

READY TO THRIVE

Trade agreement with Korea opens doors for WA

PROSPECT





In 2013–14, Western Australia contributed 50 per cent of the nation's exports to South Korea with a total that stood at more than A\$10 billion. While much of the focus of Western Australia's exports to Asia lies with China and Japan, the State has also developed a trade relationship with South Korea that is similarly robust.

This partnership is now set to blossom even further with the Korea-Australia Free Trade Agreement (KAFTA) entering into force in December 2014, the first Free Trade Agreement to be concluded with a major trading partner in North Asia.

In this issue of *Prospect*, the Regional Director of the Western Australian Government's Trade and Investment Office in Seoul, Jean Ough, outlines what benefits can be derived from the KAFTA and how the office can assist WA businesses to enter the Korean market (story page 3).

Korean Steelmaking giant POSCO has made sizeable investments in major resources projects in the State over the last decade (story page 2) and I look forward to seeing other businesses follow suit as they capitalise on the benefits of the agreement.

In December last year I was pleased to visit Onslow to announce a number of infrastructure projects that will ensure the town accommodates the expected growth in population (story page 26). Of particular note is the construction of a new hospital, which will bring a range of health services to one location.

The Mining Rehabilitation Fund (MRF) has returned more than A\$1 billion to Western Australia's mining industry since its introduction (story page 6). As well as safeguarding the State against the expense of rehabilitating future abandoned mines, the MRF allows for the rehabilitation of legacy mine sites.

Managing the groundwork to give Western Australian industries an option to reduce their carbon footprint is a challenge being undertaken by the Department of Mines and Petroleum (DMP). *Prospect* takes a look at how the department's South West Hub project is progressing, new research facilities, and our closer ties with China on carbon capture (story page 8).

The Western Australian Government's decision to expand the Minerals Research Institute of Western Australia's (MRIWA) postgraduate scholarship program will come to fruition next month when MRIWA's 2015 scholarships worth a total of nearly A\$500,000 are awarded (story page 23).

DMP's expertise in oil and gas licensing took centre stage at last month's Oil and Gas International Summit 2015 in London (story page 7). The audience heard that WA is internationally recognised for having a best-practice oil and gas licensing system with transparent regulatory and governance processes.

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Cover photo: Large fishing vessel - leaves the Port of Busan in South Korea.

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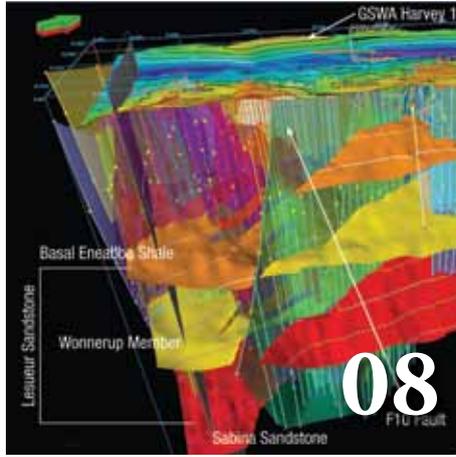
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POSCO steelworks in South Korea. Photo: POSCO.

A STEELY RESOLVE

From humble beginnings in 1968, Korean steel manufacturer POSCO has risen with great speed to become one of the world's biggest steel makers by volume. In fact, in 2012 it was ranked fourth-largest, producing 39.1 million tonnes of steel.

The rapid development of POSCO, which began steel production a mere four years after the company was founded, mirrored the economic growth of South Korea from the 1960s to the 1980s. During this period, a focus on the country's industrial sector provided conditions that were ripe for POSCO's growth and a small but dedicated team set the company on the path to success.

In order to produce such vast quantities of steel, POSCO needs to ensure it has access to a stable supply of high-quality iron ore. It was with this in mind that the company acquired a 12.5 per cent stake in the Roy Hill mining project, which once completed will be the biggest single-pit iron ore mining project in Australia. First exports from the mine are expected to occur by the end of 2015, and POSCO has secured seven million tonnes of iron ore per annum for 30 years.

As explained by POSCO's Chief Representative in Western Australia, Mr Sung-Uk Sohn, the investment in the Roy Hill project is part of an investment relationship with the resources industry in Western Australia that's more than ten years old.

"In 2002, BHP Billiton proposed a joint venture with POSCO for the development and operation of the Area C mine in the Pilbara region," Mr Sohn said. "We had confidence in the quality of the iron ore in the area and were comfortable with both our partner and the structure of the joint venture."

"In 2009, POSCO reviewed investment options in second tier iron ore companies such as Roy Hill and API, and as a result made a cornerstone investment in the Roy Hill project.

"We were assured by the quality of Roy Hill iron ore and needed to diversify our procurement chains. POSCO has also invested in the West Pilbara iron ore project, which has lower-quality iron ore but good long-term prospects."

Such interests have led to POSCO being one of Australia's biggest corporate buyers, purchasing A\$6 billion worth of raw materials in 2013 alone. That represents more than 25 per cent of Australia's total exports to Korea.

While such significant ventures are set to guarantee a long future in the production of steel, the recent past has set its own challenges. For a number of years, an oversupply of steel has flooded the market, resulting in a drop in a price. However, while Mr Sohn doesn't expect this imbalance to be corrected in the immediate future, he is confident POSCO will continue to flourish.

"It is likely the oversupply in the steel market will keep going due to the massive production in China, so POSCO will aim to retain its competitive edge through the development of steel technology and expanding its marketing channels," Mr Sohn said.

With a number of additional companies that fall under the POSCO banner, the company operates in countries including Vietnam, India, Japan and Brazil, as well as Australia. It is also looking to explore additional investment opportunities in Western Australia that lie outside the iron ore sector.

"While POSCO itself needs to procure various ferroalloys, such as nickel, manganese, silicon, vanadium and titanium, our subsidiary companies are also trying to become involved in the WA construction business," Mr Sohn said.

Armed with foundations built on diligence and a single-minded determination to prosper, POSCO's future pursuits will likely be characterised by the success that has made the company a world leader.



Q&A WITH JEAN OUGH, REGIONAL DIRECTOR

Can you describe your role? What does an average day entail for you?

I have different ways of describing my roles and responsibilities, but the most succinct is I am the person representing Western Australian business interests in Korea. My priorities lie with the promotion of WA trade and investment activities in Korea, and helping WA industries become more competitive when pursuing domestic and/or export market opportunities by collaborating with Korean companies and industries.

I spend considerable time raising the profile of the State with Korean industries by presenting to and meeting and networking with various people in the industries and Korean government agencies and ministries. I also search for trade and investment opportunities and monitor domestic and global market information and trends. Providing support to WA stakeholders is also an important daily task.

Korea is the State's third-largest export market, as well as a major investor. What do you think are the key opportunities it presents for WA businesses and the State?

Western Australia accounted for 50 per cent of Australia's exports to Korea during 2013–14, of which 92 per cent was in energy and commodities. I am happy with the current progress, but would like to see more diverse products and services accommodating the needs of the Korean market. Our Korea office is focusing its efforts on promoting WA agricultural products, food ingredients and even processed food to support Korean food security. For example, in 2014, our office provided significant support to a Western Australian spring water company to sell WA bottled water in major Korean retail stores. This is significant because it evidences the networking capabilities of the office and our ability to access the appropriate business channels.

And similarly, what is Korea seeking from WA?

In commercial terms, Koreans are basically looking for two things: consistent and sustainable fuel to keep Korea's economic

engine running, and business opportunities for their long-term growth. Apart from importing resource commodities such as iron ore, oil and LNG, they are always on the lookout for Western Australian products, technologies, collaboration and investment opportunities with a view to becoming more competitive in both Korean and export markets. They are also constantly looking for construction opportunities, particularly in infrastructure, and our office helps facilitate these by organising funding arrangements with Korean financial institutions.

What are some key investments Korea has made into WA in recent years?

The latest investment made by a Korean firm is a A\$22 million investment in the A\$300 million Mundaring Water Treatment Plant project. We are currently helping a Korean company complete its due diligence in a joint venture investment deal with a WA farmer. The nature of Korean investments is often not to acquire a controlling stake, but instead to obtain enough equity to secure and develop the raw materials they need. We do not hear much about Korean investments in Australia, particularly in WA, because Koreans are still learning about Western Australia. The scale of investment deals is comparatively small compared to those from China, and there is not the investment history that the State has with a country like Japan. Nevertheless, there is great potential and we expect there will be greater investment from Korea in the future.

The Korea-Australia FTA (KAFTA) was signed in April and ratified by both countries' legislature. What impact and opportunities will the KAFTA bring to WA?

I am excited to see the KAFTA come into force, and the agreement will undoubtedly take the trade and investment relationship between the two countries to a new level. However, I believe that while some Western Australian companies will see some immediate benefits, others will need to work hard to capitalise on the opportunities that will arise. The beef industry, for instance, will need to work hard to capture a greater market share of the imported beef market, in which WA only supplied one per cent of the A\$883 million of Australian beef exported to Korea last year.

Additionally, we need to look at capitalising on the 15 FTAs Korea has signed with other countries. I call this the 'multinational FTA market access opportunity'. The agreement will ultimately serve to enhance the relationship between the State and Korea.

What advice would you give WA companies looking to expand into Korea? What is the key to success in the Korean market?

There is no magic formula that will make you successful in the Korean market – or any market for that matter – but there are some essential elements to be included in your business plan.

You need to define your products and services to suit the Korean market. That is, you must understand the Korean market and its consumers, as it's different to the Western Australian, Chinese and Japanese markets. Unless you have sufficient resources to work independently, I suggest finding a confident local partner. Finding the right partner, however, is an art in itself.

What are your main goals in the Korea market going forward?

Apart from our usual activities in promoting various WA opportunities, I intend to seek opportunities brought about by the KAFTA. I'll be looking at industrial sectors and consumer areas for future trade opportunities, brand awareness of WA products, professional service engagement in areas such as financial consultation and legal services, and technological collaboration in such areas as biomedical and environmental sciences.

In specific market activities, I will spend time and effort enhancing relationships with financial institutions and fund managers, who are now forced to find more profitable projects amid the low interest rates in Korea. I will be focusing on not only energy and resource sector opportunities, but also on a variety of other Western Australian industries. I will continue my efforts in expanding trade and investment opportunities in agrifood sectors, especially in developing new product markets and increasing WA's share of beef in the Korean meat market.



Mines and Petroleum Minister Bill Marmion.

INVESTMENT PROSPECTS THE FOCUS AT WAKER FORUM

Western Australian businesses looking at opportunities in South Korea are encouraged to participate in the third Western Australia–Korea Energy and Resources (WAKER) Forum, to be held in Seoul on 28 May 2015. The forum aims to enhance bilateral business/investment cooperation between WA and Korea, particularly in the energy, mineral, construction and finance investment sectors. A shipyard site visit is scheduled for 29 May.

Previous forums were held in Perth in November 2012 and November 2013, with the upcoming third forum the first to be held in Seoul. The event is jointly supported by the Korean and Western Australian governments, with Mines and Petroleum Minister Bill Marmion scheduled to attend and lead a business and industry delegation.

As with preceding events, this year's forum will provide an opportunity for the State and business to engage closely with the Korean Government and with major Korean players in the resources and energy sector.

Having set an energy self-sufficiency target of 30 per cent by 2019, the Korean Government has recognised Western Australia's potential as a destination for overseas energy resources development, and the State's attractiveness as both an investment destination and business partner for Korea will be a feature of the event.

If you're interested in attending the forum, please contact Naila Mazzucco, Country Manager, Korea, Japan and the Americas, on +61 8 9222 0584, or at naila.mazzucco@dcd.wa.gov.au

DR VIBHUTI MISRA – OBITUARY

Staff at the Department of State Development and the Department of Mines and Petroleum are saddened by the recent passing of an esteemed long-serving colleague, Dr Vibhuti Misra.

Dr Misra was a highly qualified and well-respected metallurgist, with a career spanning Western Australia and India.

Dr Misra began his career with the State Government in 1988 as a regional metallurgist for the Department of Mines stationed at the Kalgoorlie metallurgical laboratory. In 1991, he became Chief of the Laboratory. While stationed in Kalgoorlie from 1989–1994, he lectured in pyrometallurgy at the Western Australian School of Mines.

After transferring to the Mineral Processing Laboratory in Bentley in 1994 as Principal Research Metallurgist, Dr Misra became its Senior Principal Metallurgist the following year. He continued working as Manager – Metallurgy when CSIRO took over the laboratory in 1998.

In January 2001, Dr Misra pursued a five-year stint in India as Director of the Regional Research Laboratory in Bhubaneswar. He returned to Western Australia in 2006 as a Senior Project Manager, first in the Department of Industry and Resources and then in the newly-formed Department of State Development. His final role was General Manager of Special Projects, which he

was appointed to in October 2011 and was serving in when he sadly passed away after a long illness.

Dr Misra's expertise was respected and admired, both in government and in the private sector. The Government of Western Australia would like to acknowledge the valuable contribution Dr Vibhuti Misra made to the State during his career. He was a caring and considerate colleague who will be missed.

DIGGING FOR INNOVATION IN RESOURCES

An inventive approach to problem-solving is resulting in ground-breaking ideas that have the potential to save the resources industry millions of dollars, and put Australia firmly on the map as a hub for innovation.

The source of these initiatives is Uneathed, a unique 54-hour 'hackathon' that aims to produce prototype solutions to resource industry challenges.

The brainchild of Resources Innovation & Information Technology Directors Zane Prickett, Paul Lucey and Justin Strharsky, Uneathed was borne out of the difficulties associated with introducing new technologies to the mining industry.

"Both Justin and I run startup companies focused on the resources sector and saw that an opportunity existed to both reduce the time it takes industry to adopt new technologies and build a local technology innovation ecosystem," said Mr Prickett.

"Paul has extensive experience on the other side of the fence trying to drive innovation from within a global mining company, so we've all experienced the challenges in this area firsthand."

The first Uneathed took place in May 2014 and saw more than 70 software developers and data scientists working together to address real issues in the mining sector. A crucial aspect that contributes to the success of this collaborative approach is the involvement of the mining companies themselves,

and since the inaugural event Mr Prickett has seen industry become significantly more receptive to the idea of an 'open innovation' approach to problem solving.

"While we think some of this change is attributable to the awareness created by Uneathed, much of it is likely due to growing recognition by resources companies that they must accelerate innovation in order to be more efficient and globally competitive," he said.

"Falling commodity prices have sharpened the industry's focus on productivity and increased the willingness to consider novel solutions."

Rio Tinto initially identified six potential challenges for the event last year, which were then reduced to the three that the Uneathed team believed had the best chance of being addressed over the course of a weekend.

After 54 hours of problem solving, the teams developed a solution and presented it to a panel of judges comprised of venture capitalists, entrepreneurs and mining executives.

Newton Labs, the team that took out the event, focused on the issue of oversized rocks which can damage or bog crushers, an incident which requires crushing to be stopped while the boulder is cleared. Impressively, within six months the team had formed a company and developed and tested their products at sites in Western Australia.

"Newton Labs has progressed from an initial iPhone prototype developed at Uneathed to an industrial-grade accelerometer sensor package," Mr Prickett said.

"In addition to detecting large boulders, they are now measuring cycle times, rock fragmentation, and other critical load parameters.

"Having completed successful site trials, they have taken their technology from prototype to production and are on track to deliver their first installation in March. In less than a year they've made amazing progress."

Buoyed by the success of the initial event, Uneathed will expand to include Perth, Brisbane, Sydney and Melbourne in 2015, with more than 300 innovators working to launch some 60 prototypes. As many major resource projects move into the production phase, innovation in the mining equipment, technology and services field through initiatives like Uneathed has taken on increasing importance.

"As companies transition out of construction, their main opportunity to find additional value will come from improved efficiency and productivity," said Mr Prickett.

"Therefore, it is critical that they prepare for and embrace the wave of technological change that's coming."

Uneathed 2015 will be launched in Perth in March, with other states to follow.



The crowd looks on at the inaugural Uneathed event.



The winners of the first Uneathed. Photos: RIIT.



Minister Marmion hands over a cheque to Great Western Exploration Managing Director Jordan Luckett.

MINING REHABILITATION FUND MARKS \$1 BILLION IN BONDS RETIRED

In December 2014, the State Government reached the A\$1 billion milestone returning unconditional performance bonds to the Western Australian mining industry, just six months after the launch of the Mining Rehabilitation Fund (MRF).

The world-first MRF replaced the previous system in which unconditional performance bonds were held by the State as security to ensure companies rehabilitated their sites following mine closure.

The majority of these bonds have now been retired as exploration and mining companies entered the MRF and made their first levy payment.

Marking the milestone, Mines and Petroleum Minister Bill Marmion said that the fund had been a big winner for jobs and the industry during a challenging time for the resources sector.

“Money was previously tied up in environmental bonds but is now back with companies and helping boost their exploration and mining activities,” Mr Marmion said.

DMP Executive Director Environment Dr Phil Gorey said that prior to the MRF about A\$1.2 billion in environmental bonds was being held by the State.

“The MRF has been a real win for industry and the environment,” Dr Gorey said.

“We’ve been able to return money to companies that they are now investing in development or using for progressive rehabilitation of their tenements.”

“Under the MRF, the annual levy is based on the actual level and type of disturbance on a tenement at the annual reporting date, so there is now a financial incentive for companies to rehabilitate as soon as mining work on an area is completed.”

Dr Gorey said that while the bonds system was commonly used in mining jurisdictions throughout the world, it had a number of limitations.

“Bonds could only be used to rehabilitate the specific tenements against which they were held,” Dr Gorey said.

“The cost of rehabilitation had also increased to the point where the value of bonds held was estimated to only cover around 25 per cent of the true cost of rehabilitation.

“As well as safeguarding the State against the expense of rehabilitating future abandoned mines, the MRF allows for the rehabilitation of legacy abandoned mine sites, which the State Government previously had no means of funding.”

For many smaller companies, the requirement to post bonds was often a disincentive to development as it meant the bond value had to be outlaid before any exploration or mining work could start.

Great Western Exploration, a Western Australian nickel, copper and gold exploration company, was one of the last companies whose bond retirement helped push the total over the A\$1 billion mark.

Managing Director of Great Western Exploration, Jordan Luckett, said that under the previous bond system, small companies like theirs were required to initially commit twice the amount of capital for rehabilitation as was required.

They had to post the rehabilitation value as a bond as well as fund the actual rehabilitation work.

Mr Lockett said that having capital tied up in bonds for long periods of time increased the upfront cost of drilling, but the MRF allowed them to manage their capital more efficiently, hopefully meaning the next big discovery was that little bit closer.

"The benefit of the MRF in our circumstance is that it allows us to more efficiently use our capital and not have large amounts tied up in bonds, sometimes for a number of years," Mr Lockett explained.

Mr Lockett also saw the MRF's ability to fund rehabilitation of legacy sites as beneficial to the industry and hopes it helps build sustainable relationships with the community.

"It is appropriate that the industry helps fund the clean-up of legacy areas and prevent them re-occurring in the future so that a sustainable relationship with the community is maintained."

"I think over time it will build trust with the wider community, especially if there is a transparent system in place that guarantees the rehabilitation of mining areas and the cost is covered by the mining industry."

Mr Lockett said that while Great Western Exploration was committed to establishing a social licence to operate, the MRF provided additional incentive to complete progressive rehabilitation in order to stay below the MRF payment threshold.

The company will use its retired bonds for more drilling at the Finlayson prospect near Wiluna.

Do you need assistance with your 2015 MRF report?

MRF staff will be visiting regional centres to assist with 2015 MRF reports on the following dates:

- Coolgardie - Thursday 7 May
- Kalgoorlie - Thursday 7 May to Saturday 9 May
- Leonora - Monday 11 May
- Sandstone - Tuesday 12 May
- Mt Magnet - Wednesday 13 May
- Paynes Find - Wednesday 13 May

Assistance will also be available in Perth.

Venues and times are still being confirmed. If you'd like more details please contact: MRFFenquiries@dmp.wa.gov.au

DMP'S OIL AND GAS LICENSING EXPERTISE TAKES CENTRE STAGE AT LONDON SUMMIT



State Government officials delivered presentations at the 2015 Oil and Gas International Summit London.

The Department of Mines and Petroleum's (DMP) expertise in oil and gas licensing took centre stage in February at the Oil and Gas International Summit 2015 in London.

"WA is internationally recognised as having a best practice oil and gas licensing system," State Government Trade and Investment Manager Richard Riordan said after the summit.

"This is because it is a mature system with transparent regulatory and governance processes.

"It is also because the quality and scope of the data provided as part of DMP's acreage release rounds is extensive, modern and meets industry expectations."

At the summit, Mr Riordan delivered a joint presentation entitled Western Australia Licensing Oil and Gas Titles, developed with DMP's Petroleum Exploration Geologist Richard Bruce, who is responsible for managing and promoting WA's petroleum acreage releases onshore and in State Waters.

Mr Riordan said licensing formed the foundation of the oil and gas industry.

"Licensing rounds allow companies and joint ventures across the world to search for commercially feasible deposits for extracting petroleum," he said.

"The procedures through which each sovereign country distributes licences can vary greatly from country to country.

"The state or government carefully selects the licensing system that aligns with the social, geographical, and political need of that country.

"The need to create an efficient system to attract investment and build a strong oil and gas industry within a country is crucial, given the vital role that oil and gas plays at a national and global level."

Mr Riordan said in the shadow of the recent decline in oil and gas prices, a number of the summit presentations recognised the need for countries to design efficient licensing systems to attract investment.

This investment encourages the development of a strong oil and gas sector within their economies.

"There are a number of countries keen to learn from Western Australia," Mr Riordan said.

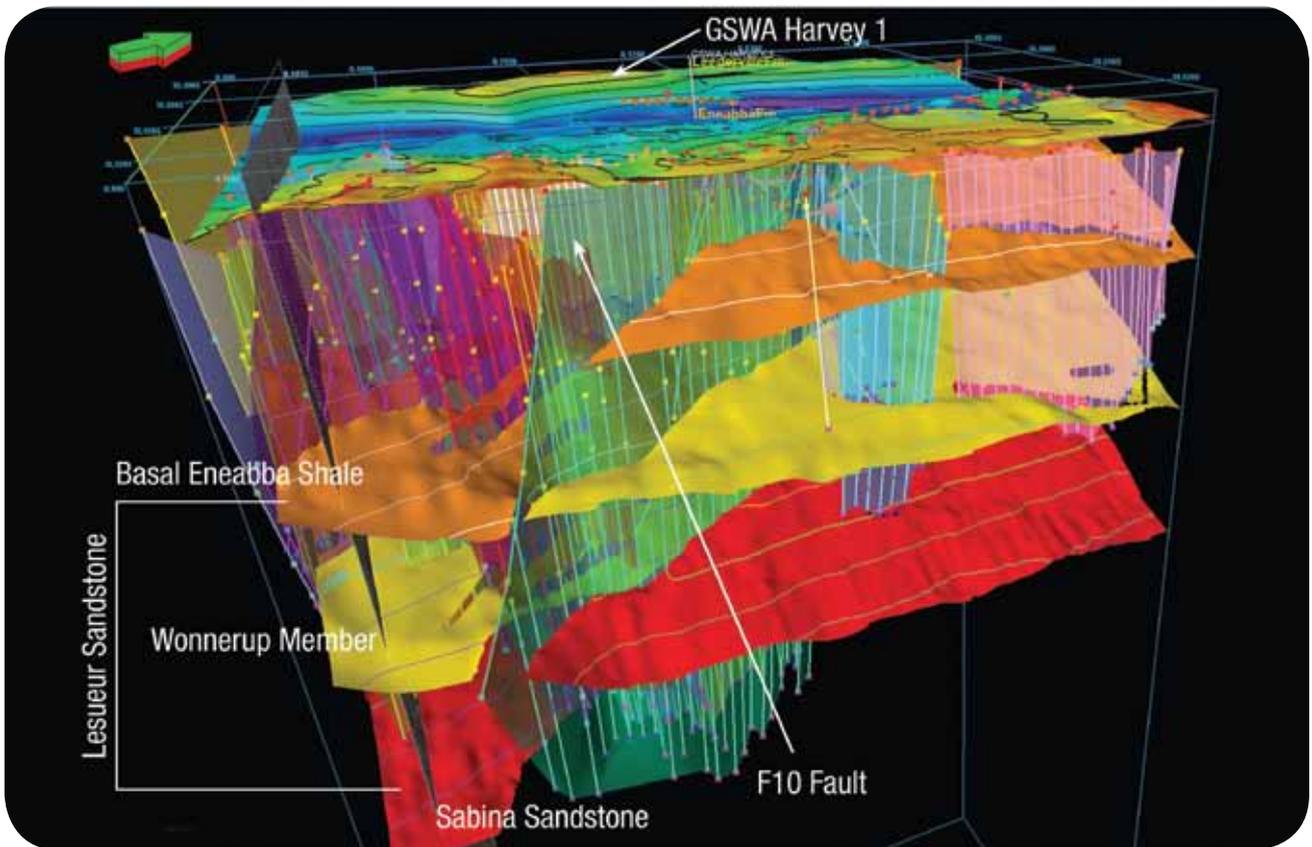
"They wish to harness our substantial expertise and experience in administering oil and gas titles, information, royalties, legal governance and regulatory structure.

"This is a strategic opportunity to promote and develop Western Australia's international relationships.

"Facilitating the spread of transparent systems promotes a level playing field for the future release of WA acreage."

State Government representatives also used the summit to promote the 18th International Conference and Exhibition on Liquefied Natural Gas (LNG18) which will be held in Perth from 11-15 April 2016.

The call for papers for LNG18 is open until 20 April 2015.



Recent South West Hub successes include a deep stratigraphic well and complex seismic surveying conducted to gather data which can be processed, interpreted and used to create models of the stratigraphy such as the one pictured above.

SOUTH WEST HUB PROJECT TO REDUCE CARBON FOOTPRINT

Managing the groundwork to give Western Australian industries an option to reduce their carbon footprint is a challenge being undertaken by the Department of Mines and Petroleum (DMP). Prospect looks at how the department's South West Hub project is progressing.

The State Government is working with major industrial companies and coal miners to reduce the amount of carbon dioxide being emitted by South West industries using Collie coal.

A small and dedicated team led by DMP's Carbon Strategy Coordinator Dominique Van Gent has been working from the South West Hub project office in Bunbury for the past eight years.

The project was inspired by desktop studies in 2007 which identified the Harvey and Waroona area as a potential carbon dioxide storage reservoir.

"Since then the long-term process of acquiring geological data has progressed in stages, managed by the department and

supported by the Australian Government through Carbon Capture and Storage Flagships funding," Mr Van Gent said.

He said each stage was dependent on the success of the previous one, so any information that ruled out the area's carbon dioxide storage potential would stop the project moving forward.

"However, there has been no show-stopper and, stage by stage, the project is increasing confidence that the Lesueur Sandstone is a reservoir available to help tackle the issue of atmospheric carbon dioxide."

The initial stage was a 2D Seismic Survey conducted in 2011 which traversed 106 kilometres of established roadways to the north-west of the Harvey townsite, sending sound waves into the earth and recording the echoes which help to describe the underground formations.

"The survey results were encouraging and early in 2012 the Harvey 1 stratigraphic well was sunk down through the target reservoir in the Lesueur Sandstone, and into the underlying Sabina Sandstone, reaching a

depth of nearly three kilometres," Mr Van Gent said.

"Core samples of rock and electronic data were collected, and again the results increased confidence in the suitability of the stratigraphy, as well as highlighting the need to collect additional water samples."

The next stage was a major logistical challenge. During six weeks stretching from February through to April in 2014, seismic survey company Geokinetics completed what the company describes as the most complex 3D seismic survey it has undertaken in Australia.

The survey involved 75 landholders and covered 115 square kilometres of rural land under various agricultural uses and conservation values.

About 300 new gates needed to be installed and more than 7000 seismic recorders (geophones) were placed over the area. Despite the challenges, it was a resounding success, both in data quality and quantity.

"Land access protocols were developed and land access requirements were

negotiated by a team which was in communication with landholders over an extended period, ensuring that everyday farming activities could continue,” Mr Van Gent said.

The survey collected almost double the required data for depths below 1500m, which fed into the creation of virtual 3D stratigraphic models, as well as assisting with the identification of sites for the current drilling program.

Taking advantage of the dry summer conditions (by early February it had not rained in Harvey for more than two months), the latest data acquisition stage involves three stratigraphic wells being drilled in the southern part of the survey area.

Two are using mineral drilling rigs and one a mud rotary rig to reach about 50m into the upper Lesueur (Yalgorup Member) at depths of between 1350m and 1800m. These depths are relatively shallow in comparison to the earlier Harvey 1 well, which reached a final depth of 2945m.

“From the project’s outset, DMP has engaged with the local community and

while there have been challenges in relation to land access and the past experiences of some landholders with industry and government departments, the overwhelming community response has been supportive of the scientific investigation,” Mr Van Gent said.

He said the knowledge gained through each stage was shared openly with the community through meetings, presentations, information days, tours of the activities and attendance at agricultural shows in the region.

Sometimes a picture really is worth a thousand words and virtual 3D models of

underground formations, such as the ones pictured here, are helping community members to understand what lies beneath their feet.

These computer models have been developed by geoscientists using data acquired through successive South West Hub stages.

The website www.dmp.wa.gov.au/ccs is regularly updated with information about the South West Hub project, including access to technical reports.



Seismic trucks operating in Harvey.

WA IN CLOSER TIES WITH CHINA ON CARBON CAPTURE AND STORAGE



A Chinese scientist discusses drilling techniques onsite in Harvey.

Senior Chinese officials visited Western Australia’s nation-leading South West Hub Carbon Capture and Storage project in February this year.

Mines and Petroleum Minister Bill Marmion welcomed them to Australia and said the visit strengthened the already strong ties between the two nations.

“A vital concern to both countries is the creation and use of low-emission technology, to cut waste and increase the amount of energy gained from each tonne of coal,” Mr Marmion said.

“Carbon capture and storage (CCS) is a developing technology that offers very good prospects of emissions reduction in the future.”

Along with Australian Government and Eastern States representatives, the Chinese delegation visited WA for the 7th Australia-China Bilateral Dialogue on Resource and Energy Cooperation and major meetings on carbon reduction technology.

The delegation inspected sites in the Harvey and Waroona shires where the State Government’s Department of Mines and Petroleum is overseeing the drilling of three new wells for the South West Hub project.

“This is an area with excellent prospects as an injection site for the underground storage of carbon dioxide in the Lesueur Sandstone,” the Minister said.

“The Chinese delegation is also aware of the advances we have made in CCS in cooperation with industry in WA.

“The Gorgon Project at Barrow Island is the world’s largest carbon sequestration project, storing up to four million tonnes of carbon dioxide a year and set to reduce the project’s greenhouse gas emissions by about 40 per cent.”

China and Australia are collaborating on two Carbon Post Combustion Capture projects in China worth A\$14.4 million.

The South West Hub project is jointly funded by the State and Australian governments.

For more information, visit www.dmp.wa.gov.au



NEW RESEARCH FACILITIES PUT WA AT THE FOREFRONT OF CARBON STORAGE

Dr Lionel Esteban of CSIRO places a section of core sample in the Medical CT scanner at the National Geosequestration Laboratory in Perth. Photo courtesy of Andrew Ross.

The relationship between the Department of Mines and Petroleum (DMP) and research institutions in WA has grown dramatically in the past few years thanks to a A\$48.4 million grant from the Australian Government to build the National Geosequestration Laboratory.

Under the banner of the laboratory, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the University of Western Australia and Curtin University are working closely with DMP on pre-feasibility data acquisition for the South West Hub carbon capture and storage feasibility project.

The South West Hub data acquisition is being steered by DMP's Carbon Strategy Coordinator Dominique Van Gent, with the objective of obtaining sufficient data to enable acreage release for carbon dioxide storage in a location within the Perth Sedimentary Basin, about 110km south of Perth.

"The laboratory's principal site is at the CSIRO Australian Research Resources Centre in Perth," Mr Van Gent said.

"This facility houses a number of CSIRO, UWA and Curtin University laboratories, and boasts a recent extension of new and refurbished laboratories housing new geochemical, core-flooding, sensors, tracers and other equipment."

Heading the CSIRO's involvement is the laboratory's Science Director Dr Linda Stalker, who is responsible for overseeing the different research programs involved in the project.

"In addition to state-of-the-art laboratory facilities, an extensive effort has been put into the procurement of instrumentation and facilities that can be mobilised to field sites," Dr Stalker said.

She said new equipment included atmospheric, soil gas, passive seismic and ground water monitoring instruments, as well as mobile containerised laboratories.

These laboratories allow extensive in-field analysis rated for extreme environments, including marine surveys, and down-hole instruments for the monitoring and interrogation of the deep subsurface.

In November 2014, a carbon dioxide processing laboratory opened at the UWA campus, featuring advanced geophysical sensors and data analysis equipment, as well as chemical engineering laboratories to support scientists and engineers undertaking research into new techniques to transport and store carbon dioxide.

"The UWA facility will also be used by the next generation of geophysicists, process engineers and other technical experts to develop skills needed to meet the science and engineering challenges of energy and industrial projects across the globe," Dr Stalker said.

On the Curtin University campus, construction of a 900-metre fully plastic-cased well, test stand and staging facility is underway. Because it is fully

CRANE DESIGNER FINED \$16,000

A Western Australian engineering company was fined A\$16,000 and A\$5000 in court costs in January this year for failing to design a crane to the appropriate Australian Standard.

Mr W. Etschmann of Etschmann Engineering pleaded guilty in Perth Magistrates Court to breaching 6.33(b) of the Mines Safety and Inspection Regulations (1995) following the structural collapse of an 80-tonne crane during test loading in April 2013.

Department of Mines and Petroleum (DMP) Director of Mines Safety and State Mining Engineer, Andrew Chaplyn, said the outcome was significant because DMP had not previously prosecuted a designer.

“Safety in design is one of the major areas of concern identified by the department,” he said.

“We hope this sends a strong message to designers working across the mining industry, but in particular, that negligent or inferior services will be not be accepted in Western Australia.



Etschmann Engineering was fined A\$16,000 following the structural collapse of an 80-tonne crane during test loading in April 2013.

“I take this opportunity to remind all those involved in servicing the industry of their duties under the Mines Safety and Inspection Act and regulations.”

Mr Chaplyn said DMP was promoting a risk-based approach which should employ the hierarchy of control.

“Engineering sits above the two lowest levels of control – Administrative and Personal Protective Equipment – and these two levels are being relied on far too much in WA mining,” he said.

“We really want to see sites becoming safer work places, and we will work with companies to achieve this.”

plastic-cased, the well allows advances in electromagnetic testing and cross-well testing to be developed.

“This unique facility will house geophysical tools that can be used for wire-line logging and training tomorrow’s scientists and engineers in data acquisition and the analysis of existing techniques,” Dr Stalker said.

“The ability to conduct field testing with a pair of vibroseis trucks adds to the capacity and value offered by this training and testing facility”.

Mr Van Gent said the combined equipment and capability base of the three research institutions put Western Australia at the forefront of carbon capture and storage research in Australia, as well as providing sufficient flexibility to be used in other core geoscience applications.

“For example, soil gas and atmospheric equipment is monitoring methane release at a number of sites and geophysical tools are being used in near-surface

archaeological assessments and groundwater monitoring activities,” he said.

“Additionally, the geochemistry laboratories contain equipment able to support mineral exploration survey analyses and petroleum exploration and production problem solving.

“On a positive note for Australian industry, almost two thirds of the equipment in the laboratories was sourced from local and national suppliers and outlets.”

Mr Van Gent said having all these capabilities in Western Australia added new capacity to a team of WA-based personnel with many valuable years of experience in research and development, including carbon dioxide storage, as well as geoscience and engineering.

“The facilities and personnel combined will ensure the laboratory can deliver research across the entire CCS value chain, and beyond, to advance our core geoscience-based activities and facilitate greater collaboration between DMP and research institutions in the future,” he said.

For an example of recently completed activities conducted in collaboration with DMP at the South West Hub site go to www.anlecrd.com.au/announcements/media-release-research-project-drills-down-for-results

For further information on the new capabilities go to www.ngl.org.au or contact Dr Linda Stalker (linda.stalker@csiro.au).



One of the National Geosequestration Laboratory’s Curtin University-based vibroseis trucks used for seismic survey research.



Mines and Petroleum Minister Bill Marmion (left) with APA Group General Manager WA Steve Lewis (centre) and AngloGold Ashanti Australia Senior Vice President Mike Erickson.

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EASTERN GOLDFIELDS FUTURE FIRES UP WITH NEW GAS PIPELINE

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Work has started on the construction of a A\$140 million gas transmission pipeline to dramatically improve the energy supply and development potential of Western Australia's Eastern Goldfields region.

The Eastern Goldfields Gas Pipeline, a Lead Agency project with the Department of Mines and Petroleum (DMP), is being developed by APA Group (APA).

DMP Lead Agency Project Coordinator Graham Cobby said the 292km high-pressure gas transmission pipeline would connect to APA's existing gas pipelines to transport natural gas to AngloGold Ashanti's Sunrise Dam and Tropicana gold mines.

The power stations at both mines will be modified to run on 100 per cent natural gas, while retaining diesel backup capability.

"The new pipeline will deliver gas from offshore fields off Western Australia's Pilbara coast to the two mines for local power generation, which will reduce the reliance on diesel fuel and LNG transported by road," Mr Cobby said.

"Access to a reliable and cost competitive energy supply such as natural gas is vital

for companies to ensure their mining operations have long-term viability.

"This is a good response to changing gas supply and demand patterns right across the country.

"The project provides significant infrastructure for WA which will open up economic benefits through future energy supply in the region."

AngloGold Ashanti Senior Vice President Australia Michael Erickson said the gas power generation was expected to reduce cash operating costs at both sites by between A\$25-\$30/ounce.

"The pipeline and gas transportation agreement will also provide continuity of fuel supply, reduce exposure to diesel price volatility and significantly reduce the number of trucks on the road, which has important safety benefits as well as reducing road maintenance costs," Mr Erickson said.

Expected to be completed in January 2016, the pipeline will incorporate up to 16,500 sections of the 18-metre lengths of pipeline that have been manufactured in China from Pilbara iron ore.

Once complete, the new EGGP will connect with existing APA pipelines – the Goldfields Gas Pipeline and the Murrin Murrin Lateral – allowing gas to be transported a total distance of 1500km to the mines through the three interconnected pipelines.

APA's General Manager of Transmission WA Steve Lewis acknowledged the role government had played in providing approval for new pipeline developments.

"This project will involve up to 300 construction personnel in Western Australia during the nine-month construction phase and an ongoing economic benefit through the supply of gas to mining operations in the Eastern Goldfields region," Mr Lewis said.

Baseline flora and fauna, heritage and archaeological surveys have been conducted along the proposed pipeline route and the Western Australian Environmental Protection Authority has assessed the project.

The Commonwealth has determined the project is 'not a controlled action' under the *Environment Protection and Biodiversity Conservation Act 1999*.

STATE SECURES GAS COMMITMENT

The Western Australian Government has negotiated a new domestic gas commitment from the North West Shelf Joint Venture.

Premier and State Development Minister Colin Barnett said operator Woodside Energy and its partners had agreed to reserve domestic gas equivalent in volume to 15 per cent of new approved LNG exports.

The gas will come in part from new developments at Persephone and Greater Western Flank Two, which will underpin the future operation of the project's processing plant.

These new developments will also enable the joint venture to export a further 86 million tonnes of LNG.

"The State Government is committed to ensuring that the WA community has a stable supply of gas, particularly at a time when the State is poised to become one of the world's largest producers of LNG," Mr Barnett said.

The new commitment is equivalent to approximately 100 terajoules per day of additional gas for the domestic market – about 10 per cent of the current supply.

Under the agreement, any gas produced by a third party and processed through the joint venture's plant will also be subject to the domestic gas commitment.

The North West Shelf's existing domestic gas contracts will taper off by 2020, and the State's Independent Market Operator had identified this as a key uncertainty for the energy sector at a time when the domestic gas market would be tightening.

The Premier said the new commitment cemented a long history of cooperation between the State Government and the NW Shelf Joint Venture dating back to the early 1980s.

"This agreement will help to bring more confidence and certainty for the Western Australian energy sector and energy-intensive industries such as manufacturing around the future supply of gas," Mr Barnett said.

"This outcome is consistent with the State's domestic gas policy, and we will continue to work with other producers to ensure ongoing supplies of domestic gas for WA into the future."

The agreement was formalised through an amendment to the *North West Gas*

Development (Woodside) Agreement Act 1979, which was introduced into State Parliament last year.

The Premier thanked the NW Shelf Joint Venture for working with the Government.

Production from the new gas developments is expected to start in 2017.



The Angel platform, an offshore gas production facility that is part of the North West Shelf Joint Venture. Photo: Woodside Energy Ltd.



Fauna clearance survey with Rapallo and the Ngadju to ensure as much fauna is removed unharmed prior to commencing clearing.

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WORLD-CLASS NOVA PROJECT UNDER WAY

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Mining started at Sirius Resources’ Nova Nickel Project in late January 2015, just two years after the announcement of the world-class Western Australian discovery.

In more good news for the company, the estimated capital costs for Nova have fallen by A\$30 million to A\$443 million, a result of savings made on construction contracts and tenders received.

In announcing the important milestone for the project, Sirius Managing Director Mark Bennett paid tribute to a wide range of groups that had contributed to the company’s rapid progress.

“We have started the project on time, on plan and significantly within original capital budget estimates,” Mr Bennett said.

“I would like to thank the Western Australian Environmental Protection Agency, the Department of Mines and Petroleum, and the Department of Environment Regulation for their professional and efficient participation in this process.

“It is also pleasing to continue involving local stakeholders such as the traditional owners, the Ngadju People, and local pastoralists in the venture.

“Our project management team has done a great job getting Sirius to this point so smoothly, so quickly and with the benefit of significant savings.”

Initial mining of the boxcut, the small open pit excavated to access fresh rock from which the underground decline starts, is expected to take about three months to complete.

Immediately after this, mining of the underground decline – the tunnel which accesses the Nova ore body – will start.

The mining and construction process is expected to take about two years to complete, with first concentrate expected to be produced from Nova by the end of 2016.

Sirius has said it expects Nova to be one of the lowest-cost nickel operations in the world when it comes into production, as well as one of the most financially robust nickel mines globally.

Nova is fully funded to the end of construction and offtake arrangements are in the process of being finalised.

“It is a very exciting time to be building a world-class nickel project in Western Australia,” Mr Bennett said.

“The falling Australian dollar and forecasts about a rising nickel price as the project is brought online in 2016 and 2017 could have a significant impact on the already enviable economics of Nova.

“We have a high calibre team undertaking the construction and are seeing the high costs of building these types of projects in WA falling, which is good for the industry.”

At the same time as construction gathers pace at Nova, Sirius is continuing to progressively explore its ground holding in the prospective Fraser Range, east of Norseman, and at its Polar Bear Project, to Norseman’s north.

Initial drilling at the Baloo prospect at Polar Bear has confirmed a new gold discovery and further drilling is being conducted to further understand the prospect.

At the Fraser Range, Sirius has started a drill program which will test a number of high priority targets, including the exciting Crux and Centauri prospects.

FUEL FOR THOUGHT

Within the confines of an unassuming, labyrinthine facility in Balcatta, local company Orbital is setting the standard for the rigorous testing of fuels and oils and measuring of exhaust emissions with some of the most advanced equipment in the world.

The company made – and took – its name some 40 years ago on the back of engineer Ralph Sarich’s invention of the Orbital engine. Under simulated conditions the engine produced fuel and emission results superior to the most effective engines of the era, and Orbital’s commitment to fuel efficiency was born.

Though the company doesn’t manufacture and sell that engine, its values still align closely with those that guided Sarich when Orbital was in its infancy. Today, in addition to supplying technology to traditional marine markets and the emerging unmanned aircraft sector, its engineering consultancy group’s focus has shifted to fuel testing, ensuring that clients are extracting optimum performance from their vehicles.

For over a decade, Orbital has been providing independent assessment of fuels, fuel alternatives and fuel additives to a variety of organisations in both the private and public sectors. Though much of the work it carries out is highly confidential, Caltex Australia recently made note of the independent testing conducted by Orbital on its new range of diesel products and services.

Business Development Manager Nick Coplin was pleased with the public recognition, as it allowed the good work the company was doing to spend some time in the spotlight.

“The recognition by Caltex of Orbital’s independent testing services has allowed a broader range of companies in WA’s resources sector to associate Orbital’s name with heavy-duty diesel engine experience,” Mr Coplin said.

“While companies such as Caltex are able to leverage data from overseas, local testing tailored to local requirements ultimately allows end-users to have greater confidence in both the process and the results.”

Testing showed improvements in engine performance, fuel flow and fuel consumption, results that take on even greater significance in light of the recent fall in commodity prices.

“The focus on engine efficiency and fleet maintenance varies with both economic and mine life cycles, and that focus has once again shifted to what can be done to reduce operating costs and extend engine and asset life,” Mr Coplin said.

“The implications are not just the impact on direct costs, such as fuel and oil usage, but also extend to knock on effects such as engine power and vehicle performance, which have an effect on overall productivity.”

In addition to its advanced fuel testing capabilities, Orbital is focusing its attention on the control of underground diesel emissions. In fact, at the invitation of the Department of Mines and Petroleum, Orbital presented at last year’s Diesel Particulate Forum in Kalgoorlie.

Held last June, the forum brought together government, industry, suppliers and technical experts to discuss regulations, potential solutions, infield experiences and achievements in other sectors.

“Control of emissions underground will be a significant focus for the resources industry over the next couple of years as mines try to bring occupational air quality under control,” Mr Coplin said.

“Ventilation alone will not achieve the levels required – underground mine solutions need to be engineered with an eye to robustness and ongoing cost of compliance.”

A six-cylinder turbo diesel engine used by Caltex Australia gets put to the test.



A diesel particulate filter sample. Photos: Orbital.





STRONG APPROVALS PERFORMANCE AS WA REMAINS IN THE WORLD'S TOP FIVE

Increased global competition for investment in the resources industry has marked Western Australia's fall from first to fifth in the 2014 Fraser Institute survey's investment attractiveness ranking.

"It is disappointing, but it is important to acknowledge that Western Australia is still a world-leading mining jurisdiction and the top performing Australian state by a solid margin," Department of Mines and Petroleum (DMP) Director General Richard Sellers said.

"The State Government and DMP are focused on improving the policy environment so that Western Australia continues to provide an attractive investment destination for responsible development.

"Meanwhile, the department's December quarter 2014 approvals performance report shows ongoing strong performance across key approval processes."

DMP Strategic Projects Executive Director Julie de Jong said the figures showed the majority of key approvals continue to be addressed within target timelines.

"It is extremely satisfying that the department has not only maintained its strong performance in the majority of key performance areas, but also improved performance in some areas where we'd identified improvement was needed," Mrs de Jong said.

"This is a pleasing result and a credit to the teams involved."

A total of 882 mineral tenure applications were received during the December quarter out of 3359 received during the 2014 calendar year.

Ninety-six per cent of mineral tenure applications were finalised within the 65-business-day target timeline in 2014.

In addition, 2294 mineral exploration and mining environment applications were received in 2014, of which 95 per cent were finalised within the target timeline of 30 business days.

"More than 94 per cent of all applications received by the department during the 2014 calendar year were finalised within target timelines," Mrs de Jong said.

"As the department's approval performance target is to achieve greater than 80 per cent of applications finalised within target timelines, this is an excellent result."

Government of Western Australia
Department of Mines and Petroleum

Quarter 4 | 2014

Approvals Performance Report (October - December 2014)

The approval performance target for the department is to achieve greater than 80 per cent of applications finalised within the target timeline.

December quarter 2014
During the December quarter 2014, the Department of Mines and Petroleum (DMP) received a total of 882 mineral tenure applications. Ninety six per cent of applications were finalised within the target timeline of 65 business days. DMP received 548 mining environment and safety applications. Ninety six per cent of applications were finalised within the 30 business day target. The department received 241 petroleum tenure, environment and safety applications. Eighty five per cent were finalised within the target timelines. In particular, petroleum exploration permit applications (78%) showed significant improvement.

Calendar year 2014 summary
During 2014, the department received 3359 mining tenure applications. Ninety six per cent of these applications were finalised within the target timeline of 65 business days. The department received 2294 mineral exploration and mining environmental applications. Ninety five per cent of these were finalised within the target timeline of 30 business days. Ninety eight per cent of the 73 resource safety applications received during 2014 were finalised within target timelines. During 2014, the department received 415 petroleum applications and 76 per cent of these were finalised within the target timeline. Ninety per cent of the 392 petroleum environment applications were finalised within the statutory timeline of 30 calendar days.

Five year mineral exploration trends
The December quarter 2014 completes 5 years of approval performance reporting by DMP. The graph below shows the number of mineral exploration 'Programme of Work' applications received by the department from 1 January 2009 to 31 December 2014. A seasonal trend is evident with a significant reduction in the number of exploration applications during the 4th quarter each year. Following the global financial crisis, a change in government since 2008 and the subsequent removal of a uranium mining ban, higher numbers of mineral exploration applications were received during 2009 - 2012. Since 2012, a declining trend is evident reflecting a period of mine re-evaluation and, more recently, lower commodity prices.

FIVE YEAR MINERAL EXPLORATION TRENDS

www.dmp.wa.gov.au To assist with the continual improvement of information provided, feedback from stakeholders on the quality of the content of this report is welcomed.

www.dmp.wa.gov.au



The team from Sunrise Dam is put through its paces at the Chamber of Minerals and Energy Underground Emergency Response Competition in Kalgoorlie.

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IMPORTANCE OF MINE RESCUE COMPETITIONS

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The ability of mining companies to respond in emergencies was put to the test during 2014 when mine emergency response competitions were held in the Goldfields and Perth.

As in previous years, the Department of Mines and Petroleum supported both competitions by providing adjudicators and sponsoring individual events.

Resources Safety Division Executive Director Simon Ridge said such competitions reinforced the importance of mine rescue in Western Australia.

“The competitions are an important way to gauge the capacity of mine sites to deal with on-site emergencies,” Mr Ridge said.

“It gives emergency response teams a good understanding of what their strengths are and the areas where they can improve. This is vital in ensuring competence across all areas of mine emergency response.”

The Chamber of Minerals and Energy Underground Emergency Response Competition was held at the Mount Charlotte underground mine in Kalgoorlie in late October.

The department provided adjudicators for the incident management event and sponsored the breathing apparatus event.

In late November, Perth hosted the annual Mining Emergency Response Competition (MERC).

The event was held at Perth’s Langley Park and provided an opportunity for the general public to see how mines respond to a variety of emergency scenarios.

Mr Ridge said the department sponsored the Emergency Response Team Readiness event in the competition.

“The experience and knowledge teams receive by participating in such competitions is invaluable,” Mr Ridge said.

“Workers from all the sites that have teams in these competitions can be assured of the priority their companies give to having well trained rescue teams.

“However, having skilled mine rescue teams should not be seen as a luxury, but as a necessity.”



Mines and Petroleum Minister Bill Marmion with MERC Scenario Manager Jim Mullen.



At the unveiling were Executive Director of DADAA David Doyle, sculptor Alex Mickle, Rio Tinto Paraburdoo General Manager Scott Wilkinson, Rio Tinto Pilbara Mines Managing Director Michael Gollschewski, Rio Tinto Community Investment Fund Board Member Janet Holmes á Court AC, Rio Tinto Community Investment Fund Board Member Fred Chaney AO, and Parliamentary Secretary to the Minister for Mental Health Andrea Mitchell MLA.

ART IN THE PILBARA RAISES AWARENESS OF MENTAL HEALTH

After 18 months of hard work and creative consultation, a permanent piece of public art has been unveiled in the remote community of Paraburdoo.

Miners and community members from the small Pilbara town worked alongside Western Australian sculptor Alex Mickle to develop and use unconventional approaches to create the artwork.

The sculpture is, in part, made from steel plate shaped during a series of controlled blasts on the Rio Tinto mine site near the town. Banded iron formation stone, excavated on the mine site, was cut and polished by dozens of community members and also incorporated into the striking piece.

The artwork is part of the state-wide FIVE project, a partnership between community arts and cultural development organisation DADAA and Rio Tinto. FIVE aims to address the stigma of mental health through arts engagement by

bringing communities closer together and facilitating dialogue around difficult issues.

Michael Gollschewski, Rio Tinto Pilbara Mines Managing Director, was on hand to unveil the work and spoke with enthusiasm about the success of the project.

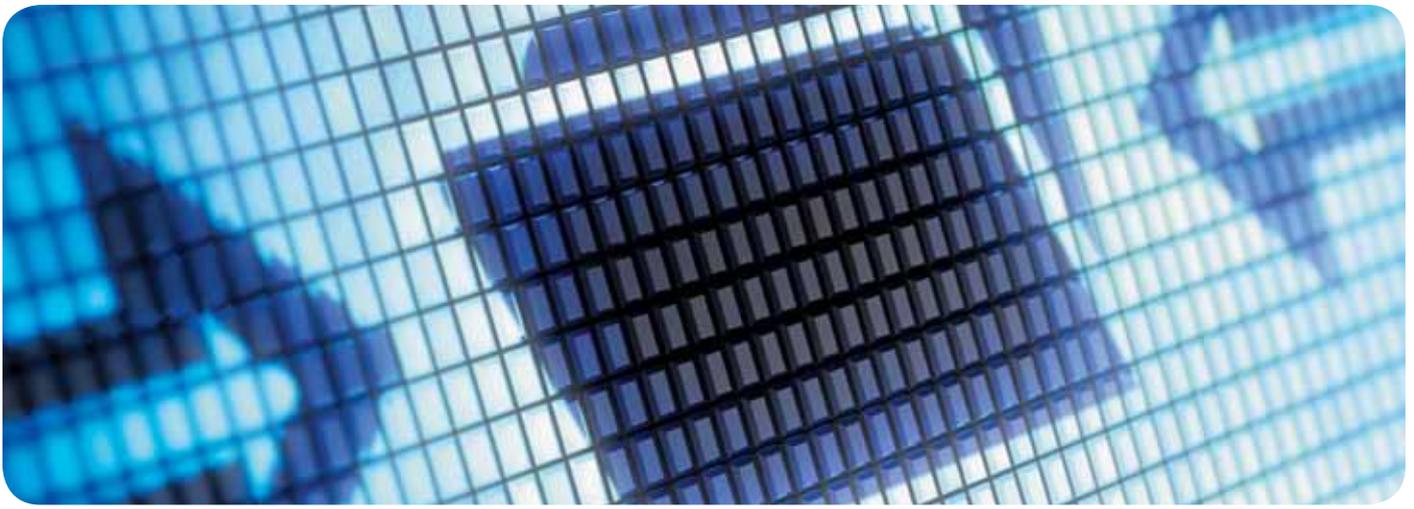
“Our challenge was to develop a partnership that would support people beyond the gates of their workplace, build community relations and raise awareness around mental health,” he said.

“FIVE has captured the hearts and minds of our employees and become a high priority for our team.

“It has helped change perceptions about what it means to be creative and part of a community, while promoting a culture where it is OK to talk about how you’re feeling.”

In addition to Paraburdoo, arts activities have taken place in Busselton, Geraldton, Derby and Esperance. The initiative supports the Mental Health Commission’s Mental Health 2020 strategy and seeks to address findings from research citing lack of communication and social isolation as contributing factors to poor mental health – particularly among the State’s regional communities.

In August 2014, FIVE received national recognition when it won a Silver Achievement Award at the Mental Health Service Awards in the category of Mental Health Promotion or Mental Illness Prevention.



DIGITAL DMP CUTS RED TAPE AND PAPERWORK

The Department of Mines and Petroleum (DMP) has made significant progress on its flagship project to improve processing timelines, cutting red tape and speeding things up for customers.

These improvements were the subject of extensive consultation and negotiation with stakeholders before their continuing implementation throughout the department as part of an internal improvement project – Digital DMP.

“We’ve made excellent progress on improving timelines and cutting red tape,” DMP Director General Richard Sellers said.

“Speeding up applications is a key improvement area and now almost 40 per cent of our customer transactions are being conducted digitally, with more than 30,000 customers already registered to use online DMP systems and services.

“Our target date to be almost completely online is mid-2016, but the exact date will be determined through continuing consultation with industry and other stakeholders on the areas that need improving.”

Mr Sellers said that he understood that DMP’s stretch target to make use of its online systems mandatory after 1 July 2016 was challenging, but pointed to achievements in the areas of the Mining Rehabilitation Fund (MRF) and Programme of Work applications.

“The successful introduction of the online use of these programs reinforces our commitment to focus on customer service and maintain good communications with our stakeholders,” he said.

“We’ve talked to industry and taken their concerns on board and we will keep talking to them.

“The primary aim of Digital DMP is to streamline approvals and increase efficiency in our processes, and industry has been working with us to cut duplication and the amount of documentation required.”

Mr Sellers said that a small number of transaction types had been identified as being unsuitable for online systems and would be exempt when an online system that industry was expected to use became available.

“For example, Miner’s Rights will be exempt because it is important for applicants to have face-to-face contact with a Mining Registrar,” he said.

“Meanwhile, a number of digital milestones have been recorded.”

Registration, submission, processing and correspondence relating to the MRF were all now being done online and industry uptake had been exceptional.

By 30 June 2014, more than 95 per cent of almost 23,000 eligible tenements had registered for the MRF and submitted data online.

Mr Sellers said that despite some initial concerns that prospectors might struggle with an online system, they achieved the highest submission rates with more than 99 per cent applying for prospecting licences by the end of June 2014.

In the Resources Safety Division, 100 per cent of Project Management Plans were being lodged online, as were 70 per cent of Mining Proposals and 87 per cent Environment Plans in the Environment Division.

“We’re making impressive, steady progress and we will keep consulting with industry and the community to make sure these kinds of achievements happen without causing inconvenience,” Mr Sellers said.

“The reality is that this is the space the next generations are working in and we need to ensure our systems will be compatible with changing international standards and the needs and expectations of the younger workforce coming through.”





NEW DMP WEBSITE NEARS LAUNCH

The new Department of Mines and Petroleum website is due to go live on 1 July 2015.

The Website Redevelopment Project has involved three years of networking, research, testing and stakeholder engagement – and some would say 'blood, sweat and tears' – as staff across DMP have worked together to create a brand new website, rather than a makeover of the existing site.

"The new website has been built around the concept of providing what our website users – our clients and stakeholders – want,

and what they come to the website to do," Communications and Marketing Branch General Manager Laura Lewis said.

Mrs Lewis said that unlike the current site, the new website was 'user-centric' and not based on the department's organisational structure.

"We've cleared out old news and information, removed clutter and focused on making the website intuitive because we want to make it easy for people to find what they're looking for," she said.

"In addition to providing easy-to-find information on Western Australia's resources industry, the new website will have new sections that promote investment in WA."

Mrs Lewis said that the current website would be carrying updates over coming months on the website's progress.

"The department will also be running briefing sessions for clients and stakeholders as we get closer to the launch," she said.



REVISED GUIDELINES FOR PREPARING MINE CLOSURE PLANS

DMP Environment Executive Director Dr Phil Gorey.

The Department of Mines and Petroleum (DMP) and the Environmental Protection Authority (EPA) have revised the guidelines for preparing Mine Closure Plans.

The original guidelines were published by the two agencies in July 2011, but to achieve better environmental outcomes, periodic reviews are undertaken in conjunction with stakeholders to ensure their continued effectiveness.

The revised guidelines are an update of the 2011 version and respond to stakeholder feedback received throughout 2013–14.

DMP Executive Director Environment Dr Phil Gorey explained the guidelines aim to ensure Western Australian mines can be closed, decommissioned and rehabilitated in an ecologically sustainable way.

"Planning for mine closure is a critical component of environmental management in the mining industry," Dr Gorey said.

"Nationally and internationally, industry-leading practice requires that planning for mine closure should start before mining commences and continue throughout the life of the mine, until final closure and relinquishment.

"Not only does this enable better environmental outcomes, it's also good business practice as it should avoid the need for costly remedial work late in the project life cycle."

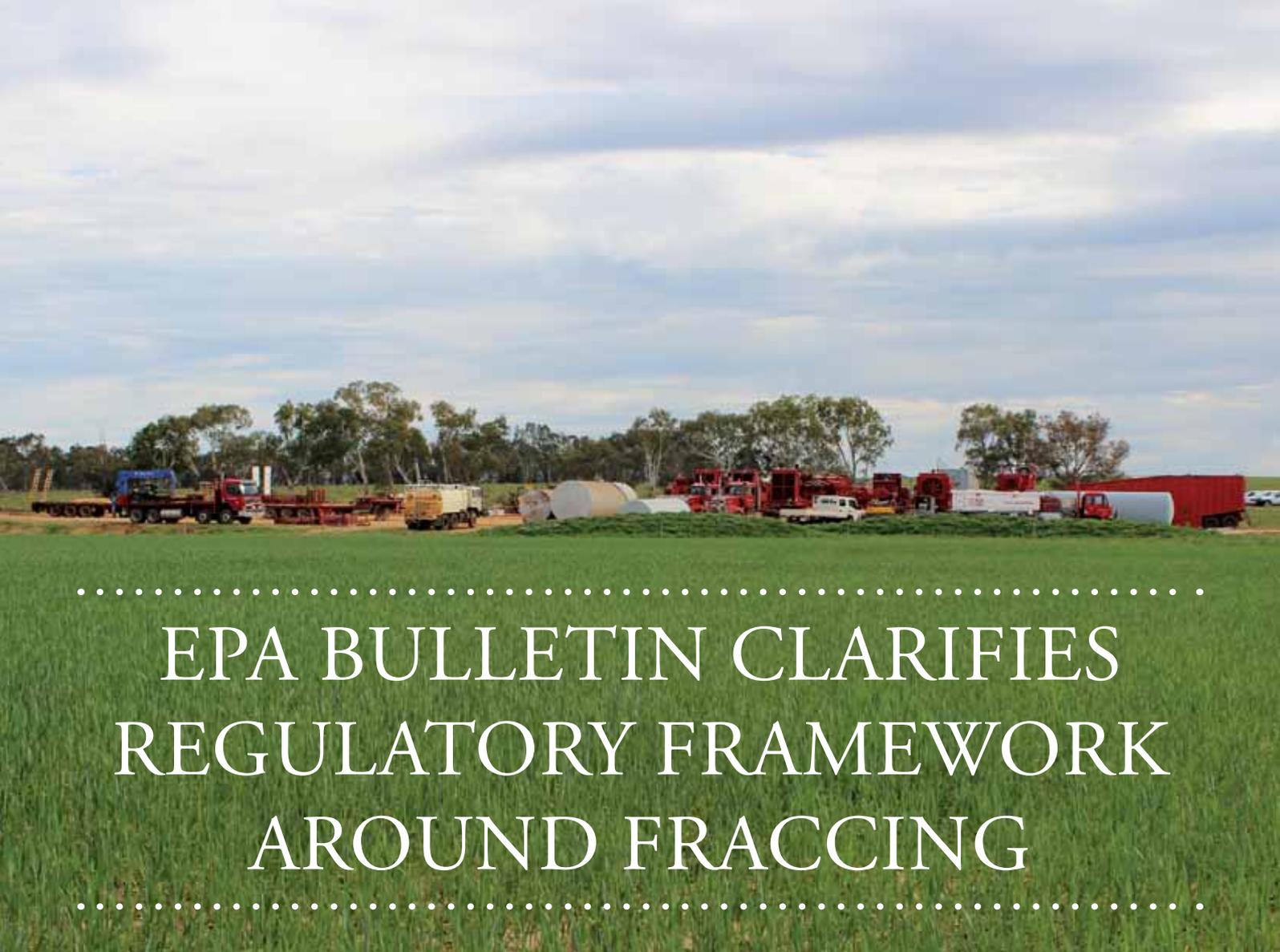
A stakeholder feedback workshop on Mine Closure Plans was run by the Chamber of Minerals and Energy (WA) in August 2013, with participation from DMP and the Office of the Environmental Protection Authority.

Wider stakeholder consultation on the guidelines via the DMP website was sought in January 2014.

The guidelines were revised further based on this feedback before a second stage of stakeholder consultation was undertaken in October 2014.

Dr Gorey said the revised guidelines had made the mine closure plan requirements at each stage of a mining operation clearer, now reflected a risk-based approach, and clarified the general structure and content of mine closure plans.

DMP expects to receive around 120 revised Mine Closure Plans in 2015.



EPA BULLETIN CLARIFIES REGULATORY FRAMEWORK AROUND FRACGING

Hydraulic fracturing in the northern Perth Basin.

An Environmental Protection Authority (EPA) bulletin released on 17 December 2014 clarifies the regulatory framework and potential environmental impacts of hydraulic fracturing for onshore natural gas from shale and tight rocks.

The bulletin replaces advice issued by the EPA in 2011 and reflects how regulation of the industry has evolved in recent years.

Natural gas found in shale and tight rock formations is trapped and cannot flow freely. Shale and tight rock formations need to undergo hydraulic fracture stimulation to release the natural gas and enable recovery.

Hydraulic fracturing, or fracking, is a process that uses fluids and other materials that are pumped under high pressure into gas-bearing rock formations to create fractures or cracks to create a path for the gas to flow.

Department of Mines and Petroleum Executive Director Environment Dr Phil Gorey said there was a high level of public interest around the potential environmental impacts of fracking.

“The EPA bulletin increases the transparency of the regulatory framework and assessment procedures around hydraulic fracturing,” Dr Gorey said.

“It will help build community confidence in the State Government’s ability to safely regulate the industry.”

The bulletin defines the circumstances under which the EPA will assess a proposal and sets out the EPA’s expectations on the information required to conduct a thorough environmental impact assessment.

The majority of onshore petroleum exploration activity interest in WA is for shale and tight gas.

The EPA’s Environmental Protection Bulletin No. 22 Hydraulic fracturing for onshore natural gas from shale and tight rocks is available at www.epa.wa.gov.au/Policies_guidelines/envprotectbulltn/Pages/EPB22.aspx



The Pinnacles and other desert areas have been removed from a recently granted exploration permit.

PINNACLES DECLARED A NO GO ZONE

The Department of Mines and Petroleum (DMP) has restricted access to popular tourist destination, the Pinnacles, and other Western Australian desert areas.

The decision was made in response to a request by Westranch Holdings Pty Ltd to amend its Mid West Exploration Permit.

DMP Petroleum Executive Director Jeff Haworth said Westranch, which is wholly owned by Norwest Energy, had voluntarily requested the variation of the terms and conditions to Exploration Permit 492 because the area was not prospective and it had no intention to propose any future activity within it.

“The department has, at the company’s request, adjusted the permit to exclude entry for the purpose of exploration to the desert areas, including the Red, Painted, Little Painted and Pinnacle deserts,” he said.

“This is the first time the department has had a company apply for such amendments.

“To date, the State’s rigorous approvals process and specific provisions under the Petroleum Act have been used to ensure sensitive areas and communities are not impacted by exploration activities.

“While it would have been highly unlikely that access for exploration activity in the Pinnacles area would be granted under the current regulatory framework, the new conditions will provide greater clarity for everyone.

“DMP expects companies to engage with communities about their projects, so we are pleased the company made this request, which demonstrates it is serious about social responsibility.”

Historically, petroleum tenements are released in rectangular blocks which may extend across town sites and environmentally or culturally sensitive areas.

Granting of a permit does not provide automatic right of entry and every activity proposed within the defined area is subject to an application and approvals process.

Western Australia’s regulatory framework and rigorous approvals process incorporates multi-agency assessment against provisions across several Acts before approval is granted and any activity can begin.

Mr Haworth said the department was reviewing its current processes for petroleum acreage release.

“The department recognises the diversity and value of Western Australia’s environment and the need to continuously improve regulatory standards and processes to ensure it is in step with new scientific and technological advances, as well as changing social considerations,” he said.

The Pinnacles were unknown to most Australians until the 1960s, when the area became part of Nambung National Park.

More than 250,000 people now visit the area each year.



Evelien Martens

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EXPANDED MRIWA SCHOLARSHIP PROGRAM IN SPOTLIGHT NEXT MONTH

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The State Government's decision to expand the Minerals Research Institute of Western Australia's (MRIWA) postgraduate scholarship program will come to fruition next month.

Mines and Petroleum Minister Bill Marmion will officially award MRIWA's 2015 scholarships, worth a total of nearly A\$500,000, at a ceremony at the Department of State Development offices in Perth on Wednesday 29 April.

MRIWA Project Manager Dr Penny Atkins said the scholarships would help talented students to develop expertise in areas crucial to Western Australia's resources future.

"This should lead them into work positions that will serve the economy of the State," she said.

Dr Atkins said that PhD research could be viewed as 'blue sky research' because it must result in a novel outcome.

"That type of research is rarely undertaken by industry, which sponsors more developmental research," she said.

MRIWA's inaugural PhD scholarship program began last year with application rounds for international and domestic students at Western Australian universities.

"We received highly competitive applications through Curtin University and the University of Western Australia (UWA)," Dr Atkins said.

MRIWA's Board of Directors awarded five scholarships worth a total of A\$480,000 at its meeting in November last year.

The first of the prestigious Directors Scholarships went to UWA's Evelien Martens for research into The Feasibility of Electrokinetic In-situ Leaching.

The project will be supervised by Professors Andy Fourie and Henning Prommer at UWA in close collaboration with researchers from CSIRO Minerals Down Under key staff, Dr Paul Breuer and Mr Xianwen Dai.

Postgraduate research scholarships are being awarded to:

- Cameron Adams (UWA): an investigation of the relationship between positive magnetic anomalies and nickel-sulphide deposits, Kambalda, Western Australia.
- Stefano Caruso (UWA): mapping sulphur deposits in selected precambrian terrenes of Western Australia to enhance predictive targeting for gold and base metal mineralisation.
- Siwei Chen (Curtin): the calculation of the evolution of rock fracture under the action of multiple field coupling.

Mr Caruso will be working in what is currently MRIWA's largest area of research funding – the distal footprints of giant ore systems; the capricorn orogeny of Western Australia project.

The State Government has invested A\$2.6 million in this A\$7.6 million collaboration between CSIRO, Curtin, UWA and the Department of Mines and Petroleum's Geological Survey of Western Australia.

Beyond 2015, PhD grants through MRIWA will include one Directors' Scholarship worth A\$40,000, five PhD Scholarships worth A\$30,000 each, and five annual Odwyn Jones Awards worth A\$5000 each.

The topics for Directors' Scholarships are Mineral Data Analytics, In Situ Leaching, and Scale up from Bench to Production.

The Odwyn Jones Awards provide research grants to students in their fourth year of university who undertake a research project related to the minerals sector.

The program is named in honour of Professor Odwyn Jones for his contribution to MRIWA and his strong advocacy for mining education programs and encouragement of students in the mining industry.

He was the Chair of the Minerals Research Advisory Committee of the former Minerals and Energy Research Institute of Western Australia from 1999 to 2013.

Eight students from Curtin and Murdoch universities were awarded individual grants of A\$2000 in 2014.



A landscape in the Capricorn Orogen.



IRON ORE RELIEF PACKAGE BACKS JOBS AND INDUSTRY

The State Government will make temporary assistance available to junior iron ore miners on a case-by-case basis as they restructure operations in challenging market conditions.

Premier and State Development Minister Colin Barnett said the assistance would be in the form of a 50 per cent rebate on eligible hematite iron ore royalties for up to 12 months, subject to the iron ore price remaining below an average of A\$90 per tonne over the period.

“This is a responsible and carefully considered move and comes on the back of a 48 per cent fall in iron ore prices since the beginning of 2014,” Mr Barnett said.

“The iron ore industry plays a hugely important role in the Western Australian economy, accounting for 56 per cent of the State’s exports and employing more than 61,000 people in 2013—14.”

At the end of the assistance period, the rebates will be fully repayable over a period of up to two years, with repayments to be made in accordance with a schedule to be negotiated between producers and the Minister for Mines and Petroleum.

Each request will be assessed by the Department of Mines and Petroleum on a case-by-case basis, through an extensive economic analysis overseen by an independent probity auditor.

The department will then make recommendations to the Minister regarding eligibility for assistance.



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INTRODUCTION OF ENVIRONMENTAL ASSESSMENT FEES

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Assessment fees will be introduced for Programme of Work and Mining Proposal applications from 1 July 2015.

The fees are part of a reform program that the Department of Mines and Petroleum (DMP) has been implementing over a number of years.

Mines and Petroleum Minister Bill Marmion outlined the State Government's position on the fees at a speech to the Association of Mining and Exploration Companies Mining and the Environment conference in Perth in February this year.

"The efforts of DMP in regulating the mining industry come at a cost," he said.

"To ensure the department can better deliver services to customers, and deliver the functions and expectations of government and the community, industry-based fees have been a necessary consideration."

Mr Marmion said that the fees had been introduced after significant consultation with industry and consideration of stakeholder feedback.

"The fees being introduced are almost half of what was initially proposed, and fees will be waived for exploration and prospecting work deemed low-impact," he said.

The low-impact waiver is for work that disturbs less than a quarter of a hectare and is not carried out not on reserve land.

"The waiver means around 20 per cent of prospecting and exploration applications will not be charged the assessment fee," Mr Marmion said.

"In the long term, the interests of the community, industry and environment will be best served by DMP maintaining its position as a robust and respected regulator operating under a sustainable funding model.

"These fees will help make this possible."

DMP Executive Director Environment Dr Phil Gorey said that a number of reforms had already been introduced to cut red tape and reduce the regulatory burden on industry, and DMP was exploring ways to further reduce that burden.

"Current environmental reforms being delivered by DMP are calculated to save industry \$32 million each year, however the efforts of the department in regulating the mining industry do incur costs," he said.

The assessment fees proposed to take effect from 1 July are \$6950 for Mining Proposals and \$590 for Programmes of Work.

A review of Programme of Work applications received by DMP over the past two years indicates the assessment fee will be waived on almost 20 per cent of prospecting and exploration applications deemed low-impact.

The fees will be payable with each application, and will last for the duration of that application.

The timeframe for Programme of Work applications was increased in 2012 from one year to four, meaning that one Programme of Work application can last for four years, effectively costing prospectors and explorers less than \$150 per year.

A Mining Proposal can be approved for the life of the mine, meaning the fee of \$6950 may be charged just once, regardless of how many holes are dug and the value of minerals discovered.

DMP will continue to consult with stakeholders over future reforms to regulation of the mining industry.

The department has published a fact sheet on the assessment fees outlining the reasons why they are being introduced, the consultation undertaken, and how they will be applied.

It is available online at the DMP website.

PREMIER ANNOUNCES NEW PROJECTS FOR ONSLOW



Former Chevron Australia Wheatstone Project General Manager Eric Dunning, Premier Colin Barnett, and DSD Deputy Director General Giles Nunis.

In December last year Premier Colin Barnett visited Onslow to announce funding and delivery timelines for a suite of community and essential infrastructure projects.

This infrastructure investment is linked to Chevron Australia's Wheatstone A\$29 billion LNG Project, which is being constructed approximately 12 kilometres from the Onslow town site.

Mr Barnett announced that Onslow would benefit from a A\$42 million new hospital, bringing major health services under one roof and providing purpose-built rooms for a range of specialists and services.

"The population of Onslow is set to grow to almost 2,000 by 2022, as a result of nearby resource developments," Mr Barnett said.

"The State Government is committed to providing outstanding health care for local residents."

Chevron will contribute A\$22 million to the project, with the State Government funding the remainder through its North West Health Initiative.

The Chevron-operated Wheatstone Project has committed to spend more than A\$250 million on new and improved infrastructure in Onslow. The State Government, through various agencies, is contributing about A\$70 million.

In addition to the hospital, Mr Barnett announced delivery timelines for dozens of other planned projects for Onslow, most of which will be built over the next three to four years by the State Government, the Shire of Ashburton and Chevron.

These include a swimming pool, a shire administration centre, an all-weather access road into town, government workers housing, a power station and a water plant.

While he was in Onslow, Mr Barnett also announced that Chevron and the State Government had approved the allocation of A\$13 million from the Onslow Community Development Fund to allow the completion of work on the Onslow Airport Redevelopment Project.

The Fund was established in 2011 through the Ashburton North State Development Agreement, with A\$10 million from the State Government's Royalties for Regions program, and A\$5 million from Chevron.

"Chevron already contributed A\$30 million to the development of the airport, but the project, which is managed by the Shire, ran over budget," Mr Barnett said.

Mr Barnett toured the airport, which began receiving small aircraft flights in late 2014. Work on the terminal building and surrounding facilities must be complete before larger jet passenger services can commence.

The new airport terminal and runway are expected to open in the first half of this year.

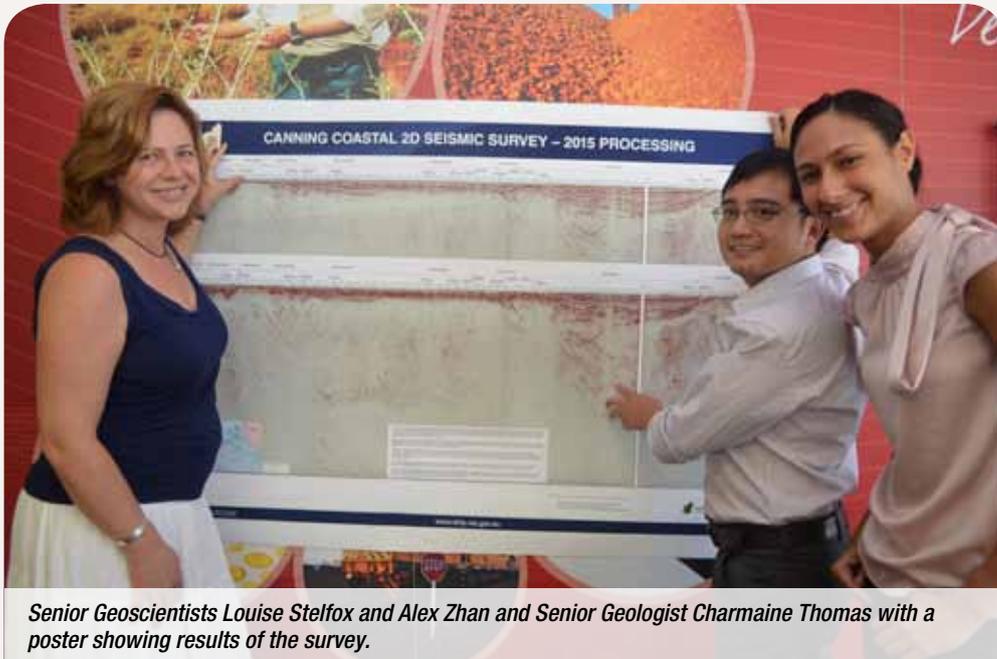
"Onslow is a small and geographically isolated town, and together these projects will improve liveability and help ease some of the challenges associated with the increase in population due to major resource developments," the Premier said.

Former Chevron Wheatstone Project General Manager Eric Dunning said much work had been done behind the scenes to plan and design infrastructure upgrades and new facilities for Onslow.

"The Wheatstone Project will operate for many decades to come, so we are proud to be contributing to Onslow's vibrant future," Mr Dunning said.

BHP Billiton, which recently completed the nearby Macedon domestic gas project, is also contributing A\$5 million toward a basketball centre and skate park, both to be delivered in late 2015.

Mr Barnett was joined on his visit by Member for North West Central Vince Catania MLA (representing the Minister for Regional Development), as well as Mark Lewis MLC, Member for the Mining and Pastoral Region.



Senior Geoscientists Louise Stelfox and Alex Zhan and Senior Geologist Charmaine Thomas with a poster showing results of the survey.

CANNING COASTAL DEEP SEISMIC SURVEY PROCESSED DATA NOW AVAILABLE

Data from last year's Canning Coastal Deep Seismic Survey has attracted strong international academic interest from universities as far away as Sweden.

The processed data, which is now available online, has also generated strong interest from petroleum explorers in the onshore Canning Basin.

The seismic survey is one of several deep-crustal surveys being carried out collaboratively between the Department of Mines and Petroleum (DMP) and Geoscience Australia as part of the National GeoTransect Program, co-funded by the Federal and State Governments.

The A\$3.65 million survey was funded by the State Government's Exploration Incentive Scheme and the data processing was federally funded.

"The objectives of this survey are to obtain a better understanding of the subsurface geology of the region, and how the Australian continent was assembled as a result of plate tectonic processes over billions of years," GSWA Assistant Director Don Flint said.

"Such knowledge obviously assists in identifying areas of petroleum, mineral and geosequestration potential."

The survey was conducted during May and June 2014 and stretched 700km across the full width of the Canning Basin, along the Great Northern Highway, and the Derby and Gibb River Roads.

Nearly two terabytes of data were recorded by a convoy of about 20 vehicles carrying a crew of about 40 people.

Three specialised trucks stopped every 40 metres and deployed large metal pads to create minute vibrations barely perceptible to people 100 metres away, but capable of penetrating through the crust and upper mantle to depths of up to 50km.

Reflected seismic energy from each stop was collected by 600 geophones spread over 12km.

The processed data was officially released by Mines and Petroleum Minister Bill Marmion at the Geological Survey of Western Australia's (GSWA) 2015 Open Day on 27 February this year.

The raw data and a preliminary interpretation by GSWA were released at DMP's Petroleum Open Day on 11 September last year.

"All of the processed data can be downloaded free via DMP's Western Australian Petroleum and Geothermal Information Management System (WAPIMS)," Mr Flint said.

"But it is voluminous, so we have provided the option of supplying the full data package on a hard drive at the cost of the drive only."

GSWA, with assistance from Geoscience Australia, is now starting a detailed interpretation of the processed data.

WAPIMS can be accessed at www.dmp.wa.gov.au/4187.aspx.



Presenters from Resources Safety with IM4DC participants.

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SHARING SAFETY LEADERSHIP SKILLS

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The Department of Mines and Petroleum's (DMP) Resources Safety Division has shared its expertise with international visitors as a part of a short course on occupational health and safety leadership.

Organised by the International Mining for Development Centre (IM4DC), it featured participants from 11 nations including Fiji, Mongolia, Zambia and Peru.

The course ran between 17 November and 12 December 2014, and provided an overview of occupational health and safety management in the resources industry.

DMP Resources Safety Division Executive Director Simon Ridge said that, as a global leader in the mining industry, it was important that Western Australia shared its knowledge across the world.

"Western Australia's mining industry is recognised not only for how it is operated, but also how it is regulated," Mr Ridge said.

"The State has some of the largest and most diverse mineral provinces in the world – we have almost 1000 sites producing more than 50 mineral commodities.

"As regulators, this requires us to be knowledgeable across the range of safety risks these operations present."

Mr Ridge said that sharing knowledge was vital to ensure regulators had the depth of understanding required to do their jobs.

"DMP is always seeking knowledge from other jurisdictions — not only here in Australia, but across the world," he said.

"When it comes to improving safety in the mining industry, sharing our collective knowledge and experiences can be one of the most powerful tools we have.

"It also allows us to learn from the experiences of others. This is particularly important for developing nations to ensure a safe, sustainable mining industry that benefits their communities."

The goal of the IM4DC short course is to develop the leadership skills of participants. It is expected they will then have the leadership skills to take a senior role in overseeing occupational health and safety in their home country's mining industry.

The department was also involved in the program in 2013, and Mr Ridge said that the presentation by Resources Safety had been well received by participants.

"I think they found it extremely valuable to hear about how the department works with our stakeholders, particularly our emphasis on raising awareness of safety issues and seeking compliance, rather than relying solely on enforcement strategies," Mr Ridge said.

"The Resources Safety presentations really highlight the holistic approach to safety that is needed to achieve best practice safety standards."

AGRICULTURE

East Kimberley – Ord – Ord/East Kimberley Expansion Project**WA STATE GOVERNMENT**

The Ord East Kimberley Expansion Project is a good example of the Australian and Western Australian governments working closely together with the local community to deliver economic, social and common use infrastructure to the East Kimberley region of the state. The Western Australian Government has invested A\$322m to construct irrigation channels, roads and off-farm infrastructure on the Ord lands. A Development Agreement has been signed with Kimberley Agricultural Investment (KAI) for the lease and development of 13,400ha of irrigation land in the Goomig and Knox Plain areas. KAI, a subsidiary of China's Shanghai Zhongfu Group, proposes to establish a sugar industry in the Kununurra region. The state is currently working towards the release of approximately 5,000ha of Ord West Bank and Mantinea lands via a Request for Proposal process. The Australian Government invested A\$195m for construction of social and common use infrastructure in the East Kimberley region through the East Kimberley Development Package (EKDP) National Partnership Agreement (NPA). Twenty-nine infrastructure projects were delivered over a three year period in health, housing, transport, education and community services. The Yawoorroong Miriung Gajerrong Yirrege Noong Dawang Aboriginal Corporation (MG Corporation) building and the Department of Housing transitional housing were successful nominations for the Australian Institute of Architects 2013 Western Australian Architectural Awards. The transitional housing project also achieved a 2013 Premier's Award for Improving Indigenous Outcomes.

Expenditure: \$517m.

INFRASTRUCTURE

South West Region - Kemerton (HUILS – Heavy Use Industrial Land Strategy)**WA STATE GOVERNMENT**

Kemerton Industrial Park (KIP), located 17km north of Bunbury, is the main strategic industrial area in the South West region and the nearest regional heavy industrial site to Perth. It is designed to supplement the Kwinana Industrial Area, only 90 minutes away by road. The estate comprises 7,543ha of land, including 2,019ha of industrial core, a 293ha support industry area and 5,231ha buffer areas. It is accessible to the Port of Bunbury by road and a rail link is being planned. The estate is serviced by major road links to the metropolitan area. The KIP currently includes a silicon smelter, a titanium dioxide plant, a chlor-alkali plant, two peak load power stations and a wastewater treatment plant. Under the Heavy Use Industrial Land Strategy, the Western Australian Government is progressing Kemerton towards project ready status by undertaking environmental, heritage and planning approvals for the estate. Work towards progressing approvals commenced in 2009 and is anticipated to be completed in 2015, by which time the structure plan and zoning adjustments will also have been completed.

AMMONIUM NITRATE

Pilbara – Burrup Industrial Estate Site D – Yara Pilbara Nitrates**YARA INTERNATIONAL ASA**

Yara, Orica and Apache have formed a joint venture - Yara Pilbara Nitrates Pty Ltd (YPNPL). YPNPL has executed an Engineering, Procurement and Construction (EPC) contract for the construction of a circa 350,000tpa Technical Ammonium Nitrate (TAN) plant to be located on the Burrup Peninsula. Ammonia feedstock will be supplied from Yara Pilbara Fertilisers Pty Ltd (YPFPL), which operates its facility directly adjacent to the proposed location for the new TAN plant. YPNPL will be the operator of the TAN plant and Orica will manage the product sales and distribution. Yara and Orica each have a 45 per cent interest in the joint venture and Apache the remaining 10 per cent. It is expected that all manufactured product will be sold into the Pilbara region. Work on the project has commenced and it is expected that the new plant will be commissioned during the third quarter of 2015.

Expenditure: \$800m.

Employment: Construction: 600; Operation: 65

HEAVY MINERAL SANDS

Keysbrook – Heavy Mineral Sands Mine MZI RESOURCES LTD

MZI has commenced the development of the Keysbrook Mineral Sands Project, located near the township of Keysbrook approximately 70km south of Perth. The project comprises a new mine and wet concentration plant, and upgrades to the existing mineral separation plant owned by Doral Mineral Sands in Picton, near Bunbury. MZI has obtained environmental approval from the Minister for Environment, and development approval and extractive industry licenses from the Shires of Murray and Serpentine-Jarrahdale. Keysbrook has a mineral resource of 78.9Mt at an average grade of 2.5 per cent total heavy mineral (THM) and an ore reserve of 670,000t THM, which underpins the first five-and-a-half years of operations. Based on the total mineral resource estimate, the potential mine life could be more than 15 years. Approximately 110,000tpa of heavy mineral concentrate from Keysbrook will be trucked 120km south to Doral's mineral separation plant in Picton, where it will be toll treated under a processing agreement. The project is expected to produce 67,500tpa of leucoxene products and 28,700tpa of zircon concentrate, which will be exported from the Bunbury Port. The project has a capital cost of approximately A\$70 million and will employ up to 100 people during the construction and commissioning phase, with 50 permanent jobs created for operational activities. MZI plan to commence production in the fourth quarter of 2015.

Expenditure: \$70m.

Employment: Construction: 100; Operation: 50

INFRASTRUCTURE

Pilbara – Ashburton North Strategic Industrial Area**WA STATE GOVERNMENT**

The State Government is developing the Ashburton North Strategic Industrial Area (ANSIA) as a hydrocarbon precinct in the Shire of Ashburton, 11km south-west of Onslow. This is to enable the development of natural gas projects and associated industries to exploit the gas reserves particularly in the Carnarvon Basin. The ANSIA includes two sites for major gas processing proponents, sites for downstream processing, areas for general support industries and supply base operations, infrastructure corridors, and a port with common user facilities to be managed by the Pilbara Ports Authority. Two foundation proponents, BHP Billiton Petroleum (Macedon Project) and Chevron Australia (Wheatstone Project) have taken up land allocations within the ANSIA. Macedon commissioned a domestic gas plant in 2014 with a production capacity of 200TJ per day. Wheatstone's construction schedule is over 49 per cent completed with first LNG export scheduled for late 2016.

IRON ORE

Pilbara – BHP Billiton Iron Ore – Shiploaders 1 and 2**BHP BILLITON IRON ORE PTY LTD**

During the December 2013 quarter, BHP Billiton approved an investment of approximately US\$300 million (BHP Billiton share) to replace shiploaders 1 and 2 at the company's Nelson Point operations in Port Hedland. The two new shiploaders will increase the reliability of its inner harbour port facilities and create additional port capacity that will be utilised as a series of debottlenecking initiatives to increase the capacity of BHP's supply chain to approximately 260Mtpa to 270Mtpa (100% basis), at a low capital cost.

Expenditure: \$407m.

Employment: Construction: 500

Pilbara – Roy Hill Iron Ore Mine & Infrastructure ROY HILL HOLDINGS PTY LTD

Roy Hill Holdings is a private company which is majority-owned by Hancock Prospecting Pty Ltd, and also has key international investment partners with strategic steel-making interests. It is developing the Roy Hill iron ore project located 115km north of Newman. This project is expected to come into production in 2015 and will produce 55Mtpa of iron ore for 20 years following ramp-up. The project includes mine development, mine processing infrastructure, a new heavy-haul railway, and significant new port facilities at Port Hedland's inner harbour. All primary environmental and other approvals have been secured and major project works commenced in 2012. Dredging, the airstrip and internal mine roads have been completed, and the rail construction, mine and port accommodation villages are being utilised. Considerable works are already underway on port, rail and mine construction with the project passing the 70 per cent completion milestone in late December 2014. Roy Hill secured the world's largest ever debt financing package for a mining project of US\$7.2b in March 2014.

Expenditure: \$10b.

Employment: Construction: 4200; Operation: 2000

IRON ORE PROCESSING

Pilbara – Cape Preston – Sino Iron CITIC PACIFIC

The Sino Iron project is located at Cape Preston, 100km south-west of Karratha. Construction of the largest magnetite mining and processing project in Australia is at an advanced stage, with limited production from the first and second of six lines commencing in 2013. On completion, the project will comprise of in-pit crushers, six autogenous and six ball mills, concentrators, a 6Mtpa pellet plant, 25km slurry pipeline, a combined cycle 450MW power station, new port and trans-shipment facilities, and a 51GL desalination plant. At full production the project will export up to 21.6Mtpa of magnetite concentrate and 6Mtpa of high grade pellets. The first shipment of ore occurred on 2 December 2013.

Expenditure: \$11.1b.

Employment: Construction: 4000; Operation: 500

OIL & GAS DEVELOPMENTS

Carnarvon Basin – Greater Western Flank Phase 1

WOODSIDE ENERGY

The Greater Western Flank Phase 1 Project will develop the Goodwyn GH and Tidepole fields, via a subsea tie-back to the existing Goodwyn A Platform. The project remains on schedule for start-up expected in early 2016.

Expenditure: \$2.5b.

Carnarvon Basin - Persephone Project

WOODSIDE ENERGY

Woodside Energy Ltd, as operator of the North West Shelf Joint Venture, proposes to develop the Persephone gas field. The development involves two subsea wells and an 8km subsea tieback from the Persephone field to the existing North Rankin Complex. Project start-up is expected in early 2018.

Expenditure: \$1.2b.

Carnarvon Offshore Basin – Barrow Island – Gorgon Project

GORGON JOINT VENTURE

The Gorgon Joint Venture (GJV) made its final investment decision on the Gorgon Project in mid-September 2009. The Foundation Project on Barrow Island is a three train LNG development with a nameplate capacity of 15.6Mtpa and includes a domestic gas plant capable of delivering at least 300TJ/d of gas to the mainland. Cost estimates for the project construction have been reassessed at A\$55b (US\$54b) following a cost and schedule review conducted by Chevron in December 2013. The project involves the processing of gas from both the Gorgon and Jansz/lo gas fields and includes potentially the largest commercial CO₂ geosequestration project in the world. The project obtained State and Federal environmental approvals in August 2009. On-island activity started in late 2009 and the major construction work for the processing plant commenced in 2011. Plant start-up and first gas is planned for mid-2015, with the provision of domestic gas by 31 December 2015.

Expenditure: \$55b.

Employment: Construction: 6250; Operation: 300

Pilbara – Wheatstone LNG Development

CHEVRON AUSTRALIA PTY LTD

Chevron Australia Pty Ltd is currently constructing an LNG plant, a domestic gas plant and port facilities at the Ashburton North Strategic Industrial Area near Onslow for its Wheatstone Project.

The Project will initially have two LNG trains with a combined capacity of 8.9Mtpa, expandable to five trains with a total capacity of 25Mtpa, and a 250Mcf per day domestic gas plant connected to the Dampier-to-Bunbury Natural Gas Pipeline. The construction schedule is currently over 49 per cent completed. The first export of LNG is scheduled for late 2016.

Expenditure: \$30.7b.

Employment: Construction: 6500; Operation: 400

POWER STATIONS

Boodarie Industrial Estate – South Hedland Power Station

TRANSALTA

In July 2014, TransAlta Energy (Australia) Pty Ltd announced it will build, own and operate a 150 megawatt power station in South Hedland's Boodarie Industrial Estate. The plant will consist of a combined cycle gas plant, which is a reliable, highly-efficient, low-cost and clean process of generating electricity, featuring both natural gas and steam turbines. The A\$570 million investment will help meet the future energy needs of the region through a 25-year agreement with both Horizon Power and Fortescue Metals Group. The plant is being designed to allow for expansion and there is a possibility that other customers may be added in the future. Construction is anticipated to commence early 2015 and expected to create up to 250 jobs. Full commissioning is expected to be complete in 2017.

Expenditure: \$570m.

Employment: Construction: 250; Operation: 20

AMMONIA/UREA

Shotts Industrial Park – Collie Coal to Urea PERDAMAN CHEMICALS AND FERTILISERS PTY LTD

Perdaman Chemical and Fertilisers Pty Ltd is proposing to develop a A\$3.5b coal to urea plant at the new Shotts Industrial Park, near Collie. The plant will use proven coal gasification and fertiliser production technologies. Around 2.7Mtpa of coal will be used to produce approximately 2Mtpa of urea, primarily for export. The urea will be transported to Bunbury Port by rail. The company has received all its environmental and all other approvals from both the Western Australian and Australian governments. The project is on hold as the company is still seeking to finalise a suitable domestic coal supply arrangement prior to achieving its financial investment decision.

Expenditure: \$3.9b.

Employment: Construction: 2000; Operation: 200

HEAVY MINERAL SANDS

Shark Bay – Coburn Zircon Project STRANDLINE RESOURCES LIMITED

Strandline proposes to develop the Coburn zircon project, located south of Shark Bay and approximately 250km north of Geraldton. It contains total ore reserves of 308Mt at an average grade of 1.2 per cent heavy minerals, all of which lie within the portion of the project area that has received government environmental approvals for mining. At a mining rate of 23.4Mtpa, the project is expected to produce 49,500tpa of zircon, 109,000tpa of chloride ilmenite and 23,500tpa of a mixed rutile-leucoxene over its 19-year mine life. The company has secured all of the approvals required to commence mining and processing operations at Coburn, and is continuing to pursue discussions with parties having a potential interest in acquiring a major stake in the project.

Expenditure: \$202m.

Employment: Construction: 170; Operation: 110

INFRASTRUCTURE

Dampier Peninsula – Browse LNG Precinct WA STATE GOVERNMENT

The State Government is developing the Browse Liquefied Natural Gas (LNG) Precinct approximately 60km north of Broome. By focussing development at a suitable location, the Precinct will minimise the environmental footprint of gas processing and any social impacts in the region while maximising opportunities for the local community to benefit from development of the Browse Basin gas fields. The Precinct will have the capacity to accommodate at least two LNG processing operations, with a combined capacity of up to 50Mtpa. The Western Australian Government has acquired the land for the Precinct and will secure all relevant approvals to ensure the Precinct is 'project ready.'

Pilbara – Anketell – Anketell Port and SIA (Strategic Industrial Area)

WA STATE GOVERNMENT

The Anketell project involves the establishment of a multi-user, multi-commodity deep water port and associated strategic industrial area (SIA) at Anketell, located 30km east of Karratha on the Pilbara coast. The port and associated infrastructure will be a proponent funded but State controlled port which will be managed and operated under the *Port Authorities Act 1999*. The strategic industrial land will fall under the jurisdiction of the Western Australian Land Authority (LandCorp). During its initial phase, it is expected that Anketell will be an iron ore export facility and that, at its peak capacity, not less than 350Mtpa will be exported to customers, mainly in Asia. A number of iron ore producers with mining assets in the Pilbara have expressed interest in using the planned facilities at Anketell. It is likely that the port will be developed in stages to accord with the development of the various mining operations which are located throughout the Pilbara. The Anketell Port Master Plan was released in June 2014 and a downloadable copy can be obtained from the DSD website.

IRON ORE

Pilbara – West Pilbara Iron Ore Project API MANAGEMENT PTY LTD

The Australian Premium Iron Joint Venture is proposing to develop the West Pilbara Iron Ore Project. Stage 1 of the project is based on the production of 40Mtpa of direct shipping iron ore from deposits, including Red Hill and Mt Stuart deposits, located 35-80km south-west of Pannawonica. The ore will be transported by a new heavy haul railway for export via the proposed multi-user 350Mtpa port at Anketell. Subject to the successful completion of feasibility and environmental studies, and receipt of government regulatory approvals, the company anticipates construction to commence following a decision to proceed by the joint venturers and completion of funding arrangements. Primary State and Federal environmental approvals for the mine and rail elements of the project were received in December 2011, and for the first stage of Anketell Port in the first half of 2013.

Expenditure: \$7b.

Employment: Construction: 3500; Operation: 1000

Yilgarn – Deception Iron Ore Deposit CLIFFS ASIA PACIFIC IRON ORE PTY LTD

Cliffs proposes to expand its Koolyanobbing Operation to include an additional iron ore mining area at the Deception Deposit, located approximately 150km north of Southern Cross. The Deception Deposit contains an estimated 7.1Mt of iron ore and is expected to have a mine life of around five years. Mining of the Deception Deposit has environmental approval with first production expected in first half of 2017.

Expenditure: \$35m.

NICKEL

Mt Windarra – Windarra Nickel POSEIDON NICKEL NL

Poseidon Nickel Ltd has submitted a project development proposal for assessment for the redevelopment of the Mt Windarra underground nickel mine and associated project infrastructure at Mt Windarra. Subject to obtaining all relevant approvals Poseidon is forecast to commence mining in 2015.

Expenditure: \$11.5m.

Employment: Construction: 50; Operation: 100

OIL & GAS DEVELOPMENTS

Canning Basin – Buru Canning Basin Tight Gas BURU ENERGY

The Buru Energy/Mitsubishi joint venture (JV) is undertaking the Laurel Formation Tight Gas Pilot Exploration (TGS) Program to test the commercial potential of the Laurel Formation, a large onshore natural gas resource located in the Canning Basin. Phase 1 of the TGS Program has recently been completed at the company's eastern well sites. These works included completing well site preparation and civil works, well conditioning, cement bond logging, and conducting mini fracs or diagnostic fracture injection tests (DFITs). The next operational phase of the TGS program will occur early in the 2015 dry season to determine gas flows from the target reservoir. In preparation, the JV is continuing with a baseline groundwater monitoring program to detect any effect of activities on groundwater. This is considered most unlikely. The Yungngora people at Noonkanbah have provided assistance with Phase 1 operations and have participated actively in training and employment opportunities under the TGS program. This has led to the creation of over 15 casual and contracting roles for members of the Noonkanbah community. The JV is also working with the Kimberley Training Institute to deliver relevant Certificate II programs for site operations. Should the resource prove to be commercially viable, gas from the Canning Basin will provide energy security to WA domestic and industrial markets. Under a State Agreement the JV, upon proving up sufficient reserves, is obligated to supply into the WA domestic market at least 1,500 petajoules of gas.

Expenditure: \$40m.

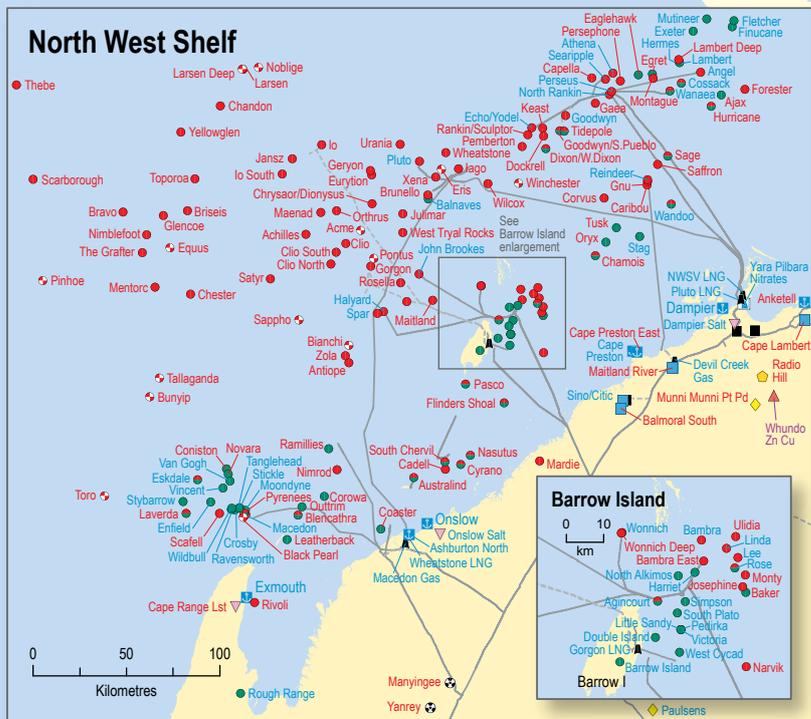
Employment: Operation: 30

Kalgoorlie – Tropicana Gas Pipeline Project ANGLOGOLD ASHANTI/APA GROUP JOINT VENTURE

APA Operations Pty Ltd, a subsidiary company within the APA Group (APA), plan to construct and operate a 294km high pressure natural gas pipeline to convey gas from the Murrin Murrin gas lateral pipeline (licence PL 36) to the Tropicana Gold Mine. The project has been referred to the Environmental Protection Authority and is being assessed. Construction works for the pipeline and associated facilities on site are scheduled to start in 2015 with first gas delivery planned for early 2016.

Major Resource Projects

March 2015



Project labels:

Projects operating or currently under development with an actual or anticipated value of production greater than A\$10 Million are shown in blue

Proposed or potential projects with a capital expenditure greater than A\$20 Million are shown in red

Projects under care and maintenance are shown in purple



Commodities

- Ag.....Silver
- Au.....Gold
- Co.....Cobalt
- Cu.....Copper
- Dmd.....Diamond
- Fe.....Iron
- Fl.....Fluorite
- Gp.....Gypsum
- Gr.....Graphite
- Grt.....Garnet
- K.....Potassium
- Kln.....Kaolin
- Lst.....Limestone
- LNG.....Liquefied natural gas
- Mag.....Magnetite
- Mn.....Manganese
- Nb.....Niobium
- Ni.....Nickel
- Pb.....Lead
- Pd.....Palladium
- PGE.....Platinum group elements
- Pt.....Platinum
- REE.....Rare earth elements
- Ti.....Titanium
- V.....Vanadium
- W.....Tungsten
- Zn.....Zinc
- Zr.....Zirconium

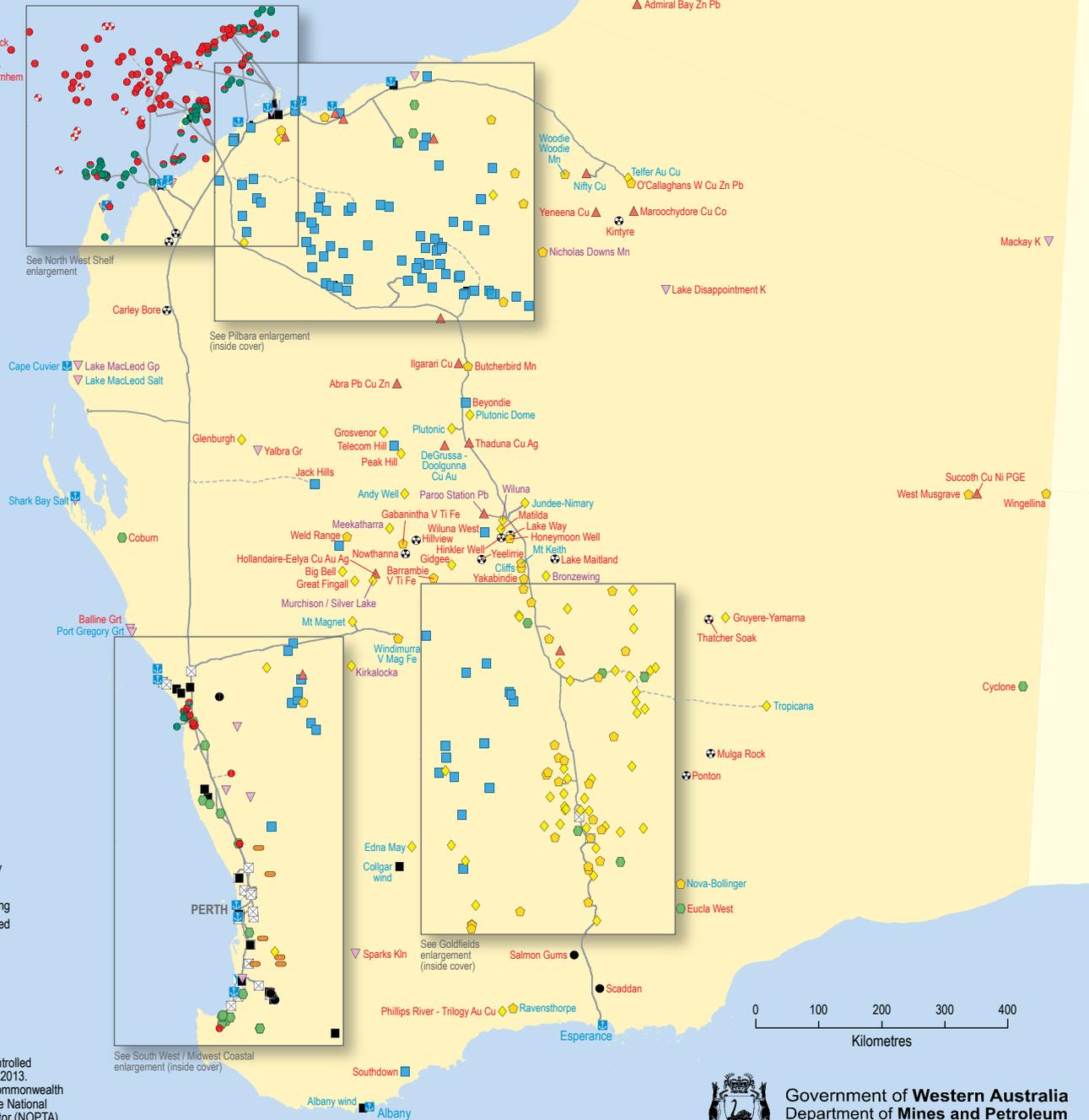
Mineral symbols

- ☆ Precious mineral
- Dmd Diamond
- ◆ Precious metal
- Au (or as shown)
- ◆ Steel alloy metal
- Ni (or as shown)
- ◆ Speciality metal
- Ti-Zr (or as shown)
- ▲ Base metal
- Iron
- Alumina
- All sites are bauxite
- Coal and lignite
- ☼ Uranium
- ▽ Industrial mineral
- ⊠ Processing plant
- Petroleum symbols
- Gas field
- Oil field
- Oil and gas field
- Significant gas discovery
- Significant oil and gas discovery
- ▲ Processing plant
- Oil / gas pipeline, operating
- - - Oil / gas pipeline, proposed

Infrastructure

- Power plant
- ▵ Irrigation / water / desalination
- Port

Data for offshore Commonwealth controlled waters is up-to-date as of December 2013. Enquiries for latest information for Commonwealth controlled waters is available from the National Offshore Petroleum Titles Administrator (NOPTA) at <info@nopta.gov.au>



Government of Western Australia
Department of Mines and Petroleum