

# Road to China

CITIC Pacific Mining drives forward with  
Sino Iron project

# PROSPECT





## Weathering the storm

Welcome to the first issue of *Prospect* magazine for 2009.

This is also the first issue to be produced by the new Department of Mines and Petroleum and Department of State Development.

The State Government created these two new departments with the restructure of the previous publisher of *Prospect*, the Department of Industry and Resources.

We believe this process has created two efficient and transparent new departments that will provide an improved service to the vital Western Australian resources industry at a time when it needs it most.

In recent months the global economic crisis has taken a heavy toll on the industry, with frequent reports of project closures and job cuts.

The State Government is working with the people affected, such as those working for the Ravensthorpe Nickel operation, and is overhauling the mining and petroleum approvals process to ensure new wealth-generating projects get off the ground.

This issue of *Prospect* provides proof that there is much life in the industry and that it continues to generate incredible wealth for all Western Australians, and indeed the nation.

CITIC Pacific's Sino Iron is a huge operation that will employ thousands of workers and it is encouraging to see real progress being made on this project.

Meanwhile, the proposed Ashburton North industrial precinct is a good example of strategic infrastructure that could aid the development of the State's resources, in this case the gas reserves of the Exmouth Gulf and Carnarvon Basin.

We believe there is a strong future in the mining and petroleum industry and that it will continue to be the driving force behind Western Australia's economy.

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

**Norman Moore**  
**MINISTER FOR MINES AND PETROLEUM**

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Cover photo: CITIC Pacific Mining expects to send its first Western Australian iron ore to China in 2010.

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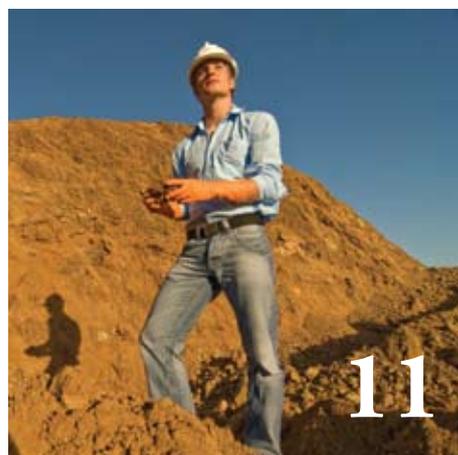
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# FULL STEAM

## ahead for Sino Iron

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The incredible growth of China during the past decade has revolutionised the iron ore sector based in Western Australia's Pilbara region.

Two of the region's established players, BHP Billiton and Rio Tinto, took the lead by embarking on huge expansion plans to cater for the increased demand.

Then, eager for a slice of the action, Western Australian-based companies Fortescue Metals Group and Atlas Iron established projects and sent their first shipments of ore to the Asian powerhouse last year.

The landscape is set to change again in 2010 when CITIC Pacific Mining (CPM) will become the first Chinese-owned company to send Western Australian iron ore to China.

Despite the global economic crisis almost halving China's economic growth during 2008, the company is pushing ahead with plans for a magnetite iron ore mine and processing plant.

Located near Karratha at Cape Preston, CPM's project is known as Sino Iron and is based on magnetite deposits obtained from another company, Mineralogy, which has a State Agreement Act in place.

Ministerial approval was granted for the project in May 2008 and amendments to the State Agreement were granted at the end of the year, allowing CPM to export iron ore concentrate as well as pellets.

Sino Iron has an estimated value of US\$3.5 billion and will create about 2500 construction jobs and 600 permanent positions.

CPM Chief Executive Barry Fitzgerald said the company had an identified resource of two billion tonnes of magnetite, from which it planned to

export about 27 million tonnes of pellet and concentrate each year.

"Based on the current mine plan, the project will have a life of about 25 years," Mr Fitzgerald said.

The recent State Agreement amendments were critical to the company delivering on its full project plan.

"For some time now major steel mills in China, including those belonging to our parent company CITIC Pacific, have had an interest in establishing a stable source of quality concentrate which meets requirements for special steel production," Mr Fitzgerald said.

"Most mills in China now have a pellet plant attached to their operations and are more interested in receiving a high quality concentrate product than pellet.

"The amendments provided certainty for us to proceed beyond this initial scope and develop a project that features a concentrator, a desalination plant, power station and port facilities to export pellet and importantly, magnetite concentrate."

The amendments tie CITIC Pacific into delivering a significant benefits package once the project is in operation.

According to Mr Fitzgerald, this includes a range of initiatives to ensure social, environmental and economic benefits for the Western Australian community.

About 75 per cent of the planned capital expenditure on Sino Iron has already been committed.

Earthworks have begun on what will be the Pilbara's first 450 MW combined gas-fired power station and CPM is awaiting the arrival of its first two gas turbines.

Other long lead-time components for the project are currently being manufactured and more than 500 people are already employed in operations in Perth, Cape Preston and China.

Mr Fitzgerald believes the importance of Sino Iron has grown in the past few months.

"In these difficult economic times, projects like the Sino Iron project are vital to keep the Western Australian economy and employment strong," he said.

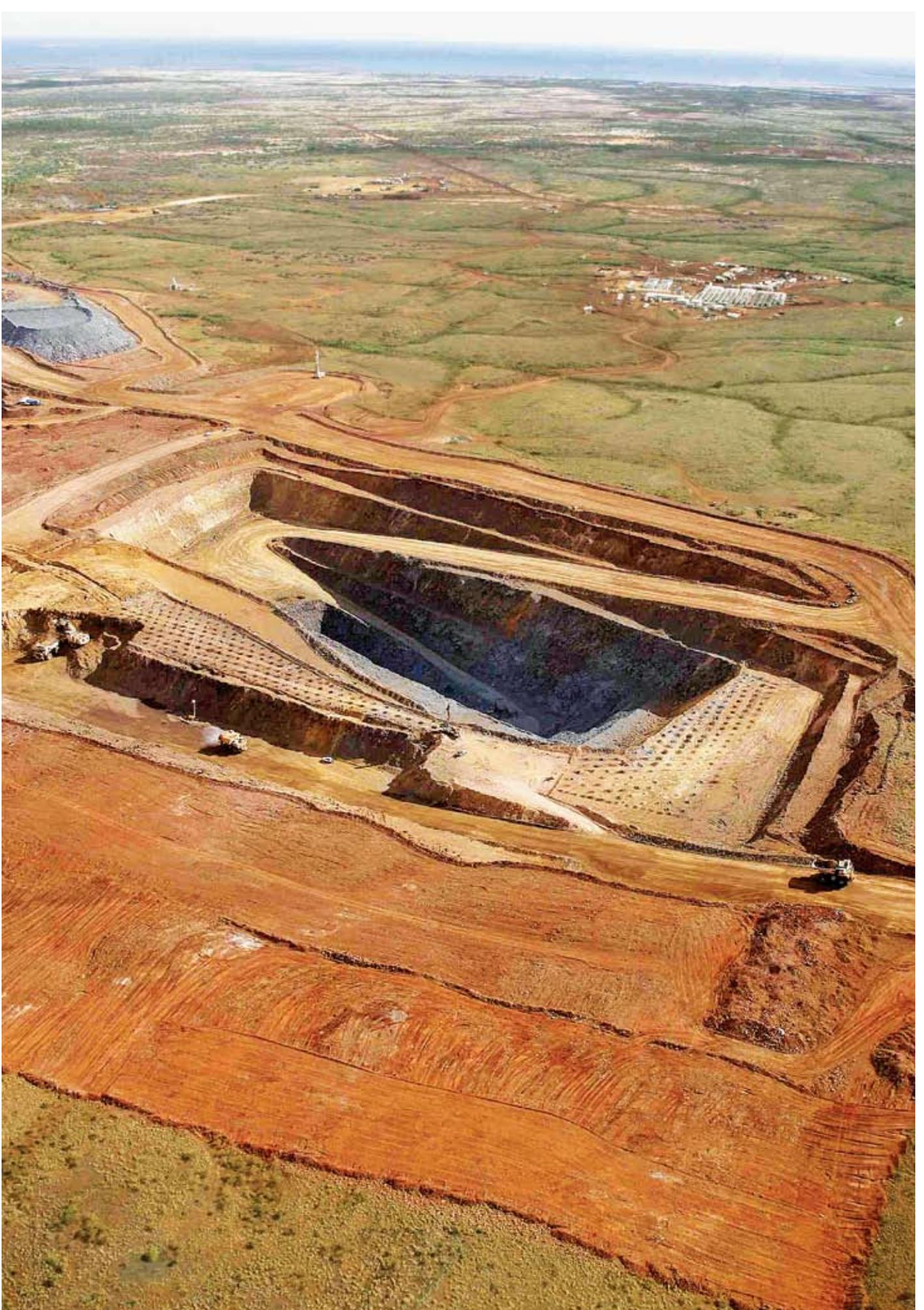
"By approving the amendments, the Government has recognised the opportunity for sustained growth and stability and the importance of reducing project risk.

"Such certainty allows us to make significant commitments like signing a major gas supply arrangement, which not only feeds our project but underpins the development of a new source of natural gas for Western Australia."

CPM has signed a seven-year supply deal, starting in 2011, for gas from the Reindeer field being developed by Apache and joint venture partner Santos.

The deal revived Apache's Devil Creek domestic gas project, which is expected to be a significant new gas supplier for Western Australia and was previously shelved as a result of the economic downturn.

Because magnetite ore undergoes the process of beneficiation prior to export, whereby waste particles are removed, Mr Fitzgerald said the sale of pellets and concentrate from Sino Iron would generate nearly double the value of traditionally mined, unprocessed direct shipping ore.



*Sino Iron's mine pit is in the early stages of development.*



*A shovel and haul truck in action at CITIC Pacific Mining's Cape Preston operations.*

"Overall we anticipate the project will add an estimated A\$75 billion in export income to the Australian economy over the next 25 years, with a significant investment in regional infrastructure," Mr Fitzgerald said.

The project is expected to directly contribute A\$3.3 billion in royalties to the State and CPM has a policy of sourcing more than 70 per cent of goods and services for the project from within Australia.

The final component in the Sino Iron grand plan is a commitment to increasing Indigenous employment in Western Australia.

"At the moment we are still growing and have a couple of hundred employees on our site in the Pilbara – of these about 30 are Indigenous and half of these employees are from traditional owner groups," Mr Fitzgerald said.

"With many resource companies trying to employ job-ready Indigenous people in the Pilbara, we are looking at reducing the barriers to entry and targeting people in the community who may have not found it easy to get work in the past." ■

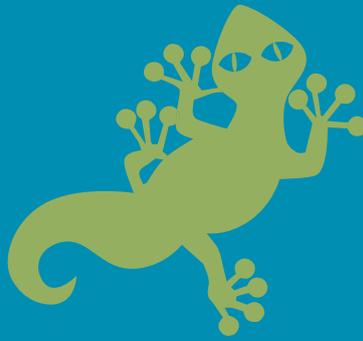
## CHINA'S IMPORTANCE TO WESTERN AUSTRALIA

China is Western Australia's largest trading partner and accounted for A\$16.9 billion worth of exports from the State in 2007-08.

This accounts for 24.9 per cent of the State's total exports, with the bulk of trade made up by resources commodities.

In the 2007-08 financial year, 58 per cent of Western Australia's iron ore exports went to China.

CITIC Pacific is one of a number of Chinese firms that have established offices in the Western Australian capital of Perth in recent years.



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# NEW DEPARTMENTS to boost resources industry

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*Western Australian Premier and State Development Minister Colin Barnett said the new Department of State Development would focus on the development of major resource projects.*

The beginning of 2009 brought with it two new State Government departments to oversee operations in Western Australia's vital mining and petroleum industry.

The Department of Mines and Petroleum (DMP) and Department of State Development (DSD) have been created by the restructure of the Department of Industry and Resources (DoIR) and Department of Consumer and Employment Protection (DoCEP).

DMP maintains a regulatory role for mines and petroleum and has incorporated the resources safety responsibilities of DoCEP.

It was created to provide a stronger focus on the resources industry within Government.

DSD will work with industry and across government to promote economic development, attract new investment and ensure the success of major public and private sector resource, industrial and infrastructure projects.

It incorporates the functions of the Office of Development Approvals Coordination, previously housed within the Department of Premier and Cabinet.

Previous DoIR Director General Anne Nolan has been appointed as the Director General of DSD.

Dr Tim Griffin, executive director of the Geological Survey of Western Australia, is the DMP's acting Director General while a permanent appointee is sought.

Western Australian Premier and State Development Minister Colin Barnett said DSD would work to attract wealth-generating private sector projects, coordinate strategic public sector infrastructure projects and assist the development of economic strategies that promoted growth.

"As Premier of Western Australia and leader of a State Government committed to economic growth, I have made investment and major project success my direct responsibility," Mr Barnett said.

"WA's vast mineral, energy and agricultural resources, coupled with our close proximity to the Asia-Pacific region gives the State immense opportunities.

"Seizing these opportunities will enable us to increase WA's already significant contribution to Australia's economy."

As well as developing and coordinating significant projects, DSD will attract investment to Western Australia, reform and monitor approvals processes and ensure the development of strategic industrial land and infrastructure.

It will also provide strategic policy advice on State development, advise businesses on global opportunities and manage and develop State Agreement Acts for major projects.

Mines and Petroleum Minister Norman Moore said DMP would be dedicated to serving mining and petroleum companies.

"Its number one responsibility is to improve the approvals process for the resources sector, in concert with a whole-of-government approach which is being undertaken across all agencies," Mr Moore said.

"It also needs to further develop the regulatory framework to accommodate important new initiatives such as uranium mining and carbon capture and storage, which may play a significant part in the future of the industry.

"Another priority in the current economic environment is to find new ways to encourage on-going investment in exploration in greenfields sites so that the mines of tomorrow are found today."

DMP regulates mining, petroleum, geothermal and carbon capture and storage activities and provides pre-competitive geo-scientific information in order to attract private sector investment in exploration and development.

The department also has responsibility for management of royalties from mining and petroleum projects and for ensuring safety, health and environmental standards that are consistent with relevant State and Commonwealth legislation, regulations and policies.

A new Department of Commerce was also created by the restructure of DoIR and DoCEP. ■



**Government of Western Australia**  
**Department of Mines and Petroleum**

- Regulates mining, petroleum, geothermal and carbon capture and storage activities.
- Attracts public sector investment in exploration and development through the provision of pre-competitive geoscience.
- Manages royalties from resources projects.
- Ensures safety, health and environmental standards consistent with State and Commonwealth legislation.

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**Government of Western Australia**  
**Department of State Development**

- Develops and coordinates significant State projects.
- Attracts strategic investment to Western Australia.
- Facilitates major resource investment.
- Reforms and monitors approvals processes.
- Identifies and ensures development of strategic industrial land and infrastructure.
- Provides strategic policy advice on State development.
- Advises Western Australian businesses about global opportunities.
- Manages and develops State Agreements.

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# KIMBERLEY LNG

## development to follow James Price Point selection

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The Western Australian Government's selection of James Price Point as the preferred site for a liquefied natural gas processing precinct is a major step towards securing economic benefits from the development of offshore petroleum resources.

James Price Point is in the Kimberley region of the State's north, about 60 km north of Broome and 300-400 km from petroleum exploration fields in the offshore Browse Basin.

The Government is studying an area extending approximately 10 km north and south of James Price Point, to identify a 1000 ha industrial site for gas processing facilities that meets technical, environmental, social impact and Indigenous heritage criteria.

The Browse Basin's proven reserves of 27.5 trillion cubic feet (Tcf) of gas and 600 million barrels of condensate, along with gas reserves estimated at 60 Tcf, make it comparable to the State's North West Shelf in terms of prospectivity.

The proposed site would be able to accommodate LNG processing facilities with a total capacity of up to 50 million tonnes per annum, and allow producers to offset development costs by sharing industry-ready land and infrastructure.

Securing processing facilities in the Kimberley would bring millions of investment dollars, hundreds of long-term jobs and create a significant diversification of the region's economy.

The Department of State Development's Gail McGowan, Acting Deputy Director General of State Initiatives, is charged with co-ordinating the detailed work needed to enable the project to proceed.

"After considering more than 40 locations and four in detail since 2007, the Government chose James Price Point as likely to work best for the environment, for industry and for the local and State economies," Ms McGowan said.

"The development will secure projects that will bring jobs, business opportunities and investment to the Kimberley for at least the next 30 years.

"Employment of up to 3000 construction workers and 400 operational staff, and other spending associated with the development, could have a positive impact to the lives of many local people.

"However, there is still much work to be done before these opportunities can be realised."

Ms McGowan said that from a technical perspective alone, choosing the best site, in an area subject to large tidal movements and cyclonic winds and rainfall, was not a straightforward matter.

"The area is covered in Pindan, a red, clayey sand up to 10-20 m deep, over limestone formations, with distances from the coastline to deep water between 5.2 and 9.5 km," she said.

"The location we choose must be able to safely accommodate major facilities and offer reasonable access to deep water.

"We will also need to carefully anticipate and manage the cumulative impacts on the local environment from the construction of port and plant infrastructure and the ongoing operations of the LNG precinct.

"Further environmental studies have already begun with Perth-based firm Biota Environmental contracted to study wet season flora and fauna during March.

"Other detailed studies will follow.

"The precinct design will have to minimise visual impacts on the landscape and coastline because the Kimberley is highly valued by Australians, including many who've never been there."

Ms McGowan said the area being considered was the subject of a Native Title claim and contained sites of Indigenous heritage significance.

"Discussions with the claimants are proceeding and we hope to reach an Indigenous land use agreement by negotiation," she said.

To assist this process the Australian Government has appointed Mr Bill Gray to facilitate negotiations between Indigenous groups, government and developers and ensure they produce a fair and reasonable compensation package.



*James Price Point, north of Broome, has been selected as the site of a new Kimberley liquefied natural gas precinct.*

Mr Gray has a long background in negotiations relating to Indigenous land and resource development issues.

Ms McGowan said that providing real long-term benefits to local Indigenous people, as well as the wider community in the Shires of Broome and Derby-West Kimberley, was a priority in planning the precinct.

Broome Shire, which includes the largest town and port in the Kimberley, has a population of more than 15,000, including about 5,000 Indigenous people living in Broome and in communities along the Dampier Peninsula.

As well as being an internationally recognised tourism destination, Broome supports pearling and pastoral industries and in recent decades has been a supply base for offshore petroleum exploration and development.

LNG processing could strengthen local economies, especially when changing global economic conditions are likely to impact significantly on international tourism.

"Ongoing consultation with Kimberley communities will help us identify

how these benefits are best realised," Ms McGowan said.

"This includes a detailed social impact assessment now underway, to anticipate the potential impact of population increases and other changes the project might bring to Broome and the Dampier Peninsula.

"The assessment will take into account the impact of the precinct development on local pearling, tourism and fishing industries and on recreational camping and fishing.

"It will also identify how local people can benefit directly from employment and from participating in the increased economic activity that LNG processing would trigger.

"This may result in a requirement for the Government and other proponents to provide training and expand community infrastructure."

Woodside Energy Ltd's Browse LNG Development joint venture, which holds a resource of about 14 trillion cubic feet of dry gas and 370 million barrels of condensate, is scheduled to begin processing LNG in the middle of the next decade.

The company is currently considering James Price Point, or existing Woodside-operated facilities located near Karratha a further 500 km away, as alternatives for processing the resource, and is expected to make a decision by mid 2009.

The Australian Government is also keen to see the Browse Basin LNG development proceed and deliver an early and productive outcome for the region.

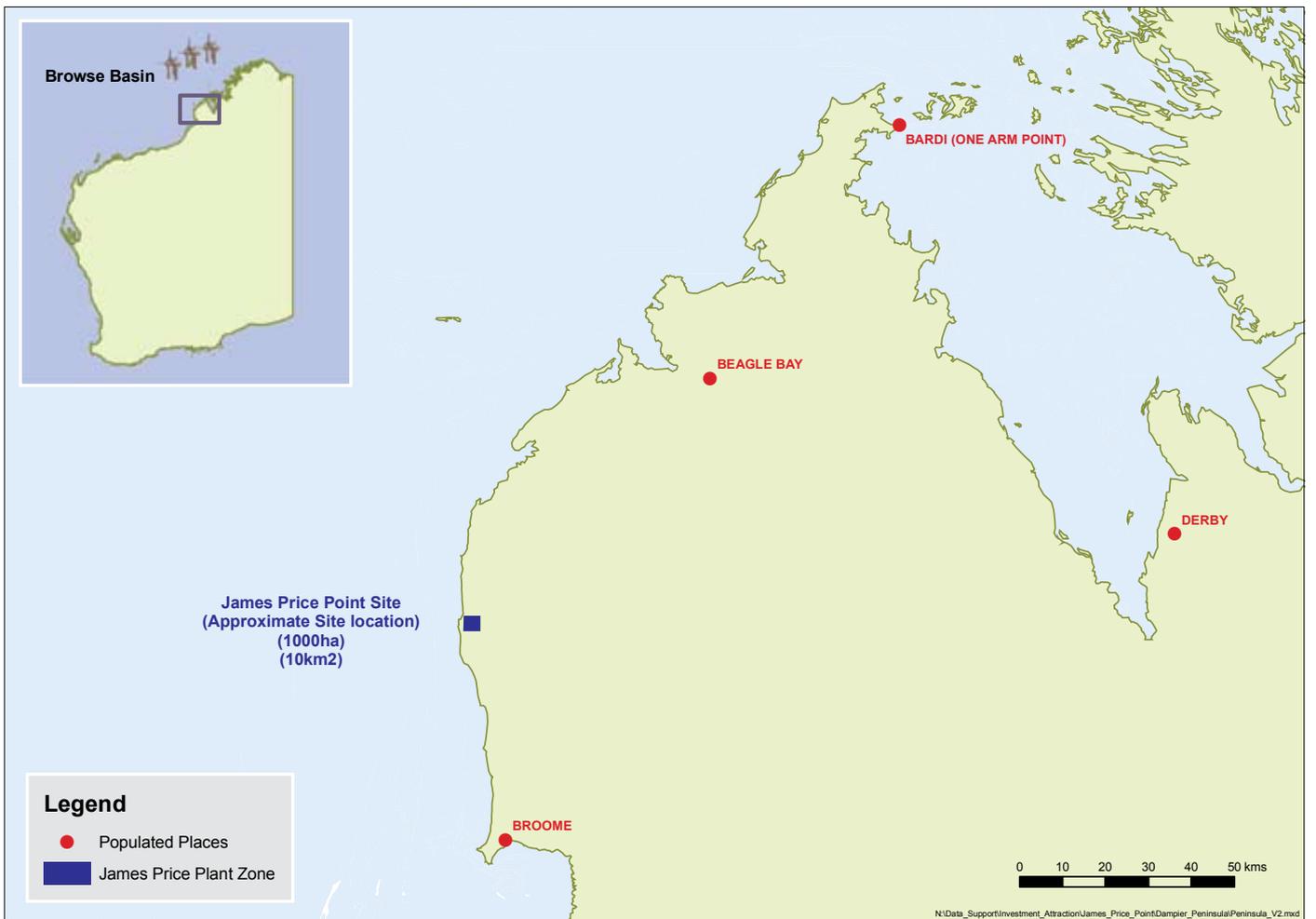
Federal Resources, Energy and Tourism Minister Martin Ferguson visited the Kimberley in February and met with local Indigenous, business, tourism and environmental stakeholders.

"Canberra is working with the State Government to provide potential developers with certainty regarding access to the proposed site," Mr Ferguson said.

"At the same time, we want to ensure that development broadens the local economy and brings real employment opportunities for local Indigenous people." ■



James Price Point is expected to accommodate LNG facilities with a capacity of 50 million tonnes per annum.



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# MILESTONE

## reached for mining tenements

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The Department of Mines and Petroleum has reached a significant milestone with the reduction of the number of pending tenement applications to fewer than 10,000.

This achievement comes about two years after the tenement backlog peaked at 18,727 pending applications, in February 2007.

It is the first time in 10 years that the backlog has fallen below 10,000 pending applications.

Department of Mines and Petroleum Mineral Titles Director Roy Burton said staff in its nine regional centres and Perth office had worked hard to clear the backlog.

"We're confident that we'll continue to reduce the backlog and streamline our approvals processes," he said.

"There has been a lot of work behind the scenes improving our internal databases while our diligent mining registrars and tenure officers have been dealing with record numbers of applications.

"From 2004 to 2008, the department received 22,871 tenement applications. In the preceding four-year period the department received only 13,581."

Mr Burton said the spike in applications was a result of changes to the *Mining Act* that came into effect in 2006.

Two of the changes were the introduction of the need to demonstrate that mineralisation had been discovered before a mining lease could be applied for, and longer terms for exploration titles.

Also, a one-year reversion option was made available to the applicants for 7700 mining leases, to encourage a return to exploration titles.

Another change to the legislation meant proponents could apply to explore a maximum of 200 blocks of land instead of 70 blocks.

"This meant that from February 2006 to February 2007, the department received more than 6630 prospecting and exploration licence applications and only 22 mining lease applications," Mr Burton said.

This year marks the start of reviewing the amended legislation by canvassing the industry about how the changes to the

Act have affected their current and proposed operations.

Mr Burton said Western Australia had the largest mineral titles system in Australia, if not the world, and the changes to the Act had made it the most effective mining legislation in Australia.

"Our statistics show the department is making good progress through the tenement backlog and I expect that we will continue to improve our processes and reach more milestones in the years ahead," he said. ■



*The Department of Mines and Petroleum has reduced the backlog of mining tenements in Western Australia to below 10,000.*

# ASHBURTON NORTH

## earmarked for LNG precinct

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A site 12 km south-west of Onslow has been identified as the potential location of a new Strategic Industrial Area (SIA) to aid the development of nearby offshore natural gas resources.

The Premier and Minister for State Development Colin Barnett has supported the development of the Ashburton North site, as an alternative to an expansion of the industrial area at Onslow, which is considered too close to the town site.

The new precinct is intended to provide an opportunity to establish processing facilities for the commercialisation of gas fields being developed in the western Carnarvon Basin, as well as any future discoveries.

Land within the SIA has already been earmarked for Chevron, which is developing the Wheatstone gas field, and BHP Billiton, which is developing the Macedon field, and the Scarborough field with joint venture partner Exxon Mobil.

Chevron's General Manager for Wheatstone, Geoff Strong said Ashburton North was selected as the company's preferred site for Wheatstone's onshore facilities after a site screening and public consultation process that considered a broad range of environmental, social and engineering factors.

"Environmental, cultural heritage, engineering and social impact studies on the site will continue to ensure its suitability," Mr Strong said.

"Chevron will maintain its consultation with the Onslow community, Thalanyji people, Ashburton Shire, Pilbara regional bodies, various government agencies and environmental stakeholders."

Chevron plans to submit a scope of studies for the environmental impact assessment for Ashburton North early this year. Front-end engineering and design for the Wheatstone Project is also expected to commence mid-year.

The company plans to develop two liquefied natural gas (LNG) trains with an export capacity of nominally five million tonnes per annum each, and a domestic gas plant with a capacity of 250 million standard cubic feet a day.

A March 2008 estimate for Wheatstone, which is located about 145 km off the coast, showed a resource of 4.5 trillion cubic feet of gas.

"This resource estimate will be upgraded once evaluation of our successful 2008 appraisal drilling program is complete," Mr Strong said.

For the time being, the global economic crisis had not threatened development of the project.

"We're closely monitoring the situation in the financial markets, including monitoring banks with whom we do business," he said.

"Chevron has a strong balance sheet and we've been taking steps to carefully manage exposures in the current environment."

BHP Billiton's Macedon gas field is located about 50 km north of Exmouth and is being investigated as the basis for a domestic gas project for Western Australia.

It has an estimated resource of 1.2 Tcf.

A BHP Billiton spokesperson said the company welcomed the State Government's support of the Ashburton North SIA.

"We are actively working to progress the Macedon gas development and in November 2008 submitted both Federal and State environmental referrals to the relevant agencies," the spokesperson said.



*Chevron External Affairs Advisor Mike Edmondson discusses the Wheatstone project during a community meeting in Onslow.*



Photos are courtesy of Chevron Australia

“We believe Macedon is one of the most mature supply options, which, upon broadening of Western Australia’s gas specification, could assist the State’s domestic gas shortage.”

Legislation is currently being drafted that will allow gas with a lower energy content into Western Australian domestic pipelines.

It was expected to be introduced to State Parliament this month.

BHP Billiton and ExxonMobil are working to identify the optimal development of the Scarborough field, which is located 280 km west of Onslow.

The BHP Billiton spokesperson said the project was in a “concept select phase”.

“The purpose of this phase is to assess all commercialisation options and define an economically viable development option for the Scarborough resource,” the spokesperson said.

The Ashburton North site covers an area of up to 8000 hectares, making it large enough to accommodate major LNG developments and other prospective industry.

Mr Barnett said it would be an exciting development for the Western Australian natural gas sector and was consistent with the Government’s policy of developing strategic industrial areas throughout the State.

“In choosing to develop the site, the Government has taken into account community interests and the suggestions of the prospective users of the new precinct,” he said.

“Ashburton North is further from the town of Onslow than the existing Onslow industrial area and has ample room for future development.

“It has suitable access to the coast for LNG developments and will be able to accommodate a mix of future industrial activities.”

Mr Barnett said the Macedon project and the domestic component of the

Wheatstone development would provide a much-needed boost to Western Australia’s future energy security.

The Government will now proceed with detailed planning for the industrial use of the Ashburton North site.

This will include a port precinct and multi-user facilities on the coastal strip, and a multi-user infrastructure corridor. ■

## GAS PROJECTS IN DEVELOPMENT IN THE WESTERN CARNARVON BASIN

**Project:** Wheatstone  
**Proponent:** Chevron  
**Resource estimate:** 4.5 Tcf

**Project:** Macedon  
**Proponent:** BHP Billiton  
**Resource estimate:** 1.2 Tcf

**Project:** Scarborough  
**Proponent:** BHP Billiton and Exxon Mobil  
**Resource estimate:** 8 Tcf

# FAMILIAR FACE

## in charge of Resources Safety Division

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*Resources Safety Division Executive Director Malcolm Russell said the success of the division was down to the professionalism and commitment of its staff.*

There is a strong sense of familiarity to the new Department of Mines and Petroleum (DMP), arising to a large extent from the return of a specialist health and safety arm.

DMP's Resource Safety Division (RSD) was created in 2005 as part of the Department of Consumer and Employment Protection and was formed by the removal of safety and health responsibilities from DMP's predecessor, the Department of Industry and Resources.

With the creation of DMP, these responsibilities were returned to the department in an effort to provide more clarity and consistency for the resources industry.

And there is also a familiar face at the helm of RSD in the form of Executive Director Malcolm Russell.

Mr Russell has been the head of the division since it split from DoIR and was also in charge of its previous incarnations as DoIR's Safety, Health and Environment Division, and Explosives and Dangerous Goods Division.

His positions outside the department include Director of Marine Safety with the Western Australian Government and Chief Executive Officer of the Marine Board of Victoria.

He has also been a member of the State's Commission for Occupational Safety and Health for the past five years.

Mr Russell studied mechanical engineering and naval architecture in the United Kingdom and worked as a maintenance project manager on the national nuclear submarine fleet before leaving the country.

RSD is responsible for administering two pieces of legislation, the *Dangerous Goods Safety Act* and the *Mines Safety and Inspection Act*.

The former covers the import, export, manufacture, storage, transport and use of dangerous goods, while the latter extends to all aspects of occupational safety and health at mine sites.

The division also regulates safety in the onshore oil and gas sector.

"What's interesting about dangerous goods is that we cover everything from the basic public firework display all the way up to most complex chemical processing plants, some of which are absolutely state-of-the-art in world terms, like the ammonia plant and the liquefied natural gas plant on the Burrup," Mr Russell said.

He said mining was a particularly hazardous profession, so there was great interest in safety across the sector.

"That is particularly so underground, where you can get a combination of the worst of the hazards – fires, use of explosives, ventilation, flooding, rock collapse, all of these things compound the normal hazard management issues that you find in any workplace," he said.

The division has four core functions in enforcing safety legislation: monitoring compliance with safety standards; issuing licences and permits; assisting in policy formation; and educating and creating awareness about safety.

Tied in with the licensing function is the responsibility for Western Australia's counter-terrorism measures related to dangerous goods such as ammonium nitrate.

Mr Russell said under these measures people with unsupervised access to explosives and ammonium nitrate needed to have a security clearance.

"What that involves is police checks and Australian Security Intelligence Organisation clearances and if you obtain these we issue a security card," he said.

"When the current phase-in period runs out later in 2009, if you don't have that security card you will not be allowed unsupervised access to some products."

There are about 145 staff within RSD, including the headquarters in Cannington and regional offices at Kalgoorlie, Collie and Karratha.

The range of skilled technicians within the division includes risk analysts, chemists, mining engineers, structural engineers and geotechnical engineers.

"What's absolutely pleasurable about this job is it's so broad, so complex and advanced that we need to employ staff who are at the cutting edge in their field because industry expects us as the regulator to be able to communicate at the same level," Mr Russell said.

"That also means that when industry are incorporating new technologies in their operations, we need to understand those new technologies, so we can't ever stay still, we've got to constantly develop our technical capability."

To achieve this, the division is about to launch a major professional development scheme aimed at constantly improving the skills of its staff.

Based on individual training needs analysis and recognition of prior learning, every member of staff will be supported in undertaking further professional development.

Mr Russell said the division had faced significant challenges in the past few years as a result of the growth in the resources and dangerous goods sectors.

"With that has come a rapid influx of people into the State, many of whom haven't had the chance to build up experience in the safety procedures applicable to the resources industries," he said.

This growth and subsequent high wages had also seen experienced staff leave the division for the private sector.

"And of course when we lose somebody it's not easy to replace those skills," he said.

"It takes probably two years between when we recruit and when the person is able to fully operate as an inspector."

Despite the challenges, the number of fatalities and lost time injuries in the industries the division regulates is at a very low level compared with previous decades.

"Since the 80s the number of employees has gone up and the number of fatalities has come down," Mr Russell said.

"I think most of our success is down to the professionalism and the commitment of our staff.

"Almost all of the people who work here are not doing so for money, they're doing so because they're interested in their professional field and making a difference in the industry."

Mr Russell believes the return of the Resources Safety Division to DMP will be a positive for industry.

"It provides excellent opportunities for the future because there's an alignment between what we do and the work done by the rest of the department," he said.

"I believe it will eliminate some inefficiencies and there should be some additional clarity for industry that results, particularly in the oil and gas sector." ■

## SPREADING THE SAFETY MESSAGE

As part of its educational role, the Resources Safety Division organises annual mine safety roadshows throughout Western Australia.

These ensure that the latest safety information for industry and access to highly trained technical staff are available in regional areas.

In 2008, an additional roadshow series focused on issues specific to mineral exploration and was well received by industry.

The annual roadshows are backed up by comprehensive health surveillance and biological monitoring systems, with results recorded in the MineHealth and CONTAM databases.

There are also databases containing information on fatalities and incidents, with statistics summarised in an annual publication.

# Dangerous Goods Security Card exemption period extended

Western Australian users of explosives and ammonium nitrate will continue to be exempt from holding a new security clearance card for a further 10 months following an extension of the exemption period.

Minister for Mines and Petroleum Norman Moore extended the transitional period to December 31, 2009.

The Minister said that when the new security vetting provisions were in force, they would require all licence holders and their key supervisory employees to be security cleared by WA Police.

"In the form of photo identification, the Dangerous Goods Security Card will be issued by the Chief Dangerous Goods Officer on the advice of the Commissioner of Police," he said.

"That advice will follow the police security clearance that considers the applicant's criminal history and advice from the Australian Security and Intelligence Organisation.

"Security checking is deliberately complex, but my department is looking at ways to streamline the process."

"The exemption will enable the mining and associated industries that handle explosives and ammonium nitrate to continue to operate lawfully."



*The new licence will apply to fireworks handlers.*

# WORK BEGINS

## to remove Esperance lead stockpile

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The removal of 9000 tonnes of stockpiled lead carbonate from Esperance Port, in Western Australia's south, has begun.

The lead will be removed with the help of specialised bagging equipment and a dust extraction system.

At the time of the announcement, Deputy Premier Dr Kim Hames said he was pleased the bagging machine and dust extraction system were on site at the port and being assembled ready for work.

Dr Hames said the bagging process would be carried out to an extremely high standard to protect the local community and environment.

"The lead will be placed in double-lined two tonne bags and sealed and stored in containers in a designated dangerous goods storage area ready for export to China.

"To prevent any dust escaping, a negative pressure system has been installed in the sheds where the bagging of the lead and containerising of the bags is carried out. The whole process will be carefully monitored.

"The Department of Environment and Conservation will have officers on-site during operations to ensure compliance with the strict conditions imposed on the port, with all monitoring results to be made available to the community.

"A container ship has been arranged by Magellan Metals and will berth at Esperance to collect the containers once the bagging has been completed, which is expected to take about 10 weeks."

Dr Hames said in addition to handling the lead issue, strict conditions on the export of nickel sulphide had been set down.



*Bagging and removal of lead from Esperance Port has begun.*

"The port of Esperance is now operating under the most stringent environmental licence issued to a WA port," he said.

"The Esperance community is protected by the most sophisticated emission monitoring network ever seen used for a port in this State before.

"Furthermore, the licence contains dust targets and the requirement for the port to have a ship-loading protocol, based on Department of Health advice, which takes into account onshore wind conditions."

Dr Hames said that progressively over the next two years, Esperance would get a purpose-built bulk handling facility for nickel sulphide and other metal concentrates that would be to world's best standard.

In the interim, licence conditions will require the port to undertake modifications to its facilities to ensure the community's health is protected. ■

Deputy Premier Kim Hames said the State Government had:

- Committed more than A\$100million to upgrade facilities for bulk exports
- Negotiated a A\$10million compensation package from Magellan Metals, including A\$1million for community projects in Esperance
- Committed to cleaning-up the Esperance town site and homes, including ceiling voids, with sampling afterwards to ensure it's done properly
- Fitted reverse osmosis filters to the homes of families with young children with elevated blood lead levels
- Appointed an independent environmental auditor to audit all stages of the lead-removal process.

# NEW SYSTEMS

## keep WA at forefront of resource management

The Department of Mines and Petroleum (DMP) has introduced two new business systems designed to increase its efficiency and maintain Western Australia's position as a leader in resources industry management.

The new Electronic Mineral Titles System (eMiTS) will play a vital role in the management of Western Australia's system of mineral titles – one of the biggest in the world.

The web-based platform will form a major part of the department's provision of titles to the mining sector, by allowing for quicker processing by staff in the Perth and regional offices.

DMP has also become the first government regulator in Australia to offer online payments for annual and title search fees for petroleum and geothermal companies.

DMP acting Director General Tim Griffin said eMiTS would increase security of exploration for industry and ultimately deliver benefits to the entire Western Australian community through a more robust mining sector.

"Due to its improved capabilities, eMiTS will free up departmental resources for important outcomes such as reducing the approvals backlog for new projects," Dr Griffin said.

The new system integrates with DMP's Tengraph spatial management system and registers information on mining tenements such as the holder, location, title encumbrances, conditions of grant, and rental and expenditure details.

It forms the back-end to the department's Mineral Titles Online

(MTO) service, which has been in place for six years and has more than 12,000 registered uses within the prospecting, mining, surveying, geology and tenement consulting fields.

"eMiTS has also created a platform for the introduction of future service improvements, such as online lodgement of tenement applications, payments and compliance reporting, creating further efficiency gains for the mining sector," Dr Griffin said.

The online payment option for petroleum and geothermal companies has been made possible through modifications to the Petroleum and Geothermal Register (PGR), an electronic titles system used by DMP's Petroleum and Environment Division.

"The introduction of online payments will simplify business practices for business and also free up resources within DMP," Dr Griffin said.

The PGR was introduced at the beginning of 2008 to streamline and simplify business processes for recording, tracking and maintaining information relating to petroleum and geothermal titles in State and Commonwealth jurisdictions.

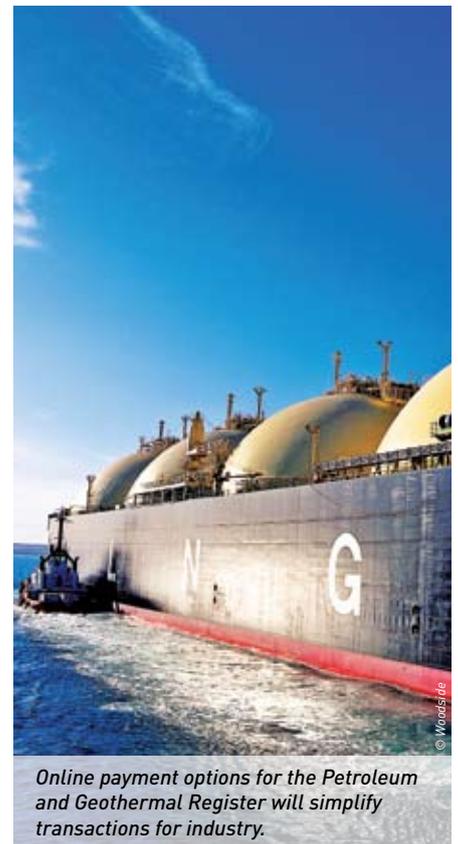
"Other States and Territories have since expressed an interest in adopting a similar system and are using the PGR as a benchmark," Dr Griffin said.

"The PGR and its online payment options were developed following extensive consultation with State and Commonwealth government departments, banks and industry representatives."

Further modifications to the system expected early this year will offer more enhancements and payment options.

"The changes to the PGR and the introduction of eMiTS will deliver important outcomes in terms of streamlining business practices inside and outside the department," Dr Griffin said.

"The implementation of these new systems is testament to the hard work of a great many staff members at the Department of Mines and Petroleum." ■



*Online payment options for the Petroleum and Geothermal Register will simplify transactions for industry.*

# DRILLING

## could unlock potential of tight gas

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Drilling that began at a site 200 km north of Perth in January could have enormous repercussions for Western Australia's domestic energy security.

Latent Petroleum and its joint venture partners Alcoa and TranServ Energy are developing what is potentially the State's first tight gas project at the Warro gas field.

If they are successful, it could encourage the development of further reserves in the South West region and create a viable supply alternative to conventional gas from the offshore Pilbara region in the State's North West.

Tight gas is found in rock with low permeability and requires expensive specialist drilling equipment and technology for extraction.

But there is enough gas in the Warro field alone to provide for more than 10 per cent of Western Australia's current consumption.

Latent Petroleum Managing Director Stephen Keenihan said the field had been discovered in the 1970s but languished since then due to low gas prices.

"In the last 30 years there have been substantial improvements in technology and recently the price of gas has increased significantly," he said.

"Warro is the largest tight gas field discovery to date (in Western Australia), and, if the new technology can be applied successfully, will become a substantial and secure supplier of gas."

The field, located in the onshore Perth Basin within the Shire of Dandaragan, could yield 1-3 trillion cubic feet (Tcf) of gas over its lifetime and produce more than 100 terrajoules of energy per day.

"That would make it on par with the larger offshore fields," Mr Keenihan said.

"Warro has the added benefit of being close to Perth, so it will provide a secure and reliable source of gas and could act as a buffer in energy supply should offshore gas be disrupted.

"Importantly, success at Warro will show that tight gas accumulations in the Perth Basin can be commercially exploited and this will provide impetus for further exploration and development."

The Department of Mines and Petroleum (DMP) estimates there is between nine and 12 Tcf of gas in the Perth Basin, which would be enough to supply the State for up to 30 years.

Natural gas makes up half of Western Australia's energy supply and all of this currently comes from just two suppliers, from operations thousands of kilometres away from Perth and the bulk of consumers.

The lack of supply alternatives was brought into sharp focus last year when a pipeline ruptured at Apache Energy's Varanus Island facility, temporarily cutting almost a third of the State's gas supply.

The Warro gas field is just 30 km from the Dampier-to-Bunbury Natural Gas Pipeline, the major gas transmission structure in the State.

It is also the same distance from the Parmelia Pipeline.

Latent expects to drill two new wells during 2009 after taking delivery of a specialist rig from the United States late last year.

The company's founders have experience in the US tight gas industry, which provides up to 30 per cent of that country's total gas production.

Mr Keenihan said the joint venture was currently drilling its Warro-3 well and, if successful, the results would determine how quickly the development would proceed.

"Of course no one is immune to the current global financial uncertainties, but Warro is well positioned to supply gas into the WA market," he said.

"We hope to be in a position to produce gas in 2010 but the first gas not only depends on technical success, but also the timing of Government approvals and the right fiscal regime."

Latent is planning for a successful outcome from this process and has already applied for its pipeline licence.

The company is also in discussions with the State Government on an appropriate royalty regime for the project.

"Tight gas industries at their start-up stage have elsewhere been provided with incentives that acknowledge their embryonic nature and considerable risks and costs," Mr Keenihan said.

If the Warro development is successful, Mr Keenihan said it would lead to the creation of a Western Australian industry for fracture stimulation, which is required to extract tight gas.



*Latent Petroleum is using a 1500 horsepower drilling rig from the United States to develop Western Australia's first tight gas operation.*



*Tight gas operations are more labour-intensive than conventional petroleum operations.*

“Latent hopes to be at the forefront of this industry and we would expect that our experience at Warro will place us in a strong position to be a significant player,” he said.

Mines and Petroleum Minister Norman Moore visited the Warro site in February to investigate its progress.

He said Western Australia had the most energy-intensive economy in Australia.

“Along with other new developments such as geothermal energy, tight gas provides a genuine supply alternative in a convenient location for the domestic market,” Mr Moore said.

“It also opens up the energy market to a broader range of companies and creates significant new employment opportunities in regional areas because tight gas operations are more labour-intensive than conventional gas operations.”

DMP and its predecessor, the Department of Industry and Resources, have encouraged development of tight gas resources through industry consultation, workshops and the release of acreage for exploration. ■

## TIGHT GAS IN THE PERTH BASIN

There is an estimated 12 trillion cubic feet of tight gas in the Perth Basin, which is enough to satisfy Western Australia's needs for up to 30 years.

Discoveries have been made since the 1960s but there is yet to be a successfully developed tight gas operation in the State.

Most interest has focused on the Warro, Whicher Range and West Erregulla fields.

Tight gas operations in Western Australia are only considered economical to develop near recognised markets and existing pipelines.

# WESTERN AUSTRALIAN geoscientist goes global

One of Western Australia's leading geoscientists has returned from a world-wide trip promoting the State's mineral deposits.

Dr Franco Pirajno, from the Department of Mines and Petroleum's (DMP) Geological Survey Division, travelled to London, Moscow, Siberia and Beijing to present a series of lectures on WA's vast mineral deposits and unique geological features.

Dr Pirajno was selected to perform the lecture tour from a number of candidates by the International Association of Genesis Ore Deposits.

He said the tour provided an opportunity to market the State to an international audience of experts in mineral systems.

"In my opinion the tour was successful in showcasing what we have in our country in terms of mineral deposits, many of which are world-class," he said.

"This means that the prospect for similar deposits is very good."

Dr Pirajno, who has worked for the Geological Survey for the past 15 years, said one of the tour highlights occurred in Novosibirsk, Siberia.

"During my lecture in Novosibirsk, I had a large audience of more than 100 geoscientists from many parts of Siberia and Far East Russia," he said.

"They were fascinated not only by the presentation on the geology and mineral deposits of WA but also by its scenery and wildlife.

"I couldn't help but also showcase Australia's kangaroos, snakes and goannas and by the end of the lecture, I was faced with many questions with excited people wanting to know more."

Originally from Italy, Dr Pirajno moved to Australia and dedicated his professional life to exploring and cataloguing Western Australia's vast mineral deposits and geological features.

He has written several books on the State's mineral deposits, contributed to geological maps and reports, and had papers published in international journals.

His work with the DMP is currently focused on encouraging exploration in greenfield areas.

Dr Pirajno said the response from delegates while on the tour was extremely positive.

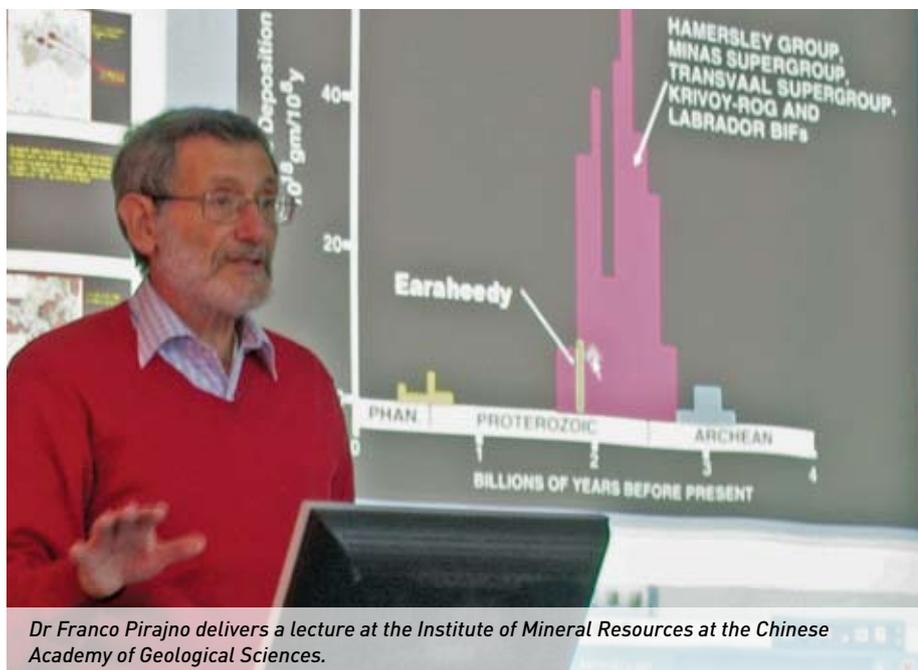
"There was a lot of curiosity about our far away country from people in Russia, where not a whole lot about Australia is publicised" he said.

"There was a similar reception in China, where I pointed out the importance of our mineral resource exports to Chinese industries.

"Chinese attendees really appreciated learning more about the mineral and energy resources that power their economy."

Dr Pirajno said in terms of business and investments, interest in Western Australia was most likely to come from China but the ice had at least been broken with the group of Russians, who now knew a bit more about the State.

The lecture tour took place from November 22 to December 10, 2008. ■





*The Mid West Indigenous Skills Study is expected to create new opportunities for the Mid West Indigenous population.*

© Gindalbie Metals

## Indigenous employment the focus of A\$60,000 Mid West study

A major study set to begin will identify the needs of Mid West-Murchison Indigenous people looking to enter the mining industry.

The Mid West Indigenous Skills Study will gather important data on the numbers of Indigenous people in the region and sub-regions of the Mid West-Murchison, along with information about their preferred jobs, levels of skills and job preparedness.

Initiated by the Midwest Mining and Aboriginal Economic Development Partnership, the study will also help partnership members identify any gaps and training needs of local Indigenous people seeking to enter the industry.

The Geraldton Iron Ore Alliance (GIOA) committed A\$60,000 to fund the study from November 2008 and Oakebribe Pty Ltd was engaged in February this year through a submission process.

GIOA Chief Executive Rob Jefferies said the study was one of the first steps in ensuring the Mid West iron ore industry was able to provide sustainable employment opportunities for Indigenous people.

"Alliance members have a genuine interest in offering employment to people in the region they are working in," he said.

"By gathering this information we will be better able to work with the local TAFE, educational and Indigenous training organisations to ensure we are providing the right training and skills development that the local people require.

"The Mid West-Murchison region's iron ore industry is very new and in the early

stages the aim is to have skilled workers ready to take up the available jobs as it fires up."

Some of the Mid West-Murchison region development Mr Jefferies expected to be underway within the next five years included the Oakajee Port development and the Northern Rail project.

Gindalbie Metals' Karara iron ore project is also scheduled to start construction in the coming months, and its major magnetite project will potentially employ about 500 people, starting from 2010.

A further major magnetite project nearby will be Asia Iron Holdings' Extension Hill, proposed to be operational by 2011.

"The development of these significant mining projects, together with major hematite mines in the Murchison region, planned to commence when Oakajee Port is in place, creates an excellent opportunity for good employment outcomes for our Indigenous population," Mr Jefferies said.

"Unemployment within the Indigenous community is unacceptably high, with almost 50 per cent of the region's 3077 registered unemployed being Aboriginal people, when only 10 per cent of the Mid West population is Indigenous.

"We are planning for an industry with a life in excess of 40 years and the Indigenous Skills Study is just one strategy being implemented to deliver sustainable outcomes for the communities and industry of the Mid West region."

The methodology of the study will ensure it can be replicated at any time if required in smaller areas, to provide

snapshots prior to start up and beyond, or to monitor success of the project.

Expected to be completed by June or July this year, the study will occur in parallel with another study, the Indigenous Employment Gateway, to be led by the Mid West Development Commission and also partly funded by GOIA.

The aim of the second study is to develop organisation and business plans for a "one-stop-shop" for Indigenous employment in the region.

"We strongly believe in the need to build the capacity of Indigenous communities and organisations to facilitate employment for their people," Mr Jefferies said. ■

### **Geraldton Iron Ore Alliance**

The Geraldton Iron Ore Alliance was formed in 2005 to promote the burgeoning iron ore sector in the Mid West region of Western Australia.

It is made up of Asia Iron, Atlas Iron, Crosslands Resources, Gindalbie Metals, Golden West Resources, Midwest Corporation and Royal Resources – all companies that are exploring or developing iron ore projects in the area.

The members have agreed to cooperate in areas such as infrastructure and Government and community relations.

The alliance hopes to establish the Mid West as Australia's second major iron ore region, after the Pilbara, also in Western Australia.

# WESTERN AUSTRALIA

## turns up the heat

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Harnessing geothermal energy on a large scale in Western Australia has moved a step closer with the release of the preferred applicants for geothermal exploration in the Perth Basin.

The majority of the applicants are expected to use the geothermal energy to generate electricity for the State's power needs.

There is also the possibility of using geothermal energy to air-condition small cities.

Mines and Petroleum Minister Norman Moore, who announced the preferred applicants at an event at the University of Western Australia (UWA), said the release heralded the start of a new industry which would reap benefits for the State's economy.

"The expected expenditure for geothermal exploration for the 36 permits in the Perth Basin is more than A\$560 million in the next six years," he said.

"This industry has the potential to provide clean energy to the State's electricity network and to offer innovative solutions for companies to meet their own power requirements.

"Harnessing geothermal energy for heating and power use is another feather in the State's clean energy cap."

UWA, which submitted a joint application with Green Rock Energy, plans to harness the geothermal energy below its Crawley grounds to power the campus' air-conditioning and heat its swimming pools.

The university also hopes that data collected from its geothermal-powered air-conditioning plant will further its case for a desalination plant that uses geothermal energy to create fresh water.

UWA holds a provisional patent on a geothermal desalination plant that could boost the freshwater yield of a typical multi-effect distillation desalination plant by 30 to 40 per cent.

The university is also home to the Geothermal Centre of Excellence, a joint venture between the CSIRO, UWA and Curtin University of Technology.

The centre, which was given A\$2.3 million by the State Government last year, will build capacity and knowledge in Western Australia to undertake exploration and development of geothermal resources.

The centre is led by Professor Klaus Regenauer-Lieb, a geothermal expert and Premier's Research Fellow in Multi-scale Earth System Dynamics.

Professor Regenauer-Lieb, who believes that geothermal energy can be used to air-condition Perth cities, said the centre would contribute to addressing the global problem of securing low-emission energy sources.

"Geothermal energy is classically used in volcanic settings in many countries such as the USA, Iceland and New Zealand for power generation and has been used in WA for heating the swimming pools at Challenge Stadium and Christ Church Grammar School," he said.

"We want to go one step further and use our natural, hot, geothermal water to air-condition cities."

He said the centre would focus on the geological setting of sedimentary basins like the Perth Basin where heat was available for use.

Geothermal groundwater convection in such basins provides a natural underground heat exchanger.

The geothermal acreage releases are in the Perth metropolitan area; south of Kwinana; north of Bunbury; west and southwest of Collie; and south of Geraldton.

A second geothermal acreage release, for the Carnarvon Basin, was issued in mid-August and closed in February 2009.

The Carnarvon Basin includes the Pilbara and Gascoyne regions where the majority of Western Australia's resources industry activity occurs.

Geothermal energy produced in these areas could be used to power mining, petroleum and industrial operations, as well as important regional centres, ports and infrastructure. ■



*Minister Norman Moore, Professor Hui Tong Chua and Professor Klaus Regenauer-Lieb discuss the UWA geothermal project.*



*Minister Norman Moore and Professor Hui Tong Chua visit an air-conditioning plant.*

## PREFERRED APPLICANTS FOR THE PERTH BASIN GEOTHERMAL RELEASE:

- Green Rock Energy /University of Western Australia - one area in Perth
- Green Rock Energy/Worlsey Alumina - three areas
- Green Rock Energy/ARC Energy - eight areas
- Green Rock Energy - three areas
- AAA Energy - one area
- Austral Iron - one area
- New World Energy Solutions - nine areas
- Granite Power - two areas
- Geothermal Power - three areas
- Torrens Energy - two areas
- Thermal Resources - three areas

# KARRATHA

## housing relief on horizon

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It has become a well-known fact that accommodation in the key mining town of Karratha, in Western Australia's Pilbara region, is at a premium.

Although demand for housing has abated slightly with the fallout from the global financial crisis, finding somewhere affordable to live in Karratha is still a difficult task.

Rents are extremely high, even by city standards. A three-bedroom house can cost between A\$900 and A\$1300 a week and a 40-year-old three-bedroom home sells for about A\$630,000.

Anecdotes include people sleeping in cars on the side of the road or of tents pitched in friends' backyards.

While this makes life hard for those who work for resources companies, it makes it even more arduous for small business employees. In some cases, it makes living in Karratha impossible.

To alleviate the shortage, the Western Australian government's land and property developer, LandCorp, has allocated 50 residential lots to local businesses in its latest land release of 194 lots.

The plan is that local businesses, many of whom have struggled to accommodate staff, will build houses for their employees.

Ray White co-director Richard Naulls said 16 businesses registered their interest on the first day and were lined up outside the office at 7am.

"It's going to bring people into town instead of living in caravans in the light industrial estate," he said.

LandCorp, in conjunction with the Pilbara Development Commission and the Karratha and Districts Chamber of

Commerce, surveyed local businesses before the release, asking them what their staff accommodation difficulties were and what they thought the solution would be.

LandCorp Regional Manager Ben Killigrew said the agency had wanted a better idea about what style of accommodation businesses wanted for their staff in future land developments and, more importantly, to ensure lots of various size and pricing were immediately available to businesses.

He said 89 businesses responded to the survey.

"We are trying to create permanency for Pilbara towns, and obviously local businesses are an integral part of the towns' and the regions' productivity," he said.

Mr Killigrew said demand for housing had been an issue in the Pilbara during the recent boom and the agency had been working to release enough land to keep up.

"Demand for many things, including land was very strong," he said.

"There were often thousands of workers required at relatively short notice for construction of some of the bigger resource projects in and around the Pilbara.

"This led to extraordinary demand for somewhere to stay in Pilbara towns, the largest of which are only able to house around ten to fifteen thousand full-time residents."

According to Karratha Chamber of Commerce and Industry President Julie Pope, small business owners have had to contend with a revolving door of employees who work in town for a

short time before either finding a higher paying resources job or leaving because accommodation is too difficult to find or prohibitively expensive.

Ms Pope said wages had risen to compete with the resource companies, but the issue now was where to house employees.

"We've had stories of employees, whether they've told their employers or not, pitching tents and sleeping in cars," Ms Pope said.

"Or of up to eight people in one house.

"That does happen, you can drive around town and think that there's a party at someone's house and there's not – it's just where they live."

Roebourne Shire President Brad Snell agrees that having a stable workforce is important for the community.

"The Shire of Roebourne welcomes this (the business lot allocation)," he said.

"It's been a long standing problem in the Shire. Small businesses found it difficult to expand because of accommodation shortages for their employees.

"Even though the current economic circumstances are a bit difficult, the long-term prospects for Karratha are particularly good.

"With the mixture of oil and gas, iron ore and other projects, we're still expecting a rosy future for the Pilbara.

"We know that there's got to be a combination of fly-in, fly-out and residential, but from the Shire's point of view, we'd like these towns to be as normal possible, we want people to be able to see this as their home." ■



*Landcorp has allocated 50 housing lots to Karratha small business owners.*



*The new housing is designed to help businesses attract and retain workers who would ordinarily have difficulty finding accommodation in Karratha.*



*The long-term prospects for Karratha are promising despite the current economic crisis.*

## IRON ORE

### Cape Lambert - Port Expansion

ROBE RIVER MINING CO PTY LTD

The construction of the upgrade to Cape Lambert Port has been completed, and the ramp-up towards a capacity of 80 Mt/a is nearing completion. The port will be able to operate at full capacity within the first half of 2009.

Expenditure: \$1.1b.

Employment: Construction: 450; Operation: 70

### Pilbara - Iron Ore Mine, Rail and Port Development

FORTESCUE METALS GROUP LTD

FMG 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. First exports of iron ore to China commenced in May 2008.

Expenditure: \$3.2b.

Employment: Construction: 2500; Operation: 870

## OIL & GAS DEVELOPMENTS

### Carnarvon Offshore Basin - Vincent Oil Field

WOODSIDE ENERGY

The field is located approximately 50 km northwest of Exmouth in a water depth of about 350 m. Oil is produced through an eight well subsea development and processed and stored in a Floating Production Storage and Offloading (FPSO) vessel. Q4 2008 was the first full quarter of production from the Vincent field. The field was producing approximately 35,800 bbl per day at the end of the quarter.

Expenditure: \$1b.

## BAUXITE

### Boddington - Alumina Refinery Expansion

BHP BILLITON

BHP Billiton announced the go-ahead for the A\$2.5 billion Efficiency and Growth expansion project at its Worsley alumina refinery in May 2008. 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. Construction has commenced and first production is expected in the first half of 2011.

Expenditure: \$2.5b.

Employment: Construction: 1500; Operation: 200

## COAL

### Collie - Collie Coal Mine (Ewington I)

THE GRIFFIN COAL MINING COMPANY PTY LIMITED

In March 2008, Griffin Coal commissioned a demonstration scale char plant (capacity 0.2 mt/a) adjacent to the Ewington I mine and 4.5 km from Collie. The proposed full scale production plant will convert up to 800,000 t/a of coal from the Ewington II mine to 400,000 t/a of char from two process units. The plant will produce a high value char suitable for steelmaking, as well as generation of 24 MW of power.

Expenditure: \$20m.

## DIAMONDS

### Kimberley - Argyle Diamond Mine

ARGYLE DIAMOND MINES PTY LIMITED

Development of the Argyle Diamond Mine commenced in 1982 and mining commenced 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 mine expansion. Commencement of underground operations occurred in Q4 of 2008 with the first blast of the undercut having been achieved. Due to current global market conditions Argyle Diamonds has

slowed down its underground development, resulting in a workforce reduction. The company remains committed to the underground expansion; however it expects the slowdown to delay the ramp up to full production by approximately 18 months.

Expenditure: \$1.2b.

Employment: Construction: 250; Operation: 500

## ELECTRICITY

### Collie - Bluewaters I and II Coal-fired Power Stations

GRIFFIN ENERGY PTY LTD

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 I coal-fired baseload power station is expected by early-to-mid 2009. Griffin expects the second of the two power stations (Bluewaters II) to be commissioned in late 2009.

Expenditure: \$400m.

Employment: Construction: 600; Operation: 50

### Karratha - 7 Mile Power Station

HAMERSLEY IRON PTY LIMITED

Rio Tinto has proposed a power infrastructure rationalisation program and upgrade for its mining and port operations in the Pilbara region. Hamersley Iron Pty Ltd is constructing a new power generating facility at 7 Mile near Karratha. Robe River Mining Company Pty Ltd is constructing a 220 kV transmission line and a sub-station at Cape Lambert. The Cape Lambert sub-station will be linked to the 7 Mile main power generator via the new transmission line. Hamersley and Robe will share the generation capacity created by the new power station. This new single station will replace the two aging plants at Dampier and Cape Lambert. Construction of this project has commenced.

Expenditure: \$500m.

## GOLD

### Boddington - Gold Mine

BGM MANAGEMENT COMPANY PTY LTD

BGM Management Company Pty Ltd, on behalf of Newmont and AngloGold Ashanti, is developing the Boddington Gold Mine based on mining the extensive bedrock resource that underlies the mined-out oxide resource. The mine has been in the construction phase since 2006 and initial production is expected by mid 2009. Production will be around 800,000 oz/a of gold and about 30,000 t/a copper in concentrates over a 17-year mine life.

Expenditure: \$2b.

Employment: Construction: 1500; Operation: 650

## HEAVY MINERAL SANDS

### Narngulu - Processing Facility Expansion

ILUKA RESOURCES LIMITED

Iluka has commenced an upgrade of its Narngulu processing facility to treat ore from South Australia to supplement a diminishing supply from its Eneabba mining operations. Iluka will treat up to 600,000 t/a of heavy mineral concentrate from its Jacinth-Ambrosia deposit in South Australia at Narngulu, starting in early 2010. Up to 350,000 t/a of zircon will be produced at the plant.

Expenditure: \$63m.

Employment: Construction: 100; Operation: 8

## IRON ORE

### Mid West - Extension Hill Hematite Mine

MT GIBSON IRON LTD

Mount Gibson Iron has environmental approval for a 2 Mt/a hematite mining operation at Extension Hill, 330 km south-east of Geraldton. The ore will be trucked to a rail head near Perenjori then railed to the port of Geraldton for export. The Mount Gibson board has approved commencement of construction

of the project. Subject to secondary government approvals, Mount Gibson expects to have initial shipments in Q2 2009.

Expenditure: \$73m.

Employment: Construction: 150; Operation: 100

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

MIDWEST CORPORATION LIMITED

Midwest Corporation commenced transporting iron ore fines from stockpiles at Koolanooka, about 160 km south east 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 the timing of government approvals. The re-opening of the mines is being environmentally assessed at a Public Environmental Review level.

Expenditure: \$26m.

Employment: Construction: 40; Operation: 60

### Pilbara - Pardoo Hematite Direct

Shipping Ore Mine

ATLAS IRON LTD

Atlas Iron is an active explorer and developer focused on iron ore projects. The company started exporting in December 2008. With a growing number of iron ore projects and a large landholdings in the Pilbara (9,600 km<sup>2</sup>) located close to existing infrastructure, the company is effectively defining resources and reserves capable of being mined with relatively low capital expenditure. Initial production is from its Pardoo project, located some 75 km east of Port Hedland. The company has exploration programs underway across its tenement portfolio, with an exploration target of 160 to 220 million tonnes grading 57-60 per cent iron. This will underpin an expanded long-term production business.

### Pilbara - Rapid Growth Project 4

BHP BILLITON IRON ORE PTY LTD

BHP Billiton Iron Ore has obtained all relevant government approvals and is currently expanding the production capacity of its Western Australian iron ore operations from 129 Mt/a to 155 Mt/a to operate from 2010. The increased production will be achieved through infrastructure upgrades and the creation of a Newman hub. The company is also undertaking a parallel expansion Rapid Growth Project 5.

Expenditure: \$2.84b.

Employment: Construction: 3500

### Pilbara - Rapid Growth Project 5

BHP BILLITON IRON ORE PTY LTD

BHP Billiton Iron Ore is currently in the process of obtaining all relevant government approvals for a further production capacity expansion of its Western Australian iron ore operations to 205 Mt/a in 2011. The increased production involves mine expansions, railway duplication and additional berths at Port Hedland. The company is in the study phases for future potential expansions.

Expenditure: \$7.365b.

### Pilbara - Brockman Syncline 4 Iron Ore Mine

HAMERSLEY IRON PTY LIMITED

Hamersley Iron is developing the Brockman Syncline 4 iron ore deposit. Construction work has commenced. Full capacity of the project will be 22 Mt/a.

Expenditure: \$1.52b.

Employment: Operation: 1500

### Pilbara - Mesa A/Warramboe Iron Ore

ROBE RIVER MINING CO PTY LTD

Robe River Iron Associates is developing the Mesa A mine in the Western Pilbara. Production is planned to be approximately 25 Mt/a. Construction commenced in January 2008.

Expenditure: \$1.1b.

## IRON ORE PROCESSING

### Cape Preston - Sino Iron Pellet Project

CITIC PACIFIC MINING

CITIC Pacific Mining, a Chinese-owned company, received ministerial approval on 2 May 2008 for the development of a magnetite iron ore mine and pellet plant with a capacity of 6 Mt/a. A bulk sample has been completed and construction has commenced on a concentrator, pellet plant, slurry pipeline, port facilities, 240 MW power station and desalination plant to 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: \$5.2b.

Employment: Construction: 2500; Operation: 500

## OIL AND GAS DEVELOPMENTS

### Carnarvon Offshore Basin - Pluto LNG

WOODSIDE ENERGY

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

### Carnarvon Offshore Basin - Pyrenees Development Oil Fields

BHP BILLITON PETROLEUM AUSTRALIA PTY LIMITED

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 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.

### Carnarvon Offshore Basin - Van Gogh Oil Field

APACHE ENERGY LIMITED

The Van Gogh oil development, located about 50 km north-west 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. Subject to obtaining all the necessary government approvals, the field installation of Van Gogh is expected to be in production by mid 2009. The expected life of the development is 12-15 years.

Expenditure: \$600m.

## 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 per cent grade for 1.18 Mt rare earth oxides (REO). The development involves an open-pit mine and concentration plant at Mt Weld. The concentrate will be containerised on site then trucked to Leonora and railed to a container port for export. The first mining campaign was completed in May 2008 and construction of the concentration plant has commenced. The ore will be shipped to a US\$214 million processing plant in Malaysia, which will have an initial production capacity of 10,500 t/a REO in Q4 2009 and is then expected to be expanded to 21,000 t/a in 2011. On 10 February 2009, Lynas announced that as a result of the uncertainty concerning the financing structure for the project, it is proposing to suspend work.

Expenditure: \$115m.

Employment: Construction: 12; Operation: 40

## TITANIUM DIOXIDE PIGMENT

### Kwinana - Titanium Dioxide Pigment Plant Expansion

TIWEST JOINT VENTURE

The Tiwest Joint Venture partners, Tronox Incorporated subsidiary Tronox Western Australia Pty Ltd, and Exxaro Resources Limited subsidiary Yalgoo Minerals Pty Ltd, approved an expansion at their Titanium Dioxide Pigment Plant in Kwinana that will see production capacity increase from 110,000 t/a to about 150,000 t/a. Construction is due to commence in Q1 2009, with the additional capacity expected to come online in early 2010.

Expenditure: \$100m.

Employment: Construction: 150; Operation: 12

## AMMONIA/UREA

### Burrup Peninsula - Ammonia Plant

DYNO NOBEL ASIA PACIFIC LIMITED

Dyno Nobel 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 on the Burrup Peninsula. The alternative of building a small scale facility to supply the ammonium nitrate plant is being investigated as part of the feasibility study.

Expenditure: \$900m.

Employment: Construction: 1000; Operation: 130

### Collie - Coal-to-Urea Plant

PERDAMAN CHEMICALS AND FERTILISERS PTY LTD

Perdaman Chemical and Fertilisers, formerly North West Chemicals and Fertilisers, plans to develop a coal-to-urea plant at the soon-to-be developed Shotts Industrial Park, near Collie. The plant will use proven "best in class" coal gasification and fertiliser production technologies. Around 2.7 Mt/a of coal will be used to produce approximately 2 Mt/a of urea, primarily for export to India. The urea will be transported to Bunbury Port by rail. The company has commenced environmental approval processes and has Government approval to obtain land in the Shotts Industrial Park. Supply and off-take arrangements are agreed and will be finalised by early 2010. Construction is expected to commence in Q2 or Q3 2010 with the first shipment of urea occurring in Q3 2013.

Expenditure: US\$2.5 billion

Employment: Construction 1500; Operation: 200

## AMMONIUM NITRATE

### Burrup Peninsula - Burrup Ammonium Nitrate Plant

BURRUP NITRATES PTY LTD

Burrup Nitrates Pty Ltd, a joint venture between Burrup Holdings Ltd (BHL) of Australia and Yara International ASA of Norway, is conducting a feasibility study into the construction of a 350,000 t/a Technical Ammonium Nitrate (TAN) plant to be located on the Burrup Peninsula. Ammonia feedstock will be supplied from BHL's subsidiary company Burrup Fertilisers Pty Ltd, which operates its facility directly adjacent to the proposed location for the new TAN plant. It is expected that all manufactured product will be sold into the Pilbara region. Regulatory approval has been requested with construction targeted to commence in the last quarter 2009 and commissioning during the first quarter 2012.

Expenditure: \$600m.

Employment: Construction: 600; Operation: 65

## BAUXITE

### Wagerup - Alumina Refinery Train 3 Expansion

ALCOA WORLD ALUMINA AUSTRALIA

In November 2008, Alcoa announced that the proposed expansion of its Wagerup alumina refinery (Wagerup 3) had been suspended until market conditions improved. Alcoa had been investigating the feasibility of a third production train at the refinery to increase capacity up to 4.7 Mt/a. The Minister for the Environment approved the expansion proposal in September 2006.

Expenditure: \$1.5b.

Employment: Construction: 1500; Operation: 260

## COAL

### Collie - Bluewaters III and IV, Coal-Fired Power Stations

THE GRIFFIN COAL MINING COMPANY PTY LIMITED

Griffin Energy Pty Limited is planning to expand the Bluewaters Power Station Project with two additional 208 MW coal-fired power stations to be located on the Coolongatta Industrial Estate, 4.5 km north-east of Collie. Commissioning of the Bluewaters III base-load power station is expected by late 2012 and commissioning of Bluewaters IV by late 2014. Final Investment Decision is due in Q3 for Bluewaters III and Q3 2010 for Bluewaters IV. Construction phases are scheduled to commence at those times.

Expenditure: \$800m.

Employment: Construction: 600; Operation: 30

## ELECTRICITY

### Mid West - Centauri 1 Power Project

ENEABBA GAS LIMITED

Eneabba Gas Limited via its wholly owned subsidiary Eneabba Energy Pty Ltd (EEPL) is planning to develop the 168 MW Centauri 1 gas-fired turbine power station 8 km east of Dongara. Generation capacity can be increased to 365 MW. The project will be capable of supplying power into the South West Interconnected System network but will be focused on supplying additional volumes of energy for the developing Mid West iron ore industries. As soon as take or pay contracts for Mid West iron ore customers are confirmed, construction can commence on site immediately and the plant can be operational in approximately 14 months. Besides sourcing gas from the Dampier-to-Bunbury Natural Gas Pipeline, EEPL is awaiting government approval for an expanded drilling program to prove up the capacity for underground coal gasification of the resource.

Expenditure: \$200m.

Employment: Construction: 100; Operation: 4

### Mid West - Central West Coal & Coolimba Power Projects

AVIVA CORPORATION LTD

Aviva Corporation Ltd is developing the Coolimba Power Project, a 2 x 200 MW base-load coal-fired power station and 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. Upon commissioning, the power station will constitute 8 per cent of the installed capacity in the South West Inter-connected System (SWIS) network and have an operating life of 30 years. Subject to government approvals, construction is expected to commence in mid 2009 and will extend over three years for completion in 2011-12.

Expenditure: \$1b.

Employment: Construction: 600; Operation: 100

## Neerabup – Bioenergy Power Station

### SPIRITWEST BIOENERGY PTY LTD

SpiritWest is developing a 30 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 Q2 2009, with construction expected to commence in Q3 2009. Commercial operation is scheduled for 2011. Expenditure: \$100m. Employment: Construction: 250; Operation: 45

## GOLD

## Kalgoorlie - Super Pit Golden Pike Cutback

### KALGOORLIE CONSOLIDATED GOLD MINES

Kalgoorlie Consolidated Gold Mines (KCGM) is planning to extend the life of its Fimiston Super Pit open cut mine by five years to 2017, with the Golden Pike Cutback. This will entail additional tailings storage facilities and waste rock dumps. The expansion of the Super Pit received environmental approval in late January 2009. KCGM will have to comply with stringent environmental conditions that address noise, air quality, waste disposal and vibration issues, as well as heritage and cultural values, and is required to submit a rehabilitation and closure management plan to the Department of Environment and Conservation before April 2010. Employment: Operation: 1043

## Goldfields - Tropicana Gold Project

### ANGLOGOLD ASHANTI/INDEPENDENCE GROUP JOINT VENTURE

AngloGold Ashanti, as joint venture manager, has undertaken an intensive exploration and resource development program approximately 400 km north-east of Kalgoorlie. Plans for the project are to develop an open-cut gold mine and nearby processing plant. So far, a resource estimate of 5 million oz of gold has been identified with a mine life of 10-15 years. Mining is planned to commence in 2010 with production of up to 420,000 oz per annum. Expenditure: \$500m. Employment: Construction: 700; Operation: 600

## HEAVY MINERAL SANDS

## Happy Valley - Heavy Mineral Sands Mine

### BEMAX CABLE SANDS PTY LTD

Located adjacent to the Bemax 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 State Forest. The level of assessment for the project has been set at Environmental Review and Management Program. Environmental impact studies for the proposed mine development have been completed. Happy Valley contains a reserve of about 6 Mt of ore at a heavy mineral grade of 11.3 per cent. Expenditure: \$35m. Employment: Construction: 100; Operation: 30

## Jangardup South - Heavy Mineral Sands Mine

### BEMAX CABLE SANDS 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 LTD

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 leucocoxene. The concentrate will be processed at Cable Sands' plant at Bunbury over the mine's eight year life. In late October 2007, the Environmental Protection Authority recommended approval of the project subject to Olympia meeting a number of conditions in the development and operation of the mine. The finalisation of the environmental impact assessment process is currently progressing. Expenditure: \$18m. Employment: Construction: 35; Operation: 30

## Shark Bay - 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 per cent 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 2007, Gunson signed two memoranda of understandings with CTIEC of China for CTIEC and an electric power supply company in the Chinese city of Bengbu to take a combined 40 per cent interest in the project. CTIEC has subsequently confirmed its intent to take up a 20 per cent interest but the Bengbu power supply company is to be replaced by another investor. 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 per cent titanium dioxide. 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 south-east 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 five to six year life, which will be transported to Capel for further processing. Tutunup South is scheduled to commence mining operations in Q4 2009, subject to obtaining necessary government approvals, and will replace Iluka's Wagerup mine site. Expenditure: \$25m. Employment: Construction: 150; Operation: 40

## IRON ORE

## Cape Preston - Magnetite Iron Ore Mine

### AUSTRALASIAN RESOURCES LTD

Australasian Resources Ltd (ARH) through its 100 per cent-owned subsidiary International Minerals Pty Ltd (IM) is developing a 12Mt/a magnetite iron ore mine with associated processing and infrastructure facilities to produce concentrate and pellets for export under a shared export facilities with CITIC Pacific at the Cape Preston Port. IM has a right to mine 1Bt of magnetite ore over 25 years from the Mineralogy-owned South Balmoral magnetite iron ore deposit, located approximately 30 km from Cape Preston. In an agreement with the fourth largest steel mill in China, Shougang Corporation, ARH retains an option to fund

100 per cent of the project development cost interest free to earn a 50 per cent share in IM. A bankable feasibility study for the project was completed in 2008. Environmental level of assessment for the project was set as a Public Environmental Review lodged with the Environmental Protection Authority in September 2008. The company expects to commission the project in 2011, with first shipment in 2012.

Expenditure: \$2.7b.

Employment: Construction: 2500; Operation: 800

## Great Southern - Southdown Magnetite Mine

### GRANGE RESOURCES LTD

Grange is undertaking a definitive feasibility study on the Southdown magnetite project, 90 km north-east of Albany. The company plans to produce an initial 3.3 Mt/a magnetite concentrate 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. The recent merger with Australian Bulk Minerals now brings significant magnetite mining and pelletising experience to the Southdown project. Expenditure: \$839m.

Employment: Construction: 700; Operation: 250

## Mid West - Extension Hill Magnetite Mine

### ASIA IRON

Asia Iron has primary 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. The company is currently seeking secondary approvals. Expenditure: \$715m.

Employment: Construction: 1000; Operation: 350

## Mid West - 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 increased production to 2 Mt/a in 2008 and will now proceed to Stage 2, which would involve a further increase to 10-25 Mt/a of hematite and beneficiation ore. 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 - Mt Karara Magnetite Mine

### GINDALBIE METALS LTD

Gindalbie Metals is developing a magnetite mining operation at Karara, 85 km east of Morawa, based on a world-class 522 Mt JORC reserve plus a 1853 Mt JORC resource. First production is scheduled to take place in the fourth quarter of 2010 at an initial rate of 8 Mt/a of magnetite concentrate. The mine life is expected to be more than 50 years. Design and engineering work is underway and orders have been placed for long lead items. On-site work is awaiting final environmental approval. Expenditure: \$1.7b.

Employment: Construction: 400; Operation: 240

## Mid West - Mungada Hematite Mine

### GINDALBIE METALS LTD

Gindalbie Metals is developing a direct shipping hematite ore project at Karara, 85 km east of Morawa, based on an initial 10.9 Mt JORC reserve and 16.2 Mt JORC resource. First production is scheduled for the fourth quarter of 2009 at a rate of 1.5 Mt/a, moving to 2 Mt/a. The project is currently awaiting final environmental approval. Expenditure: \$108m.

## Mid West - 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 Concentrate Project

AUROX RESOURCES LIMITED

Aurox Resources Limited is a Perth-based metals developer with a primary asset of the 100 per cent-owned Balla Balla iron ore concentrate project.

The project is located near the coast, west of Port Hedland, in the Pilbara region of Western Australia. Aurox is well advanced in the development of Balla Balla with detailed engineering nearly complete and all long lead items, such as crusher and mills, secured. The company has in place two 15 year sales contracts for a total of 6 Mt/a, increasing to 10 Mt/a concentrate production in year five, with major Chinese steel companies. Balla Balla is based on a large homogenous magnetite ore body, which will be developed as one of the lowest cost magnetite operations in Australia. The project also has significant vanadium, titanium and phosphate potential, and is located near major ports, gas and grid power with main highway access. The Balla Balla feasibility study demonstrated strong project economics with magnetite iron ore shipments to China scheduled to commence in 2011.

## Pilbara - Roy Hill Iron Ore Mine

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 moved to a bankable feasibility study at the end of 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 port facilities at Port Hedland.

## 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 three 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 early 2012.

Expenditure: \$3.9b.

Employment: Construction: 1300; Operation: 700

## LITHIUM

### Mt Cattlin - Lithium Mine

GALAXY RESOURCES LIMITED

Galaxy Resources Limited is developing a 1 Mt/a lithium and tantalum (over a 15 year mine life) project at Mt Cattlin, north of Ravensthorpe. Galaxy plans to commence mine development and plant construction in Q3 2009 with first production of concentrates during Q3 2010. Lithium (spodumene) and tantalum concentrate is expected to be shipped through Esperance. Galaxy's initial fast-track project schedule aims to meet the growing demand for lithium-ion batteries currently being fuelled by the rapidly expanding international hybrid and electric vehicle market. Scoping studies for on-site processing of lithium carbonate, due for completion by mid 2009, could reveal significant upside to the value of the Mt Cattlin project.

Expenditure: \$75m.

Employment: Construction: 100; Operation: 75

## MOLYBDENUM

### Pilbara - Spinifex Ridge Molybdenum/Copper Mine

MOLY MINES LIMITED

The Spinifex Ridge Project is located 50 km north-east of Marble Bar in the Pilbara region of Western Australia. It is based on a resource of 469 Mt at 0.06 per cent 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 - Kalgoorlie Nickel Project

HERON RESOURCES LTD

This project will involve a mine and hydrometallurgical processing plant at Goongarrie (about 85 km north of Kalgoorlie) producing up to 50,000 t/a of nickel from laterite resources of 903 Mt grading 0.74 per cent nickel and 0.05 per cent cobalt. Heron and Vale Inco completed a pre-feasibility study in January 2009 and have commenced a six month review period to decide whether to commit to a full feasibility study by 30 July 2009. Further ore reserve estimation, mine planning and metallurgical testing will be undertaken.

Expenditure: \$1.4b.

Employment: Construction: 1000; Operation: 300

## OIL AND GAS DEVELOPMENTS

### Carnarvon Offshore Basin - Gorgon LNG

GORGON JOINT VENTURE

In December 2007, the Gorgon Joint Venture (GJV) announced its intention to upgrade the project specifications from a 10Mt/a (2 train) to a 15 Mt/a (3 train) development on Barrow Island. The project is based on gas from both the offshore Gorgon and Jansz fields. The development on Barrow Island is also to include a domestic gas plant. The GJV obtained environmental approval for a 10 Mt/a development in late 2007. In September 2008, the GJV released a Public Environmental Review document for public comment regarding the addition of a third LNG train. Once the GJV has obtained environmental approvals for the additional train and completed front-end engineering and design work for the project, it will consider a final investment decision.

Expenditure: \$11b.

Employment: Construction: 3000; Operation: 600

### Carnarvon Offshore Basin - Wheatstone LNG

CHEVRON AUSTRALIA PTY LTD

Chevron intends to develop an LNG project based on the Wheatstone and Iago gas fields in the Carnarvon Offshore Basin. The project will have an initial capacity of two LNG trains following a successful appraisal program, which has increased the reported gas reserves of 4.5 trillion cubic feet. Chevron is expected to enter Front End Engineering and Design in the second half of 2009.

Employment: Construction: 3000

### Pilbara - Devil Creek Development Project

APACHE ENERGY LIMITED

Apache Northwest Pty Ltd and Santos Offshore Pty Ltd are investigating the Devil Creek Development Project (DCDP), a greenfield gas project comprised of: an unmanned offshore gas production platform over the Reindeer gas field, located about 80 km northwest of Dampier; offshore and onshore gas pipelines; an onshore gas processing plant 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 200 TJ per day of dry natural gas and between 80 kl to 160 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 Q3 2009, with first gas delivered into the DBNGP Q3 2011, subject to receiving all the required statutory approvals.

Expenditure: \$800m.

Employment: Construction: 200; Operation: 20

## SALT

### Exmouth Gulf - Yannarie Solar Salt Project

STRAITS RESOURCES LTD

Straits Salt is proposing to develop the Yannarie Solar Salt, a 4 Mt/a salt operation in the east coast of Exmouth Gulf. It has exploration licences over the area and has applied for a mining lease. The proposal was assessed at the Environmental Review and Management Program level by the EPA. In a statement released on 23 July 2008, EPA Report 1295 recommended against approval for the Yannarie Solar Salt proposal. Straits has appealed against the EPA's recommendation and the matter is currently under investigation by the Office of the Appeals Convenor.

Expenditure: \$200m.

Employment: Construction: 100; Operation: 75

## TIMBER

### Great Southern - Engineered Strand

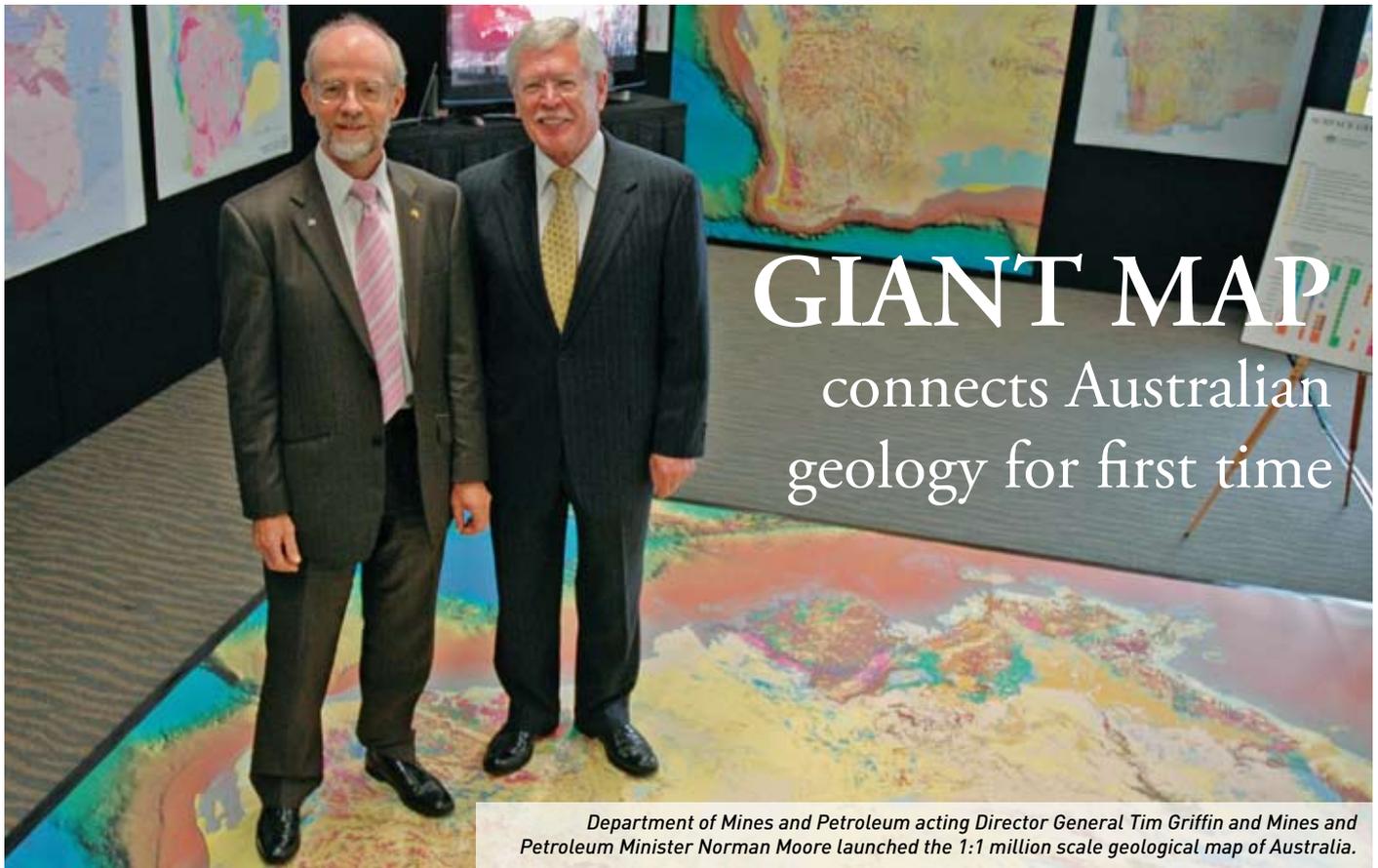
LUMBER PLANT

LIGNOR LTD

Lignor Ltd is proposing the development of an Engineered Strand Lumber/Engineered Strand Board plant 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 or Dieffenbacher. The company has nearly completed its feasibility study. Further project development has been put on hold pending more favourable global financial market conditions.

Expenditure: \$350m.

Employment: Construction: 400; Operation: 125



# GIANT MAP

connects Australian  
geology for first time

*Department of Mines and Petroleum acting Director General Tim Griffin and Mines and Petroleum Minister Norman Moore launched the 1:1 million scale geological map of Australia.*

Mineral and petroleum explorers now have access to a 1:1 million scale map that seamlessly links the whole of Australia's geology for the first time.

Western Australia was the last piece of the puzzle to be added to the project that geologists and cartographers from Geoscience Australia and all State and Territory geological surveys have been working on since 2000.

The complete national map, which replaces a 1:2.5 million scale version, stands almost four metres tall when printed, but will be primarily used as a digital tool in computer-based Geographic Information Systems (GIS).

Western Australian Mines and Petroleum Minister Norman Moore launched the map in Perth late last year as part of a series of nation-wide events in conjunction with Geoscience Australia and State and Territory Geological Surveys.

"The WA section of the map combines all available geological information gathered by the Geological Survey of Western Australia (GSWA) over the past 45 years, often in partnership with Geoscience Australia," Mr Moore said.

"This is a milestone project for Australia and will allow mineral and petroleum explorers unprecedented understanding of the country's regional geology."

It has produced an accurate image of those mineral and petroleum-rich provinces that stretch across borders, including the promising Musgrave region, which crosses the Western Australian border into South Australia and the Northern Territory.

"For the first time in Australian history, we have a map that truly reflects the geology of the entire country."

Mr Moore said the map would be a powerful tool for comparing remote, greenfields areas of Western Australia with areas of similar geology containing valuable minerals, such as Mount Isa in Queensland, Olympic Dam in South Australia and Broken Hill in New South Wales.

To complete the project, GSWA provided up-to-date mapping and advice on its latest understanding of Western Australian geology to Geoscience Australia.

GSWA Assistant Director Ian Tyler said new information would continually be provided to ensure this was a 'living map'.

"The primary intention of the map is to be used as a digital tool in computer-based GIS, by mineral and petroleum explorers, by researchers, and by land use planners," Dr Tyler said.

The Australian map is being integrated into a global project called OneGeology,

which is creating a dynamic digital geological map that is web accessible.

"The project will remove mismatches across borders and point to areas where our understanding of the geology of a country or region is incomplete," Dr Tyler said.

"It highlights the need for further mapping and research in some areas, and areas which may not have been previously considered prospective for mineral or petroleum exploration."

There are currently 94 nations involved in OneGeology and this is expected to grow as the project moves forward.

The project uses GeoSciML technology, which enables the map to be downloaded in a number of different formats making it accessible for all web users.

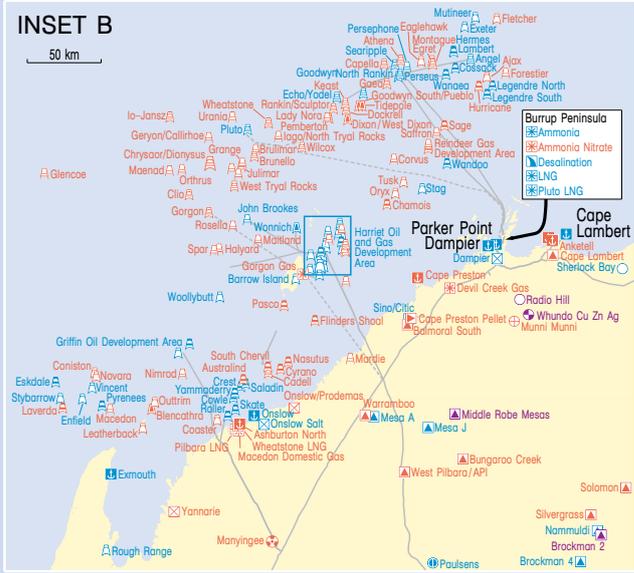
OneGeology also gives step-by-step information through its 'cookbooks' to help guide participants through the process of creating digital scans and uploading all map data to the web via their portal.

The 1:1 million scale map of Australia is available from the Geoscience Australia website: [www.ga.gov.au](http://www.ga.gov.au), or the GSWA website [www.dmp.wa.gov.au/datacentre](http://www.dmp.wa.gov.au/datacentre)

For more information on the OneGeology project, visit [www.onegeology.com](http://www.onegeology.com) ■

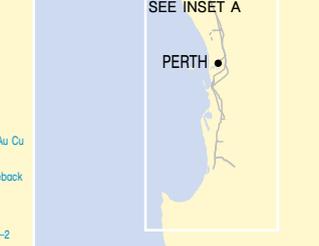
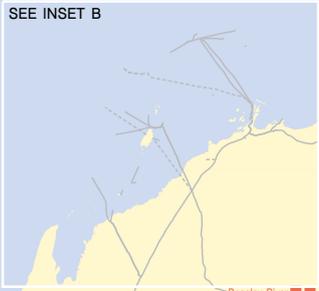
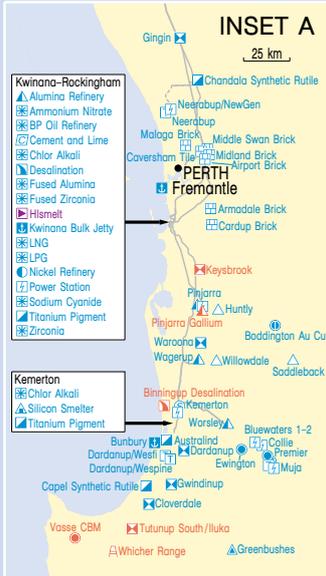


# Major Resource Projects – March 2009



## RESOURCE SYMBOLS

- Bauxite - Alumina**
- ▲ Mines and deposits
- ▲ Alumina refineries
- Chemicals/Petroleum**
- ⊠ Processing plants/refineries
- ▲ Natural gas fields
- ▲ Oil fields
- ▲ Natural gas/oil fields
- ▲ Natural gas/condensate fields
- ▲ Natural gas/oil/condensate fields
- Chromite**
- ▲ Mines and deposits
- Clays**
- ⊠ Brick/tile processing plants
- ▲ Coal
- Coal mines and deposits
- Light-mine deposits
- Copper-Lead-Zinc (Cu-Pb-Zn)**
- ▲ Mines and deposits
- Diamonds**
- ▲ Mines and deposits
- Gold (Au)**
- Mines and deposits
- Gypsum**
- ▲ Mines and deposits
- Heavy mineral sands**
- ▲ Mines and deposits — titanium-bearing sands
- ▲ Mines and deposits — garnet-bearing sands
- ▲ Titanium pigment and synthetic rutile plants
- Iron ore**
- ▲ Mines and deposits
- ▲ Downstream processing plants
- Limestone - Limesand**
- ▲ Mines and deposits
- ▲ Cement and lime plants
- Magnetite**
- ▲ Mines and deposits
- Manganese ore**
- ▲ Mines and deposits
- Nickel**
- Mines and deposits
- ▲ Smelters and refineries
- Phosphate**
- ▲ Mines and deposits
- Platinoids**
- ▲ Mines and deposits
- Rare earth elements**
- ▲ Mines and deposits
- Salt/Potash**
- ▲ Production facilities/pans
- Silica - Silica sand**
- ▲ Mines and deposits
- ▲ Silicon smelters
- Talc**
- ▲ Mines and deposits
- Tantalum and/or Lithium**
- ▲ Mines and deposits
- Uranium**
- ▲ Deposits
- Vanadium - Titanium**
- ▲ Mines and deposits
- NON-MINERAL PROJECTS**
- ▲ Irrigation/water/desalination schemes
- ▲ Major port handling facilities
- ▲ Major power stations/Radio astronomy park
- ▲ Timber processing plants
- Oil/Gas pipeline
- Proposed Oil/Gas pipeline



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



Government of Western Australia  
 Department of Mines and Petroleum