

PROSPECT

WESTERN AUSTRALIA'S INTERNATIONAL RESOURCES DEVELOPMENT MAGAZINE June - August 2008 \$3 (inc GST)

Ravensthorpe Nickel

BHP Billiton project opens
on south coast

Resources education

Partnerships formed for
industry's future



DEPARTMENT OF INDUSTRY AND RESOURCES**Investment Services**

1 Adelaide Terrace
 East Perth, Western Australia 6004
 Tel: +61 8 9222 3333 • Fax: +61 8 9222 3862
 Email: investment@doir.wa.gov.au
 www.doir.wa.gov.au

INTERNATIONAL OFFICES**Europe**

European Office • 5th floor, Australia Centre
 Corner of Strand and Melbourne Place
 London WC2B 4LG • UNITED KINGDOM
 Tel: +44 20 7240 2881 • Fax: +44 20 7240 6637
 Email: europe@wago.co.uk

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
 Email: middleeastindia@doir.wa.gov.au

India — Chennai

Western Australian Trade Office - Advisory Office
 1 Doshi Regency • 876 Poonamallee High Road
 Kilpauk • Chennai 600 084 • INDIA
 Tel: +91 44 2640 0407 • Fax: +91 44 2643 0064
 Email: middleeastindia@doir.wa.gov.au

Indonesia — Jakarta

Western Australia Trade Office
 Wisma Budi Building Floor 5 Suite 504
 Jl H R Rasuna Said Kav C-6
 Kuningan, Jakarta 12940 • INDONESIA
 Tel: +62 21 5290 2860 • Fax: +62 21 5296 2722
 Email: southeastasia@doir.wa.gov.au

Japan — Tokyo

Government of Western Australia, Tokyo Office
 13th floor, Fukoku Seimei Building
 2-2-2 Uchisaiwai-cho Chiyoda-ku • TOKYO 100-0011 • JAPAN
 Tel: +81 3 5157 8281 • Fax: +81 3 5157 8286
 Email: japankorea@wajapan.net

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
 Email: japankorea@wajapan.net

Malaysia — Kuala Lumpur

Western Australian Trade Office
 4th floor, UBN Tower • 10 Jalan P Ramlee
 KUALA LUMPUR 50250 • MALAYSIA
 Tel: +60 3 2031 8175/6 • Fax: +60 3 2031 8177
 Email: southeastasia@doir.wa.gov.au

Middle East — Dubai

Western Australian Trade Office • Emarat Atrium
 PO Box 58007 • Dubai • UNITED ARAB EMIRATES
 Tel: +971 4 343 3226 • Fax: +971 4 343 3238
 Email: middleeastindia@wato.ae

People's Republic of China — Shanghai

Western Australian Trade & Investment Promotion
 Room 2208 • CITIC Square
 1168 Nanjing Road West
 SHANGHAI 20004 • PEOPLES REPUBLIC OF CHINA
 Tel: +86 21 5292 5899 • Fax: +86 21 5292 5889
 Email: china@doir.wa.gov.au

People's Republic of China — Hangzhou

Western Australian Trade & Investment Promotion
 Hangzhou Representative Office
 Room 1705 • World Trade Office Plaza
 Zhejiang World Trade Centre
 122 Shuguang Road • Hangzhou 310007
 PEOPLES REPUBLIC OF CHINA
 Tel: +86 571 8795 0296 • Fax: +86 571 8795 0295
 Email: china@doir.wa.gov.au

South Korea — Seoul

Western Australian Trade & Investment Office
 11th floor, Kyobo Building
 1 Jongro 1-Ga, Jongro-Gu Seoul 110-714 • SOUTH KOREA
 Tel: +82 2 722 1217 • Fax: +82 2 722 1218
 Email: japankorea@doir.wa.gov.au

Taiwan — Taipei

Australian Commerce & Industry Office
 27th floor, No 9 Song Gao Road, Taipei, 11073 • TAIWAN
 Tel: +886 2 8780 9118 ext 216 • Fax: +886 2 2757 6707
 Email: bruce.richardson@doir.wa.gov.au

Hong Kong

Australian Trade Commission
 Hong Kong Office Rm. 2404, 24/F., Harbour Centre
 25 Harbour Road, Wan Chai • HONG KONG
 Tel: +852 2588 5300 • Fax: +852 2827 4145
 Email: china@doir.wa.gov.au

Thailand — Bangkok

WA Business Development Manager
 Australian Trade Commission • Australian Embassy
 37 South Sathorn Road • Bangkok 10120 • THAILAND
 Tel: +662 344 6337 • Fax: +662 344 6306
 Email: southeastasia@doir.wa.gov.au

United States — Los Angeles

Western Australian Trade and Investment Office
 Howard Hughes Centre, 6080 Centre Drive, 6th Floor
 Los Angeles, CA 90045 • USA
 Tel: +1 5625924342
 Email: usa@doir.wa.gov.au



Facing up to the challenges

It seems strange to talk of the challenges facing the Western Australian resources industry when the sales value of minerals and petroleum from the State jumped 7 per cent last year to A\$53.1 billion, and spending on exploration for new resources was a record at more than A\$3 billion.

The fact of the matter remains though, that the industry's incredible growth has been constrained by obstacles that will only be overcome with a coordinated and innovative effort from industry, government and the community.

BHP Billiton's US\$2.1 billion Ravensthorpe Nickel project, which opened in May, provides a prime example of how these stakeholders can combine to achieve significant outcomes for Western Australia.

Central to the project's delivery was BHP Billiton and the State and Federal Governments committing close to A\$40 million for infrastructure to accommodate more than 600 new workers and their families in the Shire of Ravensthorpe.

This month's edition of *Prospect* also reveals how the resources industry is attempting to arrest its skills shortage by working with the education sector.

One person who had a significant impact on the success we are now enjoying in the industry was former Department of Industry and Resources Director General Jim Limerick, who stood down in March this year after more than 20 years at the department.

Jim presided over the biggest economic boom in this State's history and made an immense contribution to maintaining economic prosperity for all Western Australians.

Stuart Smith

ACTING DIRECTOR GENERAL

Prospect

Western Australian *Prospect* magazine is published quarterly by the Western Australian Government's Department of Industry and Resources (DoIR).
 Editorial management: James Bowen, DoIR Communications and Marketing Division. Tel: (08) 9222 3804 • Fax: (08) 9222 3069

Disclaimer

Prospect has been compiled in good faith by the Department of Industry and Resources. Opinions expressed in *Prospect* are those of the authors and do not necessarily represent the views, or have the endorsement of the Department of Industry and Resources. The Department of Industry and Resources 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. The Department of Industry and Resources 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: BHP Billiton's US\$2.1 billion nickel mine transforms the Shire of Ravensthorpe



Department of
Industry and Resources

www.doir.wa.gov.au

IN THIS ISSUE

2-3 **Ravensthorpe unveiled**



BHP Billiton's US\$2.1 billion nickel mine transforms the Shire of Ravensthorpe

10-11 **Back to school**



Education is the key as resources industry faces up to challenges

6 **Overseas opportunities**



Staff in 15 overseas offices busily promote Western Australia's abundant trade opportunities

24-25 **Sound science**



Cockburn Sound Management Council achieves environmental outcomes for industry and community

8-9 **Golden prices**



Emerging projects could cash in as world gold price reaches US\$1000 an ounce

27 **Acres of potential**



New Commonwealth and State petroleum acreage increases opportunities for explorers

Hi-tech minerals

Western Australian minerals used to make mobile phones and electric cars.

For more information turn to page 16



Ravensthorpe on world stage as nickel project opens

The transformation of Western Australia's Shire of Ravensthorpe from sleepy farming district to prosperous mining hub is complete following the opening of BHP Billiton US\$2.1 billion Ravensthorpe Nickel project near Hopetoun in May.

Senior BHP Billiton executives, State and Federal politicians, mine constructors and customers, and the world media flocked to the picturesque south-east coast region to witness the culmination of eight years of work by the company and three tiers of Australian government.

The Ravensthorpe Nickel project is expected to produce about 50,000 tonnes of nickel and 1400 tonnes of cobalt per annum over its 25-year lifespan. It accounts for a large proportion of Western Australia's nickel resources, which total 27 million tonnes - the third largest in the world.

Immense benefits are expected to flow from the project due to the incredibly strong global nickel price. The value of nickel sales from Western Australia climbed 19 per cent in 2007 to be worth A\$7 billion, despite the sales quantity actually falling.

The project will have a locally based workforce of 650 employees in the long-term, with more than 300 associated families already established in the Shire of Ravensthorpe and nearby Shire of Esperance. More than 450 families are expected to call the region home by the second half of this year.

It accounts for a large proportion of Western Australia's nickel resources, which total 27 million tonnes - the third largest in the world.

Ford Murray of BHP Billiton Nickel West said the Ravensthorpe project had been delivered with 80 per cent Australian content, 70 per cent Western Australian content and 9 per cent of its budget spent in the south-east region.

"Integrating a resources industry operation within an agricultural district has raised the overall income of the district, deepened existing community capacity and built new community capacity," Mr Murray said.

He said the project had represented a new level of partnership with government through the establishment of a locally based workforce, and community development.

"We have learnt that physical infrastructure is one aspect and the delivery of social infrastructure and community amenity is equally important," he said.

This new social infrastructure included improved child care, sports and recreation, medical, police and youth services facilities.

Mr Murray said the project had also further developed nickel laterite technology in Western Australia and enhanced the State's already sound reputation for mineral processing knowledge and technology.

Western Australian Premier Alan Carpenter, who attended the Ravensthorpe opening, congratulated all parties involved in getting such a major project off the ground.

"A historic 2004 agreement saw the State Government contribute A\$18 million, the Federal Government A\$9.8 million and BHP Billiton A\$9.5 million to the development of multi-user infrastructure in the Shire of Ravensthorpe," Mr Carpenter said.

"The successful opening of this project is as much about the development of regional Western Australian communities as it is about the State's buoyant resources industry."

The nickel mined at Ravensthorpe will be transported for processing at BHP Billiton's Yabulu refinery in Queensland, which has also received a A\$587 million upgrade, making the combined Ravensthorpe Nickel project the biggest one-off investment in the mining company's history.

From Yabulu, the nickel will be shipped to important foreign markets such as China, but for now all eyes are on Ravensthorpe.

Thanks to the massive capital and population influx, the Shire is currently one of the fastest growing local government areas in Australia. Between the Australian censuses of 2001 and 2006, its population increased from 1420 to 1950 and is currently estimated at more than 2500.

In contrast to the fly-in, fly-out operations used elsewhere in the Western Australian resources industry, workers and their families have readily established homes in Hopetoun.

The area offers immense lifestyle opportunities due to its coastal location, mild climate and proximity to Fitzgerald River National Park, while workers still earn the same attractive rates of pay enjoyed by their counterparts in the Pilbara and other mining areas.

Shire of Ravensthorpe President Brenda Tilbrook said prior to the nickel project getting off the ground, Ravensthorpe suffered the same problems as any other regional Australian shire, including a dwindling population and a lack of infrastructure.

"Because of BHP Billiton setting up down here we've had more people coming to town, we've had new jobs created. And because of that there's been a new school built in Hopetoun to service the families that are moving there," she said.

Middle school facilities at Esperance Senior High School have also been upgraded with State funding, as has Vocational and Educational Training at Ravensthorpe District High School.

The region's age demographic is also benefiting with the influx of young

Extensive housing and amenities have been created at Hopetoun to house the Ravensthorpe Nickel workforce.



singles, couples and families. And the greater employment opportunities and amenities being created are expected to help locals in the 15-25 age range resist the lure of the city.

Ms Tilbrook said it was very important from a regional development point of view for the project's workforce to be based in the Shire of Ravensthorpe.

"If they're fly-in, fly-out then there's no real benefit for us... a lot of the workers who do that in the Pilbara would never even see the towns near them. If it weren't for the residential workers we wouldn't have the new school, we wouldn't have the new infrastructure, or the other money being spent in the Shire," she said.

Inevitable infrastructure gaps associated with the incredible growth of the Ravensthorpe region have seen some workers still commute from Perth and Esperance, but the bulk of the workforce should be settled in Hopetoun by mid-2009.

Mr Carpenter said the State Government had identified the infrastructure pressures confronting Hopetoun as an important opportunity to explore alternative energy, water and wastewater solutions.

- Investment in Western Australia is worth US\$2.1 billion
- Investment in Yabulu refinery in Queensland is worth US\$587 million
- The biggest single investment in BHP Billiton's history
- Will produce about 50,000 tonnes of nickel and 1400 tonnes of cobalt per annum over 25 years
- A workforce of 650 has been created in the south-east of Western Australia
- The State Government contributed A\$18 million, the Federal Government A\$9.8 million and BHP Billiton A\$9.5 million to shared infrastructure

"The State Government and BHP Billiton have commissioned Landcorp to lead a study to establish an innovative infrastructure solution for Hopetoun and a powerful decision making tool to help solve infrastructure problems in other regional towns across Western Australia," he said.

Ravensthorpe Nickel is also delivering important outcomes for indigenous

Australians, who currently make up about 4 per cent of the project workforce.

An Indigenous Participation Strategy developed by BHP Billiton will use the nickel project as a key plank in efforts to deliver lasting social and economic development for indigenous communities in the Goldfields and south-east region of Western Australia. ■



The Ravensthorpe Nickel project has transformed the town of Hopetoun and surrounding Shire of Ravensthorpe.

What's in a name?

Tatiana Govorina, Department of Industry and Resources

Rio Tinto Iron Ore mine surveyor Nathan Daams led efforts to recognise the traditional names of geographic features near the company's West Angelas mine.



Miners at West Angelas are surrounded by ancient geographic features that now officially bear their traditional indigenous names.

Western Australian history is being created with the recognition of traditional Aboriginal names for geographic features that are located near the State's mining sites.

The Western Australian Geographic Naming Committee has established policy guidelines for dual naming of hills, rivers and other features in recognition of a growing local government awareness of traditional place names.

The move brings Western Australia into line with other Australian States and will ensure Aboriginal names are properly recognised as a fundamental part of Western Australia's heritage.

The committee has been working on the implementation of this initiative with Landgate, the statutory authority responsible for Western Australia's land and property information. Together they have been raising awareness of the traditional names of land features that currently have well known European names.

Where possible, community support is gauged for proposals to completely replace European names with indigenous names.

The project has been adopted by a mine surveyor employed in the Pilbara region. In early 2007 Nathan Daams, who works for Rio Tinto Iron Ore, approached the WA Geographic Names Committee for help in identifying the traditional names of hills and ranges near the company's West Angelas mine. This led to contact between Mr Daams and the elders of the area's traditional owners, the Gobawarra Minduarra Yinhawanga people.

After successfully identifying several names, Mr Daams completed the approvals process with the committee to have the names registered.

Gobawarra Minduarra Yinhawanga Aboriginal Corporation chairman Roy Tommy said the naming of geographic features provided a symbol of the traditional ownership of the region surrounding West Angelas.

"To have geographical features named on behalf of our community is greatly appreciated because these names are now a permanent part of our culture," Mr Tommy said.

A 60 kilometre stretch of hills south of the West Angelas mine site was

subsequently named the Gurinbiddy Range. And Mt Ella, which was originally named after the wife of a pioneering geologist, has been given the traditional name of Gujuwana.

At the south end of the Gurinbiddy Range, a culturally significant landmark has been named Bibi Thaloo Hill and a smaller range to the north has been called the Goondoowandoo Range.

Mr Daams said the traditional naming of geographical features was one of the best ways to express the appreciation for the use of traditional land by the resources industry.

"Indigenous names for geographical features help to maintain ongoing strong cultural relationships with the indigenous community," he said.

"Not only is indigenous feature naming beneficial to mining companies and the local community, it is also a personal achievement knowing that you have contributed to a part of history that will stand for years to come."

West Angelas surveyors are now looking forward to working closely with Landgate to help educate other mining employees about how indigenous naming works. ■

Remote mining opens up



Imagine you are a pit or plant controller, overseeing open pit mining operations in a remote outback region of Western Australia. Financially it is very rewarding, your employer provides meals and accommodation, and when you're rostered off you can fly home.

But on the downside, it can be isolated, the days are long and hot, the work can be dirty and noisy and the fly-in, fly-out arrangement means you can spend weeks on end away from home.

Now visualise a situation where you do the same job from the city with the aid of remote control technology.

The oil and gas sector already uses remote control technology, as do underground mining companies. Now it's the open pit industry's turn and, while much of the technology is relatively well-known, it's the application that's breaking new ground.

Rio Tinto has already trialled the concept at its East Pilbara Remote Operations Centre (ROC) based in Perth. The operation is staffed by about 30 people and its success has demonstrated that remote control technology could be the way of the future.

Rio Tinto is now establishing a 350 person-plus ROC within the Perth Airport precinct. The facility will manage mining operations that are a 17-hour drive away in the northern Pilbara region.

"The ROC will consist of pit and plant controllers across our 11 mines; all controllers across two ports; aspects of mine planning and mine maintenance; port and rail schedulers; rail controllers; along with key operational planning, logistics and support roles," said Rio Tinto ROC Integration Manager Andy Duffield.

Mr Duffield has worked for Rio Tinto for 28 years in a wide variety of roles, which he said gave him a strong understanding of the vital links between each important function that would be undertaken at the Perth ROC.

"We know there will be many synergies as a result of working under one roof. Our people will be able to make quicker, better informed decisions and collaborate more," he said.

By removing the need for some workers to fly-in, fly-out, the company expects greater ease in hiring and retaining staff in the highly-competitive labour market.

In addition, building a house in the Pilbara region currently costs about A\$750,000 so re-locating a variety of roles in Perth should have a healthy impact on Rio Tinto's bottom line.

The company is quick to point out that there will always be a need for a significant number of people on-site, because many roles can only be effectively managed in a hands-on manner.

Rio Tinto is the first company in Australia to adopt this approach on such a large scale and it is confident this method will define the mine of the future. ■



An artist's impression of Rio Tinto's remote operations centre near Perth Airport, which will house 350 staff managing operations in the distant Pilbara.

Western Australia benefits as *overseas network* diversifies

The current prosperity enjoyed by Western Australia has been assisted by staff working in 15 overseas offices spreading the word about the State's trade and investment opportunities.

Operated by the Western Australian Government Overseas Network (WAGON), the offices are an extension of the International Market Development Division (IMDD) of the Department of Industry and Resources (DoIR).

Designed to stimulate economic growth, the WAGON network facilitates exports and investment by promoting Western Australia internationally.

IMDD Director Steve Arnott said the WAGON offices were a strategic delivery point for government programs, assisting with the development of new and existing industry opportunities in local and global marketplaces.

"The services provided by the WAGON offices range from supporting small-to-medium-sized business through to larger organisations in Western Australia. The network also supports Western Australian Government ministers when they travel overseas," Mr Arnott said.

"In providing these services, DoIR often plays a coordinating role for other government departments, including the Department of Agriculture and Food, the Small Business Development Corporation and Tourism Western Australia. IMDD manage the mechanism

that delivers their product into those markets."

One office is located in each of Hong Kong, Indonesia, Malaysia, the United Arab Emirates, the United States of America, South Korea, Taiwan and Thailand; while Japan, China and India have two offices each, and the London office also manages trade and investment opportunities throughout Europe.

Each office is different and the services delivered are tailored to specific demands and opportunities available within the country they service.

The huge Chinese demand for commodities, such as iron ore and nickel, ensures there is a large emphasis on resources in the Shanghai and Hangzhou offices.

Reflecting the Western Australian Government's dedication to diversification, these China offices also represent education, agriculture, small business development, skilled migration and tourism, in addition to emerging industries.

China office Regional Director BJ Zhuang said the office, established in 1994, helped Western Australian exporters gain entry into the Chinese market and Chinese companies to invest in Western Australia.

Mr Zhuang said it was critically important that Western Australian companies were well prepared before entering an export market.

"DoIR and relevant Western Australian agencies can assist exporters in this regard," Mr Zhuang said.

Various models of delivery are employed by WAGON depending upon the characteristics of the market. These include stand-alone offices managed by IMDD, others operated by the Department of Premier and Cabinet and a third group operated by IMDD in conjunction with national trade promotion body Austrade.

Mr Arnott said Western Australia provided 34 per cent of Australia's export income and WAGON representatives were extremely helpful in promoting trade and investment opportunities for Western Australia.

Companies needed to have an internationally competitive product or service and sufficient financial and human resources committed to developing a presence over several years, he said.

Trade highlights facilitated by WAGON offices include the establishment of a A\$25 billion liquefied natural gas supply deal with China and Indian investment in the A\$630 million Burrup Fertilisers project.

The overseas offices have also assisted the creation of a Western Australian presence for many international companies. The Los Angeles-based US office for example, helped on-line game developer Interzone set up a studio in Perth and music producer RookPark establish a scoring and mixing facility. ■



Collie coal suitable for low emission energy

Marta Sabinasz, Department of Industry and Resources



Resources Minister Francis Logan and Coal Futures Group chairman Mick Murray (centre) were presented with the findings of the coal gasification study by members of the CSIRO, CCSD and Coal Futures Group.

Coal mined at Collie in the South West of Western Australia has been identified as one of the more suitable Australian coals for gasification, enabling low emission power generation when combined with carbon capture and storage options such as geosequestration.

Coal gasification uses oxygen at high pressures to break coal into several components, such as hydrogen and carbon monoxide, which can be used as a fuel. It offers a versatile and clean way to convert coal into electricity and other valuable energy and chemical products.

These findings came from gasification research that was undertaken at the Siemens Gasification Test Facility in Freiberg, Germany, by the Cooperative Research Centre for Coal in Sustainable Development (CCSD) with the participation of the CSIRO Energy Technology in Brisbane.

CCSD's research aims to address the coal and power industries' needs, to better understand the suitability and performance of Australian coals for use in emerging power generation technologies based on gasification. It also aims to develop enabling technologies for coal

gasification systems and to facilitate their introduction and deployment in Australia.

As part of the program, CCSD, through CSIRO, trialled four Australian thermal coals at the Siemens facility. There are no facilities in Australia for pilot scale testing of coals.

Furthermore, prior to the recent program conducted in Germany, there were no accessible gasification performance data for Australian black coals in any pilot or full scale gasification systems.

For the first time, these trials allowed practical-scale gasification performance data for a well-characterised suite of Australian black coals to be measured.

CCSD Chief Executive Officer Frank van Schagen said the gasification trials were very significant for Australia's coal future.

"Understanding coal performance in advanced power generation technologies is becoming increasingly important as the coal industry moves towards trading in new and emerging markets," Mr van Schagen said.

"Australia now has a world-class centre of gasification research capability, which works closely with international

research and technology development organisations.

"We appreciate the contribution of all our sponsors, but in particular we congratulate the Coal Futures Group and Verve Energy, who recognised the potential of Collie coal to lead in the development of new technologies."

Chairman of the Coal Futures Group Mick Murray said Collie was poised for an exciting future.

"This study proves that we can meet the world's large and ever increasing energy demand, while capitalising on Collie's natural resources in an environmentally friendly way," he said.

"The use of clean coal technology ensures everyone wins."

Western Australian Industry and Enterprise Minister Francis Logan said the study allowed the State to progress with its commitment to look at clean coal technology as one of its power generation methods.

"The initiative of Collie-Wellington MLA Mick Murray and the Coal Futures Group in funding this research will benefit Collie and Western Australia for many years to come," Mr Logan said.

For more information on the gasification study on Collie coal please visit

www.ccsd.biz ■

The price is right for gold



The Boddington Gold Mine is expanding and production is expected to start at the end of 2008 or the beginning of 2009.

With the world gold price topping US\$1000 an ounce for the first time this year and remaining close to that historical high, a number of Western Australian projects are poised to cash in on the resurgent metal.

The price of gold has climbed as investors have sought shelter from volatile global stock and credit markets and a weakened US dollar.

Recent Australian Bureau of Statistics data show this investment interest could be having an impact on Western Australian gold exploration expenditure.

In the December quarter A\$85.8 million was spent looking for gold in the State, which was a 12 per cent increase on the September 2007 figure and one of the biggest quarterly increases of the past five years.

Gold exploration activity is beginning to emerge from the shadows of the glamour commodities of recent years – iron ore and nickel.

Opinions about the longevity of prices vary but most analysts agree the gold sector's short-term prospects are strong.

Speaking at the 2008 Paydirt Gold Conference in April, Westpac Institutional Bank senior economist Justin Smirk said he expected gold to outperform other resources commodities in the near term, averaging about US\$938 in the next year and climbing to a US\$1023 average during 2009.

With this in mind the timing of several emerging projects in Western Australia could be ideal.

The development of AngloGold Ashanti and Independence Group's Tropicana joint venture north-east of Kalgoorlie, considered the most significant gold discovery in Western Australia for at least 10 years, has sparked new interest in the sector and revived the possibility of additional greenfields discoveries.

The mine has an expected 10-year lifespan and is scheduled for completion in 2010, so it is hoped the high prices will continue for some time to come.

The Boddington Gold Mine expansion, being developed by Newmont and AngloGold Ashanti in the State's South West, is expected to start production at the end of this year or the beginning of 2009.

With total gold reserves of 16 million ounces, the project partners expect the mine will produce about one million ounces a year during its first five years of operation.

Newmont claims to be the world's largest unhedged gold producer, which it says gives it full exposure to rising gold prices, and has placed heavy emphasis on securing financial resources to invest in key projects such as Boddington.

Newmont Asia Pacific Vice President Brian Hill said he expected the gold price to remain strong.

"The fundamentals supporting a strong gold price remain intact, including a weakened US dollar, inflationary pressure, rising energy costs and an increased demand for gold as a hedge against inflation and the devaluation of the US dollar," he said.

To meet the challenges posed by rising gold demand, Newmont intends to invest between US\$220 million and US\$230 million on global exploration in 2008.

The new A\$77 million Trident underground gold mine of emerging gold producer Avoca Resources, located at Higginsville in the south-eastern Goldfields, is expected to be commissioned even sooner than Boddington, most likely in mid-2008.

Mine construction passed the 80 per cent mark in April and Avoca expected to have in excess of 150,000 tonnes of ore stockpiled by the time of plant commissioning.

Avoca managing director Rohan Williams said the company would initially focus on bringing the large high-grade stopes in Trident's Western Zone into production, with a production rate target of about one million tonnes per annum.

"Our target is for a maiden full year production in financial year 2009 of 170,000 ounces of gold increasing then to 190,000 per annum for a minimum 10-year mine life," Mr Williams said.

He said Avoca was well exposed to the current strong gold price environment, with current cash costs for Trident estimated at about A\$369 an ounce, the commissioning process on budget and no forward hedging in place.

"We expect gold prices to remain strong in the medium-to-long term due to inflationary pressures and corresponding investment demand in gold, as well as the growth of consumer incomes in developing economies," Mr Williams said.

Avoca has tipped the Higginsville region to emerge as a major new gold production centre.

Joining Tropicana, another significant new greenfields development in Western Australia in recent years has been Integra Resources' Salt Creek deposit, which is part of its Aldiss-Randalls gold project.

Integra announced in April that at Salt Creek it had received the biggest drill intercept to date of 78 metres at 5.77 grams of gold per tonne. The Salt Creek deposit was discovered in May 2007 and the company had rapidly advanced within a year to an initial resource estimate that contains a quarter of a million ounces of gold.

Integra consulting geologist Greg Wilson said that dependent on the results of a feasibility study, due to be completed towards the end of this year, Salt Creek may be operational by late 2009.

Mr Wilson said it was significant that new gold discoveries continued to be made in Western Australia.

"Any greenfields discovery is important for the gold sector, Salt Creek in particular (is important) as it is only 65 km from Kalgoorlie," he said.

Integra is putting its faith in analysts who predict a strong gold price for some time to come, but Mr Wilson said this still might not be enough to offset the increasing cost of labour and equipment affecting the industry.

Meanwhile, another Western Australian-focused gold miner, St Barbara, has set its sights on producing one million ounces of gold by 2010 following its acquisition of a suite of underground and open pit operations at Leonora from former gold miner Sons of Gwalia in 2003.

Ramelius Resources also recommenced mining at its Wattle Dam gold mine near Coolgardie in late April after the previous pit limit was reached in October last year. The company expects production of 70,000 ounces during 2008-09.

Western Australian Department of Industry and Resources Commodity Analyst, Don Flint, said gold was following a typical commodity cycle of a price increase leading to increased exploration expenditure and increased production, albeit with a slight time lag.

Mr Flint said Western Australia had historically been regarded as Australia's "Golden State", and production increased enormously during the past 20 years from about 353,000 ounces in 1977 to a peak of 8.5 million ounces in 1997.

But this had declined to about 5.4 million ounces by 2007.

"It is to be hoped that gold production will substantially increase again with these major developments," Mr Flint said. ■

The price of gold

- The world gold price reached US\$1000 an ounce in March this year
- Has now cooled to about US\$900 an ounce
- Tipped to climb above US\$1000 again in 2009

A sample from Avoca Resources' Trident gold mine, which the company expects will eventually produce 190,000 ounces of gold per annum.

Resources industry goes *back to school*

The education sector is becoming a key partner as the Western Australian resources industry faces up to the challenges associated with its incredible growth.

Increasing international demand and prices for commodities such as petroleum, iron ore and nickel have created unprecedented economic conditions in the State. Unemployment is hovering around 3 per cent and gross state product is forecast to grow by 4.5 per cent in 2007-08.

But obstacles, chiefly a lack of workers at all levels, have stopped the mining and petroleum sectors from realising their full potential and could hamper efforts to create a strong economic base to follow the end of the resources boom.

The Federally commissioned *Labour Force Outlook in the Minerals Resources Sector: 2005 to 2015* report, indicates that Western Australia needs at least 42,000 more employees by 2015 to achieve predicted output increases in that time.

The need to maintain a solid research base with so much attention focused on current projects and so many researchers joining the private sector, is also paramount.

Collaboration between the Western Australian resources and educational sectors is nothing new. The Western Australian School of Mines (WASM), now administered by Curtin University of Technology, has been in operation in the Goldfields region since 1902.

But a greater sense of urgency has seen more and more specialised cooperation, often supported by the State Government's Department of Industry and Resources (DoIR) and Department of Education and Training.

Global miner Rio Tinto for example, has recently formed a A\$10.5 million partnership with Curtin to develop a Centre for Materials and Sensing in Mining.

The centre will be based at the university's Bentley campus and is hoped to be a magnet for talented scientists and engineers working to enhance the company's advanced mining systems.

Rio Tinto Iron Ore chief executive Sam Walsh said the partnership was exciting from practical and commercial perspectives.

"Its main work will be in development, testing and deployment of technologies with specific application to Rio Tinto's operations," Mr Walsh said.

These included open pit mining and associated transport efficiency issues.

Curtin Dean of Graduate Studies Graeme Wright, from the Office of Research and Development, said the partnership was one of many between Curtin and resources companies.

A memorandum of understanding (MoU) with BHP Billiton sees Curtin identify issues likely to affect the company's effective operation and develop solutions accordingly.

Mr Wright said regional education was a major priority for both partners. Curtin is the largest provider of tertiary education in regional Western Australia and operates four campuses outside Perth including WASM at Kalgoorlie. It also has Centres for Regional Education in locations such as Karratha and Port Hedland.

"A lot of the work with BHP is designed to reinforce that regional activity, because they see it as a key driver of their ability to attract and retain quality workers. Where you have local provision of adequate education and students can stay in the same area as their family, it counts towards arresting that turnover and churn of staff," Mr Wright said.

Curtin is currently building a A\$113 million resources and chemistry precinct that it expects will be completed in 2009.

Western Australia's other major universities have also been active in supporting the mining and petroleum sectors.

In April this year the University of Western Australia partnered oil and gas giant Chevron in a A\$6.9 million program that will fund a Chair in Natural Gas Process Engineering, two postdoctoral appointments and two PhD scholarships.

In the process, UWA became the only Australian university to participate in Chevron's University Partnership Program, joining such institutions as Stanford College and Texas A&M University in the United States, and the United Kingdom's Imperial College, London.

Chevron Australia Managing Director Roy Krzywosinski praised the new partnership.

"The University Partnership Program will strengthen the work of Chevron's Global Technology Centre in Perth and our involvement with the Western Australian Energy Research Alliance by identifying new ideas and research and development opportunities to discover and develop gas resources for domestic and international markets," he said.

Curtin and UWA, along with Murdoch University, are members of the Minerals Institute, an initiative of DoIR and the Chamber of Minerals and Energy of Western Australia (CME), to promote and improve the delivery of minerals tertiary education in Western Australia and achieve a suitably skilled industry workforce.

The initiative is in the fourth and final year of its current program and executive officer Claire Thomas said renewal may entail a change in direction.

"The original focus of the institute was on undergraduate studies and linking that to research and development, but we're not sure that's the best model going forward," Ms Thomas said.

"We want to ensure the WA mining industry can compete on a global scale through encouraging robust research and more PhD students to look at completing work in this area."

As its work with the institute attests, the CME is one of the most active bodies



The Western Australian School of Mines was established in Coolgardie in 1902 before being relocated to its present home in Kalgoorlie the following year.

in attempting to close the skills gaps affecting the mining and petroleum sectors and recently signed an MoU with Curtin for this purpose.

CME's People for the Future executive officer Tanya Cecconi said topics already discussed included the creation of a summer school to provide indigenous people with exposure to the resources industry.

"We're also looking at immigration policy, with a particular focus on attracting international students. We're looking at ways of attracting more international students to the resources field and ways of keeping them here," Ms Cecconi said.

While tertiary sector efforts will train more individuals to fill high-end positions in fields such as engineering and metallurgy, and create a better overall standard of research, it is at the secondary and vocational education level

that many of the most desperate trade skills shortages are being addressed.

The Australian Technical College in the Pilbara operates from campuses in Port Hedland, Karratha and Roeburne and counts Rio Tinto, BHP Billiton and oil and gas companies Chevron and Woodside as college sponsors.

The college was one of 25 technical colleges created by Australia's previous Coalition Government to offer school-based apprenticeships in the fields of metal and engineering, construction, automotive, electrotechnology and commercial cookery.

That scope has been broadened under the new Labor Government to include plant process, childcare and other critically understaffed professions in the resources industry.

"We work very closely with industry to identify what their needs are and to create an appropriate program to suit

those needs," College chief executive Nancy Rees said.

"There are currently more heads than we know what to do with, we've actually got a waiting list to get into the program, so it's clearly working."

The college has a strong focus on creating indigenous employment opportunities, and Ms Rees is proud of her team's achievement in this respect. Half of the students at Port Hedland are indigenous, as are a quarter of the college's total staff.

These programs are just the tip of the iceberg when it comes to educating the resources industry. Close to 10 per cent of the Department of Education and Training's total public delivery is devoted to the industry and many new initiatives are likely to flow on from planning undertaken by the State Training Board's Resources Sector Committee for the 2008-2015 period. ■



Curtin University's A\$113 million resources and chemistry precinct is expected to be completed by 2009. (image courtesy of Woods Bagot)

Newman school mines town strengths

The town of Newman in Western Australia's Pilbara region was created in the 1960s to service the iron ore sector and is now home to a pioneering school program that builds on its history and strengths.

Newman Senior High School has this year accepted the inaugural intake for its mining academy - the first of its kind in the State and the result of a A\$3 million partnership formed in 2005 between the school, BHP Billiton and the Western Australian Department of Education and Training.

The academy offers a specialised curriculum for students who want to complete an apprenticeship or tertiary education in the mining industry, and offers courses in engineering, applied information technology, earth and environmental science, and mechanics.

All subjects are Western Australian Curriculum Council approved, but are specifically tailored towards a mining career. This includes English that focuses on the marketing of the sector, and maths that is relevant to either high-end engineering or trade applications.

School Principal Michael Morgan said the academy was sparked by a desire to capitalise on what Newman had to offer students, to build on the opportunities provided by the Western Australian mining boom, and to address skills shortages.

"We've got groups of kids here who have grown up with mining, who have

a mining background in their blood and we thought why don't we foster something that will allow them to pursue that?" Mr Morgan said.

Despite the school's arrangement with BHP Billiton, the academy is designed to benefit the mining industry as a whole, and other partnerships have already been formed with equipment provider Westrac and engineering firms Macmahon and HWE.

The program was only offered to Year 10 students this year but will be expanded to Year 11 and 12 by 2010. About 30 per cent of students enrolled in the academy are female and 20 per cent are indigenous.

Applicants were required to submit an application and attend an interview panel of industry and education representatives before being accepted.

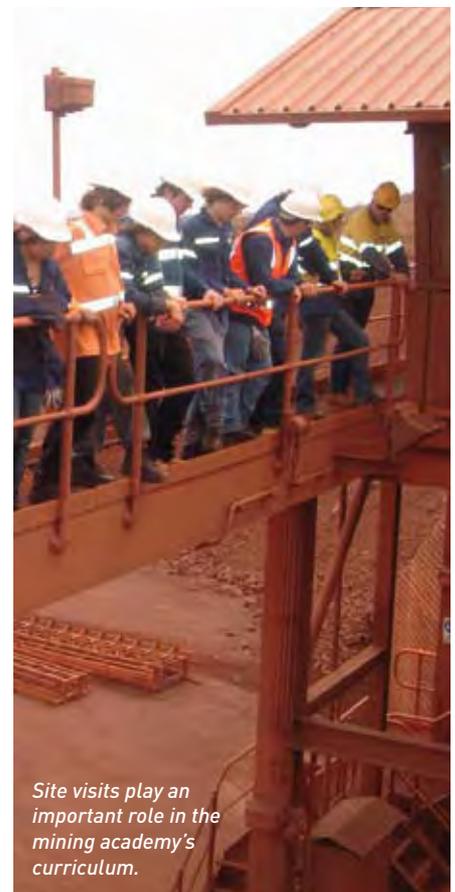
Mr Morgan said the opportunities provided by the academy were exceptional, including access to 10 sites at BHP Billiton's Mount Whaleback operations.

"We've even got access to mining simulators. If you're a Year 10 student and suddenly you're on a mining simulator then it's really putting you ahead of the pack - I don't think there'd be anyone in Perth who'd have that chance," he said.

He said the academy could play an important role in increasing skills in fields such as engineering and environmental science, and help to

reduce reliance on the 457 visa system for importing foreign workers to Australia.

"If you can fill a position with someone who comes from a mining background, who understands the industry and area, you can see how that would be far more sustainable than flying in someone from Thailand for example," he said. ■



Site visits play an important role in the mining academy's curriculum.



Newman Senior High School mining students have access to a range of training and equipment.

MERIWA scholarships safeguard research future

The future of resources research in Western Australia is in safe hands judging by the quality of recipients for the 2008 Minerals and Energy Research Institute of Western Australia (MERIWA) supplementary scholarship.

Five MERIWA scholarships worth A\$10,000 each were handed out this year to PhD students who are undertaking research in the field of minerals and petroleum at Western Australian universities.

Among the potential results of research that has been fostered by this year's scholarships are the development of new software tools to optimise mine design, and technology for the commercial production of hydrogen to reduce global warming.

Each MERIWA scholarship consists of a A\$5000 stipend and A\$5000 for project maintenance.

In presenting the scholarships, Resources Minister Francis Logan said the Western Australian Government was committed to fostering research in the mining and petroleum sectors.

"The assistance provided through the scholarships helps ensure the next generation of scientists has the necessary support to develop vital projects," Mr Logan said.

"A higher than average number of scholarships was awarded this year, reflecting the high quality of research being conducted at WA universities and the continuing desirability of the resources sector for study and work."

University of Western Australia (UWA) student Tarrant Elkington, in the third year of his PhD, received funding for his work to develop software tools that will optimise strategic decisions in the planning and operation of underground mines.

Tarrant's work is expected to fill a gap in established computer-based mine modelling systems and has already produced impressive results in stope



(L-R) MERIWA chairman Rex Baker, Resources Minister Francis Logan and scholarship recipients Tarrant Elkington, Matthew Landers, Yvette Hill, Andrew Jones and Andrew Cornejo.

design, development layout and mine scheduling.

"In doing so, the tools developed will help to identify opportunities to add value as well as risks and uncertainties that may need to be addressed, and provide the best possible information on which to base strategic decisions for underground mines," he said.

Tarrant, who was also a 2007 MERIWA scholarship recipient, has used the financial assistance to purchase essential hardware and software to further his research, and to travel to conferences and make valuable industry contacts.

He said there was excellent research being conducted within institutions involved with the resources industry.

"The major problem in this area is attracting and retaining quality people into R&D roles when wages in the industry are so high. In order to take best advantage of the current boom, advances in technology are essential," Tarrant said.

Fellow UWA student Andrew Cornejo is also in the third year of his PhD and received a scholarship for his investigations into the catalytic

decomposition of short chain hydrocarbons. This work aims to commercially produce hydrogen that is free of oxides of carbon, as well as a high quality carbon by-product.

The other 2008 scholarship recipients were UWA student Matthew Landers and Murdoch students Andrew Jones and Yvette Hill.

Matthew is investigating the specific location and distribution of nickel and other minerals in iron ores found in lateritic soils developed on nickel-rich ultramafic rocks. Andrew is looking to increase understanding of the ageing of mixed nickel-cobalt hydroxide at BHP Billiton's Ravensthorpe mine and Yvette is investigating symbiotic associations of legume species and the potential for rehabilitating mine sites.

MERIWA encourages the development of the minerals and energy industries by fostering and promoting research that is subsequently published and made available in Australian libraries and through the institute itself.

"This research has helped to stimulate the growth of the minerals and extractive energy industries in the State and create a number of internationally recognised researchers," Mr Logan said. ■

MINEDEX:

A useful tool for mining professionals

Keeping
pace with
industry



DoIR Industry and Commodity Analyst Don Flint said MINEDEX would help internal staff and external clients with extensive searching, reporting and exporting of industry data.

Industry experts and professionals now have access to more in-depth information and new search features through a new and improved database system for Western Australian mines and mineral deposits.

MINEDEX is a continuously updated textual database containing information on mines and mineral resources and their ownership, location, production data and geological attributes.

The system was originally launched in the mid 1980s by former Department of Industry and Resources (DoIR) Director General, Des Kelly, as a comprehensive reference system for Western Australian minerals. It has now been upgraded and replaced with a new database.

As well as MINEDEX, this database combines the WAMIN system, which provides geological information on mineralised sites, and WABMINES, which is an inventory of abandoned mine sites.

DoIR Industry and Commodity Analyst, Don Flint, said the new MINEDEX system was an enhanced integrated minerals database with intelligent links to other DoIR and Geological Survey of Western Australia systems.

He said it would help internal staff and external clients with extensive searching, reporting and exporting of industry data.

“The main objective was to create a system that would be more simple and easier to use, and as a result more functional. I believe the new MINEDEX system fully meets these requirements,” Mr Flint said.

The new database has a more user-friendly interface and will provide clients with more search screens and additional search parameters on each of those screens, providing more detailed information.

The main menu highlights the key objects of the database system and

its related search screens, which are the key components to MINEDEX. These elements include sites, resource estimates, production, tenements, projects and project owners.

There will also be a new feature that allows the capacity to store and share corporate photos. The MINEDEX system will have 220,000 records for reference purposes and a collection of reports that can be run and exported in different file formats.

The new MINEDEX website has taken two-and-a-half years to design and cost A\$1 million to set up. The website was developed by external contractors, SRA Information Technology, based in Adelaide.

SRA is also developing a new environmental workflow system called EARS (Environment Approvals and Regulatory System), which will manage native vegetation clearing permits, mining proposals and environmental reports for DoIR’s Environment Division. ■

The Western Australian Department of Industry and Resources is adopting two new computing platforms that will increase its internal efficiency and quality of service to the State's mining sector.

Efficiency through eMiTS

The new Electronic Mineral Titles System (eMiTS) being developed by Western Australia's Department of Industry and Resources (DoIR) will significantly enhance maintenance and management of mineral titles.

The system will replace DoIR's existing Mineral Titles Management System (MiTiS) and integrate with the spatial management system Tengraph. A framework for the delivery of current services such as Mineral Titles Online (MTO) and future services such as eLodgement will be established with eMiTS.

MTO currently provides detailed information to the department's external clients including prospectors, mining companies, surveyors, geologists and tenement consultants.

It has been in place for six years and has more than 5000 registered users. Access and use of MTO is free but official title searches incur a cost.

More than 150 staff in DoIR's Mineral and Title Services Division will use eMiTS, which promises to deliver processing and operational efficiencies necessary to support the State's mining sector.

The information about a mining tenement obtained through eMiTS includes its holder, location, title encumbrances,



The new eMiTS system will be used by more than 150 Department of Industry and Resources staff.

conditions of grant, rental and expenditure details.

DoIR says its external client base should not notice any difference in the already high quality and extent of information it provides.

DoIR Business Systems Senior Team Leader Tony Harrison said eMiTS was the culmination of three years of work and replaced six mainframe systems as well as MiTiS, which was no longer cost effective to maintain.

"The new system is far more efficient in the way it enables processing of titles and information, regardless of whether you are in Perth or a regional office," Mr Harrison said.

"This will be particularly beneficial at a time when there are a significant number of tenement applications awaiting determination."

He said the combination of eMiTS, MTO and Tengraph created a world-class mineral titles management system.

"In fact, there has recently been international interest in the system. The Indian Government for example, investigated whether the eMiTS and Tengraph systems could be modified to fit their requirements."

The final testing phase for eMiTS is the end of June this year and implementation should follow shortly after. ■



Kick-start exports with TradeStart

The Department of Industry and Resources, in partnership with Austrade, has a dedicated TradeStart Export Adviser, Christine Schulz.

TradeStart will work with small-to-medium-sized businesses in the mining, oil and gas equipment and services sector to help develop overseas markets.

The program will assess a company's export capability, investigate selected markets, identify potential customers and provide follow-up assistance.

For further information please call Christine Schulz on (08) 9222 0583 or email christine.schulz@doir.wa.gov.au

New era for *high-tech* minerals

Mobile phones, electric cars and wine glasses aren't products that most people would associate with Western Australia's mining industry but they are just some of the wares that are the end product of minerals extracted by two mines in the South West of the State.

Tantalum and lithium are the minerals being mined to create such products. Tantalum is used to make high-tech electronic products such as mobile phones and laptop computers, while spodumene – a lithium mineral – is used in the manufacture of advanced batteries, high-quality glassware and ceramic products.

Western Australia has several known deposits of tantalum and lithium but there are only two mines operating in the State, and both are now owned by Talison Minerals.

A third lithium and tantalum deposit, Mount Cattlin, is currently being explored by Galaxy Resources at Ravensthorpe.

Talison's Greenbushes mine in the South West region of Western Australia is a world-class resource for tantalum and lithium. Tin mining began at Greenbushes in 1888, making it the longest continuously operated mine in the State.

Tantalum's unique electrical properties, which enable it to store and release an electrical charge, generated an increased focus on the metal in the 1980s. The importance of lithium has grown more recently, driven by the development of the lithium-ion batteries used in mobile phones and laptops and is now rapidly becoming the power source for electric cars.

Talison Chief Executive Officer Peter Robinson said the Greenbushes spodumene resource was the largest deposit of high grade lithium minerals in the world.

"The Greenbushes mine has lithium resources of 36 million tonnes,

containing an extraordinary 42 per cent spodumene," Mr Robinson said.

"In addition, Greenbushes has tantalum resources of 191 million tonnes containing 74 million pounds of tantalum pentoxide, and the operation has the ability to process four million tonnes per annum."

Talison also operates the Wodgina mine, another world-class tantalum resource, located in the Pilbara, inland from Port Hedland.

"Wodgina has resources of 133 million tonnes, including 41 million tonnes at 349 parts per million of tantalum pentoxide and a processing capacity of three million tonnes of ore a year," Mr Robinson said.

"Talison currently has the capacity to produce 50 per cent of the world's tantalum minerals and produces 80 per cent of the world's spodumene."

Tantalum pegmatites are found in Western Australia and around the world but not all deposits are economic to mine. Other tantalum producers are found in Brazil, Africa, Canada and South East Asia.

Lithium is sourced from brines (salt lakes) and minerals. Talison is by far the world's largest producer of lithium from minerals, but some mineral production also comes from Canada, Zimbabwe, Brazil, China and Portugal.

Talison is confident the resources at Greenbushes and Wodgina will have a significant part to play in the tantalum industry for many years to come.

"Tantalum hasn't enjoyed the booming prices of other commodities, but tantalum production is steady and meets current demand," Mr Robinson said.

"A niche market for high performance tantalum capacitors will always be there and society continues to demand higher performance, smaller and more reliable products, so this aspect of the market will continue to grow.

"Investigations into downstream processing to add value to our resources are also a high priority for us.

"The future for spodumene is exciting with strong growth potential and economic benefits for rechargeable batteries in automotive applications.

"The transition from hybrid to "plug-in" cars is expected to progress in the very near future."

Galaxy Resources is exploring the potential for a lithium and tantalum operation at Mount Cattlin. The deposit could be used in the production of lithium for battery-grade carbonate and lithium ion batteries for use in hybrid cars.

During the past two years Mount Caitlin has undergone an extensive exploration program, with 350 holes drilled last year.

Galaxy Resources Managing Director Michael Fotios said vehicle manufacturers, such as Honda and Toyota, were trialling lithium ion batteries in their hybrid models, the Honda Civic Hybrid and Toyota Prius.

These vehicles have a battery-powered electric motor alongside the standard petrol motor.

"There is potential for Western Australia to be at the forefront of this new, global-warming-friendly technology," Mr Fotios said.

"As far as we are aware, there are no other producers of lithium carbonate in Australia and the market looks positive."

Mr Fotios said if production did eventually go ahead at Mt Cattlin, it would be a lithium-based operation, focused around spodumene, with tantalum treated as a by-product.

Galaxy intends to deliver lithium carbonate, as well as producing a spodumene mineral concentrate for shipping out. Mr Fotios said delivering lithium carbonate as well added considerable value which warranted its inclusion in the process.



Talison Mineral's Greenbushes mine in Western Australia's South West is a world-class resource for tantalum and lithium.

He said the in-situ value of spodumene production was only valued at A\$1 billion, and that the lithium-carbonate production as a value-added product would add considerable value to that.

A Bankable Feasibility Study has been taking place since January this year, with the results expected by September.

Mr Fotios said if they were able to make a decision in September, then production could begin in late 2009 or early 2010.

"We expect that most of 2009 will be spent getting the plant up and ready for production," he said.

The company is currently focused on determining the full potential of its resource and is very confident as it waits for the results of the study.

"If we look at demand, especially for lithium carbonate, and where the world is headed with the electrification of cars and also with the day-to-day demand for devices that use lithium

batteries, there is a pretty good outlook.

"We are pretty positive about the future of the lithium market and I think that it has the potential to take Galaxy to the next level.

"We've identified the significant-sized lithium (spodumene) resource and think there is room to expand that within the existing resource model and beyond that."

Galaxy Resources is confident that it can deliver a quality and cost-effective product into the market. Mr Fotios said the company already had a number of queries from potential customers.

Talison currently exports spodumene minerals to the glass and ceramic markets of China, Europe and the USA, and the lithium chemicals market in China. Its tantalum is exported to the USA, Germany and Asia with more than half of its tantalum used for capacitors in electronics. Tantalum use in superalloys - used for turbine blades in jet aircraft - is also growing strongly. ■

Tantalum and spodumene

- Tantalum is used in the production of mobile phones, laptop computers and other electronics
- Spodumene is a lithium mineral used in the manufacture of advanced batteries, high quality glassware and ceramic products
- Western Australia has two tantalum and spodumene mines in production, at Greenbushes and Wodonga
- Owner Talison Minerals has the capacity to produce 50 per cent of the world's tantalum and 80 per cent of the world's spodumene
- Galaxy Resources is also exploring a lithium and tantalum deposit at Mount Cattlin

New beds for booming Port Hedland community



Port Hedland has experienced considerable growth due to new and expanding resources projects.

Auzcorp's Beachfront development has turned the Port Hedland Detention Centre into an asset for the resources industry.

A new housing development in the Pilbara town of Port Hedland is expected to go some way to easing the critical accommodation shortage that is affecting the key mining centre, while simultaneously removing a blight on its landscape.

The Port Hedland Detention Centre was established in the 1990s to house asylum seekers arriving on Australia's west coast by boat. It closed in 2004 following a drop in the numbers of refugees received and a history of protest activity over Australia's detention policy.

The Federal Government put the lease for the facility out to tender last year following strong lobbying by the Town of Port Hedland. Developer Auzcorp opened the culmination of that process on May 5 this year – a A\$7 million accommodation facility named Beachfront.

The project is expected to make a significant impact on the shortage of short and long-term housing in Port Hedland, which is the major port for the Western Australian resources industry and home to many workers, both permanent and temporary, servicing the Pilbara's booming mining and petroleum sectors.

Beachfront has provided an immediate 400 extra rooms in the town and will benefit the resources industry and the tourism industry that competes with it for beds.

The timing of the project is particularly fortunate in light of the massive influx of temporary and permanent residents that are expected in Port Hedland during the next 18 months. The Utah Point Berth port expansion and construction of the new Port Hedland Hospital will add further stress to that which has already been created by the resources industry.

Auzcorp undertook a long consultation process with major resources companies to ensure the dining and accommodation facilities at Beachfront met the needs of their staff and contractors. The company also worked with the Federal Department of Immigration and Citizenship on the delivery of the project.

Auzcorp project manager Dan Caddy said the creation of Beachfront was not easy.

"One cannot emphasise enough the unique challenges presented by the fact that we were attempting to convert a decommissioned detention facility into somewhere people might like to call home," Mr Caddy said.

Auzcorp also opened the Mia Mia Hotel in the iron ore mining centre of Newman in November last year.

Western Australian Member for the Mining and Pastoral Region, Vince Catania, said it was pleasing to see a local company tackling such an unconventional project, which would provide a net benefit for the region and the resources industry.

The Town of Port Hedland is also currently looking at creating a new village that would be capable of accommodating more than 1200 transient workers. A meeting in Port Hedland in April was attended by 21 prospective tenderers for the project.

Town of Port Hedland Mayor Stan Martin said the town was working closely with the State Government to release more residential land in Port Hedland and its satellite suburb, South Hedland.

"It is expected that in three years there will be around 1700 new houses throughout town," Mr Martin said. ■

Beachfront has provided an immediate 400 extra rooms in the town and will benefit the resources industry and the tourism industry that competes with it for beds.

Graduate program provides career head start



(L-R) DoIR graduate Matt Beahan, Graduate Program coordinator Victoria Keeping and graduate Marta Sabinasz.

Graduating from university provides a person with a stamp of achievement as they set out to become a productive member of the workforce.

And with record low unemployment rates in Western Australia, university graduates can be selective about where they choose to work.

Despite this surplus of choice, it makes sense that any resources-related employment is a smart career move.

It's no surprise therefore, that the application process to the Department of Industry and Resource's (DoIR) Graduate Training Program is competitive.

Last year alone over 240 university graduates applied for the strictly-limited 12 places on offer.

DoIR's Graduate Program Coordinator Victoria Keeping said the program provided exciting opportunities for graduates, while also ensuring DoIR developed a leadership strategy for the future.

"The purpose of the program is to help graduates build their skills and knowledge of DoIR and to develop their careers," Ms Keeping said.

"We look for people who communicate effectively and have good research and problem-solving skills, together with a

positive and flexible approach to their careers," she said.

The 18-month program involves a number of rotations around different areas of DoIR, and a comprehensive training program including policy development, project management, preparation of business cases and understanding the legislative framework of government.

Marta Sabinasz commenced at DoIR in 2006, after graduating from Curtin University of Technology with a Bachelor of Commerce, majoring in Marketing and Tourism Management.

Ms Sabinasz said she saw the program as an opportunity to expand her knowledge of key industries in WA.

"I have enjoyed working with the Science, Technology and Innovation group (Science and Strategic Services Branch) where I was responsible for coordinating the development of a Western Australian Government Science Research Capability directory," she said.

The purpose of the program is to help graduates build their skills and knowledge of DoIR and to develop their careers.

"This involved liaising with State Government departments to obtain information on the science research undertaken. The information will be used to raise the profile of the Western Australian Government science capability among industry, business and academia."

Matt Beahan was accepted to the program in January 2007 after graduating from Murdoch University with a Bachelor of Arts Degree, majoring in Sociology and minoring in Sustainable Development.

Mr Beahan said the training provided an opportunity to gain knowledge and skills in a variety of different areas across a large department.

"With DoIR playing such a large role in the resources boom in Western Australia, I thought that working here would give me valuable experience and interesting work," he said.

His most preferred area has been the Human Resources division, where he worked on a research project covering staff attraction and retention.

The next intake will be advertised in July or August 2008 for commencement in January 2009.

For further information contact: Graduate Program Coordinator Victoria Keeping on tel: **08 9222 3148** or email: victoria.keeping@doir.wa.gov.au ■

New study reveals

The Western Australia mining and petroleum sectors would come to a standstill if not for the large number of workers adopting a fly-in, fly-out system of employment. This is the subject of a new study by the State's Chamber of Minerals and Energy.

The study shows that just under half of Western Australia's resources workers operate on a fly-in, fly-out (FIFO) basis, with the remainder employed close to home.

FIFO involves a rotation of rostered days on and off for employees with air travel between home, typically Perth, and remote work locations such as the Pilbara and the Goldfields.

The Chamber of Minerals and Energy (CME) has calculated that on average more than 70 flights leave Perth Domestic Airport for regional Western Australia each day, with a significant proportion flying direct to mining and petroleum sites.

The CME's recent FIFO report attempts to gain further insight into this system of employment, which has been widely adopted due to the challenges of Western Australia's booming resources industry, such as a critical lack of regional workers and infrastructure.

CME director Nicole Roocke said some resources operations were able to offer employees the choice of whether to work on a FIFO basis or live near their place of work.

"This is the best of both worlds because it gives individuals the opportunity to

choose which work journey arrangement is most suitable," Ms Roocke said.

The report identifies a variety of reasons why individuals and families opt for the FIFO system over residential-based work when given the choice.

These included access to better health and education services; greater employment opportunities for partners; closer proximity to family, friends and other social support; distinct separation of home and work life; and the ability to pursue other activities and goals when not working.

In short, FIFO is seen as offering the convenience and quality of life of metropolitan or major regional centres with the work and financial opportunities of the resources industry.

But the CME study has also identified issues and pressures associated with a FIFO lifestyle, such as difficulty in maintaining ongoing communication with family and friends, the importance of facilities on offer being of a high quality and the value of maintaining a sense of continuity in non-work related activities.

Ms Roocke isolated a number of steps that could address these challenges.

"To assist potential workers and families to determine whether the FIFO lifestyle is for them, it's important that companies provide information about the industry, site and job to prospective employees and family in the form of newsletters and other forms of company information," she said.

"Companies which are not already doing so may also consider site visits for families, flexibility in roster arrangements to cater for emergencies and special occasions, and company social events for FIFO employees and their families."

The CME report recognised a number of successful FIFO operations in place in Western Australia.

The introduction of Rio Tinto's Geraldton FIFO program in 2006 for example, was seen as creating new, more flexible work and lifestyle options for employees.

After previously only offering FIFO commute rosters to its Pilbara operations from Perth, the company now has 60 workers based in Geraldton.

It has also extended the program to the Kimberley town of Broome for indigenous workers, and the South West town of Busselton for employees working closer to that region.

Meanwhile, at AngloGold Ashanti's Sunrise Dam gold mine, regular contact with home is made easier for employees through the installation of a mobile phone tower on-site, access to email and internet facilities and the provision of phone cards.

Employees and their families are also given FIFO handbooks, and regular site visits for families are encouraged.

The CME said accommodation and on-site facilities at resources sites had improved dramatically in recent years. So much so that standard on-site facilities now included ensuite rooms

BHP Billiton FIFO employees have access to:

- Ensuite rooms with split-system reverse-cycle air conditioning.
- Televisions in all rooms along with in-house movie channels.
- Camp facilities include a fully-equipped gym, swimming pools in most locations and sporting grounds.
- General recreational facilities including barbeques, and recreation rooms complete with pool table, kitchenette, wide screen television and internet.
- Wireless internet in selected locations.

FIFO value



and extensive recreation amenities such as swimming pools, gyms and sporting courts. Site landscaping was common and meals provided were high quality.

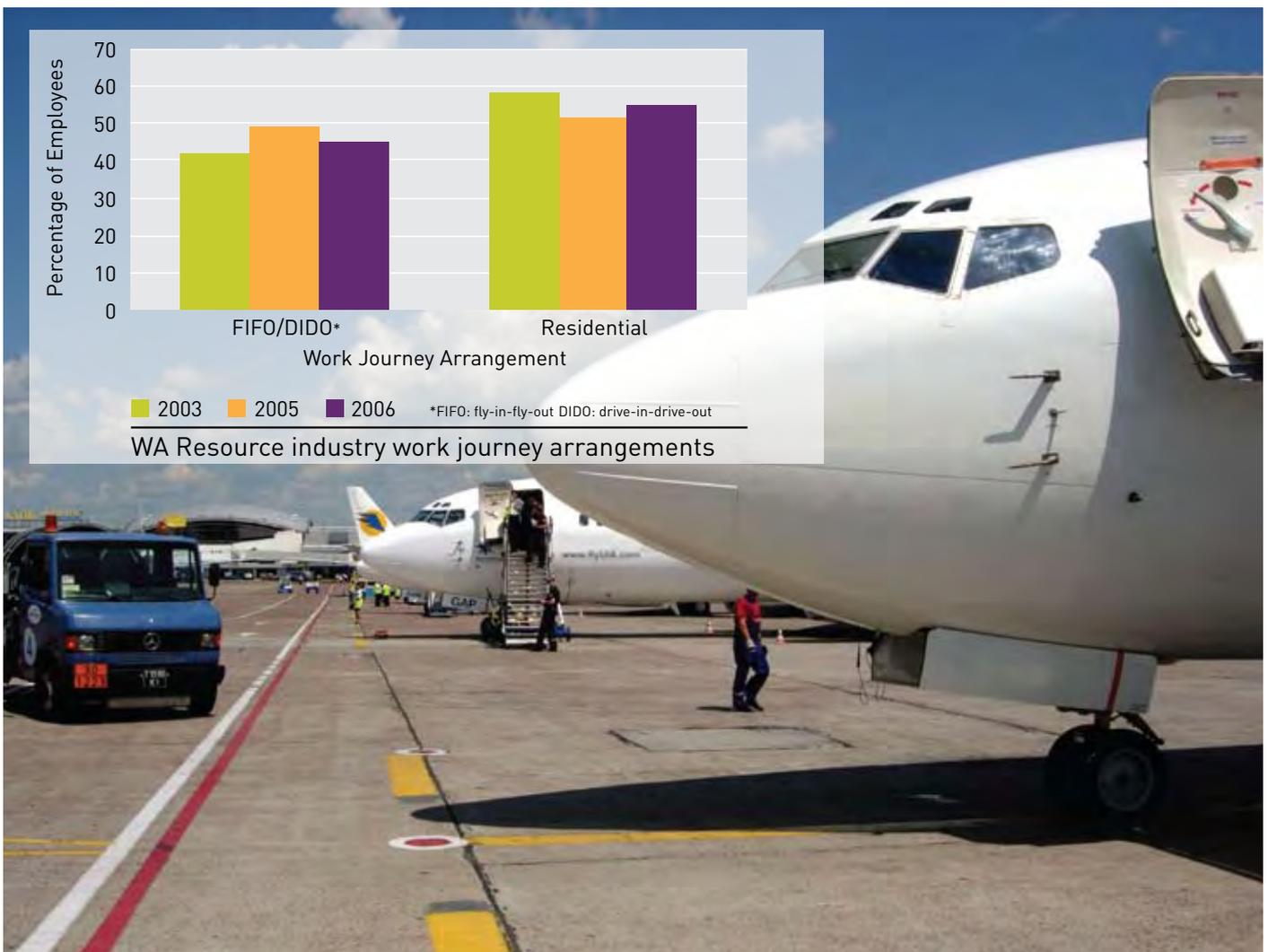
Companies were also engaging fitness consultants to develop whole

of site policies incorporating fatigue management and exercise schedules.

The CME report found the FIFO system created less of an environmental impact than the establishment of new towns, was critically important to the viability of

the resources industry, and was ideally suited to construction and expansion projects that required a large short-term workforce.

For further information go to:
www.cmewa.com.au



Issues influencing the rate of FIFO

Skills shortages and labour supply issues mean the industry will be required to discover new ways of attracting and retaining employees.

According to the CME, by 2015, the resources industry in Australia will need to employ 70,000 more employees to achieve predicted increases in output.

Of these 70,000, 42,000 will be required in Western Australia, almost 15,000 in Queensland and 5000 in New South Wales and South Australia.

Restricted land releases, inflated housing construction costs, particularly for remote areas, and a lack of on-site accommodation can all influence a company's decision to use FIFO.



2008 Western Australian Industry and Export Awards

Celebrating 20 years of stellar achievement

The annual Western Australian Industry and Export Awards now celebrating their 20th year, recognise companies for their innovation and success in industry and export.

Recognising excellence in engineering and technology, marketing and design, innovation and a host of other industry and exporting achievements, the Awards are coordinated by the Department of Industry and Resources.

Thousands of businesses in the suburbs of Perth and the regions make up a vibrant industry in Western Australia. Some are high profile and well resourced with proven track records, others have modest premises and small workforces. Many are doing business in a smart and innovative way. All are important and deserve to be recognised and rewarded for their efforts.

Closing date for entries is Wednesday 16 July 2008.

The benefits

Experience shows that firms enjoy a real business advantage as a finalist or winner in the Awards. All finalists and winners can benefit from:

- Doors opening for emerging exporters
- Enhanced standing with clients and bank managers
- Assistance to explore potential overseas markets
- Networks and partnerships
- Businesses learning from others
- Media coverage in *The West Australian* newspaper and regional media
- Valuable publicity and increased industry recognition through prominent showcasing at the Gala Awards presentation evening
- Finalists receive a distinctive award certificate and winners a handsome trophy
- Finalists and winners can use the Awards logo on their stationery and marketing material
- Using the Gala Presentation Night to reward the efforts of management and staff, even if you don't win an award
- Export Award winners automatically become finalists in the Australian Export Awards — increasing opportunities for national and international exposure

Access the department's website www.doir.wa.gov.au/awards or telephone June Phillips on (08) 9222 3846 for more details.



APPEA puts Perth in petroleum spotlight



APPEA provided valuable networking opportunities for oil and gas sector professionals.



Department of Industry and Resources Director of Petroleum and Royalties, Bill Tinapple, used APPEA to promote the opportunities for exploration in Western Australia.

Western Australia's capital city Perth, cemented its reputation as a global oil and gas hub when it hosted this year's Australian Petroleum Production and Exploration Association Conference and Exhibition, which attracted a record number of attendees.

More than 2500 participants attended the 48th annual APPEA conference, making it the largest edition on record and also, according to organisers, the most successful.

Department of Industry and Resources Director of Petroleum and Royalties, Bill Tinapple, said the conference demonstrated Perth had come of age as the oil and gas capital of Australia.

"Normally the APPEA conference rotates around each capital city every six years, however APPEA have decided the conference will now come to Perth every three years," Mr Tinapple said.

Western Australia has more than A\$53 billion worth of oil and gas projects either underway or in the planning stage, and petroleum sales from the State jumped 8 per cent in 2007 to a value of A\$16.7 billion.

Spending on petroleum exploration in Western Australian and adjacent

Commonwealth waters was also a record A\$1.9 billion in 2007.

Mr Tinapple said the oil and gas industries were expanding and speakers at the APPEA conference had emphasised the need to bring more and younger people into the industry.

"Essentially, the boom is on and we have a shortage of people. The critical skills shortage was one of the major themes coming out of this conference," he said.

Mr Tinapple said those interested in joining the petroleum sector should ideally attend an APPEA conference.

"Australia has an open door policy due to the skills shortage and people living overseas can be sponsored by a company before they arrive," he said.

"The internet is a good starting point for people interested in working in Western Australia.

"The State's resources industry needed to attract increased exploration in greenfield areas if it were to be self-sustaining," he said.

Chevron General Manager of the Greater Gorgon Area, Colin Beckett, spoke at APPEA about the unique challenges of 'mega projects'.

The Greater Gorgon Gas Project is located between 130-200 km off the north-west coast of Western Australia and, with about 40 trillion cubic feet of gas, is Australia's largest known undeveloped gas resource.

"Mega projects like Gorgon involve technical and commercial innovation and stretch the limits of available technology," Mr Beckett said.

"Mega projects stretch the ability of suppliers to meet the scale of the project and the capability of the labour markets to provide the necessary skills."

He said they also attracted interest, not unreasonably, from host governments as to what social or political agenda they could serve.

Mr Beckett said the scale of mega projects and the associated challenges meant the risk of not getting things right was much greater than with smaller projects.

He said there needed to be a focus on planning every aspect of the project to minimise the risk of failure and ensure the reasonable aspirations of other stakeholders were met.

"Taking the time to get the risk understood and resolved is the correct way to ensure that host government and shareholder returns are maximised," he said. ■

Helping industry achieve the triple bottom line

Balancing the priorities of industry and the community, while preserving the State's amazing marine environment, is a complicated job. But the Cockburn Sound Management Council (CSMC) is taking the lead and making sure these priorities are managed for the benefit of a range of stakeholders.

CSMC is a Ministerial Advisory Council that reports to the Minister for the Environment and the Environmental Protection Authority and is responsible for protecting the environmental health of Cockburn Sound and Owen Anchorage. It does this by monitoring the impact of various commercial, industrial and recreational users on marine water quality in these socially and economically important waters.

Through formal environmental management frameworks, the CSMC carefully coordinates application of environmental management systems so that environmental standards are met to benefit the community, industry and government.

Department of Industry and Resources (DoIR) General Manager of Environment and active CSMC member, Ian Briggs said the Council set the overall environmental standards for the Cockburn Sound and Owen Anchorage areas. This was done by reporting against a range of robust environmental standards and guidelines.

Management of the area is governed by the *State Environmental (Cockburn Sound) Policy 2005*, and the *Environmental*

Management Plan for Cockburn Sound and its Catchment 2005.

"Through this policy and plan, the CSMC has a clear management framework for protecting the environmental values of Cockburn Sound and the Owen Anchorage," Mr Briggs said.

"By closely monitoring these areas, analysing scientific research and undertaking report comparisons, the Council can clearly identify ground and marine water quality changes and assess the general health of the areas."

Currently, the marine water quality in these areas meets prescribed standards, but this has not always been the case. The hard work of the CSMC, together with a number of government agencies, industry and the community, has been instrumental in ensuring the water quality has improved significantly in recent years.

Cockburn Sound, located 20 km south of Fremantle, is one of the most intensively used marine environments in WA, by both industry and the community. Since the 1950s, the Sound has been a vital part of the State economy, incorporating the Kwinana Industrial Area – home to important downstream processing industries such as alumina, nickel, and oil refineries, chemical manufacturing factories, power stations, cement manufacturing, and fertiliser plants.

The Sound has also become a base for international commercial shipping, with multiple port facilities and a naval base. The State's first, and the Southern Hemisphere's largest, seawater

desalination plant is located on its shores at Kwinana.

CSMC Chair Professor Kateryna Longley said polluted groundwater, nutrient rich industrial discharges and commercial scallop dredging severely degraded the water quality of Cockburn Sound between the 1950s and late 1970s.

In the early 90s, industries in the Kwinana region decided to work together on environmental management issues. This led to the formation of the Kwinana Industrial Council, which immediately tackled the issues of air quality and ground and marine water quality within the area.

"Before this, the water quality in the area was unacceptable and in a bid to reinforce the need to protect the environment, the Cockburn Sound Management Council was established by the State Government in 2000," Professor Longley said.

"Since the Council's inception, there has been a marked improvement in the water quality of the Sound, despite an increase in activity by all of its users - a standout outcome when you consider what we had to work with when the Council was first established."

Cockburn Sound is set to become busier with the announcement of four extra boat launching ramps at Woodman Point. Dolphin watching, mussel farming, recreational diving, swimming and a significant fish breeding nursery make the Sound an important asset to the local community.

The Cockburn Sound Management Council (CSMC) is an expert voice on environmental impacts to the Cockburn Sound and Owen Anchorage areas. In just eight years, the CSMC has recorded many achievements including these from 2006-2007.

- Established the CSMC Owen Anchorage Sub-committee and commissioned a report, to guide its expanded role in the Owen Anchorage area to the north of Cockburn Sound.
- The Report Cards show 2006-2007 was one of the best years for water clarity since 1978.
- Oxygen, temperature, salinity and pH within Cockburn Sound are at good levels, a key indicator of a healthy ecosystem.
- The CSMC commissioned a study to determine levels of toxicants in sediments at 21 sites in Cockburn Sound and Owen Anchorage. This indicated there were very few areas of concern.
- The CSMC has provided expert advice on a range of high-level industrial developments and proposals, including the Kwinana Quays Project, Perth Seawater Desalination Plant, NewGen Gas Fired Power Station, Cape Peron Tourist Precinct Project and Port Rockingham Proposal.
- Seagrass meadows within the area have not declined and remain at steady levels.



The CBH Grain Terminal at Rockingham Beach is one of many industrial facilities at Cockburn Sound.

The CSMC is obligated to report once a year on the marine water quality of the Sound to the Minister for Environment and the Parliament of WA and produces annual Report Cards that provide a summary of results collected from within three Ecological Protection Areas of the Sound.

The Report Cards clearly detail data that has been collected for physical and chemical measures, biological parameters, toxicants in sediments, and water and chemical contaminants in seafood flesh.

Community education is an important aspect of the CSMC's responsible management of the Sound and is achieved through the Report Cards and community forums.

Professor Longley said each individual company in the area had statutory licensing conditions that were enforced through environmental approvals and regulations.

"The role of the CSMC is to go a step further and foster an integrated, more cooperative approach to environmental management with better industry, government and community stewardship of the Cockburn Sound," she said.

"We also provide advice on project development proposals of any scale that may affect the Cockburn Sound environment, such as the Kwinana Quays project, the desalination plant and the NewGen gas-fired power station."

The CSMC comprises 23 members encompassing all of the Sound's multiple users. DoIR and the Kwinana Industries Council (KIC) are among the statutory members.

KIC Director Chris Oughton said a representative from KIC sat on the CSMC on behalf of local industry in the Kwinana area, and whole-heartedly supported the CSMC's objectives.

"The CSMC is the honest third party when it comes to scientific opinions about the

water quality of the Cockburn Sound," Mr Oughton said.

"Its monitoring work over time is telling us that the water quality is improving and that industry is doing the right thing in terms of assisting with the improvement.

"There are those in the community who have trouble believing this, so it is helpful for industry to be able to point to scientific evidence that it is improving. You could say CSMC puts objectivity into the picture."

The KIC has already provided A\$250,000 and has committed an additional A\$90,000 over the next three years to support the CSMC's independent marine water quality monitoring and reporting work.

The overall environmental improvement evident in Cockburn Sound is testimony to the coordination efforts of the CSMC, supported by industry, government, the community and environmental groups. These continued efforts will ensure the ongoing improvement of water quality and dependent ecosystems to meet conservation, commercial and recreation demands.

For further information, contact the Cockburn Sound Management Council on **(08) 9591 3837**, email **csmc@environment.wa.gov.au** or visit **<http://csmc.environment.wa.gov.au>** ■

Recreational fishing is a favoured pastime at Val Street Jetty, Rockingham Beach, in the Cockburn Sound.



WA's resources industry showcased at NAPE

Western Australia's oil and gas sector has been showcased to an international audience at the world's largest event dedicated to promoting petroleum exploration opportunities.

The North American Prospect Expo (NAPE), held in Houston on 7-8 February, provides a marketplace for the buying, selling and trading of oil and gas prospects and dissemination of information through exhibition booths.

More than 18,000 people attended the two-day event which had more than 5000 exhibitions. Western Australia was showcased in the Australian Pavilion sponsored by Geoscience Australia.

Department of Industry and Resources Director of Petroleum and Royalties, Bill Tinapple, and Manager of Petroleum Geology Jeff Haworth represented Western Australia at the event.

Mr Tinapple said the exposition was a great opportunity to put Western Australia on display in front of an international audience.

"Western Australia's presence at NAPE was a valuable opportunity for the State to be exposed to oil and gas explorers," he said.

"It was a chance for Western Australia to brand itself as a huge State with many opportunities."

Before attending NAPE, Mr Tinapple gave a presentation at an international symposium, outlining Western Australia's outlook for oil and gas.

He said the presentation highlighted investment opportunities in Western Australia's resources sector.

The exposition and symposium both generated great interest from industry players in Western Australia.

"Representatives from the United States showed a great deal of interest

in Western Australia, particularly in tight gas," he said.

"The United States is starting to run out of its tight gas prospects for new exploration and development, and is keen to pursue tight gas exploration in Western Australia."

Tight gas currently provides 30 per cent of the United States' gas.

Mr Tinapple said industry representatives were also interested in bidding for Western Australian petroleum acreage releases.

"One of the current world trends identified at NAPE was the worldwide energy supply and anxiety to control oil and gas," he said.

"Western Australia is already the nation's largest producer of oil and gas and is a likely source of additional petroleum to meet this demand.

"Representatives were therefore interested in what investment opportunities Western Australia could offer them.

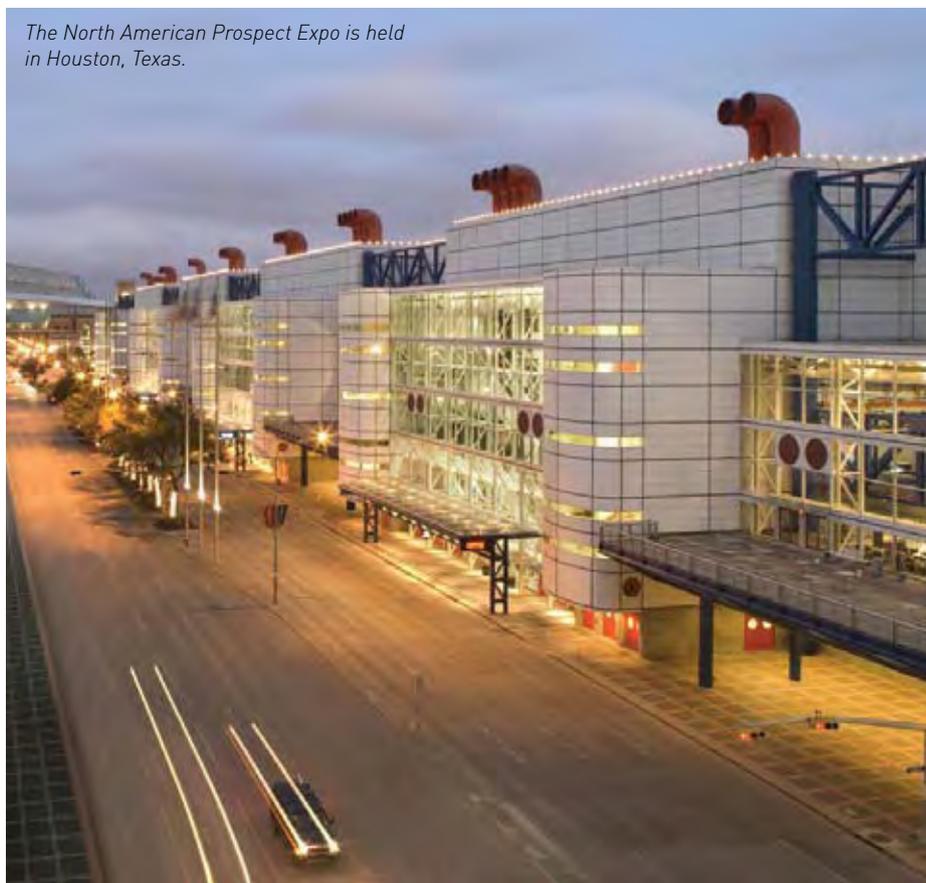
"The event created a marketplace where industry could establish alliances for doing business and initiating purchases and trades."

Mr Tinapple said other global trends identified during NAPE included countries rewriting petroleum legislation; larger companies moving into deeper water and developing leading technology; and the changing international landscape resulting from governments increasing their participation in oil.

This is the seventh year the Department of Industry and Resources has taken part in NAPE.

NAPE is scheduled to take place in Houston on 5-6 February 2009. ■

The North American Prospect Expo is held in Houston, Texas.



Release of petroleum exploration acreage

Oil and gas explorers now have the opportunity to bid for offshore petroleum acreage releases in Commonwealth waters.

The Federal Government announced the release of 35 new exploration areas in April. The 2008 releases are located across five basins off the Northern Territory, Western Australia and the Territory of Ashmore and Cartier Islands coastlines.

Of the 35 areas released, 23 are located in Western Australia.

Department of Industry and Resources Exploration Geologist Richard Bruce said the 2008 acreage releases would encourage investment in petroleum exploration within Western Australia.

"Exploration is fundamental to the future of the State's resources industry, and the long-term growth of this vital industry," he said.

Petroleum production in Western Australia has grown over the years, from US\$24 million worth of production in 1973, to more than US\$12 billion now.

"Intensifying oil and gas exploration ensures Western Australia maintains its international competitiveness," Mr Bruce said.

"Western Australia is one of the few places in the developed world where potential remains for larger discoveries and potential for ongoing exploration success is enormous."

The 2008 release also includes seven Designated Frontier Areas which are eligible for the frontier exploration tax incentive of 150 per cent uplift for exploration expenditure.

Mr Bruce said the tax incentive boosted the attractiveness of frontier areas to explorers.

"As exploration in frontier areas is often a higher cost and risk, tax incentives are a way to encourage exploration in the area," he said.

"Encouraging exploration in these selected areas can contribute to increasing the chances of a new petroleum province being discovered."

In addition to the 35 offshore areas released in April, the State Government has announced the availability of 10 more petroleum acreage areas in Western Australia.

"The Department of Industry and Resources has released six onshore and four offshore Western Australian petroleum acreage releases," Mr Bruce said.

"The State has extensive onshore and offshore sedimentary basins, the majority of which are considered prospective for new petroleum discoveries.

"The 10 areas are located in the Canning Basin, Northern Carnarvon Basin and onshore Perth Basin.

"Western Australia ranks among the best areas in the world for petroleum exploration, and can boast an exploration success rate in the order of 10 to 40 per cent in recent years.

"These acreage releases reflect the State Government's commitment to intensifying mineral, oil and gas exploration."

Applications for acreage released by the Department of Industry and Resources close on 2 October, while acreage released by the Federal Government close on 9 October for 17 of the new areas and 9 April 2009 for the remaining 18 areas.

Further information on areas released by the Department of Industry and Resources can be obtained at <http://www.doir.wa.gov.au>

Information on the areas released by the Federal Government can be found at <http://www.ret.go.au/petexp> ■

Offshore acreage releases will encourage investment in petroleum exploration within Western Australia.



Western Australian petroleum exploration

- Worth a record A\$1.9 billion in 2007
- Increased 50 per cent from 2006
- Accounts for 72 per cent of Australian total

AMMONIUM NITRATE

Kwinana - Ammonium Nitrate Plant & Expansions

CSBP CHEMICALS

CSBP has completed the doubling of capacity of its existing ammonium nitrate manufacturing facility, at its Kwinana operations. The duplicate nitric acid plant, ammonium nitrate plant and ammonium nitrate prilling plant have been commissioned. Full integration of the expansion project will occur by end of Q2 2008.

Expenditure: \$260m.

Employment: Construction: 500

HEAVY MINERAL SANDS

Gwindinup - Heavy Mineral Sands Mine

BEMAX CABLE SANDS (WA) PTY LTD

The Gwindinup dry mineral sands operation, comprising the Gwindinup North and South deposits, was commissioned in mid-February 2008. The operation utilises an existing wet plant and material is transported 30 km south to Bemax's Bunbury Mineral Separation Plant for processing. Gwindinup contains a reserve of 5 Mt of ore at a heavy mineral grade of 12.6% and is expected to have a mine life of more than five years.

Expenditure: \$15m.

Employment: Construction: 120; Operation: 35

IRON ORE

Pilbara - Iron Ore Mine Rail and Port Development

FORTESCUE METALS GROUP (FMG)

FMG Chichester operates a 45 Mt/a iron ore mine at Cloud Break in the Chichester Ranges of the eastern Pilbara. The mine is serviced by a multi-user railway and new port facilities at Port Hedland. The project is being commissioned. First exports commenced in May 2008

Expenditure: \$3.2b.

Employment: Construction: 2500; Operation: 870

Pilbara - Rapid Growth Project 3

BHP BILLITON IRON ORE PTY LTD

The US\$1.5 billion Rapid Growth Project 3 ("RGP3") expansion to increase capacity of BHP Billiton's iron ore operations in the Pilbara to 129 Mt/a was completed in Q4 2007. The key elements of RGP3 comprise the expansion of the Area C mine by 20 Mt/a, additional sidings on the Newman railway, and port works at Nelson Point and Finucane Island.

Expenditure: \$2b.

Employment: Construction: 900; Operation: 150

KAOLIN

Kwinana - Kaolin Processing Plant and Mine

WA KAOLIN HOLDINGS PTY LTD

WA Kaolin is in the process of commissioning its Kwinana pilot plant to produce a saleable product targeting the paper coating market. This will lead to production of 250,000 t/a coating grade kaolin. The kaolin will be sourced from its Wickepin deposit some 200 km northeast of Kwinana.

Expenditure: \$130m.

Employment: Operation: 50

NICKEL

Ravensthorpe - Lateritic Nickel Mine and Hydro-metallurgical Processing Plant

BHP BILLITON - RAVENSTHORPE NICKEL OPERATION PTY LTD

The project includes an open-cut mine and hydrometallurgical process plant using laterite ores. The plant will have the capacity to produce up to 50,000 t/a of contained nickel and 1400 t/a of cobalt in a mixed hydroxide intermediate product to be recovered at the company's Yabulu refinery in Queensland. Plant commissioning is underway, with the first shipment of product leaving Esperance in December 2007. The Ravensthorpe project was officially opened on 23 May 2008.

Expenditure: \$2.8b.

Employment: Construction: 2000; Operation: 650

OIL & GAS DEVELOPMENTS

Stybarrow (Carnarvon Offshore Basin) - Oil Field

BHP BILLITON PETROLEUM PTY LTD

First oil production from the Stybarrow project commenced in November 2007. Located approximately 65 km northwest of Exmouth in 825 metres of water, Stybarrow is the deepest oil field development ever undertaken in Australia. It involves a nine well subsea development and a FPSO vessel with capacity of approximately 80,000 bbl/d of oil. Stybarrow and the adjacent small oil rim of the Eskdale field have estimated recoverable oil reserves of 60-90 million barrels. The estimated economic field life is 10 years.

Expenditure: \$860m.

BAUXITE

Worsley/Boddington - Alumina Refinery Expansion to 4.7 Mt/a

WORSLEY ALUMINA PTY LTD

BHP Billiton announced in May the go-ahead for the \$2.5 billion Efficiency and Growth expansion project at its Worsley alumina refinery. The expansion project will lift capacity of the refinery from 3.5 Mt/a to 4.7 Mt/a through expanded mining operations, additional refining capacity and upgraded port facilities. The construction phase will start immediately and first production is expected in the first half of 2011.

Expenditure: \$2.5b.

Employment: Construction: 1500; Operation: 200

CHAR

Premier Mine - Char Plant (Coal)

WESFARMERS PREMIER COAL

At its Premier coal mine near Collie, Wesfarmers Energy has commissioned a demonstration scale char plant, with a target production capacity at full operation of 50,000 t/a. The plant is providing sufficient volume to allow potential customers to fully assess the product. Char has applications in steelmaking, ferro alloy production, mineral sands processing, smelting and some chemical plant processes.

Expenditure: \$8m.

Employment: Operation: 10

COAL

Collie - Coal Mine (Ewington I)

THE GRIFFIN COAL MINING COMPANY PTY LIMITED

Griffin Coal plans to develop its Ewington I deposit, approximately 2 km east of Collie, which has estimated recoverable reserves of 75 Mt. The mine will produce about 2 Mt/a coal for private sector customers, including Griffin Energy's nearby Bluewaters 1 power station, presently under construction, and its proposed Bluewaters 2 power station.

Expenditure: \$20m.

DIAMONDS

Argyle - Underground Diamond Mine

ARGYLE DIAMOND MINES PTY LIMITED

Development of the Argyle Diamond Mine commenced in 1982 and mining began in the main ore body (AK1) in 1985. The mine is operational and in order to extend the life of the mine to around 2024, the company has committed to an underground expansion. Commencement of underground operations is scheduled for Q4 of 2008.

Expenditure: \$1.2b.

Employment: Construction: 250; Operation: 500

ELECTRICITY

Collie - Bluewaters 1 Coal-Fired Power Station

GRIFFIN ENERGY

Griffin Energy is constructing the first of two 208 MW coal-fired power stations at the proposed Coolangatta industrial estate, 10 km northeast of Collie. Commissioning of the Bluewaters 1 base load power station is expected by late 2008.

Expenditure: \$400m.

Employment: Construction: 600; Operation: 50

GOLD

Boddington - Gold Mine (Wandoo Expansion)

BGM MANAGEMENT COMPANY PTY LTD

BGM Management Company Pty Ltd, on behalf of Newmont and AngloGold Ashanti, is developing the Wandoo project, based on mining the extensive bedrock resource that underlies the mined-out oxide resource. Production will be up to 600,000 oz/a of gold and about 20,000 t/a copper in concentrates over a 17-year mine life. Initial production is expected by late 2008. The Wandoo project will result in significant growth in and around the rural community of Boddington, 120 km southeast of Perth.

Expenditure: \$2b.

Employment: Construction: 1500; Operation: 650

IRON ORE

Mid West Region - Extension Hill Hematite Mine

MT GIBSON IRON LIMITED

Mount Gibson Iron has environmental approval for a 2 Mt/a hematite mining operation at Extension Hill, 330 km southeast of Geraldton. The ore will be railled to the Port of Geraldton for export. The Mount Gibson board has approved commencement of construction of the project. First ore shipments are expected in January 2009.

Expenditure: \$73m.

Employment: Construction: 150; Operation: 100

Mid West Region - Koolanooka/Blue Hills Hematite Iron Ore Mine

MIDWEST CORPORATION LIMITED

Midwest Corporation commenced transporting iron ore fines from stockpiles at Koolanooka, about 160 km southeast of Geraldton, in January 2006, with the first exports shipped in February 2006. Midwest proposes to re-open the Koolanooka and Blue Hills hematite iron ore mines at a rate of 1-2 Mt/a, with timing dependent on government approvals. The re-opening of the mines is being environmentally assessed at a Public Environmental Review level.

Expenditure: \$26.4m.

Employment: Construction: 40; Operation: 60

Pilbara - Brockman 4 Iron Ore Mine

HAMERSLEY IRON PTY LIMITED

Hamersley Iron is developing the Brockman 4 iron ore deposit. Construction work has commenced and commissioning is expected in 2010. Full capacity of 22 Mt/a is expected to be reached in 2012.

Expenditure: \$1.5b.

Pilbara - Cape Lambert Port Expansion

ROBE RIVER MINING COMPANY PTY LIMITED

Robe River Mining is planning to expand the capacity of its port facilities at Cape Lambert, east of Karratha. The expansion will lift the iron ore export capacity of the facilities to 85 Mt/a. It is anticipated that the expansion will be completed Q4 2008.

Expenditure: \$1.1b.

Employment: Construction: 450; Operation: 70

Pilbara - Dampier Port Expansion

HAMERSLEY IRON PTY LIMITED

Hamersley Iron is well advanced in its construction work to expand the capacity of its port facilities at Dampier Port from 120 Mt/a to 145 Mt/a. This work included installation of a new car dumper, screen house and related facilities. Full commissioning is expected by Q3 2008.

Expenditure: \$920m.

Employment: Construction: 800; Operation: 200

Pilbara - Rapid Growth Project 4

BHP BILLITON IRON ORE PTY LTD

In March 2007, BHP Billiton announced its Board approval for Rapid Growth Project 4 ("RGP4"), which will increase system capacity across its Pilbara iron ore operations by 26 Mt/a to 155 Mt/a at a cost of US\$2.6 billion. RGP4 includes development of a new crushing and screening plant, as well as additional stockyards, car dumping and train loading facilities at Mt Whaleback. Infrastructure upgrades will also be implemented at satellite orebodies and the rail and port operations.

Work has started and initial production is expected to commence in the first half of 2010, with ramp-up to full capacity expected to be achieved by the end of 2012. Expenditure: \$2.6b.

Pilbara - Hope Downs - Iron Ore Mine

HAMERSLEY WA PTY LTD.

The initial mining project includes the development of mining in the East Pilbara and the construction of a rail spur line to connect to the existing Pilbara rail network. Production will be up to 30 Mt/a after 5 years. Full operation is expected to commence in Q4 2008. Hope Downs Iron Ore assigned a 50% interest in the project to Hamersley WA Pty Ltd.

Expenditure: \$1.5b

Employment: Operation: 300

IRON ORE PROCESSING

Kwinana - Hismelt Commercial Iron Making Plant
HISMELT CORPORATION LIMITED

Hismelt Corporation, in a joint venture with Nucor (25%), Mitsubishi (10%) and Shougang (5%), has developed a commercial-scale Hismelt process plant at Kwinana, near Perth. The first stage of the plant is designed to produce 800,000 t/a of pig iron from iron ore fines, coal and fluxes. First hot metal production commenced in mid-2005, with commissioning continuing towards full production capacity over 3 years.

Expenditure: \$800m.

Employment: Construction: 320; Operation: 65

OIL & GAS DEVELOPMENTS

Angel (Carnarvon Offshore Basin) - Gas and Condensate Field

WOODSIDE ENERGY LTD

The Angel gas and condensate field, operated by Woodside as part of the North West Shelf Venture ("NWSV"), includes the NWSV's third fixed production platform, which will be remotely operated, three subsea production wells and a 50 km subsea pipeline which will link the new platform to the existing North Rankin production facility. Angel is expected to start up in Q4 2008. The platform will be capable of processing 800 million standard cubic feet of gas a day and 50,000 bbl/d of condensate.

Expenditure: \$1.6b.

Carnarvon Basin - Pluto LNG

WOODSIDE ENERGY LTD

Woodside approved the Pluto LNG project in Q3 2007. Construction has commenced on Sites A and B on the Burrup Industrial Estate for export of LNG in Q4 2010.

Expenditure: \$11.2b.

Employment: Construction: 3000; Operation: 200

North West Shelf - Project Expansion - 5th LNG Train

WOODSIDE ENERGY LTD

Commissioning is due in Q4 2008 and first LNG export cargoes are also planned for Q4 2008. The fifth train will boost the North West Shelf project's total LNG production capacity to 16.3 Mt/a.

Expenditure: \$2.4b.

Employment: Construction: 1500; Operation: 20

Pyrenees Development (Carnarvon Offshore Basin) - Oil Fields

BHP BILLITON PETROLEUM PTY LTD

In July 2007, BHPB Petroleum announced approval of the Pyrenees oil development, located 45 km north of Exmouth. The development comprises the Crosby, Ravensworth and Stickle oil fields which have estimated recoverable oil reserves in the range of 80-120 million barrels. The project involves the development of 13 subsea wells connected via flowlines to a FPSO vessel, which will be capable of producing about 96,000 bbl/d of oil. First production is expected during the first half of 2010 and the estimated economic field life is 25 years.

Expenditure: \$2b.

Van Gogh (Carnarvon Offshore Basin) - Oil Field

APACHE ENERGY LIMITED

The Van Gogh oil development, located around 50 km northwest of Exmouth, will utilise a FPSO vessel with a processing capacity of 63,000 bbl/d of oil and storage capacity of 620,000 barrels. It will be linked to two

subsea drill centres with 10 production wells. Drilling commenced in January 2008 and will continue until September 2008. Subject to obtaining all the necessary government approvals, the field installation of Van Gogh is expected to start in late 2008 and be in production by early to mid-2009. The expected life of the development is 12-15 years.

Expenditure: \$600m.

Vincent (Carnarvon Offshore Basin) - Oil Field

WOODSIDE ENERGY LTD

Approval of the first phase of the Vincent oil development was given in March 2006. The field is located approximately 50 km northwest of Exmouth in a water depth of about 350 metres. Oil will be produced through an eight well subsea development and processed and stored in a FPSO vessel. First oil is planned for Q4 2008, with initial production at about 100,000 bbl/d.

Expenditure: \$1b.

RARE EARTHS

Mt Weld - Rare Earths Mine

LYNAS CORPORATION LTD

The Mt Weld deposit, located about 35 km south of Laverton, contains an estimated resource of 12.2 Mt at 9.7% grade for 1.18 Mt rare earth oxides ("REO"). The development involves an open pit mine and concentrator at Mt Weld. The ore will be trucked to Leonora and then railed to Esperance Port for export. Mining of ore was completed in May 2008. The ore will be shipped to a \$220 million processing plant in Malaysia, which will have an initial production capacity of 10,500 t/a REO in late 2009 and is then expected to be expanded to 21,000 t/a in 2011.

Expenditure: \$90m.

Employment: Operation: 40

VANADIUM

Windimurra - Vanadium Pentoxide mine and processing plant

WINDIMURRA VANADIUM LIMITED

The project involves construction of a processing plant with operations expected to begin in late 2008. Once operational, the mine will produce approximately 5600 t/a of contained vanadium. The process plant will produce both ferro-vanadium (an alloy of vanadium, aluminium and iron) and high purity vanadium pentoxide.

Expenditure: \$296m.

Employment: Construction: 400; Operation: 120

AMMONIA/UREA

Burrup Peninsula - Ammonia Urea Plant

DAMPIER NITROGEN

Dyno Nobel has purchased the interests of Plenty River (Plentex) and Thiess in a large scale ammonia/urea project to be located on the Burrup Peninsula. The company is also conducting a feasibility study into developing a 230,000 t/a ammonium nitrate production facility, which could be located adjacent to the ammonia/urea plant. The alternative (to a large scale ammonia plant) of building a small scale ammonia plant to supply the ammonium nitrate plant is being investigated as part of the feasibility study.

Expenditure: \$900m.

Employment: Construction: 1000; Operation: 130

BAUXITE

Wagerup/Willowdale - Alumina Refinery Train 3 Expansion

ALCOA WORLD ALUMINA AUSTRALIA

Alcoa is investigating the feasibility of a third production train expansion at its Wagerup alumina refinery to increase capacity up to 4.7 Mt/a. On 14 September 2006, the Minister for the Environment approved the expansion proposal. A decision on the project go-ahead is dependent on market factors.

Expenditure: \$1.5b.

Employment: Construction: 1500; Operation: 260

COPPER

Pilbara - Panorama Copper/Zinc mine

CBH RESOURCES LTD

The Panorama Project is located about 110 km southeast of Port Hedland. It involves the construction and operation of an open pit mine and associated infrastructure, with a mine life of approximately 8 years. Approximately 75,000 t/a of copper concentrate and 85,000 t/a of zinc concentrate are planned to be produced for shipment via Port Hedland. The project is currently undergoing environmental assessment through a Public Environmental Review.

Expenditure: \$250m.

Employment: Construction: 176; Operation: 150

ELECTRICITY

Mid West Region - Central West Coal & Coolimba Power Projects

AVIVA CORPORATION LTD

Aviva Corporation Ltd is progressing the development of the Coolimba Power Project, a 2 x 200 MW base load coal-fired power station and an associated coal mine located 20 km south of Eneabba. Coolimba will be the first power station in WA to deploy leading edge emissions technology for carbon capture, desulphurisation and air cooling. Upon commissioning, the power station will constitute 8% of the installed capacity in the SWIS network and have an operating life of 30 years. Construction is planned to commence in late 2008 and will extend over 3 years for completion in 2011/12.

Expenditure: \$1b.

Employment: Construction: 600; Operation: 100

Neerabup - Perth - Bioenergy

SPIRITWEST BIOENERGY PTY LTD

SpiritWest is developing a 46 MW base load power station at Neerabup, 33 km north of Perth. The power station will use timber waste from pine plantations nearby and other wood residues. Environmental approval was received in 2006, and a final investment decision is expected by mid-2008, with construction commencing shortly thereafter. Commercial operation is scheduled for 2010.

Expenditure: \$100m.

Employment: Construction: 250; Operation: 45

GOLD

Kalgoorlie - Super Pit - Golden Pike Cutback

KALGOORLIE CONSOLIDATED GOLD MINES PTY LTD

KCGM is planning to extend the life of its Fimiston openpit mine by 5 years to 2017, with the Golden Pike Cutback. This will entail additional tailings storage facilities and waste rock dumps. KCGM is also required to develop a detailed closure plan prior to commencing the expansion.

Employment: Operation: 1043

HEAVY MINERAL SANDS

Happy Valley - Heavy Mineral Sands Mine

BEMAX CABLE SANDS (WA) PTY LTD

Located adjacent to Bemax's Gwindinup deposits, the project will involve the mining of mineral sands from two deposits (Happy Valley North and South) located on private land and in a State Forest. The level of assessment for the project has been set at Environmental Review and Management Program ("ERMP"). Environmental studies for the proposed mine development have largely been completed, with the ERMP expected to be submitted in mid-2008. Happy Valley contains a reserve of around 6 Mt of ore at a heavy mineral grade of 11.3%.

Expenditure: \$35m.

Employment: Construction: 100; Operation: 30

Jangardup South - Heavy Mineral Sands Mine

BEMAX CABLE SANDS (WA) PTY LTD

The Jangardup South minerals deposit is situated 54 km south of the Nannup township and adjacent to the D'Entrecasteaux National Park. Cable Sands estimates that the deposit would provide 2 Mt of minerals. Feasibility and environmental studies are well advanced. An environmental impact statement for the project is being prepared.

Expenditure: \$60m.

Employment: Construction: 100; Operation: 50

Keysbrook - Heavy Mineral Sands Mine

OLYMPIA RESOURCES LIMITED

Olympia proposes to develop a mineral sands mine located near the township of Keysbrook, approximately 70 km south of Perth. Olympia has identified proven and probable reserves of 41 Mt of ore containing 1.2 Mt of zircon, ilmenite and leucoxene. The concentrate will be processed at Cable Sands' plant at Bunbury over the mine's 8 year life. In late-October 2007, the EPA recommended approval of the project subject to Olympia meeting a number of conditions in the development and operation of the mine. If the EPA recommendations are accepted, Olympia will seek local government clearance to begin development of the mining operation in the second half of 2008.

Expenditure: \$18m.

Employment: Construction: 35; Operation: 30

Kwinana - Titanium Dioxide Pigment Plant Expansion

TIWEST JOINT VENTURE

Tiwest, through its joint venture partners Tronox Incorporated and Exxaro Resources, has environmental approval for an expansion that will see a 36% ramp-up in production from the plant's current capacity of 110,000 tpa to around 150,000 tpa in a bid to take advantage of the strong demand for titanium oxide in the Asia-Pacific region. Construction will start this year, subject to regulatory approvals, with additional capacity to come online in early 2010. A decision to proceed with further stages within this approved expansion is dependent on market conditions.

Expenditure: \$100m.

Employment: Construction: 108; Operation: 98

Shark Bay - Coburn - Heavy Mineral Sands Mine

GUNSON RESOURCES LIMITED

Gunson proposes to develop the Coburn mineral sands project, located south of Shark Bay, which contains total ore reserves of 306 Mt at an average grade of 1.2% heavy minerals. All of these reserves lie within the portion of the project area that has received government environmental approvals for mining. At the proposed mining rate of 17.5 Mt/a, the Coburn mine life is estimated to be 17.5 years. In October 2007, Gunson signed a second MOU with CTIEC of China providing for CTIEC's parent, CNBM and an electric power supply company in the Chinese city of Bengbu, to take a combined 40% in the project. A formal agreement between the parties is currently being negotiated. It is planned that zircon-rich non-magnetic concentrate from the Coburn mine will be shipped to a mineral separation plant in China for further processing. The magnetic fraction is to be sold in Geraldton as a final ilmenite product containing 62% TiO2.

Expenditure: \$100m.

Employment: Construction: 170; Operation: 110

Tutunup South - Heavy Mineral Sands Mine

ILUKA RESOURCES LIMITED

Iluka proposes to develop the Tutunup South mineral sands mine, located approximately 15 km southeast of Busselton. The project will include the construction of mine pits, solar drying dams, ore concentrator and associated mine infrastructure. The mine is expected to produce over 1.2 Mt of heavy mineral concentrate over its 5 to 6 year life, which will be transported to Capel for further processing. Tutunup South is scheduled to commence operation in early 2009, subject to obtaining necessary government approvals, and will replace Iluka's Wagerup mine site. The project is currently in the Environmental Impact Assessment phase and is being assessed at the level of Public Environmental Review.

Expenditure: \$25m.

Employment: Construction: 150; Operation: 40

IRON ORE

Great Southern Region - Southdown Magnetite Mine

GRANGE RESOURCES LIMITED

Grange is finalising a bankable feasibility study on the Southdown magnetite project, 90 km northeast of Albany. The company plans to produce an initial 3.3 Mt/a magnetite concentrate from 2012 stepping up to 6.6 Mt/a. The concentrate will be transported via a slurry pipeline to the Port of Albany for export and pelletising in Malaysia. The project is currently being environmentally assessed at a Public Environmental Review level. Subject to environmental approvals, construction is anticipated to commence in 2009, with commissioning Q4 2012.

Expenditure: \$839m.

Employment: Construction: 700; Operation: 250

Mid West Region - Extension Hill Magnetite Mine

ASIA IRON

Asia Iron has environmental approval to produce up to 5 Mt/a of magnetite concentrate, which will be transported by slurry pipeline to the Port of Geraldton for export. Site works are anticipated to commence in the first half of 2008, plant construction is planned for late 2008/early 2009, with first exports by the end of 2010.

Expenditure: \$715m.

Employment: Construction: 1000; Operation: 280

Mid West Region - Jack Hills Hematite Mine Stage 2

CROSSLANDS RESOURCES

Murchison Metals commenced trucking 1.5 Mt/a hematite from its Jack Hills operations to the Port of Geraldton in December 2006. The company expects to increase production to 2 Mt/a in 2008 before proceeding to Stage 2, which would involve a further increase to 10-25 Mt/a of hematite. The ore would be transported by a new railway to a new deepwater port at Oakajee. A definitive feasibility study and exploration drilling program on its Jack Hills Stage 2 project is progressing.

Expenditure: \$750m.

Employment: Construction: 450; Operation: 350

Mid West Region - Mt Karara Magnetite Mine

GINDALBIE METALS LIMITED

Gindalbie Metals plans to develop an 12 Mt/a magnetite concentrate project at Mt Karara, which has a resource life of about 50 years. Transport options for the ore are currently under investigation. The project is currently undergoing environmental assessment at a Public Environmental Review level. The company anticipates that first shipment will occur in Q1 2010, subject to government approvals.

Expenditure: \$1b.

Employment: Construction: 400; Operation: 240

Mid West Region - Mungada Hematite Mine

GINDALBIE METALS LIMITED

Gindalbie Metals is proposing to develop a direct shipping hematite ore project of up to 3 Mt/a at Mungada, 85 km east of Morawa. The project is currently undergoing environmental assessment at a Public Environmental Review level.

Expenditure: \$75m.

Employment: Construction: 200; Operation: 170

Mid West Region - Weld Range Iron Ore Mine

MIDWEST CORPORATION LIMITED

Midwest Corporation proposes to develop a 15-20 Mt/a iron ore mine at Weld Range 65 km southwest of Meekatharra, producing a mix of hematite lump and fines. The project is expected to utilise a new rail line and a new deep water port facility at Oakajee. The company commenced an extensive drilling program in June 2006 and is currently completing a pre-feasibility study.

Expenditure: \$800m.

Employment: Construction: 900; Operation: 220

Pilbara - Balla Balla Iron Ore Project

AUROX RESOURCES LIMITED

Aurox has recently signed contracts for the design, engineering and manufacture of all major components required to commission both the mine and port aspects of the Balla Balla magnetite iron ore project located mid-way between Karratha and Port Hedland. Aurox has also

signed two 15-year 3 Mt/a magnetite sales agreements with major Chinese steel companies. First export of magnetite is expected in 2011. Granted mining leases contain a 306 Mt resource grading 0.66% V2O5, 43% Fe and 13% Ti, including an initial ore reserve of 54 Mt at 0.73% V2O5. Figures confirm a likely 30-year mine life.

Pilbara - Iron Ore Mine - Roy Hill

HANCOCK PROSPECTING PTY LTD

Hancock Prospecting Pty Ltd is undertaking a pre-feasibility assessment of the development of the Roy Hill iron ore deposit, possibly Australia's largest undeveloped Marra Mamba iron ore deposit. The deposit is located about 80 km north of Newman. In 2007, the company invested \$38 million on a major drilling program to more closely define the iron ore resource. Further infill drilling is continuing. The development program is to move to a bankable feasibility study by Q3 2008 for a decision on the project by late 2009. The project includes the development of mines, a new railway or third party use of an existing railway, and export port facilities at Port Hedland.

Pilbara - Pardoo Hematite D50 Mine

ATLAS IRON LTD

Atlas Iron is completing a definitive feasibility study on the mining of 1 Mt/a of iron ore from the Pardoo deposit 75 km east of Port Hedland. Atlas expects to commence mining in 2008 (subject to government regulatory approvals) before increasing production to 3 Mt/a by 2010. The company intends to truck the ore to the public access berth at Port Hedland for export.

Expenditure: \$8.3m.

Employment: Operation: 70

Pilbara - Rapid Growth Project 5

BHP BILLITON IRON ORE PTY LTD

In February 2008, BHP Billiton approved the RGP5 iron ore expansion. This work includes the expansion of Port Hedland's inner harbour by constructing two new berths and shiploading facilities at Harriet Point. Construction is planned for 2009, with operation by mid 2010. It will also increase the rail capacity to 300 Mt/a by duplication of the railway track between the Yandi mine and Port Hedland. This work commenced in May 2008. RGP5 is scheduled to be completed by mid 2010.

Expenditure: \$1.2b.

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 20-30 Mt/a of direct shipping iron ore from a group of 3 mine sites located approximately 50 km southwest of Pannawonica. The ore will be exported via a new railway and port facility located on the Pilbara coast. Subject to the successful completion of feasibility and environmental studies (in process), and receipt of government regulatory approvals, the company anticipates that the first shipment will occur in the second half of 2011.

Expenditure: \$3b.

Employment: Construction: 1300; Operation: 700

IRON ORE PROCESSING

Pilbara - Cape Preston - Iron Ore Processing

CITIC PACIFIC

CITIC Pacific, a Chinese company, is planning the development of a magnetite iron ore mine and pellet plant with a capacity of 6 Mt/a. Construction is due to begin this year. A concentrator, pellet plant, slurry pipeline, port facilities, 240 MW power station and desalination plant will be built at Cape Preston, as well as accommodation facilities. The company plans to export the first high-grade pellets to China in 2010.

Expenditure: \$3.5b.

Employment: Construction: 2500; Operation: 500

Pilbara - Cape Preston - Mine and Pellet Plant

MINERALOGY PTY LTD

This project has an Iron Ore Processing (Mineralogy Pty Ltd) Agreement based on the development of Mineralogy Pty Ltd's Fortescue magnetite deposits, located near Cape Preston, 70 km southwest of Dampier. Mineralogy has sold subsidiary companies with right-to-mine

agreements to two purchasing companies, CITIC Pacific Ltd and Australasian Resources, which are planning the development of separate projects under the Mineralogy State Agreement. Australasian Resources Ltd has announced an agreement with Shougang Corporation which will fund a feasibility study on a combined concentrate/pellet and DRI project. If viable, Shougang will fund the project development, with Australasian keeping a 50% interest.

Expenditure: \$5b.

Employment: Construction: 2000; Operation: 800

MOLYBDENUM

Pilbara - Spinifex Ridge Mo/Cu mine

MOLY MINES LIMITED

The Spinifex Ridge Project is located 50 km northeast of Marble Bar in the Pilbara region of Western Australia. It is based on a resource of 469 Mt at 0.06% molybdenum and 0.09% copper. Moly Mines has completed a definitive feasibility study which has forecast 240 Mlbs of molybdenum concentrate and 270 Mlbs of copper concentrate will be produced in the first 10 years of the operation. The project's processing plant design capacity is at 20 Mt/a. The project is undergoing environmental assessment.

Expenditure: \$1.084b.

Employment: Construction: 400; Operation: 375

NICKEL

Goongarrie - Kalgoortie Nickel Project - Mine (laterite ore) and Hydrometallurgical Processing Plant

HERON RESOURCES LTD

This project will involve a mine and hydrometallurgical processing plant at Goongarrie (about 85 km north of Kalgoortie) producing up to 50,000 t/a of nickel from laterite resources of 903 Mt grading 0.74% Ni and 0.05% Co. Heron and Vale Inco are undertaking a pre-feasibility study which is due for completion in January 2009. Further ore reserve estimation, mine planning and metallurgical testing will be undertaken. The main focus will be on development of three flowsheet applications, leading to preliminary plant design, final flowsheet selection and new capital and operating cost estimates.

Expenditure: \$1.4b.

Employment: Construction: 1000; Operation: 300

North Eastern Goldfields - Yakabindie Nickel Mine

BHP BILLITON NICKEL

The Yakabindie project is based on a large nickel deposit situated near BHP Billiton's existing Mt Keith nickel project and is estimated to contain a resource of 289 Mt at 0.58% nickel. BHPB is considering developing Yakabindie as an integrated part of the Mt Keith project, and is conducting a pre-feasibility study, including infill drilling of the ore body and metallurgical testing.

Expenditure: \$20m.

Pilbara - Nickel Mine

SHERLOCK BAY NICKEL COMPANY

Sherlock Bay Nickel Corporation owns the Sherlock Bay nickel project, 120 km east of Karratha. The project is comprised of the Symonds and Discovery deposits. The ore body extends over a length of approximately 1.6 km and varies in width between 5 m and 35 m. The deposits contain a combined proven resource of 25.4 Mt at 0.4% Ni, 0.09% Cu and 0.02% Co. This resource is expected to give a project life of 12 years. Processing of the ore will use the BioHeap bulk heap leach process, which will produce metal with an expected recovery of 88%.

Expenditure: \$30m.

OIL & GAS DEVELOPMENTS

Barrow Island (Carnarvon Offshore Basin) - Gorgon LNG

CHEVRON AUSTRALIA PTY LTD

In December 2007, the Gorgon Joint Venture announced its intention to upgrade the project specifications from a 10 Mt/a (2 train) to a 15 Mt/a (3 train) development on Barrow Island. The project is based on gas from both the Gorgon and Jansz fields. The GJV is also considering a domestic gas development on Barrow Island. The GJV obtained environmental approval for a 10 Mt/a

development in late 2007. Once the GJV has obtained environmental approvals for the additional train and completed front-end engineering and design work, it will consider a final investment decision on the project.

Expenditure: \$11b.

Employment: Construction: 3000; Operation: 600

Browse Basin - Ichthys (Browse Offshore Basin)

INPEX

The Ichthys gas and condensate field was discovered in 1980 and is located in 250 metres of water, approximately 440 km north of Broome and 250 km from the mainland. Six discovery and appraisal wells have been drilled in the period 2000-2004. The P50 estimated recoverable resource in place is approximately 12.8 Tcf of gas and 527 mbl of condensate and LPGs. The permit is owned by Inpex Browse Ltd (76%) and Total (24%). Development of the field is planned to include offshore semi-submersible facilities and a subsea pipeline to an offshore location, where approximately 8 Mt/a of LNG will be produced for export to the Asia-Pacific market, with the first LNG shipment scheduled for 2012. The company is also looking at new technologies associated with GTL and DME, as well as possibilities for domestic supply.

Expenditure: \$10b.

Employment: Construction: 2000; Operation: 500

Macedon (Carnarvon Offshore Basin) - Gas Field

BHP BILLITON PETROLEUM PTY LTD

The Macedon gas field, located about 50 km north of Exmouth, was discovered in 1992 by the West Muiron-3 well, with a follow-up appraisal campaign in 1994. BHP Billiton is continuing to investigate domestic market opportunities for Macedon, which is estimated to contain a gas resource of up to 1.2 Tcf. Gas recovered to date is dry, containing no condensate or LPG.

Pilbara - Devil Creek Development Project

APACHE ENERGY LTD

Apache Energy Ltd and Santos Ltd are developing the Devil Creek Development Project (DCDP). The DCDP is a greenfield gas development comprised of an unmanned offshore gas production platform over the Reindeer gas field which is located about 80 km northwest of Dampier; offshore and onshore gas pipelines; an onshore gas processing plant site located near Devil Creek, 65km southwest of Karratha; and a sales gas export pipeline connected to the Dampier to Bunbury Natural Gas Pipeline (DBNGP). The DCDP is designed to provide up to 300 TJ per day of dry natural gas and between 160 kl to 800 kl per day of gas condensate. All gas from the DCDP will service the domestic gas market in Western Australia. Construction is scheduled to start by end 2008, with first gas delivered into the DBNG pipeline by mid 2010, subject to receiving all the required statutory approvals.

Expenditure: \$600m.

Employment: Construction: 200; Operation: 20

Pilbara - LNG Plant

BHP BILLITON PETROLEUM

BHP Billiton Petroleum and Exxon Mobil are working together to identify the optimal development plan for the commercial development of the Scarborough gas field located offshore in about 900 metres of water and about 280 km northwest of Onslow. The project is examining a number of concepts including the development of an associated 6 Mt/a LNG plant at a site approximately 4.5 km southwest of Onslow. The LNG produced may be sold to the American west coast and Asian energy markets.

Expenditure: \$5b.

Employment: Construction: 2400; Operation: 125

Scott Reef/Brecknock (Browse Basin) - Gas Fields

WOODSIDE ENERGY LTD

Woodside discovered gas and condensate at Torosa (Scott Reef) in 1971, Brecknock in 1979 and Calliance (Brecknock South) in 2000. The fields are located in water depths of up to 800 metres, about 425 km northwest of Broome and 250 km from the mainland. The reserves in these fields are currently held as a contingent resource and are estimated to be in excess of 20 Tcf of gas and 300 Mbls of condensate. During 2007 and 2008, Woodside (Operator and ~50% interest holder) is planning to continue with field appraisal activities and concept

evaluation studies to select a preferred development concept in the latter half of 2008. Woodside is targeting an LNG production facility capable of supporting up to 15 Mt/a of LNG. Start-up of LNG production is expected in the period 2013 to 2015.

Tern/Petrel (Bonaparte Offshore Basin) - Gas Fields

SANTOS LIMITED

The offshore Petrel gas field, discovered in 1969, is located about 250 km west of Darwin on the WA/NT seabed border in the Bonaparte Basin. The offshore Tern gas field, discovered in 1971, is located about 300 km west of Darwin in WA waters in the Bonaparte Basin. Field development options include installation of unmanned offshore production platforms with a pipeline to a gas treatment plant south of Darwin. The development possibilities for these fields have been enhanced by recent significant discoveries by other parties nearby, which may provide tie-in potential for Petrel and Tern to service domestic gas customers. A conceptual plan involves initial development of Petrel with a pipeline to an onshore gas plant and a subsequent phase that completes Petrel and develops Tern.

Expenditure: \$1b.

PLATINUM GROUP METALS

Halls Creek - Panton Sill-Platinum Project

PLATINUM AUSTRALIA LIMITED

The Panton platinum-palladium deposit is located 60 km north of Halls Creek in the Kimberley region of Western Australia, and contains the highest grade of PGMs known in Australia. A bankable feasibility study (BFS) has found that, while the project is technically sound, it is not commercially viable. The company is considering updating the BFS during the first half of 2009 to assess the impact of current higher prices for platinum, palladium and by-product nickel.

Pilbara - Platinum Deposit

HELIX RESOURCES NL

Helix Resources NL has established an indicated resource of 9.2 Mt at 2.9 g/t combined platinum, palladium, rhodium, and gold, 0.2% nickel, and 0.3% copper at its project site near Karratha. Preliminary mining studies suggested a mining rate of combined open cut and underground production of 1.5 Mt/a. Further activity was postponed in early 2003, as a result of poor exploration results and a decreased palladium price. The project is under review.

SALT

Exmouth Gulf - Yannarie Solar Salt Project

STRAITS SALT PTY LTD

Straits Salt is developing a 4 Mt/a operation in the eastern Exmouth Gulf. It has exploration licences over the area and has applied for a mining lease. The proposal is being assessed at the Environmental Review and Management Program level by the EPA. The modified proposal and additional reports were submitted to the EPA. The public submissions for these documents closed on 24 March 2008.

Expenditure: \$200m.

Employment: Construction: 100; Operation: 75

TIMBER

Mirambeena Timber Processing Precinct - Engineered Strand Lumber

LIGNOR LTD

Lignor Ltd is proposing the development of an engineered strand lumber plant located at Mirambeena, near Albany. The plant will source most of its timber from the extensive eucalypt plantations growing in the Albany region and will use technology developed by the German engineering company, Siempelkamp. The company has completed its feasibility study. Further project development has been put on hold pending more favourable global market conditions.

Expenditure: \$350m.

Employment: Construction: 400; Operation: 140

Record run continues for mining sector

Western Australia's mining industry continues to break records, with more than 50.75 million hectares of the State now covered by granted mining tenements and A\$1 billion spent on mineral exploration last year.

Figures from the Department of Industry and Resources (DoIR) showed the 50 million hectare mark was passed in January 2008, when exploration licences covering 1.85 million were approved.

This represents a fifth of the Western Australian landmass of 250 million hectares, which is the largest size of any Australian State or Territory. The recent milestone broke the previous granted tenement record of 41.4 million hectares set in 1996-97.

The record was attributed to a rapid increase in the area held under mining tenements in the second half of 2007.

Australian Bureau of Statistics (ABS) figures for the December 2007 quarter also revealed a record level of mineral exploration expenditure in Western Australia for the whole of last year.

The A\$1 billion total for the combined four quarters of 2007 was a 51 per cent increase on 2006 spending and accounted for half of Australia's spending level of A\$2 billion.

State exploration spending during the December quarter itself was likewise a record, at A\$290 million. Spending on iron ore exploration exceeded gold for the first time during the period.

Resources Minister Francis Logan praised the performance of the mining industry last year and said Western Australia was now confirmed as a global mining hotspot.

"It was a bumper year for mineral exploration in 2007 and Western Australians will continue to see the benefits of these efforts for many years to come," Mr Logan said.

"The figures show a continuing optimistic outlook for mineral

exploration expenditure in WA during the first half of 2008."

He said the high iron ore prices negotiated earlier this year were expected to keep that sector buoyant, but warned that the global credit squeeze and fears of a US recession provided cause for concern.

These factors aside, the mining industry has much good news to celebrate.

DoIR has been working to reduce the backlog of tenement applications awaiting determination with the aid of new staff employed with A\$3.5 million funding that it received at the end of 2007.

As of March this year there were 16,066 tenement applications awaiting determination, which compared with 18,708 at the same time in 2007.

This performance was tempered by more than 4000 tenement applications being received in the same period due to the continuing high level of interest in mineral exploration in Western Australia.

The State's petroleum sector is also enjoying unprecedented boom times. The ABS figures show exploration expenditure in Western Australian and adjacent Commonwealth waters was a record A\$1.9 billion last year, which was up 50 per cent on the 2006 total and accounted for more than 72 per cent of Australian exploration spending.

There are currently more than A\$100 billion worth of mineral and petroleum projects either underway or planned in Western Australia during the next few years. ■

Western Australian mining records

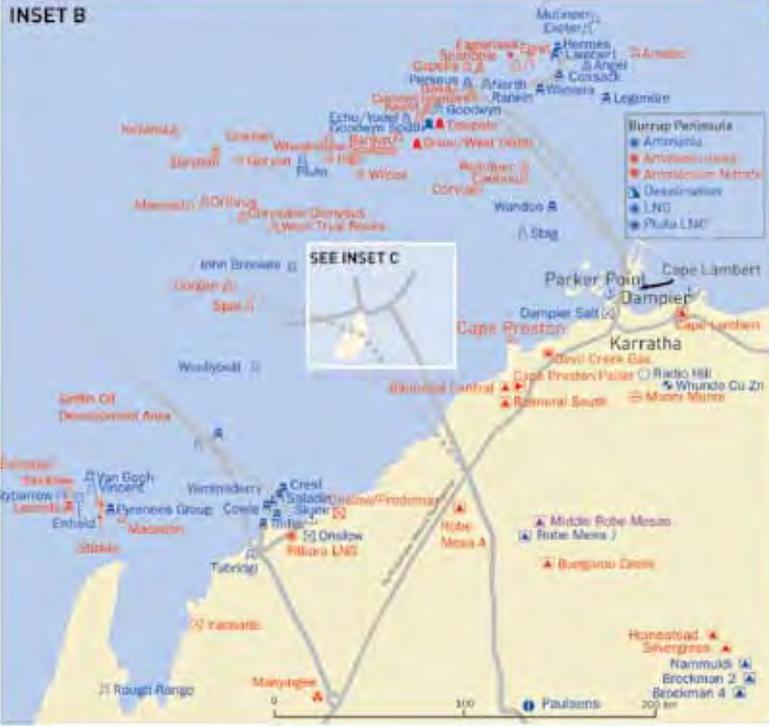


- Granted tenements cover more than 50 million hectares
- A\$1 billion was spent on mineral exploration in 2007
- December quarter exploration was A\$290 million

The A\$1 billion total for the combined four quarters of 2007 was a 51 per cent increase on 2006 spending and accounted for half of Australia's spending level of A\$2 billion.

Major Resource Development Projects: Western Australia

INSET B



KIMBERLEY

- RESOURCE SYMBOLS**
- Basaltic Alteration
 - Alumina Refinery
 - Mines and Deposits
 - Chemicals / Petrochemicals / Refineries
 - Processing plants / Refineries
 - Natural gas field
 - Oil field
 - Natural gas / Feil field
 - Natural gas / Condensate field
 - Natural gas / oil / condensate field
 - Chromite
 - Mines and deposits
 - Clays
 - Brick / tile processing plants
 - Coal
 - Coal/chemical bed methane (CCBM) mines and deposits
 - Lignite mines and deposits
 - Copper-Lead-Zinc
 - Mines and deposits
 - Diamonds
 - Mines and deposits
 - Gold
 - Mines and deposits
 - Gypsum
 - Heavy minerals and deposits
 - Heavy minerals and deposits - Washmill-bearing sands
 - Mines and deposits - garnet-bearing sands
 - Tellurium and synthetic ruble plants
 - Iron ore
 - Mines and deposits
 - Downstream processing plants
 - Limestone-Lime sand
 - Mines and Deposits
 - Cement plants
 - Magnesium
 - Mines and Deposits
 - Manganese ore
 - Mines and deposits
 - Nickel
 - Mines and deposits
 - Smelters and refineries
 - Phosphate
 - Mines and deposits
 - Plantfields
 - Mines and deposits
 - Rare earth elements
 - Mines and deposits
 - Salt/Potash
 - Sulphuric Acid/Ammonia / Perm
 - Silica - Silica Sand
 - Mines and deposits
 - Silica smelters
 - Talc
 - Mines and deposits
 - Tantalum
 - Mines and deposits
 - Uranium
 - Mines and deposits
 - Vanadium-Titanium
 - Mines and deposits

- NON-MINERAL PROJECTS**
- Environmental schemes
 - Major port handling facilities
 - Major power stations
 - Downstream (other processing plant)
 - Gas pipeline
 - Proposed gas pipeline

OPERATING PROJECTS ARE SHOWN IN BLUE
 POTENTIAL PROJECTS ARE SHOWN IN RED
 PROJECTS ON CARE AND MAINTENANCE ARE SHOWN IN PURPLE



SEE INSET A