivered, vertically integrated services, solutions and products are tailor-made for the mining industry.

With our global experience and expertise recognised throughout Australia, KAEFER is optimally equipped to meet the demands – across all aspects of new construction or maintenance.

100 YEARS
One history. One team. One future.

Find us on Page 3

www.kaefer.com.au

What stories matter to you?



reuben@miningoilgas.com.au

NEWS 1

Commodities Snapshot	4
The Contractors	10
Technology & Innovation	12
International	19
Explorers on the Move	20
Commodity Focus: Mineral Sands	21

SPECIAL FEATURES

Mining in Cobar	22
BHP Iron Ore	26
Pilbara Minerals	29
Western Areas	31
AngloGold Ashanti	32
Gruyere Gold Project	39
Drones: Transforming the Mine	52
Water in Mining	75

INDUSTRY SPOTLIGHT

Companies Gearing Up	40
Abrasive Blasting	43
Chemical Specialists	45
Civil Engineering	46
Communication Systems	47
Conference & Function Venues	48
Conveying, Belting & Screening	49
Corporate Travel	50
Industrial Tyres	61
Mine Lighting	65
Mine Shutdown & Maintenance	66
Vehicle & Machinery Washdown	71
Vending Machines	72

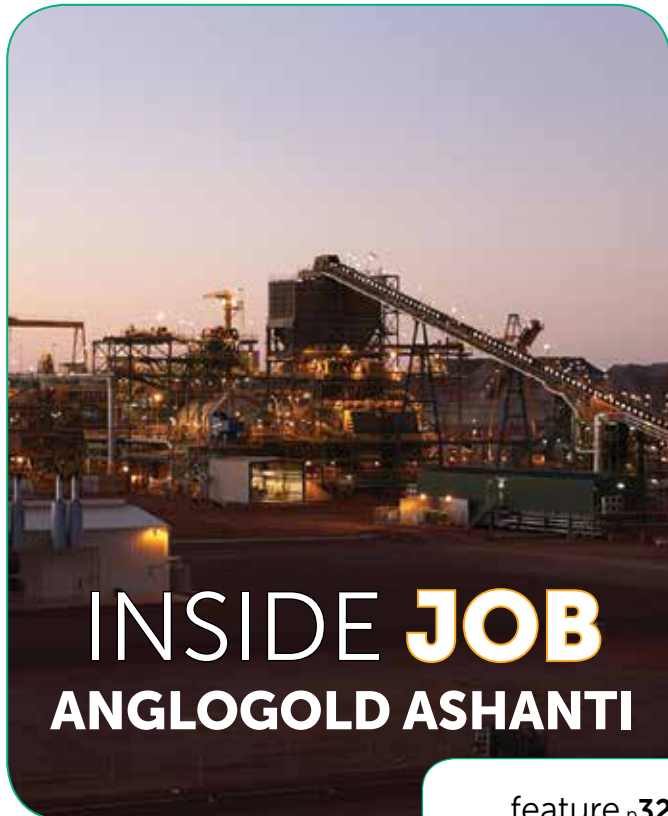


ALEX STANOJEVIC

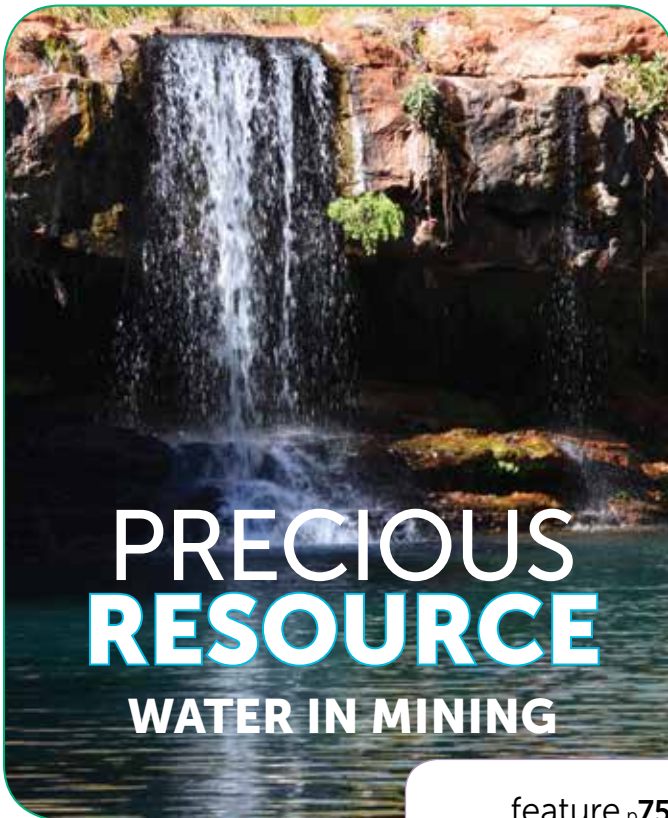
MESCA – the interview p78

MAKING THE
GRADE
WESTERN AREAS

feature p31

INSIDE JOB
ANGLOGOLD ASHANTI

feature p32

PRECIOUS
RESOURCE
WATER IN MINING

feature p75

PUBLISHED BY
ABN 28 112 572 433A product of
**Publications &
Exhibitions Australia Pty Ltd**

GENERAL MANAGER

Brad Francis

brad@miningoilgas.com.au

MANAGING EDITOR

Reuben Adams

reuben@miningoilgas.com.au

JOURNALISTS

Cameron Drummond

cam@miningoilgas.com.au

Elizabeth Fabri

elizabeth@miningoilgas.com.au

GRAPHIC DESIGNER

Charlotte Lufino

charlotte@miningoilgas.com.au

SALES EXECUTIVES

Beej Francis, John Carter,
Penny West

PRINTER

Rural Press

CONTACT US

P: (08) 6314 0300

F: (08) 9481 7322

160 Beaufort Street, Perth, WA 6000.

PO Box 8023, Perth BC, WA 6849.

E-mail the editor at
editorial@miningoilgas.com.au

For all other emails to staff, the standard convention is, first name (only) @miningoilgas.com.au

The Australian Mining Review is a free publication to all mine sites and mining companies in Australia. Its value is \$11 an issue. (Includes GST, postage and handling).

The copyright is vested in the Proprietors of The Australian Mining Review; neither whole nor any part of this issue may be reproduced without permission. The views expressed in this publication are not necessarily those of Miningoilgas Pty Ltd and its staff, but are those of the respective author who accepts sole responsibility and liability for them.

NOTICE TO ADVERTISERS:

The Trade Practices Act, 1974 came into force on the 1st October 1974. All advertisers and advertising agents are directed to carefully study the provisions of the Act, which contain strict regulations on advertising.

It can be an offence for anyone to engage, in trade or commerce, in conduct deemed "misleading or deceptive". Specifically s53 of the Act contains prohibitions from doing any of the following in connection with the promotion, by any means, of the supply or use of goods or services:

(a) falsely represent that goods are of a particular standard, quality, value, grade, composition, style or model or have had a particular history or particular previous use; (b) falsely represent that goods are new; (c) represent that goods or services have sponsorship, approval, performance characteristics, accessories, uses or benefits they do not have; (d) represent that the corporation has a sponsorship, approval or affiliation it does not have; (e) make a false or misleading representation with respect to the price of goods or services; (f) make a false or misleading representation concerning the need for any goods or services; or (g) make a false or misleading representation concerning the existence, exclusion or effect of any condition, warranty, guarantee, right or remedy.

PENALTIES:

For an individual — \$10,000 or six months imprisonment

For a corporation — \$50,000. It is not possible for this company to ensure that advertisements published in this newspaper comply with the Act and the responsibility must, therefore, be on the person, company or advertising agency submitting the advertising for publication. In case of doubt, consult your lawyer.

YOUR 12 MONTH HARD COPY SUBSCRIPTION TO
THE AUSTRALIAN MINING REVIEW

+ Original commentary and analysis + Interviews + News

+ In-depth company and project profiles + Cutting edge technology, products and services

Just \$120 + GST for 12 issues (Australia only)

CONTACT US TODAY ✉ brad@miningoilgas.com.au ☎ [08] 6314 0303

THE AUSTRALIAN
MINING REVIEW
miningoilgas.com.au



KAEFER

KAEFER, your partner for mining solutions

Core Services:

- > Surface Protection
- > Access Management
- > Insulation & Cladding
- > Mechanical & Maintenance Services

More than good ideas . . .

With technology and innovation the core of our business, our LEAN delivered, vertically integrated services, solutions and products are tailor-made for mining solutions.

With our global experience and expertise recognised throughout Australia, KAEFER is optimally equipped to meet the demands – across all aspects of new construction or maintenance.

Inside and out - all over the world. That's KAEFER.



4/156 Kewdale Road, Kewdale WA 6105 | Phone: +61 8 9224 4600 | info@kaefer.com.au | www.kaefer.com.au

TSURUMI

Extreme conditions reveal TRUE VALUE

Deep well dewatering through to slurry pumps

- Cast iron, 316 stainless & Titanium
- Heads to 200m
- 1000v options
- Japan's largest manufacturer
- 3 year warranty



Aussie Pumps

FREE selection guide
02 8865 3500

AUSTRALIAN PUMP INDUSTRIES PTY LTD
info@aussiepumps.com.au
www.aussiepumps.com.au

MAJOR COMMODITIES

SNAPSHOT

GOLD

\$US/oz

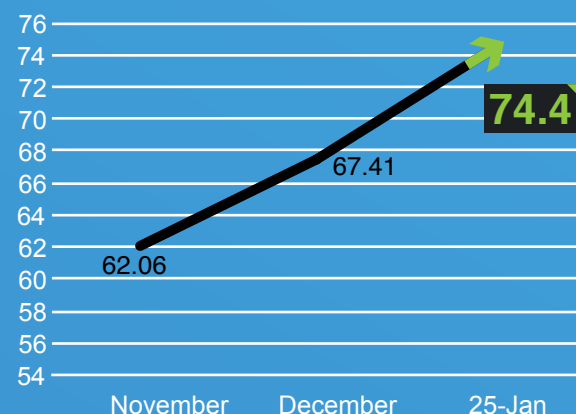
The US dollar hit a three year low in late January, helping gold reach 18-month highs of \$US1365.



IRON ORE

\$US/t
62% Fe CFR China

Iron ore has been on a tear since October lows of \$US57.10, however fresh drops at the end of January could be perceived as a pull-back, or perhaps the start of a deeper downtrend.



COPPER

\$US/t
LME Price

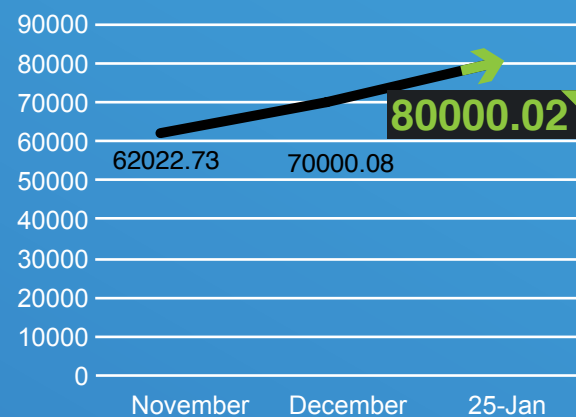
Copper has surged impressively since bottoming out in the beginning of 2016. By late January it had steadied, with analysts predicting waning Chinese demand would dampen prices.



COBALT

\$US/t
LME Price

Cobalt's stellar run has continued into 2018, as projected demand for lithium-ion batteries improves.



ALUMINIUM

\$US/t
LME Price

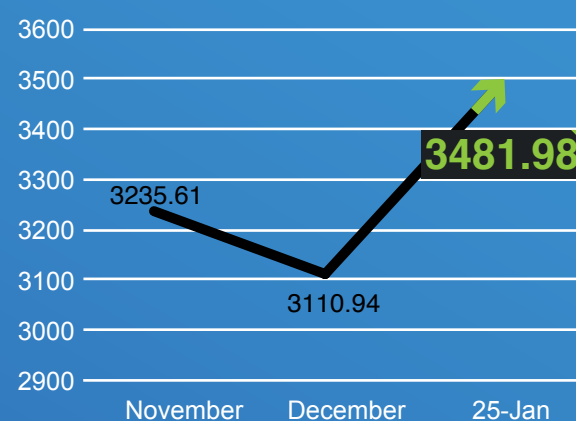
Aluminium prices have remained relatively steady in the past few months, and Chinese supply reforms may spell the capping of future price growth.



ZINC

\$US/t
LME Price

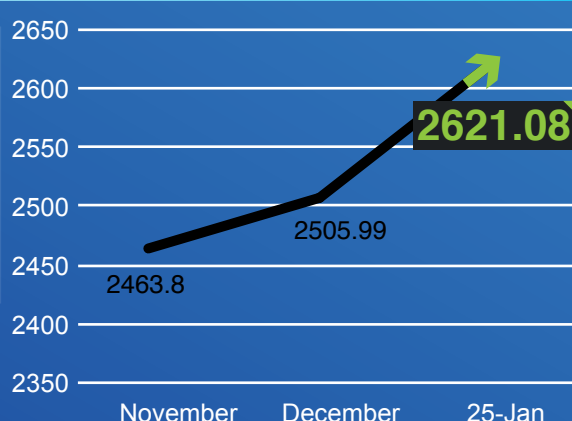
Zinc prices have surged to their highest level since 2007 as demand for zinc-using steel continues to trend up.



LEAD

\$US/t
LME Price

Lead has increased more than 23% in the last 12 months and is tipped to have a bright 2018, according to analysts.



NICKEL

\$US/t
LME Price

Nickel has come off two-year highs as investors booked profits, however it is tipped to continue its bull run on the back of an improving demand and supply outlook.



SUPERIOR TECHNOLOGY

IN **EMERGENCY SHOWER AND
EYE WASH EQUIPMENT**



SIMULTANEOUS FLOW COMPLIANT

The Haws shower has been balanced to ensure simultaneous operation of the shower and eyewash as required by AS4775.

LAMINAR NOT AERATED OUTLETS

The use of aerators in many eye/face wash designs whilst originally recommended for comfort may also pose a potential risk to the user in poorly maintained systems due to the aerosols they may generate from contaminated water which may be inhaled and cause further hazard to the user.

MEDICALLY SUPERIOR RESPONSE TECHNOLOGY

Low velocity, predictable stream height with smooth laminar flow for greater user comfort. The inverted stream directs fluid outward and away from the sensitive glands and ducts of the eye which is proven to be the ideal methodology by medical professionals.



OPTIONS

- Fluoro or LED lights
- Flow switches
- Beacons / Alarms
- Scald Protection
- Wireless Monitoring

WE ALSO SUPPLY



Personal eyewash
equipment for
acid and alkali
burns



Self-contained,
gravity-fed showers
designed for
remote applications



Atlas Iron's future is looking brighter, having accelerated its debt repayments and exploration programs.

Atlas irons out debt

CAMERON DRUMMOND
WA

ONCE-BELEAGUED iron ore junior Atlas Iron will pay back a further \$20 million of debt on the back of surging iron ore prices.

Atlas' lenders have also agreed to ease loan covenants, including reducing the minimum cash balance requirement at the end of each month from \$35m to \$15m.

Atlas managing director Cliff Lawrenson said the decision to reduce debt was in line with the company's strategy to re-position the business, and the strong Australian dollar made the timing opportune.

"A stronger balance sheet will allow us to face volatility in the iron ore market with increased confidence."

"Following this \$20m, we will have reduced our debt from more than \$180m in June 2016 to less than \$85 million – cutting our interest cost by about \$8m a year," he said.

"After evaluating other financing alternatives, we concluded that a staged repayment of the term loan is the best option for the company to preserve liquidity while strengthening our balance sheet.

"A stronger balance sheet will allow us to face volatility in the iron ore market with increased confidence.

"The decision reflects our commitment to re-position the business by reducing debt, growing our existing iron ore business through Utah Point and diversification beyond iron ore."

Atlas recently returned encouraging results from first pass field reconnaissance at its Pancho lithium project.

"Analytical results from surface rock chip sampling show several of the targets have geochemistry that confirms they are lithium-caesium-tantalum style pegmatites that have the potential to host lithium enrichment," the company stated.

"Compilation of these results along with other information gathered in the field has enabled Atlas to define a specific zone of focus for the next stage of exploration work."

RC drilling at the company's Copper Range project also provided positive results.

WA drives M&A uptick

CAMERON DRUMMOND
WA

THE WA mining sector is leading the charge in the merger market on the back of increased foreign interest in a range of commodities.

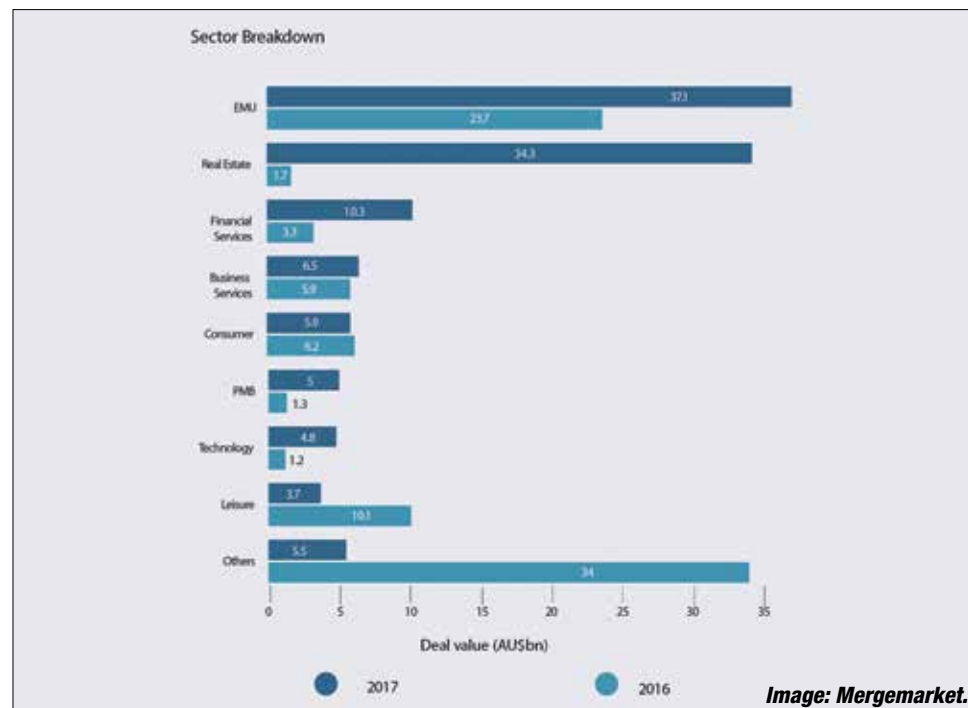
According to Mergemarket's 2017 Australia M&A report, Energy, Mining and Utilities (EMU) has taken over Transportation as the most targeted merger and acquisitions (M&A) sector, with 77 deals worth a total \$37.1 billion made during 2017 – a 56.7 per cent increase on 2016 figures.

Australia, and in particular WA, is poised for further increases in 2018 for deals in the tech metals sector, as the Federal and State Governments open doors to capitalise on growing global demand.

Electric vehicles, stricter environmental emissions legislation, and household-use solar power batteries are driving demand for commodities such as lithium, cobalt, boron, vanadium, copper, and nickel.

Mergemarket said WA in particular would again expected to be the engine room of such mining deals, as well as initial public offerings (IPO).

Improvements in processes at Australia's Foreign Investment Review Board (FIRB), will allow for more strategic acquisitions



Mergers and Acquisitions in Australia's Energy, Mining and Utilities sector are on the rise.

from foreign companies, particularly from countries such as China.

That trend is already being witnessed, with a 141.5 per cent increase in Australia's inbound M&A value (\$80.5bn) compared to 2016, and a 27 per cent decrease in outbound M&A value (\$24.7bn) compared to 2016.

The total value of Australia's M&A in

2017 was \$113bn.

A consortium led by Cheung Kong Property to acquire Duet Group was the top deal for the EMU sector with a value of \$13.1bn.

That deal, along with two other deals in the EMU sector comprised three of the top five deals last year.

Iron ore win for Whyalla



"Iron Sultan will play a significant role in reducing the costs of steelmaking at Whyalla steelworks, while Iron Warrior continues South Australia's role as a reliable iron ore exporter."

Image: GFG Alliance.

ELIZABETH FABRI
SOUTH AUSTRALIA

SANJEEV Gupta's SIMEC Mining has received approval for two new iron ore mines that will feed the Whyalla steelworks and boost exports from the region.

This follows a strong year of purchases and commitments from Mr Gupta, including the acquisition of the beleaguered Arrium steelworks in 2017.

SIMEC Mining, a division of GFG Alliance, secured approval in January to develop the Iron Sultan lease, which will provide 600,000 tonnes of 'cheap' iron ore to the steelworks, and the Iron Warrior mine, capable of exporting up to 1.5 million tonnes of iron ore per annum.

"Iron Sultan will play a significant role in reducing the costs of steelmaking at Whyalla steelworks, while Iron Warrior continues South Australia's role as a reliable iron ore exporter," South Australian mining minister Tom Koutsantonis said.

"Approval of these two mines demonstrates the commitment of the new owner to develop its South Australian iron ore assets and create a more sustainable steelmaking business."

SIMEC acquired both Middleback Range mining leases as part of GFG Alliance's acquisition of Arrium in August 2017.

The mines, 35km west of Whyalla, are expected to create 56 direct jobs and a further 130 contractor positions.

Earlier in the month, GFG Alliance also

agreed to purchase Glencore's high-quality Tahmoor metallurgical coking coal mine in NSW.

"The acquisition of the Tahmoor mine is an exciting step forward in our stated strategy to create fully-integrated, end-to-end businesses in Australia, from raw materials and energy right through to high-value finished products ready for market," Mr Gupta said.

"Through this purchase we secure and de-risk an important feed for the Whyalla Steelworks.

"This, together with our iron ore mines in South Australia, now makes GFG the only fully-integrated Australian steel producer, whether from iron ore and coking coal to primary steel, or from scrap metal and renewable energy to GREENSTEEL."

Optimized mill lining design results in up to 40% less wear parts related downtime

That’s how we make the big difference, the Metso Way.

Every grinding mill is unique but they all have one thing in common: the need for optimal operation. Liner changes need to happen quickly and safely.

Experience from over 8,000 mills world-wide combined with the market’s widest range of grinding wear parts and services mean we can design and select exactly the right parts for your mill.

Coupling this expertise with a Life Cycle Services shutdown and wear parts optimization package you will change wear parts less often, minimize planned downtime and optimize your production.

#TheMetsoWay



Mining & Construction
Oil & Gas
Offshore Supplies



Anything, Anywhere,

FAST

- ▶ 24/7 1ST CLASS SERVICE
- ▶ SHUTDOWN SUPPORT SPECIALISTS
- ▶ CUSTOMISED CONTAINER AND TOOLING SOLUTIONS
- ▶ PLANT MAINTENANCE SUPPORT EXPERTS
- ▶ DEDICATED RESOURCE INDUSTRY PROFESSIONALS
- ▶ HOT SHOT SERVICE AVAILABLE



WWW.INTIND.COM.AU

1300 787 995

SALES@INTIND.COM.AU

10-14 HAZELHURST STREET, KEWDALE WA 6105

ABN: 30 123 184 252

IN BRIEF

TPP breakthrough
“unambiguously good news”

EXPORTS

THE revival of the Trans-Pacific Partnership (TPP) is a major breakthrough for global trade which will deliver significant economic and strategic benefits for Australia, according to Minerals Council interim chief executive David Byers.

“Economic modelling has found that even without the US, the TPP would boost Australia’s exports by \$US23 billion, or four per cent, and its national income by \$US12 billion, or 0.5 per cent, in 2030,” Mr Byers said.

“Australia is a trading nation – 2.7 million Australian jobs rely on trade and trade accounts for 40 per cent of our economy – which means that the revival of the TPP is unambiguously good news.”

Monty development progressing on schedule

COPPER

SANDFIRE Resources has reported strong mine production and milling rates for the December quarter, maintaining FY18 guidance at between 63,000 tonnes and 66,000t copper and between 35,000 ounces and 38,000oz of gold.

Bulk earthworks and civils were substantially completed at the new Monty development with surface infrastructure progressing on schedule and the Monty decline advanced to 346m at quarter-end – well ahead of the budget of 286m.

First ore from Monty is on track to be delivered in Q2 FY19.

Record December quarter performance at Cadia

GOLD

NEWCREST Mining has increased December quarter gold and copper production by 17.2 per cent and 33.8 per cent respectively on the prior quarter.

Group AISC per ounce dropped \$69 per ounce to \$829/oz compared to the prior quarter, with Cadia achieved a record low AISC of \$129/oz for the quarter.

Group AISC per ounce margin also increased by 13.1 per cent to \$459/oz for the quarter.

Chief Executive Officer Sandeep Biswas said Newcrest remained on track for production from continuing operations to be stronger in the second half of FY18, with FY guidance remaining unchanged.

PKCT workers row escalates



Image: MUA.

More than 200 people protested at a workers assembly outside PKCT on 11 January.

ELIZABETH FABRI
NSW

A DISPUTE between Port Kembla Coal Terminal (PKCT) and a worker union came to a head in January when PKCT locked out 60 of its employees without pay for a four day period.

The lockout began on 7 January, after Construction Forestry Mining and Energy Union (CFMEU) members took protected industrial action against the company’s push to scrap its current employee enterprise agreement, in favour of a new agreement which removes existing sick leave provisions, and cuts superannuation payments.

The terminal had a replacement workforce ready to load ships during the lockout so exports were not overly affected.

At its peak the PKCT was loading more than

14 million tonnes of coal a year, but its forecast throughput for 2018 has fallen to just 5.1mt, according to the operator.

PKCT, which is owned and operated by coal mining companies South32, Glencore, Peabody Energy, Centennial Coal and Wollongong Coal, has been in negotiations with the union for a new employee agreement since 2015.

CFMEU Mining and Energy South-West vice president Bob Timbs said the lockout was an “outrageous move by PKCT” and can only serve to worsen the dispute.

“Our members have been trying to negotiate a new enterprise agreement with PKCT and instead of continuing those talks in good faith, the company has decided to lock the workforce out for five days,” Mr Timbs said.

“The CFMEU is ready to sit down with PKCT and its shareholders to find a way forward

without the need to resort to tactics which will create further disruption to coal loading activities through Port Kembla.

“We know the coal companies are behind this move and we are calling on all those involved to step back and reflect on how to resolve this dispute rather than make matters worse.”

In early January CFMEU Mining and Energy members established a picket line outside PKCT across a number of days.

The members were joined by the Illawarra branches of the Maritime Union of Australia (MUA); CFMEU Building and Construction; Australian Workers Union; Australian Manufacturing Workers’ Union; Transport Workers Union; Rail Tram and Bus Union; and Electrical Trades Union (ETU), with the assistance of the South Coast Labour Council (SCLC).

Wallarah 2 project green lit

ELIZABETH FABRI
NSW

THE controversial Wallarah 2 underground coal mine has the tick of approval from the NSW Government to begin development.

In mid-January, the NSW Planning Assessment Commission (PAC) declared the Wyong Areas Coal JV project on the Central Coast “in the public interest” and granted consent for it to produce up to 5 million tonnes of run of mine (ROM) thermal coal a year for 25 years, subject to conditions.

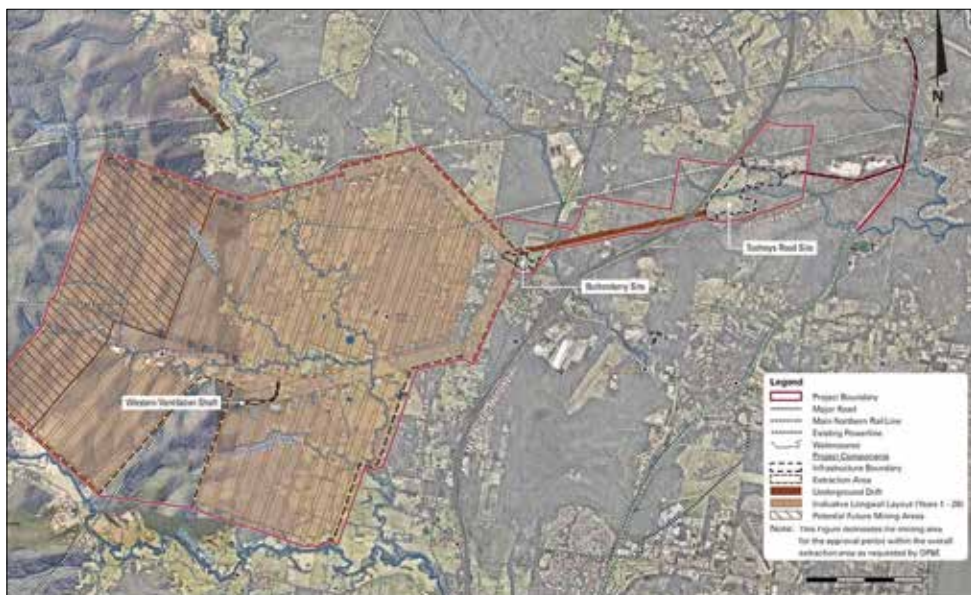
“The Commission heard and acknowledged strong calls for it to take a precautionary approach given the potential for impacts to the Central Coast’s drinking water supply catchment,” PAC stated.

“The issue has been assessed in detail. Impacts were assessed to be small and acceptable, with no net impact on the availability of water for the Central Coast drinking water supply catchment during the life of the mine.

“Impacts and potential risks can be appropriately managed through the framework of rigorous controls and requirements in place to manage, mitigate, minimise, compensate and offset those impacts.”

The Wallarah 2 mine has been on the drawing board for some time; the first application was lodged in 2006, which was refused in March 2011 by the then Minister for Planning.

In late 2012, a new application was lodged



and subject to a PAC review in 2014.

However a dispute over land access with the Darkinjung LaLC led to the lodgement of an amendment development application in July 2016.

PAC said the project, once developed, would create up to 300 operational jobs, 450 construction jobs, and significant investment for the local area and royalties for the State.

Wyong Coal general manager Peter Allonby told *S&P Global Platts* he anticipated construction to start next year, with coal development beginning in 2021, and longwall production in 2022.

“The project will now move to the next

stage of evaluating the approval details, scoping additional approval and licensing requirements, detailed design work and completing a final feasibility study,” Mr Allonby said.

The Australian Coal Alliance said it had commenced a legal challenge against the PAC’s decision to approve the mine.

In late January more than 200 people met in Ourimbah to back the Australian Coal Alliance’s campaign to block the project from going ahead.

Wallarah 2 said it will hold community consultations on the last Wednesday of every month, beginning in February.

32 YEARS IN OTR TYRES & WHEELS



WE'RE OTR.
WHERE EXPERIENCE COUNTS.



Find out more at tyredoctor.com.au



TYRE DOCTOR

IN BRIEF

Glencore extends Clermont flight contract

QLD

MINING giant Glencore has extended a charter services contract with Alliance Aviation Services for its Clermont coal mine in QLD.

Alliance has been providing services to various Glencore operations since 2003, and Clermont since 2015.

The contract extension was retained through a competitive tender process, and will see Alliance continue flying for Glencore until 2021.

"We are proud of this extension as it provides great acknowledgement of our ability to provide Glencore with safe, reliable and cost effective services from Brisbane, Sunshine Coast and Emerald," Alliance chief executive Lee Schofield said.

Big contract wins for ECM

NATIONAL

WA-based construction and maintenance contractor ECM has secured a series of new contracts with a combined value of \$130 million.

The contracts include a turnkey design/construct gold expansion at Evolution Mining's Cowal project with CPC Engineering; an electrical and instrumentation package for Tianqi Lithium Australia Kwinana Lithium Hydroxide Processing Plant 1 for MSP Engineering; an electrical and instrumentation package for BHP's Caval Ridge expansion for CPB Contractors; and two additional contracts for the defence and infrastructure sectors.

"The geographic spread and new market entries represented by these contract awards are particularly pleasing as they underline the success of the ECM Group diversity and growth strategy," ECM stated.

Bis secures GBU coal work

INDONESIA

RESOURCES logistics provider Bis has won a five-year contract to deliver load and haul services at the Gunung Bara Utama (GBU) coal mine in East Kalimantan, Indonesia.

The contract marked the company's continued expansion into the Indonesian resources industry, and would run between 2018 and 2023, with an option to extend for a further two years.

"We are excited to partner with GBU to help deliver on their high quality Indonesian coal project, through the application of our innovative and proven high payload haulage solution," Bis chief executive Brad Rogers said.

Incitec loses contracts



Incitec Pivot's Roy Hill contract ends on 9 February.

ELIZABETH FABRI
WA

INDUSTRIAL chemicals company Incitec Pivot has missed out on two contract renewals to supply explosives and services to Roy Hill and BHP Iron Ore operations.

In January the company notified the ASX it will cease to be Roy Hill's contracted supplier on 9 February, less than a month after it announced BHP would not extend its contract to supply nitrate prill beyond 28 November 2019.

The Roy Hill contract loss was estimated to have a one off impact on Net Profit After Tax (NPAT) of about \$5 million in FY18, \$16m in FY19, \$22m in FY20, \$18m in FY21, \$20m in FY22, and minimal impact beyond.

In addition, the BHP contract termination

was estimated to have a \$10m hit in FY20 and \$25m impact in FY21.

"These NPAT impacts are estimated on the basis of expected input costs, and may be able to be mitigated to some extent by other commercial arrangements," Incitec Pivot stated.

Media speculation has pegged Orica as a possible replacement contractor for both BHP and Roy Hill.

On 29 January, Incitec went public with an executive team restructure as Incitec Pivot Fertilisers (IPF) president and Asia Pacific president of Dyno Nobel Asia Pacific (DNAP) Simon Atkinson departed the company.

"As a consequence of Mr Atkinson's departure, IPL has taken the opportunity to reassess the structure of its executive team," Incitec said.

"This reassessment has resulted in the leadership of the DNAP and IPF businesses being separated."

Greg Hayne will assume the role of DNAP president, and James Crough has been appointed IPF president in an interim capacity.

Two new executive roles have also been created; Robert Rounsley has been appointed chief technology development officer and will lead IPL's global technology group for both the explosives and fertilisers businesses, and the new role of executive commercial officer will be taken up by Seth Hobby.

"These changes will enable each business to continue to effectively serve their customer base, focus on technology and innovation, and improve our agility in responding to market changes," IPL managing director and chief executive Jeanne Johns said.

Minnovo snapped up by DRA

CAMERON DRUMMOND
WA

SOUTH African engineering company DRA has acquired Perth-based mining services company Minnovo for an undisclosed amount.

DRA said the acquisition was part of its growth strategy into the Asia-Pacific region, adding further depth DRA's metallurgical, engineering, procurement, project management, construction and commissioning capabilities in Australia, as well as enhancing on-the-ground resources to clients in the Asia-Pacific region.

"The acquisition of Minnovo will add key resources and experience to DRA's Australian capabilities and will enhance the group's overall strength in the design and construction of processing facilities across a wide range of minerals including ferrous metals, precious metals, base metals and industrial minerals, along with the associated infrastructure requirements," DRA chief executive Wray Carvelas said.

"We are excited about combining the Minnovo and DRA capabilities in APAC and we are delighted to be joining the DRA team of 3300 dedicated people across the globe," Minnovo managing director Greg McRostie said.

The acquisition is expected to be concluded in the first quarter of 2018.





SYNERGY UNDERCARRIAGE COMPONENTS PTY LTD

ACN 155 057 659

High Quality, Competitively Priced Tracks and Drive Sprockets for Mining Sized Excavators & Shovels

1 / 172 Beringarra Ave Malaga, Western Australia 6090

0440 356 7824 (08) 9209 2224 info@syunco.com.au www.syunco.com.au

EURO AUCTIONS

BRISBANE Australia

Buyers commission 2.5%

161 Sandmere Road, Pinkenba, QLD, 4008

OPEN TO THE PUBLIC - 100% UNRESERVED AUCTION

Thursday 8th February 2018 @ 8.30am



Unused Hitachi
ZX470LCH-5



2017 Doosan DX225LC



2016 JCB 110W (Ex Demo)



Unused Volvo EW60E
- Choice of 3



Unused CAT 308E2CR
- Choice of 2



Unused Bobcat E85
- Choice of 4



Unused Hitachi ZX55U-5A
- Choice of 3



2007 CAT D10T



2012 CAT D9T



2013 CAT D8R
- Choice of 3



Unused CAT 950GC
- Choice of 2



Unused CAT 432F2



Unused Manitou MT1440
- Choice of 2



2015 Bobcat S590



Unused Terex TA6S
- Choice of 3



Unused New Holland TD5.95
c/w Quicke X31 Front
Loader



2015 Terex Finlay 694+
Supertrak 4 Way Split
Screener



Unused Barford R6536TR
Tracked Conveyor

Brisbane Office (QLD)
T. 0736 074800
E. info@euroauctions.com

Paul Haynes (NSW)
T. 0429 534493
E. phaynes@euroauctions.com

Craig Hart (QLD)
T. 0417 927337
E. chart@euroauctions.com

Jacob Webber (QLD)
T. 0413 172700
E. jwebber@euroauctions.com



Visit our website for full inventory

www.euroauctions.com

IN BRIEF

Space mining mission begins

US

PLANETARY Resources has launched its Arkyd-6 spacecraft that is designed to detect water resources while in space.

The high-tech fully autonomous spacecraft has been successfully deployed to its orbit, and is now busy gathering and recording data.

"If all of the experimental systems operate successfully, Planetary Resources intends to use the Arkyd-6 satellite to capture MWIR images of targets on Earth's surface, including agricultural land, resource exploration regions, and infrastructure for mining and energy," Planetary Resources chief engineer Chris Voorhees said.

"Lessons learned from Arkyd-6 will inform the company's approach as it builds on this technology to enable the scientific and economic evaluation of asteroids during its future Space Resource Exploration Mission."

Rio driverless trucks hit milestone

WA

RIO Tinto's autonomous haul truck fleet has moved more than 1 billion tonnes of ore and waste material since the technology was deployed across its Pilbara operations in 2008.

"Hauling one billion tonnes autonomously is an impressive milestone for our business and again highlights Rio Tinto's pioneering spirit when it comes to adopting revolutionary new technologies which are making the industry safer and more efficient," Rio Tinto Iron Ore chief executive Chris Salisbury said.

The miner currently operates 80 autonomous Komatsu trucks, with plans to increase this to more than 140 by the end of 2019.

De Beers launches blockchain tech

GLOBAL

ANGLO American's De Beers Group is developing a world-first blockchain technology to span the diamond value chain to help strengthen confidence in the industry.

The technology will provide a single, tamper-proof and permanent digital record for every diamond registered on the platform, and ensure all registered stones are authentic and conflict-free.

De Beers Group chief executive Bruce Cleaver said a pilot was now underway and once fully established the blockchain would operate as an open platform.

"We are very excited about this initiative and the benefits it could deliver across the diamond value chain, from producers through to retailers and consumers," Mr Cleaver said.

Skills gap will widen: report

ELIZABETH FABRI
NATIONAL

MINING companies are embracing the transition to the 'digital mine' by investing in new technologies, but falling short when it comes to preparing future workforces, Newport Consulting has found.

In its *2018 Mining Business Outlook*, the operational management consultancy firm revealed strong signs of revival for the sector following a series of in-depth interviews with more than 50 mining leaders.

However it flagged an emerging skills gap confronting the industry as a result of the rise of automation and a 'gig economy' set to redefine roles and disrupt job security.

"We spoke to many companies of all sizes that voiced concern over a widening skills gap, giving way to a pressing need to upskill and re-train the workforce," Newport Consulting managing director David Hand said.

"Miners must be able to meet the new digital demands of Australia's mining future."

"If Australia can push hard and train the next generation of engineers, miners and technologists, that's a real global advantage."

Quoted in the report was Unearthed Solutions director Zane Prickett, who claimed Australian miners must be faster in adopting a forward-thinking approach.

"One key theme is that we're going from a digital non-natives market to a digital natives market," Mr Prickett said.

CAMERON DRUMMOND
WA

TIME is running out for Australia to take advantage of an estimated \$2 trillion lithium value chain, according to the Association of Mining and Exploration Companies (AMEC).

AMEC is calling for collaboration between industry and Government to pounce on developing domestic downstream lithium processing, in its report *A lithium industry in Australia: A value chain analysis for downstreaming Australia's lithium resources*, by business-to-business advisory service Future Smart Strategies.

While Australia is the dominant global producer of mine concentrate, it is yet to implement further downstream processes such as refinement, the production of battery cells, and the assembly of systems.

Each stage further down the chain adds value to the product.

"Australia is in the enviable position of having large reserves of lithium in the form of hard rock," the report stated.

"This resource is very accessible by established mining technology and already deployed in other mining applications by a substantive, skilled, and efficient mining industry in Australia.

"By comparison, most other major global reserves are held in salt lakes and are extracted by natural evaporation.

"Whilst this allows producers in, for example, South America to enjoy low operational costs, their pathway to expand production is both environmentally and technically challenging, more costly, time-consuming and to a large

Figure 9: Areas of technology investment

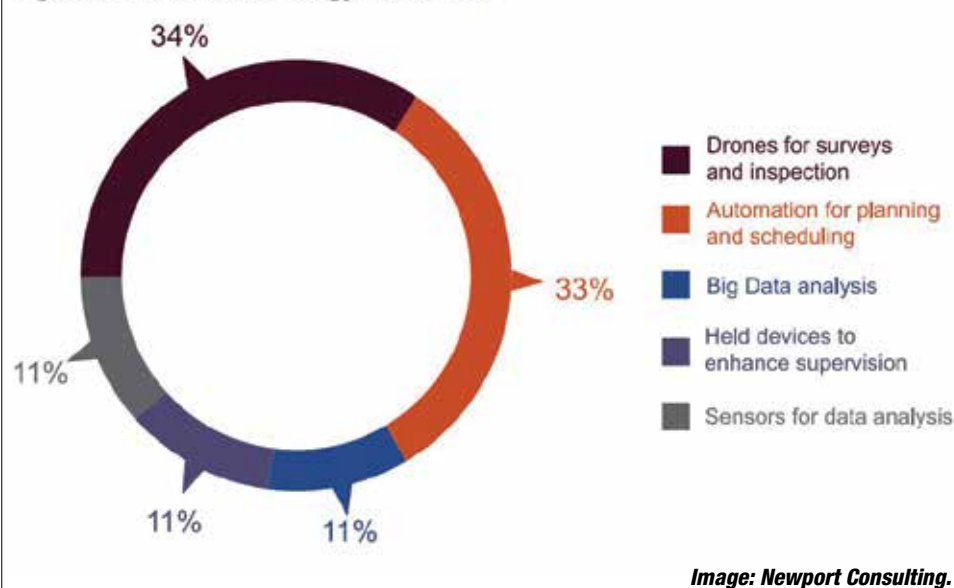


Image: Newport Consulting.

Areas of technology investment in Australian mining.

"I don't want to downplay the past and the impressive human skill that has been involved in mining and highly technical engineering.

"However, the reality is that we're now in a fully connected and digitally enabled world, which means our approach to work flows and how we build the mines of the future is fundamentally different."

Mr Prickett said Australia was at the "tip of the iceberg" when it came to automation and urged miners to put together a plan on how to upskill, support and nurture future workers.

"The future will involve computers doing 90 per cent of the work and humans looking at design and processes," he said.

"We haven't reached a point yet where we are designing from a computer-first perspective.

"There's still a lot of cultural change that will

go on in the industry, and a huge opportunity to paint an exciting future.

"For miners, Australia can be the leading space to develop the scalable products and processes of the future.

"If Australia can push hard and train the next generation of engineers, miners and technologists, that's a real global advantage."

Some of Australia's bigger miners were already leading the charge.

"Rio Tinto is a prime example of a company leading the field in this area, having recently partnered with the WA Government and TAFE Australia to provide vocational training in robotics for mining workers," Mr Hand said.

"The government should follow Rio Tinto's lead to close this growing skills gap, which is occurring because of technology disruption."

Taking opportunity downstream

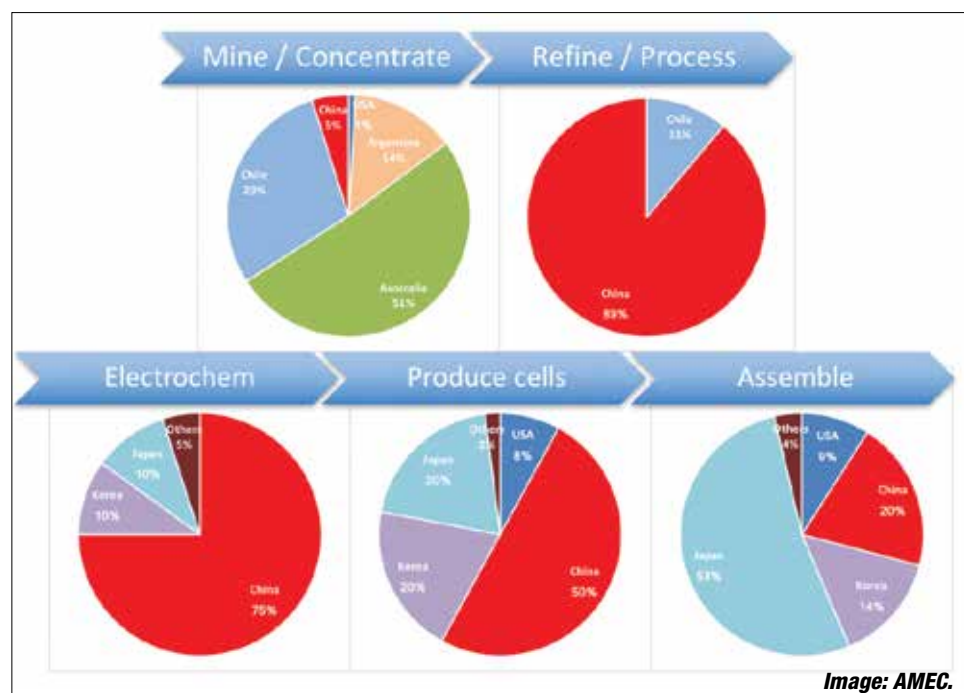


Image: AMEC.

extent, weather dependant.

"In comparison, the advantage for Australia's producers is that they can rapidly, cost-effectively and predictably expand production to meet demand using established technology."

At the moment, it would be at least until 2020 – when Tianqi Lithium's Kwinana processing hub comes online – before Australia has Stage 2 processing abilities.

"This report is a call to action; there is a unique opportunity for Australia to undertake greater lithium downstream processing," AMEC chief executive officer Warren Pearce said.

"Australia produces over 60 per cent of the world's lithium, dominating one end of the value chain [and] also produces all of the minerals (other than soda ash) that are needed to manufacture lithium rechargeable batteries.

"Australia has a series of comparative advantages that we can capitalise on, if Government and industry collaborate to achieve greater downstream processing.

"It is important that all levels of Government engage with industry to grasp this opportunity.

"We have a window of roughly two years before it is set where battery components and batteries will be manufactured and by whom."



Control System and Electrical Engineering Specialist

TURNKEY PROJECTS

OPERATIONS

MAINTENANCE

OPTIMISATION

TRAINING

Technical design, specialist engineering precision, flawless control systems and operator interface. Our vast experience in PLC's, SCADA, DCS, and control system design & integration gives our customers a solid foundation on which to base their projects. Our experts bring reliability, efficiency and innovation whilst eliminating downtime and increasing output to your

• PLC / SCADA / HMI / SAFETY PLC SOFTWARE DEVELOPMENT

• RADIO / TELEMETRY

• ELECTRICAL ENGINEERING DESIGN (FRONT END, CONCEPT, DETAILED)

• SOLAR FEASIBILITY & DESIGN

• MANUFACTURE / SUPPLY OF CONTROL PANELS AND MCC's.

• NETWORKING AND COMMUNICATION

• COMMISSIONING & TESTING

• PERFORMANCE / OPTIMISATION

• INSTRUMENTATION

• FUNCTIONAL SAFETY

• TRAINING AND AUDITING

• PROJECT MANAGEMENT

ISO:9001:2015 Quality Management Certified
Integrator partners include: Schneider, Siemens, Rockwell and GE amongst others.



08 9477 3919 | info@megatronicpower.com | megatronicpower.com

BEST VALUE SKILLED LABOUR AND EQUIPMENT SOLUTIONS

Get running. Stay running.

Minimise downtime and increase productivity with the best value skilled labour, equipment and electrical engineering and compliance solutions to help deliver your projects on time and on budget.

EMS
GROUP

emsgroup.com.au/amr

THE CONVERSATION

Because it's cheap and simple, biomining can effectively exploit low grade sources of metals (such as mine tailings) that would otherwise be uneconomical using traditional methods.



Image: Joey Kyber/Pixels.

Biomining the elements of the future

AUTHOR: MARCOS VOUTSINOSI
PHD CANDIDATE, GEOMICROBIOLOGY,
UNIVERSITY OF MELBOURNE

BIOMINING is the kind of technique promised by science fiction: a vast tank filled with microorganisms that leach metal from ore, old mobile phones and hard drives.

It sounds futuristic, but it's currently used to produce about 5 per cent of the world's gold and 20 per cent of the world's copper. It's also used to a lesser extent to extract nickel, zinc, cobalt and rare earth elements. But perhaps it's most exciting potential is extracting rare earth elements, which are crucial in everything from mobile phones to renewable energy technology.

The Mary Kathleen mine, an exhausted uranium mine in northwest Queensland, contains an estimated \$4 billion in rare earth elements. Biomining offers a cost-effective and environmentally friendly option for getting it out.

Biomining is so versatile that it can be used on other planetary bodies. Bioleaching studies on the international space station have shown microorganisms from extreme environments on Earth can leach a large variety of important minerals and metals from rocks when exposed to the cold, heat, radiation and vacuum of space.

Some scientists even believe we cannot colonise other planets without the help of biomining technologies.

How does it work?

Biomining takes place within large, closed, stirred-tank reactors (bioreactors). These devices generally contain water, microorganisms (bacteria, archaea, or fungi),

ore material, and a source of energy for the microbes.

The source of energy required depends on the specific microbe necessary for the job. For example, gold and copper are biologically "leached" from sulfidic ores using microorganisms that can derive energy from inorganic sources, via the oxidation of sulfur and iron.

However, rare earth elements are bioleached from non-sulfidic ores using microorganisms that require an organic carbon source, because these ores do not contain a usable energy source. In this case, sugars are added to allow the microbes to grow.

All living organisms need metals to carry out basic enzyme reactions. Humans get their metals from the trace concentrations in their food. Microbes, however, obtain metals by dissolving them from the minerals in their environment. They do this by producing organic acids and metal-binding compounds. Scientists exploit these traits by mixing microbes in solution with ores and collecting the metal as it floats to the top.

The temperature, sugars, the rate at which the tank is stirred, acidity, carbon dioxide and oxygen levels all need to be monitored and fine-tuned to provide optimal working conditions

The benefits of biomining

Traditional mining methods require harsh chemicals, lots of energy and produce many pollutants. In contrast, biomining uses little energy and produces few microbial by-products such as organic acids and gases.

Because it's cheap and simple, biomining can effectively exploit low grade sources of

metals (such as mine tailings) that would otherwise be uneconomical using traditional methods.

Countries are increasingly turning to biomining such as Finland, Chile and Uganda. Chile has exhausted much of its copper rich ores and now utilises biomining, while Uganda has been extracting cobalt from copper mine tailings for over a decade.

Why do we need rare earth elements?

The rare earth elements include the group of 15 lanthanides near the bottom of the periodic table, plus scandium and yttrium. They are widely used in just about all electronics and are increasingly sought after by the electric vehicle and renewable energy industries.

The unique atomic properties of these elements make them useful as magnets and phosphors. They're used as strong lightweight magnets in electric vehicles, wind turbines, hard disc drives, medical equipment and as phosphors in energy efficiency lighting and in the LEDs of mobile phones, televisions and laptops.

Despite their name, rare earth elements are not rare and some are in fact more abundant than copper, nickel and lead in the Earth's crust. However, unlike these primary metals which form ores (a naturally occurring mineral or rock from which a useful substance can be easily extracted), rare earth elements are widely dispersed. Thus to be economically feasible they are generally mined as secondary products alongside primary metals such as iron and copper.

Over 90 per cent of the world's rare earth elements come from China where production monopolies, trade restrictions and illegal

mining have caused prices to fluctuate dramatically over the years.

Reports from the US Department of Energy, European Union, and the US intelligence commission have labelled several rare earth elements as critical materials, based on their importance to clean energy, high supply risk, and lack of substitutes.

These reports encourage research and development into alternative mining methods such as biomining as a potential mitigation strategy.

Heeding these calls, laboratories in Curtin, and Berkeley Universities have used microorganisms to dissolve common rare-earth-element-bearing minerals. These pilot scale studies have shown promising results, with extraction rates growing closer to those of conventional mining methods.

Because most electronics have a notoriously short lifespan and poor recyclability, laboratories are experimenting with "urban" biomining. For example, bioleaching studies have seen success in extracting rare earth elements from the phosphor powder lining fluorescent globes, and the use of microorganisms to recycle rare earth elements from electronic wastes such as hard drive magnets.

The rare earth elements are critical for the future of our technology. Biomining offers a way to obtain these valuable resources in a way that is both environmentally sustainable and economically feasible.

The author would like to acknowledge co-supervisor Dr Jillian Banfield (Banfield Laboratory, University of California, Berkeley) and principal supervisor and co-author Dr John Moreau (Geomicrobiology Lab Leader, School of Earth Sciences, University of Melbourne).



LOCKOUT STAY SAFE

GROUP LOCK BOXES OF ALL SIZES

Using a group lockout box allows you to dramatically reduce the amount of locks required on a job, limit weight on each energy point by eliminating fasteners, plus it provides a quick overview of who is still working without going to each energy point.

MULTI-FUNCTION CABLE LOCKOUTS

The MFL-2 Multi Function Cable Lockout Devices from Cirlock are very versatile devices which can be used to lock out a number of different energy sources, such as large valves, steering wheels on vehicles, a number of circuit breakers or fuse holders.



Includes: GLB-2/3, GLB-4, GLB-5, GLB-6, GLB-7, GLB-8
GLB-6 and GLB-8 are not made in Australia

MFL-2

DESIGNED
BY CIRLOCK -
MANUFACTURED
LOCALLY

sales@cirlock.com.au F +61 7 5445 8612 T 07 5445 2910

Visit Cirlock Online Today

www.cirlock.com.au

PROGRAMMED Skilled Workforce

A leading provider of managed labour, staffing and training services.

We recruit, deploy, manage and maintain a mobile workforce in excess of 15,000 per day across Australia and New Zealand.



Call us today on 13 STAFF (13 782 33)

zero/harm
programmed.com.au



Minera San Cristobal utilises SampleManager LIMS for lab integration and automation

CASE STUDY

MINERA San Cristobal S.A. is the largest mining company in Bolivia and is considered to be one of the world's largest silver-zinc-lead development projects.

Its key challenges illustrate the significant trends in the mining industry today, including the need to not only automate the laboratory, but to provide for rapid data capture and analysis of sample data through the integration of analytical instruments with laboratory software.

This case study explores the process used to select a Laboratory Information Management System (LIMS) at Minera San Cristobal.

Building a modern mining operation

San Cristobal is located in the Potosi district of southwestern Bolivia and hosts about 443 million ounces of silver, 8.4 billion pounds of zinc and 2.9 billion pounds of lead contained in 250 million tonnes of open-pittable proven and probable reserves.

The San Cristobal mine consists of an open pit mine and concentrator with a designed capacity of 40,000 tonnes per day.

A contract miner extracts ore from the open pit by conventional truck and shovel operation and transports mined ore by truck from the pit to the primary crusher.

The crushed ore is then transported by a 1.7 kilometre overland conveyor to an ore stockpile.

A reclaim system moves crushed ore from the stockpile for grinding in a semi-autogenous (SAG) and ball mill circuit.

The ore is then processed by a selective flotation process in which lead is first floated and zinc is suppressed to produce a lead-silver concentrate, and then zinc is floated and lead is suppressed to produce a zinc-silver concentrate.

Concentrates are then filtered, loaded into containers and transported by rail to the port in Mejillones, Chile, and then by ocean vessel to smelters and refineries around the world.

Construction of the San Cristobal mine began during the first quarter of 2005.

Project construction is now complete and the first sale of concentrates was initiated during the third quarter of 2007.

The infrastructure necessary to make the mine operational included construction of a power line from the town of Punutuma to San Cristobal; the operation began drawing power from the national power grid during November 2006.

A long-term agreement is in place for the transportation of the concentrates by rail to the port in Mejillones, Chile.

As transportation of the mined ore is a key component of the necessary infrastructure at Minera San Cristobal, construction of the 65 kilometre rail spur from the mine site to the main rail line began during the third quarter of 2006, was completed during the second quarter of 2007, and is now fully operational.

Concentrates will be unloaded from the rail cars at a facility at the port in Mejillones and then loaded into ships for export.

Construction of the Mejillones port facility was completed during the second quarter of 2007. Once the concentrates have arrived in Mejillones, they will be

shipped by bulk carriers to smelters around the world.

The Informatics project team and vendor selection

As the leading mine in Bolivia, Minera San Cristobal seeks continuous growth and a competitive advantage in the industry to keep its profits in line with shareholder expectations.

To keep the company strong from a technology perspective, Minera San Cristobal began an investigation into the ways it could reduce its reliance on manual processes throughout the laboratories, and automate those processes so that data capture was more timely and more accurate.

By automating its laboratory processes, Minera San Cristobal sought to ensure real time access to accurate data, avoid manual errors, produce the highest quality in the control process of samples, methods and results, and save personnel time and costs as a result.

In March of 2006, the manager for the Chemical Laboratory (D. Raúl Castro) issued a call for RFPs from the leading technology companies to assess the possibilities for automating the mining operations at Minera San Cristobal.

After a period of due diligence and involvement with laboratory and IT personnel, Thermo Scientific SampleManager LIMS was selected to automate processes and improve quality and methods in the chemicals laboratory located next to the plant.

Phase 1 of the project involved a close coordination between the laboratory

personnel and Thermo Fisher support team to begin the integration of analytical instruments and configuring the LIMS to meet the needs of the chemicals laboratory.

The goal of Phase 1 was to fully integrate the lab, from sample registration to sample report.

Phase 1 benefits achieved

Since completion of Phase 1, complete installation of SampleManager LIMS, and full laboratory instrument integration, management at Minera San Cristobal is taking advantage of some of the benefits brought by this investment in SampleManager LIMS.

The chemical laboratory has certified five test methods, as well as other tests of impurities, to the Bolivian Accreditation Organization (IBMETRO).

In addition, the volume of paper records and other physical documentation has been dramatically reduced and it is expected that by Phase 2, all paper records will be completely replaced by electronic records produced and stored within the SampleManager LIMS database.

Next steps – Phase 2

At the end of Phase 1, SampleManager LIMS was fully operational within the chemicals laboratory.

Management at the mine and laboratory personnel are now exploring new options and configurations that may be provided by SampleManager, opening new opportunities for improvement in the daily operations of the San Cristobal mine.



For example, in an effort to reinforce the analytical services provided by the chemicals laboratory, it is critical that new instrumentation is integrated across the laboratory, and SampleManager has demonstrated this capacity already.

Laboratory personnel will begin building on this capacity with new equipment as it is required and installed.

Another key component of the production process at Minera San Cristobal is the testing of minerals deployed by the chemicals laboratory, including the exploration and production of minerals and the exportation of products from concentrated minerals.

The testing services provided by the chemicals laboratory will be extended to other mining units and internal clients whose focus is environmental control, occupational health and maintenance of equipment.

Phase 2 will also include configuring SampleManager LIMS so that it becomes a fully integrated system to support production planning and control.

It is expected that SampleManager will automate all operations by its integration with ERPs, PIMS and existing instruments and software running in other operations centres of the company.

SampleManager LIMS helps meet ISO 17025 requirements

The 2005 release of ISO 17025, General Requirements for the Competence of Testing and Calibration Laboratories, covers laboratories using standard, non-standard and laboratory-developed methods.

This international standard is the accepted standard for analytical laboratories developing their data management system for quality, administrative and technical operations.

There are several critical areas of compliance for any mining operation, including security, instrumentation calibration, maintenance of electronic records, traceability of procedures, personnel, environmental and equipment monitoring.

The ability of laboratory managers at Minera San Cristobal to have control of this vital information is an important aspect of the mining operation and ensures that production can continue uninterrupted by changes related to environment, personnel,



instrumentation or equipment that falls out of calibration or becomes damaged in the production process. Laboratory managers at Minera San Cristobal will be maximising their use of SampleManager’s full capabilities regarding ISO 17025 throughout Phase 2.

SampleManager LIMS offers a centralized system to access data and extract information, enabling effective management of laboratory operations.

SampleManager LIMS provides evidence and documentation to support laboratory compliance with ISO 17025.

SampleManager addresses the security required for laboratories conducting testing in their “permanent facilities, at sites away from permanent facilities, or in associated temporary or mobile facilities,” by providing full security controls, including “group security,” which can be used to segregate work from different clients or in different laboratory areas.

SampleManager’s enhanced functionality covers a broad range of requirements, including validation of methods, instrument calibration, sampling, control of non-conformance testing and reporting of results.

To meet ISO 17025 requirements regarding the “control of non-conforming testing and/or calibration work,” SampleManager has built-in functionality for incident management and statistical analysis of both calibration standards and

sample results.

SampleManager also automatically maintains all electronic records and makes them available for either reviewing or reporting, and has built-in archiving, which allows for the removal of older records once their retention period has expired.

Full audit trail facilities are standard for SampleManager, allowing full traceability of the personnel and the procedures that were entered.

These built-in capabilities allow laboratories to more easily review their quality system by having ready access to all incidents, corrective actions, non-conforming results and other events.

To address the Technical Requirements of the standard, SampleManager has built-in functionality to handle environmental monitoring, a critical component of laboratory compliance with ISO 17025.

Within SampleManager, environmental monitoring of key areas of the laboratory can be scheduled on a routine basis.

Certain instrumentation can be connected via SampleManager’s Instrument Manager function, and data can be collected and logged at periodic intervals.

Validation of methods is a critical ISO 17025 requirement, for which SampleManager has built-in functionality to allow lab managers to be in continuous compliance.

SampleManager’s Batch Management functionality provides analytical QA/QC support, including automatic and interactive sample assignment according to pre-defined templates.

Equipment and instrument calibration, also an important part of ISO 17025, is managed by SampleManager through Instrument Calibration Scheduling, allowing the LIMS to prevent the use of any instrument that is past its calibration due date.

SampleManager provides reporting that indicates which instruments are out of compliance or need calibration.

Finally, to comply with ISO 17025 reporting requirements, SampleManager’s existing functionality includes powerful and flexible report writing, making it possible to create any report format required by the laboratory, and including any data stored within the SampleManager database.

Why Thermo Scientific SampleManager LIMS?

In undertaking this process of fully automating the chemical laboratory processes, mining operations managers at Minera San Cristobal were eager to work with an industry leader that could provide continuity of service, the highest level of training and support, and a proven LIMS that was time and industry tested.

Industry leadership/proven experience:

Thermo Scientific SampleManager LIMS is the industry leader in quality control and automation of laboratories in the mining industry, with a broad range of key references from all of the major mining centers and proven experience in critical analytical business environments.

Enterprise integration:

The ability of SampleManager LIMS to interface with enterprise systems such as ERP and PIMS, as well as analytical instrumentation was a key factor in the decision to work with Thermo Fisher Scientific.

(CONTINUED OVER)

(CONTINUED FROM PAGE 17)



understand system architecture, laboratory users can easily create new methods, reports or define new processes without seeking time consuming and costly assistance from either the IT personnel at the mine or the software provider.

Partnering with Thermo Fisher Scientific

The speed of processing reports and managing large amounts of laboratory data is now dramatically increased and allows all laboratory managers and mining personnel to have the information they need when they need it.

Standardized laboratory practices and reporting:

During the implementation of SampleManager LIMS, a team consisting of laboratory managers, IT personnel, and Thermo Fisher Scientific support personnel worked together to develop a standardized list of commonly used reports within the lab and mining operations.

The objective of this was to standardize on formats and minimize the number of different reports being used so that all laboratory personnel, across the operation, had an increased level of understanding of the data being generated and how to utilize that data.

In addition, the use of a single system to administrate and operate all the activities in the laboratory has dramatically simplified lab operations, and ensured the consistent quality of all processes and reports.

Global presence, regional strengths:

An important consideration in

selecting SampleManager was the fact that Thermo Fisher Scientific has the ability to provide fast, effective and local response to any administrative or operational situation that could arise at Minera San Cristobal. Because of its global presence, Thermo Fisher can support customers around the world, and provides local and regional Customer Support through offices in Chile, Brazil, Argentina and Mexico.

Localized training of the laboratory personnel at Minera San Cristobal ensured that SampleManager could be easily configured by all users, regardless of their level of expertise.

Because of SampleManager's easy-to-

Thermo Fisher Scientific is the worldwide leader in laboratory software and services, providing enterprise-wide, multi-laboratory solutions that are relied on at other minerals and mining companies, such as The Corporacion Nacional del Cobre de Chile (Codelco) the largest copper producer in the world, CVRD (Brazil), Doña Inés de collahuasi (Chile), Yamana Gold (Brazil) or CIMM (Chile).

To support our installations, we provide implementation, validation, training, maintenance and support from the industry's largest worldwide informatics services network.

More information can be found at: www.thermofisher.com/IntegratedInformatics.

thermoscientific

Connected workflows deliver quality results.

Introducing Thermo Scientific™ Integrated Informatics, a complete lab and data management solution. Connect your labs with your business, upstream and downstream, and see all of your data more clearly. Get more out of your quality control data and move your product to market faster.

Learn more at thermofisher.com/IntegratedInformatics

ThermoFisher
SCIENTIFIC

IN BRIEF

First gold poured at Sissingué

CÔTE D’IVOIRE

ASX-listed Perseus Mining has poured first gold at its \$US107 million Sissingué project in West Africa, one month ahead of schedule.

Sissingué is the company’s second producing mine, and provides an additional cash flow stream to reduce its reliance on the established Edikan mine in Ghana.

“The almost faultless execution of our development plan also confirms Perseus’s capacity to successfully develop gold projects in West Africa,” Perseus Mining chief executive and managing director Jeff Quartermaine said.

“This is particularly relevant in the context of our plans to start development of our third gold mine at Yaouré, also in Côte d’Ivoire, later this year.”

Anglo American receives Minas-Rio permits

BRAZIL

ANGLO American has received long-awaited environmental permits that pave the way for the mining giant to expand its Minas-Rio iron ore mine in the Brazilian state of Minas Gerais.

State environmental regulator Semad granted permission for the third-stage expansion that would boost production capacity by about 56 per cent.

The company had earlier announced it would have to shutter the operation by September as it would run out of ore without the extension.

Anglo American Brazil said that receiving the necessary licences allowed the company to continue operating in the region for at least another 15 years.

Toro Gold starts up Mako

SENEGAL

GUERNSEY-based Toro Gold has announced first pour at its Mako gold project in Eastern Senegal, two weeks ahead of schedule.

“We are delighted to be able to announce this significant milestone for the Company both ahead of schedule and under budget,” Toro chief executive Martin Horgan said.

“We are proud of our track record of consistently meeting or exceeding our development targets over this period against a backdrop of challenging market conditions.”

The company is now focused on the continued ramp up of operations to achieve steady commercial production through the first half of 2018.

Rio spends big in Mongolia

ELIZABETH FABRI
MONGOLIA

RIO Tinto will open a new office in Ulaanbaatar this year to strengthen ties with the Mongolian Government and local stakeholders amid growing tensions.

The new office, separate from its Oyu Tolgoi LLC mining division, will comprise Rio Tinto’s exploration team and the Mongolia Delivery Centre (MDC); the local branch of its Information Systems and Technology team.

Mongolian-born Munkhtushig Dul, who has previously worked in senior roles within the Noble Group’s Mongolian operations and the Mongolian Stock Exchange, will head up the 80 person office to manage Rio Tinto’s day-to-day operations.

Mr Dul will also work in coordination with the Oyu Tolgoi LLC team, led by managing director Armando Torres.

“Through its shareholding in Oyu Tolgoi, Rio Tinto has invested heavily in Mongolia and is committed to evolving this into a deep and mature partnership for the long-term,” Mr Dul said.

“I am excited to join a company that is dedicated to being a strong partner with Mongolia.”

The news followed a string of setbacks across Rio Tinto’s Oyu Tolgoi operation in January, including an \$US155 million tax blow from the Mongolian Government.

Turquoise Hill (the Rio Tinto-controlled subsidiary holding a 66 per cent interest in Oyu Tolgoi) said the mine had received an additional \$US155 million bill from the Mongolian government after an audit of taxes paid between 2013 and 2015.

Turquoise Hill, 50.79 per cent owned by Rio Tinto, claimed it was of “the firm view that Oyu Tolgoi LLC has paid all taxes and charges” under the Investment Agreement and Mongolian Law.



Image: Rio Tinto.

The Oyu Tolgoi project is currently undergoing a \$US5.3 billion expansion that will see it accelerate production.

“The tax assessment is being evaluated by Oyu Tolgoi LLC and a response will be issued within the timeframe required by the Mongolian Law,” it said.

Perth-based Hoffman Engineering workers contracted at Oyu Tolgoi were also embroiled in a dispute between the Mongolian Government and western contractors over incorrect workers visas.

In mid-January about 40 international workers at the project, including Australians, had their passports confiscated and were told to leave the country.

In a separate matter, the mine has also declared force majeure on customer contracts as a result of Chinese coal transporter protests on the Ganquimaodu Border Zone, blocking shipments.

“Oyu Tolgoi convoys are unable to cross through the Chinese-Mongolian border to deliver concentrates to customers,” Turquoise Hill said.

“Safe and normal mine operations, including underground development, have been maintained and no production impact is expected.”

On 23 January, Rio Tinto chief executive J-S Jacques met with the Mongolia Prime Minister and other government representatives to discuss ways to progress their partnership.

Both parties agreed to form a joint working group to explore where funding costs can be reduced to improve benefits from Oyu Tolgoi for shareholders; an accelerated path of development for a power solution in Mongolia; and a strategy towards sustainable community development of Khanbogd, the closest town to the mine.

Since 2010, Rio Tinto has invested more than \$7 billion in Mongolia, and a further \$1.5 billion in taxes, royalties and other payments to the government of Mongolia.

In mid-2017 the company began new exploration work in Mongolia’s Gobi desert in search of the next Oyu Tolgoi mine, after a five year hiatus.

“By investing more in Mongolia we are creating future leaders for our global business and exporting Mongolia’s intellectual capacity around the world,” Mr Jacques said.

GFG’s European expansion

ELIZABETH FABRI
FRANCE

BRITISH steel magnate Sanjeev Gupta’s GFG Alliance will pay \$US500 million for Rio Tinto’s Dunkerque Aluminium smelter as part of a planned expansion into central Europe.

Rio Tinto announced it had received a binding offer from GFG Alliance’s industrial arm Liberty House, which it expected to complete in the second quarter of 2018, subject to final adjustments.

The deal followed GFG Alliance’s acquisition of Rio Tinto’s Lochaber Smelter and assets in Scotland in December 2016; however this would be the group’s first significant step into continental Europe.

GFG Alliance executive chairman Mr Gupta said Liberty planned to develop the 570-worker plant, and potentially create thousands more jobs on-site and for the wider community.

The company also hoped to capitalise on the growing market for aluminium components among European vehicle manufacturers by working with stakeholders to establish downstream manufacturing activities linked to the smelter.

“Our detailed analysis leads us to believe that Dunkerque is the best location to drive forward our downstream automotive strategy,” Mr Gupta said.

“Aluminium Dunkerque has a high-quality aluminium operation benefitting from a top-class workforce and management.

“We want to develop the plant into an



GFG Alliance executive chairman Sanjeev Gupta.

international centre of aluminium and downstream aluminium products expertise, demonstrating our GREENALUMINIUM strategy.

“This investment will help fulfil our ambitions in the sector, further enabling us to capitalise fully on expected growth in demand for aluminium over the coming years.”

Liberty was also currently engaged in a formal bidding process to acquire Asco Industries; a business which owned steel mills and service centres at six locations across France.

Mr Gupta said it was French President Emmanuel Macron’s “pro-business environment” that attracted him to the region.

“This has motivated our ambition to

establish a global hub for the group in France, not only investing heavily in aluminium, steel and automotive but also bringing our other divisions including energy, banking and property development to explore opportunities in France and Europe, also complementing and supporting Dunkerque,” he said.

Rio Tinto Aluminium chief executive Alf Barrios said the Dunkerque sale represented the best option for the future development of the site, as the major miner continued to streamline its portfolio.

“Liberty House has a track record of investing in similar assets, which should secure a long-term sustainable future for Aluminium Dunkerque and continued economic benefit for the wider community,” Mr Barrios said.

IN BRIEF

Bombora supersized ahead of maiden resource

GOLD

NEWLY discovered gold lodes have upgraded the scale and economic potential of Breaker Resources’ 2.2km long Bombora gold discovery at the Lake Roe gold project in WA.

Breaker executive chairman Tom Sanders said the results highlighted the potential for a single large 2.2km long open pit, while the “stacking” of the steep and flat lodes was likely to keep repeating at depth.

“It generally takes at three years for a deposit to progress from a promising discovery hole to a potentially economic resource and it has only been two years since our first RC discovery drill hole,” Mr Sanders said.

A maiden resource is due later this quarter.

Artemis raises \$4.5m to fast track projects

GOLD

ARTEMIS Resources has received firm “bought deal” commitments from London-based Global Investment Strategy UK to raise \$4.5 million (before costs) through the issue of about 22.5 million fully paid shares at \$0.20 per share.

“This oversees institutional financing further increases our cash reserves as we head in to a very busy six month period of re-commissioning and upgrades at our Radio Hill treatment plant,” Artemis executive chairman David Lenigas said.

“The additional funding will provide Artemis with the necessary working capital to commence early mining operations at a number of our proximal deposits in the Karratha area in order to have sufficient stockpiles pre-mined at the plant site available for processing.”

Northern Minerals doubles cap raising to \$10m

RARE EARTHS

RARE Earths-focused Northern Minerals has extended the closing date of its share purchase plan to 12 February in the hope of raising \$10 million for its Browns Range heavy rare earths project in the Tanami Desert, after it received initial applications for more than \$5m.

Northern Minerals managing director George Bauk said he was encouraged with shareholder support for the project.

“We have received positive feedback from a number of shareholders, particularly with regards to the project enhancement initiatives have the potential to set up Browns Range as a globally significant heavy rare earths project,” Mr Bauk said.

Greenshoots for WA mining

TABLE 1: NUMBER OF PROGRAMME OF WORK APPLICATIONS 2012 – 2017

Calendar Year	Number of Programme of Work mineral exploration applications received
2017	2575
2016	1799
2015	2068
2014	2021
2013	2091
2012	2565

In 2017, the Department received 2575 Programme of Work applications.

Image: Department of Mines, Industry Regulation and Safety WA.

ELIZABETH FABRI WA

GROWING interest in gold and lithium across WA has resulted in a 40 per cent increase in exploration applications submitted to the Department of Mines, Industry Regulation and Safety (DMIRS) in 2017.

In its December quarterly report, the Department said it had received 2575 Programme of Work (PoW) applications in calendar year 2017 compared to 1799 the previous year.

During the year, the department officers also finalised 98 per cent of exploration licence applications and 100 per cent of mining lease applications within 65 business days.

DMIRS Strategic Projects senior advisor

Graham Cobby attributed the uptick in exploration applications to increased interest in gold and lithium.

“The announcement reinforces a mounting body of evidence that the Western Australian mining and mineral exploration industry is growing and confidence is returning.”

“Interest in gold and lithium remained high throughout 2017 and is likely to continue into 2018,” Mr Cobby said.

Association of Mining and Exploration Companies (AMEC) chief executive Warren Pearce said the increase in PoW aligned with similar statistics from the Environmental Protection Authority that a number of significant projects requiring assessment in 2017 were up by 50 per cent over the previous year.

“The announcement reinforces a mounting body of evidence that the Western Australian mining and mineral exploration industry is growing and confidence is returning,” Mr Pearce said.

“It is important the Government works with industry to build this momentum.

“These statistics show that DMIRS has the capacity to reduce approvals timeframes, and support industry to create new jobs, revenues for local communities and royalties for the State.”

Newmont exits Ernest Giles deal



Image: Greatland Gold.

Drilling works at the Ernest Giles Meadows target area.

ELIZABETH FABRI WA

NEWMONT Mining has pulled the plug on its exploration partnership with Greatland Gold at the Ernest Giles gold project in central WA as it focuses on other gold districts.

Under the partnership, formed in May 2017, Newmont conducted Deep Sensing Geochemistry (DSG) survey at the site which defined several gold anomalies at the Meadows

prospect, including an anomaly 5km long and 1.5km wide, which sits about 1km to the north of Greatland’s previous drilling.

“The collaboration between Newmont and Greatland has successfully defined several additional gold anomalies, and we would like to thank Newmont for their efforts,” Greatland Gold chief executive Gervaise Heddle said.

“The results of their survey have enhanced our understanding of the project and identified multiple new targets for further exploration

work, reinforcing our view that the Ernest Giles project has the potential to host several multi-million-ounce gold deposits.

“We are well financed to actively progress exploration at Ernest Giles and look forward to reporting progress through the year.”

Greatland said it will soon lodge a Programme of Work with the WA Department of Mines and Petroleum, and subject to approval, anticipates to begin an exploration campaign in Q1 2018.

IN BRIEF

Keysbrook
Operating Plan
producing results

WA

THE benefits of MZI's 5.25mtpa Operating Plan at the underperforming Keysbrook mineral sands operations in WA are expected to become evident in the second half of FY2018, the company has stated.

"The ongoing trend of process improvements continued with better production and sales volumes being evident in the December half compared with the prior corresponding six-month period," the company said in its December quarter report.

In the December quarter, Keysbrook Heavy Mineral Concentrate (HMC) production was in line with the prior quarter at 26,570t.

December half HMC output rose 9 per cent to 53,239t while saleable production increased 35 per cent to 39,251t. Sales volumes increased by 47 per cent to 29,750t compared with the prior corresponding half.

Fungoni, Coburn
move closer to
development

WA/TANZANIA

STRANDLINE Resources has continued to make strong progress on its HMS projects in Australia and Tanzania during the December quarter.

This included completion of the Fungoni project Definitive Feasibility Study (DFS) in Tanzania, and initiation of a funding and development strategy for the large-scale Coburn project in WA.

The company also announced that it had secured a binding take-or-pay offtake agreement for 100 per cent of the zircon-monzonite product produced at Fungoni, which would pave the way for Strandline to finalise project funding.

Sheffield shakes
off legal setback

WA

DESPITE a legal stumbling block, Sheffield Resources' \$348m Thunderbird Mineral Sands Project is progressing toward development with 100 per cent of zircon concentrate and about 75 per cent of premium zircon for Stage 1 now secured under binding agreements.

In December, the Federal Court upheld a native title appeal over the project. The company didn't expect the appeal would have a material impact on Thunderbird's development timeline, with a tribunal hearing scheduled for the current quarter.

Financing arrangements to support development also advanced during the quarter with

Sheffield executing a \$US200m debt financing mandate with Taurus Mining Finance Fund.

SHIFTING
SANDS

The mineral sands industry has bounced back from low prices between 2013 and 2016, as a lack of new mines in recent years constrains supply. This is having a major impact on commodity prices and sales volumes.

Image: Iluka Resources.

STRANDLINE – \$300 million Coburn Project

Looking for development partners.

SHEFFIELD – \$350 million Thunderbird Project

200-300 construction jobs – commencing later this year.

ILUKA – \$250m - \$275m Cataby Project

220 construction jobs, 120 operational jobs – construction likely to start next year.

CAMERON DRUMMOND

ILUKA Resources managing director Tom O'Leary said current robust market conditions could strengthen even further.

By the March quarter last year, industry leader Iluka had reported a 130 per cent increase in total zircon, rutile and synthetic rutile sales volumes relative to the same period in 2016, due to its \$389m acquisition of the Sierra Rutile mineral sands operation in Africa.

"The most recent \$130 per tonne [zircon price] increase, effective 1 October 2017, which I can confirm, has been accepted into the market, has been stated as effective through Q4 2017 and Q1 2018," Mr O'Leary said.

Mr O'Leary said the lack of significant, high grade discoveries would continue to drive pricing up.

"In broad terms the quality of the deposits currently being investigated for development are lower grade, and lesser quality than those currently being exploited," he said.

"There's less zircon, less rutile, less valuable chloride ilmenite and there's more trash.

"There have been no discoveries of significant higher-grade deposits in the last decade.

"So projects like our fine minerals project and other higher cost projects are required.

"This will, over time, drive pricing up."

A 40 per cent share price gain by March 2017 for Iluka has spurred juniors to accelerate the development of their respective



Image: Iluka Resources.

A flurry of Australian mineral sands developments are being spurred by higher prices.

projects, most of which are in WA.

Projects On The Horizon

Emerging mineral sands producers such as Strandline Resources are looking to take advantage of buoyant prices.

Strandline has launched the hunt for a joint venture (JV) partner to oversee the funding, development and operation of its Coburn project in WA.

Coburn is fully approved, development-ready and defined by a resource estimate of 979 million tonnes (mt) at 1.26 per cent heavy minerals (HM).

Another WA developer, Sheffield Resources,

has secured a \$US200 million funding for its Thunderbird mineral sands project in WA's Canning Basin, and pre-construction works are currently underway.

Thunderbird has one of the world's largest and highest grade zircon and ilmenite rich ore reserves, with a resource of 680.5mt at 11 per cent HM over a 42 year mine life.

The project will provide between 200 and 300 jobs during construction later this year.

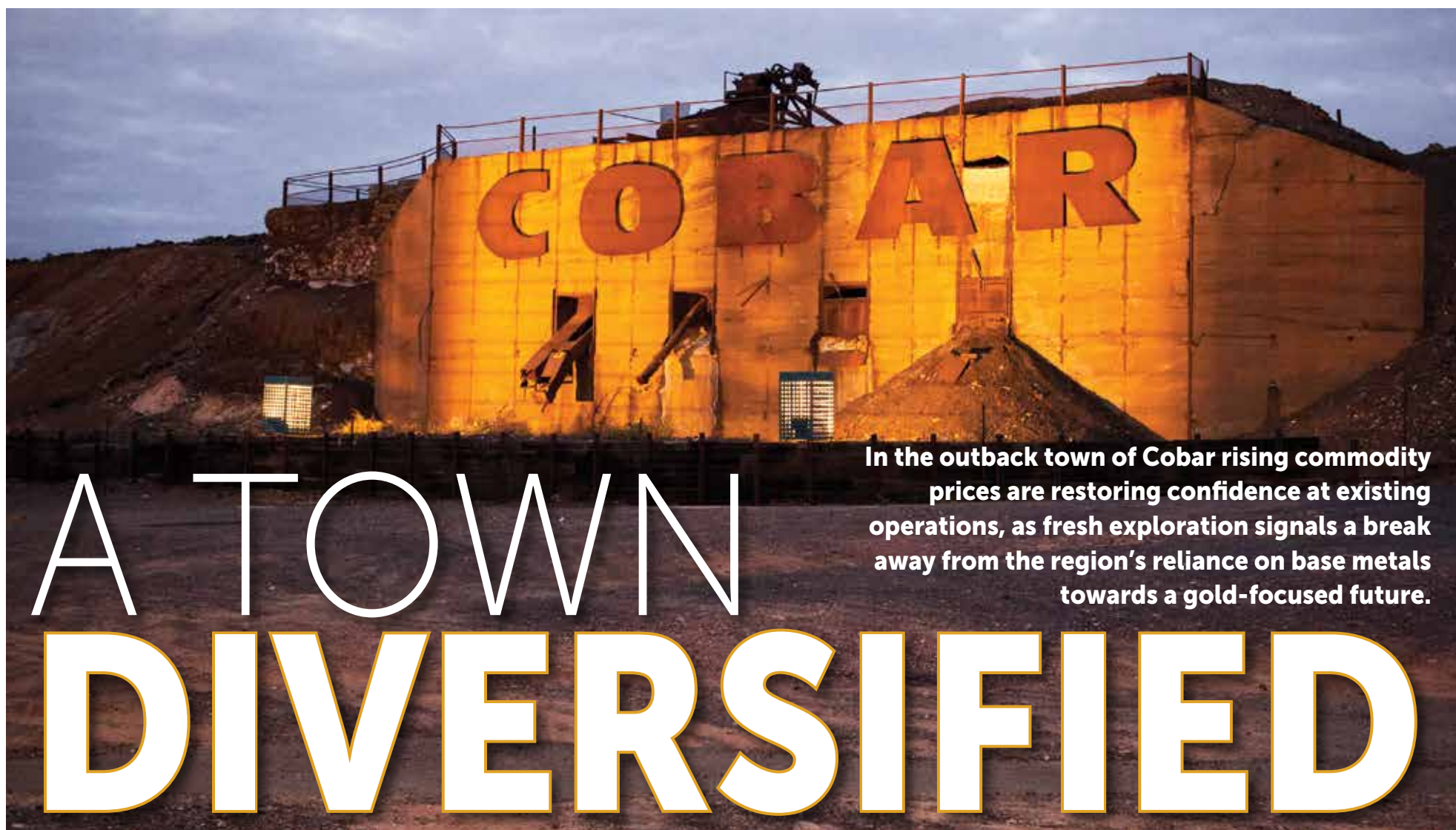
Iluka has also approved the development of its Cataby project near Perth.

Cataby has resource estimate of 13.8mt at 4.4 per cent HM over an 8.5 year mine life.

Iluka is also looking to restart its Jacinta-Ambrosia mine in South Australia, which it mothballed in February 2016.

SPECIAL FEATURES

MINING IN COBAR



In the outback town of Cobar rising commodity prices are restoring confidence at existing operations, as fresh exploration signals a break away from the region's reliance on base metals towards a gold-focused future.

A TOWN DIVERSIFIED

COBAR PROJECTS

OPERATIONAL

- PEAK MINES (Aurelia Metals)
- CSA COPPER MINE (Glencore)
- ENDEAVOR MINE (CBH Resources)
- HERA-NYMAGEE PROJECT (Aurelia Metals)

UNDER DEVELOPMENT:

- NYNGAN SCANDIUM PROJECT (Scandium International Mining Corp)

EXPLORATION:

- MALLEE BULL (JV Peel Mining and CBH Resources)
- COBAR SUPERBASIN (Peel Mining 60%):
 - WAGGA TANK (Peel Mining)
- COBAR GOLD PROJECT (Helix Resources)
- COLLERINA PROJECT (Helix Resources)

ELIZABETH FABRI

IT'S been boom-and-bust for Cobar since first copper was discovered in the region in 1869.

The town has witnessed great successes (at peak it had a population of 10,000) followed by incredible lows when commodity cycles took a dive.

Just two years ago this was the case when one of the town's major employers, CBH Resources' Endeavor mine, made almost half of its workforce (116 people) redundant as a result of declining zinc and lead prices.

It was a tough pill to swallow for the 5000-person town, and while not comparable to Ashanti Gold's closure of the CSA mine between 1997 and 1999, sentiment was down — again.

Then there was news that Glencore, the current owner of the CSA mine, had intentions to sell the \$US400 million project to reduce its debt pile; creating an additional layer of uncertainty.

The verdict was still out on whether Glencore will sell the CSA mine, but overall things were getting brighter for Cobar as commodity prices climbed.

In early 2017, production began ramping up again at Endeavor mine, restoring jobs that were lost. A swarm of junior to mid-tier miners were also pouring capital into new and established projects in the region.

And as commodity prices improve further, with copper fetching \$US7270 per tonne in January, gold sitting at \$US1342 an ounce, and zinc hitting 10-year highs at \$US3423 a tonne, more green shoots were expected.

The next step will be safeguarding the region against a future downturn, and the solution looks to be diversification beyond base metals to other commodities such as gold and silver.

Recent activity

Aurelia Metals is the owner of the Hera-Nymagee project and soon to be owner of Peak Mines.

Managing director and chief executive Jim Simpson said because Cobar has been base metal dominant throughout its history, it has been stung by the fluctuation of base metal prices.

However, Mr Simpson said the region was beginning to see a shift towards gold, and his company was in a strong position to take advantage.

In November, Aurelia Metals entered a binding agreement with New Gold to purchase the Peak mines for \$US58 million which will close in the first quarter of 2018.

The Peak mines are in close proximity to its Hera-Nymagee project, which collectively contain a mix of gold and base metals including copper, lead and zinc.

"The leases adjoin the Hera/Nymagee leases which now span over 100km along the strike length of the Cobar Basin establishing Aurelia Metals with a strong foothold in the prospective Cobar Basin," Mr Simpson said.

"The key plan for Peak is to convert the extensive current resource base into ore reserves thereby increasing the life of the operation from its existing three year mine life."

Nearby, the \$US87.1 million Nyngan scandium project was also in development, and is aiming for production in the first half of 2019, while Peel Mining was fast advancing exploration at its Mallee Bull and Wagga Tank projects.

Peel Mining managing director Rob Tyson said Mallee Bull, a JV with CBH Resources comprising the highly prospective polymetallic discovery and historic May-Day gold-base metal deposit, was its most advanced project.

"We are currently undertaking a feasibility study into development options," Mr Tyson said.

"It has been an iterative process and we are hoping to complete the study by end of March.

"The project needs a considerable amount of exploration still, to define mineable reserves, so we are likely to pursue a staged exploration-focused development to enable deeper, cheaper underground diamond drilling."

Since late 2017, Peel Mining shares have risen considerably, increasing from \$0.23 a share in early October to \$0.56 a share mid-January on the back of positive drilling results at the high-grade Southern Nights discovery within the Wagga Tank polymetallic project.

Gold miner St Barbara has also shown interest in the stock, purchasing an additional \$1.5 million worth of Peel shares in November to increase its stake in the company from 9.6 per cent to about 10.8 per cent.

The region's existing mines were also showing promise.

In November last year, CSA mine staff held a community consultation which gave an overview of the aging project's mine operating plan (MOP) for 2018-2020.

It confirmed over the next three years, it planned to mine at a rate of between 1.25 and 1.3 million tonnes per annum (mtpa) of copper ore, which could be sustained beyond its MOP until at least 2026.

The company was in the process of ramping up exploration at CSA, spending about \$6 million in 2017 and an estimated \$10 million in 2018.

Endeavor was also "recruiting strongly and the life of mine is extending," Ms Shephard said.

"There are new areas in the shire with good drilling results pointing to a strong mining future for the shire."

Regional Challenges

"Cobar is a transient town — always has been," Cobar Shire Corporate and Economic Development director Angela Shepherd said.



Peel Mining’s Southern Nights discovery at its Wagga Tank polymetallic project.

“The mining industry is hugely important to the Cobar Shire with more than 40 per cent of the workforce employed directly in the mines, according to ABS figures.
“Our biggest challenge, for all industries, is to attract and retain a workforce.”

Due to the region’s remote position (710km from Sydney and 301km from Dubbo) there were still issues hanging over the town.

This was exacerbated by Air Link’s decision in December to terminate its public transport air services between Cobar and Dubbo following the conclusion of working arrangements with local stakeholders.

The air services provider, which had been operating air services between the towns since August 2015, said there were “no current plans to recommence services to Cobar”.

The news sent shockwaves through the town, which in the past has struggled to attract professional workers due to its isolation.

“This is a large blow for the community,” Ms Shephard said.

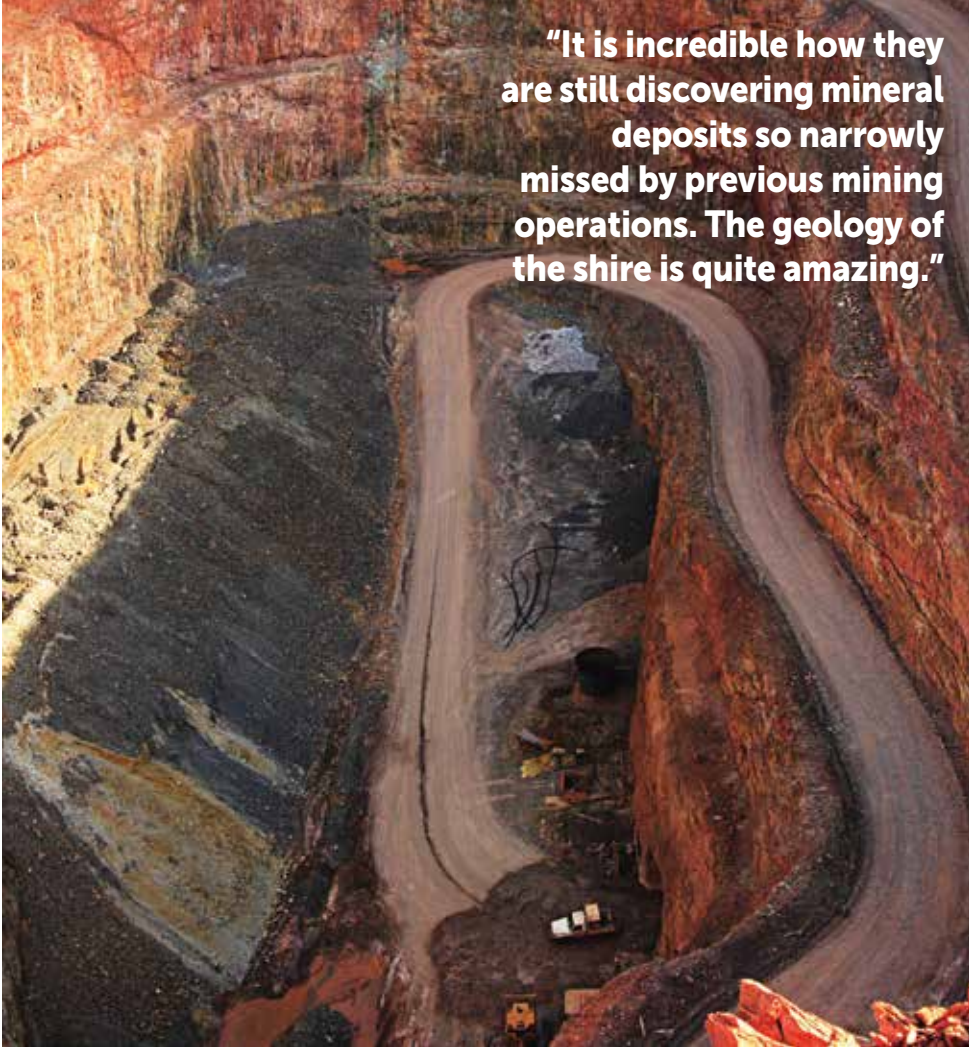
“We have been fortunate to have a Regular Passenger Transport (RPT) service, however with Rex (Airlink) pulling out it places stress not only on the mining industry but also on the rest of the community, such as our ability to attract and retain doctors.

“It has been one of our advantages over other towns, that we had a Sydney air service at least four days a week.

“An air service reduces our isolation for business and personal needs of the workforce.

“However, we have had similar hiccups in the past and once again we will work together to find a new operator for our town.”

Ms Shephard said while the airport



“It is incredible how they are still discovering mineral deposits so narrowly missed by previous mining operations. The geology of the shire is quite amazing.”

Fort Bourke Hill — the historic site of Cobar’s first gold mine, the New Cobar gold mine.

would still be used by charters, it was imperative that a new regular passenger transport operator would link to the town.

“The Council is working with the mining companies to secure another provider,” she said.

“This may take some time as any new provider will need to secure landing and leaving time slots at Sydney.

“I believe there is a good sense of cooperation by everyone as we are all keen to see this happen.”

Other issues facing the region were the availability and cost of power and water.

“We are located a long way from a river with the Bogan 130km away,” Ms Shephard said.

(CONTINUED OVER)

**PROTECTING HEALTH
AND THE ENVIRONMENT
THROUGH SCIENCE**

HAZMAT CONSULTANCY
Your **LOCAL** consultancy

Based in **Dubbo Western NSW**, we live and work locally with fast mobilisation to site and strong local partnerships to ensure smooth running projects

RISK
ASSESSMENT

MONITORING

SITE TRAINING

POLLUTION
INCIDENTS

DUST

CONTAMINATED
SITES

ASBESTOS

VIBRATION

REMEDIATION

EnviroScience
1300 372 436
EnviroScience.com.au
Dubbo | Wagga | Tamworth | Maroochydore | Sydney

AWI CONSULTING
GROW • CONNECT • ACHIEVE

**PRIORITISING
EMPLOYEE WELLNESS**

AWI Consulting is a specialist provider of psychological and training services including:
Employee Assistance Programs (EAP) and Critical Incident Stress Management (CISM) to NSW’s mining and resources sector.

Mining and resources are our speciality. With staff based in regional and remote NSW, we deliver services tailored for your business, your culture and the individual concerns that challenge your employees.

1300 363 577
info@awiconsulting.com.au
www.awiconsulting.com.au

"Our biggest challenge, for all industries, is to attract and retain a workforce."



Image: Aurelia Metals.

An aerial view of Aurelia Metals' Hera project.

"Cobar relies on water supplies from Burrendong Dam, via an open 70km channel; the water is stored in weir pools before being piped to Cobar.

"There are large losses from the system. Expansion of the industry will require larger water licenses and access to more water."

Ms Shephard said the NSW Government was currently investing in this infrastructure, however the mining operations around Nymagee were not connected to the pipeline and instead relied on underground water, which was scarce in some parts.

"In addition, we all know that power supplies are limited and the cost is rising significantly," she said.

"Cobar is located a long way from power generation sources, and while the Nyngan solar farm has changed that in part, Cobar needs an alternative power supply to be available closer to home – possibly on site for new mines that are not on the grid.

"There is very limited power networks in the Nymagee area and Hera mine actually have their own source."

Aurelia Metals' Mr Simpson said the decline in services over the years has also been one of the biggest challenges.

"This makes it harder for mining companies to attract key personnel," Mr Simpson said.

A Bright Outlook

Mr Simpson said the outlook for Cobar looked positive, and Aurelia Metals "will certainly look at any opportunity that presents itself".

"There has been some very positive exploration in the Cobar region in recent years with some good prospects of new mines starting from this successful exploration," he said.

"I believe that this will continue."

Ms Shephard agreed, claiming the Cobar mining industry "has a very strong future, as long as international prices don't collapse".

She anticipated the majority of the aging mines in the region (if not all) to still be producing in the medium term.

"They are continuing to invest in exploration with strong results showing

and development plans are being made," she said.

"I don't believe anyone knows the extent of resources in the ground still and it is incredible how they are still discovering mineral deposits so narrowly missed by previous mining operations.

"The geology of the shire is quite amazing."

Looking ahead, Ms Shephard said it was also important for the companies exploring the region to actively invest in its social fabric.

One of the most topical issues at present was the town's push for a Cobar Miners Memorial to commemorate the 172 miners that have lost their lives in the shire over the years.

"Fundraising efforts are continuing, a design has been approved, a DA approved by Council, and all the research completed," Ms Shephard said.

"The aim is to have it constructed by our 150th anniversary in 2019/2020."

Cobar Miners Memorial Committee chairman, long-time Cobar resident and former miner Barry Knight said the committee needed \$380,000 to build the memorial, and currently had \$112,000 in the bank.

"In October last year as part of Cobar's annual Festival of The Miners Ghost we held our first memorial service to honour those who lost their lives 'A Night To Remember Our Lost Miners' which was attended by 250 people of which 50 were from out of town and travelled to Cobar just for the service," Mr Knight said.

"All the mining companies have been very supportive to date, and the Cobar community are right behind me on this project."

COBAR CONTRACTING SOLUTIONS



Established in 2014,
Mathew Farrell Contracting
is a local Cobar-based contracting
company specialising in:

- Metal fabrication and construction • Labour hire
- Mining maintenance and mechanical repairs
- Product sourcing and sales • Mobile welding

**Contact us today to discuss your next project,
we'd love to hear from you.**

4 Wrightville Street
Cobar NSW 2835
0407 521 106
mathewfarrell@hotmail.com

MFC

Thinking ‘outside the box’



More information on Jemrok can be found at www.jemrok.com.au.

NATIONAL

ESTABLISHED in 2011, Jemrok has quickly become a leader in underground mining and associated services in the Cobar region.

Built on a strong foundation of working with integrity, intelligent and responsible engineering practices, the national company

offers an extensive range of surface and underground equipment for hire.

It is also a highly respected multi-specialist mining provider, with expertise in mine development and rehabilitation, vehicle and heavy equipment maintenance, light and heavy auto parts procurement, mine production activities and professional labour hire.

“Jemrok is part of the Kyda Group and

currently have five operational sites throughout Tasmania, NSW and Victoria which includes the management of automotive workshops for maintenance and repair of service fleet and customer vehicles,” Jemrok sales and marketing director Paul Sturzaker said.

“While based from our operational sites our civil engineering and mining teams travel Australia wide, and we are dedicated

to providing the highest possible level of service and customer satisfaction, with quality products and availability throughout our distribution network.”

Parts available on demand include a full range of genuine, OEM and aftermarket parts, suitable for CV shafts, joints and axle components, exhaust systems, suspension, brakes, filtration, steering, cooling and more.



Jemrok has established ourselves as the ‘go-to’ for smart solutions. With a heritage in underground mining services, Jemrok leads the way with innovative outcomes and technical advice. This success is built on a strong foundation of integrity, commitment and responsible engineering practices. Offering an extensive list of capabilities, Jemrok is leading the way in:

- MINING SERVICES • VEHICLE MAINTENANCE
- PARTS PROCUREMENT • LABOUR HIRE

Jemrok’s point of difference lies in the level of ingenuity, innovation and project execution. We pride ourselves in our professionalism and the capability of our employees to complete projects to a high standard.



LABOUR HIRE



VEHICLE MAINTENANCE



PARTS PROCUREMENT



MINING SERVICES

COBAR

5 Lewis Street, Cobar NSW 2835

(02) 6836 4011 admin@jemrok.com.au

jemrok.com.au

LIFEBLOOD

OF THE PILBARA

BHP's Western Australian Iron Ore operations remain on track after a strong 2017. This year, a final investment decision to proceed with the development of its \$US3.2 billion South Flank project is set unlock thousands of construction jobs in the region.

Image: BHP.

SOUTH FLANK

**Approximate
Project Value
(CAPEX):
\$2 billion**

**Preliminary
Enabling Works:
commencing
CY17**

**Final Investment
Decision: Q1 CY18**

**Main
construction and
commissioning
works: Q1 CY18
to Q1 CY21.**



**CAMERON DRUMMOND
REUBEN ADAMS**

"WE are simpler, with half the assets we had before and a portfolio now focused on truly tier-one assets with common characteristics," BHP chief Andrew Mackenzie said at the global miner's November AGM.

This focus on simplification and productivity is paying dividends; in FY17 all BHP-operated assets were free cash flow positive and delivered a total free cash flow of US\$12.6 billion, the second highest on record. Net debt was also reduced by \$US10 billion.

At current prices most iron ore miners are in the black, but in January Macquarie Bank calculated that Rio Tinto (\$US28) and BHP (\$US31) boasted the lowest break even points of all iron ore miners monitored by some margin; well ahead of Brazil's Vale and Fortescue Metals Group at \$US43 and \$US48, respectively.

The December 2017 quarter saw BHP mark a record-high annualised production rate of 284 million tonnes (mt) (100 per cent basis) at Western Australia Iron Ore (WAIO) as prices remained robust.

Total iron ore production for the December 2017 half was in line with the same period last year at 117 mt, or 136 mt on a 100 per cent basis.




Guidance for the 2018 financial year remains unchanged at between 239mt and 243 mt, or between 275 mt and 280 mt (100 per cent basis), with volumes weighted to the second half of the financial year.

(CONTINUED ON PAGE 28)

Access Made Easy

Fast and affordable access to fixtures and equipment through our lowering pole technology

Swivelpole™

Complete	Component	Convert
		
<i>Choose from a range of complete poles</i>	<i>Build your own lowering pole</i>	<i>"It's cheaper to install a Safe Swivel Joint than to build a scaffold"</i>

Exciting New Products

- » **High Vibration Pole Top** ideal for autonomous trucks, crushing plants and any high vibration areas
- » **F17 Freestanding Swivelpole** up to 6m, for lightweight fixtures and equipment
- » **Giraffe Pole** up to 6m, ideal for heavy fixtures and equipment
- » **Horizontal Pole** for platform mounted area lighting

See our NEW website www.swivelpole.com

Ph: 08 9582 0870

(CONTINUED FROM PAGE 26)



Image: BHP.

MULTIPLAN

3D STEELWORK DRAFTING



- Steelwork modelling & detailing services
- Servicing the mining industry since 1993
- Mining platework, mechanical and structural
- Proven track record on large mining projects
- Our staff can work seamlessly alongside designers

CONTACT US



(08) 9356 5993



multiplan@mddwa.com.au

www.mddwa.com.au

At WAIO, record production at Jimblebar and Mining Area C was offset by the impact of lower opening stockpile levels following the fire at the Mt Whaleback screening plant in June 2017, and planned maintenance in the previous quarter.

Volumes increased by 11 per cent from the September 2017 quarter with a record annualised rate of 284mt (100 per cent basis) achieved for the December 2017 quarter.

“The project is expected to be submitted for board approval in the middle of the 2018 calendar year, with first ore targeted in the 2021 calendar year and ramp-up timed to coincide with the ramp-down of Yandi.”

The higher volumes reflect increased plant availability and improved rail performance. Port debottlenecking activities were completed in the December 2017 quarter and will support higher volumes in the second half of the financial year.

BHP continues to work with the relevant authorities in relation to the necessary approvals to increase system capacity to 290mtpa (100 per cent basis).

Sustaining Production

To sustain production levels as its Yandi operation reaches the end of its mine life over the next five to ten years, BHP WAIO will require the development of an

additional ore deposit.

The preferred replacement is the proposed \$US3.2 billion South Flank project, a high-grade iron ore deposit that enables BHP to utilise existing infrastructure at Mining Area C, and will output 80 million tonnes of ore per annum.

The proposed project is currently in study phase and is progressing through approvals, with a first production target of 2021.

In August last year, BHP chose Fluor for construction management of the project after spending \$184m on pre-commitment work, which includes the expansion of the existing Mulla Mulla accommodation village.

In December, the project was approved by the Environmental Protection Agency, and it is expected BHP will make a final investment decision by mid-year.

“The project is expected to be submitted for board approval in the middle of the 2018 calendar year, with first ore targeted in the 2021 calendar year and ramp-up timed to coincide with the ramp-down of Yandi,” BHP said.

The capital cost for South Flank is expected to be in the range of \$US30 to \$US40 per tonne, with expenditure fitting within WAIO’s previously indicated average sustaining capital expenditure of \$US4 per tonne over the next five years.

Mr Henry said the capital efficient South Flank project was a compelling option to replace Yandi production and offered attractive returns.

“The capital efficiency of South Flank is underpinned by the planned use of existing infrastructure at the Mining Area C operation, which would, if approved, become one of the largest standalone iron ore processing centres in the world, within reach of several billion tonnes of high-grade ore,” Mr Henry said.



Pilbara Minerals' \$234 million Pilgangoora lithium-tantalum project is ramping up to production. We spoke with the company's managing director Ken Brinsden about its development and his thoughts on the lithium market.

All images: Pilbara Minerals.

CAMERON DRUMMOND

Q. How far into development is Pilgangoora, and what key components need finalising before production?

It's only in the last probably two to three months that we've really got into the major site works.

Between now and June, 80 per cent of the balance of the site works will be completed and we will be into the commissioning period, with construction personnel to peak at over 500 people in the next few weeks.

Our strategy from a commissioning point of view tends to be quite different from other projects that have proceeded us.

We are very focused on the fines portion of the circuit using flotation, which is a relatively simpler commissioning process than dense media separation.

We've also continued to work on Stage 2 in parallel to Stage 1, and are going through the pre-feasibility and definitive feasibility study processes primarily in the first half of this year, with an expectation that there will be a commitment to the project on or around mid-year.

As a result we would be commissioning the second stage in the third quarter of 2019 and ramping up capacity leading into the end of that year.

Stage 2 should be significantly cheaper as expansion will run off the back of Stage 1's infrastructure platform.

Q. The DSO arrangement with Atlas Iron is beneficial for its own diversification from iron ore. How does this benefit Pilbara Minerals?

The demand for direct shipping ore (DSO) has never really gone away. The question for us was more about attracting the right type of customer that was prepared to work with us and not leave us high and dry in a sales arrangement.

We are happy to progress a small DSO program which has the benefit to be able to



Pilbara Minerals' managing director Ken Brinsden.

"I do genuinely believe that Chinese demand is being underestimated by the global investment community."

bring forward more cash flow.

What the demand for DSO tells you is that there is a critical shortage of lithium units in China, and people are prepared to pay a very healthy price for the DSO ore.

I do genuinely believe that Chinese demand is being underestimated by the global investment community.

They are moving much faster in the lithium sphere than perhaps they are being given credit for today, as well as with the application of downstream technologies.

Q. Is the company actively looking for more offtake agreements?

We have made no secret of our desire to build

out our customer base, especially where it can work outside China.

Hard rock sources of supply are really important for the future mix of batteries because of their ability to get into production faster than that of the brine operations.

Perhaps more importantly, they are also a more stable, and in fact typically higher quality source of supply; and in that regard they are very well in line with the higher-grade battery demand segment that has emerged.

The big global battery manufacturers can see that and we believe they are looking to position themselves to a hard-rock supply base, and we like to think that we can take advantage of that and be an important part of that supply base in the future.

The North Pilbara's combined production

**PILGANGOORA
IN NUMBERS**

- Construction Cost of **\$236 million**
- **330,000tpa** of **6% Li₂O** spodumene concentrate
- Current Ore Reserve Estimate of **80.3mt @ 1.27% Li₂O**
- **36+** year mine life
- **Stage 2** studies underway
- **\$180m** spent with WA suppliers

between Galaxy Resources, Altura Mining and Pilbara Minerals is going to be a significant portion of the global supply base, and could become the world's lithium mining centre.

I have no doubt that the scale in the resources will ultimately deliver significant production. In terms of cooperation, Both Altura and Pilbara Minerals were prepared to continue to invest in the projects when they were perhaps not considered so sexy.

There is a healthy level of cooperation with both our companies in regards to infrastructure and sharing arrangements for our neighbouring projects. There are lots of reasons not to trip over each other and we value a continued, healthy relationship into the future.

(CONTINUED OVER)

(CONTINUED FROM PAGE 29)



"The idea that all of a sudden some new technology usurps lithium-ion batteries in the short to medium term is a false premise. The industry is voting with its feet and its capital now for lithium-ion."

Construction of the plant will be more than 80 per cent complete by June.

WE CARE • WE ARE FLEXIBLE • WE DELIVER

MACA is an integrated services contractor specialising in:

- Mining
- Civil construction
- Infrastructure
- Mineral processing equipment

We are a team of over 1,300 dedicated and highly skilled people across our Australian and International operations. The way we operate is underpinned by our **CAN DO** spirit.

MACA.NET.AU **CanDo**



Spodumene shed foundations.

Q. Some market analysts believe supply will outstrip demand as new lithium production comes online. What is your view on the lithium market over the next 5-10 years?

The two key phenomena that are being underestimated by the market today are the speed with which the chemical facilities, cathode materials and battery pack-making facilities are being built, especially in China; and secondly, the speed with which the technology is being adopted.

To me that speaks to demand growing at a faster rate than currently the market is giving credit for.

Yes, there are a lot of projects – and realistically there is not necessarily a shortage of lithium in the ground.

However, the speed with which the projects ultimately get developed and attract finance will continue to disappoint, and as a result the supply side will lag.

The combined effect of those two things is that we have reason to be optimistic about the direction the market takes from here.

The success of our business is not going to be defined by the price we receive, but our ability to deliver a high quality product at a low price. With the team we have here at Pilgangoora we have the capacity to do that, and as a result we will be one of projects that is the lowest cost

globally and in the upper premium of quality.

In terms of technology development – while it's exciting to think about all the opportunities in the rechargeable battery market – the reality is that the ability to commercialise them is over-estimated, and will take a lot longer people currently assume.

The best example I can give you is that the lithium-ion battery was discovered 40 years ago, only commercialised 10 or 12 years ago, and realistically has only hit critical mass now.

The incumbency of the technology in the battery market is important because of the difficulty of it to be displaced.

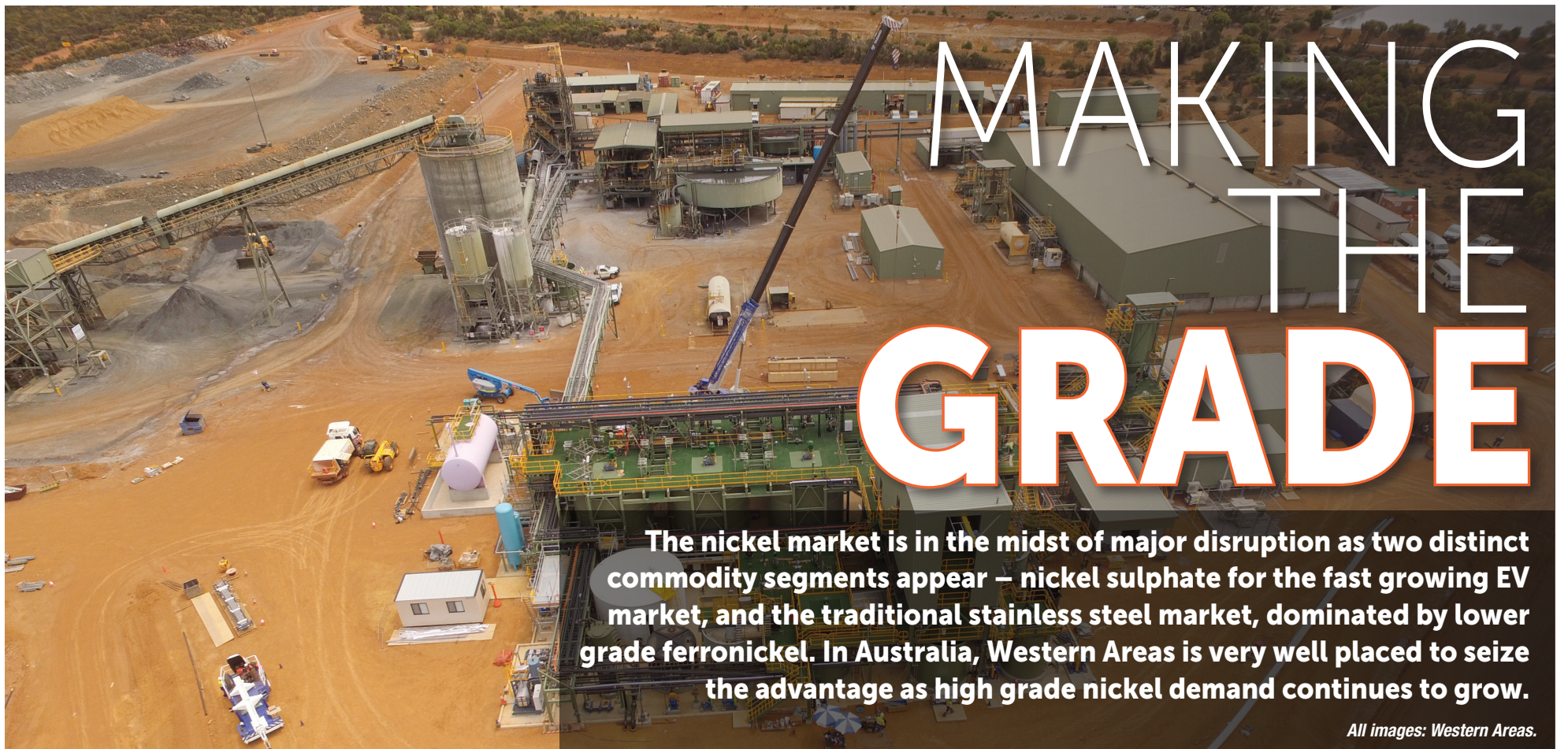
Once a rechargeable battery attracts the investment pool – and billions of dollars are being pumped into lithium-ion technology, the implication is that as the scale of the battery market grows, the cost of the battery becomes less and becomes the go-to battery technology.

It is therefore very difficult for another technology to penetrate that space.

The idea that all of a sudden some new technology usurps lithium-ion batteries in the short to medium term is a false premise.

The industry is voting with its feet and its capital now for lithium-ion.

Certain technologies will have certain niches – which is a logical outcome – but they just won't carry the volume of the lithium-ion subset of the market.



REUBEN ADAMS



Western Areas chief executive Dan Lougher.

IN early January, the Western Areas share price had climbed to a 52-week high of \$3.53.

By late January, it was still 30 per cent higher on the same time last year.

Western Areas chief executive Dan Lougher said the positive share price surge mirrored a similar spike in January 2017 – with one key difference.

“Funnily enough, if you look back at Western Areas in January last year the stock had a hard run almost identical to what has happened this year,” he said.

“Except in January 2017 Indonesia started to relax their ban a bit and that caused chaos.

“We aren’t expecting any of that this year, so it looks like a good start.”

Western Areas is Australia’s second largest sulphide nickel miner, producing between 22,000 and 25,000 nickel tonnes per annum from its Flying Fox and Spotted Quoll mines —two of the lowest cost and highest grade nickel operations in the world.

The miner had another strong year of production in 2017 while advancing its key growth projects, including the construction of the Mill Recovery Enhancement Project (MREP) at Forrestania and the delivery of a pre-feasibility study (PFS) on the Odysseus project at Cosmos.

“At the end of the day the company has worked very hard at positioning itself where we are today,” Mr Lougher said.

Tapping an emerging market

Western Areas identified the emerging trend towards nickel demand for battery manufacture a few years ago, when it started seriously discussing the disruptive potential of the EV market.

“Nickel is a well know battery product, so it doesn’t surprise me that it has come out as a key component of the Li-ion battery,” Mr Lougher said.

“The new [lithium-ion battery] technology is going to be eight parts nickel, one part cobalt, one part manganese.

That product is going to become more and more common which is going to be a major demand driver, Mr Lougher said.

“I can certainly remember people telling us to get off the bandwagon, and I still get people asking me – ‘are you really buying into these projections for EV?’” he said.

“You just have to listen to what’s happening in some of the smaller countries already. Some European countries will be banning all internal combustions engine vehicles.

“History will show us that when these things take hold they run pretty hard.”

MREP: a product for the battery supply chain

In April last year, Western Areas gave the go ahead for the Mill Recovery Enhancement Project (MREP), which will create a product for the EV battery supply chain from a specific cut of the live tailings stream that was previously discarded.

This innovative process will generate high value product for sale directly into the battery manufacturing market.

Construction works have progressed on time and on budget with commissioning and production scheduled for late in the March 2018 quarter.

“The MREP project will be producing a very high quality material – you’re talking about a 45 per cent to 50 per cent nickel sulphide,” Mr Lougher said.

“When we are commissioning, which is very soon, we will mix it in with the existing concentrate.

“When we have the batching plant up and running, and producing to spec, that product will be sold separately.”

This material will be “high spec”, which

means potential buyers in the EV precursor market will want to “test before they buy”, Mr Lougher said.

“We don’t want to give them samples until the plant is fully commissioned; then we will start the offtake conversation,” he said.

“We have already had a lot of interest out of Japan, Korea and now quite a bit of interest from China.”

A New Morning

The New Morning deposit is a medium grade nickel deposit, lying between the high grade Flying Fox and Spotted Quoll mines.

New Morning would have been economic at a higher nickel price, but Western Areas believes the MREP technology will fast track this development and several previously uneconomic or borderline economic projects.

With the construction of the MREP well underway, Western Areas has been re-assessing options for establishing an open pit operation at New Morning, producing additional high-value nickel product for the EV market using the company’s patented BioHeap process.

Western Areas has commenced a scoping study for an open pit, with an adjacent heap leach pad.

“Now we have the MREP plant it can actually take more product in the back end,” Mr Lougher said.

“[New Morning] would work at floatation at some point, but the MREP has allowed us to bring it on quicker and cheaper.”

Odysseus: a new mining centre

In 2015, Western Areas paid Glencore \$24.5m for the Cosmos Nickel Complex, 370km north-west of Kalgoorlie in WA, with the aim to establish a second mining centre in the State.

A PFS indicated that the 12,000 nickel tonnes per annum Odysseys development at Cosmos could become a core growth asset for the company.

With definitive feasibility work now underway, Western Area’s December quarter report indicated that the ongoing Odysseus studies were pointing towards a larger project and longer mine life than previously envisaged by the PFS.

Based on preliminary modelling current expectations see mine life extending beyond 10 years from the initial 7.5 years.

“If you are positive about the EV market demand then [Odysseys] fits quite nicely,” Mr Lougher said.

“There will be a transition into Odysseys as a major producer.

“It’s going to be a good operation for us; Odysseus cost per tonne is cheaper than Spotted Quoll and Flying Fox.

“The other part we haven’t included in the feasibility study is the AM5/AM6 deposits which were partially mined by Xstrata [as] they come off the same decline as Odysseys.”

The AM5 and AM6 deposits represent upside of about 53,000t of nickel. The benefit of Odysseus is that the existing infrastructure means pre-production CAPEX can be done in stages.

“There’s a lot of things we can tweak with low CAPEX to get the project started up,” Mr Lougher said.

Outlook

In WA, BHP Nickel West plans to become the world’s biggest exporter of nickel sulphate by initially producing 100,000t a year by April 2019, using existing infrastructure at its Kwinana facility.

A proposed stage two expansion to 200,000t a year would leverage off the initial investment in stage one.

Alpha Fine Chemicals has also completed its pre-feasibility study on an Esperance Nickel Sulphate Plant in WA, with a final investment decision pending this year.

Mr Lougher said this was a great sign for the future of the industry.

“Anything that uses up nickel products is good for the market, because it will draw down inventory stockpiles more quickly than we anticipated,” he said.

“The more people that use nickel, the higher the demand for the sulphide product.”

Still, some are sceptical that the bullish scenarios will play out, with EVs still a niche industry and nickel oversupply remaining a risk.

“There are still sceptics out there; there’s still a view that the projections are not sustainable, but if you play the 50 per cent rule that’s still a big market,” Mr Lougher said.

“My guess is that we will get a pinch point where stainless demand is also still growing.

“The value add for our products is only going to get better.”

INSIDE JOB

Global miner AngloGold Ashanti is looking inwards to expand. In Australia, the world's third-largest gold miner is already seeing dividends from brownfields projects designed to increase production, lower costs and extend mine life at its optimised Tropicana and Sunrise Dam assets.

Image: Tropicana JV.

REUBEN ADAMS

DESPITE historically low volatility across most asset classes in 2017, gold performed remarkably well with flows into global gold-backed exchange-traded funds (ETFs) totalling \$US8.2 billion.

January is traditionally a strong month for gold, but it's been a stronger than usual start to 2018.

Money has been piling into gold-backed ETFs, with investors lured by the biggest annual rally in seven years, according to *Bloomberg*.

In Australia the timing is good; gold production is forecast to increase in 2018, driven by new projects and mine expansions.

South Africa's AngloGold Ashanti is backing its well performing Australian assets, Sunrise Dam and the Tropicana JV.

Here, it has focused on increasing production, lowering costs and extending life of mine via low CAPEX expansions and upgrades.

A key part of its global portfolio, Sunrise Dam and Tropicana (Anglo 70 per cent) are responsible for about 522,000 ounces per annum, or 15 per cent of portfolio production.

Sunrise Dam and Tropicana production increased 18 per cent to 143,000oz for the third quarter of 2017 compared to 121,000oz for the same quarter in 2016.

This result was driven by higher mill throughput, increased grades and metallurgical recoveries.

Total cash costs fell, assisted by production increases together with lower



The Tropicana JV approved Phase One of the Long Island strategy in December.

maintenance and processing costs at Sunrise Dam.

Tropicana's production was driven by the mill throughput, which increased by 15 per cent during the quarter due to plant de-bottlenecking.

A New Sunrise

55km south of Laverton in WA, Sunrise celebrated its 20th anniversary in 2017 – and with a long track record of consistently growing reserves and resources, the

company sees a long future ahead.

After more than 17 years of operation, the open pit was completed in 2013 to a depth of 490m below surface.

(CONTINUED ON PAGE 34)



Blue Spec Drilling Pty Ltd provides a variety of drilling services including:

- ✓ Reverse circulation
- ✓ Surface diamond drilling
- ✓ Directional drilling
- ✓ Water bores
- ✓ Remote area exploration and camps



Blue Spec Drilling employs highly skilled and experienced operators and has a fleet of 19 modern multi-purpose drill rigs, which incorporate the latest safety and drilling techniques.

Blue Spec Drilling is based in Kalgoorlie, WA and also has operations in South America.



Blue Spec Drilling Pty Ltd is based in Kalgoorlie, WA and also has operations in South America.

Contact Murray Black 0417 973 394 P: 08 9021 3033
www.bluespec.net.au Email: murray@bluespec.net.au

(CONTINUED FROM PAGE 32)

"This project is in line with our approach of developing cost-effective brownfield projects with attractive payback periods that extend life and improve margins."



In 2014 the underground mine became the primary source of mill feed, but lower grades meant that all-in sustaining costs continued to creep higher.

In March last year AngloGold drove more than \$30 million into Sunrise Dam to tackle costs at the ageing mine.

A strategy is underway to lift recovered grade at the Sunrise Dam Processing Plant – the Recovery Enhancement Project – by an average of 8 per cent.

In June, GR Engineering Services was awarded a \$31.3 million engineering, procurement and construction (EPC) contract to undertake the design and construction of a brownfields upgrade to Sunrise processing facilities.

Under the contract, GR Engineering would design and construct a new flotation and ultra-fine grind processing facility with associated services upgrades to operate within the existing processing infrastructure currently in operation.

Work is scheduled for completion in June 2018.

A plan was also put in place to accelerate development and grade control drilling in the Vogue and Cosmo work areas to lift the mined grade.

In the third quarter of 2017 Sunrise Dam's production was 63,000oz, up 24 per cent on the same period last year as a result of higher mill throughput, increased grades, and improved metallurgical recoveries.

Strong production was anticipated in the last quarter as high-grade stopes are mined in the Cosmo ore zone.

Capital spend is expected to be higher in the last quarter at both Sunrise Dam and Tropicana as construction advances on the Recovery Enhancement Project and a wall raise on the tailings facility is undertaken at Sunrise Dam.

At Tropicana, the increase will be driven by the Fines Pulping Project in the processing plant and expansion of the village to support Long Island.

Long Island

On 7 December, the Tropicana JV (Anglo 70 per cent, Independence Group 30 per cent) approved Phase One of the Long Island strategy, which would increase production from the mine in the medium term and extend mine life.

Over the past two years, productivity improvements through the JV's Operational Excellence program have resulted in a reduction in mining costs to \$3.07/t using conventional mining methods.

It is anticipated that ongoing mining efficiencies will further reduce mining costs by between 5 per cent and 10 per cent during Phase One.

Mining rates at Tropicana have been successfully increased over the past year to more than 90mtpa with the addition last year of a 600t face shovel, de-risking the increase to the Long Island mining rate of between 95mtpa and 107mtpa.

The mining rate will peak at 107mtpa in 2019 and continue at that rate for about four years until the bulk of the

Havana pit is mined.

To achieve the additional material movement increase, a second 600t shovel with up to five additional Caterpillar 793 trucks and supporting ancillary equipment, will be added to the fleet.

The full Long Island strategy adds 2.1 million ounces to Tropicana's business plan, extending mine life by about seven years to 2027.

The capital expenditure related to Long Island will be small; about \$18 million, primarily for an expansion to the accommodation camp and heavy vehicle workshop infrastructure.

The additional fleet will be provided by Macmahon Holdings as part of the mining contract at the site.

Long Island uses a strip-mining approach that minimises waste haulage distances by using in-pit backfill, rather than trucking material long distances to surface waste dumps.

The completed Tropicana pit will be used as the first backfill location.

Phase One of Long Island comprises mining of the Havana South and Boston Shaker pits ahead of the next decision point in 2020 on whether to start stripping the Havana Main pit, and the third decision point in 2022 on whether to commence with the final stages of the Havana Main pit.

This phased approach provides flexibility to adjust to prevailing economic conditions.

The JV will also install an additional 6 megawatt (MW) ball mill in the

processing plant, enabling throughput to be matched to the increased mining rate and improving gold recovery by up to 3 per cent to about 92 per cent.

Grade streaming, which prioritises the processing of higher-grade ore and stockpiling lower-grade material for processing at a later date, has resumed at Tropicana and will continue through 2018 and 2019.

Gold production (100 per cent basis) is forecast to be between 478,000oz and 492,000oz in 2018 and between 530,000oz and 548,000oz in 2019.

"This project is in line with our approach of developing cost-effective brownfield projects with attractive payback periods that extend life and improve margins," AngloGold senior vice president Australia Michael Erickson said.

"The project validates the innovative ideas developed by our site team and technical specialists, and also gives us an excellent base from which we can investigate adding additional value through underground mining opportunities and regional exploration."

Gold production over Tropicana's remaining life of mine is now forecast to be about 4moz, which does not include potential future underground production from mineralization at the Boston Shaker orebody, which remains open at depth.

Following a scoping study, which is currently underway, a prefeasibility study on underground mining will begin in 2018.

Delivering innovation at Sunrise Dam

NATIONAL

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

GRES is currently delivering the Sunrise Dam Gold Recovery Enhancement Project for AngloGold Ashanti Australia (AngloGold) and previously completed the feasibility study work which established the viable pathway for development of the Recovery Enhancement Project.

GRES is proud to be assisting AngloGold in the delivery of the Recovery Enhancement project at Sunrise Dam, where sulphide mineral recovery and ultra-fine grinding unit processes are being incorporated into the process plant to consistently increase gold recovery.

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

The innovative engineering solutions developed by GRES enables its clients to secure project funding and move confidently into development with the knowledge that the outcomes from study work will be replicated from their projects.

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



GRES develops innovative engineering solutions to a range of major mining projects across Australia.

The company has delivered processing facilities and infrastructure for precious metals, base metals, mineral sands, industrial minerals, tin, tungsten and iron ore projects for a range of clients in

Australia and internationally.

GRES also has a presence in the hydrocarbons industry via its wholly owned subsidiary, Upstream Production Solutions (Upstream).

Upstream is a leading provider of operations, maintenance and well management services to the oil and gas industry in Australian and South East Asia.

FEASIBILITY STUDIES
DESIGN & CONSTRUCTION
OPERATIONS
PLANT REFURBISHMENT
ASSET MANAGEMENT
CONSULTING SERVICES

Specialising in high quality process engineering design and construction solutions to the minerals industry.

Proudly supporting AngloGold Ashanti Australia in the development of Sunrise Dam Gold Recovery Enhancement Project



www.gres.com.au | +61 8 6272 6000 | ASX:GNG

GR ENGINEERING SERVICES
ENGINEERING CONSULTANTS AND CONTRACTORS

TROPICANA: UNLOCKING VALUE

The Tropicana JV partners have embarked on multiple work programs that have demonstrated significant additional value to date. These work programs have included:

- **Debottlenecking process plant capacity** through to the end of 2017 from 5.8mtpa to 7.6mtpa. An additional ball mill will further debottleneck the processing plant capacity by the end of CY18 to 8.1mtpa, and increase metallurgical recovery by up to 3 per cent;
- **Accelerated mining in 2017** to deliver a period of elevated gold production during FY18 to FY20;
- **Long Island mining strategy** to extend mine life by understanding the resource potential beneath the pits;
- **Underground studies** to better understand and unlock further potential beneath the pits within this major mineralised system; and
- **Regional exploration** to understand the potential for further discoveries.

Building the digital mine

NATIONAL

THE use of machine learning has exploded in recent years.

Machine learning, a type of artificial intelligence (AI), provides computers with the ability to develop programs that can grow and change based on interaction with new data sets.

Within field service, machine learning underscores the idea of predictive service.

If a mining company, or supplier can predict when a service is needed, this improves a whole host of areas across the business, including resource scheduling optimisation (RSO).

RSO aids technicians in reducing their drive-times, thus creating more billable revenue.

With RSO, equipment can be scheduled in the same manner as people's time.

Within a large machinery company, for example, a specific backhoe may need to be at one site on Monday but three different sites later in the week.

RSO software can determine the best path for the equipment to take throughout the week, thereby minimising accrued miles and providing an overview of when to prioritise work needing the backhoe.

Employing RSO can shift manufacturers and FSOs from a work-order billing model to an outcome-driven service model rooted in predictive decision making.

Velrada, an expert in the roll out of artificial intelligence across the mining sector, are a Gold Certified Microsoft Partner with global experience in deploying Microsoft Dynamics 365, Office 365 Microsoft Data and AI solutions based on Azure.

Over the last few years the Microsoft Cloud



More information on Velrada's capabilities can be found at: www.velrada.com.

Platform has had a significant impact on its clients' ability to make profitable decisions.

As an example, Velrada has clients with thousands of field service technicians who are operating in geographically remote locations and can have considerable distance between jobs.

Using the Microsoft Dynamics Field Service Platform allows for assets to be managed better, resources to be assigned, routes to be optimised and data to be captured on mobile devices – all in a single cloud-based platform, which offers fast time-to-value.

With a single integrated collection of core data there is complete transparency and accuracy that would be difficult to achieve from siloed systems.

This makes for a more informed environment in which to operate and the data itself becomes more reliable and gives a richer and deeper information about the services provided.

Velrada is extending the use of Microsoft Artificial Intelligence with automated sensors that are being used for temperature checks on food, machines and the environment.

This allows for correlation between temperature information with other data and means the company is able to form a better understanding of the performance of assets, assess any impact on people's health and safety, and generally make better decisions.

Additionally, some of Velrada's clientele are looking to enhance management of islands off the coast of Australia by offering ever more sustainable services.

The value of IoT in achieving this, is perceived to be extremely high.



velrada.com

A VELRADA SUCCESS STORY

Transforming quality of life with technology

Global facilities management giant Sodexo, whose aim is to be the Quality of Life Services brand, has begun a world leading major digital transformation initiative that is rapidly changing the face of the facilities management industry.



Sodexo transforming quality of life with technology

In the past Sodexo relied on a plethora of standalone computing systems which were not integrated. Sodexo's transformation embracing cloud computing, the internet of things and advanced analytics is already saving tens of millions of dollars through efficiency gains.

This is only possible with a clear understanding of what's going on under the hood. To ensure the successful delivery of the suite of different, but related services Sodexo requires a sophisticated and integrated information platform as its digital foundation.



Technology transforms

By transitioning to Microsoft Azure, Microsoft Dynamics 365 & Microsoft Office 365 Sodexo now has flexible, scalable access to a completely integrated information system.

Applying Dynamics 365 Field Services has had a significant impact on Sodexo's ability to make profitable decisions.

With a single integrated collection of core data there is complete transparency and accuracy that would be difficult to achieve from siloed systems. Azure and Dynamics 365 is accessible by anyone authorised, from anywhere, at anytime.



Velrada's Impact

In terms of the overall business impact Paul Bean, CEO, Mining says the digital transformation is delivering productivity and efficiency benefits. "We have more empirical views of how we are actually operating. The system is a component that enables those savings and efficiencies to be made.

As one of the regions leading Microsoft and Business Transformation Partners, Velrada is proud of the positive impact being made to Quality of Life Services.

To discuss how Velrada can add-value in the transformation of your organisation please contact Saul Sabath. m. 0411 048 178 e. Saul.Sabath@velrada.com

Perth. Adelaide. Sydney. Melbourne.

1300 835 723

The secret behind operational improvements

NATIONAL

THREE years ago, when many other operators were busy cutting costs, AngloGold Ashanti (AGA) chief operating officer Ludwig Eybers had the foresight to place four of its open pit mines on a different trajectory: operational excellence.

Today that decision is paying off in spades.

Under the expert guidance of AMC Consultants' Improve team, the operations implemented tailored business improvement initiatives that have led to improved operational insight and decision-making, a stronger familiarity with operational behaviour, and an increased understanding of site interrelationships.

The numbers speak for themselves.

One continental African operation saw a 54 per cent improvement in drill fleet operating efficiency.

That is a whopping 2500 annualised operation hours in an area that was identified as the bottleneck of the operation and therefore the most important area of focus.

Similarly, one of the Australian operations recorded a year on year improvement in average daily movement (BCM) of 24 per cent last year compared to 2016.

"AMC's benchmarking studies, in conjunction with its detailed operational analysis studies at AGA's Continental African Region operations provided us with insights into the key drivers of open



AMC Consultants' Improve initiative increases miner's operational efficiencies.

pit mining performance and the potential operating cost savings that could be realised," Mr Eybers said.

"AMC were able to provide an

independent analysis of the current and future cost bases for each operation, providing valuable input to AGA's mining task force project."

More information on how AMC's unique Improve approach could help uncover hidden value in operations can be found at: www.amcconsultants.com.

WONDERING ABOUT YOUR MINE'S HIDDEN VALUE?



Since 2015, AngloGold Ashanti has entrusted AMC Consultants with reducing costs and improving performance at its Continental African and Australian operations. Some highlights are:

54% ↑ ANNUALIZED OPERATION HOURS

24% ↑ AVERAGE DAILY MOVEMENT (BCM)



www.amcconsultants.com





REUBEN ADAMS

A JANUARY update underscored the massive scope of this 270,000 ounce per annum (ozpa) project, which remains on budget and on track to pour first gold in early 2019.

In the December quarter, the Gruyere JV awarded a key five-year, \$400 million mining services contract to Downer EDI Mining, which will begin construction of mining infrastructure in the March quarter.

MACA Civil has continued to make strong progress on the bulk earthworks, completing the 28km Gruyere main access road, sealed airstrip and clearing for the Stage 1 Pit and Tailings Storage Facility (TSF).

More than 4200sqm of concrete has been poured by EPC contractor Amec Foster Wheeler Civmec Joint Venture (ACJV) in the process plant area; and a further 10,500sqm is to be poured before the process plant is complete.

Construction of the seven carbon-in-leach tanks is progressing to schedule, with the floor and annular plates for the tanks transported to site from Civmec's Henderson facility, and welding had commenced on these tanks during the December quarter.

Delivery of the first structural steel for the process plant is scheduled for the March quarter, as is delivery of the ball mill components, which are currently undergoing final inspection in Perth.

Separately, APA Group received final approval for the Yamarna Gas Pipeline (YGP). APA will design, build, own and operate the 198km pipeline and a 45 megawatt gas-fired power station to supply power to Gruyere, at a total cost of about \$180m.

Gold Fields: A WA mainstay

For Gold Fields, Gruyere will tip annual production from its WA mines over the 1 million ounce per annum mark.

Currently, Gold Fields is the second largest gold miner in WA, and the third largest Australia-wide. It has been a WA mainstay for 17 years, producing about 900,000ozpa from its three WA mines: St Ives, Agnew, and Granny Smith.

These operations provide about \$343m

of cash flow and employ 2200 staff and contractors. Results for 2017 are also expected to be very positive.

And yet the company – which is listed on the NYSE and JSE – has traditionally flown under the radar in Australia.

Gold Fields Australia boss Stuart Mathews said the company had recently committed to boosting its public profile.

“WA is very important to the company. I've made it a mission of mine as the EVP for the region to lift our profile, so that people know who we are through engagement with Local and State Government, and by speaking at more forums like the Mining Club,” Mr Mathews said.

“It is significant what we are doing here. We are currently underselling ourselves a bit I think – we have a good story to tell.”

“In 2017, that \$100m represented about one third of the total gold exploration spend in the whole of Australia.”

For Gold Fields, the 50 per cent buy-in to Gruyere will add substantial life to the miner's production profile.

Gruyere boasts a 13 year life on present reserves, but the JV partners expect it will grow well beyond that.

Mr Mathews said often there had been criticisms of short life of mine from investors and analysts in Australia, which was not necessarily justified – companies must invest in growing reserves at the right level to keep themselves sustainable.

“For instance, at Agnew [gold mine] people would say ‘well, you've only got three or four years of reserves left,’” he said.

“That's true – but Agnew has had three or four years of reserves left for 35 years, and there's still no end in sight.”

Justified or not, Gruyere has helped Gold Field's life of mine story, and it will take the miner to over 1moz per annum in Australia alone.

But the highly prospective wider tenement package also provides the miner with longer term growth options.

The Golden Highway

The benefits of the Gruyere JV lie beyond the initial 270,000ozpa operation and into the exploration potential of the project's surrounding area.

Gold Fields has a history of defying trends in exploration.

For the past three years the company has sunk \$100m annually into exploration across its Australian assets.

“It's always the same – when commodity prices are in the doldrums usually exploration is the first casualty,” Mr Mathews said.

“We took a view that this was the time for us to invest heavily. We wanted to shift the dial a little bit in Australia, so it's part of an initial five year program of investment.”

In 2017, that \$100m represented about one third of the total gold exploration spend in the whole of Australia.

The exploration program is now beginning to see real rewards.

“It just proves that even though we have been on these big tenement packages in Australia for a long time, they are still yielding results for us which will keep Gold Fields sustainable for a long time,” Mr Mathews said.

While its focus is on bringing Gruyere into production, the miner is co-funding further exploration at Gruyere to the tune of \$5.5m, part of a total budget of \$11m for the 2017 year. Exploration investment at Gruyere will continue going forward.

Gold Fields took a 10 per cent stake in Gold Road in May last year, a company which also has a history of exceptional exploration success.

Gold Road will be spearheading the exploration program on the Gruyere JV tenements, which involves a program of diamond and RC drilling along the so-called Golden Highway.

The Golden Highway is a 14km long and up to 90m wide zone of anomalous gold defined by grades greater than 0.1 grams per tonne (g/t) occurring within the Attila-Alaric Trend.

A December exploration update confirmed a number of deposits along the 14km trend had the potential to add significant value to the project – extending its life well beyond the

initial 13 years.

The best intersection returned from the recent drilling was at Montagne with an intercept of 8.47m at 15.38 g/t of gold from 56m.

A detailed IP survey was also recently completed over the full extent of the Attila-Alaric trend, which will assist in defining the extent of the gold mineralisation.

Recruitment: A skills issue

A resurgent mining sector always highlights labour market pressures as skill shortages begin to emerge – a problem that Mr Mathews said required long term solutions.

“I think most companies would be worried about the level of people entering universities and taking up subjects relevant to the mining industry,” he said.

“It doesn't help that new commodities like lithium and cobalt are taking off, which is going to put even more pressure on getting quality people.

“The problem is that people leave mining during the downturns and do other things – and they don't come back.

“There's always a lot of talk about mining downturns, so as a young person with a view to go into the mining industry – engineering, geology, or environmental science – you'll probably think twice.

“We have to try and make mining a bit more attractive again.”

It's a debate that many miners would be having at a management level.

Gold Fields are going to be here for a long time, and so the miner must start “deep diving” in skills, Mr Mathews said.

“We aren't just talking about being a mining engineer, or a geologist or metallurgist anymore – we have great jobs in finance, in community relations, business engagement, and all sorts of sustainability projects that people don't realise,” he said.

“We need to think about giving people career options at a low level before they even consider going to university, even at high school level.”

INDUSTRY SPOTLIGHT

COMPANIES GEARING UP

What's best, tube and clip or system?

NATIONAL

PEOPLE have always found themselves in a quandary about this issue.

Angry arguments ensue. Who's right and who's wrong? What if they both were right and after decades of indecision whether to utilise either tube and clip or system scaffolding? Now there is a product that keeps everyone happy.

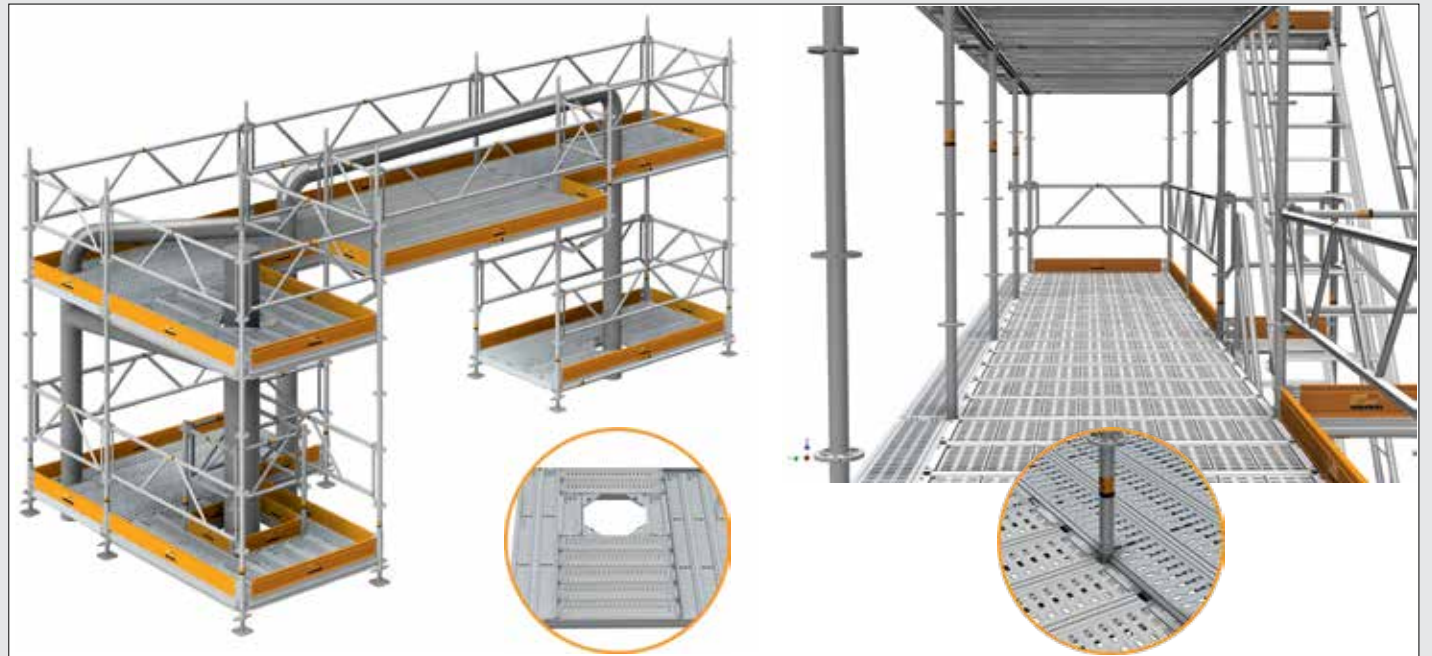
MONZON Asia Pacific (MAP) is proudly to introducing to the market its MonZon NO LIMIT® — a new concept in the scaffolding industry.

NO LIMIT® in both aluminium and steel was developed as a result of many years of research by Swedish manufacturer MonZon and an Australian scaffold end-user with vast experience in all applications of scaffold access systems.

They collaborated with main contractors, scaffolders and end-users from all around the world, in all facets of the construction, oil, gas, (downstream, midstream, upstream) remedial and protective coatings, coal, nuclear, wind, solar, electricity, marine, aviation, cement plants, government and infrastructure sectors for shutdowns and maintenance globally.

MAP did this in order to find out the problem areas that needed to be solved, as well as its clients' requirements for a scaffolding system for the future.

The requirements were clear – they all wanted the same thing, one system that could be built faster, one system that is flexible as tube and coupler, and at the same time is as easy to assemble as system scaffold; as well as be cost effective when it comes to storage and transport.



A new concept in scaffolding has hit Australia's shores.

The system should be light and strong to improve ergonomic and environmental aspects with no compromises on safety.

The NO LIMIT® concept addresses these issues and more.

The system is light and strong, to improve ergonomic and environmental aspects with no compromises on safety, and cost-effective when it comes to storage and transport.

MAP has also introduced its Building Information Modelling (BIM) for shutdowns and maintenance to the Australian market.

BIM is a digital representation of physical and functional characteristics of a facility or plant.

It can bridge the information loss associated with handling a project through

design, construction, maintenance and shutdown.

This is done by allowing each group to add and reference all information they acquire during their period of contribution to the BIM model.

The model provides the specific scaffold or access type, manufacturer, part number and any other information ever researched in the past, and only needs to be modified when additional plant is installed.

MAP solutions provide real-time analytics of shutdowns, instantaneous outage planning execution readiness, productivity ratios metrics, man hours, expenditure, emerging work, which work types / trades are ahead or behind program, and measures

current maintenance performance against company benchmarks.

MAP has an experienced team with the capability to assist in shutdown execution by allowing maintenance planners to “virtually” execute the shut through the 3D model prior to actual execution.

This mitigates work-front and resource clashes, identifies work orders that are incomplete, as well as evaluates spares, resources, permits, support and equipment availability work order components at a granular level.

What this all means to clients is more speed, efficiency, safety and profit.

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

Powered by quality control

WA

MEGATRONIC Power Systems is a control systems and electrical engineering company based in Perth, WA, specialising in electrical and control systems design, commissioning, and maintenance.

The company was set up in 2013 to provide a trustworthy and efficient service with quality as its key objective.

Its team has demonstrated experience and expertise in engineering, design and project management of small to large projects; from concept and feasibility to completion.

From technical design and implementation, to operator interface, every detail receives specialist engineering precision that both its customers and the company can be proud of.

From an operation and maintenance perspective, Megatronic takes a proactive approach to identifying all risk to operations and advises on appropriate preventative action.

Its team of electrical and control system



Megatronic's control systems.

engineers have a vast range of experience in industries including mining, water treatment, power generation, manufacturing and process plants.

Megatronic is an ISO:9001:2008 certified company and its staff are proud of the quality

management system which is the heart of the company's operations.

Through functional project planning, control of records and administration, combined with Megatronic's specialist technical abilities, projects are delivered on

time and on budget, to a standard clients can trust.

It is the standout company when it comes to electrical and control system design and strives to stay at the top through its continual improvement policy.



Some of EMS Group clients include Newcrest Mining, Centennial Mining, and Aeris Resources.

Underground mining equipment solutions

NATIONAL

RECENTLY purchasing \$5 million worth of additional machinery and parts to service its clients, hard rock mining service provider EMS Group is well placed to tackle all tasks, big or small, through 2018.

The established business, founded in 2010, specialises in equipment and labour hire, spare part sales, machinery hire, repair and sales; and is currently clearing a 20 acre block at the back of its Dubbo headquarters to make way for a new fleet.

“We’ve got arguably the largest stock of underground machinery and spare parts

in the country,” EMS Group founder and director Tom Cavanagh said.

“We’re privately owned so we have the freedom to be a dynamic and adaptable business that is not rigid with our product offerings.

“If clients want hire machinery and they don’t want to buy it at first, we can do finance deals to assist with cash flow, or a special deal where they can take over at any point; we also do labour hire in a similar way, so if we recruit and find the people that they want and they want to take them on their books, we offer a service where we can help them transition the workers into their company.”

Mr Cavanagh said it is through this flexibility that EMS Group has found its success, as well as buying current model machines at the end of their life and rebuilding them to new spec to offer more competitive prices.

“We’ve now got more than 100 pieces of specialty machinery in our hire fleet,” Mr Cavanagh said.

“Now that’s predominately underground and tunnel equipment, such as underground haul trucks, bidders, jumbos, long haul rigs, but we have also have a really large fleet of specialised railway construction equipment and civil construction equipment.”

In 2017 the company also opened a new underground high voltage electrical division with a team now working at projects in NSW, WA, QLD, Victoria and the Northern Territory.

While based in Dubbo, the company also has offices in Orange and Sydney, and has its sights set on opening up an office in Kalgoorlie, WA later this year.

“We’re really gearing ourselves up for what we believe will be a strong year for underground mining, and we’re confident that we’re going to have quite an enviable stockist for clients that are chasing good, used machinery,” Mr Cavanagh said.

Safety assured with Group lock boxes

NATIONAL

LOCKOUT equipment physically locks machinery in a safe mode, ensuring energy cannot be restored while someone is still working on the plant.

Tagout is the labelling used during the lockout process.

If more than one person is working on the same plant, each person should attach their own lock to the isolation device to prevent the isolator being opened before all locks have been removed.

A group lock box is often used to avoid the need for multiple locks on each lockout point; it can also reduce the amount of locks required on a job; and can eliminate the need for multiple lockout hasps and provide an overview of who is still working on the plant.

Under this system, each lockout point is locked by one lock only (supervisor lock), and these keys are placed inside a group lock box.

Each worker places their personal lock on the outside of the box, securely locking the isolation keys away.



More information on Cirlock can be found at www.cirlock.com.au.

As each worker’s task is completed, he or she removes their personal lock, and when all locks have been removed, an authorised site supervisor verifies all workers are out of danger before reactivating power supplies or equipment.

Cirlock stocks options from 16 to 84 padlock holes, in varying designs to cater to the needs of the job.

Larger group lock boxes also include

storage hooks for padlocks and instruction holders can be fitted to some models.

Gearing up its range in 2018, Cirlock will be offering additional colours of the GLB-4 by popular demand.

High-quality tracks and drive sprockets

NATIONAL

SYNERGY Undercarriage Components supplies market-leading, superior tracks and drive sprockets for most popular mining size hydraulic excavators and electric rope shovels to end users across Australia, the Pacific region and Africa.

The company's strategic partnerships with blue chip mining contractors and companies over the years has afforded it the opportunity to develop a broad range of designs, materials and processes to provide unique, cost-effective solutions that are application specific – whether it be hard rock copper and gold, coking and thermal coal or iron ore.

The team understand no two ore bodies are the same and that operating conditions can vary greatly – which a standard design and material from an OEM may not stand up to.

Its unique, long standing and technology driven partnership with its manufacturer – which has been manufacturing steel castings for more than 80 years – enables it to provide quality solution based differentiated products in the face of continual global competition at highly competitive prices.

"There's no denying that the last few years



Liebherr R996B tracks operating in a Bowen Basin coal mine.

have been tough for most manufacturers and suppliers, but as the saying goes 'those that fail to plan, plan to fail,' Synergy Undercarriage Components sales manager Peter Easton said.

"With this in mind, both Synergy and our manufacturer recognised the need to plan

for an uptake in demand and embarked on a significant capacity expansion over the last 12 months to position us to continue to not only support our long standing customers' future needs but new prospects as well.

"I would encourage mobile maintenance

superintendents or managers to put us to the test and get in touch to discuss their requirements."

More information on Synergy Undercarriage Components can be found at: www.syunco.com.au.

Online drug education portal launched

NATIONAL

NOT-FOR-PROFIT Sideeffect Australia has launched a new online platform to combat Australia's workplace drug culture.

The Orange Card is an online program which includes eight drug education modules, covering methamphetamine, MDMA, research chemicals, 25in BOME, synthetic cannabis, marijuana, cocaine, and fentanyl.

Sideeffect Australia director David Hobbs said the Orange Card was inspired by the mandatory White Card used in the construction industry.

"Our aim is to educate employees about the dangers of substance abuse and to create a safer community and workplace for everyone," Mr Hobbs said.

"We are envisioning that completion of The Orange Card will become mandatory across all high-risk industries and beyond, just as the White Card is."

The Orange Card was recently trialled by WA's largest residential builder, the ABN Group, where over 160 apprentices completed the program across three separate TAFE colleges in WA.

"During the trial phase of the program, we received extremely positive feedback from employers and employees alike," Mr Hobbs said.

"It's all about keeping people educated and accountable.

"Illicit drug use and substance abuse are costing billions of dollars in economic loss, absenteeism, and insurance claims – early intervention and prevention is the answer."

The cost for completion of The Orange Card is \$59.95 per employee, which gives Sideeffect Australia the opportunity to raise additional funds and continue its school drug education program.

More information can be found at: theorangecard.com.au.

Safe and secure workers deliver results



More information on Programmed can be found at www.programmed.com.au.

NATIONAL

THERE is no doubt that workers who are safe and secure in their employment are happier and will work more effectively.

When managing large groups of people, it is often a challenge to create and maintain a harmonious workplace, while also ensuring safety on site, especially in the mining industry.

Programmed Skilled Workforce has

significant strength and experience in maintaining harmonious workforces, gained over 50 years working in the Australian mining industry.

Its substantial in-house workplace relations capability is made up of legal professionals as well as industrial relations advisors who proactively manage the IR environment and quickly respond to issues as they arise.

With branch locations close to key mining sites across the country, Programmed staff are nearby to support employees and customers,

and maintain a regular onsite presence.

"We value our workforce and know that happy workers deliver better productivity outcomes for our customers," Programmed national coal manager Craig Allen said.

"We strive to create a workplace environment that is safe and secure, as well as offering attractive wages and career development opportunities.

"This helps us attract the best candidates, while also maintaining our current high performing teams."

Industry leading protective coatings

NATIONAL

HEAVY duty abrasive blasting to remove years of thick corrosion is just one of the specialty services Cormac Metal Spray offers its clients across Australasia.

For more than 22 years, the company has been actively involved in the application and development of Thermal Metal Spray (hot metal spray) which is used for 'long term corrosion protection' in the mining, petrochemical, marine, power generation, waste water and construction industries.

The application of a variety of metals can be used such as zinc, aluminium (TSA), zinc aluminium alloys and nickel, stainless steel, hastalloys, Monel and bronze.

Cormac has developed unique mobile equipment and plant for all onsite thermal metal spray, protective coatings and cathodic protection applications/installations, and also has expertise in areas such as ultra-high pressure water jetting.

"We also provide thermal spray training, thermal spray equipment sales and maintenance, and project supervision and consultancy," Cormac Metal Spray operations manager Bob Cordewener said.

The company boasts more than 16 high deposition Thermal Metal Spray systems, a unique 'Internal pipe blast and thermal spray system', and numerous abrasive blasting systems including two fully self-contained 4x4 mobile blast/metal spray trucks that can mobilise throughout Australia.

Cormac Metal Spray also strives to provide clients with safe work practices,



More information on Cormac Metal Spray can be found at www.cormacmetalspray.com.au.

quality work ethics and product satisfaction. This is evident by the calibre of clients Cormac has attracted over the years, which include heavyweights such as BHP; SHELL; Rio Tinto; OneSteel; Caltex; ExxonMobil; BP; the Australian, Philippine and Singapore navies; Chevron; Port Kembla Coal Terminal; INPEX and Keppel Fels.



SUPERIOR CORROSION PROTECTION

Cormac Metal Spray has been actively involved in the application and development of thermal arc spray (metal spray) throughout Australasia for more than two decades for use in the prevention of corrosion to steel and steel in concrete.

OUR SERVICES:

- Abrasive blasting
- Thermal Metal Spray
- Ultra High Pressure Water Jetting
- Protective coatings
- Cathodic protection (Thermally sprayed anodes)
- Powder Coating
- Non Skid/Slip - RMS approved coating

HEAD OFFICE:

12 Samantha Place, Smeaton Grange NSW 2567
T. 1300 CORMAC or +61 2 4647 4001
E. info@cormacmetalspray.com.au
cormacmetalspray.com.au

CORMAC
Thermal Metal Spray
Proud distributor for THERMAX 'Quality thermal metal spray equipment'

MELBOURNE SINGAPORE JOHOR BAHRU PORT KEMBLA

A leading Australian manufacturer of ABRASIVE BLAST EQUIPMENT



ProtoBlast has been designing and manufacturing to suit customers' individual needs since 1975.

ABRASIVE RECOVERY SYSTEM

AIRLESS BLAST MACHINES

SECTION BLAST MACHINES

DUST COLLECTORS

The best way to prepare a surface for a coating is by using the abrasive blasting process. Whether you need to blast earthmoving equipment, turbines, structural steel or railway lines...

We have successfully completed projects for Bechtel, BHP Billiton, ThyssenKrupp and BAE Systems just to mention a few.

ProtoBlast has the experience to design and supply equipment that is fast, efficient, improves your product and saves you money ... year after year

www.protoBlast.com.au



P.O. Box 157 Picton NSW 2571 // P. 1800 772 320 // International +61 2 4677 2320 // E. sales@protoBlast.com.au

One-stop water management



SUEZ offers a full range of water and process solutions.

NATIONAL

SUSTAINABLE management of the water cycle is critical to the success of mining operations in Australia.

The mining industry, for example, often uses large quantities of water and must comply with stringent quality criteria for water used as part of this process.

The team at SUEZ understands that controlling the water cycle in the mining industry requires detailed knowledge of the production processes and the ability to correctly scale the associated water treatment lines.

From sourcing to discharge, SUEZ offers a one-stop shop that addresses the environmental safeguards of operations while providing an optimised, safe, and

cost-effective outcome for customers.

This includes water supply and desalination, cooling and boiler systems, wastewater, acid mine drainage, recycling and mobile solutions.

Furthermore, SUEZ offers a full range of services that cover the complete running of your water treatment installations, the maintenance, technical assistance and the provision of mobile water treatment units

to meet any temporary needs in times of emergency or during maintenance periods.

With more than 50 major mining contracts in Europe, America, Africa and Oceania, SUEZ is a global trusted partner in the mining sector, making it well-placed to share this expertise with the Australian mining market to provide effective, innovative and reliable solutions for the water-related challenges mining clients face.



sustainable solutions for the mining industry

SUEZ provides leading resource recovery, water treatment and process solutions for mining companies across Australia. Thanks to our local roots and global expertise, our advanced solutions are adapted to every stage of a mine's life. From planning and construction to operation and closure, our solutions are cost-effective, reliable and safe.

From chemical monitoring systems through to advanced filtration and desalination, we offer a complete set of solutions to help manage and improve your water resources.

- Site services
- Processing reagents
- Process water scale control
- Foam control
- Slurry filtration aids
- Boiler and cooling treatments
- Dust control
- Membrane chemicals

08 9469 9212
www.suezwatertechnologies.com



Engineering design specialists

WA

FOR more than 21 years, WA-owned consulting engineering company WML Consultants has been a leading specialist in road, civil, structural and geotechnical design engineering; as well as technical support and project supervision.

The company can assemble tailored, multi-skilled teams to meet particular job requirements for projects in the resources and other sectors.

WML prioritises servicing regional locations with offices in Kalgoorlie and Bunbury.

Its services are readily accessible to regional areas allowing the company to provide cost-effective and timely solutions for its clients.

It is the regional engineering company for WA, and takes pride in its regional heritage and “accessible expertise” available throughout the State.

The company has three primary divisions: Civil Engineering, Structural Engineering and Geotechnical/Pavement Engineering.

Each discipline are leaders in their fields and WML is frequently the ‘go to’ company, particularly where its ‘hands-on’ local knowledge is essential to the practical, technical and cost effectiveness of the design.

WML has proved its road design expertise through long-standing relationships with Main Roads WA, numerous local governments, mining companies and land developers.

Its road designs cross the entire State, from



WML has a long standing relationship with government and industry.

Bunbury to the Goldfields, and Esperance to the Kimberley.

The designs include major highways, local distributors, sub-division, heavy haul roads and intersections, with services that can extend to sourcing road materials through to construction supervision and tailings dams design and raising.

WML's geotechnical and pavements

team are widely recognised as experts in the field with decades of regional experience throughout WA.

Whether it is understanding the site soil conditions, design, sourcing and assessing materials for road construction WML have it covered.

Its reputation for cost-effective and practical solutions is second to none.

The company also has extensive structural engineering knowledge for building and structures design, condition assessments, structural audit, structural maintenance and construction supervision for projects in the mining industry and general structural engineering.

More information on WML's capabilities can be found at: www.wml.com.au.

CIVIL ENGINEERING FULL RANGE

We proudly service all of regional Western Australia with our full range of civil engineering capabilities.

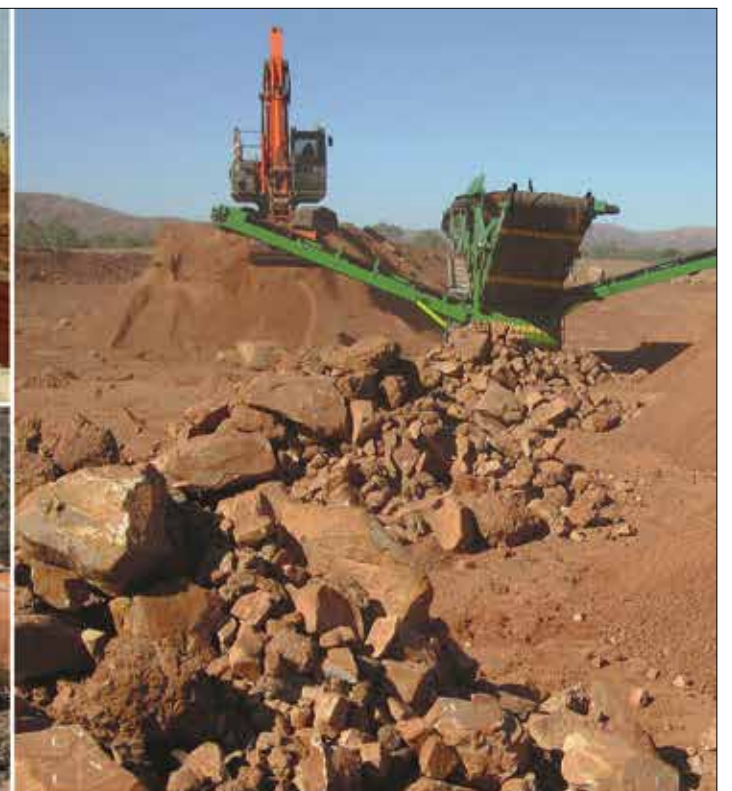
HIGHWAY AND ROAD DESIGN

HAUL ROADS AND CROSSINGS

DRAINAGE DESIGN

TAILINGS AND STORAGE DAMS

SUPERINTENDENCE AND ADMINISTRATION



WML 
accessible expertise

wml.com.au
wml@wml.com.au

BUNBURY
(08) 9722 3544

KALGOORLIE
(08) 9021 1811

CIVIL | STRUCTURAL | GEOTECHNICAL |
CONSULTING ENGINEERS

Leading edge industry tech

NATIONAL

AUSTDAC was founded in 1983 to provide intrinsically safe telephone systems and communications equipment to the Australian coal industry.

With continued growth and development, Austdac now supplies advanced communication solutions, environmental monitoring systems, safety equipment, intrinsically safe lighting, power supplies and conveyor control equipment worldwide.

The mining industry is continuously evolving and as a result Austdac products utilise the latest technology to help facilitate its continued growth.

The principle focus is the design and manufacture of rugged and hard wearing reliable products, all designed to operate in extreme outdoor and underground hazardous areas, improving the ability to communicate, monitor and control equipment in the mining industry.

With the introduction of Hubbus, Austdac now offers the ability to monitor and control equipment in the field from the control room



Austdac provides rugged, hard-wearing technology to support the ever changing needs of the mining industry.

and vice versa.

Hubbus is a long range (10-20 kilometres) data bus system for analogue and digital I/O with the unique feature of devices being

powered downline from the one signal line.

Austdac is driven to utilise leading-edge technologies and manufacturing techniques to help clients with safety and production

concerns.

Austdac product ranges are designed and certified according to the leading global standards.

COMMUNICATION, CONTROL AND MONITORING SOLUTIONS

Austdac proudly supplies communication, control and monitoring solutions for some of the harshest environments on the planet. We are committed to providing quality products and services that will meet and exceed your expectations.



Hubbus is a distributed I/O system allowing communications from controller to field service and vice versa:

- Line length 16km plus with over 320 line powered devices
- Configurable bandwidth
- Unique dual receiver for inbound signals
- 2048 addressable devices
- Integrated pullkey assembly
- Low voltage system

• Standard and SMART Analogue options
• VoIP-SIP options available
• Vandal resistant handset and cord options
• Robust and weather resistant
• Help Point phones
• Clean Room phones

Austdac Mine Telephone system features:

- Intrinsically safe for use in coal mines
- Emergency call monitoring via dialled number or tone
- Public address announcements via operator
- GUI interface with visual display of all mine phones
- Line fault monitoring for open or short circuit cables
- Display of non-verbal communications using DTMF
- Emergency alert / Evac tone to all mine phones



\$65 Business Day Delegate Package

VENUE HIRE | FULL DAY CATERING | CONFERENCE AMENITIES

- **Arrival** – Tea and Coffee
- **Morning Tea** – Freshly brewed coffee and tea, accompanied with chef's selection of one bakery item and selection of sliced seasonal fruit
- **Lunch** – Your choice of 2 x gourmet sandwich items, 1 x gourmet salad and 1 x something extra plus a fresh fruit platter, served with a selection of soft drinks
- **Afternoon Tea** – Coffee and tea accompanied by homemade cookies
 - **Choice of:** tripod screen (or) flipchart (or) whiteboard
 - Delegates also receive pads, pens, iced water and mints

BONUS: The Australian Mining Review readers that hold an event before 30 June 2018 will receive a complimentary 30-minute sundowner at the end of the day. T&C apply

112 Melville Parade, Como WA | (08) 9367 0300
admin@pagoda.com.au | www.pagoda.com.au

Conditions: Minimum of 20 guests, new bookings only and subject to availability; main plenary venue only; Monday-Friday only, valid until 30 December 2018; not valid in conjunction with any other offer.



Pagoda Resort & Spa is well equipped to cater for all corporate conferences and functions.

Corporate conferences resort-style

WA

NESTLED on the shores of the spectacular Swan River, the 4.5 star Pagoda Resort & Spa is one of Perth's famous historic riverside landmarks.

The resort, just five minutes from the CBD, offers a choice of six venue options, accompanied by deluxe rooms and serviced apartment accommodation.

The Pagoda also features its own onsite restaurant and bar (open daily for buffet breakfast, a la carte lunch and dinner, plus high tea) that is certain to impress with its pool view, tropical surroundings and relaxed atmosphere.

"If you're planning a conference,

product launch, exhibition or simply looking for a reception venue with well-appointed accommodation, you will be warmly welcomed," Pagoda Resort & Spa general manager Peow Lim said.

The resort is currently offering *The Australian Mining Review* readers (new bookings only) a \$65 Business Day Delegate Package including venue hire and full day catering.

"We invite you to meet with us to view our function facilities and discuss the details of your conference, seminar, dinner or meeting," Mr Lim said.

More information can be found at www.pagoda.com.au or by contacting its banquet sales department on (08) 9367 0300.

THE AUSTRALIAN
MINING REVIEW

FEATURES FOR MARCH 2018

Byrnes
Dacian Gold
Indigenous Contractors
Integra Mine – Glencore
Mining North-West Queensland
Mt Gibson Iron
Olympic Dam – BHP
Northern Minerals
Ramelius Resources
Rio Tinto Iron Ore
SIMEC Mining
Tellus Holdings

CALL US TO BOOK YOUR PLACEMENT TODAY

BOOKING DEADLINE: **February 16th 2018**

BRAD FRANCIS

☎ (08) 6314 0303 📞 0405 345 312

✉ brad@miningoilgas.com.au

Continental 
The Future in Motion



Shorter shutdowns mean more time to unload trains

Here's a great example of the benefits possible through client/contractor collaboration and innovation. The project required installation and splicing of 5,460m of 1500mm wide ST3150 17mm x 7mm conveyor belt on a causeway conveyor in the Pilbara. ContiTech's Pilbara team worked closely with the leading iron ore miner client's team resulting in shutdown time being cut from an allocated 144 hours to just 96. And only 12 hours to wind the old belt off and new belt on, with no crane lifts. Furthermore, not a single safety incident during the entire process. Make contact with ContiTech now and start benefitting from expertise like this.

ContiTech Australia Pty Ltd
www.contitech.net.au
+61 3 9721 0600 Melbourne VIC
+61 8 6240 3502 Perth WA

+61 8 9186 0500 Karratha WA
+61 7 48419800 Mackay QLD
+61 2 8839 9600 Parramatta NSW
+61 2 4966 3493 Beresfield NSW

ContiTech

WE GET YOU TO

WHERE YOU NEED TO BE



Sean Simmons Travel will provide the best travel solutions for you or your company.

We are a dedicated team of Travel Experts providing you with:

Service rated by our clients as consistently above excellent

Extensive knowledge of supplier products and rates, including short term special offers

Quick and effective consultation

Adherence to your Travel Policy and Preferred Suppliers, ensuring genuine savings

Regular communication and analysis of trends, keeping you updated on potential savings

24-hour service by our own staff, who are intimately aware of your travel program. Don't sit on hold to an overseas call-centre!

Manage all aspects of your travel program online:

"End to end" bookings including air, car, hotel, transfers – with multiple providers, including Wotif.com, Bookings.com.au, Expedia.com

Pre and post departure changes

Bespoke mobile app

Expense management system including full credit card integration

Multi-level approval process

Our class leading systems give you access to:

420 airlines, including low cost alternatives

750,000 hotel properties

39 car rental suppliers

SEAN SIMMONS TRAVEL



To get the personal care and tailored service that we're famous for, speak to a Sean Simmons Travel Expert

Call: 1300 391 590
Melbourne: 03 9429 3294
info@seanstravel.com.au
seansimmonstravel.com.au

helloworld
BUSINESS TRAVEL

Sean Simmons Travel is a member of
Australia's Best Travel Agency Group
AFTA Travel Industry Award Winner 2016/17

Tailored travel options

NATIONAL

OUT with the ‘one size fits all’ attitude to corporate travel, we endeavour to create tailored travel solutions that suit your business needs

At Sean Simmons Travel, we have successfully brought together some of the most talented and dedicated corporate and leisure specialists to manage all of your travel needs.

These qualifiers will always remain as our highest priority as we continue to grow.

But our team is more than just that.

We are travel professionals in our own right with more than 70 years combined experience in the industry.

We are inquisitive globetrotters, airline food connoisseurs, turbulence lovers.

But most importantly, we are exceptionally passionate about travel.

Add to this our market leading technology, duty of care and reporting systems, and we really do have you covered.

Our team is happy to discuss any aspect of your travel requirements, so if you need a team of specialists to help you get the best results from your travel program, call us on 03 9429 3294 or drop a line to info@seanstravel.com.au.



Sean Simmons Travel brings together the best corporate and leisure specialists to provide top quality customer service.

THE AUSTRALIAN
MINING REVIEW

PROFILES FOR MARCH 2018

- Acoustical Consultants
- Air Compressors & Air Tools
- Batteries and Energy Storage
- Cables & Cabling
- Commercial Photography
- Corporate Team Building
- Diesel Emissions
- Dump & Haul Trucks
- Emergency Services
- Emergency Warning Systems
- Equipment Finance
- Filters & Filtration
- Fuel & Lubricant Solutions
- Geotechnical Services
- Industrial Pumps & Valves
- Mine Rehabilitation
- Mineral Processing
- Recruitment Services
- Scaffolding Services
- Workshop Safety

CALL US TO BOOK YOUR PLACEMENT TODAY
BOOKING DEADLINE: **February 16th 2018**

BRAD FRANCIS
☎ (08) 6314 0303 📞 0405 345 312
✉ brad@miningoilgas.com.au

LEADING THE WAY

Australian researchers are at the forefront of advancing drone applications for the mining industry.



Image: UNSW.

CAMERON DRUMMOND

SINCE its initial use in military applications, drone technology has evolved into a cost-saving and efficient tool for many industries, including mining.

Mining majors such as BHP already recognise the advantages of drone technology for a range of applications.

BMA mining production head Frans Knox said the use of drones at mine sites has made operations safer and more productive.

“At some of our coal mines in QLD, they’re used to ensure areas are clear before a blast takes place and to track fumes post-blast,” Mr Knox said.

“They’re also used to improve road safety on sites, by monitoring traffic, road conditions and hazards.

“At our Olympic Dam mine in South Australia, the maintenance team use them to help inspect overhead cranes, towers and roofs of tall buildings to avoid working at height.

“We’re also becoming more productive. We’ve been trialling drones fitted with military-grade cameras to provide real time aerial footage and 3D maps of our sites.

“This is far cheaper than using planes for survey work, and the savings at our sites in QLD alone are estimated to be \$5m a year.

“With drones, we now gather more information about our sites than ever before.

“We can more quickly and accurately measure our stockpiles, review compliance to design against mine plans and understand



Image: Data61.

Underground drone testing of Hovermap's LiDAR mapping and autonomy payload.

where we need to make changes to improve safety or boost productivity.”

Automated drones

According to global consultancy firm McKinsey & Company, the rise of automation – including its use in drones – will increase productivity at mine sites by a whopping 25 per cent.

They could also cut health and safety costs as much as 20 per cent by reducing the number of workplace accidents.

Over the past decade, the growing use of robotic process automation has quietly taken root – with early adopters such as Boeing investing more than \$1 billion in research and development.

It automates repetitive and often rules-based processes without the use

of a human resource, and is an area of technological advancement that business leaders in mining are looking at to help maximise efficiencies and cut labour costs.

While most drone applications in the mining industry are currently performed with human input, companies – such as Israeli-based Airobotics – offer drone systems that do not require a pilot or an operator.

Airobotics founder Ran Krauss said his company’s vision was to develop a totally unmanned system capable of carrying out the same tasks as piloted drones.

“The system fully automates drone operations, and consists of three components: An airbase, a 2.1m high docking station equipped with a robotic arm for battery and payload swapping, the industrial-grade Optimus drone and the Airobotics cloud-based software,” Mr Krauss said.

Besides removing the need of a pilot, the utilisation of automated drones in the mining industry can offer a range of benefits.

Leading Australian drone researcher Dr Simit Raval from University of NSW’s Mining Engineering department said that advances in drone technology had hit a price point and safety benefit for industries such as the mining sector.

“Basically, drone based observations in most of the cases are quicker and cheaper compared to airborne or in some cases ground based survey without compromising on the accuracy,” Dr Raval said.

(CONTINUED ON PAGE 54)

Piloted asset inspections

NATIONAL

GROWING numbers of asset owners are using drones for condition assessments as they provide significant improvements in safety and data quality compared to traditional inspection methods.

Duratec's Australia-wide Specialist Access Division is an industry leader in drone inspections and performs detailed visual inspections of structures, often with restricted access, to assess their general condition.

This is often a precursor to a more comprehensive physical investigation, particularly if the asset is still online.

Duratec has in-house, RPAS certified UAS (Drone) pilots and more than six years' experience in conducting condition assessments including utilising the latest in confined space and 3D mapping technology.

Its pilots have qualifications in non-destructive testing, civil and structural engineering, which allows them to supply the best personnel to meet the specific needs of their client's projects.

Duratec's range of drones accept interchangeable pay loads such as HD digital SLR cameras, HD video cameras and thermal imaging cameras have the ability to inspect in winds up to 20 knots making them ideal for the inspection of chimneys and towers, bridges, oil rigs and pressure tanks.



Yara Pilbara engaged Duratec Australia to conduct a visual inspection of restricted access site structures, which revealed a defective silencer on the stack.

The company recently won a contract to complete drone inspections of the roofs of almost 200 metro and regional schools

in WA.

Once the surveys are completed, the client will be provided with footage so that

they can ascertain the existing condition of the roofs and plan a maintenance schedule if required.

DRONE SURVEYS

- Wharves
- Bridges
- Stackers
- Flares
- Tanks
- Masts
- Chimneys
- Cooling towers

We offer detailed technical drone inspections Australia-wide for concrete and steel structures

Call 1300 402 409 or email drones@duratecaustralia.com.au



Australian Government
Civil Aviation Safety Authority
Duratec ARN: 1008548

(CONTINUED FROM PAGE 52)



Image: UNSW

Nowadays, drones can provide more frequent and accurate inspections of critical infrastructure such as pits, tailings dams and haul roads, and help prevent infrastructure failure and equipment damage by quickly identifying risks and the area of concerns.

Their use can also save on fuel and labour costs by removing the need for employees using ground-based vehicles to conduct inspections.

Drilling and blasting can become more efficient, with automated drones providing accurate drill-hole alignments, and therefore eliminating the excessive use of blast materials.

The mapping of the blast fragmentation sizes produced by accurate blasting as well as tracking of fumes dispersion is possible in-turn help reduce wear and tear on hauling and crushing equipment using drones.

"We flew drones over a coal stockpile at Glencore's Ulan Coal mine for thermal imaging, and have also used drone mounted high resolution hyperspectral imaging at Russell Vale Colliery to 'fingerprint' the

sensitive ecosystem over a longwall mining area at a very fine scale that is impractical by any other conventional methods of ecological surveys," Dr Raval said.

"We have also designed a prototype drone-based water sample collection system and tested it successfully at the tailings dam of the Glendell coal mine."

Drones can help with quick incident detection to minimise damage and clean-up costs, as well as environmental damage.

The ability to provide live video feeds means they can also be used for site security and help aid with response during emergency situations.

Dr Raval and his team are actively involved in developing drone-based "precision mine rehabilitation technologies" to aid speedy recovery of mined land.

Administration and management can also be made more efficient, using drones to make it faster and easier to track and locate equipment, manage contractors, and perform precise stockpile evaluations.

"We are in process of coupling virtual

reality system with real-time drone feed, which in recent future would benefit active administration and management," Dr Raval said.

Dr Raval is also currently leading an Australian Coal Association Research Program (ACARP) project that explores drone-based LiDAR system for characterising structural parameters of pit walls.

"In mining, my vision for a mine site is to have a number of drones making automated observations that feed into a smart system to predict areas of concern and mitigate against them," Dr Raval said.

He also downplayed fears that employees in the mining industry would lose jobs to drone technology.

"It is highly unlikely for people to lose jobs over the use of drones," Dr Raval said.

"In fact, increase in commercial use of drones is more likely to create new jobs.

"We all are experiencing a big evolution in terms of automation; if we believe in Darwin's theory of evolution then this is the time to embrace and adopt these new gadgets in

HOW DRONES ARE CHANGING MINING

Recording stockpile
Volumes and
end-of-month
Reconciliation

Terrain Mapping and
Change Detection

Asset Management and
Scheduling

Situational Awareness and
Emergency Response

Infrastructure and
Equipment Inspection

Security and Surveillance

mining.

Current CASA regulations limits the use of fully autonomous drone systems at the moment, but that would soon change Dr Raval mused as the technology becomes more advanced and safer.

"I have no doubt that there will be drones everywhere in industry applications as the technology gets better and more reliable."

Going Underground

While mining companies regularly fly drones to get aerial views of their facilities, taking them underground represents a much riskier use of the technology.

Recently blasted and low visibility cavities such as stopes can conceal hidden dangers, such as falling rocks, dampness or dust with the potential to incapacitate or destroy the expensive machines.

Another major challenge for a drone flying underground is that it isn't able to use conventional satellite-navigation systems, such as GPS, like it could on the surface.

However the CSIRO, under its research unit Data61, is currently testing its Hovermap system – a payload that is attached to a drone that can be deployed to navigate large areas in underground mining operations.

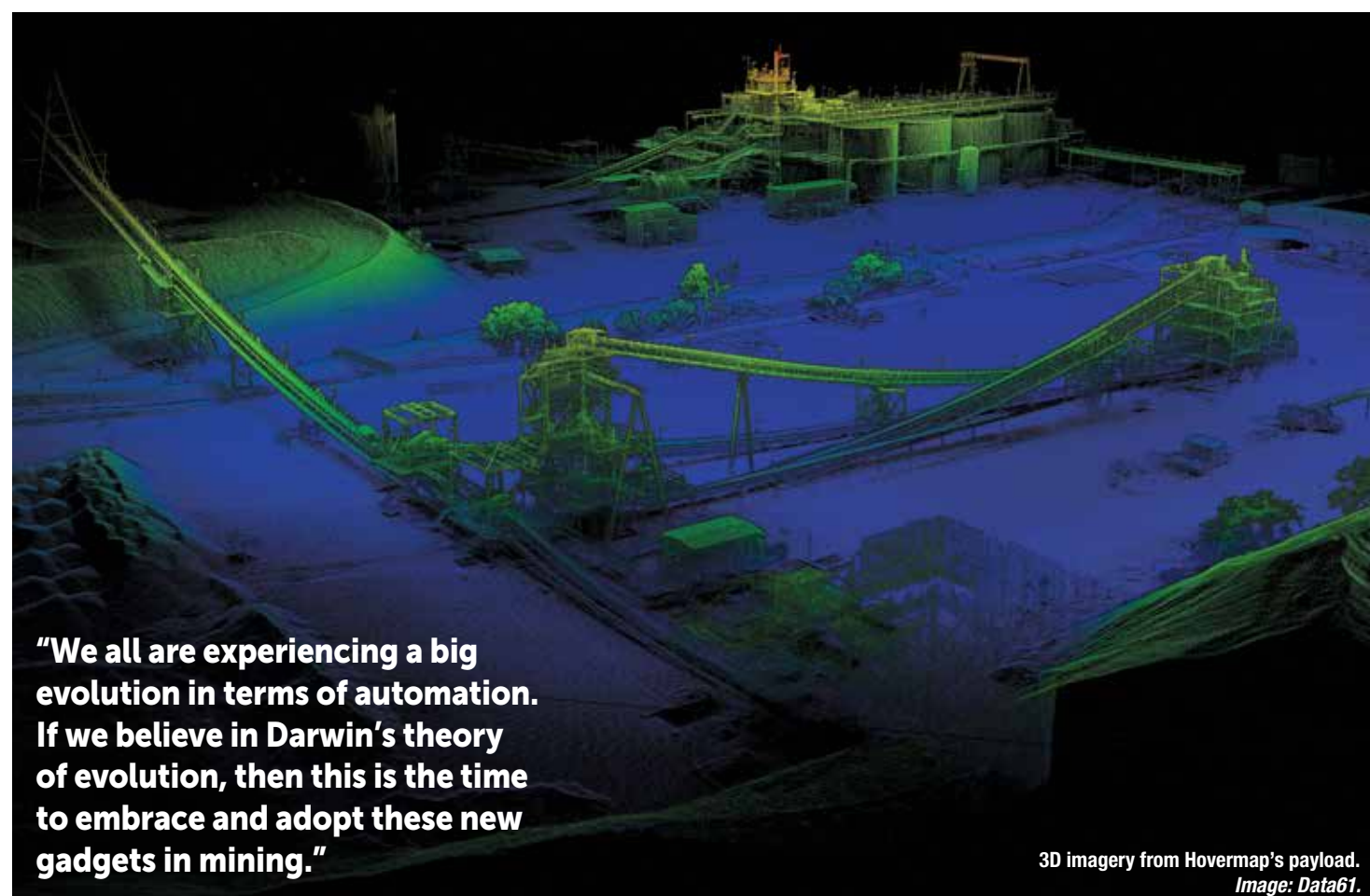
Data 61 principal research scientist Dr Stefan Hrabar said that he and his team had already successfully carried out underground tests using Hovermap at Northern Star Resources' Jundee and South32's Cannington projects in WA, as well as Newcrest's Cadia Valley mine in NSW.

"Hovermap consists of a LiDAR laser and on board computer with software connected to an autopilot system," Dr Hrabar said.

LiDAR is a surveying method that measures distance to a target by illuminating that target with a pulsed laser light, and measuring the reflected pulses with a sensor.

"Hovermap is a combination of two different areas of research," Dr Hrabar said.

"One part is drone autonomy – which we have been working on for more than 10 years – involving putting in sensors and intelligence to drones using cameras, lasers and radar so the drone can detect obstacles and follow different types of terrain without the need for expert pilot control."



"We all are experiencing a big evolution in terms of automation. If we believe in Darwin's theory of evolution, then this is the time to embrace and adopt these new gadgets in mining."

3D imagery from Hovermap's payload.
Image: Data61.

(CONTINUED ON PAGE 56)

State-of-the-art UAV drone solutions

NATIONAL

APPLUS+ is a worldwide leader in the testing, inspection and certification sector.

It is a trusted partner to the mining industry, enhancing the quality and safety of its clients' assets and infrastructure, while safeguarding their day to day operations.

Applus+ is revolutionising remote-access inspection, aerial mapping and survey workflows, with it's highly customisable and scalable UAV drone solutions, which are tailored to meet clients' specific requirements.

The company recently acquired a new state-of-the-art aerial LiDAR Laser Scanner, advancing the capability of its industrial grade UAV drone systems. UAV LiDAR scanning allows for highly accurate 3D models to be processed and produced in a fast, efficient and reliable manner.

Using the LiDAR scanner and high-resolution RGB cameras at the same time also allows for an CM accurate LiDAR model to be colourised with photogrammetry data to produce photorealistic 3D models, DTM/DEM, volumetric mesh files and a number of other geospatial outputs.

Using only the very best industrial-grade UAV equipment, operated by highly skilled and experienced pilots, Applus+ provides clients with safer, more efficient inspection and surveying solutions.

This all results in important insights are gained by engineers, production managers and land owners at a more on-demand timeframe than ever before.



Applus+ high-tech drones provide mining personnel with on-demand insights into assets under their control.



Applus⁺

UAV Drone Mapping, Surveying and Inspection Services

Over 10 years of full time UAV drone operational experience
First CASA Certified UAV Multirotor Operator in Australia

OUR SERVICES INCLUDE:

- ⊕ Aerial LiDAR Laser Scanning
- ⊕ Photogrammetric Applications
- ⊕ Stockpile Calculations
- ⊕ Open Cut Pit Volumes
- ⊕ Pit Wall Inspections
- ⊕ Infrastructure Visual Inspection
- ⊕ Point Cloud Generation
- ⊕ PPK Geo-Referenced Ortho-Mosaics
- ⊕ Thermographic Surveys
- ⊕ Multispectral Imagery
- ⊕ Environmental Monitoring
- ⊕ Heritage Area Reporting



94 Discovery Drive,
Bibra Lake WA 6163
Australia



+61 8 9410 9300



craig.davies@applusrtd.com

www.applus.com

(CONTINUED FROM PAGE 54)

"In parallel we have been solving the problem of how to localise a robot in a new environment.

"This started with ground-based robots going into a brand new area it's never seen and being able to build a map and figure out where it belongs within that map – a common problem in robotics.

"Our research developed a very robust way of implementing simultaneous localisation and mapping (SLAM) using only the data from a 3D LiDAR and a low-grade IMU, meaning the Hovermap payload can allow a drone to go into a brand new environment while moving around and mapping its surrounding area.

"SLAM is used to navigate in situations without using GPS, and post-flight we are able to use the same algorithms to produce a high resolution 3D model and correct for any drifts that may have been accumulated during flight.

"The by-product is that we are able produce this lovely looking map which you can analyse, manipulate and take measurements from – and we realised this can be very valuable in applications such as underground mining."

Trials mapping underground stopes at Cannington and Jundee were well received by the mining companies.

"We tested the autonomous capability at South32's Cannington underground mine, which showed the ability of the drone's stability and collision avoidance systems while measuring the stope autonomously, which marked the world's first autonomous drone flights underground," Dr Hrabar said.

"Having the drone fly into a stope means you don't have to have any people near the stope itself, which adds safety value to the operation, and for volumetric calculations it's just way better – it removes the guesswork of the shadowing effects from current forms of stope measurement such as a cavity

"The by-product is that we are able produce this lovely looking map which you can analyse, manipulate and take measurements from – and we realised this can be very valuable in applications such as underground mining."

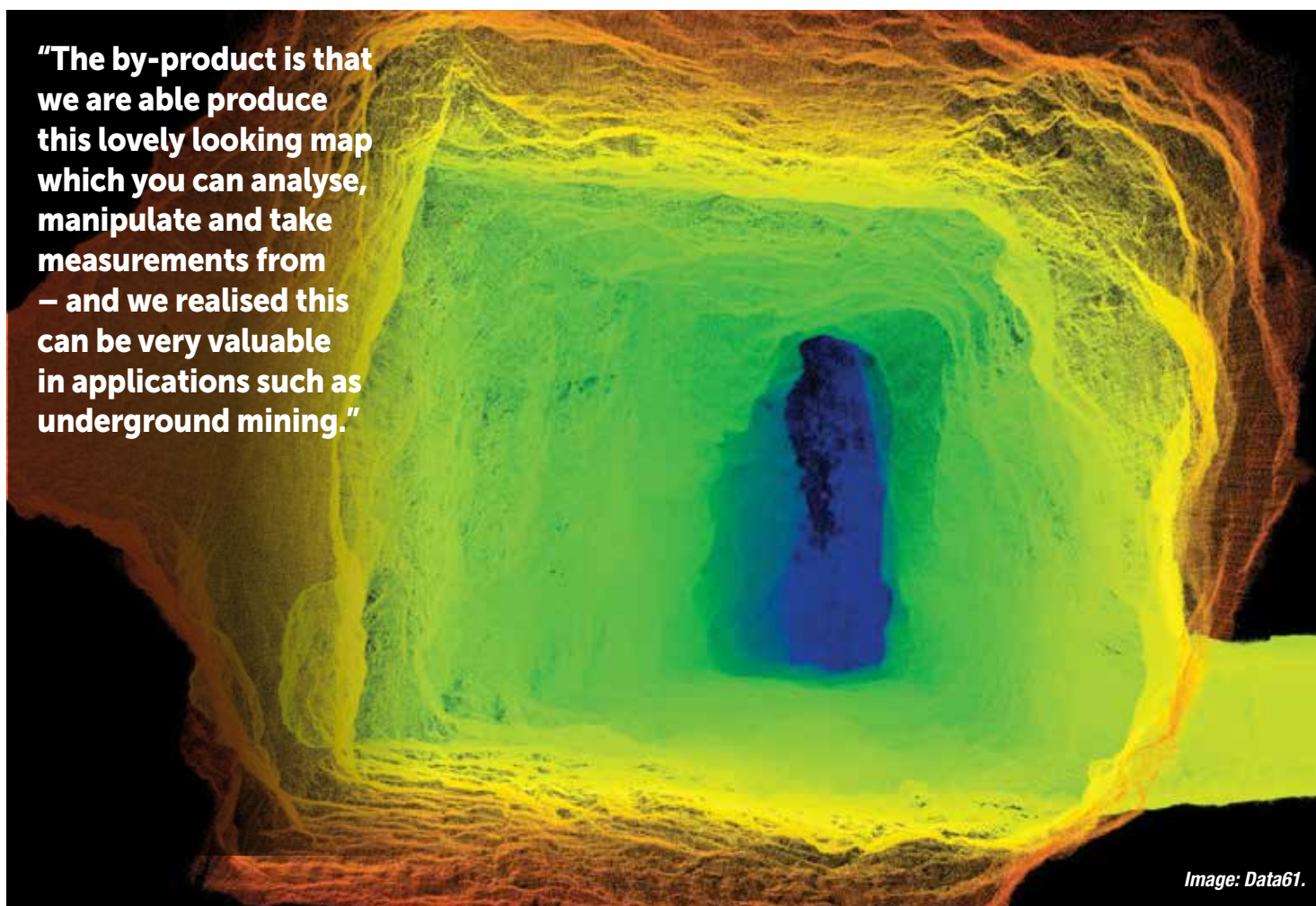


Image: Data61.

3D point cloud of an underground mine stope generated by the Hovermap LiDAR payload.

monitoring system (CMS).

"Because of the density and level of detail gathered by the Hovermap payload, miners can now understand the geotechnical side of things a lot better.

"The big difference of our test at Jundee was we flew beyond line-of-site of the operator, sending the drone into areas where it flew

autonomously for nine minutes of flight without anyone being able to see it.

"This underground autonomous beyond line-of-sight flight was another world first."

The Data61 team also tested Hovermap in a block cave environment at Newcrest's Cadia Valley mine, where it successfully flew into the draw points of a block cave to see if it could map out any hangups that may have clogged

up.

"It's been eye opening to see so much demand for the application of systems like Hovermap for autonomous underground mapping using drones," Dr Hrabar said.

"Our next test will be in Canada at Glencore's Kidd Creek operation for further trials and demonstrations together with UAS Inc, our Canadian-based early adopter."

Insitu leading the data revolution

NATIONAL

INNOVATIONS in remote sensing technologies combined with the new era of big data is heralding a step-change in resource sector operations.

As more of the mining industry embraces new technology, digitisation and automation of mining operations enabled by the introduction of remote sensing and data analytics are key drivers of productivity and safety gains.

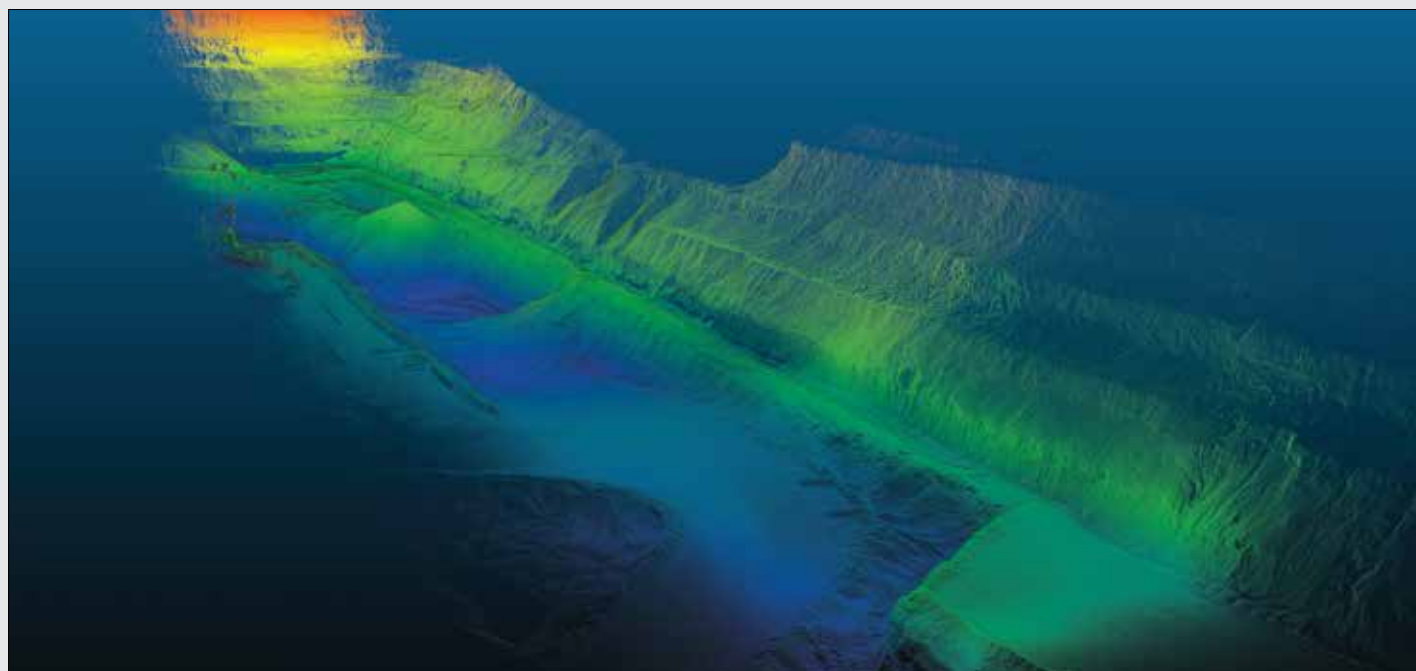
Combining new technologies such as Unmanned Aerial Systems (UAVs), sensors and data analytics tools into an end-to-end innovative solution can bring benefits now and into the future.

Insitu Asia Pacific Commercial Solutions director Andrew Donald said that the use of highly temporal airborne remote sensing capabilities can provide significant business efficiency improvements.

"Sensor data collected from a whole mine site using one or more UAVs is connected with Insitu's cloud based capability called INEXA Solutions to enable superior decision-making," Mr Donald said.

Leveraging Beyond Visual Line of Sight (BVLOS) UAVs with single flight durations in excess of 12 hours on a daily basis is driving the transformation of traditional surveying and infrastructure inspections.

The result offers the potential for significant efficiencies across multiple operations including overall circuit health for ground assets, environmental compliance, dig-to-load timings, haulage carry back and load status, GO line monitoring, stock pile and block status



LiDAR imagery from Insitu Pacific's UAV's.

across entire mine sites.

"By leveraging BVLOS UAVs with long flight durations, a shift from traditional surveying and inspection has seen significant efficiencies across operations, including reduced operational downtime," Mr Donald said.

"For example, during blast operations not only is safety increased but shut down periods are reduced by leveraging real-time information on the footprint, heave direction and fume monitoring."

Secondary benefits have been recognised in emergency management where real-time

situational awareness of incidents such as geotechnical failures, flooding and vehicle incident is invaluable in assisting reaction decision velocity.

This can be achieved by streaming near real-time video and still imagery to incident response and management teams located anywhere globally.

An overall single-source contract for aerial remote sensing and data management provides standardised data collection, processing, analytics, storage and dissemination.

This enables a more cost-effective approach aligning with enterprise business systems.

Rapid advancements are slated to provide even greater levels of information for operational staff.

Insitu anticipates remote operations will bring live situational awareness to headquarters, and decisions will be disseminated back to the field in real time, supported by augmented reality tools.

"Recurring maintenance inspections and surveying tasks could be conducted in full autonomy, complemented by swarming (one-to-many) and drone-in-a-box configurations," Mr Donald said.



See your bottom line from above

Open-cut mining operations require micro and macro inspection, surveillance and analysis. Insitu uses aerial remote sensing to plan, collect, analyze and distribute critical information to mine operators to improve mine efficiency and safety, while avoiding any disruption in operations. Partnering with us won't just change how you see your business. It will change how you do it. insitupacific.com.au



Advanced detection capabilities

NATIONAL

THE subject of process gas emissions is wide and varied presenting unforeseen work and tasks that take on so many challenges to meet today's high standards.

Australian Dynamic Technologies (ADT) has taken on some of these difficulties by offering different methods of procuring real time data in two areas.

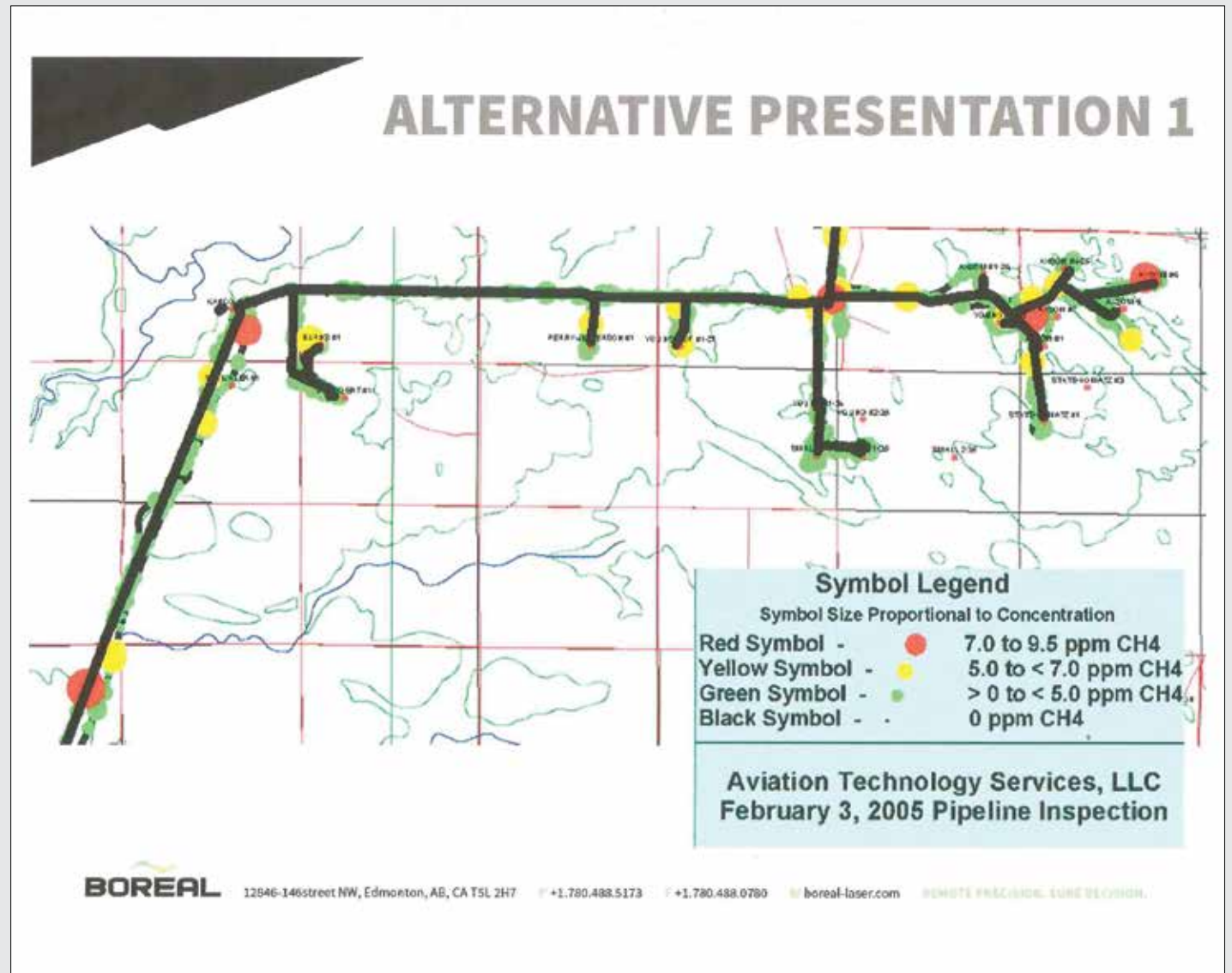
Pipeline gas detection involves getting close to the potential leakage sources while covering vast lengths of gas pipeline and reporting gas liberations.

In this instance, the Boreal UAV Laser Analyser is the ultimate answer, with parts per million detection, no cross sensitivities, high speed and integral automatic calibration – surely the engineers' best friend.

The same technique can be used for fence line monitoring, where large areas need to be monitored with full wireless communications.

On the other hand, stack emissions are met with another drone equipped gas analyser with a Scentroid DR1000 carrying up to six sensors – part of a list of 22 different sensors – to feed back concentrations of stack plumes with full drone control.

The system can also carry a camera to inspect remote locations and report back



A pipeline inspection from the Boreal UAV Laser Analyser.

potential problems before they occur.

In another application, bund pond liquid collections are a valuable addition to the

ability of the Scentroid DR1000.

Operators would know how difficult this procedure is.

ADT offers specialist focus upon the design and production of gas analysis systems with follow up contract servicing and maintenance.

Aerial Gas Detection

The answer for inaccessible locations.

SCENTROID
Future of Sensory Technology

Drone Mounted Gas Analyser DR1000

- Designed for Process Air Quality, Stack Emissions, Fence Line Monitoring, Flare Plume Conditions, Pond Fluid Collections and Pipeline Monitoring
- Can use Thermal Imaging Camera
- Fixed Wing or Rotary Wing Capacity for 22 Gas Species down to ppm's, VOC's and Particulates to 1 micron
- Data Storage and Direct Communications



BOREAL UAV Mounted Laser Gas Analyser GF-2UAV

- Gas Pipeline detection of CO2, HF, NH3 and CH4
- Long Term Integral Calibration
- No interference
- Wireless Communications with stored data and GPS Dongle
- High Speed flight to 185 km/h
- Height above ground to 65 metres
- Fixed Wing or Rotary Blade



Further information

adt
australian dynamic technologies

Aust. Dynamic Technologies Co Pty Ltd
5 Aspinall Place, Mulgrave NSW 2756
Tel: +61 2 4577 9347 | Fax: +61 2 4587 7786
Email: sales@austdynatech.com.au

www.austdynatech.com.au

Drone delivers blast site efficiencies

NATIONAL

DRONE Services Australia provides topographic and Normalised Difference Vegetation Index (NDVI) aerial surveillance imagery services capable of achieving decimetre accuracy.

In mining, its drone technology can be utilised across a wide range of areas, including generating high-quality aerial imagery of a blast site after holes have been drilled, capturing the exact GPS coordinates of each hole.

In this example, the position of each hole is surveyed and then marked so it is easily identified in the footage from the drone as it passes overhead.

The actual blast-hole positions can then be referenced exactly to the survey coordinates of the mine, thereby allowing for accurate measurement of the variables necessary to plan a blast.

The coordinates are exported into a miner's blast timing design program, and into its electronic detonator system so that the appropriate firing sequences, timing and charge distributions can be applied to the blast, based on the exact positioning of each hole.



Miners are utilising drones at blast sites to improve accuracy of operations.

The benefit of this data is being able to adjust the timing of a detonation in a blast hole, as well as firing sequences and charge distribution, because workers can take into account any slight divergence of

a hole's actual position, compared with its position on the survey plan.

Before this latest drone technology was available, miners had to guess this information.

Drone Services Australia is available to work with clients on all kinds of drone works.

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



Optimus: primed for Australian mining

NATIONAL

ISRAEL-based Airobotics is pioneering into Australia's mining industry by providing the world's first fully automated drone system.

Airobotics' Optimus drone system is self-sufficient, recharging itself at a docking station, thus providing 24/7 availability.

It requires no human intervention for any aspect of its operation; launching, flying, landing and completing all maintenance itself.

With its advanced automated UAV design, Optimus is capable of flying scheduled and pre-planned missions as well as on-demand and emergency response flights, and it can do so in the harsh environments in which industrial-grade drones are expected to fly thanks to its robust build.

When not flying, Optimus is housed in the Airbase that makes up a major component of the Airobotics system.

Not only does the Airbase provide shelter for the drone, but it also includes a robotic arm that provides necessary maintenance including automatic battery changing and payload swapping. Without the Airbase, the Optimus would not have end-to-end automation.

The Australian mining industry provides the perfect platform for such a technology.

"In 2017 we opened a head office in Perth, and built it from a sales office to a logistics enterprise, recruiting about 20 staff locally," Airobotics Business Development vice president Yahel Nov said.

It includes a demo centre, assembly area, workspaces and a Remote Operation Centre (ROC) from which the Airobotics team monitors



Australia is Airobotics' first market outside Israel.

and operate its systems in Australia.

The company also has teams in Brisbane and Melbourne.

"We knew that we wanted to go into mining, because it provides a great fit for our product," Mr Nov said.

"It's a large industry with many outside operations where drones can be utilised, and Australia has one of the best – if not the best mining sector to operate in.

"There has also been such a push to digitise the mines in here – so we felt that our product could be easily absorbed into companies' current infrastructure."

Mr Nov said Optimus – with its advanced capture system – would increase operational efficiencies, improve safety, and reduce labour costs; as unlike drones currently deployed in the mining sector, Optimus does not require a qualified pilot at the helm.

"Once you replace the pilots with an automated system you are now capturing data at a much higher frequency.

"Personnel such as surveyors can spend a lot more time analysing, and capture about 5 to 10 times more data than he or she would otherwise have to be collecting in terms of quantity.

"This means an uptick in productivity.

"The information that we capture is either pictures or LiDAR information that can be transformed into a 3D model, providing the basis for measuring and calculating volumes and inventory.

"It also captures thermal asset and inspection data."

Mr Nov said the drone system complies with all current Australian standards.

"We have adapted our procedures to Australian industry regulations and gone through the rigor of CASA, which have accepted our product very well," Mr Nov said.

"Our product is now certified to fly at customers' sites Beyond Visual Line of Sight (BVLOS), which is an important step for the marketability of the system."

Mr Nov said 2018 would be about growth and reaching out to new potential customers.

"We will be making more technological improvements to make our product bigger, better, faster," Mr Nov said.

"These include longer flight duration, larger area coverage and new sensors which will allow us to capture new layers of information.

"Our hiring trend will also continue, recruiting an additional 10 to 15 personnel as we expand our footprint here in Australia."

AIROBOTICS

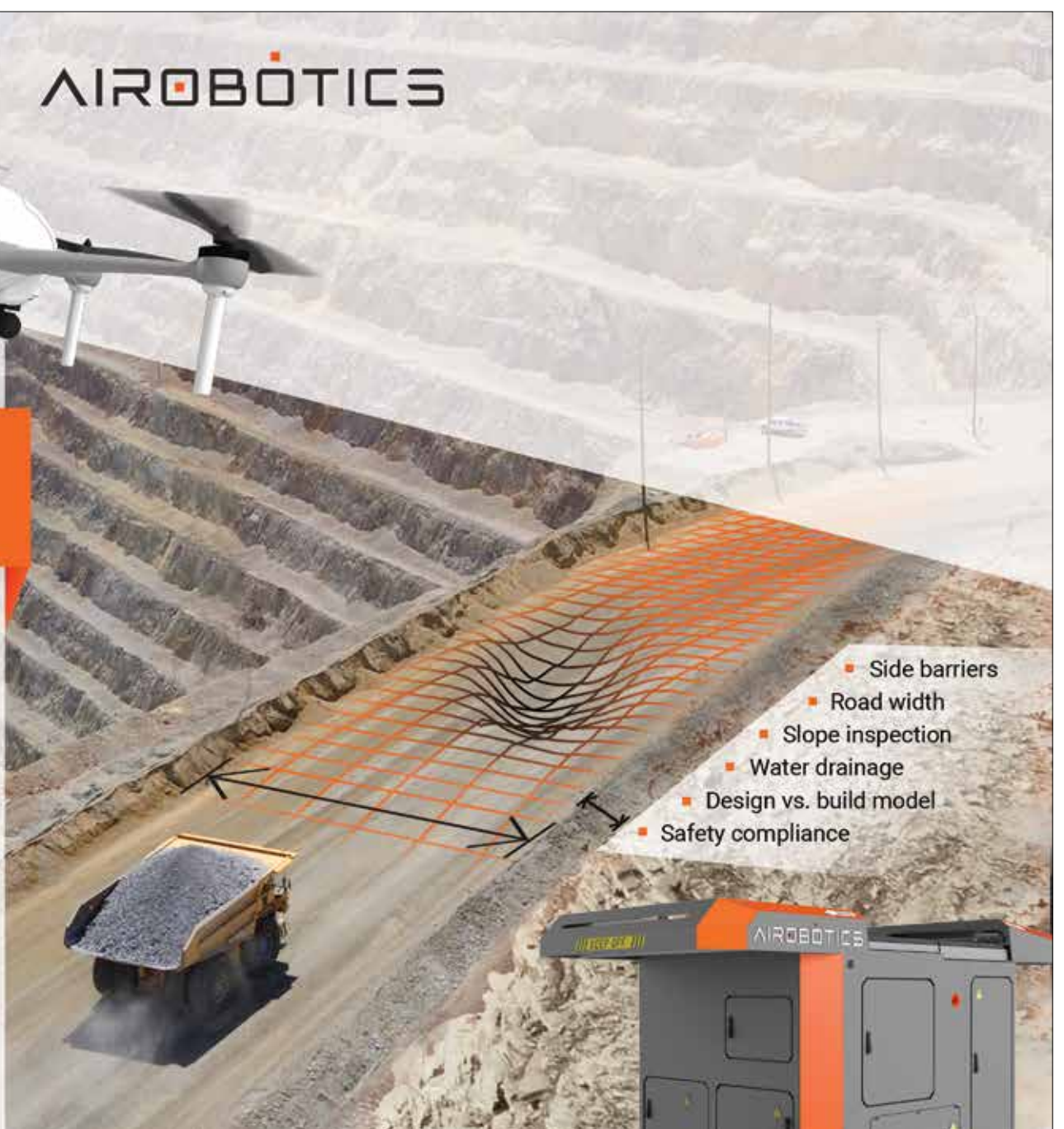
AUTOMATED INDUSTRIAL DRONES

Transforming mining with drone automation

Haul roads design and operational costs represent a large portion of the mine's expenses. Optimizing your roads using automated drones introduces significant savings and operational efficiency.

Roads are your asset, digitize them

- Side barriers
- Road width
- Slope inspection
- Water drainage
- Design vs. build model
- Safety compliance



Big Tyre addresses OTR tyre shortage

QLD

WITH a severe shortage of off-the-road (OTR) tyres once again hitting the mining industry, mines have to be proactive to keep 100 per cent of their truck fleets operating.

Extending tyre life not only keeps the trucks moving but reduces operational expenditure, improves efficiency, and reduces tyre disposal costs.

Australian owned company, Big Tyre, is an expert in the repair of OTR tyres.

It achieves a very high success rate by using a unique (and confidential) method to significantly improve repair durability.

Big Tyre is the preferred repairer of OTR tyres by one of the leading OTR tyre suppliers and recommends sending in a truckload of tyres at a time and back-loading repaired tyres to minimise transport costs.

Big Tyre managing director Bruce Loudon recalls the OTR tyre shortage in 2005/2007, where mines were digging up tyres to use the last 10 per cent of tread



Bruce Loudon with repaired OTR tyres.

when they could have retreaded them to 70 per cent of original tread depth for fitting to the rear of trucks like some of Big Tyre's customers.

This included a mine with a 22km haul cycle.

Big Tyre achieves a wear-rate similar

to that of a new tyre by using heat and cut-resistant compounds.

Big Tyre also frequently buffs new tyres to reduce the tread depth to suit an application.

Casing separations are generally caused by excessive heat built up within

the tyre and can be minimised or avoided altogether by reducing the tread depth to suit the application.

Based in Toowoomba QLD, Big Tyre can be contacted on (07) 4699 9711 or via their contact page at www.bigtyre.com.au.



BIG TYRE

Tyres, Wheels & Rubber Tracks

(07) 46 999 711

www.bigtyre.com.au

OTR Tyres

- ◆ Repairs & Retreading*
- ◆ Buffing to fit chains
- ◆ Buffing to reduce heat related failures
- ◆ New tyre sales

*Heat & cut resistant compounds
Premium quality natural rubber




Solid Rubber Wheels

- ◆ Designed & Manufactured in Australia
- ◆ New & Service Exchange*
- ◆ Best-in-Class Guarantees
- ◆ Industry Leading Innovations
- ◆ Preferred Supplier to Leading Manufacturers
- ◆ To suit LHDs, chock trailers, mill re-lining equipment and trailers for generators, concrete mixers, etc.

* For common wheel sizes





UGWHEEL

BEST DOWN UNDER

Aftermarket wheels to suit most machines

Our solid wheels are used in more than 50 countries around the world

Innovation reducing cost of tyre ownership

NATIONAL

WITH more than 45 years' experience delivering off-the-road (OTR) tyre solutions to customers worldwide, Otraco continues to reduce the total cost of tyre ownership by delivering new, cost-effective innovations.

Otraco general manager Mick Carr said innovation is key to helping customers achieve step change improvements across their day-to-day operations.

"We encourage our teams to challenge the traditional ways of completing tasks," Mr Carr said.

"Often, when you ask the question 'how can we get this job done in a safer way?' you can uncover some simple and highly cost effective solutions."

For example, a new set of tools called 'spacer plates' were developed by site supervisor Jamie Pickels at the Meandu mine in QLD.

Earning an award from the National Safety Council of Australia, this innovation has significantly reduced the risk and improved efficiency for tyre and rim assembly on Hitachi dump trucks.

Mr Carr said successful innovation comes from a team approach.

"By working closely with our customers we get a hands-on understanding of their operational challenges and can then work together to identify and test various solutions," he said.

Testament to Otraco's close customer relationships is its long-term contracts with some of the world's largest mining



Otraco Innovation recognised at the National Safety Awards of Excellence.

operators.

With innovation at the core of its training programs (which are delivered through Otraco's Enterprise Registered

Training Organisation 51112), Otraco's teams combine their hands-on knowledge of customer operations with highly skilled technical expertise to help customers

achieve their specific cost and productivity targets for each project.

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

Transforming tyre management.

Helping customers increase productivity and reduce the total cost of tyre ownership.

We focus on safety and innovation, ensuring our people have the courage to challenge the status quo and deliver step change solutions to help customers succeed.

To find out how we can bring a step change to your operations **call us today on 08 6274 7200.**

www.otraco.com
www.downergroup.com

KLINGETM



Total Tyre ControlTM Web

Developed for **tomorrow's needs**, not yesterday's trends

 Self writing reports

 Live Data Entry 

 Work Scheduler

 Software that learns

 OTR, Industrial & Commercial Tyre friendly

 Integrated Tools 

 SaaS Subscription

 Tyre Usage Forecasting

 Scalable Architecture

Designed to **improve your business & save you money**

FREE Trial for 30 days



tyre-software.com

TOUGH JOBS,

soft ride



EXPECT 50% BETTER STABILITY COMPARED TO A PNEUMATIC TYRE, NO MORE PNEUMATIC BOUNCE & RIDES COMPARABLE TO A PU FILLED TYRE

Designed with the demands of recycling and waste management operations in mind Brawler HPS Soft Ride delivers the toughness of a traditional solid tire and a ride comfort equivalent to a filled pneumatic tire.

Brawler HPS Soft Ride tires are designed to perform in tough recycling and waste management applications while providing the most comfortable ride within the Trelleborg Brawler range.

Available sizes with the Soft Ride feature in our ranges of the Brawler HPS Solidflex Smooth and Brawler HPS Solidflex Traction can be found through our website.

National Contact:
Matthew Gill
0408 004 446
matthew.gill@trelleborg.com
trelleborg.com

**ANTI VIBRATION CONSTRUCTION**
Enhanced driver comfort

**ELLYPTICAL APERTURES**
Increased deflection

**CUT RESISTANT COMPOUND**
Damage protection

**HIGH TREAD**
Extended service life





Where experience counts

NATIONAL

ESTABLISHED in 1986, Tyre Doctor has grown from humble beginnings as a hot-vulcanised tyre repair specialist servicing the NSW Riverina, to a 'full-service' OTR tyre and rim specialist for the mining and heavy earthmoving sectors across eastern Australia.

TyreDoctor's customer base now includes major operators such as Yancoal, Newcrest, BHP, Evolution Mining, Peabody, Downer, and many contract miners and heavy earthmoving contractors.

A 2nd generation family company, TyreDoctor's most unique expertise is in hot vulcanised repair of OTR tyres – a craft requiring extensive experience, an understanding of tyre construction and in-depth knowledge of OTR operating conditions.

That expertise continues to grow with key personnel actively supervising each individual tyre repair job, including extensive preventative maintenance repairs on 57" and 63" ultra-class tyres for major mining fleets.

A company-owned fleet of specialised rigs for transporting ultra-class tyres, and a number of onsite fitting trucks handling up to 63" tyre and wheel assemblies allow TyreDoctor to provide a complete Gate-To-Gate service and retain full control of service response and lead-times.

A substantial workshop facility opened in Mackay in 2017 has enabled TyreDoctor



More information can be found at tyredoctor.com.au or by calling 1800 897 336.

to begin ramping up its services throughout Queensland's Bowen Basin mining region – offering the knowledge and expertise of an experienced OTR tyre repair specialist along with in-house wheel & rim testing, repair and manufacturing capabilities.

TyreDoctor carries a large, constantly

moving stock of both new and second-hand OTR tyres, backed up by in-depth knowledge and experience of tyre & wheel applications in underground mining, surface mining and heavy earthmoving.

TyreDoctor is now the second largest independent dealer for Michelin OTR in

Australia; and a significant dealer for other major OTR brands including Yokohama, Goodyear & Dynamaxx.

All personnel are highly trained to comply with Australian standards, with ISO 9001 and 14001 certifications in place across all company operations.

FOR THE MINING STORIES THAT MATTER





LET THERE BE LIGHT

LED LIGHTING TOWER SOLUTIONS FOR MINING

There is no limit to what we can achieve

MICKALA GROUP 6 TURBO DRIVE PAGET QLD 4740 (07) 4998 5447 mickalaminig.com.au

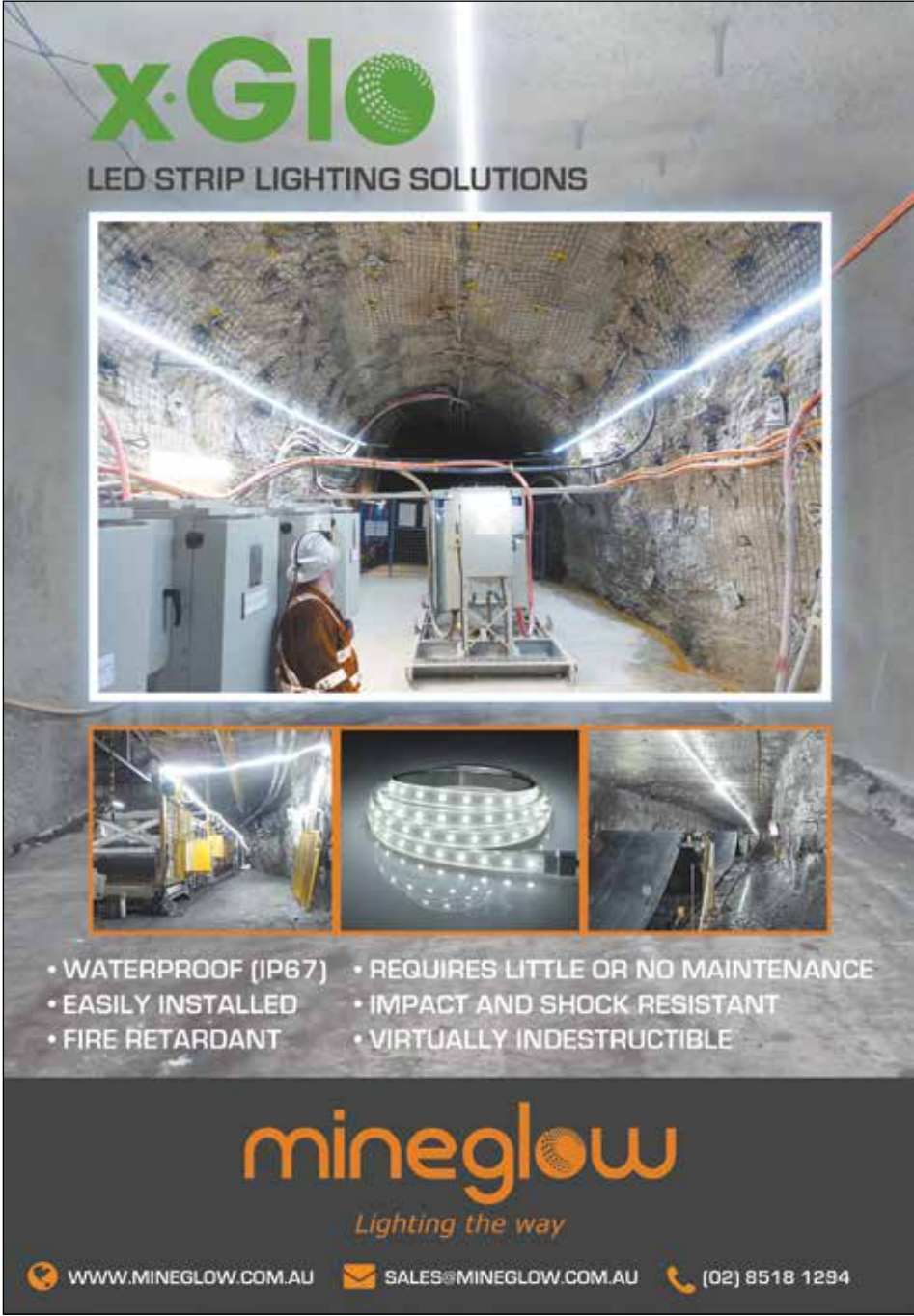
MICKALA GROUP

MICKALA GROUP manufactures the world's highest performing LED Lighting Tower on the market.



The state-of-the-art technology uses the lowest energy usage to produce the highest output, slashing operating costs for miners.

THE BENEFITS:

- Extra Low Voltage
- 80% reduction in Fuel costs
- 500 hour service intervals
- Finance options available
- OEM support
- Suitable for Mobile or Fixed Plants, and AC or DC Voltage
- Built for the Australian mining Industry



LED STRIP LIGHTING SOLUTIONS



- WATERPROOF (IP67)
- EASILY INSTALLED
- FIRE RETARDANT
- REQUIRES LITTLE OR NO MAINTENANCE
- IMPACT AND SHOCK RESISTANT
- VIRTUALLY INDESTRUCTIBLE

mineglow
Lighting the way

WWW.MINEGLOW.COM.AU SALES@MINEGLOW.COM.AU (02) 8518 1294

Lighting the way with xGlo



X-GLO has proven to increase safety and awareness, dramatically boost efficiency and increase performance.

NATIONAL

MINEGLOW is the proud Oceanic distributor of the xGlo range of LED strip lighting solutions, specifically designed to weather the harsh conditions of underground mining.

Able to run 24 hours a day, seven days a week and with an expected lifespan of 10 years, xGlo is the most cost-effective and reliable form of lighting available.

The xGlo LED strip lighting provides a complete uniform blanket of light, eliminating dark areas, which in turn improves safety in dangerous working environments.

The company's recent lighting installations varied from substations, service pits and portal exit lighting in hard rock mines; to general drift, conveyors and transitional lighting in coal mines with

great success.

MineGlow also offers an emergency lighting system with a back-up battery, this system triggers the strip to pulse and can be used to alert miners on upcoming hazards or direct towards refuge bays.

A variety of colours are available including RGB (Red, Green and Blue), and RGW (Red, Green and White), with colour temperatures ranging between 2500K and 6500K.

MineGlow has installed its lighting solutions across some of the country's biggest mines; its client list includes companies such as Anglo American, Evolution Mining, Glencore, MMG, Newcrest Mining, Rio Tinto, Newmont, BHP, South32, Centennial Coal, Vale, Barrick and more.

More information on xGlo lighting can be found at: www.mineglow.com.au.

One stop supply solution

WA

SINCE incorporation in 1992, Integrated Industrial has become a highly successful and well respected major supplier to the mining & construction, oil & gas, offshore and marine sectors in Australia and overseas.

The company provides a professional and efficient one-stop-shop, focused on delivering first-class service.

As an ISO 9001 2015 compliant company, Integrated Industrial is uniquely positioned to source and supply a full spectrum of industrial products to suit clients' needs, with access to more than 4000 active suppliers, and proudly partnered with Castrol Industrial Lubricants, a major supplier to industry.

Priding itself as a "single supply solution" for mining & construction, oil & gas and offshore supplies and consumables, the company maintains a substantial customer base of more than 160 businesses.

This is supported by a strong network of local and international suppliers and logistics partners committed to the ever-changing needs of valued customers.

Integrated Industrial holds a significant number of supply contracts with major resources companies across Australia and internationally, varying from general industrial consumables, PPE and mining construction products, through to OEM spares from all around the world.

The focus of Integrated Industrial's management has been to establish a uniquely skilled team that is committed to customer



Integrated Industrial is uniquely positioned to source and supply a full spectrum of industrial products.

service excellence and continued business growth.

More than 53 dedicated professionals service the day-to-day needs of the company's client base.

Integrated Industrial operates with the

motto 'anything, anywhere, fast', and is renowned for its 'can-do' attitude.

It guarantees to provide quotes within 24 hours and delivery within 24 to 48 hours, making it a fast and efficient option for all mining, oil and gas and offshore supplies.

The logistics team understands the challenges remote customers are faced with and can ensure all consignments are securely packed, wrapped and dispatched on time in accordance with customer requirements and industry best practice.

Second fit bucket solutions

NATIONAL

AFTER several months of customer engagement, planning and design modifications, Liebherr-Australia branches in Mt Thorley and Adelaide, along with the excavator factory in Colmar (France), have successfully combined their innate customer and product knowledge to design and commercialise second fit bucket solutions for both Thiess Mt Owen and Glencore Mangoola.

The Liebherr-Australia fabrication department in Adelaide, led by fabrication manager Paul Hermann, was tasked with the challenging feat of maximising productivity while reducing weight from the standard R 9800 bucket.

With custom design work from the company's French factory's Bucket Engineering team, the local teams have built the first unique R 9800 47m³ High Performance (HP) bucket for Thiess Mt Owen.

While several iterations of the bucket design were required, the finished product arrived on site in June 2017 and is performing well on EX1760, one of the Thiess' most important production machines.

Thiess and Liebherr-Australia have enjoyed a successful partnership for more than 20 years and this project is another example of the collaboration and commitment from both companies to both meet a challenge and develop

a solution: delivering greater productivity, efficiency and reliability.

The Adelaide fabrication shop continues to increase its output, not only with Thiess and its expanding requirement for second fit buckets attachments, but with another valued customer, Glencore Mangoola, who recently purchased a new clam for their R 996 B Face Shovel.

The new clam was recently delivered to site after careful planning and execution between the parties.

In operation since 1984, the Liebherr-Australia fabrication department has produced many hundreds of standard and custom-designed buckets for Liebherr excavators.

The team has extensive experience in both new fabrication and repairs of buckets and excavator attachments.

The 7200sqm facility, located in the Adelaide head office complex, allows the fabrication and repair of products to suit the entire Liebherr range of mining excavators: from 5 cubic metres up to 49 cubic metres.

While Liebherr's One Bucket solution focuses on Liebherr High Performance bucket designs and Liebherr GET combinations, the team can also integrate custom bucket design with customer preferences for common brands of Bucket Lip and GET.

By working closely with our customers on design, bucket wear packages, and GET



Image: John Nieddu.

Liebherr Australia has commercialised second fit buckets for both Thiess and Glencore.

selection, Liebherr-Australia's Fabrication team works to ensure maximum machine performance.

With market confidence building,

Liebherr-Australia continues to enjoy growth in after-sales, as customers seek solutions to the everyday challenges of moving more dirt at the lowest cost per tonne.

‘Disruption’ meets workforce mobilisation

NATIONAL

WE have all witnessed industries like transport and accommodation being upended as new technology sweeps through.

Now no business seems safe. But where there is change there is opportunity for those prepared lead.

Enter Rapid Crews.

Speaking with CRN Australia in January, Rapid Crews Managing Director Russell Fitzgerald said his company was changing the economics of workforce mobilisation—especially for shutdowns and large project workforces.

“Recruiters and Co-ordinators have been starved for quality systems and now Rapid Crews presents a real opportunity for businesses to reduce their costs, reduce their risks and to scale up their business,” he said.

The latest BIS Shrapnel *Maintenance in Australia 2016-2031* report described maintenance spending in the resources sector as the next boom.

It outlined that previously deferred spending and new assets will drive growth of 52 per cent by 2021.

For shutdown recruiters, this represents a lot of extra pressure, but more importantly it represents a massive opportunity.

“Maintenance spending is growing strongly and we are already seeing shortages in some trades,” the report stated.

“Recruiters that will succeed in this market will have the best people ready at their fingertips and be able to mobilise them faster and more reliably,” Rapid Crews business improvement specialist Allison Stratton said.



Turn backs at the site gate can be very costly.

“Some people seem to think that old expensive HR software and spreadsheets are good enough, but we’ve had a strong response from businesses that want to scale their business while making the job easier and faster for their front-line staff.”

Rapid Crews is specifically built for workforce mobilisation by Perth-based speciality resources software company Red Rock Software.

“We saw a real opportunity to bring a modern, low-cost approach to recruiters tailored specifically for their industry,” Mr Fitzgerald said.

“Now we have our first investors we are in a great position to help our customers grow their business.”

“Red Rock consulted widely, then designed and built Rapid Crews on its own industry proven web app infrastructure.

“It’s a single platform with templates, automation, alerts, compliance, sites, contractors, ticket management and scheduling.

“Right from our early test runs we saw significant savings in time and cost by reducing emails, phone calls, admin work, document handling and history tracking.

“Early adopters should be excited about the impact to their bottom line.”



WORKFORCE MOBILISATION

Making workforce mobilisation for shutdowns and projects leaner and more profitable.

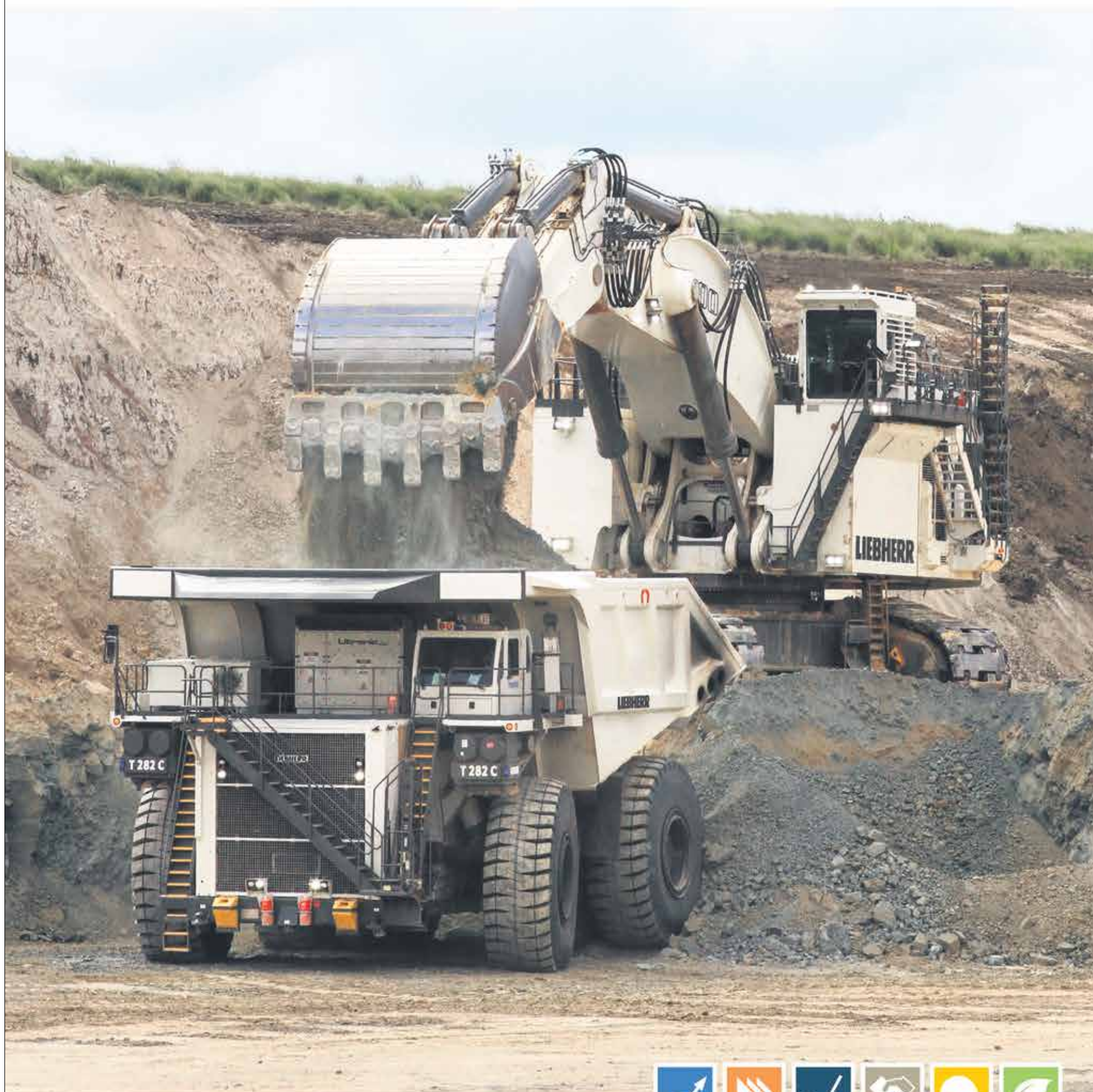
RAPID CREWS BOOSTS YOUR BOTTOM LINE BY:

- Boosting efficiency by targeting wasted effort, duplication, manual admin tasks
- Has a powerful dashboard insights for managers
- Easy monitoring and alerts of workers, skills, tickets, performance and calendars
- Helps you build teams of the best skilled workers fast and reliably
- Easy team work all in one software platform. No more spreadsheets, email, SMS, HR and more.

INCREASED PROFIT
REDUCED RISK
LOWER COST

RC RAPID Crews
(08) 62617608
hello@rapidcrews.com
rapidcrews.com

Experience the Progress.



Liebherr's Innovative Mining Solutions

- Integrated smart technologies lower the total cost per tonne
- Intelligent design to increase uptime and reliability
- Highest productivity and efficiency through intelligent energy management
- Ergonomic design for safe and user-friendly operation and maintenance
- Customer-focused support throughout the entire equipment lifecycle
- Liebherr's continuous focus to reduce environmental footprint across all machines

Liebherr-Australia Pty Ltd.
1 Dr. Willi Liebherr Drive
Para Hills West, South Australia 5096
Phone: (08) 8344 0200
E-Mail: info.as@liebherr.com
www.facebook.com/LiebherrMining
www.liebherr.com.au

LIEBHERR

TED gets tick of approval from miners

NIVEK Industries' Tracked Elevating Device (TED) is becoming increasingly relied on in mines and workshops across Australia to keep fitters safe from suspended load crush injuries.

TED is the only remote controlled, all-terrain belly plate jack on the market.

The benefits of being remote controlled are massive, and include removing fitters from the dangerous crush zone at the time of component lifting and lowering.

The simple remote-control operation means that fitters are not lugging heavy parts around on their hands and knees or wrestling with difficult-to-manoeuvre unpropelled jacks.

TED was originally designed by Nivek Industries managing director and founder Kevin Cant to facilitate the safe removal and installation of belly plates in the workshop and field especially.

However over its time in operation, fitters have found the maintenance applications seemingly endless, and Nivek Industries has developed and continues to expand an array of attachments to be used for a multitude of tasks.

Fitters are now utilising TED to take the weight out of tasks like removing and replacing steer cylinders, cutting edges, sound suppression, pumps, sumps, track rollers, y-links and more.

Replacement parts can be easily placed onto one of TED's attachments, then driven under the machine to be repaired and manoeuvred into place all via remote; bypassing the need for excessive manual handling while crawling.

While fitters interviewed have reported



The Nivek Industries' Tracked Elevating Device (TED).

enjoying the benefits of reduced manual handling and finishing work less sore, managers are enjoying massive reductions

in man hours and machinery down time, especially on tricky jobs in the field or pit.

Clients can enquire about how

TED can help save lives and time by calling 0418 517 359 or visiting www.nivekindustries.com.au.

TED "Worth its weight in gold"

An ever-increasing number of mines are ditching the cumbersome methods of slings and chains in the pit, and awkward push jacks in the workshop for belly plate removal, in favour of the safer, smarter, Tracked Elevating Device aka TED. TED is a remote controlled, all-terrain hydraulic belly plate jack, designed to remove fitters from suspended load hazards and other manual handling injuries often sustained during removal and replacement of belly plates and other heavy components.

Many sites across the world are now enjoying the benefits of our innovative, Australian designed and manufactured TED, for a whole lot more than belly plate removal.

The ever-evolving range of attachments can be used in conjunction with TED to Remove and maintain hydraulic pumps, y-links, steer cylinders, sumps, sound suppression panels, change cutting edges and track rollers.

Join global companies like Rio Tinto, Thiess, Yancoal, Fortescue Metals Group, and Peabody in appreciating the Safety benefits and reduced down-time. Send your fitters home safely with the help of a TED.

"In the pit...it's worth its weight in gold safety wise, and you get the job done quicker. You're not in the line of fire... the downtime would have been easily halved." Lloyd - Crew supervisor





Interquip

WE CARE • WE ARE FLEXIBLE • WE DELIVER

MACA INTERQUIP'S CAPABILITIES

MACA Interquip is your mineral processing solution provider. With over ten years' experience in mine site construction, we are an ISO compliant Western Australian owned company specialising in structural, mechanical and piping installations.

Ready for Anything.

We're your end-to-end solution, offering a full range of site services:

- **Construction:** Fixed plant installation and commissioning
- **SMP Supply and Installation:** Structural, mechanical and piping capabilities
- **EPC Contracts:** Engineering, procurement and construction
- **Tank Builds:** New tank installation
- **Maintenance:** Mining maintenance solutions
- **Upgrades:** Process plant upgrades
- **Refurbishment:** On and off site refurbishment services
- **Dismantling & Relocation:** Plant dismantling, relocation and installation
- **Recommissioning:** Mineral processing facilities

Equipped for Everything.

The fleet comprises:

- **220 tonne** Liebherr hydraulic crawler
- **130 tonne** Grove all terrain
- **75 tonne** Grove rough terrain (x2)
- **45 tonne** Grove rough terrain
- **30 tonne** rough terrain (x2)
- **20 tonne** Frannas (x6)
- Forklifts & Telehandlers
- Access Equipment
- Tools and Infrastructure

Talk to us today about how we can find you an affordable solution for your next project.
We will work with you to create the solution you need.

MACAINTERQUIP.NET.AU

CanDo

If you missed the latest issue of
THE AUSTRALIAN
MINING REVIEW

visit us online: www.miningoilgas.com.au





MODULAR ABOVE GROUND WASHBAYS — & — COMPLIANT WASTE WATER RECYCLING AND DISCHARGE

WASHBAYS AND WATER TREATMENT

- Portable Water Treatment
- Containerised Recycling Plants
- OWS - DAF - Clarifier
- 2-200 Tonne Washbays
- Hot Dip Galvanised Steel
- LV-HV-Mining Vehicles
- Designed and Built In Australia



Call Today
1300 661 130
info@enviroconcept.com.au



enviroconcepts



enviroconcept.com.au

Benleigh

VENDING SYSTEMS



PPE Vending Machine

Increased **workplace safety** through accessing vending machines quickly.

Managers see a rise in staff **accountability** through an in-depth recording system.

Companies **reduce** their PPE equipment spend anywhere **between 25% - 60%**.

Improved inventory control, you can now 'set and forget' as the system will alert you once stock thresholds are met.

Credit Card, RFID cards

Employees are **more efficient** in their role - they do not have to rely directly on a PPE store person or interrupting their managers for equipment.

In depth **reporting system**

BV5 Dimensions

Height: 1830mm, Width: 1035mm, Depth: 830mm



**FREE
TECH SUPPORT**



**PURCHASE OUTRIGHT
OR
3 - 5 YEAR
RENTAL AGREEMENT**



**FLEXIBILITY AND
FREEDOM**



PAYWAVE



FREE CONFIGURATION

CONTACT DETAILS

Adelaide, Hobart, Melbourne, Canberra, Sydney, Brisbane, Gold Coast, Darwin, Perth

Phone: 1300 629 153 | www.benleighvending.com.au |

Email: corporate@benleighvending.com

Improving workplace safety

NATIONAL

MINING companies across Australia are increasingly placing personal safety at the forefront of priorities in the workplace.

Easy access to personal protective equipment (PPE) is one of the collective ambitions across management teams, and the solution for many has been the installation of PPE vending machines.

PPE machines supply users with a wide range of safety equipment which is tracked via a computer server connected to RFID smart card technology.

All that a staff member is required to do is a swipe, and their chosen item will be released from the system.

Once the transaction has taken place, the machine records a range of data; the name and ID details of the employee, the item that has been distributed, the number of the vending machine and time and date it was dispensed.

Furthermore, the vending machine places the power back into management's hands, allowing them to easily keep an eye on stock levels and when items need to be replaced thanks to a web-based reporting system that permits real-time monitoring of all stock levels.

Overall, the advantages of the safety PPE vending machines are many.

Its ability to reduce paperwork and increase staff efficiency is another benefit owners of the machine regularly praise.

A proven track record and reduction of consumption of up to 60 per cent have been documented.

Benleigh Vending Systems also specialises in combination drink and snack vending machines, creating one point of contact for all vending requirements.

Benleigh Vending Systems stocks the most extensive and most varied range of vending machines in Australia.

The company has been in business for more than 22 years and supplies products across a wide range of sectors, from mining and construction to army and air force bases, universities and more.

More information on Benleigh Vending Systems products can be found at www.benleighvending.com.au or by emailing corporate@benleighvending.com.



PPE vending machines use RFID smart card technology.

DON'T BE LEFT
IN THE DARK.

Keep up to date with the latest industry specific news.

Subscribe to The Australian Mining Review and The Australian Energy Review today, or visit us online for full news coverage and industry specific products.

ARE YOU RUNNING A PPE PROGRAM OR A MARATHON



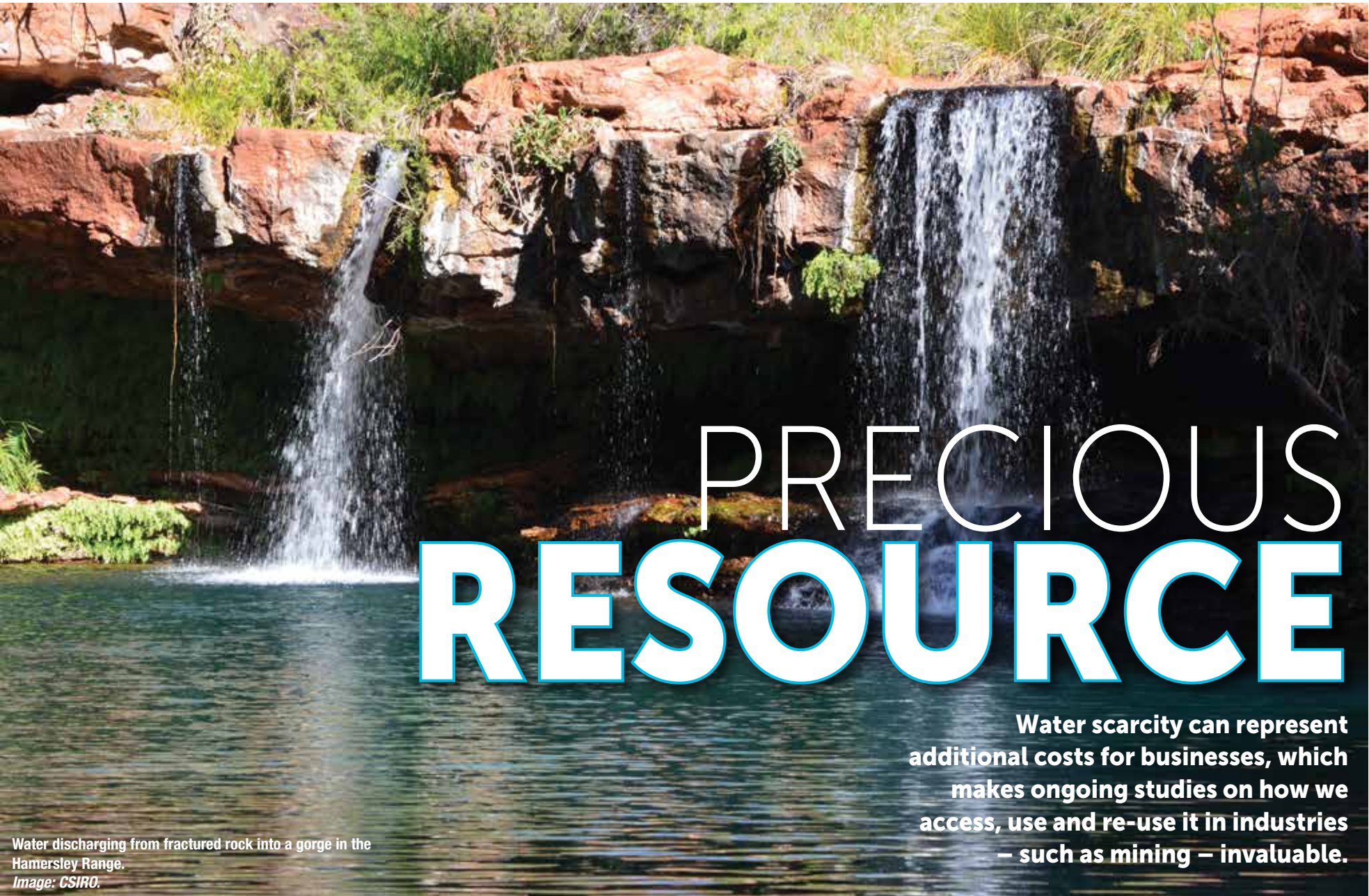
Stop all the running.
Ensure each employee
always has the right PPE
supplies, right where they
work, and get the automated
reports to prove it.

STOP THE MARATHON

ApexSupplyChain.com/au/Mining

© 2018 Apex Industrial Technologies LLC. All rights reserved.
Apex Supply Chain Technologies and Trajectory Cloud are trademarks of Apex Industrial Technologies LLC.





PRECIOUS RESOURCE

Water scarcity can represent additional costs for businesses, which makes ongoing studies on how we access, use and re-use it in industries – such as mining – invaluable.

Water discharging from fractured rock into a gorge in the Hamersley Range.
Image: CSIRO.

CAMERON DRUMMOND

WATER is essential to mineral processing, and is used at various steps in the process to recover valuable metals from ore.

The water use is quite high – for example, around 1600 litres of water is used to obtain about 19kg of copper – about the same as is needed for manufacturing a medium-sized family car.

However the mining sector is a relatively small water user, accounting for less than 3.7 per cent of national water consumption in 2014-15.

By comparison, agriculture (including forestry and fishing) consumed 60 per cent and households consumed a further 12 per cent.

According to the Minerals Council of Australia, the mining sector is one of the highest value water users in Australia.

In 2016-17, the gross value add per gigalitre (GL) of water used by mining ranged between \$111m/GL and \$127m/GL, compared to \$4m/GL for agriculture.

Valuing Water

Water availability and security of supply is critical for the minerals industry.

Miners face a wide variety of water management challenges, including limited water supply, use and treatment of poor quality water, mine dewatering and the management of excess water.

Operations are required to install, operate and maintain the infrastructure when necessary for their water supply, and in some circumstances the water infrastructure provided and maintained by industry can be shared with other stakeholders, including neighbouring communities, farmers and pastoralists.

Many mining operations are based in remote locations, where water may not be readily available.

This can represent a significant potential constraint on further investment and expansion.

Even environments where it is accessible, processes for making the water suitable for use in the refining process (such as desalination) can add significant costs through increased energy use.

As ore grades decline, the amount of water used increases and more intensive processing is required.

Studies conducted by the CSIRO suggest mining lower grade ore is becoming more prevalent in Australia, and the research group has responded by looking at ways to estimate water footprints for major mineral commodities such as nickel, copper and gold.

“By investigating methods of valuing water in mining, mineral processing and metal production, and comparing these with other industrial processes and water users, we will be able to better manage water and reduce the risk of water scarcity,” the CSIRO stated.

The method is a technique called life cycle assessment.

“Using our method, industry can measure and analyse its water footprint from the point where ore is extracted through the production process, and on to its end use and disposal.

“Operators can identify and calculate the direct water use of various processes such as milling and flotation as well as indirect water use.

“Water use ‘hotspots’ can be detected and opportunities for water savings – and the associated cost benefits – highlighted.

“It is leading to more sustainable minerals processing operations.”

Collaborations between industry and scientists, such as the Pilbara Water Resource Assessment project, have examined water ecosystems and how they change during wet and dry periods.

The \$3.5 million partnership between the CSIRO, BHP Billiton and the WA Government, was aimed to aid water managers and local

industry plan for future water use in an area rich in resources and environmental assets.

The study revealed some of the mechanisms responsible for filling the Pilbara’s groundwater stores.

It found that between 8mm and 30mm of rainfall is required before runoff starts in most catchments, which leaks through streambeds to provide the main source of aquifer replenishment.

Water from these shallow alluvial aquifers then recharges deeper dolomite aquifers, which can store large quantities of water in inland areas.

“Knowing how the water systems operate right across the region, such as how groundwater is affected by rainfall and storm events, helps with the planning and management of local water use,” CSIRO project leader Dr Don McFarlane said.

PROJECT SNAPSHOT Nolans: Groundwater Assessment

In early January, the NT Environmental Protection Agency (EPA) approved Arafura Resources’ \$900m Nolans rare earths project, 135km northwest of Alice Springs.

As part of its study, the EPA identified a risk to the stability of groundwater levels, citing that the project would use 2.7 gigalitres of groundwater each year over a lengthy mine life of between 35 and 55 years – but found that it could be managed.

In Arafura’s Environmental Impact Statement (EIS) submission to the EPA, the groundwater model presented indicated that the open pit would become a permanent groundwater sink with estimated inflows of eight litres a second.

“This would result in a continuous drawdown of groundwater surrounding the pit,” the EPA said.

“At the end of mine life the open pit would contain a pit lake that would reach equilibrium where evaporation matches inflows, at a level

80m below the original aquifer depth.”

The EPA projected that the pit lake that would be left behind after the end of Nolans’ mine life would not harm the surrounding geology.

“The groundwater sink from the pit is not predicted to have any significant impact on the high quality aquifers of the Ti Tree Basin and Southern Basins after closure of the project because the rock basement connecting these aquifers has very low transmissivity.”

However, it noted there would be uncertainties surrounding the behaviour of the pit lake post-closure.

“The NT EPA considers further studies are required on the final void water quality including the surrounding groundwater level and expected quality of water held in the void prior to final acceptance of the mine closure plan.”

It recommended that aquifer levels and water usage be monitored in real-time with data made available to the public on a regular basis.

The EPA also recommended that Arafura conduct risk-based assessments of the impacts of on stygofauna in the remaining groundwater.

Arafura said it was happy with the EPA’s recommendations and looked forward to further mine planning, with a view to start construction in 2019.

“Our sustainability team has worked diligently alongside our environmental consultants GHD to produce comprehensive, quality documentation to support the passage of the Nolans project through the Northern Territory environmental approvals process,” Arafura managing director Gavin Lockyer said.

“This should go some way to securing final government approval for the project, enabling construction to move forward, subject to financing and FID.”

Mining's pontoon pump solution

NATIONAL

SINCE the early 2000s, Tru-Flo Pumping Systems (Tru-Flo) has built quality electric and diesel driven pontoon pump units recognised in the mining industry for their high performance and reliability in harsh conditions.

Headquartered in Bathurst, NSW, Tru-Flo has branches operating near key mining hubs in QLD, WA and Indonesia.

From these bases, Tru-Flo can service clients throughout Australia and abroad; even in remote international mining locations such as Papua New Guinea and the Pacific Islands.

When building a pontoon pump, Tru-Flo's skilled in-house engineering team considers each location's particular specifications during the planning and design process, resulting in the delivery of a tailored pump that precisely meets client specifications.

Tru-Flo pontoons can be configured to suit a range of applications, including tailings return, dewatering, leachate and CHPP supply water pumps; as well as to underground or fire water supply and water evaporation projects.

The range is capable of pumping against high head situations, large quantities of solids, and slurries; often encountered in mine dewatering.

During Tru-Flo's manufacturing process, safety and quality assurance are always top of mind.

Tru-Flo diesel pontoons are manufactured to withstand harsh Australian and international open cut mining environments.

The diesel range can be fully customised to suit individual mine applications, with



Tru-Flo's pontoons can be configured for a large range of mining applications.

engineering approvals available for compliance, displacements and weight carrying capacities; and are custom designed for safety, quality and ease of use.

Each Tru-Flo diesel pontoon pump is manufactured in three module sections enabling easy transport in condensed shipping and sea freight containers.

All diesel pumps are quality assured and pressure tested prior to painting, as pumps are primed and painted with high build, two pack epoxy paint in accordance with Tru-Flo's 'mine spec' coating and bake procedure to protect

against abrasive mine water.

They can be dragged and skidded across tough mining terrain, as they have a rugged design that is fitted with super heavy duty push bars enabling them to be towed or pushed by earthmoving equipment.

Tru-Flo also provides electric pontoons that are used extensively by mining companies throughout the diverse range of applications that the industry demands.

From acidic leachate ponds to dredge pontoons, the Tru-Flo range of electric

pontoons come varied and adaptable to suit a range of mining requirements.

Steel constructed or Roto mould high-density polyethylene cells are available, with the option of foam filling for indestructible buoyancy.

Access to the pontoon is available through various systems including floating and spanning walk ways.

As with all of Tru-Flo's pump range, electric pumps are fully customisable and built to the highest quality and performance standards.



VAC-ASSIST MINING PUMPS

endure the harshest conditions



- ▶ Hydro Mining
- ▶ Mine Dewatering
- ▶ Slurry Pumping
- ▶ Water Transfer
- ▶ Flood Recovery

Tru-Flo Pumping Systems custom design and build mining pumpsets that withstand harsh, rugged conditions. The Vac-Assist range sets the standard for premium quality, reliable and efficient pumps. Tru-Flo is known for its high quality, world class pumping equipment by clients in Australia and Indonesia.

- ▶ Skid or trailer mounted
- ▶ High performance vacuum pump
- ▶ Onsite training
- ▶ Super heavy duty construction
- ▶ Pump high volumes of suspended solids

FREECALL 1800 813 677

WWW.TRUFLOPUMPS.COM.AU

Hydraulic tanker pump makes sense

NATIONAL

AUSTRALIAN Pump Industries (Aussie Pumps) has announced the release of a new high head cast iron semi trash hydraulic drive pump.

The 3-inch self-priming pump, called the Aussie G3TMK-A/ST HYD, is close coupled to a powerful Casappa hydraulic motor.

With a maximum flow of 1100 litres per minute (lpm) and a maximum head to 55 metres, the big 3-inch pump is capable of handling a wide range of applications, including dust suppression, drill rigs, tankers, mine dewatering and moving contaminated water.

Hydraulic drive pumps derive their power from the main engine of the vehicle or equipment on which they are mounted.

Thus, operators can get the advantages of virtually unlimited power, delivered through a flexible drive system that doesn't depend on shaft or separate engines.

That flexibility of drive system and the compact design means that the pump can be placed in the most appropriate location, with huge operational cost reductions and advantages.

These advantages include a major reduction in maintenance costs by the elimination of a separate petrol or diesel engine to drive the pump.

"This pump really bridges a gap in the



The new high head semi trash pump from Australian Pump combines high head performance with the ability to handle drilling fluid and dirty water.

market in terms of a high head hydraulic drive pump that will handle dirty water," Aussie Pumps product manager Neil Bennett said.

"At a maximum head of 47m the pump will deliver 500lpm flow. That's impressive

for a 3-inch self-priming semi trash pump."

The 3-inch pump has excellent self-priming characteristics with the ability to draw water from pits of depths of 6m.

It has been designed to pass solids up to 16mm making it suitable for handling

drilling fluid.

The new Aussie semi trash pump is fitted with a hard wearing silicon carbide mechanical seals with an alumina counterface with nitrile rubber elastomers.

It also features a stainless steel wear plate and stainless steel motor shaft.

The pump includes a front opening clean-out port that makes it easy to access the pumps internals. That's a huge advantage as this means the unit can be cleared of chokes in situ without having to dismantle pipework.

The Casappa PLM series motor requires 35cm³ per rev at 100 bar pressure – that's equivalent to 12.5kW.

Electric and bare shaft configurations of this pump are also available.

The big pump will soon be available in cast 316 grade stainless steel, making it suitable for environments where liquids are particularly corrosive; for example tailing dam pump-out or even chemical transfer (Viton seals are also an option).

Like all Aussie Pump products the units are designed and built to ISO 9001 quality standards. Australian Pump believes that users deserve the best quality and won't offer any product that is not built to its stringent standards.

Further information including a free catalogue is available from Australian Pump Industries 02 8865 3500 and from Australian Pump Industrial Distributors.

Tank shower purpose-built for mining

NATIONAL

ALL Valve Industries is a specialist supplier of emergency shower equipment, industrial and waterworks valves, water metering solutions and monitoring systems.

In conjunction with its globally recognised manufacturing partners, the company services a diverse range of industries including mining, chemical, oil and gas, waste water treatment, defence and marine.

All Valve Industries provide clients with industry leading emergency shower innovation and deliver solutions for extreme conditions and environments.

Its technical specification development and support to meet the challenges of industry and minimise workplace health and safety risk is unrivalled as is the company's knowledge, with its team having also played a leading role in creating the Australian Standard AS4775; and direct input into the European Standard EN15154 (Part 1 and 2) as well as the American National Standard ANSI Z 358.1 -2014.

"Every mine site is subject to a unique combination of operating demands and climate conditions," All Valve Industries Australasian project manager Phil Plain said.

"With a broad range of hazardous chemicals and chemical by products ranging from Potassium Cyanide (KCN) to Dimethylmercury (C₂H₆Hg) present at many mining sites, providing effective safety and drench systems is absolutely essential.

"Our Haws Integrated showers apply a unique combination of engineering expertise (hydraulic, power, thermal and instrumentation), project management and safety response knowledge to optimise the system attributes and operational functionality throughout the entire asset lifecycle."

The Haws Model 8770.25 (1721)



The All Valve Industries tank shower.

self-contained gravity fed tank shower has been purpose-built for the mining sector and has been engineered to maintain its structural integrity and functionality in accordance with: AS4775 – 2007; wind load rated - AS1170.2.2011 to 88m/s cyclonic wind speed, Region D, Importance Level 4; and seismic designed to AS1170.4 – 2007: Category D.

Constructed of paint protected (RAL 6029) galvanised steel and bright yellow chemically

resistant elastomeric waterproof side panels, this unit contains a 1628 litre overhead storage tank with integrated temperature gauge.

AXION MSR eye/face wash and hydrodynamic showerhead technology delivers 15 minutes of flushing time in accordance with AS4775 and ANSI Z358.1.

Additional standard fittings integrated into Model 8770.25 (1721) include; Axion

MSR Medically Superior Response technology; Mariotte Syphon Valve for constant flow rate delivery; a pull handle or push bar shower operation; walk on foot grate; scald protection valve; shower test handle; fork liftable 1600 litre water tank; mounting plates; and 40mm water connection.

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

Alex Stanojevic

MESCA national manager

The future competitiveness of Australia's mining industry is synonymous with the health of its Mining Equipment Technologies and Services (METS) sector. But how can companies stay ahead amid an ever-changing digital landscape?

AS technology rapidly advances, the opportunities and challenges for METS companies increase with it. **Elizabeth Fabri** spoke with Mining and Energy Services Council of Australia (MESCA) national manager **Alex Stanojevic** about the next wave of growth for the sector and how his industry association facilitates collaboration.

Q. What does MESCA have planned for 2018?

The Mining and Energy Services Council of Australia (MESCA) is part of the Australian Industry Group (Ai Group). MESCA primarily engages with two key stakeholder groups; suppliers (members) and project proponents.

In 2018, MESCA is planning to deliver a busy schedule of events around major projects and supplier opportunities across Australia.

We're looking to have 10-12 major project briefings around the country this year – that's our wish list.

2018 will also see MESCA ramp up its policy and advocacy capability. This will be done in partnership with Ai Group and will result in an increased ability for member's voices to be heard at both State and Federal Government levels.

Q. What are the biggest issues facing the sector at present?

- *Digital disruption* – This includes everything from cyber security (many companies are not taking this risk seriously enough), IoT, Industry 4.0, and digital supply chains. Companies must have robust integrated systems in place to accommodate these and similar threats.

- *Energy security/policy/pricing* – these areas are currently in state of flux and companies must adopt proactive strategic approaches to manage risk. Currently Australia has no clear energy plan and increasing power prices are challenging the viability of many industry sectors. As a nation we also need to agree upon a range of key issues including: what is the future of coal? What is the best way to integrate and phase in renewable energy sources? What will the impacts on the environment be, what role should gas play, and what is the true potential of HELE coal power stations or carbon capture technology? These issues require further debate and sensible policy outcomes.

- *Innovation* – Australia must invest more to support the development of an innovation culture. This must be an ongoing process to assist Australian METS companies to innovate. We can never stop and must always stay vigilant otherwise we will be overtaken by others that do.

- *Social licence* – The importance of social licence to mining and energy projects has increased exponentially in recent times.



Q. FMG Christmas Creek general manager Jim Herring was recently quoted saying one of the big issues facing METS companies is that in many cases mine managers have never heard of them. Do you agree that marketing is an issue?

I have no doubt the mine managers have a lot of people knocking on their doors. I myself have had a lot of cold calls that have come from people I have never heard from before, but you look at the product and it doesn't take long to figure out whether the product – regardless of whether it is a known brand or not – is of value to you.

For marketing in general it varies – there's no standard response. Some companies are extremely mature and have highly sophisticated systems and have got great websites, and e-marketing and e-commerce all sorted.

Some companies still don't have a website on the smaller end of town but they are still in business and doing quite well. I think those sorts of places need to have that on their agenda for their capability development and improve it.

There's certainly a space there for marketing to be improved, but some companies are doing it very well. I think most of them would know some of the deficiencies they have got; it is more about dedicating resources and prioritising them.

Q. I understand Industry 4.0 is the next focus area for METS companies. How does this compare to Industry 3.0?

Industry 4.0 is about advanced manufacturing. Companies cannot afford to ignore the disruption potential of this technology.

Industry 4.0 differs from 3.0 by its emphasis on cyber physical systems, which is a fancy way of saying that machines and sensors are connected via wireless or remote technology.

One of the best examples of this is the new wave of tracking and communications systems in underground mines.

Wi Fi technology has been adapted to function in underground environments and monitor everything from air quality to the movement of vehicles and personnel.

Similar applications of remote technologies are also being applied to automate mining operations; this includes driverless dump trucks, mining equipment and trains.

Q. Are mining operations heading towards Industry 4.0?

I suppose not many companies would be at 4, but it's where the industry is going and needs to be.

Many would be at 3; they've got those systems that talk within their factories, they have computerised high-tech equipment that

make things and systems monitor and record, but they don't have cyber physical systems with sensors and remote monitoring and transmission, and collection of data.

It's an ongoing journey. If we're going to make high tech products, manufacturing systems we will have to compete on a global base line, and I can guarantee Europe and other advanced economies in the world are all moving towards these advanced manufacturing platforms.

If you want to survive in Australia you have to be aware of those global trends and adopt the same, if not better standards, to give yourself a competitive advantage.

Q. Is QLD poised to become the national METS hub or are other areas showing promise, such as the WA Goldfields, Spencer Gulf and Hunter Valley?

METS hubs tend to spawn in areas surrounded by significant mining projects.

All of the areas mentioned above will no doubt go up and down with the tide according to developments in their regions.

In regards to QLD, when Adani and the GVK projects reach final investment decision stage and all approvals have been granted then I see no reason why the existing capability of QLD's existing METS hubs should not also increase proportionately.

Q. How important is collaboration to the industry's future?

Collaboration is essential to the future of the METS industry. It is at the core of everything MESCA does. MESCA project briefings are business development events, they only occur when contracts are on the table or are soon to be released.

Members have two opportunities to win work at the events. The first is to hear the project proponent and get an update on upcoming work packages; the second is to attend business opportunities forged over the post briefing networking and drinks sessions. MESCA members have repeatedly told me that they have won significant work as a direct result of attending MESCA events.

Q. What advice do you give to emerging METS companies looking to make their mark?

- Find ways to stay well informed on industry developments and emerging technologies.

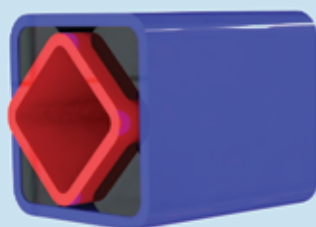
- Develop your business development teams. Industry intelligence is becoming / has become a digital commodity, the days of "Bob" having a few contacts he can call upon are rapidly disappearing.

- Partner, network and collaborate with others in your industry.

- Innovate or die.

Leverlink®

World-Class Engineering Solutions



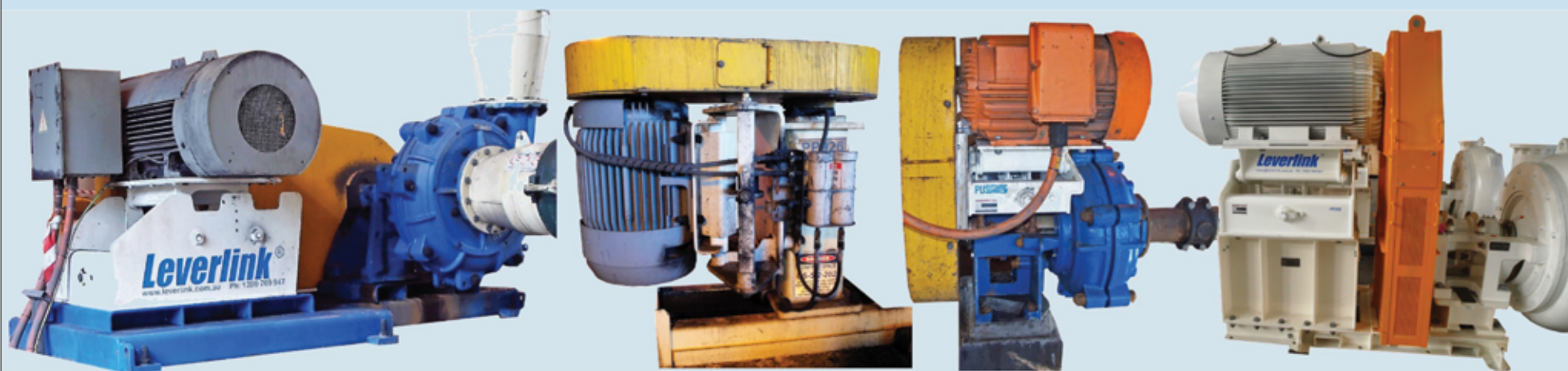
Rubber Suspension Units / Rubber Torsion Springs

We are Australia's leading designer and manufacturer of Rubber Torsion Springs and Rubber Suspension Units.



Motor Bases - Made in Australia

All sizes - All Mounting Positions



Motor Bases - Made in Australia

All Applications



Dynamic Impact Beds - Made in Australia

Big Conveyor Belt Specialists



We Specialize In Conveyor Belts In The 1200mm to 3000mm Wide Range

Key Contacts

Paul Carlon: 0437 440 430 Williem Suryadi: 0402 572 517 Richard Sharp: 0409 159 100

sales@leverlink.com.au www.leverlink.com.au



monzonasiapacific.com