

# GOOD VIBRATIONS

3D seismic survey in the South West





The Western Australian resources sector may have come off its peak, but it continues to be the backbone of the State economy with a number of new projects and expansions coming on stream in recent months.

In 2012-13, the total value of the State's mineral and petroleum industry was A\$102 billion (story page 4).

This was the second-best year on record, and the third consecutive year the total value of the industry topped A\$100 billion. Iron ore production was valued at A\$56.4 billion, and the value of the petroleum sector increased another 2.9 per cent to A\$24.5 billion.

These figures demonstrate the robustness of the mineral and petroleum sectors on the back of strong support from the Western Australian Government.

A number of recently completed projects are also set to support further growth in production and exports of iron ore.

Rio Tinto Iron Ore's Cape Lambert port expansion is among them and I was pleased to officially open that project in October (story page 10).

In addition this quarter, the Western Australian Government finalised the acquisition of land near James Price Point to support the development of nearby gas fields, delivering on a commitment to the Indigenous people of the Kimberley (story page 6).

As we enter 2014, the onshore Canning Basin is an exciting new frontier for the oil and gas sector and is likely to see further exploration. Construction will also continue on major projects such as the Gorgon and Wheatstone LNG projects.

This activity, coupled with innovation in fields like geological surveying (story pages 2-3), point to the growing diversity of the Western Australian economy, and provide the foundations for growth and success in 2014 and beyond.

**Colin Barnett**

**PREMIER OF WESTERN AUSTRALIA & MINISTER FOR STATE DEVELOPMENT**

**Bill Marmion**

**MINISTER FOR MINES AND PETROLEUM**

ISSN 1037-4590

#### **Prospect**

*Western Australian Prospect magazine is published quarterly by the Western Australian Government's Department of Mines and Petroleum (DMP) and Department of State Development (DSD).*

*DSD Editorial management: Rebecca Atkinson, DSD Communications and Marketing Division.*

*Tel: +61 08 9222 0417 • Fax: +61 08 9222 0505*

*DMP Editorial management: Peter W. Lewis, DMP Communications and Marketing Division.*

*Tel: +61 08 9222 3572 • Fax: +61 08 9222 3862*

*Subscriptions: Gerard O'Neill. Tel: +61 08 9222 3821 • Email: [gerard.oneill@dmp.wa.gov.au](mailto:gerard.oneill@dmp.wa.gov.au)*

#### **Disclaimer**

*Prospect has been compiled in good faith by the Department of Mines and Petroleum (DMP) and Department of State Development (DSD). Opinions expressed in Prospect are those of the authors and do not necessarily represent the views, or have the endorsement of DMP and DSD. DMP and DSD has used all reasonable endeavours to ensure the material contained in this publication is correct, but it is intended to be general in nature. No representation is made with regard to the completeness or accuracy of the information contained herein. DMP and DSD disclaims any or all liability for loss or damage whatsoever suffered or incurred resulting from the use of or reliance on information contained herein. Readers of this publication should make and rely on their own enquiries, research and judgements in making decisions affecting their own or any other persons interest.*



Cover photo: One of Curtin University's new vibroseis trucks was part of a South West Hub project display at the Brunswick Show. Similar vibroseis trucks will be used for next year's 3D seismic survey.

Scan this QR code to view links to all the department's publications

#### **DEPARTMENT OF STATE DEVELOPMENT**

##### **International Trade and Investment**

1 Adelaide Terrace

East Perth, Western Australia 6004 • AUSTRALIA

Tel: +61 8 9222 0566 • Fax: +61 8 9222 6151

Email: [invest@dsd.wa.gov.au](mailto:invest@dsd.wa.gov.au)

[www.dsd.wa.gov.au](http://www.dsd.wa.gov.au)

#### **INTERNATIONAL OFFICES**

##### **Europe**

European Office • 5th floor, The Australia Centre

Corner of Strand and Melbourne Place

London WC2B 4LG • UNITED KINGDOM

Tel: +44 20 7240 2881 • Fax: +44 20 7240 6637

##### **India — Mumbai**

Western Australian Trade Office

93 Jolly Maker Chambers No 2

9th floor, Nariman Point • Mumbai 400 021 • INDIA

Tel: +91 22 6630 3973 • Fax: +91 22 6630 3977

##### **Indonesia — Jakarta**

Western Australia Trade Office

Wisma Budi Building • floor 5 Suite 504

Jl HR Rasuna Said Kav C-6

Kuningan, Jakarta 12940 • INDONESIA

Tel: +62 21 5290 2860 • Fax: +62 21 5296 2722

##### **Japan — Tokyo**

Government of Western Australia, Tokyo Office

14th floor, Imperial Tower

1-1-1 Uchisaiwai-cho Chiyoda-ku

Tokyo 100-0011 • JAPAN

Tel: +81 3 5157 8281 • Fax: +81 3 5157 8286

##### **Japan — Kobe**

Western Australian Government Office

6th floor, Golden Sun Building

4-3-6 Nakayamate-dori

Chuo-Ku • Kobe 650-0004 • JAPAN

Tel: +81 78 242 7705 • Fax: +81 78 242 7707

##### **Middle East — Dubai**

Western Australian Trade Office • 106, Emarat Atrium

PO Box 58007 • Dubai • UNITED ARAB EMIRATES

Tel: +971 4 343 3226 • Fax: +971 4 343 3238

##### **People's Republic of China — Shanghai**

Western Australian Trade Office

Room 2204 • CITIC Square

1168 Nanjing Road West

Shanghai 20004 • PEOPLE'S REPUBLIC OF CHINA

Tel: +86 21 5292 5899 • Fax: +86 21 5292 5889

##### **People's Republic of China — Hangzhou**

Western Australian Trade and Investment Promotion

Hangzhou Representative Office

Room 1705 • World Trade Office Plaza

Zhejiang World Trade Centre

122 Shuguang Road • Hangzhou 310007

PEOPLE'S REPUBLIC OF CHINA

Tel: +86 571 8795 0296 • Fax: +86 571 8795 0295

##### **Singapore**

Western Australian Trade and Investment Office

Suntec Tower Four, #20-02

6 Temasek Boulevard • SINGAPORE 038986

Tel: +65 6836 5626 • Fax: +65 6836 5698

##### **South Korea — Seoul**

Western Australian Trade and Investment Office

Unit 702 • 7th Floor • Kwanghwamoon Building

211 Sejongno, Jongno-gu

Seoul • South Korea 110-730 • KOREA

Tel: +82 2 722 1217 • Fax: +82 2 722 1218



# In this issue



## **02 Seismic Surveying in the South West**

Valuable geological data will be the target of a 3D Seismic Survey to be conducted in the Harvey and Waroona shires in early 2014.

## **04 WA mining results remain strong**

Western Australia's resources industry has experienced its second best financial year performance on record in 2012-13.

## **06 Land secured for Kimberley gas precinct**

The Western Australian Government has completed the acquisition of land for a gas precinct near James Price Point in the Kimberley.

## **10 Rio Tinto port expansion a boost for Pilbara iron ore**

Mining giant Rio Tinto completed the first phase of a major expansion of its iron ore operations in the Pilbara region in October.

## **16 Q&A with Pankaj Savara**

The Western Australian Government's Commissioner for the Middle East and Africa provides an insight into economic issues in the region.

## **22 Mining rehabilitation fund delivering data spin-off**

The introduction of the Mining Rehabilitation Fund earlier in 2013 is already paying dividends through a new bank of knowledge.



Department of **Mines and Petroleum**  
Department of **State Development**

Department of Mines and Petroleum  
[www.dmp.wa.gov.au](http://www.dmp.wa.gov.au)

Department of State Development  
[www.dsd.wa.gov.au](http://www.dsd.wa.gov.au)

# SEISMIC SURVEYING IN THE SOUTH WEST



*One of Curtin University's new vibroseis trucks at the Brunswick Show.*

Valuable geological data will be the target of a 3D Seismic Survey to be conducted in the Harvey and Waroona shires in early 2014 as a part of research into carbon capture and storage in the South West.

Department of Mines and Petroleum (DMP) Coordinator Carbon Strategy Dominique Van Gent said the survey would cover approximately 115 square kilometres.

"The survey will be managed by the department and is a part of the South West Hub project," Mr Van Gent said.

"The stratigraphic data collected will be used to create a three-dimensional model of the area's underground geology."

Mr Van Gent said the survey would be conducted by international exploration company Geokinetics.

"Seismic surveying is an environmentally friendly method of mapping the

## DMP staff make an impression at the Brunswick Show

The South West Hub team made an impression on the public at the Brunswick Show with a display featuring one of Curtin University's two new vibroseis trucks.

These machines provide the seismic source, or low frequency sound waves, which are used to create three dimensional maps of the underground.

A 3D Seismic Survey of approximately 115 square kilometres will be conducted by the South West Hub in the Harvey Waroona area from February 2014.

At six metres in length the Curtin University vibroseis truck is a smaller version of the vibroseis trucks which will be used for next year's survey.

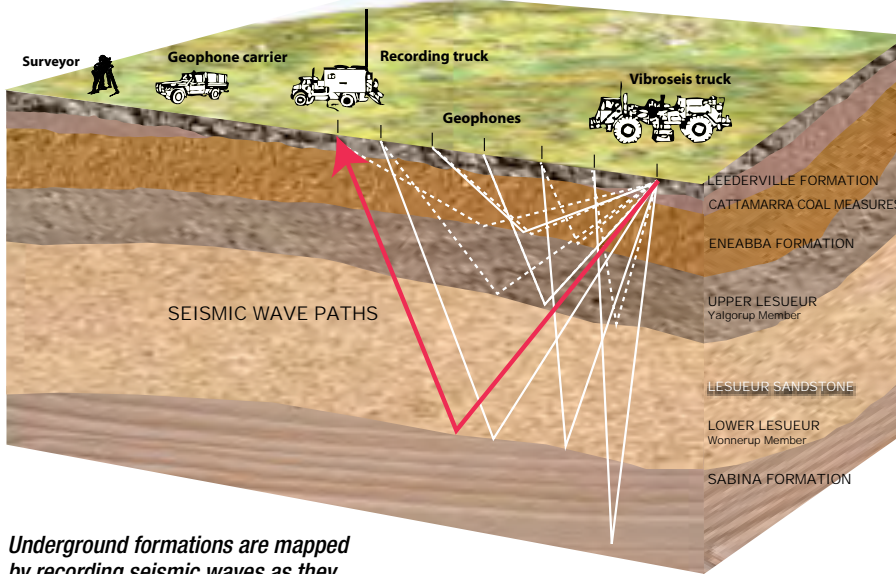
During the show the team ran two hourly demonstrations of the seismic operations from a site in the middle of the machinery section, alongside the cattle judging.

This was a good opportunity to discuss the South West Hub research program with locals.

The department, the CSIRO and Curtin University teamed up to make the truck available for the show.



## How is the survey conducted?



*Underground formations are mapped by recording seismic waves as they reflect off various subsurface strata.*

The subsurface geological formations are mapped using seismic waves sent into the ground. The echoes reflecting off various subsurface formations are received at the surface, using instruments known as geophones, and recorded for analysis.

This method of seismic surveying has a low environmental impact.

A grid pattern is established which covers the entire survey area with survey lines approximately 200 metres apart.

During the survey seismic waves at various frequencies are sent down from a vibroseis truck; vibroseis is a combination word derived from vibration and seismic.

The vibroseis trucks are manufactured to conduct seismic surveys in populated areas.

They are fitted with flotation tyres which minimise any impact on the environment, and they are operated according to internationally recognised safety standards.

At each source point the seismic wave generation time is four to five seconds.

While these seismic waves will travel kilometres below the earth's surface, the vibrations can rarely be felt by people more than 20 metres away from a vibroseis truck.

subsurface geology using seismic waves at various frequencies," he said.

"Vibroseis trucks send patterns of seismic waves from the surface down into the ground.

"The echoes reflecting off the subsurface formations are recorded and interpreted by geologists to determine the position and properties of various strata.

"The data we get from the survey can also be used by other agencies, such as the Department of Water, and will increase our overall geological knowledge of the area."

The survey is an important step in the research program for the South West Hub project.

"This will provide information which is vital to understanding the subsurface geology, and informing carbon capture and storage options for the South West region," Mr Van Gent said.

"The target formation is called the Lesueur Sandstone lying between

1.4 and 3 kilometres underground where CO<sub>2</sub> could be permanently stored.

"In order to make informed decisions about this project, the South West Hub needs accurate data about the underground formations and aquifers in the area."

Previous research in the area included a 2D seismic survey in 2011 and the drilling of a stratigraphic well in 2012.

"Engaging with the local community has been an ongoing focus of DMP, the CSIRO and the Joint Venture partners as part of the project to investigate the potential for carbon capture and storage in the South West," Mr Van Gent said.

"This has also been the case for the 3D seismic survey."

The seismic survey team will need to access land in the data acquisition area in order to conduct the survey.

"Landowners have been consulted about the survey lines to ensure that sensitive

areas are either avoided or treated with due care," Mr Van Gent said.

Precautions will also be taken to ensure that the seismic survey is conducted safely, with due regard for the environment, property, stock and the community.

"A Land Access Team has been consulting landowners for the last year and regular contact will be maintained throughout the survey," Mr Van Gent said.

"After the survey vehicles have passed, the Land Access Team will ensure that the area is free of rubbish and any accidental damage is repaired.

"Restoration work will be carried out after all the survey equipment has been removed and the whole crew has passed the property." •

For more information about the project visit [www.dmp.wa.gov.au/ccs](http://www.dmp.wa.gov.au/ccs)

# WA MINING RESULTS REMAIN STRONG

Western Australia's resources industry experienced its second best financial year performance on record in 2012-13.

Mines and Petroleum Minister Bill Marmion said the latest statistics showed that the value of WA's mineral and petroleum industry in 2012-13 was A\$102 billion — marking the third consecutive year above A\$100 billion.

Mr Marmion said the newly released Department of Mines and Petroleum (DMP) 2012-13 records demonstrated that WA's resources industry remained robust on the back of strong State Government support to reduce red and green tape and improve efficiencies.

"What this means is jobs, jobs, jobs for Western Australians," he said.

Iron ore remained the State's highest value commodity, accounting for A\$56.4 billion (73 per cent) of total mineral sales.

The petroleum sector increased by 2.9 per cent to A\$24.5 billion with LNG the most valuable product, increasing output by almost 29 per cent to a record 19.8 million tonnes.

The Minister said the State Government would continue to work to ensure WA remained competitive.

"I am working with DMP to drive down costs and attract ongoing resources investment into WA, for the benefit of Western Australians," he said.

This includes the recent introduction of WA's first fund exclusively dedicated to the rehabilitation of abandoned mine sites, the Mining Rehabilitation Fund, which has the potential to return more than A\$1 billion in financial institution-held bonds to companies.

"Upholding environmental standards and improving efficiency, WA has also recently extended the validity of Programme of Works (PoW) from two to four years and we continue to offer two rounds of government co-funding a year to projects — supporting more than 320,000m of exploration drilling in the past five years," Mr Marmion said.

The Minister said this proactive approach was already paying dividends as WA remained an attractive resources investment destination, despite global economic uncertainty and price pressure in some commodities.

"Our State maintained its ranking in the Fraser Institute Survey of Mining Companies during 2012-13, achieving the highest ranking in Australia and the 15th best exploration destination in the world — which is impressive," he said. •

The full statistics can be found at:  
[www.dmp.wa.gov.au/  
lateststatisticsrelease](http://www.dmp.wa.gov.au/lateststatisticsrelease)

## Highlights in 2012-13

**Iron ore** remains the State's most valuable sector of the mining industry, accounting for \$56.4 billion (73 per cent) of the mineral sector's total sales. Although this result was 7.3 per cent lower than the 2011-12 year, increased output of 13 per cent (58 million tonnes) helped to offset weaker prices and a strong Australian dollar. In total 513 million tonnes were exported in 2012-13.

**Gold** was the second most valuable mineral sector, with total sales of just under \$9 billion, representing 12 per cent of the mineral sector's total sales. The gold price continued its upward momentum in the first half of 2012-13, however started to weaken in December 2012 and continued a downward trend to June 2013. The quantity sold fell slightly from 5.8 million ounces in 2011-12 to 5.7 million ounces.

**Alumina** and **nickel** maintained their long-held positions as the State's third and fourth most valuable mineral sectors. Prices for both commodities were negatively impacted this financial year. The quantity of nickel sales increased by 9.5 per cent to a record 228,000 tonnes, however the total value decreased by 2.3 per cent, from \$3.7 billion in 2011-12 to \$3.6 billion this financial year.





The total value of alumina decreased by 1.3 per cent to \$3.9 billion however the quantity sold increased by 8.9 per cent. The alumina price fell some nine per cent during the period.

The overall value of **base metals** (copper, lead and zinc) increased by 22 per cent to just under \$1.6 billion in 2012–13. This increase was due to the commencement of shipments from the Paroo Station Lead project and Sandfire's DeGrussa-Dulgunna copper-gold project. Copper was by far the most significant base metal with total sales of \$1.4 billion, up 24 per cent on the previous financial year. Sales of lead increased sharply from \$12.9 million to just under \$47 million. Zinc output levels fell by 12 per cent, with the total value of sales falling from \$121 million in 2011–12 to \$100 million in 2012–13.

The total value of **mineral sands** sales fell by just under 16 per cent to \$756 million. Sales revenues were impacted by lower sales tonnages in ilmenite, synthetic rutile and zircon.

The value of **salt** sales rose by around eight per cent to \$382 million in 2012–13 while volumes fell by three per cent to 12.4 million tonnes.

In 2012–13, **Diamond** sales volumes rebounded by 10.6 per cent to 9.6 million carats. Increased tonnages and higher

grades from the Argyle underground mine accounted for this improvement in sales.

**Coal** prices remained static, while output and values increased by a little over seven per cent to reach 7.5 million tonnes and \$311 million respectively.

Output for **cobalt**, as a by-product of nickel mining, increased by 31 per cent to 6,383 tonnes but weaker prices translated into only a ten per cent increase in sales value which reached \$160 million.

**Petroleum**, which includes crude oil, condensate, LNG, natural gas and LPG (butane and propane) was valued at a record \$24.5 billion. The increase can be attributed to the Pluto LNG project coming on stream which countered falls in crude oil, LPG and domestic gas.

**LNG** was the most valuable petroleum product in the State in 2012–13 with output increasing by almost 29 per cent to reach a record 19.8 million tonnes. The value of sales increased by 25 per cent to a record \$12.5 billion. LNG production is forecast to grow in the period ahead due to increased demand from Asia and supply from new projects including Wheatstone and Gorgon.

Production of **crude oil**, the second most valuable petroleum product in 2012–13, decreased by 24 per cent to 54 million barrels, with sales values decreasing

to \$6 billion. Crude oil is continuing its downward trend due to maturing fields.

The value of **condensate** increased by two per cent to \$3.9 billion and output rose by four per cent to 38 million barrels. Most of this increase can be attributed to Pluto and North Rankin.

In 2012–13 domestic **natural gas** sales decreased by four per cent to 8.7 billion cubic metres while the value of sales was steady at \$1.4 billion. Output of **LPG (butane and propane)** decreased by ten per cent with the sales value also decreasing to \$639 million, down 13 per cent on the previous financial year.

Western Australia's mineral and petroleum resources, in order of value for 2012–13, were:

Commodity	\$A Billion
Iron Ore	56.4
LNG	12.5
Crude Oil and Condensate	9.9
Gold	9.0
Alumina	3.9
Nickel	3.6
Others	6.5
<b>Total</b>	<b>101.8</b>



# LAND SECURED FOR KIMBERLEY GAS PRECINCT

The Western Australian Government has completed the acquisition of land for a gas precinct near James Price Point in the Kimberley to support the development of nearby gas fields.

Premier and State Development Minister Colin Barnett said securing the land was an important next step in ensuring the efficient development of offshore and onshore gas in the Kimberley.

“It has taken substantial effort to reach this point, with the support of traditional landholders,” Mr Barnett said.

Under native title agreements reached with the Goolarabooloo Jabirr Jabirr native title claimant group in June 2011, the completion of the transaction has triggered a A\$10 million economic development fund and A\$20 million for Indigenous housing.

“I thank the Indigenous community for their courage in working with the State Government to secure this agreement and its associated social and economic benefits,” the Premier said.

Traditional Owners will also have an ongoing role in managing the environmental, social and heritage outcomes of the precinct.

The State has been working since 2007 to establish the Browse liquefied natural gas (LNG) Precinct as a means to diversify and expand the economy of the Kimberley.

James Price Point was selected by the State Government in 2009 as the most suitable site from more than 40 locations, with the remote location minimising potential impacts on the community and the access to deep water close to the shore reducing the need for dredging and blasting.

In April 2013, Woodside Petroleum and its joint venture partners announced they would not be proceeding with the construction of a processing facility at James Price Point.

While Mr Barnett has described the decision as “disappointing”, the State Government remains committed to the development of a gas precinct at the site.

This development would provide vital economic stimulus for the region including the provision of employment opportunities for the local Indigenous community.

“The State Government is committed to delivering a project-ready site for the development of the region’s world-class gas resources,” Mr Barnett said.

The strategic value of the site is enhanced by recent exploration and development in the Canning Basin. •



# LINKING GLOBALLY:

## WA'S OVERSEAS OFFICES TALK TRADE AND INVESTMENT



**Western Australia's international offices regional directors with Department of State Development executives and Premier Colin Barnett:**  
(back row L-R) Stephanie Catchpole, Giles Nunis, Gail McGowan, Stuart Crockett, Vibhuti Misra, John Osborn, (front row L-R) Nathan Backhouse, Peter Forby, Premier Colin Barnett, Jean Ough, Kellie-Jane Pritchard and Craig Peacock.

Leaders from Western Australia's trade and investment offices, that are scattered around the globe, converged on Perth in September for the Regional Directors Conference 2013.

During their week long visit to WA, the regional directors had a private morning tea with Premier and State Development Minister Colin Barnett, and also took part in a series of discussions and presentations covering topics including tourism, mining and resources, and agriculture.

The Western Australian Government operates international trade and investment offices spanning: China, Indonesia, Singapore, South Korea, Japan, India, Europe and the Middle East.

The offices promote investment opportunities in Western Australia to overseas investors, and also assist local

businesses to access international markets for their products.

Those attending the conference included:

- John Osborn: Regional Director, Singapore
- Nathan Backhouse: Regional Director, China
- Kellie-Jane Pritchard: Regional Director, Indonesia
- Craig Peacock: Commissioner, North Asia Agency
- Jean Ough: Regional Director, South Korea
- Peter Forby: Regional Director, India

During the conference, the directors took part in a panel session on tourism investment, with executives from Leighton Holdings, Squire Sanders, Jones Lang LaSalle,

Duxton Hotel, CBRE Hotels, ANZ, Alceon Group, Crown Metropol, and the Metropolitan Redevelopment Authority attending.

The regional directors' individual presentations at the end of their visit also drew a crowd, with more than 170 people attending to hear about opportunities and trends in priority markets — the largest audience the annual conference has ever attracted.

The directors were also available for one-on-one meetings with companies and groups interested in exploring opportunities offshore. •

For more information on Western Australia's international offices and trade and investment opportunities, visit [www.dsd.wa.gov.au](http://www.dsd.wa.gov.au)

---

# SHALE AND TIGHT GAS ON THE AGENDA

---

Petroleum experts recently used the annual Department of Mines and Petroleum's (DMP) *Petroleum and Geothermal Open Day* to put the spotlight on Western Australia's emerging natural gas from shale and tight rock industry.

Addressing the 300-strong crowd, DMP's acting Petroleum Executive Director Jeff Haworth spoke about the State Government's commitment to ensuring the industry is robustly regulated.

"During these early stages of exploration, WA has a unique opportunity to learn from experiences in other jurisdictions around the world which are already producing shale and tight gas," Mr Haworth said.

"The State Government has undertaken to further strengthen its regulatory framework to ensure WA has world best practices in place to mitigate risks and ensure this developing industry is sustainable and safe."

Mr Haworth said DMP recognised the diverse environmental values across Western Australia and was strengthening its regulatory frameworks

to ensure industry adopts high standards and practices that will address community expectations.

"Lessons from other jurisdictions have also taught us that we need to be open and transparent with the public about our regulations and where activities are occurring.

"Affected communities also need to be engaged early, by the government and petroleum companies providing information and activities, to enable them to make informed decisions about the impacts the industry could have in their area."

Mr Haworth was quick to acknowledge community interest surrounding the method used to extract the natural gas (hydraulic fracture stimulation or fracking), saying strong regulation will ensure the industry is developed in a safe, sustainable and environmentally responsible manner.

"The State Government is currently working to further strengthen WA's petroleum regulations – particularly around water protection and chemical disclosure – to provide the community with confidence the



*At the Petroleum Open Day.*

industry will be regulated to the highest environmental standards," he said.

"With strong regulation, careful industry practices and best practice monitoring, the State Government believes the risks associated with fracking activities can be managed to world best standards which will provide public confidence." •

## DMP WELCOMES HYDRAULIC FRACTURING INQUIRY

The State's lead regulator for shale and tight gas activities has welcomed the announcement of a Parliamentary inquiry into the implications of hydraulic fracturing in Western Australia.

Department of Mines and Petroleum (DMP) A/Petroleum Executive Director, Jeff Haworth said the department would be assisting the inquiry.

"During these early stages of shale and tight gas exploration, the department welcomes the opportunity for a wider public policy discussion on the potential impacts and opportunities for communities

from the development of natural gas from shale and tight rock," Mr Haworth said.

The inquiry, led by the Standing Committee on Environment and Public Affairs, will address four key areas:

- How hydraulic fracturing may impact on current and future uses of land;
- The regulation of chemicals used in the hydraulic fracturing process;
- The use of ground water in the hydraulic fracturing process and the potential for recycling of produced water; and

- The reclamation (rehabilitation) of land that has been hydraulically fractured.

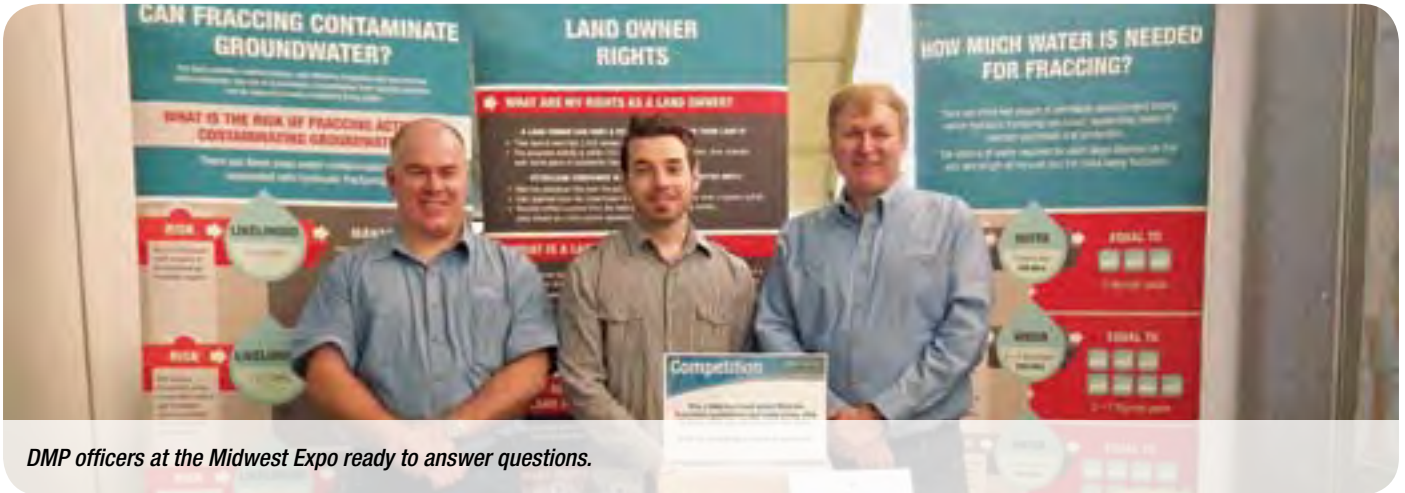
In 2011, DMP commissioned an independent review into the State's petroleum regulations to ensure they are adequate for future shale and tight gas activities.

"As a result of the review, the State Government has recently introduced new petroleum environment regulations and will soon be releasing new petroleum resource management regulations for public comment," Mr Haworth said.

He said DMP had made a submission to the inquiry. •



# COMMUNITY MEETINGS IN NORTHWEST AND MIDWEST



*DMP officers at the Midwest Expo ready to answer questions.*

As Western Australia's emerging natural gas from shale and tight rocks industry developing, the Department of Mines and Petroleum (DMP) is continuing to work with Western Australian communities to answer questions and share information.

In September DMP officers travelled to the Northwest and Midwest, following on from previous meetings with community members in these regions earlier in the year.

"The Broome visit allowed us to meet with a number of community leaders, including traditional land owners – which was extremely helpful for all involved," said DMP A/Petroleum Executive Director Jeff Haworth.

"We listened to everyone's comments and either provided answers or took the questions on notice – which really helps us get an understanding of what we, as a regulator, need to address.

"We also provided an overview of what shale and tight gas is and where it could be found in the Kimberley, as well as how it's extracted through hydraulic fracturing or 'fracking', and what fluids are used."

DMP officers also attended the Midwest Expo in Mingenew to engage directly with community members and answer any questions relating to fracking.

With the majority of attendees being farmers one of the most common questions was how fracking could impact water resources and what land access rights apply to petroleum activities.

The Department of Water (DoW) regulates the taking of water and allocation limits for petroleum activities, and will not support proposals to take water which are likely to have unacceptable impacts on water resources, the environment or existing water uses.

Typically, fracking within a shale or tight gas exploration well in WA uses approximately seven million litres of water. Production of WA shale and tight gas – which is estimated to be at least five to 10 years away – would require around 21 million litres per horizontal well – however much of this water could be recycled or reused in other wells.

As a comparison for the farming community, a 10 hectare vegetable crop would require 150 million litres of water per year.

Many farmers who attended the show were also interested in the rights private land owners had in regards to petroleum activities.

Petroleum companies wishing to conduct activities on land greater than 2,000 metres must hold the petroleum title over the area.

They must also gain approval from DMP for their proposed activity and receive written consent from the land owner before carrying out the activity. Written consent can include compensation for access to the land such as farm improvements or a financial arrangement.

If land owners and the petroleum company cannot reach a land access agreement, after three months the decision is referred

to the Magistrates Court to determine a fair agreement – something that has only occurred once in almost 50 years.

Land owners can deny a petroleum activity on their land if it is less than 2,000 square metres or the proposed petroleum activity is within 150 metres from a burial place, reservoir or substantial improvement, such as a house.

Mr Haworth said community briefings were crucial as they also covered how the industry would be regulated by DMP, the lead agency.

"While significant production of WA's shale and tight gas is still at least five to 10 years away, we made it clear that any future projects would be assessed by the department on a site by site and project by project basis," he said.

"We think it's important for people to know that, if there are any WA fracking operations down the track, our safety and environment auditors will be conducting onsite inspections to check safety and environmental compliance."

The briefings also provided an opportunity to talk about the benefits communities expect from the development of shale and tight gas, including regional jobs, energy security and economic growth. •

For more information, visit  
[www.dmp.wa.gov.au/shaleandtightgas](http://www.dmp.wa.gov.au/shaleandtightgas)



Photo: Rio Tinto

*Rio Tinto's Cape Lambert Port B facility will generate around 100 new full-time operational jobs.*

# RIO TINTO PORT EXPANSION A BOOST FOR PILBARA IRON ORE

Mining giant Rio Tinto completed the first phase of a major expansion of its integrated iron ore operations in Western Australia's Pilbara region in October.

Premier and State Development Minister Colin Barnett officially opened the new Cape Lambert Port B facility, congratulating Rio Tinto and its partners in the Robe River Iron Associates Joint Venture, Mitsui & Co and Nippon SteelSumitomo Metal Corporation on their commitment to WA.

"Rio Tinto's investment in expanding its iron ore export capacity is excellent news for Western Australia and the Pilbara," he said.

"Creation of an additional two new berths and supporting infrastructure will enable Cape Lambert's annual export capacity to grow to 140 million tonnes now, on the way to 210 million tonnes."

The Cape Lambert port facility is located 40 kilometres north of Karratha.

Construction at Cape Lambert commenced in 1970 and the first shipment of iron ore took place in October 1972, with about 8 million tonnes shipped in its first year of operation.

By 2012, that initial export figure had increased by 1,000 per cent, with 80 million tonnes of iron ore shipped through Cape Lambert's Port A facilities that year.

As part of its Pilbara growth plan to expand its iron ore operations, Rio Tinto has invested about A\$3.7 billion to date for the expansion of the port, including dredging for a new wharf.

The Cape Lambert Port B works include:

- new out loading and marine facilities ultimately allowing a total of four Cape-sized ships to be docked at any one time (across the whole of the Cape Lambert Port, eight Cape-sized vessels will be able to dock at any one time);
- two new car dumpers;
- a new stockyard including new stackers and reclaimers, with a second stockyard to come; and a new screen house.

In addition, the project has seen the expansion of housing and the upgrading of community facilities in the nearby town of Wickham, where many Cape Lambert employees live.

Construction workforce for the expansion project peaked at more than 2,000 workers and the new facility will generate about 100 full-time operational jobs.

Premier Barnett said that the iron ore industry in Western Australia contributed approximately A\$3.65 billion in royalty payments to the State in 2012-13, which was vital to the State Government's ability to provide schools, hospitals, roads and services across WA.

Overall, iron ore production in WA increased by 12 per cent to 512.6 million tonnes in 2012-13, representing 26 per cent of world production. Rio Tinto accounted for almost half the State's 2012-13 iron ore production at 239 million tonnes.

The Cape Lambert Port B project was approved under the *Iron Ore (Robe River) Agreement Act 1964*, which is administered by the Department of State Development.

The Premier said the State Government and Rio Tinto had worked together to ensure all necessary approvals were in place ahead of the Port B development and for future expansions.

"Impressively, this facility is being officially opened only 16 months after Rio Tinto took its final investment decision to commence construction," he said.

Rio Tinto said the second phase of the expansion project, including port, rail and power infrastructure, was underway and a number of options for mine capacity growth were being evaluated. These include the expansion of existing mines and the potential development of new mines. •



Photo: Rio Tinto

**Premier Colin Barnett and Rio Tinto Iron Ore Chief Executive Andrew Harding.**



# IT'S A BUG'S LIFE ... ON BARROW ISLAND

## BARROW ISLAND BUG BOOK LAUNCHED



Photos: WA Museum

*Around 2,400 species of terrestrial invertebrates have been identified on Barrow Island.*

Western Australia's Barrow Island is the focus of a new book developed by Curtin University researchers which stands as one of the most comprehensive surveys of terrestrial invertebrates on any Australian island.

The book, *The Terrestrial Invertebrate Fauna of Barrow Island*, which describes 25 new species of invertebrates on Barrow Island and neighbouring areas, was launched in November and is sponsored by Chevron Australia and published by the Western Australian Museum.

The survey was directed by Curtin entomologists Professor Jonathan Majer, Dr Nihara Gunawardene and Dr Christopher Taylor, with the help of numerous taxonomists from Australia and around the world.

Professor Majer said the book, which is a result of eight years' work on the island,

**"Within our unique surveillance program, 2,500 species were predicted to be living on the island, and we have already identified 2,400 of them," Professor Majer said.**

was a fantastic achievement, describing 25 new species including a snail, two spiders, a silverfish and 21 flies, and one new genus of wolf spider.

"Within our unique surveillance program, 2,500 species were predicted to be living on the island, and we have already identified 2,400 of them," Professor Majer said.

"We will never be able to identify all species, as many are coming and going, but we have come amazingly close."

The project started in 2005, when the Curtin entomologists and 30 international taxonomists were commissioned to survey the terrestrial invertebrates on the island, as part of Chevron Australia's obligations to protect the environment of Barrow Island and restrict introduced species.

The book comprises 22 scientific papers written by a total of 43 authors using data from more than 20 years of collecting. It includes a background into the Gorgon Gas Project and describes how the team carried out the baseline survey and designed the surveying program. •

Copies of the book can be purchased from the Western Australian Museum  
[www.museum.wa.gov.au](http://www.museum.wa.gov.au)



*Retiring Department of Mines and Petroleum (DMP) Executive Director Petroleum Bill Tinapple.*

---

# LONG SERVING PETROLEUM LEADER TO RETIRE

---

Petroleum industry identity and Department of Mines and Petroleum's (DMP) Executive Director Petroleum Bill Tinapple, has retired after more than 40 years in the oil and gas industry including 15 years at the department.

Mr Tinapple has a unique perspective of the industry due to his background in engineering and as regulator in the Northern Territory and Western Australia. He has been around for so long that most industry people over 30 have worked with him at some time over the years.

Originally from Ohio, in the mid-US, Bill's qualifications are in engineering with a Masters of Business Administration from Ohio State University.

"I'm a Mechanical Engineer by qualification but when I started in the industry there was a shortage of petroleum engineers – as a result of one of the 'up and down cycles' that we all have experienced. Mobil put me through a training program of a year of set courses and on-the-job training, to convert me to a Petroleum Engineer. I went overseas and worked in Libya, came back to the US and completed an MBA, before returning to work in the international industry," he said.

Mr Tinapple spent nine years based in the UK working on projects there and overseas. Overall, he worked

internationally for about 18 years on several oil and gas projects in the US, Libya, Indonesia, North Sea, Norway, Nigeria, Japan, Australia and Abu Dhabi, before making the permanent move to Australia in 1985.

He has been integrally associated with development of the oil and gas industry in Australia, from initial involvement in engineering studies for the North West Shelf through the development of the first floating production, storage and offloading (FPSO) unit. He was also involved in gas pipeline development, including the Amadeus to Darwin gas pipeline. The Australian Petroleum industry has benefitted ever since.



"It was 1979 when I first came to Western Australia. I was with an engineering company doing conceptual design work on the North Rankin A platform," he said.

"I came back to Perth in 1984, doing more consulting work. At the tail end of 1985 I ended up migrating to Australia and went to Darwin, working in a regulatory role with the Northern Territory Government."

After 12 years in the NT, Mr Tinapple accepted the position of Director Petroleum with the Western Australian Government, commencing with the department in 1998.

One of his early decisions was to reinstate the Petroleum Division's publication '*Petroleum in Western Australia*' and establish the first Petroleum Open Day, so that the division could communicate better with its stakeholders. Both of these are ventures still going today.

Mr Tinapple was instrumental in facilitating and encouraging the large multiclient 3D survey offshore campaign in the 1990s which greatly improved the rate of discovery of gasfields on the North

West Shelf. He has also been a fervent promoter of the prospectivity of the onshore for oil and gas.

In his role as a regulator, he oversaw the changes within the department resulting from amendments to the Commonwealth's offshore petroleum legislation (the *Offshore Petroleum and Greenhouse Gas Storage Act 2006*) which came into effect on 1 January 2012.

While heading the Petroleum Division, he has assisted in a number of new initiatives, which have been focussed on improving customer service, increasing investment in WA, and sustaining production.

He said presently Western Australia was the leading province in the world for liquefied natural gas (LNG) development and the largest user of domestic gas in Australia. At first glance, it seems as though the State has more than enough gas resources for many years. However, given lead times involved, the State needs to encourage exploration for and development of other sources of gas for future energy needs.

Recognising the potential for unconventional gas in Western Australia, particularly tight gas and shale gas, five years ago, he turned his efforts towards facilitating this aspect of the industry and making sure the Western Australian regulatory framework is appropriate for this activity. This was initially done through an independent review of the legislation which provided recommendations which are currently being implemented.

"Exploration for unconventional gas is in its infancy here, but all the predictions point to potentially huge resources of tight gas and shale gas. However, while offshore Western Australia has all the benefits of available technology and equipment, it does not have enough onshore equipment, such as drilling rigs and fracing units and associated technology."

This will be a challenge to be addressed by his successor.

The department has been fortunate in having Mr Tinapple's experience and guidance in developing Western Australia's policy and regulation over the past 15 years. •



**DMP Director General Richard Sellers, former Mines and Petroleum Minister Norman Moore with Bill Tinapple.**



**Bill Tinapple ... Retiring after more than 40 years in the oil and gas industry.**



*The State Government is planning for future water demands.*

# PROPOSED REFORM OF STATE'S WATER MANAGEMENT

The State Government recently released plans to modernise century-old water management regulations to address future demand and climate challenges.

Water Minister Terry Redman said the proposed reforms would benefit the State's water users and provide a framework for the management of the valuable resource.

*Securing Western Australia's water future* — a position paper, released for public comment in September, outlines how changes in water resource management would boost industry confidence regarding future investments.

The paper has been developed in consultation with key water users in mining, horticulture, agriculture, urban development and local government.

"The reforms will provide the State Government and water users with more

options for managing water and reflect greater transparency and clarity of regulations," Mr Redman said.

"Proposed changes include more secure entitlements for license holders and simplified processes for licence applications.

A reference group comprised of representatives from peak stakeholder groups will work with the Department of Water to finalise the policy and proposed legislation.

The proposed reform will be reflected in new legislation which will replace several existing Acts including the *Rights in Water and Irrigation Act 1914*.

The public consultation period ends on December 31, 2013 and will include metropolitan and regional workshops with licensees and interested stakeholders. •

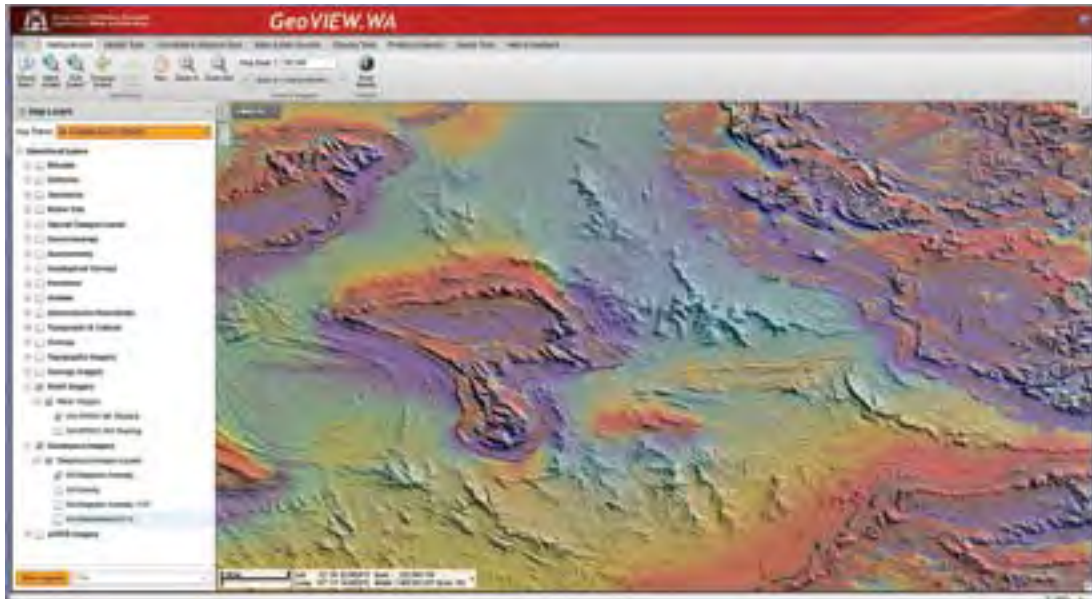
## Fact File

- More than 80 per cent of the State's available water supports mining, agriculture, horticulture, industry and local government
- Domestic users account for less than 20 per cent of water use
- The full position paper and instructions on how to provide comment can be found at [www.water.wa.gov.au](http://www.water.wa.gov.au)



# IMPROVEMENTS TO GEOVIEW.WA

## RECOGNISED AT SPATIAL AWARDS NIGHT



The Department of Mines and Petroleum's (DMP) Geological Survey of Western Australia (GSWA) has won the Spatial Enablement category at the prestigious WA Spatial Excellence Awards held in November.

The award was for GSWA's GeoVIEW.WA, a state-of-the-art geoscientific web application that is continuously updated from a range of databases to provide the latest geoscience and resource information.

"While GSWA customers have been able to use the application for the past 10 years to view and query a number of integrated geoscientific and related datasets via most web browsers, the recent improvements have received positive feedback from industry, so we are pleased to be recognised at these awards," GSWA Executive Director Dr Rick Rogerson said.

GeoVIEW.WA has been rebuilt using Geocortex Silverlight technology allowing improved functionality, along with more standard queries.

"This reduces the application development timeframe, allowing GSWA to develop

business-specific modules for GeoVIEW.WA, and choose the viewing technology that best suits the organisation's skillset," Dr Rogerson said.

In addition to tools that zoom in, zoom out, pan, query, and provide 'information' and the ability to 'drill down' to display the textual data in the viewing window, GeoVIEW.WA now provides a host of new features.

These include integration with Google Maps allowing users to open a Google Map view of an area; improved standard queries to find mineral deposits or mining licenses for a given region; and data extraction that enables users to extract multiple layers of information.

Other improvements are improved printing quality, the ability to produce a report of mineral exploration reports over an area, and being able to draw points, lines and shapes on the screen and add comments.

Areas and distances can now be measured by drawing a shape or segmented line, and units of measurement can be changed.

Other features include:

- Coordinate entry — enter known coordinates to find a feature;
- Add data — users can view CSV files and shapefiles using the new GeoVIEW.WA;
- Global search — users can type in the name of a feature to search for it on the map;
- Share your map — email your colleague a link to your map.

Additionally more data has been added to GeoVIEW.WA such as ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer) and a shaded relief imager, and major projects and operating mines are now two new layers.

GeoVIEW.WA is now in the running in the Asia-Pacific Spatial Excellence Awards (APSEA). •

GeoVIEW.WA can be found at the DMP website by clicking on 'Access to GeoVIEW.WA' at [www.dmp.wa.gov.au/7113.aspx](http://www.dmp.wa.gov.au/7113.aspx)

Media contact:  
Peter Lewis Ph 9222 3572

# Q&A WITH PANKAJ SAVARA

## WA COMMISSIONER MIDDLE EAST AND AFRICA



**Pankaj Savara, WA Commissioner for the Middle East and Africa**

Pankaj Savara is the Western Australian Government's Commissioner for the Middle East and Africa. Based in the Western Australian Trade Office in Dubai, Mr Savara works to foster links between businesses and communities in the region and the State. He spoke to *Prospect* about business conditions in the region, opportunities that exist for WA businesses and how the State is viewed by those he encounters.

**Prospect: Can you describe your role? What does an average day look like for you?**

Mr Savara: My role here at the Western Australian Trade Office in Dubai is to facilitate and encourage commercial, educational, investment and cultural ties between the Middle East and African region and Western Australia.

An average day at WATO consists of industry meetings and conference calls with our key stakeholders back in WA. Maintaining an active relationship with stakeholders in both regions provides for efficient flow of information and opportunities across the board.

**How would you describe the economic climate in the Middle East? What are the major economic issues currently occupying the thoughts of business and political leaders?**

Through the sometimes turbulent changes in the political platform of the region, the Middle East has remained resilient in its ambition for growth.

WATO primarily focuses on the countries of the Gulf Cooperative Council (GCC) which include the United Arab Emirates, Saudi Arabia, Qatar, Oman, Kuwait and Bahrain. These resource-rich economies have the means to buy and means to pay, which drives their development of major industries including infrastructure, agribusiness and natural resources.

High on the agenda of the GCC economies is meeting the demand for food and education from a growing population and vast youth base. Food security and possible solutions are an ever present concern for the desert region.

**What about the economic climate in Africa?**

Africa is increasingly drawing attention from the perspective of foreign businesses. African GDP has been positive even through the downturn of 2009 and stands firm in its path for growth.

With immense natural and human resources and strong agricultural economies, Africa is rapidly becoming one of the fastest-growing regions in the world.

WATO is keen to support and promote mining, agriculture and education and training opportunities for WA businesses interested in the African region.

**What do you think are the key opportunities for WA businesses in the regions in which you operate?**

With the State's history of proven experience in key industries, the knowledge and expertise offered by WA

businesses is an important export to the African and Middle Eastern regions.

Key opportunities for WA include, but are not limited to; agribusiness and investments into WA food supply chain, infrastructure support services, alumina smelter expertise and supply, education and training, technology-based companies as well as all sectors of the resource industry.

**And vice versa, what are businesses in your regions seeking from WA?**

The perception of Australia as a whole is that of quality and reliance in the goods and services it provides. In every industry niche and market of opportunity, businesses in this region seek that higher standard of product which has become synonymous with Australia.

**What is the most frequent inquiry you receive about WA?**

WA is the largest State in Australia with the largest share of merchandise exports. Not only rich in resources, WA is also a great destination for Gulf students to enjoy world class education in a safe and enjoyable environment.

It is these two strong sectors of the State's economy that generate the most inquiries.

**Do you feel the perception of WA has changed over the past 12 months, which has been a period of adjustment for the state economy?**

The Gulf and Africa look to WA for raw materials for agribusiness and resources. The increase of air connections between the two regions has improved understanding of WA capabilities and has increasingly solidified Perth, WA as the gateway to Australia.

This has been reflected by two high powered ministerial delegations to Perth from UAE and Saudi Arabia within this year alone.

I personally see that in the next five years the relations between Western Australia and this region will grow faster than has been witnessed in the past. •



# UAE BRINGS OPPORTUNITIES FOR WA



*Minister Al Mansouri speaks to attendees at the lunch.*



*Minister Al Mansouri with Perth Lord Mayor Lisa Scaffidi.*

Photos: CCIWA

One of the most senior members of the UAE Government has cited new opportunities for Western Australia with the rapid expansion in the United Arab Emirates aluminium industry.

UAE Minister of Economy Sultan Bin Saeed Al Mansouri travelled to Perth in October on a visit coordinated by the Department of State Development.

The Minister said the UAE would look to utilise Australian experience in the aluminium industry as a major Emirates company almost doubled its annual production over the next year.

“Alumina, which is one of the major exports from here to the UAE, this is what is really feeding into the industry in the UAE,” Minister Al Mansouri said.

“And [the industry] is about to expand, so there’s a big opportunity for the Western Australian side to be part of that. This is something that can come out from utilising the Australian expertise in this field.”

The second phase of Emirates Aluminium’s US\$4.5 billion expansion of its Abu Dhabi production facility is expected to be completed next year, growing annual capacity from 800,000 tonnes to 1.3 million tonnes.

Emirates Aluminium is a joint venture between state-owned Dubai Aluminium, and Abu Dhabi investment fund Mubadala. Emirates Aluminium and Dubai Aluminium are also planning a US\$15b, formal merger to create the world’s fifth largest aluminium producer.

The UAE was Western Australia’s eleventh largest trading partner in 2012-13, with two-way trade worth more than A\$3 billion. In 2012, the UAE received 15.9 per cent of Western Australia’s A\$2.95 billion in alumina exports.

The Minister said that opportunities also existed for increased collaboration in the natural gas sector. The UAE is currently heavily investing in natural

gas as it seeks to diversify its energy mix. Nuclear and renewable powers are also attracting growing investment.

Minister Al Mansouri made his comments while attending a lunch hosted by the Department of State Development and the Chamber of Commerce and Industry WA.

He was accompanied on his visit to Perth by representatives from some of the UAE’s major resources, energy and agriculture companies.

Minister Al Mansouri also met with Premier and Minister for State Development, Colin Barnett, who said the two discussed forging a more formal partnership in the fields of resources, agriculture and education.

Perth Lord Mayor Lisa Scaffidi officially welcomed the delegation, saying that while it was a short visit, she hoped it would be a meaningful one. •



*Stuart Gunzburg from AshOil, Jo Laughton and Paul Nugent from ESS Support Services Worldwide, with Mines and Petroleum Minister Bill Marmion (centre left) receiving this year's Golden Gecko Award for Environmental Excellence.*

# GOLDEN GECKO SUCCESS FOR BIODIESEL PROJECT

A project that recycles used cooking oil into renewable biodiesel fuel has taken out this year's Golden Gecko award for environmental excellence.

This year's award was won by ESS Support Services Worldwide and AshOil, a wholly owned subsidiary of the Ashburton Aboriginal Corporation.

Mines and Petroleum Minister Bill Marmion said AshOil recycled all of ESS' used cooking oil in Western Australia — about 200,000 litres per year.

Mr Marmion said the project reduced carbon emissions by 500 metric tonnes, the equivalent of taking 100 cars permanently off the road.

He said the project also used waste products from producing biodiesel to develop other products, such as dust suppressant, which had the potential to save large amounts of water.

The Minister said the Golden Geckos are awarded by the State Government, through

the Department of Mines and Petroleum, to recognise companies that had made an outstanding contribution to developing WA's resources in an environmentally responsible manner.

"The gecko is a great symbol of environmental performance. It is among the last species to return to an area after a land disturbance such as mining, and their presence indicates a return to a healthy functioning ecosystem," he said.

The event also recognised Franmarine Underwater Services Pty Ltd and the Department of Fisheries with a Certificate of Merit. Franmarine and the Department of Fisheries have designed a system to trial the in-water eradication of marine bio-fouling of big marine vessels.

"The system promotes a preventative risk-management approach to biosecurity, and a 'clean-hull' operating policy for WA and Australian waters," Mr Marmion said.

"This project and technology shows great innovation, exists outside and above of industry standards, and sets a precedent for in-water hull cleaning."

This year's Golden Gecko award entrants were:

- ESS Support Services Worldwide and AshOil
- Franmarine Underwater Services Pty Ltd and the Department of Fisheries
- Newmont Mining Corporation, Central Desert Native Title Services and Biota Environmental Sciences
- Rio Tinto Iron Ore
- Rio Tinto Iron Ore and Sinclair Knight Merz •

For more information go to [www.dmp.wa.gov.au/goldengecko](http://www.dmp.wa.gov.au/goldengecko)



---

# SCHOLARSHIPS HELP DRIVE RESOURCE RESEARCH

---

Seven Western Australian post-graduate students have shared A\$60,000 in scholarships for research projects in the mineral and energy industries.

Mines and Petroleum Minister Bill Marmion announced the 2013 Minerals and Energy Research Institute of Western Australia (MERIWA) scholarship winners at a special event in October.

During his speech to mark the event, Mr Marmion recognised the importance of the scholarships.

"The MERIWA scholarships play an important role in supporting WA's next crop of researchers," he said.

"It allows them to dream and to achieve, and for more than 30 years the State Government and industry has invested more the A\$50 million towards MERIWA endorsed research."

Mr Marmion said the students' research would make an important contribution to a sector that is the backbone of the State's economy.

"With research covering exploration, mineral processing and rehabilitation, the work being done by these students has the potential to make a marked difference on the resources industry," Mr Marmion said.

"They have the potential to become top researchers not only in Australia, but internationally."

Five of the seven recipients receive A\$10,000 to advance their work during the year.

This is split between a A\$5,000 living allowance and A\$5,000 towards research costs, while the other two recipients will receive the A\$5,000 living allowance.

Mr Marmion also launched a new website and logo in recognition of the development of a new research institute that will replace MERIWA.

"MERIWA has a long and proud history in Western Australia's resources industry," he said.

"However, the development of the new institute, to be known as the Minerals Research Institute of Western Australia, will further build on the wonderful work of MERIWA.

"The new institute will also give WA an opportunity to collaborate with other initiatives, such as the National Resource Sciences Precinct, and will play an important role in making Western Australia a global capital for minerals and energy research.

"The work of our scholarship recipients, past and present, will also go a long way towards this goal."

MERIWA's 2013 scholarship recipients and projects are:

- Mohammadreza Kamyab (Curtin): using numerical simulations to investigate the transport behaviour of cuttings in small annulus spaces.
- Masood Mostofi (Curtin): identifying and then quantifying the various processes occurring at the interface between Impregnated Diamond drill bits and the rock mass.
- Alexander Senaputra (Curtin): looking at the impacts of desilication product on the flocculation, sedimentation and consolidation of bauxite residue produced in alumina refining through the Bayer process.
- Amir Mokaramian (Curtin): focusing on introducing the technology of coiled tube drilling from existing applications in the petroleum industry, for deep mineral exploration drilling
- Hazel Lim (Curtin): looking to develop a leaching method that selectively dissolves specific rare earths and rare metals from ores.
- Maryam Jozegholami Barmi (Murdoch): looking to produce efficient, large scale cobalt composite electrodes for base metal electro-winning systems
- Kerry Chia (UWA): further research methods to reduce dormancy loss and promote germination in snottygobble seeds. •



*MERIWA CEO Mark Woffenden, far right, with Mines and Petroleum Minister Bill Marmion, centre, and the scholarship recipients.*

---

# COMMUNITY BENEFITS OF RESOURCES GROWTH

---

The positive flow-on effects of the Western Australian resources sector on the broader community has been confirmed and quantified in a new report released by the Chamber of Minerals and Energy of Western Australia (CME).

Mines and Petroleum Minister, Bill Marmion, recently launched the *Economic Reach of the WA Resources Sector* at an industry function.

Prepared in conjunction with KPMG, the report highlights the benefits of activity in the resources sector which have made Western Australia a stand out economic performer over recent years.

"The resources sector has been a driver of significant income, employment, community and infrastructure development and this report endeavours to quantify some of the broader benefits derived from the sector," CME Chief Executive Reg Howard-Smith said.

He said it was clear that the benefits of a strong and expanding resources sector are

shared widely and not just enjoyed by those participating directly in the sector.

The report found that:

- When 'resources-related manufacturing' (18,698) and 'resources-related construction' (20,546) is added to 'resources sector' employment (103,796) this totals 143,040 direct employees in the WA resources sector (figures for May 2013);
- This equates to 11 per cent direct employment in the state, making it the single largest sector employer;
- 56 per cent of Western Australian resources sector employment is in the regional communities. •



A copy of the full report can be accessed from the CME website  
[www.cmewa.com.au](http://www.cmewa.com.au)

## WA GAS EXPANSION BOOST

The flexibility and security of Western Australia's gas market has been boosted by the expansion of the State's only commercial gas storage facility.

Energy Minister Mike Nahan said the Mondarra Gas Storage Facility had been expanded in line with recommendations following the 2008 Varanus Island gas supply disruption.

The September opening follows a decision by the State Government in May 2011 to approve a long-term arrangement between Verve Energy and the APA Group to further develop the Mondarra Gas Storage Facility.

Dr Nahan said the expanded facility was now operating, which would help strengthen the security and reliability of gas supplies for industry, as well as gas and electricity consumers.

The Minister said the Mondarra facility near Dongara was the second of its type in Australia.

The expansion has increased its commercial gas storage capacity by five times, from three petajoules to 15 petajoules.

Dr Nahan said the gas stored at Mondarra on behalf of Verve Energy could supply Perth's power needs for up to two months, in the event of a major disruption to gas supply.

"I congratulate the APA Group for working with industry to get the development of the facility's expansion up and running, and for delivering on this important project.

The Minister said Verve Energy would be able to store spare gas for use at another time.

Facility customers will also be able to take advantage of opportunities to purchase gas when short term 'spot' wholesale gas prices are low, which reduces exposure to high priced gas and reduces business costs. •

### Gas storage facility

- Gas at Mondarra is stored in a depleted gas reservoir of porous rock at a depth of about 2,800 metres
- Gas can be repeatedly injected and withdrawn from the reservoir and can stay underground indefinitely without leakage or deterioration in quality
- The gas is transported to customers through the Dampier to Bunbury Gas Pipeline and the Parmelia Gas Pipeline





*LNG 18 is expected to draw 6,000 participants to Perth.*

# EYES OF GAS WORLD ON PERTH AS LNG 18 RAMPS UP

Preparations are well underway for the 18th International Conference and Exhibition on Liquefied Natural Gas (LNG 18) in Perth in 2016, following Australia's successful bid to host the event.

It is expected LNG 18 will attract 6,000 participants from 800 of the world's leading LNG companies to Western Australia, injecting an estimated A\$50 million into the State's economy.

Premier and State Development Minister Colin Barnett said the conference would enhance Perth's global reputation as a business and conference centre for the energy sector.

"LNG 18 will bring the heads of major global gas producing and energy companies, as well as a lot of attention, to Perth," Mr Barnett said.

"The event will provide an important opportunity to showcase Perth as a regional corporate centre, and underlines Western Australia's growing importance as an energy supplier," he said.

Western Australia is well-positioned to host the event – there are currently A\$112.5 billion of LNG projects under construction or committed in the State, with WA accounting for 25 per cent (28.1 million tonnes) of global LNG capacity under construction in 2013.

In 2012, WA produced 82 per cent of Australia's total LNG and sales are expected to grow from 20 million tonnes in 2012-13 to a capacity of almost 50 million tonnes in 2016-17.

LNG 18 will highlight the continued growth and development of WA's LNG industry, opportunities for investment and the application of new technologies.

Efforts are underway to promote the event and WA's local and international LNG capacity, most recently at the World Energy Congress in Deagu, South Korea. During 2014, the LNG 18 team will be at Gastech (South Korea) in March and the World Petroleum Congress (Russia) in June.

LNG 18 will run over four days from 12-15 April, 2016 in Perth. If you are interested in attending the event, an invitation is now open for subscribers to sign up to the LNG 18 newsletter featuring regular updates, important deadlines and information on the conference. Visit [www.lng18.org](http://www.lng18.org). •

# MINING REHABILITATION FUND DELIVERING DATA SPIN-OFF



*The Mining Rehabilitation Fund is generating important data on land disturbance associated with mining and exploration development in Western Australia.*

The introduction of the Mining Rehabilitation Fund by the Department of Mines and Petroleum (DMP) earlier in 2013 is already paying dividends through a new bank of knowledge it has developed.

The fund, which largely replaces the previous bond system, requires all tenement holders under the *Mining Act 1978* to annually submit current data on areas of land disturbance and areas of rehabilitation.

The department's Environment Division Executive Director Dr Phil Gorey said that the information generated by the MRF's reporting requirements gives DMP access to remarkably detailed data.

"The Mining Rehabilitation Fund was introduced on a voluntary basis on 1 July 2013, and since then we have been able to generate some really interesting data on land disturbance associated with mining exploration and development," Dr Gorey said.

"Once the fund becomes compulsory, we will be able to develop a clear understanding of the amount of land used as a part of mining operations in Western Australia."

The department is now developing a comprehensive database on land disturbance and rehabilitation for mine sites in WA that it regulates.

Dr Gorey started looking into the data a couple of months after the fund was voluntarily introduced.

"The data showed that the overall impact of exploration and mining activities is often small compared to the total size of the tenements," Dr Gorey said.

"For example, exploration tenements covering more than 1.3 million hectares have been submitted as a part of the MRF.

"Of those tenements, only 1,183 hectares had land disturbance. That is less than 0.1 per cent of the total area covered by an exploration tenement."

The mining leases that have been submitted make up the largest area of land disturbance, with 17,381 hectares.

"However, this was still less than five per cent of the total area covered by those mining leases," Dr Gorey said.

"While it is still early in the implementation of the MRF, it is clear that this initiative will deliver the most complete and up to date database on development and rehabilitation of the mining industry ever experienced in the State."

Over time, the dataset will also deliver a time-series record of disturbance and rehabilitation across all of Western Australia.

There are also plans to make this data publicly available.

"The State Government has introduced the Mining Legislation Amendment Bill 2013, which has provisions that will allow this data to be publicly released," Dr Gorey said.

"This is an important part of being transparent with the data we have."

The objective of the MRF is to better cover rehabilitation costs, free up considerable capital for companies and encourage early and ongoing rehabilitation of the State's mine sites.

The fund was developed after nearly three years of research, consultation and policy development and there are more than 23,000 live mineral tenements across Western Australia. For information on the MRF visit [www.dmp.wa.gov.au/mrf](http://www.dmp.wa.gov.au/mrf) •

*MRF Key statistics	
Number of tenement holders registered for MRF	1008
Total amount held in the fund	\$4.8M
Total amount for bonds retired	\$224M
<b>Total amount for bonds held</b>	<b>\$1.01B</b>

\*As at 15 November 2013



---

# SEISMIC SURVEYS REVEAL REMAINS OF SMALL CONTINENT

---

Seismic surveys undertaken by the Department of Mines and Petroleum's (DMP) Geological Survey of Western Australia (GSWA) have confirmed that the remains of a small continent, about the size of Japan, is embedded in central Western Australia.

GSWA Geologist Dr Simon Johnson said the Glenburgh Terrane, which includes Glenburgh Station near Gascoyne Junction, was trapped between the tectonic plates of the Pilbara and Yilgarn Cratons two billion years ago.

These three tectonic entities collided, forcing each other's edges up to form mighty mountain ranges.

These have slowly eroded down to become the Capricorn Orogen.

"They've now become as flat as the two bits on either side," Dr Johnson said.

"The only way we can recognise them is in the type of rocks, and by looking at the grade of the minerals in those orogenic

belts which are different to the ones surrounding them."

This is one of many facts about the region's complex crustal architecture confirmed by recent seismic surveys.

Dr Johnson said up until now, geologists had to rely on data generated by surface geological mapping, and magnetic and gravity surveys.

These cheaper but less informative methods convey little information about the Earth's deeper structure.

He says labour-intensive seismic surveys, based on data from geophones laid manually on the ground, have given researchers detailed knowledge of the top 60 kilometres or so of the Earth's surface that is the crust.

They have discovered several major fault lines that were previously unknown.

"Faults which go from the surface of the Earth all the way down to the

mantle play a significant role in mineralisation, because these can become pathways for metalliferous fluids," Dr Johnson says.

"These major fault lines are promising places to explore for minerals.

"The tectonic setting is also very important, so for example island arcs and the edges of continents are where you normally get lots of mineralisation.

"You can't necessarily tell where the major faults structures are just from geological mapping or those two-dimensional geophysical surveys.

"When we talk about architecture we are talking about understanding the crust in three dimensions."

The seismic surveys began after the State Government made funds available under the Exploration Incentive Scheme (EIS), a part of the Royalties for Regions program, four years ago. •



*View from Mount Gascoyne.*

## AGRICULTURE

### East Kimberley – Ord – Ord/East Kimberley Expansion Project

#### WA STATE GOVERNMENT

The Ord East Kimberley Expansion Project is a good example of the Commonwealth and State Government working closely together to deliver economic and Indigenous participation opportunities and much-needed infrastructure to a regional community of Western Australia. The State Government committed \$322m to increase the existing amount of irrigated land in the Kununurra region by releasing approximately 15,000ha of additional Ord farm lands. This funding has enabled the construction of irrigation channels, roads and off-farm infrastructure to service the future needs of the region's growing population and sustain economic growth. The State Government has announced that Kimberley Agricultural Investment (KAI) is the preferred proponent to lease and develop 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. To achieve a diverse agricultural mix for the region and to support local enterprise, an additional 1,700ha of newly developed land in the Ord West Bank will be available for the development of up to 25 new farms. The Commonwealth Government has invested \$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). The Yawoorroong Miriurung Gajerrong Yirrgeb Noong Dawang Aboriginal Corporation (MG Corporation) building and the Department of Housing transitional housing projects have been successful nominations for the Australian Institute of Architects 2013 Western Australian Architectural Awards.

Expenditure: \$517m.

Employment: Construction: 761

## GOLD

### Boddington – Gold Mine

#### NEWMONT BODDINGTON GOLD PTY LTD

Newmont Boddington Gold (NBG), a major gold and copper mine in the south east of Western Australia, 120km from Perth, commenced operations in 2009 after a \$3b expansion of the original Boddington Gold Mine, a joint venture which had been in care and maintenance for several years. NBG is now 100 per cent owned and operated by United States global miner Newmont Mining Corporation. First gold was poured in September 2009 and 18 months later the operation achieved its first one-million-ounce milestone. An estimated 700,000-750,000 ounces of gold per annum is expected to be produced for the life of the mine, officially more than 24 years, but it is possible the mine life could be further extended. NBG also produced 67Mlbs of copper in 2012 and this amount is expected to increase to between 70-80Mlbs in 2013.

Employment: Operation: 650

### Kalgoorlie – Tropicana Gold

#### ANGLOGOLD ASHANTI/INDEPENDENCE GROUP JOINT VENTURE

AngloGold Ashanti, as Joint Venture Manager, has continued to progress development of the Tropicana Joint Venture gold mining project proposal 330km north east of Kalgoorlie. Following State and Commonwealth Environmental approvals in the second half of 2010, key State and local government approvals required for construction of a 225km road, bore field, pipelines, airstrip, accommodation village, power station and mine plant are either in place or in the final stages. Road construction is complete and a sealed 2.1km airstrip is operational. Engineering design and procurement activities were finalised at the end of 2012. Production commenced ahead of schedule with the mine's first gold pour in September 2013. Expenditure: \$700m.

Employment: Construction: 700; Operation: 400

## 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, 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 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 2014/15, by which time the structure plan and zoning adjustments will also have been completed.

## IRON ORE

### Pilbara – Port Hedland – Atlas Iron

#### ATLAS IRON LTD

Atlas Iron Ltd is an iron ore explorer and miner focused on a developing a number of projects in the Pilbara region of Western Australia. Atlas commenced exporting in December 2008 from its Pardoo mine, east of Port Hedland. Atlas' second mine, Wodgina, commenced operations in 2010. Production has recently commenced at its third mine, Mt Dove, located 65km south of Port Hedland. The company plans to bring five mines into production in five years with the addition of Abydos Mine in June 2013, and the first phase of the Mt Webber Mine in the first half of 2014. Atlas aims to export between 9.8Mt and 10.3Mt in the 2013 financial year. Atlas plans to progressively expand its exports, targeting 15Mtpa by 2015 and 46Mtpa during the 2017 calendar year. Atlas operates its current mines on the basis of road haulage to Port Hedland. For the longer-term developments and production beyond 15Mtpa, rail haulage will be preferable due to the scale and distance to port. Atlas is engaging with a number of infrastructure owners and developers with the intent of unlocking the value of Atlas' Horizon 2 assets.

Expenditure: \$500m.

Employment: Operation: 570

## OIL & GAS DEVELOPMENTS

### Carnarvon Offshore Basin – North Rankin – North Rankin Redevelopment

#### WOODSIDE ENERGY

In October 2013, Woodside as operator of the North West Shelf Project, announced that the North Rankin Redevelopment Project achieved start-up and has exported gas to the Karratha Gas Plant. The A\$5b North Rankin Redevelopment Project involved the construction and installation of a second platform, North Rankin B, and modification and refurbishment of the existing North Rankin A platform. Located approximately 135km offshore of Karratha, the North Rankin B platform will enable the recovery of approximately 5 trillion cubic feet (100% project) of discovered, low pressure reserves from the North Rankin and Perseus fields.

Expenditure: \$5b.

## SILICON METAL

### Kemerton – Silicon Metal Plant Expansion

#### SIMCOA OPERATIONS PTY LTD

Simcoa announced in October 2009 its decision to expand the company's 32,000tpa capacity silicon metal plant at Kemerton. The first stage expansion, that involved the installation of a third furnace, increased the plant capacity to 48,000tpa and came online in 2012. Providing world demand for silicon continues to increase strongly, a second stage expansion, involving installation of a fourth furnace is under consideration and could take place by 2014 and increase plant capacity to 64,000tpa.

Expenditure: \$100m.

Employment: Construction: 120; Operation: 40



## AMMONIUM NITRATE

### Kwinana – Ammonium Nitrate Facility Expansion

#### CSBP LIMITED

CSBP is currently expanding its ammonium nitrate production facility at Kwinana from its current capacity of 520,000tpa to 780,000tpa. The expansion involves the construction of an additional nitric acid plant and ammonium nitrate plant, together with an upgrade of the existing prilling plant and other infrastructure work. Construction is well advanced with all major modules delivered to site and in place. The expansion is on track to be operational in the first half of 2014.

Expenditure: \$550m.

Employment: Construction: 300; Operation: 10

### 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. YPFPL 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 first quarter of 2015.

Expenditure: \$600m.

Employment: Construction: 600; Operation: 65

## HEAVY MINERAL SANDS

### Keysbrook – Heavy Mineral Sands Mine

#### MZI RESOURCES LTD

MZI is proceeding to develop a mineral sands mine located near the township of Keysbrook, approximately 70km south of Perth. The project has received environmental approval from the Minister for Environment, as well as development approvals and extractive industry licences 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 5.5 years of operations. The Feasibility Study, which was completed in October 2012, indicated a mine life of 7.2 years based on accessible mineral resources plus shire approvals. 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, near Bunbury, where it will be toll treated under a processing agreement. MZI plans to start site construction in late 2013, with first production scheduled in Q4 2014. The project is expected to produce 62,200tpa of leucosene products and 28,700tpa of zircon concentrate which will be exported from the Bunbury Port.

Expenditure: \$64m.

Employment: Construction: 35; Operation: 30

## 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, to enable the development of natural gas projects and associated industries to exploit the gas reserves in the Carnarvon Basin and Exmouth Gulf. The ANSIA includes three larger sites for major gas processing proponents, secondary processing sites, areas for general support industries and supply base operations, a port with common user facilities to be managed by the Dampier Port Authority and common user access and infrastructure corridors. Two foundation proponents, BHP Billiton Petroleum and Chevron Australia have been allocated land within the ANSIA. Chevron Australia commenced construction in late 2011 with first LNG exports scheduled for late 2016. BHP Billiton Petroleum has completed construction of its domestic gas plant with first sales in August 2013.

## IRON ORE

### Pilbara – BHPB – Port Blending and Rail Yard Facilities

#### BHP BILLITON IRON ORE PTY LTD

This project seeks to enhance the efficiency of BHP Billiton WA Iron Ore's supply chain and will contribute to the company's strategy to deliver capacity well beyond 220Mtpa. The Rail Yard Facilities' expansion involves a number of works to the rail operations at Port Hedland, particularly the Mooka Staging Yards, to create flexibility and increase direct load capability. Consistent with the prioritisation of efficient growth in the inner harbour, construction at the South Yard at Nelson Point operations is no longer included in the scope of this project. As at 30 June 2013, the overall project was 93 per cent complete on the basis of the revised scope and on schedule for the target completion date in the second half of 2014.

Expenditure: \$1.25b.

Employment: Construction: 2100; Operation: 720

### Pilbara – Jimblebar Iron Ore Mine Expansion

#### BHP BILLITON IRON ORE PTY LTD

During the September 2013 quarter first production was delivered from the Jimblebar Mine Expansion, six months ahead of its original schedule. The ramp up of phase one capacity to 35Mtpa is expected to be completed by the end of 2015 financial year. Together with the recent installation of four mobile crushers, this will increase total iron ore supply chain capacity to in excess of 220Mtpa. Longer term, a low cost option to expand Jimblebar to 55Mtpa and the broader debottlenecking of the supply chain is expected to underpin capital efficient growth in capacity to approximately 260 to 270Mtpa.

Expenditure: \$4b.

### Pilbara – Solomon – Chichester expansion and Solomon Mine Project

#### FORTESCUE METALS GROUP LTD

Fortescue has recently completed the expansion of its existing mines at Cloudbreak and Christmas Creek to 95Mtpa (including 5Mtpa from BC Iron). The existing rail and port facilities have been expanded by the duplication of 120km of railway south of Port Hedland, installation of two new train unloaders, and construction of two additional berths and associated infrastructure resulting in a rail and port capacity of 155Mtpa. Construction of infrastructure in support of the Solomon Hub, which includes the new 20Mtpa Firetail iron ore mine at Solomon and the 127km railway spur to Fortescue's existing Christmas Creek to Port Hedland rail line, has been recently completed. The Solomon Hub is planned to involve at least two mining areas and two processing plants. First production from the Firetail deposit at Solomon was achieved in November 2012. First production from FMG's 40Mtpa Kings mine at Solomon is expected in late 2013.

Expenditure: \$9b.

Employment: Construction: 7000; Operation: 6000

## 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 production from the first and second of six lines scheduled to commence in 2013. On completion, the project will comprise of in-pit crushers, six autogenous and six ball mills, concentrators, 6Mtpa pellet plant, 25km slurry pipeline, 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.

Expenditure: \$5.2b.

Employment: Construction: 4000; Operation: 500

## OIL & GAS DEVELOPMENTS

### Carnarvon Basin – Greater Western Flank Phase 1

#### WOODSIDE ENERGY

The Greater Western Flank (GWF) Phase 1 Project represents the next major development for the NWS Project. It will develop the Goodwyn GH and Tidepole fields, via a subsea tie-back to the existing Goodwyn A Platform. The total investment for the GWF Phase 1 Project is approximately \$2.5b and project commencement expected early in 2016.

Expenditure: \$2.5b.

### 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 increased from \$43b to \$52b following a cost and schedule review conducted by Chevron in December 2012. The project involves the processing of gas from both the Gorgon and Jansz/lo gas fields and includes potentially the largest commercial CO<sub>2</sub> geosequestration project in the world. The project obtained State and Commonwealth 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 is planned for late 2014 leading to the first LNG cargo in the Q1 2015, with the provision of domestic gas by 31 December 2015.

Expenditure: \$52b.

Employment: Construction: 6250; Operation: 300

### Carnarvon Offshore Basin – North Rankin – North Rankin Redevelopment WOODSIDE ENERGY

In October 2013, Woodside as operator of the North West Shelf Project, announced that the North Rankin Redevelopment Project achieved start-up and has exported gas to the Karratha Gas Plant. The \$5b North Rankin Redevelopment Project involved the construction and installation of a second platform, North Rankin B, and modification and refurbishment of the existing North Rankin A platform. Located approximately 135km offshore of Karratha, the North Rankin B platform will enable the recovery of approximately 5 trillion cubic feet (100 per cent project) of discovered, low pressure reserves from the North Rankin and Perseus fields.

Expenditure: \$5b.

### Pilbara – Macedon Domestic Gas Project BHP BILLITON PETROLEUM (AUSTRALIA) PTY LIMITED

BHP Billiton Petroleum (Australia) Pty Ltd and Apache Energy Limited are currently constructing a domestic gas plant for Western Australia at the Ashburton North Strategic Industrial Area near Onslow. The development involves a number of sub-sea gas wells connected to the gas field, offshore and onshore wet gas pipelines, an onshore gas processing plant 11km south west of Onslow and a sales gas pipeline connected to the Dampier-to-Bunbury Natural Gas Pipeline. Gas production has commenced with daily production expected to be in the order of 200TJ.

Expenditure: \$1.5b.

Employment: Construction: 700; Operation: 14

### Pilbara – Wheatstone LNG Development CHEVRON AUSTRALIA PTY LTD

Chevron Australia Pty Ltd is currently constructing a LNG plant, 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 or six 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 first export of LNG is scheduled for late 2016.

Expenditure: \$29b.

Employment: Construction: 5500; Operation: 400

#### AMMONIA/UREA

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

Perdaman Chemical and Fertilisers Pty Ltd is developing 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. A 20-year off take agreement has been signed with Incitec Pivot. The coal supply contract is yet to be finalised. The company has received all its environmental and all other approvals from both the Western Australian and Commonwealth governments. Construction is expected to commence Q2 2014, with the first shipment of urea planned for Q4 2017.

Expenditure: \$3.5b.

Employment: Construction: 2000; Operation: 200

#### HEAVY MINERAL SANDS

### Shark Bay – Coburn Zircon Project GUNSON RESOURCES LIMITED

Gunson 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. An Optimisation Study was completed in February 2013 which indicates a mining rate of 23.4Mtpa and a mine life of 19 years. As a result of the Optimisation Study, the project is expected to increase average annual production to 49,500t of zircon, 109,000t of chloride ilmenite and 23,500t of a mixed rutile-leucocoxene HiTi90 product.

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 State Government will secure all relevant approvals to establish a 'project ready' Precinct.



**Prospect Magazine  
is also available  
to view online.**

**Visit  
[www.dsd.wa.gov.au/Prospect](http://www.dsd.wa.gov.au/Prospect)**



## 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 owned 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.

### IRON ORE

#### Mid West Region – Extension Hill Magnetite Mine

##### ASIA IRON

Asia Iron has primary environmental approval to produce up to 10Mtpa of magnetite concentrate, which will be transported by slurry pipeline to the port of Geraldton for export. The company is currently seeking secondary approvals and undertaking an implementation study for the project.

Expenditure: \$2b.

Employment: Construction: 1000; Operation: 350

#### Mid West Region – Weld Range Iron Ore Mine SINOSTEEL MIDWEST CORPORATION LIMITED

Sinosteel Midwest Corporation proposes to develop a 15Mtpa iron ore mine at Weld Range 65km south west of Meekatharra, producing a mix of hematite lump and fines. The project is expected to utilise a proposed new rail line and deepwater port facility at Oakajee.

Expenditure: \$1b.

Employment: Construction: 1000; Operation: 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 has key international investment partners with strategic steel-making interests. They are 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. Environmental approval for Roy Hill mine Stage 1 was received in December 2009 and environmental approval for Stage 2 was received in March 2010. In July 2011, Roy Hill Infrastructure was granted a Special Railway Licence to develop a 344km railway from its mine in the eastern Pilbara to Port Hedland. All primary approvals have been secured and major project works commenced in late 2012. Dredging of the new berth areas at South West Creek was finished ahead of schedule, the airstrip and internal mine roads have been completed, the rail construction villages are completed and works are well advanced on the construction of mine and port accommodation villages. In addition, the new Corporate HQ and Remote Operations Centre at the Perth International Airport business precinct is due for completion in November 2013. Considerable works are already underway and Roy Hill is seeking to finalise its debt funding to allow the commencement of full construction.

Expenditure: \$9.9b.

Employment: Construction: 3600; Operation: 2000

## 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 30Mtpa of direct shipping iron ore from its 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. The Deception Deposit received environmental approval in June 2012 and first production is expected in first half of 2017.

Expenditure: \$35m.

### NICKEL

#### Mt Windarra – Windarra Nickel

##### POSEIDON NICKEL NL

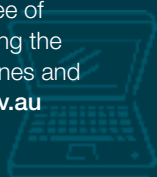
Poseidon Nickel Ltd has submitted a project development proposal for the redevelopment of the Mt Windarra underground nickel mine, the development of the new Cerberus underground nickel mine, the construction and commissioning of a nickel sulphide concentrator, a gold tailings re-treatment plant and associated project infrastructure at Mt Windarra, the historic site of previous mining and processing operations. Subject to obtaining all relevant approvals and project funding, Poseidon is forecast to commence construction in 2014.

Expenditure: \$250m.

Employment: Construction: 80; Operation: 180

# Visit us online

*Prospect* can be downloaded free of charge from the Internet by visiting the website of the Department of Mines and Petroleum at: [www.dmp.wa.gov.au](http://www.dmp.wa.gov.au)



## Prospect

Subscription/Change of address  
ABN: 69 410 35 356

Name: \_\_\_\_\_

Position: \_\_\_\_\_

Organisation: \_\_\_\_\_

Address: \_\_\_\_\_

Type of business: \_\_\_\_\_

Phone number: \_\_\_\_\_

Email: \_\_\_\_\_

### *Please tick the appropriate box*

Please add me to your mailing list to receive my one year subscription of *Prospect* magazine.

☐ one year @ \$12 (incl. GST)

My cheque, made out to the Department of Mines and Petroleum, is enclosed OR please debit the amount to my credit card using the following details:

Type of card: ☐ Visa ☐ Bankcard ☐ Mastercard

□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □

Expiry date □ □ □ □

*This form will become a tax invoice for GST purposes when payment is made.*

☐ Change of address

(please make changes required on one of your old labels).

### **Please photocopy or cut coupon and mail to:**

*Prospect* subscriptions  
Information Centre  
Department of Mines and Petroleum  
Mineral House, 100 Plain Street  
East Perth, Western Australia 6004

## Significant resource projects in Western Australia

Western Australia continues to lead the way as Australia's premier resources investment destination. There are more than A\$135 billion worth of projects either committed or under consideration for the State during the next few years. These would create more than 39,000 construction jobs and more than 13,000 permanent jobs.

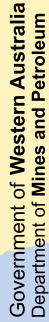
This section is intended as an overview and does not constitute an exhaustive list of projects within the Western Australian resources industry. All currency figures are in Australian dollars, as at 01/10/2013.

	Project Value (estimated A\$m)	Employment	
		Construction	Permanent
Iron and Steel			
API Management Pty Ltd – West Pilbara Iron Ore Project	7000	3500	1000
Asia Iron – Extension Hill Magnetite Mine	2000	1000	350
BHP Billiton Iron Ore – Jimblebar Mine Expansion	4000	n/a	n/a
BHP Billiton Iron Ore – Port Blending and Rail Yard Facilities	1250	2100	720
CITIC Pacific – Cape Preston Mine & Processing Projects	5200	4000	500
Fortescue Metals Group – Chichester expansion and Solomon Mine Project	9000	7000	6000
Roy Hill Holdings Pty Ltd – Iron Ore Mine - Roy Hill	9900	3600	2000
Sinosteel Midwest Corporation – Weld Range Hematite Mine	1000	1000	500
Sub Total	39350	22200	11070
Oil, Gas and Condensate			
BHP Billiton – Macedon	1500	700	14
Browse LNG Precinct	n/a	n/a	n/a
Chevron – Wheatstone LNG	29000	5500	400
Gorgon Joint Venture Gas Processing Project	52000	6250	300
Woodside Energy – Greater Western Flank Phase 1	2500	n/a	n/a
Woodside Energy – North Rankin Redevelopment	5000	n/a	n/a
Sub Total	90000	12450	714
Other			
AngloGold Ashanti/Independence Group – Tropicana Gold Project	700	700	400
Ashburton North Strategic Industrial Area	n/a	n/a	n/a
CSBP – Kwinana Ammonium Nitrate Facility Expansion	550	300	10
Newmont Boddington Gold Pty Ltd – Boddington Gold Mine	n/a	n/a	650
Ord East Kimberley Expansion Project	517	761	n/a
Perdaman Chemicals & Fertilisers – Coal-to-Urea Plant	3500	2000	200
Yara International ASA – Yara Pilbara Nitrates	600	600	65
Sub Total	5867	4361	1325
TOTAL	135217	39011	13109



## Northwest Shelf / Pilbara Region

Larsen Deep  Noblige  
Larsen  Larsen



Data for offshore Commonwealth-controlled waters is up-to-date as of June 2012. Enquiries for latest information for Commonwealth-controlled waters is available from National Offshore Petroleum Titles Administrator (NOPTA) at <[info@nopla.gov.au](mailto:info@nopla.gov.au)>

# Major Resource Projects — December 2013



## Project labels:

PROJECTS OPERATING OR CURRENTLY UNDER DEVELOPMENT WITH AN ACTUAL OR ANTICIPATED VALUE OF PRODUCTION GREATER THAN \$A10 MILLION ARE SHOWN IN BLUE  
 PROPOSED OR POTENTIAL PROJECTS WITH A CAPITAL EXPENDITURE GREATER THAN \$A20 MILLION ARE SHOWN IN RED  
 PROJECTS UNDER CARE AND MAINTENANCE ARE SHOWN IN PURPLE

Data for offshore Commonwealth-controlled waters is up-to-date as of June 2012.  
 Enquiries for latest information for Commonwealth-controlled waters is available from National Offshore Petroleum Titles Administrator (NOPTA) at <info@nopota.gov.au>

