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Jim Limerick  
Director General

## FOREWORD

Welcome to the Department of Industry and Resources' 2004-05 Statistics Digest. This publication contains the most comprehensive information available on the Western Australian mineral and petroleum industry.

The Digest provides detailed quantity and value data, by commodity and industry sector in addition to figures on employment, royalty receipts, exploration, investment and principal producers. Incorporated with these data is an analysis explaining the performance of the various mineral and petroleum sectors. Numerous facets of the State's resource sector, including commodity price trends and Western Australia's position in the global economy as a resource exporter, are also covered.

Trends in sales volumes continued to strengthen in 2004-05. The all time record increase in the US dollar denominated iron ore price of 71.5 per cent announced in early 2005 together with rises in petroleum, nickel and alumina prices contributed to a record \$33.2 billion in Western Australia resource sales for 2004-05.

The 2004-05 increase in total sales value translates to a 26 per cent increase on 2003-04. The size of this increase is a similar order of magnitude as 1999-00, which delivered a 28 per cent increase in total nominal sales value and 2000-01 when a 29 per cent increase was realised.

The breadth of the sales increases is a heartening feature, indicating increased diversity in exports as the mineral and petroleum industries expands. Diversification partly reflects our proximity to growing markets in Asia, which translates to a freight cost advantage relative to other major commodities suppliers. Strong investment in expanding the State's export capacity will help to underpin our competitiveness in coming years.

In releasing the Western Australian Mineral and Petroleum Statistics Digest for 2004-05, I would like to express my appreciation to the many individuals and companies which have contributed to the preparation of this report, including the Australian Bureau of Agricultural and Resource Economics (ABARE), the Australian Bureau of Statistics (ABS) and the Western Australian Department of Treasury and Finance.

## 1. ECONOMY

### 1.1 Global economic context

The global economy achieved above-trend growth for the 2004-05 financial year although growth was variable over the year. The temporary slowdown evident in mid-2004 was followed by a strong first quarter in 2005. Then the impact of rising oil prices created uncertainty and a softening in leading indicators. Despite the significant rises in oil prices, global trade and manufacturing continued to strengthen through the start of 2005.

The global economy continues to be driven by growth in the United States (US) and Chinese economies, with Japan showing signs of a sustained lift in 2004-05 following insipid activity in 2002-03 and the slight improvement over 2003-04. Growth slowed in the other economies in East Asia as they felt the impact of a decline in demand in the global information and telecommunications sector. Other economies adding to rising global economic momentum included Latin America, Eastern Europe and India. The growth rate and prospects in the euro area economies remained poor at about half that of the US.

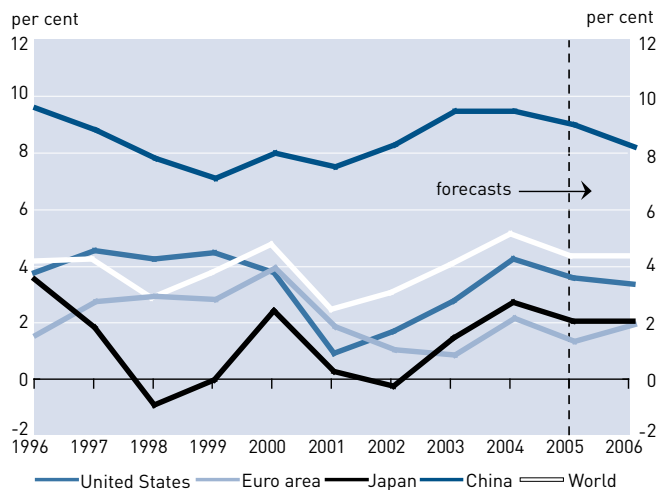


Figure 1 **Global Economic Growth - Major Economies (Year Average GDP Growth)**

Source: International Monetary Fund - World Economic Outlook September 2005  
 Note: GDP denotes Gross Domestic Product

The outlook is for continuing global growth in 2006. Nevertheless there are some important risks. These risks include a significant dependence on US and Chinese demand for imports. This risk arises because the US economy is generating large current account deficits, and wider global current account imbalances seem to be entrenched into the medium term. There is potential for financial market instability in response to these current account deficits. The secondary effects of high oil prices and a strong labour market are two other important uncertainties worrying

### Economic Growth Forecasts - Year average GDP growth

	Outcomes		Forecasts	
	2003	2004	2005	2006
United States	2.7	4.2	3.5	3.3
Euro area	0.7	2.0	1.2	1.8
Japan	1.4	2.7	2.0	2.0
China	9.5	9.5	9.0	8.2
Other East Asia	3.8	5.8	4.4	5.0
Latin America	2.0	5.7	4.2	3.8
Emerging Europe	6.1	7.4	5.1	5.2
World	4.0	5.1	4.3	4.3

Source: Reserve Bank of Australia, November 2005

central bankers with the potential for higher inflation. The productive capacity in China remains another uncertainty for the strong outlook.

#### United States

Gross Domestic Product (GDP) in the US grew solidly in the year to June 2005 recording an annual growth rate of 3.6 per cent. Growth was broad-based with investment, which rose by over 9 per cent over the year, continuing its increase driven by high levels of retained profits and low interest rates. Household consumption was also a key underlying driver growing solidly at 3.9 per cent.

A key factor driving household consumption was a rapid rise in housing prices in a number of regions. In California, for example, house prices rose at an annual rate of over 20 per cent to mid-2005. This rise in home-owner wealth drove consumer spending and confidence, and this was reflected in rising home equity-related borrowings. An important risk for the future are concerns that significant numbers of homes have become overvalued. There is a risk that household spending will slow significantly in the event of house-price falls.

A pick-up in employment growth, in the absence of significant income rises, was also critical to sustained US consumption-spending growth. Unemployment fell from 6 per cent in 2003 to 5.5 per cent in 2004 and is forecast to level out at 5.2 per cent in 2005 and 2006.

The latest estimates are that real GDP grew by 1.05 per cent in the September quarter for an annual equivalent rate of 4.3 per cent. The major contributors to the increase in that quarter were personal consumption expenditures (4.2 per cent), equipment and software (10.8 per cent), federal government spending (8.1 per cent), and residential fixed investment. The contributions of these components were partly offset by a negative contribution from private inventory investment and imports. Caution should be used when viewing a single quarter's figures as even in an economy the size of the US, aggregate data can vary considerably from quarter to quarter.

Recorded unemployment in November 2005 was 5.0 per cent and since May 2005 has ranged between 4.9 per cent and 5.1 per cent suggesting that if conditions remain favourable, the forecast of 5.2 per cent for 2005 and 2006 should be bettered. The number of unemployed people at 7.6 million has now remained static for a number of months.

### Japan

Over recent years, Japan's modest but faltering growth has largely been driven by exports. As 2004-05 progressed, domestic demand began to show signs of sustained strengthening. This improvement occurred as consumer sentiment lifted in a climate of rising wages and employment stimulating private consumption. In addition, exports of cars and capital goods to Asia, the US and oil exporting countries have been rising and an improvement in corporate balance sheets lifted business activity and investment.

This broadening of economic activity was reflected in stronger GDP growth, which expanded by 0.8 per cent in the June quarter 2005 for an annual growth rate of 2.2 per cent. While still low, this is a significant improvement on recent years.

Consumption and investment growth in the June quarter of 2005 was significantly above forecast. In addition, net exports made their first positive contribution to growth in four quarters, driven by strong car sales to the US.

Underpinning the improvement in Japan's economy has been stronger employment growth, which has boosted disposable incomes and consumer confidence. Employment grew by 0.6 per cent over the year to June and unemployment fell to 4.2 per cent, its lowest level in seven years. In a positive sign for the future, hiring expectations remain above long-term averages, suggesting further gains in the job market.

June quarter growth in business investment of 3.6 per cent led to an annual increase of 7.6 per cent. Investment intentions remain solid and, as reported in the September quarter Tankan survey, were revised upwards supported by improving corporate balance sheets, cost cutting and rising profitability. The ability of the banking sector to support rising growth through lending is also improving as finance sector balance sheets continue to be repaired and confidence improves in the banking sector following recent reforms.

### China

China's strong growth in recent years continued and even accelerated through the year. Economic growth picked up in the June quarter 2005 to be 9.5 per cent higher than the year before. Confirming ongoing strength in the economy, industrial production accelerated to over 17 per cent up from 15 per cent in the previous quarter. Exports continued to grow rapidly, by 30 per cent in the year to June and, with slower import growth, China's trade surplus widened further.

Concerns about the unbalanced nature of China's growth also

persisted. Despite the Chinese Government's aim of switching growth away from investment towards consumption to avoid unsustainable levels of excess capacity, investment growth continued. China's aggregate fixed capital investment growth accelerated to 29 per cent in the year to June, well above the official target of around 16 per cent but lower than the peak levels of early 2004. Consumer demand, as reflected in retail sales, grew by 13 per cent over the year. Private consumption as a share of GDP is 40 per cent, which remains an historic low. An important concern remains that strong rates of fixed capital investment will lead to excess capacity, which in turn, may lead to a decline in investment and a marked softening of overall Chinese growth.

Another stress-point in China's economy during the year, rapidly escalating housing prices, moderated with prices rising by a slower 8.0 per cent in the year to June 2005. This followed official policy moves to rein-in speculation in the real estate sector.

China's economy continued to grow strongly into 2005-06 surprising some analysts, though the balance in growth appears to be improving. Forecast growth for 2005 of 9.0 per cent is expected to moderate to 8.2 per cent in 2006.

Recent strength in the domestic components of demand is a positive sign in that it appears that some of the reliance on exports for China's growth is lessening. Currency reform in July 2005 assisted this process which needs to continue for China's growth rate to be sustained.

### Non-Japan East Asia

After easing during 2004, growth in the region began to improve in line with better conditions in the global telecommunications trade. Real GDP for 2004-05 was 4.3 per cent higher over the year.

In part reflecting the slowdown in telecommunications, regional exports growth slowed to stabilise at around 10 per cent, with support for economic growth provided by strong global commodity demand.

Domestic demand across the region was generally firm reflecting strong retail sales driven by rising employment, low interest rates and rising asset prices. Demand was a little softer in Thailand and South Korea reflecting the impacts of the tsunami and a rebuilding of household balance sheets respectively.

Growth recovered strongly in Hong Kong and Singapore which continued to benefit from integration with China's robust growth and strength in the biomedical industry respectively. Thailand's growth rate benefited from a recovery in tourism following the tsunami-affected March quarter.

Following an improvement in global telecommunications product demand, key regional indicators began to show some signs of life. Industrial production recovered to 7.2 per cent in

the year to August 2005 and merchandise exports lifted to over 15 per cent in the same period.

Importantly for the sustainability of recovery in the region, domestic demand across the region remained firm. High levels of capacity utilisation were a stimulus to stronger investment and retail sales lifted, driven by rising employment, low interest rates and rising asset prices.

High oil prices have put pressure on regional inflation rates, and this has been aggravated by fuel subsidies in some economies. As a consequence, there has been some moderate tightening of monetary policy across the region.

Inflation, reflecting varying impacts of higher oil prices, shows significant regional variation. Malaysia and Thailand, due to reductions of petrol price subsidies, have seen stronger price growth compared with Singapore and Hong Kong.

India, which in purchasing price parity terms is now the world's fourth largest economy, continued to grow solidly over 2004-05. GDP growth of 8.2 per cent in the year to the June quarter 2005 was driven by the manufacturing and services sectors.

### Europe

Euro area growth was weak with only a 1.1 per cent annual growth rate but there were some positive signs as the year ended with unemployment falling to 8.6 per cent from 8.9 per cent at the end of 2004.

Early in 2004-05, Europe appeared set to continue on a path of weak growth. This growth softened further as domestic demand remained moribund and exports weakened. GDP growth moderated to 1.4 per cent in the year to the March quarter 2005 with no growth in domestic demand. Within the region, Germany's growth picked up, France's slowed, while GDP in the Netherlands and Italy fell. Only Spain showed steady growth driven by the wealth effects of rising housing prices on consumption and an investment boom.

Inflation was heavily influenced by oil prices at a headline rate of 2.5 per cent to October 2005 but an underlying rate of only 1.3 per cent.

During the June quarter 2005, euro area growth slowed somewhat with falling industrial production and softer exports growth. Exporters struggled to absorb the impacts of a strong euro and rising input, including oil costs. These factors, as well as uncertainty about the impact of various economic reforms, and weak employment growth, drove falls in consumer and business confidence. Growth in June was driven primarily by changes in inventories, which contributed 0.2 percentage points to quarter-on-quarter real GDP growth.

The contribution of domestic demand to growth was weak, or even absent. In particular, the contribution of private consumption to growth was zero, which partly reflected the negative impact of rising oil prices on real income. Investment growth increased from a fall of 0.2 per cent in the first quarter

of 2005 to 0.2 per cent in the second quarter. However, this partly reflected a rebound of the weather-related decline in construction in the previous quarter.

Gross capital formation made a contribution of 0.1 percentage points to GDP growth in the second quarter. The contribution of net exports declined to almost zero in the second quarter.

On the positive side, there were signs of an improving business sector in early 2005-06 with industrial production rising by 2.5 per cent over the year to August. Exports rose by over 4 per cent and in a turnaround from recent performance, it appeared that Germany was beginning to lead the way, though growth remained modest.

The UK economy slowed rapidly over 2004-05 as cooling housing prices and higher interest rates constrained consumption. Softer domestic demand was compounded by weak merchandise exports. The labour market softened as a result, with unemployment rising from a low 2.6 per cent in January to 2.8 per cent in September 2005. On the positive side, business and consumer sentiment remained reasonably solid.

### The Global Outlook

Global growth is expected to remain firm over the near term, with the general consensus of forecasters expecting above-trend growth of 4.3 per cent in 2005 and 2006. The signs that Japan's economy is now on the path to sustained broad-based growth and that Europe is beginning to expand more broadly than simply being driven by exports growth add weight to the optimistic outlook. However, while this highly positive picture remains the "central case" for the global outlook, this scenario is contingent on sustained growth in the US and China. Both economies are facing underlying challenges which have the potential to disrupt the benign short-term outlook. The potential for sustained high levels of petrol prices and the flow-on price impacts remain an uncertainty for the global economy.

A key factor for the future is the contribution of the demand growth in China and the US to high global commodity prices. The increase in oil prices is significant but world prices of iron ore, nickel and alloy metals, and base metals are also strong because of the same underlying demand.

In the US, growth has been heavily reliant on consumer spending. To a significant degree, this spending has been driven largely by wealth effects related to rapid rises in housing prices. This has been reflected in rapid rises in household borrowing to finance consumer spending and declines in household saving. There is now some evidence that housing prices are overvalued, which may cause households to reduce consumption growth, putting a significant brake on economic activity. In addition, given high levels of household debt, any period of household balance sheet consolidation as the wealth gains from housing prices moderate may have an additional cooling effect on consumption. Given these risks, it will be important for US and global growth prospects that the current investment upward trend is sustained.

For China, the key risk to the strong growth expected over the near-term remains the potential for excess capacity. There are signs that this may now be affecting some sectors. These signs include rising inventory levels in some sectors including steel, weaker indicators of profitability and slower imports growth. To a significant extent the dependence of Chinese exports on the US demand is also a key risk factor.

Any significant weakening in China's growth, particularly in terms of imports, would have significant knock-on effects in the region and on other suppliers of inputs including those from Australia's resources sector.

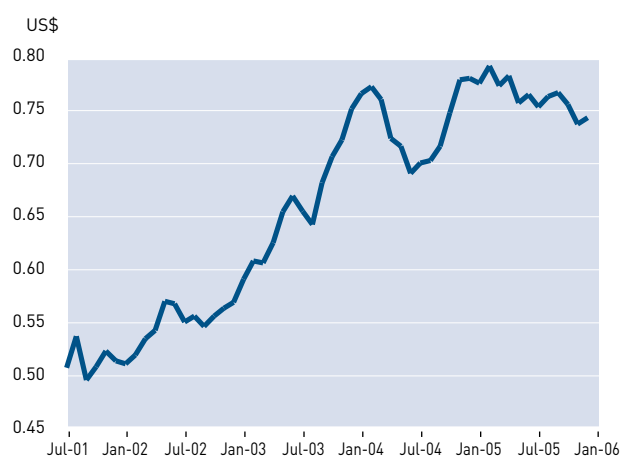


Figure 2 Exchange Rate US\$/A\$  
Source: Reserve Bank of Australia

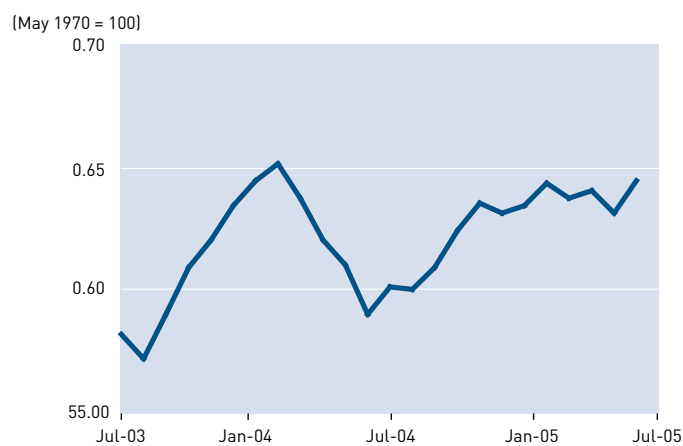


Figure 3 Exchange Rate Trade Weighted Index  
Source: Reserve Bank of Australia

### Tenements in Force 1978 Act

	1996-97		1997-98		1998-99		1999-00		2000-01		2001-02		2002-03		2003-04		2004-05	
	Number	000 ha	Number	000 ha	Number	000 ha	Number	000 ha	Number	000 ha	Number	000 ha	Number	000 ha	Number	000 ha	Number	000 ha
Prospecting Licences	8,212	1,100	7,525	992	6,242	809	5,827	745	5,512	711	4,964	634	4,566	575	4,561	568	4,665	586
Exploration Licences	4,718	38,279	4,505	35,993	3,463	23,732	3,394	20,687	3,162	18,152	2,899	18,556	2,855	21,123	2,917	20,896	3,066	22,215
Mining Leases	5,180	2,047	6,690	2,031	7,555*	2,263	4,865	1,829	4,841	1,803	4,820	1,774	4,770	1,762	4,713	1,716	5,172	1,805
Other	1,537	89	1,584	205			2,001	468	3,625	2,840	3,618	3,002	3,629	3,299	3,590	3,115	3,258	2,982
Mineral Claims & Other 1904 Act	310	34	309	34	307	34	194	22	186	21	186	22	186	22	186	22	186	22
<b>Total</b>	<b>19,647</b>	<b>41,515</b>	<b>19,029</b>	<b>39,255</b>	<b>17,567</b>	<b>26,838</b>	<b>16,280</b>	<b>23,751</b>	<b>17,326</b>	<b>23,829</b>	<b>16,487</b>	<b>23,988</b>	<b>16,006</b>	<b>26,781</b>	<b>15,967</b>	<b>26,317</b>	<b>16,347</b>	<b>27,610</b>

\* Includes Other

## 2. EXPLORATION AND INVESTMENT

### 2.1 Mineral Exploration

Western Australia continued to attract the major proportion (59 per cent) of mineral exploration expenditure in Australia. In 2004-05, mineral exploration expenditure figures for Western Australia rose by 30 per cent (\$140 million) to \$606 million. This was a significant rise on top of the increase in the previous year. However, this level of Western Australian mineral exploration was still below the peak nominal expenditure level of \$692 million achieved in 1996-97.

While very welcome, the exploration expenditure recovery has been relatively stronger elsewhere in the world. A 2005 survey conducted by the Canadian-based Metals Economic Group reported that Australia's share of the global non-ferrous exploration budget had gradually declined from second to fifth by 2004.

Gold exploration in Western Australia at \$260 million was marginally down (6 per cent or \$17 million) from the \$277 million spent in 2003-04. According to the *Geological Survey of Western Australia 2004-05 Annual Review* (GL Survey), in 2004-05 dollars gold exploration expenditure has fallen to 1985-86 expenditure levels. Gold nevertheless remains the main focus of mineral exploration, accounting for 42.8 per cent of all expenditure in Western Australia in 2004-05.

Exploration for nickel and cobalt recovered strongly in 2004-05, more than doubling to \$149 million from the \$71 million recorded in the previous financial year. According to the GL Survey, this level of expenditure, in 2004-05 is the highest since 1989-90 and probably achieved an all-time record. Importantly, the GL Survey points out that expenditure in recent years has been principally led by junior companies developing nickel sulphide deposits (particularly in the Kambalda area) and by BHP Billiton (BHPB) completing feasibility work on the Ravensthorpe laterite nickel project.

Iron ore exploration expenditure rose by a substantial 112 per cent to \$136.9 million (2004-05 dollar terms) and is now at the highest level ever recorded. This has been driven by strong customer demand for iron ore, particularly from China, with the major producers in the Pilbara able to respond fairly rapidly by expanding the operations at existing projects.

Counterbalancing the increases, diamond exploration decreased by \$16 million for the year, primarily due to reduced resource-reserve drilling at Argyle, the Ellendale project reaching production phase and limited diamond exploration elsewhere in the State. Diamond exploration expenditure has been subdued for many years, has declined gradually over the last decade and is now far below the peak level of \$139 million in 1981-82 (in 2004-05 dollar terms). However, the GL Survey indicates that greenfield exploration success in the western part of the Pilbara Craton may encourage further exploration.

According to the Australian Bureau of Statistics (ABS) exploration for mineral sands in Western Australia increased by 40 per cent to \$15 million in 2004-05. After the switch in

the 1990s by mineral sand explorers to the Murray Basin in Australia's eastern states, exploration in Western Australia has been subdued. As a result of that refocusing, Western Australia's share of the Australian exploration expenditure for heavy minerals has fallen from around 70 per cent of the total in the mid-1990s to 46 per cent in 2004-05. The main greenfields exploration project is Coburn (south of Shark Bay), which is at the bankable feasibility study stage. There is also work around Keysbrook south of Perth.

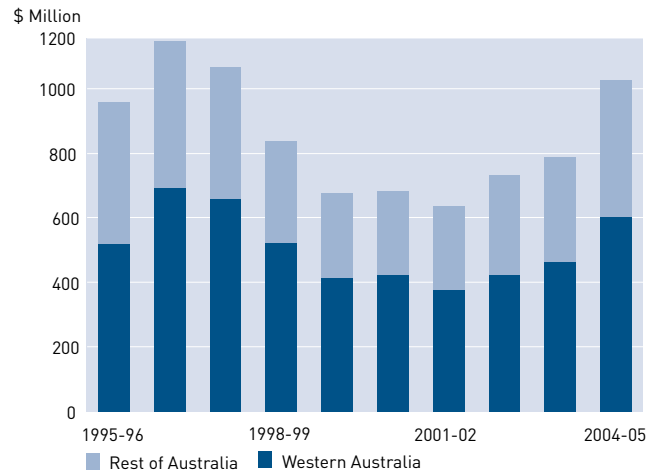


Figure 5 Mineral Exploration Expenditure Source: ABS

### 2.2 Petroleum Exploration

Western Australian petroleum exploration expenditure fell \$144 million to \$526 million in 2004-05. Total Australian petroleum exploration expenditure increased by 11 per cent to \$1045 million. As Western Australia's petroleum exploration expenditure decreased, the State's share of national petroleum expenditure fell from 71 per cent in 2003-04 to 50 per cent in 2004-05.

In 2004-05, 81 wells were drilled in Western Australia; representing a 5 per cent lift on the previous year's total of 77. Significant discoveries were made in the Northern Carnarvon and Perth Basins. Successful new developments in the

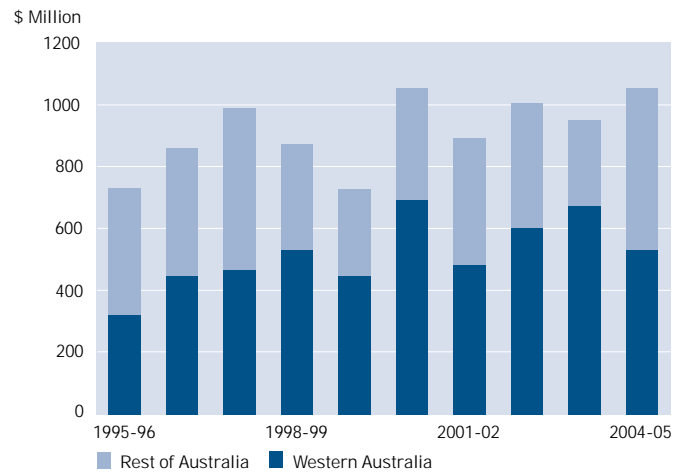


Figure 6 Petroleum Exploration Expenditure Source: ABS

offshore Exmouth Sub-basin and offshore Perth Basin and the acquisition of 3D seismic data in the onshore northern Perth Basin, also led to increased drilling.

Exploration activity has increased in petroleum as a result of the higher prices. However, the increases appear to have been more restrained than historic changes possibly as a result of company scepticism over the continued strength of such prices and capacity constraints in the exploration sector. Given the now sustained period of high prices and the outlook, petroleum exploration expenditure is likely to continue to increase.

### 3. RESOURCE FOCUS 2004-05

#### 3.1 Overview

In 2004-05, Western Australia's resources industry continued to enjoy exceptional conditions created by strong international demand for commodities. The all-time record increase in the US dollar denominated iron ore price of 71.5 per cent announced in early 2005 together with rises in petroleum, nickel and alumina prices contributed to a record \$33.2 billion (in nominal terms) in Western Australia a resource sales for 2004-05.

The 2004-05 increase in total nominal sales value translates to a 26 per cent increase on 2003-04. The size of this increase is a similar order of magnitude as 1999-2000, which delivered a 28 per cent increase in total nominal sales value and 2000-01 when a 29 per cent increase was realised. Average petroleum prices rose in 2004-05 by 40 per cent in Australian dollar terms compared with an 86 per cent average increase in 1999-2000. During this earlier period of growth, other minerals such as nickel, alumina, and to a lesser extent iron ore were contributors to the result. In 2004-05, the value of iron ore, sales was up by 56 per cent and nickel and alumina were strong with gold the only major exported commodity losing ground.

Petroleum (\$3.0 billion), iron ore (\$3.0 billion), nickel (\$470 million) and alumina (\$374 million) made up 99.7 per cent of the increase in value of minerals and petroleum sales during the year. Iron ore sales again reached record volumes, increasing by 15 per cent to 233 Mt. In addition to the increased shipments, the price increase for the Japanese fiscal year 2005-06 impacted on the June quarter production adding almost \$1.3 billion in value. Without any increase in production, the price rise would add about \$5 billion in value to the iron ore industry annual production in a full year.

With the international price of crude oil up by 47 per cent in 2004-05, and 40 per cent in Australian dollar terms, prices played the key role in the State's petroleum industry with total sales value climbing by 32 per cent to \$12.2 billion. The high price of oil coupled with a strong increase in liquefied natural gas (LNG) shipments were the key factors responsible for the increase in petroleum sales value. Actual physical sales quantities of crude oil and condensate fell by 5 per cent due to declining recovery from mature fields.

The maintenance of high international nickel prices and an end in the appreciation of the Australian dollar led to nickel

being the State's second most valuable mineral sector after iron ore in 2004-05. Although nickel sales volumes recorded a small 1 per cent fall to 180 386 t of contained nickel in 2004-05, down from 182 212 t in 2003-04, the value of sales rose by a healthy \$470 million, or 15.5 per cent to \$3.5 billion. The significance of high international nickel prices was underlined by achievement of the impressive sales outcome despite the small fall in physical sales volumes and adverse currency movements in the first half of the year.

During the course of 2004-05, the Australian dollar nearly reached US\$0.80 before falling back to US\$0.76 by June. Over the year there was a 5.2 per cent appreciation in Australia's exchange rate, though potentially reducing price competitiveness for Western Australia's commodity exports, it was relatively small when compared to a cumulative 22 per cent AUD-USD appreciation over the previous two years. The vast majority of commodity prices are denominated in US dollars and the stronger Australian currency simply reduced the higher prices that would have been received. For example, an 8.6 per cent increase in international gold prices during the past year, translated to an Australian dollar increase of 3.2 per cent. Slightly lower levels of gold output resulted in a 3 per cent drop in Western Australian gold sales in 2004-05.

Very large falls in the State's base metals output (copper, lead and zinc) also meant that this sector was unable to fully capitalise on high prices. Although there was a decline in the volume of diamond sales by almost 30 per cent, the value of diamond sales improved by more than 10 per cent in 2004-05 to \$467 million.

The State's mineral and petroleum industry recorded a very positive outcome based on strong world demand and prices. The outcome emphasises the importance of the mineral and petroleum sector in the Western Australian and national economies, contributing around three-quarters of State exports and around a quarter of gross state product. Sales growth of the mineral and petroleum sector has also experienced average annual growth of around 8 per cent per annum during the last 10 years.

Some additional key figures highlighting the importance of both the Western Australian and national resources sector produced by the ABS, the Australian Bureau of Agricultural and Resource Economics (ABARE), the Western Australian Department of Treasury and Finance and the Department of Industry and Resources indicate that in 2004-05 the:

- average number of persons employed in the Western Australian mineral and petroleum industry rose by 12 per cent or 5 800 people to reach 54 330. A significant number of these are currently engaged in construction activities bringing new mines, infrastructure, petroleum facilities and processing plants into being.
- total value of Western Australian mineral and petroleum exports are estimated to have reached \$32 billion. This represented over 80 per cent of the State's total merchandise exports of \$38.6 billion.

- total value of Australian mineral and petroleum exports are estimated to have amounted to \$68.6 billion. This represented 54 per cent of the nation's total merchandise exports of \$126.3 billion.
- total value of Western Australia's mineral and petroleum sales in 2004-05 (\$33.2 billion) represented approximately 50 per cent of ABARE's estimated total Australian value of mineral and petroleum sales in 2004-05.

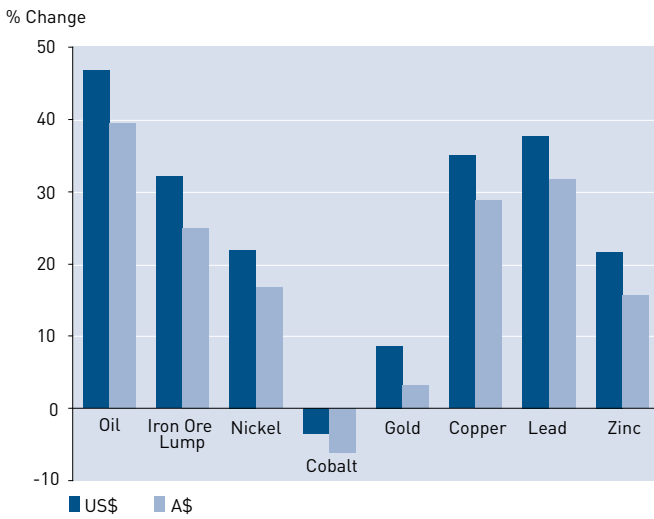


Figure 7 Average Price Comparison 2003-04 and 2004-05  
Sources: LME, Kitco, TEX report, Metal Prices

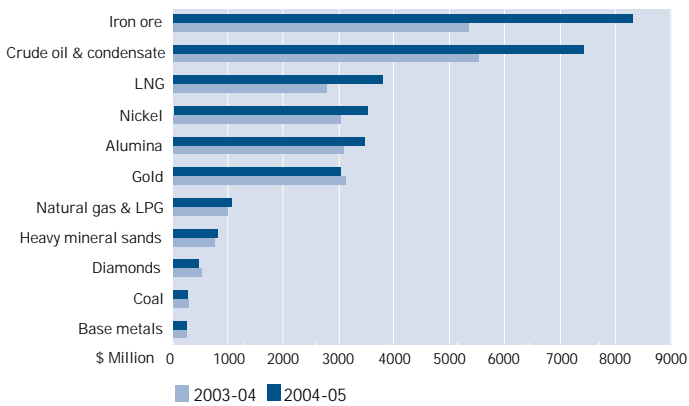


Figure 8 Major Commodities by Value 2003 and 2004  
Source: DoIR

### 3.2 Commodity Prices

In 2004-05, the Australian dollar continued to appreciate against the US dollar over the six months to December 2004, retracing some ground in the latter portion of the financial year. In annual average terms, one Australian dollar was worth US\$75.4 cents, a 5.2 per cent increase compared to the previous year (US\$71.4 cents). The slow fall in the Australian dollar since the beginning of 2005 has come about from the lower interest rate differential between Australia and the US and the outlook for more stable Australian interest rates in the future.

The resources sector experienced price increases across a range of commodities including oil which rose on average by 46.8 per cent in US dollar terms year on year. According to ABARE, a number of factors such as geopolitical tensions and a decline in spare capacity contributed to the increased oil price. Inventories of base metals were either at all-time lows, or appeared to be approaching such levels in the early stages of 2005. Overall, resource commodities performed better than most analysts expected with commodities such as base metals, alumina, nickel and tin all consolidating the price rises in the lead-up to 2004-05.

Strong global demand growth, largely attributed to China, continued to drive world demand for minerals and the average value of the Reserve Bank of Australia's (RBA) US dollar, non-rural commodity price index was 30 per cent higher in 2004-05 compared to 2003-04. Due to the continued appreciation of the Australian currency, the RBA's non-rural commodity price index in local currency terms was only 23 per cent higher in 2004-05 compared to 2003-04.

Base metals, such as copper, lead, zinc and nickel continued to experience strong price growth in US dollar terms, with the RBA's base metal price index higher on average by 22 per cent during 2004-05. In Australian dollar terms, the base metals price index was only 16 per cent higher in annual average terms. Most commodity market prices are continuing to rise and only show signs of a slowdown in the rates of increase. In the metals markets however, the price of steel has come down from its highs.

Influenced by the activity in commodity trade, spot-ocean freight prices also increased significantly with spot rates for key vessel categories that deliver dry bulk commodities, such as coal and iron ore tripling. The surge in shipping rates reflected global demand for resources underpinned by China's demand for coal and iron ore to produce steel for its construction programs. Construction books at major shipbuilders are full and the delivery dates are in the region of two to three years.

## Reserve Bank of Australia (RBA) Commodity Price Index

The Reserve Bank of Australia Commodity Price Index is based on the price of 19 major commodities exported by Australia. These commodities collectively account for around two-thirds of total commodity exports. The index is apportioned into three sections – rural, non-rural and base metals.

The non-rural index comprises base metals (which consist of aluminium, copper, nickel, zinc and lead), gold, coking coal, steaming coal, iron ore, alumina and LNG. The index is compiled monthly and is expressed in US dollars, Australian dollars and Special Drawing Rights (SDR).

The RBA's index, expressed in US dollar terms is useful because most commodities are traded in world markets in US dollars. However, such an index is subject to changes in the US dollar exchange rate (as it is based on spot prices). In this respect, the SDR index is a better indication of underlying supply and demand for commodities than the US dollar index.

SDR is a unit of account used by the International Monetary Fund (IMF). Its value is based on a basket of currencies comprising the euro, Japanese yen, English pound and US dollar. Weights are assigned to each of these currencies to reflect their relative importance in world terms. The RBA expresses the SDR component of its index in US dollar terms, with commodity prices derived from the London Metal Exchange and Bloomberg and converted to monthly averages of daily data.

Alternatively, the Australian dollar index is useful for gauging the domestic currency price received by Australian commodity exporters as it reflects the interrelation between world commodity prices and the Australian exchange rate. For example, if prices in foreign currency terms remain unchanged but the Australian dollar depreciates, this will be recorded as a favourable upward shift in the index, which would not be evident in either the SDR or US dollar index.

The RBA index is a fixed-weight Laspeyre's index, using 2001–02 as the base year and excludes crude oil. The index is re-based every five years in order to make long-run reliable comparisons, unlike the national accounts that are re-based annually to track short-run movements. Base-period weights indicate the relative importance given to individual commodities. They are based on gross exports thus explaining the omission of crude oil (for which Australia is a net importer) and correspond to the export value of each commodity as a share of total exports. These weights change over time to reflect changes in the composition of commodity exports. Movements in the index from one period to the next reflect underlying price movements and do not take into account changes in volumes.

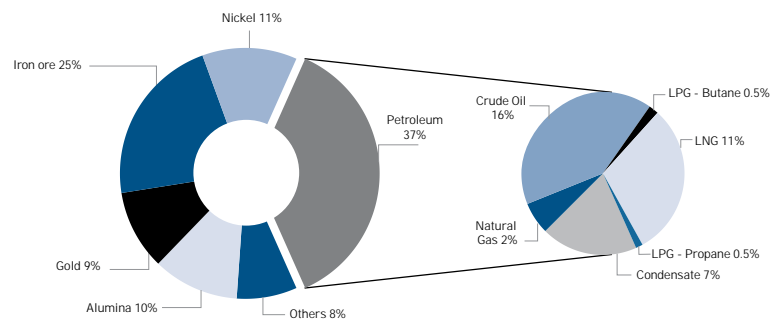


Figure 9 Sales by Commodity 2004-05 Source: DoIR

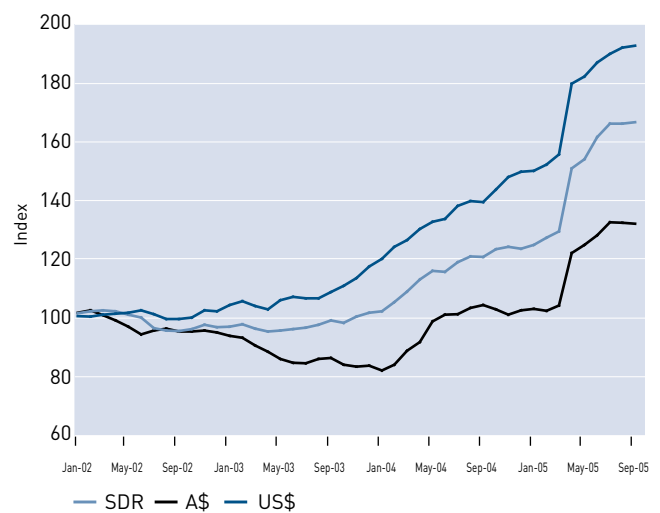


Figure 10 Non-Rural Commodity Price Index  
March 2001-02 = 100 Source: Reserve Bank of Australia

## 4. 2004-05 RESOURCE INDUSTRY ANALYSIS

### 4.1 Petroleum

World oil prices in 2004-05 averaged US\$49.4/bbl (Tapis price). This represented a 49 per cent increase above the equivalent average price in the preceding year. Locally, this increase was reduced a little by an increase in the average value of the Australian dollar against the US dollar. The average increase in the Australian dollar price was 40 per cent – still a substantial jump.

Key factors supporting oil prices have been strong demand combined with supply disruptions. On the demand side, the US economic recovery and rapid growth in oil consumption of newly industrialised countries, particularly China, have supported strong growth in oil requirements. Further upward pressure on oil prices emanated from production difficulties in Venezuela and Nigeria, continued sabotage of Iraq's oil supply infrastructure, natural disasters and other geopolitical factors. These conditions generated considerable concerns about disruptions to oil supply and served to encourage speculative activity in the market.

In 2004-05, the total value of Western Australian petroleum sales amounted to \$12.2 billion. This represented an increase of a little over 32 per cent and reversed the static trend of the past few years. The strength of oil and condensate prices and a 34 per cent increase in LNG shipments were the key factors responsible for the increase, as the quantities sold of crude oil and condensate declined. In volume terms, crude oil and condensate sales fell by 5 per cent due to declining recovery from mature fields.

Crude oil was the principal contributor to total petroleum sales, accounting for 43 per cent of total petroleum sales value, followed by LNG (31 per cent) and condensate (18 per cent). Together these commodities account for over 90 per cent of the State's petroleum sales. The rest was accounted for by natural gas (6 per cent) and liquid petroleum fuels (LPG - propane and butane).

**Crude oil**

In 2004-05, the sales value of crude oil reached \$5.2 billion, which compared with \$3.8 billion in the previous financial year. This was a 38 per cent increase due entirely to higher prices.

Strong growth in oil prices counteracted a drop in sales volumes of crude oil. Western Australia produced 80.5 MMbbl of crude oil down 3.2 per cent on the previous financial year. The total reduction in output was 2.6 MMbbl due to declining recoveries from several mature fields.

Falls in overall production levels were partially ameliorated by output increases from fields including Hermes, Hovea, Jingemia, Eremia and Mutineer-Exeter.

The financial year saw production commence at the Santos-managed Mutineer-Exeter field with first quarter production averaging 72 000 bbl per day. The project involved an establishment cost of \$440 million with a service contract for the off-take vessel estimated to total \$360 million.

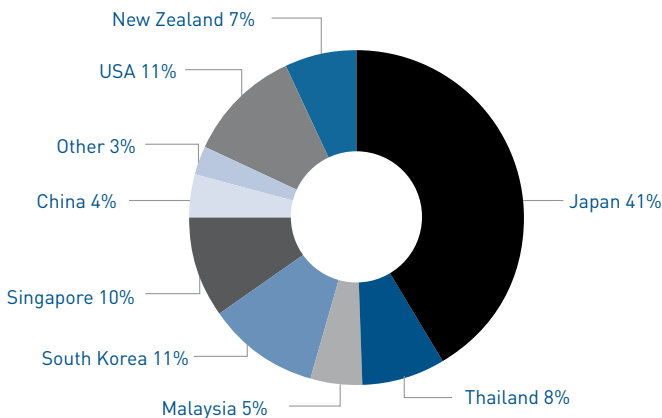


Figure 11 **Petroleum Exports**  
Total Value \$10.39 billion Source: DoIR

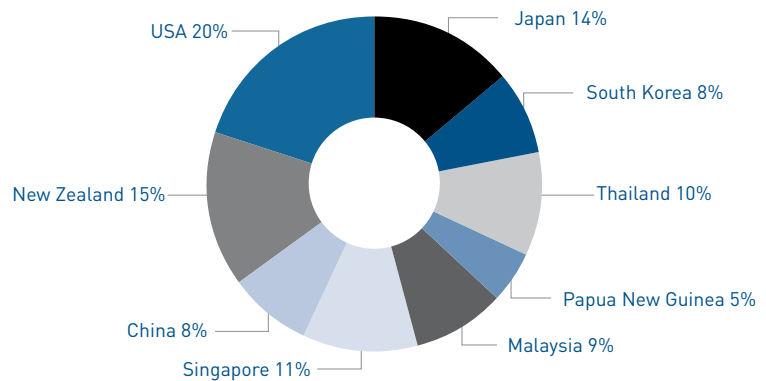


Figure 12 **Crude Oil Exports**  
Total Value \$4.11 billion Source: DoIR

Although a number of significant oil discoveries have been made in recent years, it is anticipated that oil production in the short term will not increase until new fields commence. Scheduled to commence late in 2006 is the Woodside-operated Enfield oil field, with the BHPB-operated Stybarrow project in 2008.

About half of Western Australia's crude oil is exported, with the US being the largest overseas market. Other export destinations include refineries in New Zealand, Singapore, Thailand, Malaysia, Japan, Papua New Guinea, China and South Korea.

**Condensate**

Sales volumes of condensate in Western Australia fell by 8.9 per cent to 5.63 GL in 2004-05. This was largely due to production decreases in the Goodwyn, East Spar and Perseus-Athena fields. However, the lower sales volumes

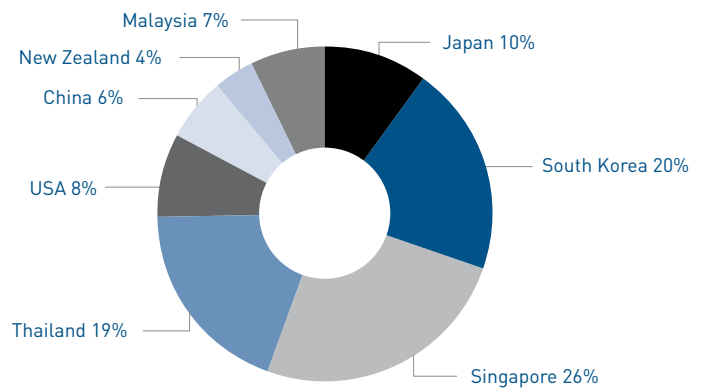


Figure 13 **Condensate Exports**  
Total Value \$2.11 billion Source: DoIR

did not cancel out the much stronger prices leading to a large 26 per cent increase in the value of output over the previous financial year.

Condensate is a by-product from gas fields and Woodside Energy is Western Australia's largest condensate producer. The top-three condensate fields operated by Woodside, namely Goodwyn, North Rankin and Echo-Yodel, account for around 93 per cent of the State's total. North Rankin is the largest producer of condensate, generating 12.9 MMbbl in 2004-05 but production levels have decreased, dropping by 9 per cent compared with the previous year.

Almost all of Western Australia's condensate was exported with the major destinations being refineries in Singapore, South Korea, Thailand, Japan and the US.

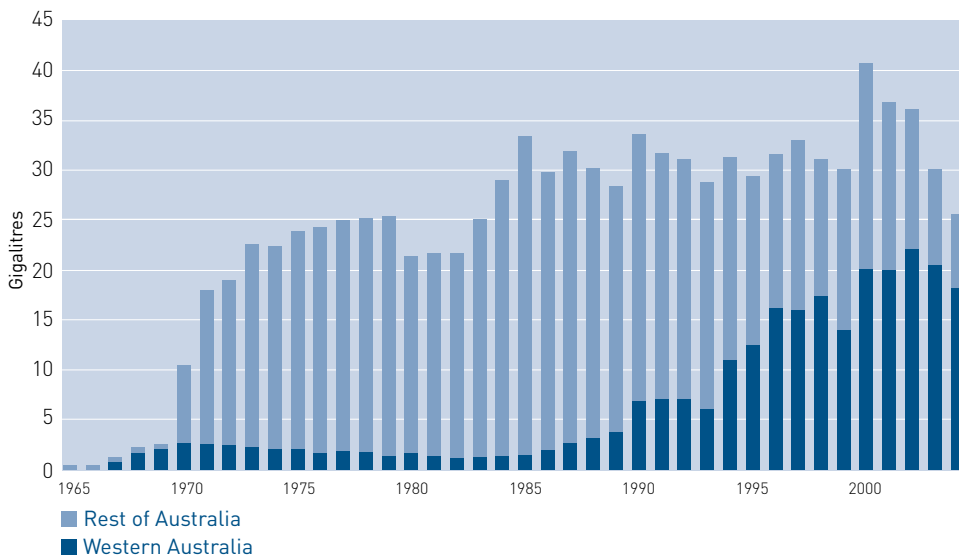


Figure 14 **Crude Oil Condensate Quantity**  
Sources: DoIR and ABARE

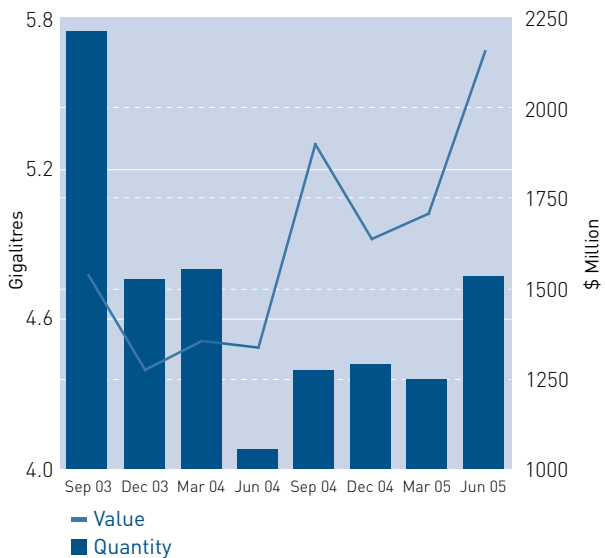


Figure 15 **Crude Oil and Condensate Quantity and Value by Quarter**  
Source: DoIR

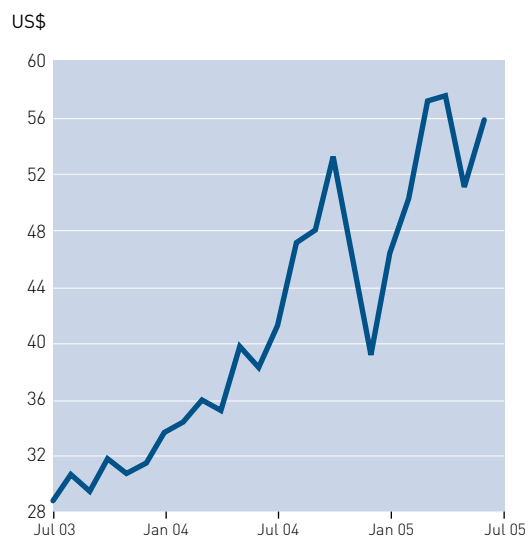


Figure 16 **Tapis Crude Oil Price US\$/bbl**  
Source: WA Treasury Corporation

**Liquefied natural gas (LNG)**

LNG is Western Australia’s second, most valuable petroleum product after crude oil, accounting for 31 per cent of the State’s total petroleum sales in 2004-05. In contrast to crude oil and condensate, the volume of LNG sales increased by an impressive 34 per cent to 10.4 Mt. All of Western Australia’s LNG is exported. In 2004-05, the value of LNG sales was \$3.78 billion representing a 36 per cent increase compared to the previous financial year. Japan remains the dominant overseas market for LNG, accounting for about 84 per cent of the State’s total exports. Other LNG export destinations include South Korea, the US and Spain.

LNG is produced by the North West Shelf Venture (NWSV) gas project. Based on extensive gas and condensate reserves discovered in the early 1970s, the NWSV project began LNG exports to Japan in 1989 under a long-term contract. Japanese power utilities remain the principal purchasers. The NWSV also began supplying LNG to South Korea under a mid-term, seven-year contract that started in late 2003. In addition to contract sales, ‘spot’ cargo sales have also taken place around the world.

A new LNG sale and purchase agreement with the Japanese energy utility, Kansai Electric Power, was signed in July 2004 by the NWS LNG sellers. In December 2004, the NWSV signed an agreement to supply LNG to the Guangdong LNG project in

China. The Chinese oil company involved also acquired equity in the NWSV project entitling it to a share of future production.

The \$2.7 billion fourth train expansion of the NWSV gas-processing facilities was completed in 2004 and commenced production in September 2004. The addition of this fourth train took production to the new high of 10.4 Mt for the year.

Woodside announced the development of a third platform on the Angel field to underpin current gas contract and future sales. This will be the third major offshore production platform (for the NWSV) to be built off the North West Shelf under the gas and condensate project. It will include a new 50 km subsea pipeline linking the platform to the venture’s existing North Rankin production facility. Platform capacity is up to 800 million cubic feet per day of gas plus up to 50 000 bbl of condensate, with production expected to commence in 2008.

Preliminary site works for a fifth LNG train have been completed. This train will lift LNG capacity to 15.9 Mt/a.

Whilst the NWSV gas project is currently the only LNG project in Western Australia, additional facilities are under consideration for the Gorgon project, the Scarborough project and the Pluto project.

The Gorgon gas project involves a processing plant on Barrow Island. The Scarborough project is considering development

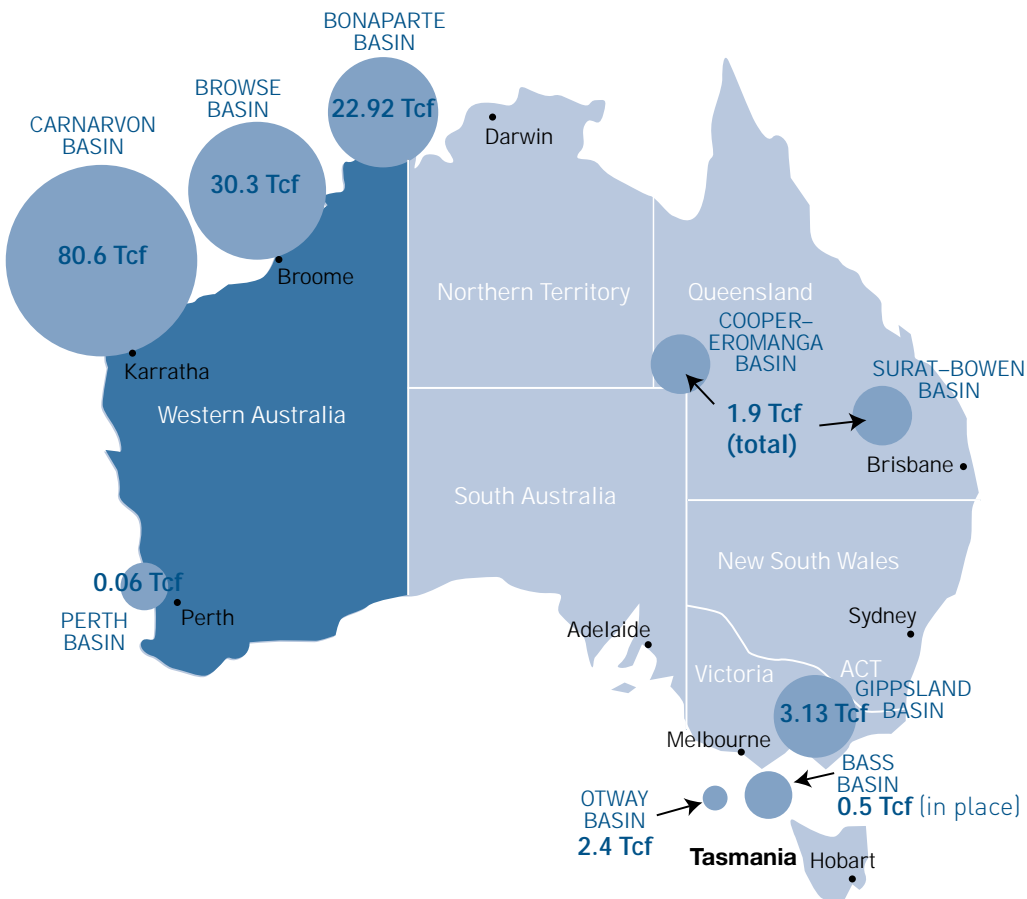


Figure 17 Australia’s Gas Resources

at Onslow and a number of possible sites are under consideration for the Woodside Pluto project. Woodside has entered into a heads of agreement for sales to Tokyo Gas.

A development decision regarding the Gorgon LNG project is subject to market commitments. The Gorgon Joint Venture is targeting markets in China, South Korea and North America. Sale commitments have been made to US customers and more contracts are being sought. Woodside is marketing gas from the proposed Pluto project to similar customers while BHPB has looked to Asia and the west coast of America.

**Natural gas**

Apart from gas used as feedstock for LNG production, all remaining natural gas produced in Western Australia is for domestic industrial and household consumption. In 2004-05, natural gas sales for domestic purposes accounted for 6 per cent of the State's total petroleum sales. Natural gas sales fell by 5 per cent to 7.6 Gm<sup>3</sup>, worth \$679 million. The reduction was primarily due to the closure of the BHPB direct reduced iron plant at Port Hedland. This project was a large gas consumer. Lack of capacity in the transmission pipeline made it difficult to sell the unwanted gas to customers in the south of the state.

The 2004-05 year marked 20 years of gas supply to Western Australia from the NWSV project. Western Australia holds about 80 per cent of the nation's total gas reserves. In addition, according to data sourced from ABARE's Australian Mineral Statistics Quarterlies, Western Australia produces 65 per cent of the nation's natural gas.

As at the end of 2005, the gas reserves for Australia were:

- Bonaparte Basin 21.6 Tcf (Western Australian portion 1.94 Tcf, Northern Territory portion 20.98 Tcf)
- Browse Basin 30.3 Tcf
- Carnarvon Basin 80.6 Tcf
- Perth Basin 0.06 Tcf
- Otway Basin 2.4 Tcf
- Bass Basin 0.5 Tcf
- Gippsland Basin 3.13 Tcf
- Cooper-Eromanga Basin and Surat-Bowen Basin 1.9 Tcf.

Western Australia holds about 80 per cent of the nation's total gas reserves. In addition, according to data sourced from ABARE's Australian Mineral Statistics Quarterlies, Western Australia produces 67 per cent of the nation's natural gas.

Reserves are calculated on the basis of a 50 per cent probability of recovery. These refer to resources that may or may not eventually prove viable. They are resources that have not at present been delineated, audited or appraised by an independent third party.

**Liquefied petroleum gas (LPG)**

In 2004-05, sales volumes of LPG (including butane and propane) increased by 4 per cent to 726 104 t compared to the previous financial year. Higher prices saw the value of

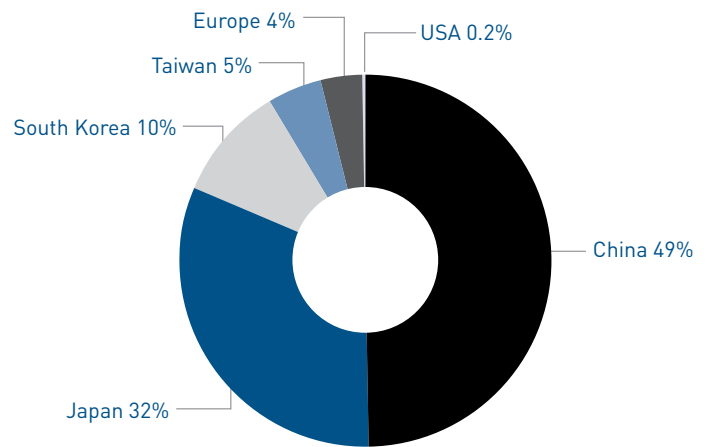


Figure 18 **Iron Ore Exports**  
Total Value \$8.17 billion Source: DoIR

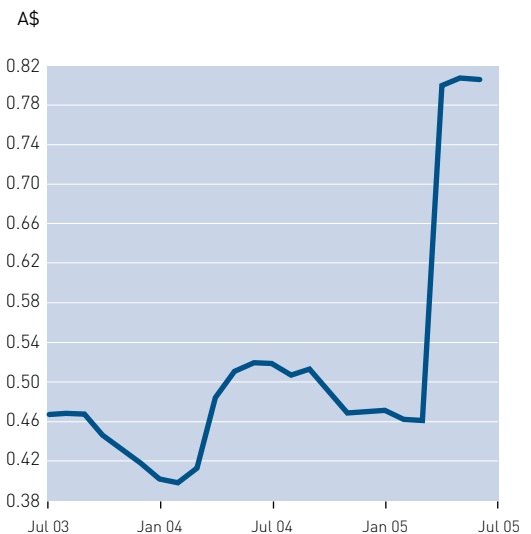


Figure 19 **Iron Ore Price A\$/Fe unit**  
Source: Tex Report, High Grade Fine Ore Prices

production jump by 33 per cent on the previous year to \$375 million. The majority of LPG produced in the State is for export to Japan, the primary destination.

**4.2 Iron Ore**

The quantity of iron ore expanded significantly by 15 per cent from 202 Mt to 233 Mt in 2004-05 while the corresponding value of production increased by 56 per cent to \$8.3 billion. As a result, the share of iron ore in the total value of 2004-05 mineral and petroleum sales increased to 25 per cent from 20 per cent in 2003-04.

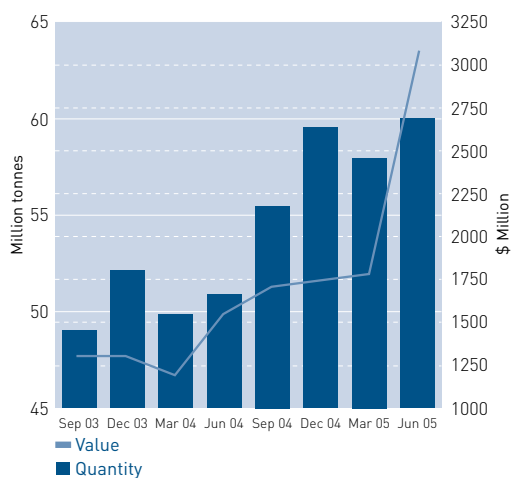


Figure 20 Iron Ore Quantity and Value by Quarter  
Source: DoIR

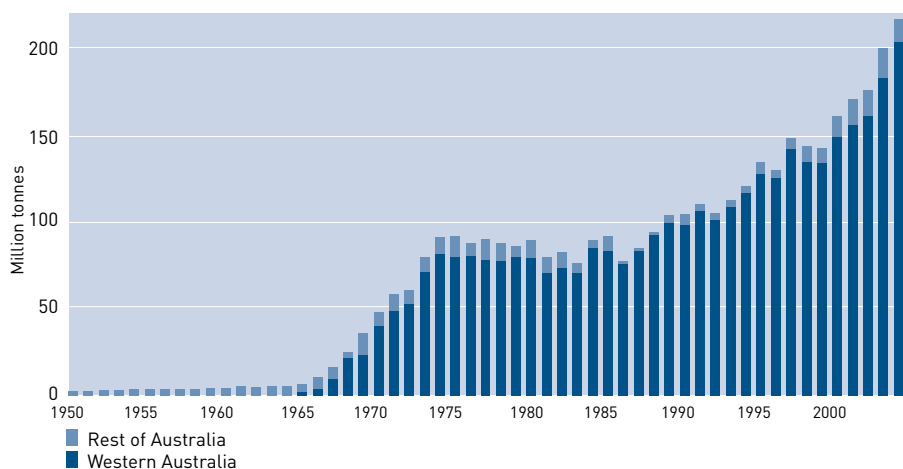


Figure 21 Iron Ore Quantity  
Sources: DoIR and ABARE

Confidence about future iron ore exports received a boost with a 71.5 per cent increase in price agreements for the 2005 contract year negotiated by two of the largest Pilbara-based suppliers (BHPB and Rio Tinto) for iron ore originating from the Pilbara region of Western Australia. The negotiated price rises brought BHPB Mount Newman High Grade Lump to 78.8 US cents per dry metric tonne unit and Mount Newman High Grade Fines to 61.7 US cents per dry metric tonne unit. Pilbara Iron (a member of the Rio Tinto Group) products likewise increased to 78.8, 61.7 and 58.0 US cents per dry metric tonne unit for Lump, Fine and Yandi ore, respectively.

The 2004-05 price increases add to a range of favourable factors for Western Australia's iron ore industry. Thus, whilst the Pilbara Region supplies 97 per cent of Western Australia's iron ore exports, favourable demand prospects help to underpin the viability of smaller mining operations located in the Wheatbelt, the Mid West and Kimberley regions. In 2004-05, approximately 2 per cent of iron ore exports originated from the Yilgarn Shire (located in the eastern portion of the Wheatbelt). Though small in the total share of iron ore exports, the quantity of 2004-05 exports represented a 12 per cent increase on 2003-04. A further 0.8 per cent originated from the Mullewa Shire (in the Mid West) and 0.4 per cent from the Shire of Derby-West Kimberley.

In the Pilbara, Rio Tinto accounted for 60 per cent of the region's iron ore output, producing close to 134.7 Mt of saleable iron ore while BHPB reported total production of 89.1 Mt to account for the remaining 40 per cent. According to BHPB's Production Report for the June quarter 2005, production by major iron ore operation located in the Pilbara consisted of Mount Newman (25.7 Mt), Mount Goldsworthy (4.7 Mt), Mining Area C (16.6 Mt), Yandi (35.7 Mt) and Jimblebar (6.4 Mt). Rio Tinto reported that its Pilbara iron ore production originated from Hamersley Iron (85.3 Mt), Pannawonica (30.2 Mt) and West Angelas (19.2 Mt).

Outside of the Pilbara, Portman Iron Ore projects at Koolyanobbing, in the Yilgarn Shire and Cockatoo Island in Yampi Sound produced 6.1 Mt of iron ore. The Koolyanobbing operation was expanded by developing the Windarling and Mount Jackson deposits north of Koolyanobbing. In the Mid West, Mount Gibson Iron reported production of 1.8 Mt from its Tallering Creek operation.

Much of the demand growth for Western Australia's iron ore originates from China. According to statistics supplied by China Customs and the Tex Report, Australia is China's largest supplier with Western Australian iron ore accounting for most of Australia's 38 per cent share of Chinese iron ore imports; a total value that exceeded \$4 billion. This represented 50 per cent of the value of the State's iron ore exports and compares with 32 per cent exported to Japan, 10 per cent to South Korea, 5 per cent to Taiwan and 3 per cent to Europe. As a result, Western Australia's cumulative iron ore production from the Pilbara has increased by 50 per cent in the past five years to around 225 Mt.

In order to meet demand growth, many of the State's iron ore suppliers have expanded capacity. During the financial year, Rio Tinto's Pilbara Iron upgraded rail, port and mining (Yandicoogina and West Angelas) capacity. Contracts entered into by Pilbara Iron mean that from 2006-07, Pilbara Iron will be committed to long-term sale agreements of iron ore totalling around 70 Mt to Chinese steel mills through joint ventures or long-term contracts. Robe River, in which Rio Tinto has a 53 per cent shareholding, will provide 15 Mt per year of this tonnage.

BHPB also increased throughput capacity in its Pilbara iron ore operations. BHPB expanded capacity through the PACE project to 110 Mt and is working on a further expansion to 118 Mt. The company is evaluating options to take production to 152 Mt a year. As part of its continuing iron ore trading links with Japan, BHPB announced a sub-lease over a resource

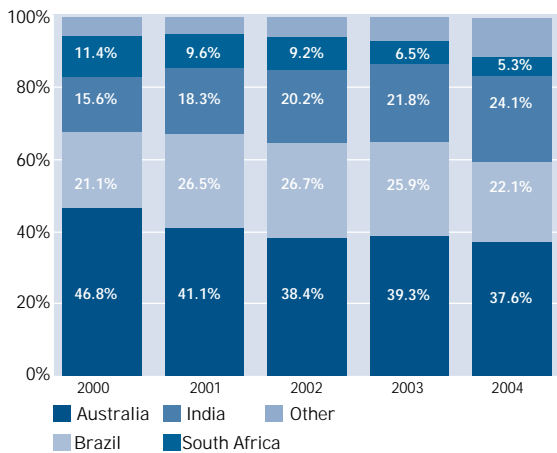


Figure 22 **China's Iron Imports by Source**  
Source: China Customs and The TEX Report

called Yandi Western 4. JFE Steel of Japan acquired a 20 per cent interest in the deposit with plans for 16 Mt over the next 11 years.

Among the smaller operators, Portman Iron Ore announced that its Koolyanobbing operation was expanded by developing the Windarling and Mount Jackson deposits north of Koolyanobbing. Portman Iron Ore also reported that the company's Esperance Port infrastructure was expanded with a further expansion to 8 Mt a year planned for late 2006. This expansion follows an upgrading of reserves at Koolyanobbing that extended the expected life of the mine by 13 years, with additional upside potential from exploration.

Mount Gibson Iron Limited said that it plans to begin production at its second mine at Mt Gibson during 2007, with expected production of 1.5 Mt per year. Asia Iron, a new company in which Mount Gibson Iron Limited has a significant shareholding interest, is progressing development plans for the exploitation of the primary banded iron formations at Extension Hill at Mt Gibson involving concentration and pelletising.

There are a number of potential new developments at various stages of evaluation including the Mineralogy magnetite project in the Pilbara, Jack Hills, Weld Range, Mt Karara, and Blue Hills in the Mid West, Koolan Island in Yampi Sound and Southdown, east of Albany. Mineralogy Pty Ltd has environmental approval to develop a 19.6 Mt/a concentrate, pellet and DRI project with a deepwater port nearby at Cape Preston. Discussions with a large Chinese steel company in regard to investing in the project are continuing.

Iron ore is also becoming the focus of exploration activity in a number of other areas of the State, with companies promoting iron ore prospects having little difficulty in raising stock exchange subscriptions to progress the search and evaluation. The continued vigour of the steel industries in China, South

Korea and Taiwan linked to a stable major demand base of Japan will underpin significant increases in Western Australia's iron ore sales well into the next decade.

### 4.3 Nickel

During 2004-05, the price of nickel continued to grow strongly with a 22 per cent 2004-05 average increase in the international US dollar denominated price over the average for 2003-04. The average price rose from US\$12 264/t (US\$5.56/lb) to US\$14,959/t. Coming on the back of a 60 per cent increase in the previous year this has resulted in an average 82 per cent increase since 2002-03. Consequently, despite the impact of the local currency's appreciation over the last two years, local producers received price increases of nearly 50 per cent.

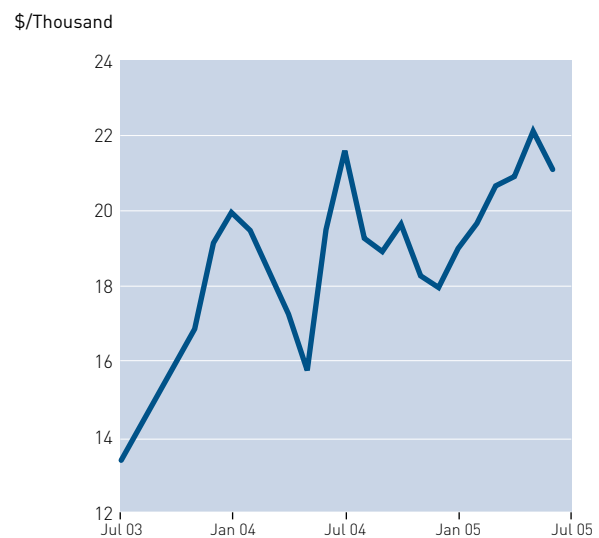


Figure 23 **Nickel Price A\$/tonne**  
Source: LME Cash, Monthly Average

In Australian dollars the nickel price rose from \$17 067/t in 2003-04 to \$19 914/t in 2004-05, a 17 per cent increase following the 30 per cent increase in the previous year. The bulk of the Australian dollar's rise had occurred in 2003-04 and the small average appreciation of 5 per cent in 2004-05 had less of a negative impact on Australian returns.

Although nickel sales volumes recorded a small 1 per cent fall to 180 386 t of contained nickel in 2004-05, the value of sales rose by \$470 million, or 16 per cent to \$3.5 billion. Nickel moved in front of alumina as the second, most-valuable mineral commodity following iron ore.

Recent high production means that Western Australia is the world's second-largest nickel producer, accounting for 14 per cent of the world's nickel output.

- According to the ABS, Western Australia accounts for 90 per cent of Australia's 26.7 Mt of total economic demonstrated resources (EDR) for nickel.

- In turn, Australia accounts for 36.6 per cent of the world's nickel EDR, making Australia the world's largest single holder of nickel resources.

Western Australia's nickel mining operations can be classified according to the ore bodies being mined and are known as being either sulphide or lateritic. According to the Australian Mines Atlas, Australia's nickeliferous sulphide ores and their host rocks mainly form parts of ancient volcanic lava flows. However, most of the world's known resources are contained in nickel-bearing laterites in minerals such as garnierite and nickeliferous limonite (nickel mixed with hydrated iron oxide). These are secondary minerals, derived by the weathering of nickel-bearing mafic and ultramafic rocks in tropical and sub-tropical climates, which have been subsequently concentrated in the soil. The nickel grade of sulphide ore typically ranges from 1-4 per cent, and that of lateritic ore from 1-2 per cent.

Currently, all of Australia's nickel production is from Western Australia. Nickel sulphide deposits are mined in Western Australia at Kambalda, Leinster, Mount Keith, Silver Swan, Cosmos, Wannaway, Mittel, RAV8, Radio Hill and Emily Ann by underground and open-cut methods. Lateritic nickel mining also occurs following the introduction of pressure acid leaching technology (PAL). Production from Cawse, Bulong and Murrin Murrin deposits all commenced in late 1998 or early 1999, with BHPB's Ravensthorpe project expected to commence operations in 2007.

The most significant structural move in the Western Australian nickel industry during 2004-05 came in June 2005 with the takeover of Western Mining Corporation (WMC) by BHPB. BHPB now runs the former WMC operations at Mount Keith, Leinster, Kambalda and Kwinana refinery under the name, Nickel West.

The WMC acquisition means that BHPB is Western Australia's largest nickel producer with the total for 2004-05 estimated to be at least 66 912 t.

Western Australia's second-largest nickel producer, Minara Resources (Murrin Murrin) produced 28 631 t. However scheduled maintenance, unscheduled problems in the hydrogen sulphide plant and a fire in May 2005, reduced production in the June quarter 2005 to 4 736 t. Consequently production in the first half of 2005 (13 356 t) was lower than the 6 months to December 2004. Production in the record March quarter, prior to the maintenance problems was an annualised rate of 32 000 t per annum.

- the Murrin Murrin nickel operation is 60 per cent owned by Minara Resources with Glencore holding the remaining 40 per cent interest.

The third-largest producer was Jubilee Mines which produced over 11 000 t in 2004-05 from underground mining at Cosmos Deeps (some 500 metres below the Cosmos mine) following the cessation of open-cut mining.

- Jubilee Mines released resource estimates for its Prospero discovery, which indicated nickel worth more than \$700 million. The initial inferred resource of 33 500 t of contained nickel, slightly more than Cosmos' 32 900 t of contained nickel. Although, the Prospero ore body lies 600 metres below the Earth's surface, Prospero is located 4.5 km south of Cosmos allowing utilisation of much of the existing infrastructure.

Other large producers include Mincor Resources (Miitel, Mariners, Redross, Wannaway) and LionOre (previously MPI Mines) operating at Black Swan, Maggie Hays and Emily Ann. Mincor commenced production from Redross in August 2004 and Mariners in early 2005 adding to its existing Miitel and Wannaway mines for an annual total of 10 028 t in 2004-05. LionOre's operations at Black Swan produced at 6 000 t of contained nickel per annum for the first half of 2005 and its Emily Ann - Maggie Hays (Lake Johnson Operations) produced 9 882 t of contained metal in 2004-05.

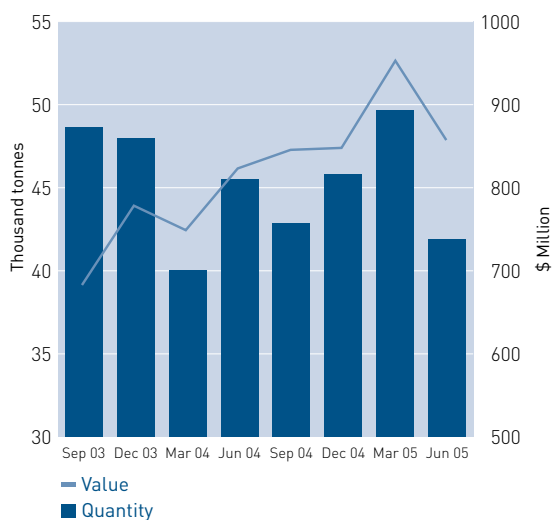


Figure 24 Nickel Quantity and Value by Quarter  
Source: DoIR

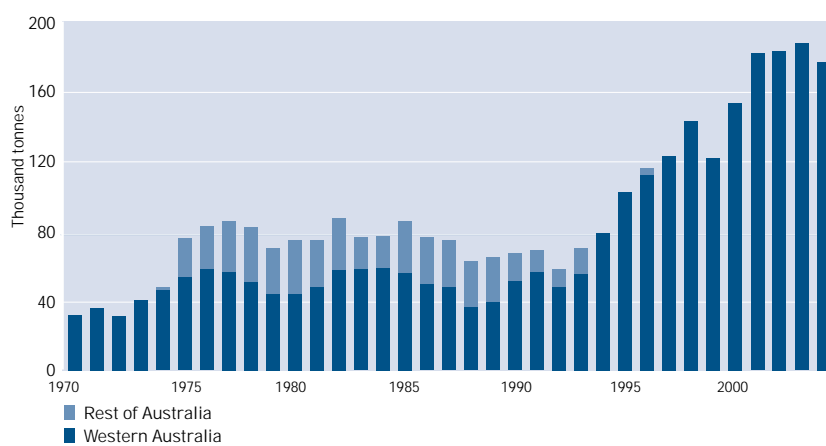


Figure 25 Nickel Quantity  
Sources: DoIR and ABARE

The continuing strong demand for nickel has stimulated the development of new prospects. Among the most significant is the BHPB Ravensthorpe nickel laterite project that is, according to the GL Survey, expected to produce 30 000 t/a to 50 000 t/a of contained nickel. Construction began in late 2004 with first production expected in late 2007 and full production in the second half of 2008. The mine is expected to have a life of 25 years.

Another large potential project is proposed by Heron Resources and Inco. Proposed production from the Kalgoorlie Nickel Project (KNP) at Goongarrie about 85 km north of Kalgoorlie is around 40 000 t/a of contained nickel. Inco, the world's second largest nickel producer, has committed to spend \$100 million to complete a bankable feasibility study of the KNP. The project, should it proceed to production, will begin mining a nickel ore body that is estimated to be approximately three times the size of BHPB's Ravensthorpe mine.

Among new projects approaching operational status, Western Areas' has identified nickel resources of at least 300 000 t at its Flying Fox nickel mine (400 km east of Perth). Production is expected to begin at the company's T1 deposit sometime in 2006. Stage 1 production is expected to produce 6 000 t of contained metal per year.

#### 4.4 Alumina

Western Australian alumina production has increased continuously from 1980 until 2004-05 and has stabilised at close to 11 Mt/a.

The price received by local producers averaged A\$310/t in the year. This was a 12 per cent increase on the previous 12 months and takes prices back towards, but still short of, the peak values received in 2000-01. This recovery in the alumina market, with solid US dollar price growth, was reflected in the strong growth in the value of production to a total of \$3.5 billion for 2004-05.

The alumina industry is, in the 2004-05 period, Western Australia's fifth-largest resources sector by sales value (after

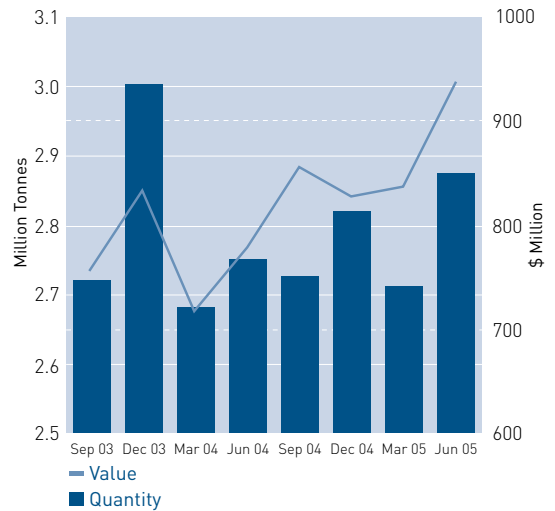


Figure 27 Alumina Quantity and Value by Quarter  
Source: DoIR

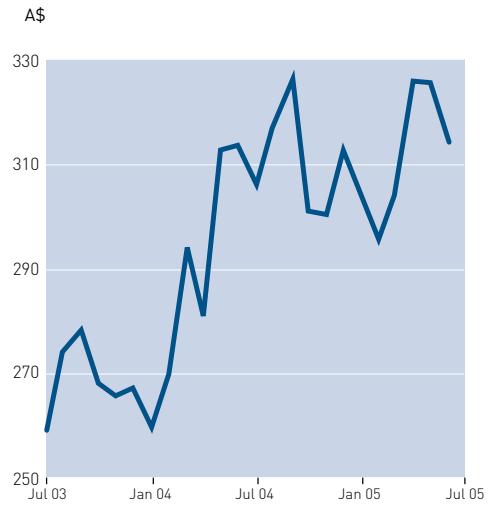


Figure 28 Alumina Price A\$/tonne Source: ABS

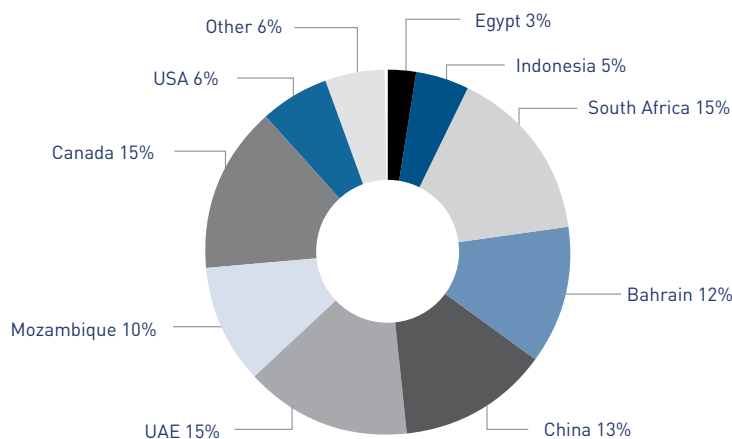


Figure 26 Alumina Exports  
Total Value \$3.05 billion Source: DoIR

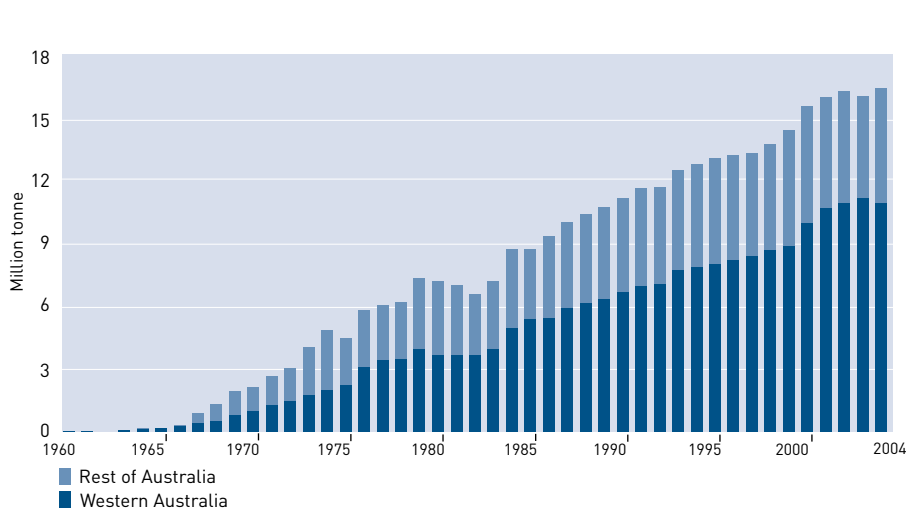


Figure 29 Alumina Quantity  
Sources: DoIR and ABARE

iron ore, crude oil, LNG and nickel), accounting for 10.4 per cent of the total value. The industry in Western Australia comprises four alumina refineries operated by Alcoa and Worsley Alumina located within close proximity to bauxite mines.

Western Australia's supply of alumina originates with bauxite ore mined in the Darling Ranges in the State's south-west region, which is then processed to produce alumina. The bulk of Western Australia's alumina is sent overseas for smelting into aluminium. Increased demand for aluminium over recent years has created, among other things, renewed interest in Western Australia's Mitchell Plateau (located in the Kimberley) bauxite resources.

Growth in the world aluminium market is stimulating expansion plans at the State's alumina refineries. Media reports indicate that Alcoa is upgrading its Pinjarra alumina refinery as well as seeking approval to upgrade its Wagerup refinery. In February, Alcoa received approval to increase Pinjarra plant capacity by 600 000 t/a. The Pinjarra refinery currently supplies 7 per cent of the world's alumina. In addition, Alcoa sought environmental approval to add a third production unit to its Wagerup refinery. The Wagerup Unit Three expansion would, if approved, increase production capacity by 80 per cent to 4.7 Mt/a.

Worsley Alumina also released its plans for a \$900 million upgrade. The release of this plan follows a \$30 million improvement program, which was carried out over recent years.

#### 4.5 Gold

Output of the State's gold industry fell by 5.5 per cent in 2004-05 from 177.4 t to 167.7 t. With a small average increase in Australian dollar prices, the fall in value of production was limited to 3 per cent resulting in a total value of \$3.0 billion, about \$92 million lower than the previous year. The fall in 2004-05 production continued seven years of steady declines

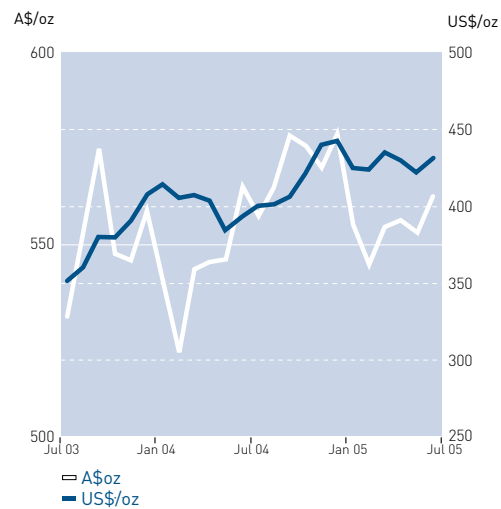


Figure 30 Gold Price  
Sources: Perth Mint and London Fix

from the peak production of 238 t in 1997-98 and the lowest recorded for 15 years.

The explanation for continuing production declines is due, in part to the declining Australian dollar-denominated gold price, which fell from a peak of A\$612.90/oz in January 2003 to A\$521.34/oz by February 2004. From March, the price improved to nearly A\$580.00/oz before declining to A\$562.36/oz by the end of June.

In addition to a trend decline in the gold price, capital cost increases delayed some projects. As explained by ABARE, Newcrest's Telfer gold mine, located in the Pilbara, was delayed due to cost increases and skilled-labour shortages.

Despite the decline in gold production, Western Australia still represents over 60 per cent of Australia's total gold production, producing more than 1.7 times more gold than the rest of Australia in 2004. Data provided by mining consultants Surbiton Associates indicate that Australia produced 265 t in the year to June 30. Comparing this figure to this year's estimate of total Western Australian gold production indicates that the State's share of national output is approximately 63 per cent in 2004-05.

Approximately 74 per cent of Western Australia's gold output for 2004-05 was mined in the Goldfields-Esperance region, which includes the gold producing shires of Coolgardie, Dundas, Kalgoorlie-Boulder, Laverton, Leonora and Menzies. The remaining 26 per cent originated from the Mid West (19 per cent), the Wheatbelt (4 per cent) and the Pilbara (3 per cent).

Western Australia's 10 largest projects produced 3.7 Moz or 115 t of gold and accounted for 69 per cent of the State's total gold production in 2004. These projects comprised:

- Super Pit (KCGM) — 914 572 oz (28.4 t)
- St Ives (Gold Fields) — 527 480 oz (16.4 t)

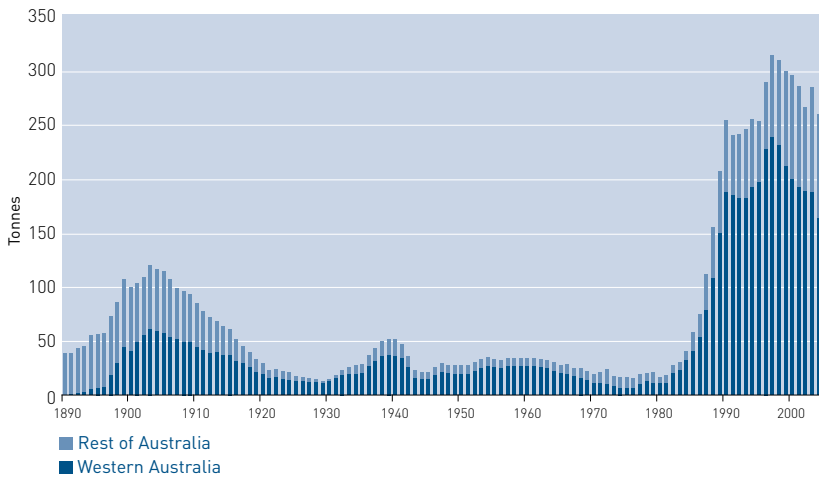


Figure 31 **Gold Production**  
Sources: DoIR and ABARE

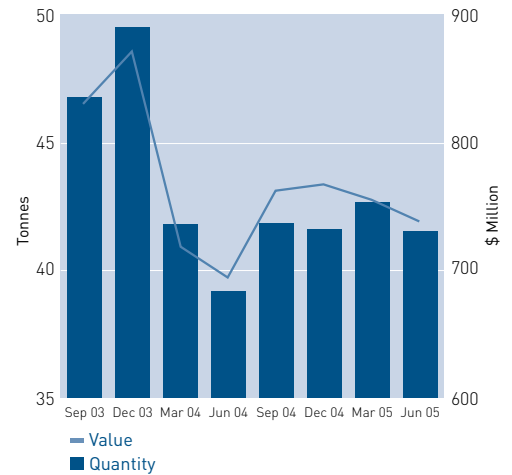


Figure 32 **Gold Quantity and Value by Quarter**  
Source: DoIR

- Sunrise Dam (AngloGold Ashanti Limited) — 473 928 oz (14.7 t)
- Granny Smith (Placer Dome) — 343 001 oz (10.7 t)
- Jundee-Nimary (Newmont) — 266 733 oz (8.3 t)
- Plutonic (Barrick Gold) — 280 892 oz (8.7 t)
- Kanowna Belle (Placer Dome) — 239 751 oz (7.5 t)
- Agnew (Gold Fields) — 212 437 oz (6.6 t)

- Marvel Loch-Southern Cross — 198 334 oz (6.2 t)
- Hill 50 – Mount Magnet (Harmony Gold) — 181 627 oz (5.6 t)

Western Australia exported 81 per cent of its gold to just three countries, India (50 per cent), the UK (17 per cent) and South Korea (14 per cent). ABARE estimates indicate that world gold production will have risen by about 70 t to 2 534 t from 2004 to 2005 and by a further 55 t in 2006. Indeed, ABARE reports that, for the first time in at least 10 years, jewellery demand exceeded mine production.

**Gold Export update 2004-05**

The Australia Bureau of Statistics (ABS) trade data indicated a significant rise in Western Australian gold exports. However, this apparent increase in gold exports from Western Australia has been due to a restructuring of Australia’s gold refining industry.

In October 2002, AGR Matthey was formed. This is a partnership between Johnson Matthey (Aust) in Victoria, Western Australia Mint (The Perth Mint) and the Australian Gold Alliance. As a result of the merger, all Australian gold is now refined in Western Australia. The Victorian refinery still refines silver and jewellery products.

Gold export data published by the ABS from Western Australia must therefore be interpreted with some caution. It includes gold produced in other States and Territories, in addition to production from overseas operations, namely Papua New Guinea and Asia, which is refined and exported from Western Australia. This export figure is therefore larger than Western Australia’s own level of gold production.

The ABS estimates that gold exports from Western Australia in 2004-05 amounted to approximately \$5.6 billion. Approximately 54 per cent or \$3.0 billion was gold

produced in Western Australia. The remaining 46 per cent (approximately \$2.7 billion) can be attributed to gold refined and exported from Western Australia but produced from mining operations in other states, territories and overseas.

Overseas imported gold also includes scrap which is refined in Western Australia and exported.

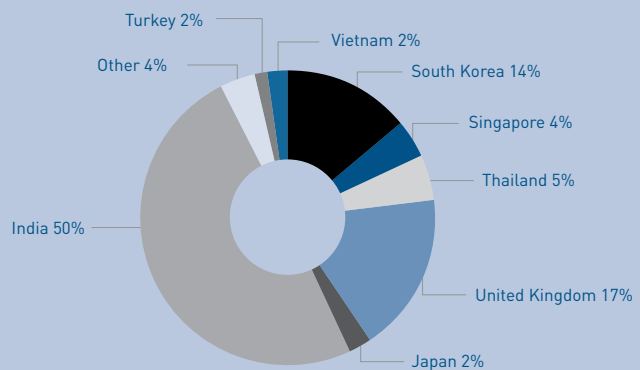


Figure 33 **Gold Exports**  
Total Value \$3.02 billion Source: DoIR

## 4.6 Heavy Mineral Sands

Western Australia remained the dominant producer of heavy mineral sands in Australia, providing 78 per cent of Australia's total mineral sands sales value in 2004–05. During 2004–05, the total sales value of Western Australian heavy mineral sands (including garnet, ilmenite, leucoxene, rutile, staurolite and zircon) increased 5.5 per cent.

Prices paid to producers fell for ilmenite (-5.5 per cent), leucoxene (-0.6 per cent), and upgraded ilmenite (-20.7 per cent) but increased for zircon (22.0 per cent), and rutile (1.6 per cent). Sales volume decreased for ilmenite (-7.4 per cent), rutile (-26.8 per cent), and zircon (-3.5 per cent) while the sales volume increased for upgraded ilmenite (9.6 per cent) and leucoxene (36.0 per cent). The remaining sands collectively realised a 116.0 per cent price increase and a volume increase of 185.6 per cent. The net impact of price and production changes resulted in an increased sales value of 5.5 per cent from \$755 million to \$797 million.

According to TZMI, the weaker prices for titanium minerals has been due to oversupply and more competitive market conditions, which were exacerbated by the entry of some new suppliers. Whilst the price fall for ilmenite was influenced by the strength of the Australian dollar compared with its US counterpart, the price in US dollar terms also fell slightly. The average price received for upgraded ilmenite (synthetic rutile) was virtually unchanged over the previous financial year at A\$515/t.

In Western Australia, the volume of zircon sales decreased by 3.5 per cent in 2004–05 to 417 924 t. The price jump of 22 per cent meant that the overall value of sales increased by nearly 18 per cent to \$297 million. This meant that zircon increased its share of the value of heavy mineral sands from 33 to 37 per cent.

Although most zircon is exported, a substantial quantity is supplied to the domestic market including three local Western Australian producers involved in value adding processing activities. These comprise Australian Fused Materials and Doral Specialty Chemicals Pty Ltd (previously owned by Millennium Inorganic Chemicals) in Kwinana and Imdex in Jandakot.

Western Australia currently accounts for around 80 per cent of the nation's production value of titanium and associated minerals and is the only state that produces the value-added products synthetic rutile and titanium dioxide pigment. The dominance of Western Australia in the Australian market reduced markedly in 2004, when it comprised 78 per cent of the total value of production. During the mid to late 1990s, this share was greater than 80 per cent, and generally exceeded 90 per cent between 1999 and 2003.

By region, 42 per cent of the State's 2004–05 total sales volume originated in the South West, a further 39 per cent from the Mid West and the remaining 19 per cent originated from the Wheat Belt. The South West heavy mineral sands extractive operations located at Capel, Dardanup, Gwindinup,

Ludlow, and Sandalwood and the Kemerton refining plant supplied the majority of the State's ilmenite (71 per cent) and leucoxene (66 per cent), 36 per cent of the State's total synthetic rutile sales and nearly a quarter of the State's zircon (23 per cent) sales. The Mid West heavy mineral sands extractive operations, located at Dongara and Eneabba, supplied 100 per cent of the State's 2004–05 garnet sales, 72 per cent of the State's naturally occurring rutile sold in 2004–05 and 53 per cent of the State's zircon. The Mid West's Narnungulu plant supplied 31 per cent of the State's total synthetic rutile sales. Remaining heavy mineral sands sales originated from the Wheat Belt. All of the State's staurolite sold in 2004–05 originated from Dandaragan.

Western Australia's principal heavy mineral sands suppliers are Cable Sands, Doral Mineral Sands, GMA Garnet, Iluka Resources and Tiwest. Cable Sands owns heavy mineral sands resources in Gwindinup, Jangardup, Ludlow, Tutunup and Yarloop, all located in the South West. The company also operates its mineral separation plant (MSP) in Bunbury. The MSP has treated ore from more than 20 ore bodies. Excess plant capacity is likely to be utilised to treat ore sourced from Pooncarie, New South Wales. Doral Sands owns mineral sands resources in Dardanup along with a wet plant and a dry plant at Picton. Operations began with an initial life of 10 years in 2002, however with identification of additional resources, mine life has been extended for a further 5–10 years. GMA Garnet mines dunes and operates a refinery in Port Gregory (Mid West) and exports its product from Geraldton port. Iluka's Western Australian production facilities are located in Capel, Eneabba and Narnungulu. The Capel operation consists of three mine sites, two dry separation plants, and a synthetic rutile processing plant. Titanium minerals and zircon from Iluka's Mid West mining operations are processed at the Narnungulu processing centre before being exported. Tiwest mines heavy mineral sands, separating titanium minerals and zircon; producing synthetic rutile and manufacturing titanium dioxide pigment.

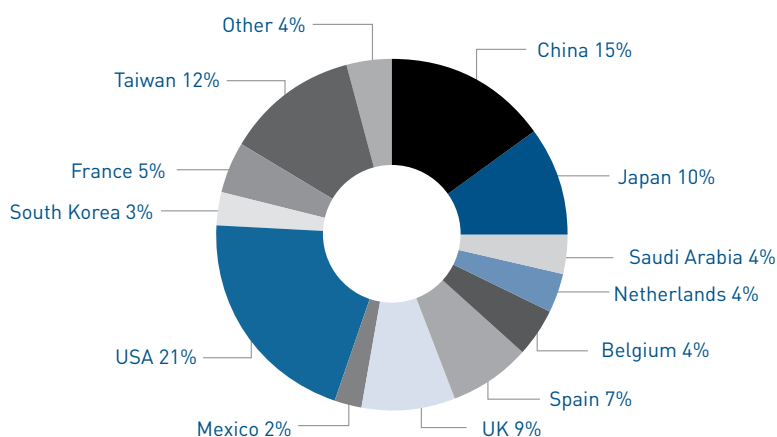


Figure 34 **Heavy Mineral Sands Exports**  
Total Value \$554.26 million Source: DoIR



Figure 35 **Heavy Mineral Sands Price Index**  
Source: WA Treasury Corporation

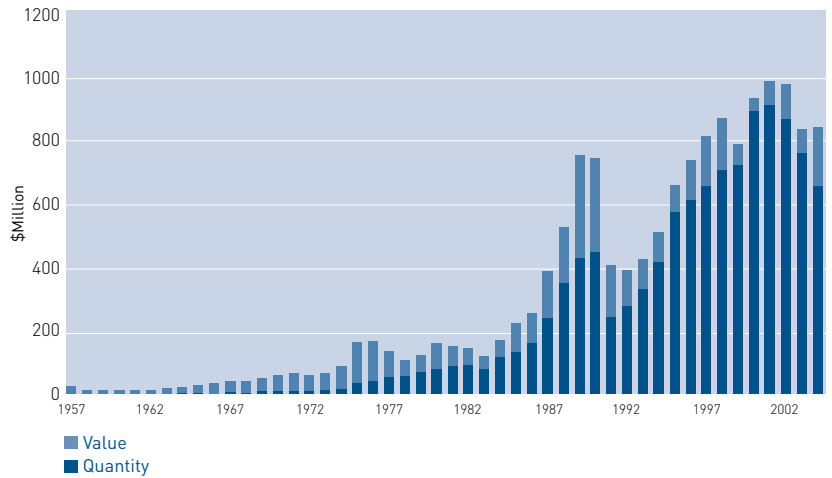


Figure 37 **Heavy Mineral Sands Value of Production**  
Includes Ilmenite, Leucoxene, Upgraded Ilmenite, Rutile, Zircon and Monazite  
Sources: DoIR and ABARE

Tiwest’s sites include: Cooljarloo (Mid West), which produces heavy mineral concentrates from dredging and dry mining operations; and Chandala (Wheatbelt) where the heavy mineral concentrates are separated into ilmenite, rutile, leucoxene and zircon. The ilmenite is also refined to synthetic rutile at Kwinana which processes synthetic rutile into titanium dioxide pigment.

Deposits north of Perth provide ilmenite suitable for synthetic rutile production and the chloride route for titanium dioxide (TiO<sub>2</sub>) pigment production. South of Perth, deposits are ilmenite-dominant and contain grades suitable for both the sulphate route [53–56 per cent TiO<sub>2</sub>] and the chloride route [greater than 57 per cent TiO<sub>2</sub>].

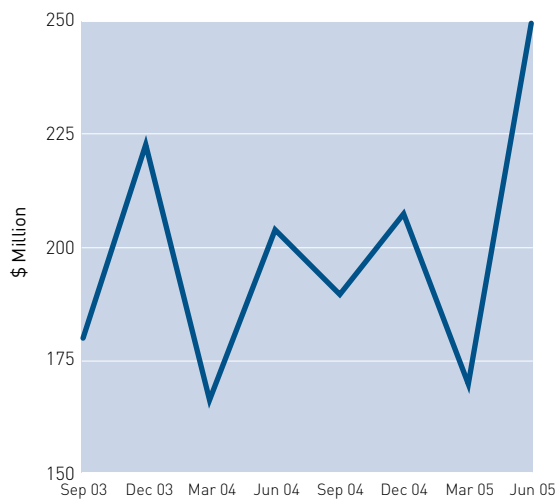


Figure 36 **Heavy Mineral Sands Value by Quarter**  
Source: DoIR

### Heavy mineral sands basics

Ilmenite, leucoxene and rutile are inorganic chemical compounds containing the element titanium. Titanium dioxide extracted from ilmenite, leucoxene and rutile is used mainly as non-toxic white pigment in products such as paints, paper, plastics, foods and cosmetics. Titanium dioxide is also used in the production of fluxes for welding rods and as a metallurgical flux in iron and steel-making. In its elemental form, titanium is a light, high-strength metal which is extremely resistant to corrosion. These characteristics have led to the use of titanium metal in jet aircraft engines and pipelines. Titanium is also being used increasingly in the manufacture of golf club heads and tennis racquets.

### 4.7 Diamonds

Western Australian diamond sales fell by approximately 30 per cent. This follows a substantial decline in production at the Argyle Diamond mine in the first half of 2004. Since that time, Argyle Diamonds has recorded substantially higher production figures. As diamond quantity statistics reported in this digest reflect sales, rather than production, the reported sales decline is consistent with the reduced production in the previous financial year. Reported sales from this mine and the Ellendale project of Kimberley Diamonds fell to 22.8 Mct from 32.5 Mct in the previous financial year. An improvement in international prices and a higher proportion of the more valuable Ellendale diamonds meant that the value of production fell by only 10 per cent compared with the 30 per cent fall in volume.

International diamond market conditions were strong in 2004-05. The Antwerp Diamond Index indicated a 6.5 per cent price increase and Belgium exports of polished diamonds increased by 10.9 per cent. Global retail sales were healthy with growth in the Asia-Pacific region, India, and the Middle East. Japan also recorded modest growth for the second year.

According to Geoscience Australia, Australia is the fourth-largest producer of diamond by weight after Botswana, Russia

and Congo. Australia is the fourth-largest producer of gem/near gem diamond and the third-largest producer of industrial grade diamonds. Western Australia dominates Australian production, with most production originating from the Argyle diamond mine located in the Kimberley.

All of Western Australia's diamonds currently originate from the Kimberley, which is the only known significant source of pink diamonds, producing 90 to 95 per cent of the world's supply. The Argyle diamond mine is also notable for being the first commercial diamond mine exploiting a volcanic pipe of lamproite, rather than the more usual kimberlite pipe.

Rio Tinto's Argyle diamond mine accounts for the bulk of diamond sales from Western Australia. The Argyle project has been the world's largest supplier of natural-coloured diamonds and its output accounts for almost all of Australia's diamond production. In 2004-05, Argyle's sales were recorded down by a third on the previous year. Mining difficulties in 2003-04 slowed production but the first half of 2005 production results from the Argyle mine showed a recovery to 18.1 Mct.

The Argyle open-pit operation is expected to continue until 2008. The company has committed to an underground mine that is expected to extend the mine's life to 2018. Average annual production from the mine in the period 2007 to 2018 is expected to be around 60 per cent of Argyle's historic annual average production level of 34 Mct.

Diamond production also continued at Western Australia's only other diamond mine, Kimberley Diamond Company's Ellendale mining operations near Derby. Kimberley Diamond Company began mining and marketing operations in 2002. The company's resource statement as at 30 June 2005 indicates a total global resource of 5 Mct across three sites called Ellendale 9, Ellendale 4 and Ellendale 4 Satellite. Ellendale 9, the first stage of Kimberley Diamond's Ellendale mine, reached full production in 2004. The operation at Ellendale 9 comprises two processing plants and associated infrastructure.

Production from Ellendale 9 reached 123 334 ct with diamond sales of 135 372 ct from Ellendale 9 and Ellendale 4 in 2004-05. According to the company, Ellendale 9 is the world's most prolific producer of fancy yellow goods. The Ellendale 4 diamonds were extracted from the top surface material above the main ore body of the pipe as part of the company's preparations to begin mining at Ellendale 4. The establishment of a second mining and production centre at Ellendale 4 is expected to increase the Kimberley Diamond Company's annual production to 700 000 ct.

The GL Survey states that diamond exploration declined 8 per cent in Western Australia. The fall was attributed largely to reduced resource-reserve drilling activities at Argyle. Kimberley Diamond Company's annual report for 2004-05 outlined an exploration program that included Ellendale 7, Ellendale 11, Terrace 5 as well as additional regional exploration.

Helix Resources Limited reported in its September Quarterly Report 2005 that:

"...reconnaissance and surface sampling [by DeBeers Australia Exploration] resulted in the discovery of two kimberlites, Blacktop and Clurrie in 2004. In a follow-up survey, three micro-diamonds were recovered from a rock chip containing weathered kimberlite from the Blacktop area. The discovery is immediately adjacent to DeBeers Australia Exploration's Balmoral Project tenements where a 32.8 t bulk sample produced 89 macro diamonds totalling 4.17 carats (-8.0 + 1.0 mm fraction) from the Blacktop and sill complex. A further 46 diamonds totalling 1.1 carats were also found in the tailings re-treatment audit of the bulk sample..." The Blacktop and Clurrie kimberlites are located in the Pilbara, south of Dampier.

### Diamond basics

Diamond is composed of carbon and is the hardest known natural substance. Its hardness and high light dispersion make it useful for industrial applications and jewellery. Diamonds are contained in manufactured items such as stone cutters, stone polishers and computer chips.

## 4.8 Base Metals (copper, lead and zinc) Overview of Western Australian production

The overall value of Western Australia's base metals production (copper, lead and zinc) increased slightly to \$255 million from \$246 million in the previous financial year. The rise was due, in part, to the recommencement of copper mining at Telfer, offsetting declines in lead and zinc caused by the closure of the Lennard Shelf mine in early 2004.

Copper accounted for 83 per cent of total base metal sales, while zinc accounted for 17 per cent and lead sales less than 1 per cent. Western Australia produces three copper products; copper cathode, copper concentrates and copper by-product. The quantity of copper sold on a 'contained copper basis' increased by 13 per cent to 60 467 t compared with 53 289 t in 2003-04. The average price received increased by around A\$553/t of contained copper to A\$3 477, helping to lift the total value of sales by 35 per cent to \$210 million.

The quantity of zinc sold in Western Australia fell by over half to 46 530 t compared with the 108 042 t in the previous financial year. The value of zinc sold fell substantially by 45 per cent from \$80 million in 2003-04 to \$44 million in 2004-05.

Overall, Western Australia is a small base metals producer. According to Geoscience Australia, Australia ranks first in the world for lead production at 700 000 t/a. This contrasts with Western Australia, which accounts for just 0.4 per cent of Australia's current production. Similarly, Western Australia's 2004-05 copper production at 60 500 t accounts for 0.4 per cent of ABARE's estimate of world copper mine production. Western Australia is also a relatively small zinc producer, accounting for 46 000 t of zinc against ABARE's 2005 world zinc mine production estimate of 9.8 Mt.

Base metals prices trended substantially higher during 2004-05. Copper prices increased by an average 35 per cent in US dollar terms, reaching an average US\$3 150/t. According to ABARE, a strong increase in Chinese copper consumption was offset by declines in the US, Japan and the European Union. Consumers reportedly delayed purchases because of high copper prices. On the supply side, world copper production increased by 3.2 per cent, with the increase largely attributed to the US and Indonesia. Significant increases in Indonesian output were offset by declines in Chilean production.

US dollar-denominated lead prices began a trend increase during 2003-04, increasing by 57 per cent. This recovery has continued into 2004-05 increasing a further 38 per cent to a high of US\$964/t, or A\$1 284/t up 32 per cent when converted to Australian dollars. Fundamentals behind this reflected strong demand for electrical battery storage and under-investment in mine production. With demand for lead continuing to rise strongly, it left the market in its worst deficit position since 1973, according to the London-based International Lead and Zinc Study Group (ILZSG). The industry organisation reported that demand exceeded supply by 236 000 t in 2004 and while production in China was up sharply, it was insufficient to offset production falls in Australia and the US.

The average LME price of zinc for 2004-05 increased by 22 per cent to US\$1 171/t and by 16 per cent to A\$1 554/t. Zinc prices increased during 2004 principally due to strong Chinese demand and relatively good OECD economic growth.

Western Australia's principal base metals suppliers include the Birla Nifty copper mine, Newcrest Mining Limited and Oxiana. The Aditya Birla Group, one of India's largest business houses, owns and operates the Birla Nifty copper mine, located in the Pilbara about 300 km southeast of Port Hedland. Birla Nifty currently has a capacity of 25 000 t of copper cathodes and a large undeveloped copper sulphide resource estimated at 1.9 Mt of copper equivalent.

Newcrest Mining Limited operates the Telfer mine, located in the Pilbara approximately 450 km southeast of Port Hedland. Known as one of the world's top ten gold deposits, the Telfer mine also produces copper. Telfer commissioned two processing trains in November 2004 and February 2005. The commissioning follows a redevelopment of the mining operations following the suspension of production in August 2000. Annual copper production capacity is estimated at 30 000 t.

Oxiana Limited acquired Newmont Mining's Golden Grove mining operation in July 2005. Located in the Mid West, approximately 280 km east of Geraldton, the Golden Grove mine produces zinc, copper, lead, gold and silver in concentrates. Oxiana estimates the mine's life at seven years. Between 2001 and 2004, Golden Grove produced an annual average of 55,240 t of zinc, 25 070 t of copper, 1.3 Mt of silver and 15 476 oz of gold.

Since the closure of the Lennard Shelf zinc mine, the originating regions for base metals has contracted to the

Mid West and the Pilbara. The Pilbara is currently the largest copper-producing region. The Mid West is the only region currently producing lead and zinc. Of particular importance for the Mid West is the Magellan lead mine being developed by Ivernica and officially opened in September 2005. Ivernica, an international base metals mining and exploration company, reported that the mine's life is estimated at 10 years based on current proven and probable reserves and latest production plans. Substantial inferred resources and exploration opportunities exist to extend mine life. The mine is anticipated to produce some 100 000 t/a of lead in concentrate by 2007.

## 4.9 Other Minerals

### Coal

All of Western Australia's coal supplies are sold domestically to Western Power or large local energy users, mainly in the mineral-processing sector. The production of coal rose 4 per cent to 6.2 Mt, but the value of sales fell by 2 per cent to \$270 million.

The Griffin Group is progressing plans for a coal-fired power station in conjunction with the proposed Coolangatta industrial estate in Collie. Griffin plans to finalise construction of the Bluewaters Power Station by late 2006. Griffin also announced plans for the expansion of the Ewington mine at Collie with reserves of 80 Mt and opening up the Chicken Creek-3 deposit to supplement supply from the Muja mine, which is fully dedicated to the Muja power station.

Wesfarmers Premier Coal is the larger of the two coal producers based at Collie, and recently won contracts to increase its sales to Western Power.

Coal comprises some 16 per cent of Western Australia's primary energy consumption. This percentage will fall as the Government has decided, following a process of open tender, that the next base-load power station will be fired by gas.

### Cobalt

World cobalt prices fell back some 3.5 per cent in 2004-05 to US\$44 728/t (US\$20/lb) and 6 per cent when converted to Australian dollars to A\$60 045/t. While price-falls for cobalt metal were reflected in prices for associated cobalt products, these make up about one-third of the value of cobalt production in Western Australia. Cobalt metal prices have been driven by strong demand, particularly from China and despite the slight weakening are at relatively high historical levels.

The buoyant demand and strong prices for cobalt metal were offset by reduced production of metal and reduced prices for other cobalt products. The result was that the total of all Western Australian cobalt sales fell from \$213 million to \$204 million for the year to June 2005.

Analysts do not expect that the high prices for cobalt metal can be sustained if the production increases associated with nickel production continue. The driving force behind the price increases has been global economic growth and while continuing for longer than originally expected, is still expected

to moderate in the medium term. The outlook is for prices to moderate in calendar year 2006 as the new production sources are expected to come on-stream. The balance between supply and demand is particularly significant for a speciality metal like cobalt with a relatively small market easily unbalanced by large changes in either supply or demand.

Production in Western Australia is expected to expand in the longer term with greatly increased levels of nickel exploration and the commencement of the Ravensthorpe Nickel-Cobalt project in 2007.

### Salt

Western Australia accounts for approximately 93 per cent of the nation's salt production and is the country's dominant exporter. In the year to June 2005, Western Australian salt sales grew by 17 per cent to 11.6 Mt and producers enjoyed improved prices to increase the value of sales in 2004-05 by 23 per cent to \$221 million.

Dampier Salt is the State's largest operator and the world's largest exporter of solar salt. It is also Australia's largest producer and exporter of natural gypsum. Dampier Salt is owned by Rio Tinto (64.9 per cent), Marubeni Corporation (20.5 per cent), Nissho-Iwai Corporation (10.1 per cent) and Itochu Corporation (4.5 per cent). The company has operations at Dampier, Lake MacLeod and Port Hedland. The major export destinations are Japan, Taiwan, Philippines and South Korea. It also exports to other parts of Asia, the Middle East, North America and Africa.

Onslow Salt, majority-owned by Akzo Nobel, a multinational pharmaceuticals, coatings and chemicals group, is another significant Western Australian producer. All production is exported, with major markets in Japan, South Korea and Indonesia.

A potential entrant into the Western Australian salt industry is Straits Resources, which is undertaking a feasibility study for its Yannarie project on the eastern margin of Exmouth Gulf and has initiated the EPA assessment and approval process for this project. Straits Resources is proposing to initially construct and operate a 3 Mt/a solar salt field on the eastern margin of the Exmouth Gulf. At peak production, the project is planned to produce up to 10 Mt/a of salt. Capital expenditure has been estimated at \$120 million, with construction scheduled to start in 2006 and production in 2008.

Salt is primarily used as a feedstock for the production of chemicals, glass and plastic. In the context of growing demand from Asia, demand for salt is likely to continue to increase. Western Australian salt producers are therefore well placed, due to their proximity to the Asian markets, particularly in the context of rising freight rates for low value bulk commodities.

### Tin, Tantalum and Lithium

The value of Western Australian tin, tantalum and lithium sales increased by 14 per cent to \$184 million, following a year of reduced value of sales in 2003-04. This result was achieved despite falls in the sales quantity of spodumene and tin. Public

information about global tantalum prices and volumes are difficult to obtain. The US Geological Survey estimate a price range of US\$30 to US\$38/lb of tantalum pentoxide content. Estimated world mine production totalled at least 1 910 t for calendar year 2005. Note that this estimate excludes output from Bolivia, China, Russia and Zambia due to poor information sources for these countries. Approximately 70 per cent of US tantalum imports originated from Australia and 13 per cent from Canada.

Western Australia's two principal tantalum producers are Sons of Gwalia and Haddington Resources. Western Australia has the world's largest tantalum mines with Sons of Gwalia's Greenbushes and Wodgina operations. Greenbushes is located in the South West region about 80 km east of the Port of Bunbury while the Wodgina operation is located approximately 100km south of Port Hedland in the Pilbara Region. Sons of Gwalia is the world's largest producer of tantalum concentrate providing 55-60 per cent of global raw materials from the two mines that hold around 75 per cent of global reserves. Tantalum is also sourced from Haddington Resources' Bald Hill tantalite project in Western Australia's Eastern Goldfields. Haddington Resources operates Bald Hill under a licence agreement with Sons of Gwalia.

Sons of Gwalia's Greenbushes mine also produces spodumene, making it the world's second largest producer of lithium minerals.

The US Geological Survey that world mine production reached 20,400 tons, excluding US production. According to Geoscience Australia, Australia is the third largest producer, all of it supplied from the Sons of Gwalia Greenbushes mine. Publicly available information about world lithium prices is not readily available.

In volume terms, tin sales fell by 30 per cent to 380 t. The resulting value of tin sales fell by 10 per cent to \$4.1 million despite the 28 per cent increase in average international tin prices in 2004-05. In Western Australia, tin is only produced as a by-product of tantalum mining. Sons of Gwalia is also Western Australia's only tin producer and its Greenbushes operation also produces kaolin.

### Tantalum basics

Tantalum is a rare, very hard, heavy, grey metallic element that is exceptionally resistant to corrosion and chemical attack below 150°C. It is used to make light-bulb filaments, electrolytic capacitors, lightning arresters, nuclear reactor parts, and some surgical instruments. The electronics industry is the largest single consumer of tantalum; it is primarily used in the manufacture of capacitors, devices that regulate the flow of electricity within an integrated circuit. Tantalum capacitors are found in many every day devices such as mobile phones, lap-top computers and video cameras. Another increasing application for tantalum is as an alloy in the manufacture of turbine blades for power stations and jet engines, where tantalum improves the structural integrity of blades at high temperatures, enabling turbines to operate at higher temperatures, thereby improving fuel efficiency.

Tantalum is obtained from tantalite, a mineral consisting of tantalum oxide of iron and manganese that occurs with niobite or in coarse granite.

According to the Tantalum-Niobium International Study Centre, tantalum ores are found primarily in Australia, Canada, Brazil and central Africa, with some additional quantities originating in South-east Asia and in China.

### Manganese

Most manganese is used in steel making and hence China now accounts for 40 per cent of the world's manganese consumption. In 2004-05, Western Australia's manganese sales remained steady at 585 454 t and a strong lift in prices of some 40 per cent caused the value of sales to increase by the same percentage to \$115 million for the same period. A 63 per cent increase in the benchmark price for manganese was announced during the March 2005 quarter and will further boost sales values into 2005-06.

Consolidated Minerals' Woodie Woodie project in the Pilbara is Western Australia's sole manganese producer and represents 5 per cent of the world's high-grade exports. The operation is also one of only two manganese mines in Australia, with a third under construction in the Northern Territory. In response to buoyant prices and strong Chinese demand, Consolidated Minerals has completed the commissioning of the upgraded processing plant at Woodie Woodie. The new long-term production level will be 1 Mt/a and a new crushing circuit will be commissioned in October 2005 which is expected to enhance the performance of the processing plant.

It is estimated that Australia is the third-largest producer of manganese after China and South Africa.

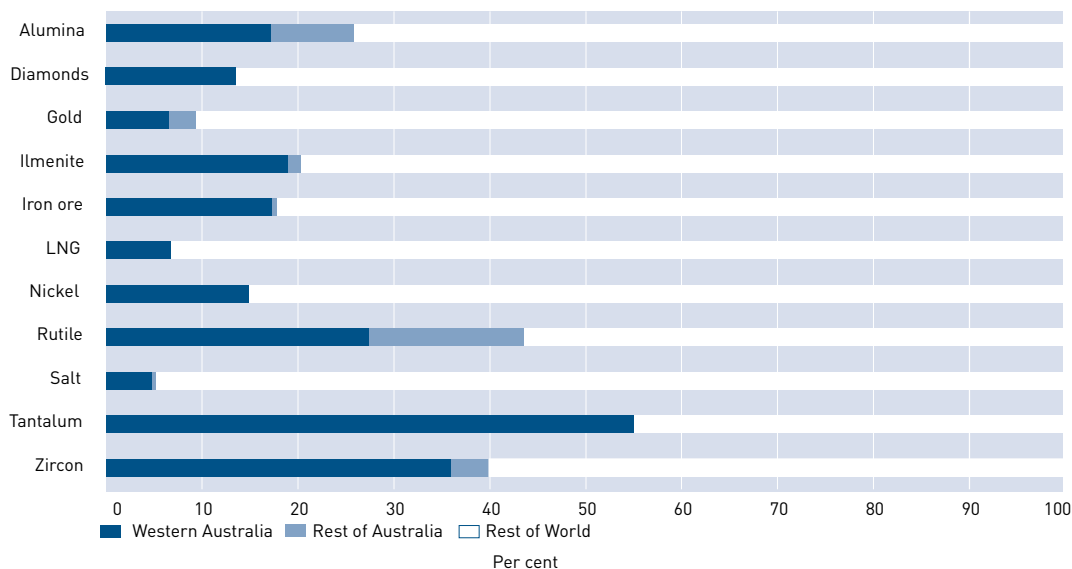


Figure 38 Selected WA Commodities relative to world production ending 2004 by quantity

Sources: DoIR, ABARE and USGS

The latest comparable data show that the Western Australian share (by quantity) of the world's output of the following products was: alumina 17%, gold 7%, ilmenite 19%, iron ore 17%, LNG (sea-borne trade) 7%, nickel 15%, rutile 27%, salt 5%, tantalum 55%, zircon 36% and 14% of diamonds (mainly industrial grade).

Commodity	Unit	2003-04		2004-05	
		Quantity	Value (\$)	Quantity	Value (\$)
ALUMINA	t	11,165,835	3,085,110,026	11,141,959	3,458,882,435
<b>BASE METALS</b>					
Copper Metal	t	53,289 (r)	155,823,435 (r)	60,467	210,222,072
Lead Metal	t	29,449 (r)	10,569,905 (r)	2,439	466,114
Zinc Metal	t	108,042 (r)	79,554,448 (r)	46,530	43,811,974
<b>TOTAL BASE METALS</b>			<b>245,947,788 (r)</b>		<b>254,500,160</b>
CHROMITE	t	86,324 (r)	26,717,936 (r)	92,675	28,290,638
<b>CLAYS</b>					
Attapulgitite	t	10,710	1,118,445	9,713	1,014,329
Clay Shale	t	12,329	98,626	19,546	158,296
Fire Clay	t	43,256	661,890	27,830	418,530
Kaolin	t	394	43,937	144	16,052
Saponite	t	901	75,417	535	51,628
<b>TOTAL CLAYS</b>			<b>1,998,315</b>		<b>1,658,835</b>
COAL	t	5,983,579	274,281,359	6,233,033	269,958,223
<b>CONSTRUCTION MATERIALS</b>					
Aggregate	t	461,384	3,576,082	423,539	3,747,930
Gravel	t	136,627 (r)	933,421 (r)	198,199	844,655
Rock	t	364,612	3,129,658	408,723	2,303,186
Sand	t	2,239,611 (r)	11,095,274 (r)	2,576,091	12,715,902
<b>TOTAL CONSTRUCTION MATERIALS</b>			<b>18,734,434 (r)</b>		<b>19,611,673</b>
DIAMONDS	ct	32,499,112 (r)	519,718,336 (r)	22,791,833	467,472,989
<b>DIMENSION STONE</b>					
Granite	t	2,685	850,895	2,908	89,449
Marble	t	397	136,609	1,613	765,367
<b>TOTAL DIMENSION STONE</b>			<b>987,504</b>		<b>854,816</b>
GEM & SEMI-PRECIOUS STONES	kg	233,957 (r)	199,480 (r)	310,185	243,692
GOLD	kg	177,384 (r)	3,114,923,422 (r)	167,701	3,022,765,189
GYPSUM	t	1,534,061 (r)	24,231,284 (r)	1,383,056	23,007,586
<b>HEAVY MINERAL SANDS</b>					
Garnet	t	118,929	n/a	188,143	n/a
Ilmenite	t	762,647 (r)	91,034,744 (r)	706,576	79,668,376
Upgraded Ilmenite (a)	t	592,178 (r)	307,002,938 (r)	648,796	334,191,981
Leucoxene	t	51,734 (r)	20,300,859 (r)	70,372	21,903,230
Mineral Sands Concentrate	t	10,354 (r)	21,090 (r)	31,168	736,287
Rutile	t	138,770 (r)	84,567,715 (r)	101,508	62,831,344
Staurolite	t	2,531 (r)	204,200 (r)	5,626	654,345
Zircon	t	433,137 (r)	251,967,475 (r)	417,924	296,690,346
<b>TOTAL HEAVY MINERAL SANDS</b>			<b>755,099,021 (r)</b>		<b>796,675,909</b>
<b>INDUSTRIAL PEGMATITE MINERALS</b>					
Feldspar	t	35,222	1,806,348	10,883	929,510
<b>IRON ORE</b>					
Domestic	t	7,417,791 (r)	171,404,509 (r)	4,115,878	127,295,683
Exported	t	194,622,915 (r)	5,160,124,206 (r)	229,035,568	8,175,039,902
<b>TOTAL IRON ORE</b>		<b>202,040,706 (r)</b>	<b>5,331,528,715 (r)</b>	<b>233,151,446</b>	<b>8,302,335,585</b>

Table 1: Quantity and Value of Minerals and Petroleum					
Commodity	Unit	2003-04		2004-05	
		Quantity	Value (\$)	Quantity	Value (\$)
<b>LIMESAND-LIMESTONE-DOLOMITE</b>					
Dolomite	t	10,842	216,353	5,287	108,439
Limesand-Limestone	t	4,614,016 (r)	33,667,013 (r)	3,786,630	34,054,465
<b>TOTAL LIMESAND-LIMESTONE-DOLOMITE</b>			<b>33,883,366 (r)</b>		<b>34,162,904</b>
<b>MANGANESE ORE</b>	t	584,970 (r)	81,780,938 (r)	585,454	115,103,411
<b>NICKEL INDUSTRY</b>					
Cobalt By-Product	t	1,279 (r)	55,767,625 (r)	1,110	47,874,215
Cobalt Metal	t	2,847 (r)	136,041,819 (r)	2,571	139,819,325
Cobalt Sulphide	t	428	21,331,662 (r)	805	15,955,605
<b>TOTAL COBALT</b>			<b>213,141,106 (r)</b>		<b>203,649,145</b>
Nickel Concentrate	t	117,307 (r)	1,895,056,831 (r)	191,797	1,601,445,575
Nickel Metal	t	64,905 (r)	1,135,983,085 (r)	98,646	1,900,021,034
<b>TOTAL NICKEL METAL</b>			<b>3031039916</b>		
Palladium By-Product	kg	577 (r)	5,048,188 (r)	877	6,295,947
Platinum By-Product	kg	90 (r)	3,157,009 (r)	174	2,854,897
<b>TOTAL NICKEL INDUSTRY</b>			<b>3,252,386,219 (r)</b>		<b>3,714,266,598</b>
<b>PETROLEUM</b>					
Condensate	kl	6,181,484	1,747,506,589 (r)	5,628,746	2,203,104,024
Crude Oil	kl	13,223,116 (r)	3,773,641,188 (r)	12,801,172	5,208,766,412
LNG	Btu 10 <sup>6</sup>	404,937,589	2,775,881,492	540,926,643	3,781,545,674
LPG - Butane	t	383,917	154,133,908	405,076	210,210,255
LPG - Propane	t	311,345	128,016,774	321,028	164,818,670
Natural Gas	000m <sup>3</sup>	8,060,810	694,071,814 (r)	7,642,801	678,722,971
<b>TOTAL PETROLEUM</b>			<b>9,273,251,765 (r)</b>		<b>12,247,168,006</b>
<b>PIGMENTS</b>					
Red Oxide	t	2,070	666,553	2,260	769,354
<b>SALT</b>	t	9,881,664	179,849,542	11,580,828	221,251,719
<b>SILICA-SILICA SAND</b>					
Silica	t	106,064	1,060,635	102,835	1,028,361
Silica Sand	t	538,141	5,698,983	597,873	5,128,111
<b>TOTAL SILICA-SILICA SAND</b>			<b>6,759,618</b>		<b>6,156,472</b>
<b>SILVER</b>	kg	55,677 (r)	12,851,196 (r)	110,564	33,857,290
<b>SPONGOLITE</b>	t	9,956	1,356,814	10,943	1,417,875
<b>TALC</b>	t	116,640	10,224,659 (r)	143,663	12,566,341
<b>TIN-TANTALUM-LITHIUM</b>					
Spodumene	t	114,568	n/a	108,784	n/a
Tantalite	t	873	n/a	1,063	n/a
Tin Metal	t	540	4,504,695	380	4,054,313
<b>TOTAL TIN-TANTALUM-LITHIUM</b>			<b>161,586,689</b>		<b>184,432,475</b>
<b>VANADIUM</b>	t	239	1,293,103 (r)	120	1,579,146
<b>TOTAL VALUE</b>			<b>26,417,174,430 (r)</b>		<b>33,219,918,833</b>

Note: Quantities used in this table only apply to Minerals and Petroleum covered by the Mining Act 1978, the Petroleum Act 1967, the Petroleum (Submerged Lands) Act 1982 and relevant State Agreement Acts.

(a) Also known as synthetic rutile

(e) Estimate

(r) Revised from previous edition

n/a Breakdown of garnet, spodumene and tantalite values not available

Table 2: Quantity and Value of Selected Major Commodities									
	Unit	1995-96		1996-97		1997-98		1998-99	
		Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M
ALUMINA	Mt	8.23	1,918.34	8.35	1,955.77	8.51	2,260.54	8.86	2,367.03
BASE METALS									
Copper Metal	kt	23.69	65.42	27.73	58.98	29.43	61.12	24.44	43.71
Lead Metal	kt	21.28	12.64	13.49	6.09	27.00	10.45	51.55	17.25
Zinc Metal	kt	113.49	75.32	88.37	75.12	124.00	117.11	194.90	170.73
TOTAL BASE METALS			153.39		140.19		188.68		231.69
COAL	Mt	5.90	270.36	5.56	257.30	5.71	257.28	5.80	256.74
COBALT	kt	0.87	66.69	0.88	50.85	1.50	81.78	1.09	55.27
DIAMONDS	M ct	33.52	525.21	52.52	395.79	42.48	537.87	51.23	610.44
GOLD	t	205.89	3,404.65	228.02	3,409.61	239.46	3,468.95	219.26	3,219.52
HEAVY MINERAL SANDS									
Ilmenite	Mt	1.10	111.18	1.10	117.28	1.31	149.14	1.32	158.59
Rutile	kt	119.14	75.06	110.96	77.74	104.13	78.58	119.71	90.97
Upgraded Ilmenite (Synthetic Rutile)	kt	517.00	252.56	545.00	270.48	688.00	355.79	475.54	275.23
Zircon	kt	410.03	181.21	324.09	177.99	321.38	169.13	284.53	136.07
Other HMS			18.50		26.51		24.63		19.44
TOTAL HEAVY MINERAL SANDS			638.51		670.00		777.27		680.30
IRON ORE	Mt	132.90	2,924.06	141.29	3,159.65	149.74	3,930.77	141.03	3,898.53
MANGANESE ORE	kt	347.04	41.34	324.11	37.62	86.30	9.39	27.40	3.42
NICKEL	kt	103.30	1,097.30	114.10	1,051.11	135.19	1,146.64	125.77	876.62
PETROLEUM									
Condensate	Gl	4.65	685.74	5.73	943.15	6.76	1,065.84	5.55	743.91
Crude oil	Gl	9.65	1,535.67	10.47	1,915.93	9.85	1,567.16	9.16	1,189.64
LNG	Btu 10 <sup>12</sup>	379.79	1,350.92	370.50	1,528.77	379.54	1,591.94	391.90	1,434.42
LPG - Butane	kt	100.24	22.71	209.69	59.67	376.09	90.47	388.69	90.62
LPG - Propane	kt	87.02	19.73	185.74	55.66	263.26	61.26	259.21	57.63
Natural Gas	Gm <sup>3</sup>	6.31	454.76	6.89	534.65	6.88	557.47	6.44	549.83
TOTAL PETROLEUM			4,069.53		5,037.83		4,934.14		4,066.65
SALT	Mt	7.45	154.22	7.55	153.62	8.19	188.70	8.57	199.64
OTHER			125.75		141.33		153.07		189.73
TOTAL			15,389.35		16,460.67		17,935.08		16,655.58

1999-00		2000-01		2001-02		2002-03		2003-04		2004-05	
Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M
9.35	2,657.89	10.48	3,600.67	10.86	3,584.38	11.13	3,204.65	11.17	3,085.11	11.14	3,458.88
30.73	64.62	42.62	111.12	53.50	122.57	59.45	138.78	53.29	155.82	60.47	210.22
64.47	20.24	82.33	37.31	75.08	36.72	70.02	31.85	29.45	10.57	2.44	0.47
232.59	251.01	236.01	280.24	223.67	173.82	206.45	173.19	108.04	79.55	46.53	43.81
	335.87		428.67		333.11		343.82		245.95		254.50
6.50	271.53	6.10	252.28	6.16	258.13	6.32	272.89	5.98	274.28	6.23	269.96
2.07	86.26	4.19	174.38	4.43	127.36	4.92	124.18	4.55	213.14	4.49	203.65
50.98	703.67	25.42	614.45	25.69	489.34	38.89	773.32	32.50	519.72	22.79	467.47
204.96	2,951.26	201.21	3,245.06	185.00	3,279.50	187.47	3,445.34	177.01	3,109.56	167.70	3,022.77
1.16	151.66	1.10	168.75	0.80	128.75	0.96	136.51	0.76	91.03	0.71	79.67
98.49	72.78	127.21	110.04	122.61	106.74	113.57	82.53	138.77	84.57	101.51	62.83
552.51	324.65	643.27	409.19	585.91	380.21	597.27	353.10	592.18	307.00	648.80	334.19
348.11	153.27	343.08	198.84	317.77	218.84	411.15	255.81	433.14	251.97	417.92	296.69
	28.85		18.08		19.78		16.86		20.53		23.29
	731.20		904.90		854.32		844.81		755.01		796.68
151.16	3,722.12	161.77	4,912.70	164.63	5,207.61	188.52	5,205.27	202.04	5,331.53	233.15	8,302.34
212.38	25.68	401.36	58.50	474.27	68.62	619.65	75.38	584.97	81.78	585.45	115.10
143.93	1,806.29	167.45	2,238.74	179.46	2,002.07	191.89	2,482.47	182.21	3,031.04	290.44	3,501.47
6.35	1,583.94	5.81	1,984.53	6.33	1,680.03	6.93	2,046.37	6.18	1,747.51	5.63	2,203.10
12.05	3,144.77	13.96	4,792.05	15.09	4,198.78	14.00	4,258.12	13.22	3,773.64	12.80	5,208.77
393.61	1,971.06	429.54	2,695.53	386.08	2,970.61	403.83	3,130.83	404.94	2,775.88	540.93	3,781.55
443.58	190.90	428.90	221.97	482.20	193.71	460.47	221.47	383.92	154.13	405.08	210.21
334.57	145.94	333.47	187.54	374.32	167.87	346.60	172.39	311.35	128.02	321.03	164.82
6.55	578.76	7.63	630.36	7.53	643.28	8.12	661.92	8.06	694.07	7.64	678.72
	7,615.37		10,511.98		9,854.28		10,491.10		9,273.25		12,247.17
8.81	208.58	8.30	233.08	8.60	227.95	9.61	227.95	9.88	179.85	11.58	221.25
	229.26		371.67		409.47		366.48		316.87		358.59
	21,344.98		27,547.08		26,696.14		27,857.66		26,417.17		33,219.92

Table 3: Quantity and Value of Commodity by Local Government Area Financial Year 2004-05				
Commodity	Local gov't authority	Quantity (Tonnes)	Content	Value (\$)
ALUMINA	Boddington	3,290,539		971,572,684
	Murray	5,525,873		1,751,219,948
	Waroona	2,325,547		736,089,803
<b>TOTAL ALUMINA</b>		<b>11,141,959</b>		<b>3,458,882,435</b> (c), (d)
<b>BASE METALS</b>			Cu tonnes	
Copper By-Product	Coolgardie		1,906	6,465,118
	Dundas		491	1,706,350
	Halls Creek		3,869	13,438,904
	Kalgoorlie-Boulder		562	1,900,826
	Ravensthorpe		76	258,717
	Roebourne		1,412	5,708,033
	Wiluna		412	1,510,054
	<b>Total</b>			<b>8,727</b>
			Cu tonnes	
Copper Concentrates	East Pilbara		18,104	56,511,248
	Yalgoo		17,701	56,232,988
	<b>Total</b>		<b>35,805</b>	<b>112,744,236</b> (a)
			Cu tonnes	
Copper Cathode	East Pilbara		15,936	66,489,834 (a)
Total Copper (Cu)			60,468	210,222,072 (a), (b)
			Pb tonnes	
Lead (Pb)	Yalgoo		2,439	466,114 (a)
			Zn tonnes	
Zinc (Zn)	Yalgoo		46,530	43,811,974 (a)
<b>TOTAL BASE METALS</b>				<b>254,500,160</b> (a), (b), (j)
<b>CHROMITE</b>			Cr <sub>2</sub> O <sub>3</sub> tonnes	
Chromite Ore	Meekatharra	221,182	92,675	28,290,638 (a)
<b>CLAY</b>				
Attapulgate	Mullewa	9,713		1,014,329
Clay Shale	Collie	19,546		158,296
Fire Clay	Broome	108		2,700
	Chittering	27,722		415,830
<b>Total</b>		<b>27,830</b>		<b>418,530</b>
Kaolin	Bridgetown-Greenbushes	144		16,052
Saponite	Coorow	535		51,628
<b>TOTAL CLAY</b>		<b>57,767</b>		<b>1,658,835</b> (e)
<b>COAL</b>	Collie	<b>6,233,033</b>		<b>269,958,223</b> (f)
<b>CONSTRUCTION MATERIALS</b>				
Aggregate	Ashburton	10,402		52,009
	Broome	66,258		1,961,526
	East Pilbara	81,621		408,105
	Port Hedland Town	88,963		444,818
	Roebourne	107,301		536,503

**Table 3: Quantity and Value of Commodity by Local Government Area Financial Year 2004-05**

Commodity	Local gov't authority	Quantity (Tonnes)	Content	Value (\$)	
	Wyndham-East Kimberley	68,994		344,970	
	<b>Total</b>	<b>423,539</b>		<b>3,747,930</b>	
Gravel	Ashburton	2,545		28,000	
	Broome	2,487		32,253	
	Coolgardie	6,574		32,870	
	Derby-West Kimberley	2,200		11,000	
	Exmouth	25		250	
	Halls Creek	1,942		17,474	
	Kalamunda	158,338		518,949	
	Kalgoorlie-Boulder	4,630		23,150	
	Port Hedland Town	5,000		62,500	
	Wyndham-East Kimberley	14,458		118,209	
		<b>Total</b>	<b>198,199</b>		<b>844,655</b>
	Rock	Broome	3,222		73,409
		Derby-West Kimberley	363		6,296
East Pilbara		302,794		1,427,462	
Kalgoorlie-Boulder		83,949		419,745	
Port Hedland Town		18,123		374,914	
Wyndham-East Kimberley		272		1,360	
		<b>Total</b>	<b>408,723</b>		<b>2,303,186</b>
Sand	Ashburton	2,925		25,275	
	Broome	40,475		300,108	
	Cockburn	133,609		534,436	
	Coolgardie	125,763		682,680	
	Coorow	3,491		15,332	
	Dandaragan	930		4,650	
	Derby-West Kimberley	7,685		46,808	
	East Pilbara	27,653		138,265	
	Esperance	1,470		7,349	
	Exmouth	11,000		104,500	
	Gingin	167		667	
	Kalgoorlie-Boulder	2,563		13,805	
	Kwinana	631,212		3,156,058	
	Marble Bar	45,502		227,510	
	Meekatharra	26,841		91,553	
	Menzies	27,218		136,091	
	Northam	125,302		626,513	
	Port Hedland Town	26,815		134,075	
	Roebourne	167,357		629,194	
	Wanneroo	1,161,373		5,807,320	
	Wyndham-East Kimberley	2,980		14,902	
Yilgarn	3,762		18,811		
	<b>Total</b>	<b>2,576,091</b>		<b>12,715,902</b>	
<b>TOTAL CONSTRUCTION MATERIAL</b>		<b>3,606,552</b>		<b>19,611,673</b>	

(e)

Table 3: Quantity and Value of Commodity by Local Government Area Financial Year 2004-05				
Commodity	Local gov't authority	Quantity (Tonnes)	Content	Value (\$)
		carats		
DIAMONDS	Derby-West Kimberley		135,374	39,684,566
	Wyndham-East Kimberley		22,656,459	427,788,423
<b>TOTAL DIAMONDS</b>			<b>22,791,833</b>	<b>467,472,989 (a)</b>
<b>DIMENSION STONE</b>				
Granite	Dundas	2,530		50,594
	Roebourne	378		38,855
	<b>Total</b>	<b>2,908</b>		<b>89,449</b>
Marble	Ashburton	1,613		765,367
<b>TOTAL DIMENSION STONE</b>		<b>4,521</b>		<b>854,816 (e)</b>
<b>GEM &amp; SEMI-PRECIOUS STONES</b>		kg		
Agate	Marble Bar	26,131		18,689
Amethyst	Upper Gascoyne	180		932
Chalcedony/Mookaite	Carnarvon	600		300
Jasper	Marble Bar	193		221
	Meekatharra	11,231		7,685
	<b>Total</b>	<b>11,424</b>		<b>7,906</b>
Tourmaline	Upper Gascoyne	649		7,497
Variscite	Carnarvon	271,200		208,368
<b>TOTAL GEM &amp; SEMI-PRECIOUS STONES</b>		<b>310,185</b>		<b>243,692</b>
		Au oz                      Au kg		
GOLD (AU)	Ashburton Shire	5,140	160	2,883,394
	Coolgardie	708,072	22,024	396,301,215
	Dundas	114,043	3,547	64,224,792
	East Pilbara	164,421	5,114	91,011,806
	Kalgoorlie-Boulder	1,631,660	50,744	916,229,607
	Laverton	348,971	10,854	195,882,507
	Leonora	1,133,487	35,255	634,948,473
	Meekatharra	282,093	8,774	158,077,405
	Menzies	51,929	1,615	29,130,140
	Mt Magnet	242,220	7,534	136,053,957
	Sandstone	42,418	1,320	23,822,714
	Wiluna	447,155	13,908	250,574,131
	Yalgoo	14,961	465	8,536,919
	Yilgarn	205,363	6,387	115,088,129
<b>TOTAL GOLD</b>		<b>5,391,933</b>	<b>167,701</b>	<b>3,022,765,189 (g)</b>
<b>GYP SUM</b>				
	Carnarvon	1,147,723		19,469,734
	Corrigin	1,603		22,442
	Dalwallinu	67,730		604,032
	Dandaragan	47,352		1,562,621
	Dundas	24,454		398,395
	Esperance	5,996		61,160
	Irwin	2,484		56,345

Table 3: Quantity and Value of Commodity by Local Government Area Financial Year 2004-05

Commodity	Local gov't authority	Quantity (Tonnes)	Content	Value (\$)
	Kent	9,390		131,459
	Koorda	220		4,400
	Lake Grace	20,784		193,493
	Nungarin	13,421		167,940
	Perenjori	840		9,240
	Ravensthorpe	17,345		90,983
	Wyalkatchem	18,782		176,148
	Yilgarn	4,933		59,195
<b>TOTAL GYPSUM</b>		<b>1,383,056</b>		<b>23,007,586</b> (f)
<b>HEAVY MINERAL SANDS</b>				
Garnet Sand	Northampton	188,143	TiO <sub>2</sub> tonnes	n/a
Ilmenite	Bunbury City	193,807		22,482,090
	Capel	212,671		22,571,099
	Carnamah	145,932		15,142,332
	Dandaragan	42,269		5,848,592
	Dardanup	97,586		12,424,259
	Northampton	14,311		1,200,004
	<b>Total</b>	<b>706,576</b>	<b>TiO<sub>2</sub> tonnes</b>	<b>79,668,376</b>
Synthetic Rutile	Capel	235,113		121,384,494
	Carnamah	200,502		102,848,302
	Dandaragan	213,181		109,959,185
	<b>Total</b>	<b>648,796</b>	<b>TiO<sub>2</sub> tonnes</b>	<b>334,191,981</b>
Leucoxene	Bunbury City	3,472		1,831,455
	Capel	34,428		8,956,372
	Dandaragan	24,166		6,962,038
	Dardanup	8,306		4,153,365
	<b>Total</b>	<b>70,372</b>		<b>21,903,230</b>
Mineral Sands Concentrate	Bunbury City	31,168		736,287
Rutile	Bunbury City	466		403,673
	Carnamah	73,357		44,136,930
	Dandaragan	27,685		18,290,741
	<b>Total</b>	<b>101,508</b>	<b>TiO<sub>2</sub> tonnes</b>	<b>62,831,344</b>
Staurolite	Dandaragan	5,626		654,345
Zircon	Bunbury City	27,266		21,224,683
	Capel	55,197		40,753,698
	Carnamah	220,023		156,244,307
	Dandaragan	101,378		67,899,840
	Dardanup	14,060		10,567,818
	<b>Total</b>	<b>417,924</b>		<b>296,690,346</b>
<b>TOTAL HEAVY MINERAL SANDS</b>				<b>796,675,909</b> (a)

Table 3: Quantity and Value of Commodity by Local Government Area Financial Year 2004-05				
Commodity	Local gov't authority	Quantity (Tonnes)	Content	Value (\$)
<b>INDUSTRIAL PEGMATITE MINERALS</b>				
Feldspar	East Pilbara	10,170		918,940
	Mukinbudin	714		10,571
	<b>Total</b>	<b>10,884</b>		<b>929,510 (e)</b>
<b>IRON ORE</b>			<b>Fe %</b>	
Domestic Ore	Ashburton	60,181		609,042
	East Pilbara	4,051,807		126,596,291
	Yilgarn	3,890		90,350
	<b>Total</b>	<b>4,115,878</b>		<b>127,295,683</b>
Exported Ore	Ashburton	73,952,716		2,408,698,274
	Derby-West Kimberley	893,023		39,569,461
	East Pilbara	147,155,713		5,436,945,315
	Mullewa	1,836,494		74,024,618
	Yilgarn	5,197,622		215,802,234
	<b>Total</b>	<b>229,035,568</b>		<b>8,175,039,902</b>
	<b>TOTAL IRON ORE</b>		<b>233,151,446</b>	
<b>LIMESAND-LIMESTONE-DOLOMITE</b>				
Dolomite	Lake Grace	2,767		66,999
	Yilgarn	2,520		41,440
	<b>Total</b>	<b>5,287</b>		<b>108,439</b>
Limesand-Limestone	Broome	25		250
	Carnamah	15,190		60,760
	Carnarvon	10,999		270,902
	Cockburn	2,126,501		6,246,088
	Coorow	18,896		283,439
	Dandaragan	41,481		263,151
	Dundas	190,200		19,489,263
	Exmouth	4,171		47,380
	Gingin	145,228		1,078,589
	Irwin	149,452		418,878
	Kwinana	59,502		609,555
	Laverton	664,300		1,328,600
	Manjimup	6,199		71,736
	Shark Bay	705		98,638
	Wanneroo	313,593		3,662,566
	Wiluna	39,031		78,062
	Wyndham-East Kimberley	1,158		46,610
<b>Total</b>		<b>3,786,630</b>		<b>34,054,465</b>
<b>TOTAL LIMESAND-LIMESTONE-DOLOMITE</b>		<b>3,791,917</b>		<b>34,162,904 (e)</b>

**Table 3: Quantity and Value of Commodity by Local Government Area Financial Year 2004-05**

Commodity	Local gov't authority	Quantity (Tonnes)	Content	Value (\$)
			Mn tonnes	
MANGANESE ORE (Mn)	East Pilbara	585,454	275,837	115,103,411
			Co tonnes	
<b>NICKEL INDUSTRY</b>				
Cobalt By-Product (Co)	Coolgardie		18.84	1,130,001
	Dundas		179.14	8,384,352
	Halls Creek		321.37	10,119,820
	Kalgoorlie-Boulder		150.54	8,443,035
	Leonora		65.07	3,534,514
	Ravensthorpe		2.44	150,773
	Roebourne		67.46	3,570,906
	Wiluna		304.66	12,540,814
	<b>Total</b>		<b>1,109.52</b>	<b>47,874,215</b>
Cobalt Metal (Co)	Coolgardie		594	34,325,724
	Laverton		1,977	105,493,601
	<b>Total</b>		<b>2,571</b>	<b>139,819,325</b>
Cobalt Sulphide	Kalgoorlie-Boulder		806	15,955,605
<b>TOTAL COBALT</b>			<b>4,486</b>	<b>203,649,145</b>
			Ni tonnes	
Nickel Concentrates	Coolgardie		20,751	410,106,932
	Dundas		9,063	177,870,261
	Halls Creek		5,757	112,338,893
	Kalgoorlie-Boulder		22,397	434,942,371
	Ravensthorpe		1,579	30,918,364
	Roebourne		2,004	37,991,908
	Wiluna		20,187	397,276,846
	<b>Total</b>		<b>81,738</b>	<b>1,601,445,575</b>
			Ni tonnes	
Nickel Metal (Ni)	Laverton		29,602	546,631,623
	Coolgardie		69,044	1,353,389,411
	<b>Total</b>		<b>98,646</b>	<b>1,900,021,034</b>
<b>TOTAL NICKEL</b>			<b>180,384</b>	<b>3,501,466,609</b>
			Pd kg	
Palladium By-Product (Pd)	Coolgardie		877	6,295,947
			Pt kg	
Platinum By-Product (Pt)	Coolgardie		175	2,854,897
<b>TOTAL NICKEL INDUSTRY</b>				<b>3,714,266,598</b>
			kilolitres	
<b>PETROLEUM</b>				
Condensate	Ashburton	146,196		57,161,390
	Carnamah	73		17,000
	Irwin	866		293,506
	Roebourne	5,481,611		2,145,632,128
	<b>Total</b>	<b>5,628,746</b>		<b>2,203,104,024</b>

Table 3: Quantity and Value of Commodity by Local Government Area Financial Year 2004-05				
Commodity	Local gov't authority	Quantity (Tonnes)	Content	Value (\$)
			Kilolitres	
Crude Oil	Ashburton	2,779,949		1,111,573,545
	Derby-West Kimberley	37,740		14,676,826
	Irwin	507,825		188,682,597
	Roebourne	9,475,658		3,893,833,443
	<b>Total</b>	<b>12,801,172</b>		<b>5,208,766,412</b>
			Btu 10 <sup>6</sup>	
LNG - Liquidified Natural Gas	Roebourne	540,926,643		3,781,545,674
			tonnes	
LPG - Butane	Roebourne	405,076		210,210,255
			tonnes	
LPG - Propane	Roebourne	321,028		164,818,670
			' 000 m <sup>3</sup>	
Natural Gas	Ashburton	663,423		60,742,932
	Carnamah	25,174		2,103,835
	Irwin	158,459		17,643,892
	Roebourne	6,795,745		598,232,312
	<b>Total</b>	<b>7,642,801</b>		<b>678,722,971</b>
<b>TOTAL PETROLEUM PRODUCTS</b>				<b>12,247,168,006 (d)</b>
<b>PIGMENTS</b>				
Red Oxide	Cue	2,260		769,354
<b>SALT</b>				
	Ashburton	2,209,202		45,859,833 (a)
	Carnarvon	1,581,855		30,805,718 (a)
	Esperance	11,955		489,304 (h)
	Port Hedland Town	3,606,273		65,966,835 (a)
	Roebourne	3,028,208		55,492,575 (a)
	Shark Bay	1,021,110		16,040,061 (a)
	Wyalkatchem	217		20,611 (h)
	Yilgarn	122,009		6,576,783 (h)
<b>TOTAL SALT</b>		<b>11,580,828</b>		<b>221,251,719</b>
<b>SILICA-SILICA SAND</b>				
Silica	Moora	102,835		1,028,361
Silica Sand	Albany	121,592		2,484,503
	Coolgardie	162,934		399,189
	Swan	313,347		2,244,419
	<b>Total</b>	<b>597,873</b>		<b>5,128,111</b>
<b>TOTAL SILICA-SILICA SAND</b>		<b>700,709</b>		<b>6,156,472 (a)</b>

Commodity	Local gov't authority	Quantity (Ag)	Content	Value (\$)	
SILVER (Ag)		Ag oz	Ag kg		
Silver By-Product	Ashburton	373	12	2,817	
	Coolgardie	67,944	2,113	571,921	
	Dundas	23,868	742	218,580	
	East Pilbara	99,352	3,090	790,473	
	Kalgoorlie-Boulder	334,721	10,411	2,567,823	
	Laverton	21,040	654	193,938	
	Leonora	136,523	4,246	1,206,202	
	Meekatharra	22,397	697	160,458	
	Menzies	7,657	238	69,274	
	Mountt Magnet	21,158	658	162,119	
	Sandstone	4,433	138	30,515	
	Wiluna	52,194	1,623	482,451	
	Yalgoo	1,296,400	38,231	11,606,808	
	Yilgarn	59,366	1,847	443,734	
	<b>Total</b>	<b>2,147,425</b>	<b>64,699</b>	<b>18,507,113</b>	(a), (j)
Silver	Kalgoorlie-Boulder	1,835,675	45,861	15,350,177	(a)
<b>TOTAL SILVER</b>		<b>3,983,101</b>	<b>110,564</b>	<b>33,857,290</b>	<b>(a), (j)</b>
<b>SPONGOLITE</b>		<b>10,943</b>		<b>1,417,875</b>	<b>(h)</b>
TALC	Meekatharra	9,536		1,165,489	
	Three Springs	134,128		11,400,852	
	<b>Total</b>	<b>143,663</b>		<b>12,566,341</b>	<b>(f)</b>
<b>TIN-TANTALUM-LITHIUM</b>			<b>Li<sub>2</sub>O tonnes</b>		
Spodumene (Li <sub>2</sub> O)	Bridgetown-Greenbushes	108,784	7,035	n/a	
			<b>Ta<sub>2</sub>O<sub>5</sub> kg</b>		
Tantalite (Ta <sub>2</sub> O <sub>5</sub> )	Bridgetown-Greenbushes	963		n/a	
	Coolgardie	100		n/a	
	<b>Total</b>	<b>1,063</b>		<b>180,378,162</b>	<b>(a)</b>
			<b>Sn tonnes</b>		
Tin (Sn)	Bridgetown-Greenbushes		380	4,054,313	
<b>TOTAL TIN-TANTALUM-LITHIUM</b>				<b>184,432,475</b>	<b>(a)</b>
			<b>V<sub>2</sub>O<sub>5</sub> tonnes</b>		
VANADIUM (V <sub>2</sub> O <sub>5</sub> )	Mount Magnet		120	1,579,146	(f)
<b>TOTAL VALUE</b>				<b>33,219,918,833</b>	

Note: Quantities used in this table only apply to Minerals and Petroleum covered by the Mining Act 1978, the Petroleum Act 1967, the Petroleum (Submerged Lands) Act 1982 and relevant State Agreement Acts.

(a) Also known as synthetic rutile

(e) Estimate

(r) Revised from previous edition

n/a Breakdown of garnet, spodumene and tantalite values not available

**Table 4: Royalty Receipts 2003–04 and 2004–05**

Commodity	2003–04 Total A\$	2004–05 Total A\$	2004–05 Growth	
			A\$	%
<b>ALUMINA</b>	49,998,033	54,578,682	4,580,649	9
<b>BASE METALS</b>				
Copper	5,808,644	6,050,690	242,046	4.2
Lead	1,139,745	23,345	-1,116,400	(98)
Zinc	7,233,354	1,863,619	-5,369,735	(74)
<b>TOTAL BASE METALS</b>	<b>14,181,743</b>	<b>7,937,654</b>	<b>-6,244,089</b>	<b>(44)</b>
<b>CHROMITE</b>	<b>1,117,826</b>	<b>1,669,491</b>	<b>551,665</b>	<b>49</b>
<b>CLAYS</b>	<b>80,357</b>	<b>72,277</b>	<b>-8,080</b>	<b>(10)</b>
<b>COAL</b>	<b>13,522,666</b>	<b>14,220,474</b>	<b>697,808</b>	<b>5</b>
<b>CONSTRUCTION MATERIALS</b>				
Aggregate	134,818	123,179	-11,639	(9)
Gravel	30,822	60,355	29,533	96
Rock	94,678	106,877	12,199	13
Sand	585,158	787,777	202,619	35
<b>TOTAL CONSTRUCTION MATERIALS</b>	<b>845,476</b>	<b>1,078,188</b>	<b>232,712</b>	<b>28</b>
<b>DIAMONDS</b>	<b>45,022,369</b>	<b>32,635,115</b>	<b>-12,387,254</b>	<b>(28)</b>
<b>DIMENSION STONE</b>	<b>1,706</b>	<b>3,236</b>	<b>1,530</b>	<b>90</b>
<b>GEM AND SEMI-PRECIOUS STONES</b>	<b>14,582</b>	<b>18,548</b>	<b>3,966</b>	<b>27</b>
<b>GOLD</b>	<b>79,500,095</b>	<b>72,914,303</b>	<b>-6,585,792</b>	<b>(8)</b>
<b>GYPSUM</b>	<b>470,469</b>	<b>546,958</b>	<b>76,489</b>	<b>16</b>
<b>HEAVY MINERAL SANDS</b>				
Garnet	777,394	884,132	106,738	14
Ilmenite	7,947,561	10,256,821	2,309,260	29
Leucoxene	960,517	740,743	-219,774	(23)
Rutile	4,458,431	3,304,079	-1,154,352	(26)
Staurolite	13,488	18,237	4,749	35
Zircon	12,052,314	11,576,731	-475,583	(4)
<b>TOTAL HEAVY MINERAL SANDS</b>	<b>26,209,705</b>	<b>26,780,743</b>	<b>571,038</b>	<b>2</b>
<b>INDUSTRIAL PEGMATITE MINERALS</b>				
Feldspar	75,548	67,370	-8,178	(11)
<b>IRON ORE</b>	<b>293,675,166</b>	<b>380,332,086</b>	<b>86,656,920</b>	<b>30</b>
<b>LIMESAND-LIMESTONE-DOLOMITE</b>				
Dolomite	3,078	1,611	-1,467	(48)
Limesand-Limestone	2,145,461	1,676,207	-469,254	(22)
<b>TOTAL LIMESAND-LIMESTONE-DOLOMITE</b>	<b>2,148,539</b>	<b>1,677,818</b>	<b>-470,721</b>	<b>(22)</b>
<b>MANGANESE</b>	<b>3,164,431</b>	<b>5,747,729</b>	<b>2,583,298</b>	<b>82</b>

Table 4: Royalty Receipts 2003–04 and 2004–05

Commodity	2003–04 Total A\$	2004–05 Total A\$	2004–05 Growth	
			A\$	%
<b>NICKEL</b>				
Palladium By-Product	85,455	124,289	38,834	45
Platinum By-Product	82,585	63,278	-19,307	(23)
<b>TOTAL NICKEL INDUSTRY</b>	<b>76,769,045</b>	<b>93,395,043</b>	<b>16,625,998</b>	<b>22</b>
<b>PETROLEUM</b>				
Condensate	88,570,858	129,949,150	41,378,292	47
Liquified Natural Gas	121,262,529	187,783,823	66,521,294	55
LPG - Butane	8,730,167	11,760,736	3,030,569	35
LPG - Propane	7,130,002	9,453,319	2,323,317	33
Natural Gas	35,463,262	38,407,720	2,944,458	8
Oil	155,174,688	172,306,165	17,131,477	11
<b>TOTAL PETROLEUM</b>	<b>416,331,506</b>	<b>549,660,913</b>	<b>133,329,407</b>	<b>32</b>
<b>PIGMENTS</b>				
Red Oxide	46,584	36,334	-10,250	(22)
<b>SALT</b>	<b>2,293,565</b>	<b>2,700,904</b>	<b>407,339</b>	<b>18</b>
<b>SILICA SAND</b>	<b>314,026</b>	<b>310,820</b>	<b>-3,206</b>	<b>(1)</b>
<b>SILVER</b>	<b>412,337</b>	<b>781,107</b>	<b>368,770</b>	<b>89</b>
<b>SPONGOLITE</b>	<b>64,969</b>	<b>75,665</b>	<b>10,696</b>	<b>16</b>
<b>TALC</b>	<b>65,900</b>	<b>71,178</b>	<b>5,278</b>	<b>8</b>
<b>TIN-TANTALUM-LITHIUM</b>				
Spodumene	991,350	916,611	-74,739	(8)
Tantalite	5,652,060	7,454,335	1,802,275	32
Tin	102,293	106,702	4,409	4
<b>TOTAL TIN-TANTALUM-LITHIUM</b>	<b>6,745,703</b>	<b>8,477,648</b>	<b>1,731,945</b>	<b>26</b>
<b>VANADIUM</b>	<b>509,643</b>	<b>93,587</b>	<b>-416,056</b>	<b>(82)</b>
<b>TOTAL REVENUE</b>	<b>1,033,581,989</b>	<b>1,255,883,871</b>	<b>222,301,882</b>	<b>22</b>

Note: All Royalty Receipts above are only those paid into the State's Consolidated Revenue Fund during the period. It does not include royalty receipts collected on behalf of the Commonwealth.

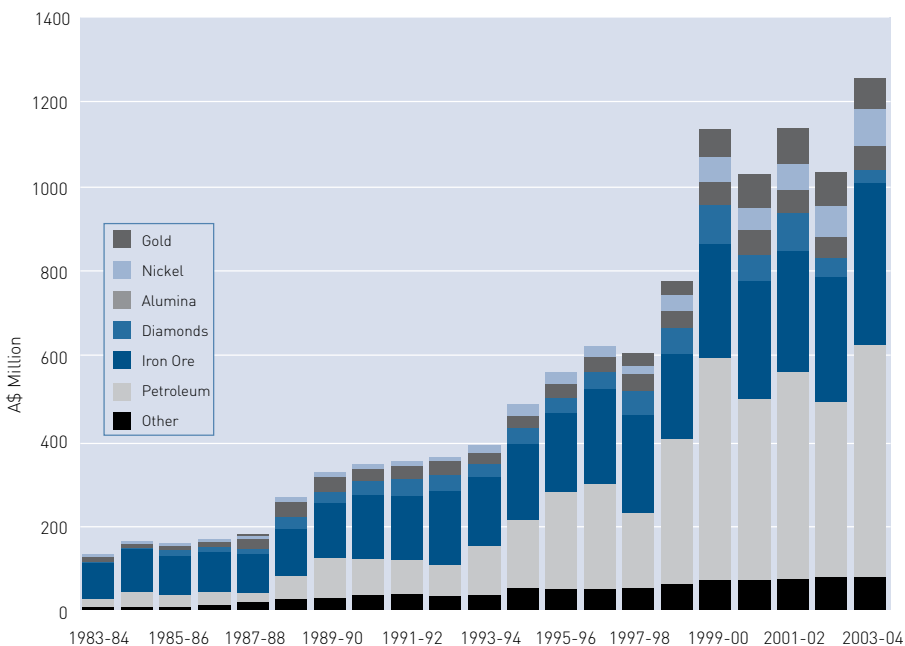


Figure 39 Royalty Receipts by Commodity Source: DoIR

**Table 5: Average Number of Persons Employed in the WA Minerals and Petroleum Industries**

Mineral/company	Operating Site	2003-04	2004-05
<b>BAUXITE - ALUMINA</b>			
Australian Fused Materials Pty Ltd	Rockingham Fused Alumina Plant	204	242
Alcoa World Alumina Australia	Huntly	920	852
	Kwinana Alumina Refinery	1,493	1,703
	Pinjarra Refinery	1,348	2,216
	Wagerup Alumina Refinery	978	1,077
	Willowdale	366	406
Worsley Alumina Pty Ltd	Worsley Mining Operations	261	282
	Worsley Refinery	1,588	1,928
<b>TOTAL BAUXITE - ALUMINA</b>		<b>7,158</b>	<b>8,706</b>
<b>BASE METALS</b>			
Birla (Nifty) Pty Ltd	Nifty	321	499
Magellan Metals	Magellan	0	72
Normandy Mining Ltd	Scuddles	404	408
Straits (Whim Creek) Pty Ltd	Whim Creek	0	97
Teck Cominco WA Pty Ltd	Pillara	183	36
Various	Other	7	0
<b>TOTAL BASE METALS</b>		<b>915</b>	<b>1,112</b>
<b>COAL</b>			
Griffin Coal Mining Co. Pty Ltd	Muja	307	317
Wesfarmers Coal Ltd	Premier/WCL	333	365
<b>TOTAL COAL</b>		<b>640</b>	<b>682</b>
<b>DIAMONDS</b>			
Argyle Diamond Mines Pty Ltd	Lake Argyle	1,078	1,282
Kimberley Diamond Company Ltd	Ellendale	136	202
<b>TOTAL DIAMONDS</b>		<b>1,214</b>	<b>1,484</b>
<b>GOLD</b>			
Agincort Resources Limited	Wiluna	199	245
Agnew Gold Mining Company Pty Limited	Emu	890	929
AngloGold Australia Ltd	Sunrise Dam	826	863
Australian Gold Resources Ltd	Perth Mint	118	125
Barminto Pty Ltd	Lights of Israel	43	2
Barrick Gold of Australia Limited	Darlot	127	178
	Lawlers	261	262
	Plutonic	607	558
BGM Group	Boddington	48	53
Big Bell Gold Operations Pty Ltd	Big Bell Consolidated	33	0
Burnakura Joint Venture	Burnakura	0	32
Coolgardie Mining Company Pty Ltd	Coolgardie Group	162	116
Croesus Mining NL	Hannan South	26	5
	Davyhurst	91	76
	Norseman	221	212
Equigold NL	Kirkalocka	106	94
Legend Mining Limited	Gidgee	112	96
Gindalbie Gold NL	Minjar	51	4
Haoma Pty Ltd	Bamboo Creek	0	9
Harmony Gold Mining Company Ltd	New Celebration, Jubilee, New Hampton	388	300
Kalgoorlie Consolidated Gold Mines Pty Ltd	Golden Mile - Super Pit	1,350	1,347
LionOre Australia (Wildara) NL	Thunderbox	202	195
Mines and Resources Australia Pty Ltd	Frogs Legs Group	104	118

**Table 5: Average Number of Persons Employed in the WA Minerals and Petroleum Industries**

Mineral/company	Operating Site	2003-04	2004-05
	White Foil	14	0
Mount Magnet Gold NL	Hill 50-Mt Magnet	404	395
Newcrest Mining Ltd	Telfer	1,476	1,868
Newmont Mining Corporation	Jundee	500	575
	Bronzewing-Mt McClure	224	11
Newfield Central Pty Ltd	Newfield Central	11	10
Nustar Mining Corporation Limited	Paulsens	0	112
Perilya Daisy-Milano Pty Ltd	Daisy-Milano	39	60
Placer Dome Inc	Granny Smith	525	595
	Kanowna Belle	473	400
	Paddington-Mt Pleasant	491	460
Siberia Gold Operations Pty Ltd	Siberia Group / SMC	0	37
Sipa Resources International NL	Mt Olympus	33	0
Sons of Gwalia NL	Marvel Loch-Yilgarn Star	493	395
St Barbara Mines Ltd	Bluebird Group	80	21
	Carosue Dam	465	269
	Sons of Gwalia	361	60
St Ives Gold Mining Company Pty Limited	Kambalda/St Ives	1,525	1,340
Troy Resources Ltd	Sandstone Group	50	47
Other	Various	21	16
<b>TOTAL GOLD</b>		<b>13,150</b>	<b>12,490</b>
<b>HEAVY MINERAL SANDS</b>			
BHP Titanium Minerals Pty Ltd	Beenup	14	8
Cable Sands Pty Ltd	Bunbury	289	324
Doral Mineral Sands Pty Ltd	Dardanup	140	286
GMA Garnet Pty Ltd	Narngulu Garnet Plant	31	29
	Port Gregory - Hutt Lagoon	23	24
Doral Specialty Chemicals Pty Ltd	Rockingham Zirconia Plant	24	23
Iluka Resources Limited	Capel	490	538
	Eneabba	301	269
	Narngulu Synthetic Rutile Plants	463	480
	Gingin/Iluka	0	28
TIWest Pty Ltd	Chandala-Muchea	232	253
	Cooljarloo	363	364
<b>TOTAL HEAVY MINERAL SANDS</b>		<b>2,370</b>	<b>2,626</b>
<b>IRON ORE</b>			
BGC Contracting Pty Ltd	Mt Newman Ore Body 18- Shovelanna Hill	0	17
BHP Iron Ore (Goldsworthy) Ltd	Finucane Island	234	277
	Yarrie	220	253
BHP Iron Ore (Jimblebar) Ltd	Jimblebar	148	244
BHP Iron Ore Ltd	Mining Area C	205	286
	Mt Newman Railway	436	486
	Mt Whaleback	1,314	1,578
	Nelson Point	601	704
	Orebody 25	135	173
	Port Hedland HBI Plant	1,331	639
	Yandi	389	384
Hamersley Iron Pty Ltd	Brockman No. 2 Detritals Group	129	194
	Dampier Port Operations (includes Hamersley and Robe railway employees)*	1,415	1,408

**Table 5: Average Number of Persons Employed in the WA Minerals and Petroleum Industries**

Mineral/company	Operating Site	2003-04	2004-05
	Hismelt/Kwinana	736	666
	Marandoo	205	206
	Nammuldi	0	9
	Paraburdoo/Channar/Eastern Range	787	682
	Tom Price	1,094	1,209
	Yandicoogina	477	595
Henry Walker Eltin Cockatoo Pty Ltd	Cockatoo Island	83	119
Mine and Port Developments Joint Venture	PACE-RGP Group	386	91
Mount Gibson Mining	Tallering Peak	43	117
Portman Mining Ltd	Koolyanobbing	225	290
Robe River Mining Co. Pty Ltd	Cape Lambert	703	771
	West Angelas	352	586
	Pannawonica Deepdale	439	475
<b>TOTAL IRON ORE</b>		<b>12,087</b>	<b>12,459</b>
<b>NICKEL</b>			
Australian Mines Limited	Blair	31	55
Australian Nickel Mines NL	Armstrong - Kambalda	0	27
BHP Billiton Minerals Pty Ltd	Ravensthorpe	3	227
Fox Resources Pty Ltd	Radio Hill	13	85
GME Resources Limited	Murrin Murrin	686	1,670 **
Goldfields Mine Management Pty Ltd	Kambalda Group /GMM	0	134
Kimberley Nickel Mines Pty Ltd	Sally Malay Group	36	208
Lanfranchi Nickel Mines	Lanfranchi	0	16
Lightning Nickel Pty Ltd	Long Nickel	111	126
LionOre Australia (Nickel) Ltd	Bulong	131	17
	Emily Ann	222	272
	Honeymoon Well	0	376
Mincor Operations Pty Ltd	Mittel, Wannaway, Redross, Mariners	187	268
OMG Cawse Pty Ltd	Cawse	210	199
MPI Mines Ltd	Black Swan	219	255
Reliance Operations Ltd	Beta-Hunt Nickel Group	31	109
Sir Samuel Mines NL	Cosmos	100	115
Tectonic Resources NL	Rav 8	75	69
View Resources Ltd	Carnilya Hill - Carnilya East	9	34
Western Areas Limited	Forrestania	0	33
Western Mining Corporation Ltd	Cliffs	0	5
	Kalgoorlie Nickel Smelter	910	911
	Kambalda	361	232
	Kwinana Refinery	454	367
	Leinster	1,147	1,372
	Mt Keith	951	1,166
<b>TOTAL NICKEL</b>		<b>5,887</b>	<b>8,348</b>
<b>PETROLEUM PRODUCTS</b>			
Apache Energy Ltd	East Spar, Harriet, Stag, Campbell, Chervil, Agincourt-Wonnich, Sinbad, Tanami, North Herald, South Pepper	202	323
ARC Energy NL	Dongara, Erimia, Hovea	29	20
BHP Billiton Petroleum (North West Shelf) Pty Ltd	Griffin	93	89
ENI Australia	Woollybutt	65	74

**Table 5: Average Number of Persons Employed in the WA Minerals and Petroleum Industries**

Mineral/company	Operating Site	2003-04	2004-05
Hardman Oil & Gas Pty Ltd	Woodada	5	0
Kimberley Oil NL	Blina, Boundary, Lloyd, Sundown, West Terrace	2	3
Mobil Exploration & Producing Australia Pty Ltd	Wandoo	28	23
Origin Energy Resources Ltd	Beharra Springs, Tubridgi, Jingemía	22	23
Nexen Petroleum Australia Pty Limited	Buffalo	23	0
ChevronTexaco Pty Ltd	Barrow Island, Cowle, Roller-Skate, Saladin, Yammaderry	131	157
Woodside Energy Ltd	Athena, Cossack, Echo-Yodel, Goodwyn, Hermes, North Rankin, Wanaea, Lambert, Legendre LNG 4th Train Construction 2nd Trunkline Construction	1,984	2,803
<b>TOTAL PETROLEUM PRODUCTS</b>		<b>2,584</b>	<b>3,515</b>
<b>SALT</b>			
Dampier Salt Ltd	Dampier	224	227
	Lake MacLeod	162	184
	Port Hedland	99	124
WA Salt Supply Koolyanobbing Pty Ltd	Lake Deborah	12	10
Onslow Solar Salt Pty Ltd	Onslow	95	142
Shark Bay Salt JV	Useless Loop	65	74
Western Salt Refinery Pty Ltd	Pink Lake	0	7
<b>TOTAL SALT</b>		<b>657</b>	<b>768</b>
<b>TOTAL CLAYS</b>		<b>65</b>	<b>72</b>
<b>TOTAL CONSTRUCTION MATERIALS</b>		<b>287</b>	<b>324</b>
<b>TOTAL DIMENSION STONE</b>		<b>125</b>	<b>132</b>
<b>TOTAL INDUSTRIAL PEGMATITE MINERALS</b>		<b>22</b>	<b>22</b>
<b>TOTAL LIMESTONE - LIMESAND</b>		<b>112</b>	<b>115</b>
<b>TOTAL MANGANESE ORE</b>		<b>154</b>	<b>308</b>
<b>TOTAL PHOSPHATE</b>		<b>137</b>	<b>135</b>
<b>TOTAL SILICA - SILICA SAND</b>		<b>190</b>	<b>216</b>
<b>TOTAL TALC</b>		<b>108</b>	<b>127</b>
<b>TOTAL TIN - TANTALUM - LITHIUM</b>		<b>479</b>	<b>526</b>
<b>TOTAL VANADIUM</b>		<b>19</b>	<b>15</b>
<b>TOTAL CHROMITE</b>		<b>40</b>	<b>51</b>
<b>ALL OTHER MATERIALS</b>		<b>68</b>	<b>97</b>
<b>TOTAL</b>		<b>48,468</b>	<b>54,330</b>

SOURCE: AXTAT Reporting System, Resources Safety Division, Department of Consumer and Employment Protection, for minerals data and petroleum producers for petroleum data. Figures are as provided by the various operating companies.

\* NOTE: Pilbara Railway Company employees are now reported under the Dampier Port Operations

\*\* The 2004-05 employee number for Murrin Murrin substantially exceeds historical variance. DoIR is investigating the reason for the variance and may revise the estimate

**TABLE 6: Principal Mineral and Petroleum Producers effective 1 December 2005**

**BASE METALS**

**Copper–Lead–Zinc**

**Newcrest Mining Ltd**  
Level 2, 20 Terrace Road  
East Perth WA 6004  
(08) 9270 7070  
Telfer  
www.newcrest.com.au

**Oxiana Limited**

PMB 7  
Geraldton WA 6530  
(08) 9956 4222  
Golden Grove  
www.oxiana.com.au

**Birla Mineral Resources Pty Ltd**

Level 2, 23 Ventnor Avenue  
West Perth WA 6005  
Nifty.  
(08) 9179 0900  
www.adityabirla.com/our\_companies/  
international\_companies/birla\_nifty.htm

**BHP Billiton (Nickel West)**

191 Great Eastern Highway  
Belmont WA 6104  
(08) 9479 0500  
Kambalda  
www.bhpbilliton.com

**BAUXITE–ALUMINA**

**Alumina**

**Alcoa World Alumina Australia**

181–205 Davy Street  
Booragoon WA 6154  
(08) 9316 5111  
Del Park, Willowdale, Huntly  
www.alcoa.com.au

**Worsley Alumina Pty Ltd**

PO Box 344  
Collie WA 6225  
(08) 9734 8311  
Boddington  
www.wapl.com.au

**CHROMITE**

**Chromite Ore**

**Pilbara Chromite Pty Ltd**

28 Ventnor Avenue  
West Perth WA 6005  
(08) 9321 3633  
Coobina  
www.consminerals.com.au

**CLAY**

**Attapulgitite**

**Hudson Resources Ltd**  
34 James Street, Narngulu  
Geraldton WA 6530  
(08) 9923 3604  
Lake Nerramnye  
www.hudsonresources.com

**Clay Shale**

**The Griffin Coal Mining Company Pty Ltd**  
28 The Esplanade  
Perth WA 6000  
(08) 9261 2800  
Collie  
www.griffincoal.com.au

**Fire Clay**

**Broome Brick Company Pty Ltd**

PO Box 323  
Broome WA 6725  
(08) 9192 1385  
Broome

**Kaolin**

**Sons of Gwalia Ltd**

16 Parliament Place  
West Perth WA 6005  
(08) 9263 5555  
Greenbushes  
www.sog.com.au

**Saponite**

**Watheroo Minerals Pty Ltd**

PO Box 353  
Dunsborough, WA 6281  
0427 517 005  
Watheroo Clays  
www.bentoniteproductswa.com.au

**COAL**

**The Griffin Coal Mining Company Pty Limited**

28 The Esplanade  
Perth WA 6000  
(08) 9261 2800  
Collie  
www.griffincoal.com.au

**Wesfarmers Premier Coal Ltd**

Premier Road  
Collie WA 6225  
(08) 9780 2222  
Collie  
www.wesfarmers.com.au

**CONSTRUCTION MATERIALS**

**Aggregate**

**The Readymix Group (WA)**

75 Canning Highway  
Victoria Park WA 6100  
(08) 9212 2000  
Boodarie, Burrup–Dampier  
Marble Bar, Newman, Turner River  
www.readymix.com.au

**Gravel**

**Hanson Construction Pty Ltd**

123 Burswood Road  
Victoria Park WA 6100  
(08) 9311 8811  
Maitland River  
www.hanson.biz/au

**Martinjinni Pty Ltd**

PO Box 7  
Kununurra WA 6743  
040 8822 736  
Kununurra

**WA Limestone Co.**

41 Spearwood Avenue  
Bibra Lake WA 6163  
(08) 9434 2299  
Pickering Brook

**Sand**

**Boral Resources (WA) Ltd**

63–69 Abernethy Road  
Belmont WA 6104  
(08) 9333 3400  
Banjup  
www.boral.com.au

**Rocla Quarry Products**

130 Fauntleroy Avenue  
Redcliffe WA 6104  
(08) 9475 2555  
Gnangarra  
www.rocla.com.au

**The Readymix Group (WA)**

75 Canning Highway  
Victoria Park WA 6100  
(08) 9212 2000  
Various sites  
www.readymix.com.au

**Tuma Holdings Pty Ltd**

T/as Action Sand Supplies  
42 Noel Road  
Gooseberry Hill WA 6076  
(08) 9275 1100  
Mobile: 0408 923 801  
Chidlow

**DIAMONDS**

**Argyle Diamonds Australia**

2 Kings Park Road  
West Perth WA 6005  
(08) 9482 1166  
Argyle  
www.argylediamonds.com.au

**Kimberley Diamond Company**

12 Walker Avenue  
West Perth WA 6005  
(08) 9321 5887  
Ellendale  
www.kimberleydiamondco.com.au

**DIMENSION STONE**

**Granite**

**Fraser Range Granite NL**

Eyre Highway  
Norseman WA 6443  
(08) 9039 3442  
Fraser Range Granite

**TABLE 6: Principal Mineral and Petroleum Producers effective 1 December 2005**

**Marble**

**Stone Dimensions Australia Pty Ltd**  
 PO Box 342  
 South Perth WA 6951  
 (08) 9474 743 355  
 Mahogany Red

**FELDSPAR**

**Unimin Australia Ltd**  
 26-28 Tomlinson Road  
 Welshpool WA 6106  
 (08) 9362 1655  
 Pippingarra, Mukinbudin  
 www.unimin.com.au

**GOLD**

**Agincourt Resources Limited**  
 1st Floor  
 16 Ord Street  
 West Perth WA 6005  
 (08) 9216 5800  
 Wiluna  
 www.agincourtresources.com.au

**Agnew Gold Mining Co. Pty Ltd**  
 PMB 10  
 Leinster WA 6437  
 (08) 9088 3822  
 Agnew  
 www.goldfields.co.za

**AngloGold Australia Ltd**  
 Level 13, St Martin's Tower  
 44 St Georges Terrace  
 Perth WA 6000  
 (08) 9425 4600  
 Sunrise Dam  
 www.anglogold.com

**Barrick Gold of Australia Limited**  
 Level 10, 2 Mill Street  
 Perth WA 6000  
 (08) 9212 5777  
 Darlot, Lawlers, Plutonic  
 www.barrick.com

**Croesus Mining NL**  
 39 Porter Street  
 Kalgoorlie WA 6430  
 (08) 9091 2222  
 Central Norseman  
 www.croesus.com.au

**Equigold NL**  
 1st Floor, 7 Sleaf Road  
 Applecross WA 6153  
 (08) 9316 3661  
 Kirkalocka  
 www.equigold.com.au

**Harmony Gold (Australia) Pty Ltd**  
 Level 1, 10 Ord Street  
 West Perth WA 6005  
 (08) 9211 3100  
 Big Bell, Hill 50–Mt Magnet, South Kal  
 Mines–New Celebration  
 www.harmony.co.za

**Focus Minerals Ltd**  
 Level 34, Exchange Plaza  
 2 The Esplanade  
 Perth WA 6000  
 (08) 9421 2121  
 Coolgardie–Three Mile  
 www.focusminerals.com.au

**Kalgoorlie Consolidated Gold Mines  
 Pty Ltd**  
 Private Bag 27  
 Kalgoorlie WA 6433  
 (08) 9022 1100  
 Golden Mile  
 www.kalgold.com.au

**LionOre Australia Pty Ltd**  
 PO Box 205  
 Leinster WA 6437  
 (08) 9088 3400  
 Thunderbox  
 www.lionore.com

**Mines and Resources Australia Pty Ltd**  
 Level 1, 12 St Georges Terrace,  
 Perth WA 6000  
 (08) 9202 1100  
 Mungari East–Frogs Legs  
 www.cogema.com

**Newcrest Mining Ltd**  
 Level 2, 20 Terrace Road  
 East Perth WA 6004  
 (08) 9270 7070  
 Telfer  
 www.newcrest.com.au

**Newfield Central Pty Ltd**  
 PO Box 1094  
 Kalgoorlie WA 6433  
 (08) 9021 7234  
 Mobile: 041 999 1713  
 Newfield Central

**Newmont Australia**  
 10 Richardson Street  
 West Perth WA 6005  
 (08) 9366 3232  
 Jundee–Nimary  
 www.newmont.com

**Nustar Mining Corporation Limited**  
 Level 2, 34 Colin Street  
 West Perth WA 6005  
 (08) 9346 000  
 Paulsens  
 www.nustarmining.com.au

**Perilya Daisy–Milano Pty Ltd**  
 PO Box 675  
 Kalgoorlie WA 6433  
 (08) 9024 2222  
 Mt Monger–Ridgeview, Daisy–Milano  
 www.perilya.com.au

**Placer (Granny Smith) Pty Ltd**  
 PO Box 33  
 Laverton WA 6440  
 (08) 9088 2211  
 Granny Smith  
 www.placerdome.com

**Placer Dome Asia Pacific Limited**  
 PO Box 1662  
 Kalgoorlie WA 6433  
 (08) 9080 6111  
 Kanowna–Golden Valley  
 www.placerdome.com

**Placer Dome Asia Pacific Limited**  
 PO Box 1161  
 Kalgoorlie WA 6433  
 (08) 9080 8400  
 Red Hill–Golden Feather  
 www.placerdome.com

**Placer Dome Asia Pacific Limited**  
 PO Box 622  
 Kalgoorlie WA 6433  
 (08) 9080 6400  
 Kundana, Paddington, White Flag  
 www.placerdome.com

**St Barbara Mines Ltd**  
 Level 2, 16 Ord Street  
 West Perth WA, 6005  
 (08) 9476 5555  
 Carosue Dam, Cornishman  
 Marvel Loch–Southern Cross  
 www.stbarbara.com.au

**St Ives Gold Mining Co. Pty Ltd**  
 POB 359  
 Kambalda WA 6442  
 (08) 9088 1111  
 Kambalda–St Ives  
 www.goldfields.co.za

**Troy Resources NL**  
 44 Ord Street  
 West Perth WA 6005  
 (08) 9481 1277  
 Sandstone  
 www.try.com.au

**GYP SUM**

**Cockburn Cement Ltd**  
 Lot 242 Russell Road East  
 East Munster WA 6166  
 (08) 9411 1000  
 Lake Hillman

**CSR Limited**  
 21 Sheffield Road  
 Welshpool WA 6106  
 (08) 9365 1666  
 Jurien Bay North

**Dampier Salt Pty Ltd**  
 37 Belmont Avenue  
 Belmont WA 6104  
 (08) 9270 9270  
 Lake MacLeod  
 www.dampiersalt.com.au

**TABLE 6: Principal Mineral and Petroleum Producers effective 1 December 2005**

Gypsum Industries  
PO Box 952  
Canning Bridge WA, 6153  
(08) 9364 4951  
Lake Cowcowing  
www.aglime.com.au

Lake Hillman Mining Pty Ltd  
PO Box 1  
Kalannie WA 6468  
(08) 9666 2045  
Lake Hillman.

**HEAVY MINERAL SANDS**

**Garnet Sand**

GMA Garnet Pty Ltd  
PO Box 188  
Geraldton WA 6531  
(08) 9923 3747  
Port Gregory,  
www.gmagarnet.com

**Ilmenite, Leucoxene, Rutile and Zircon**

Cable Sands (WA) Pty Ltd  
PO Box 133  
Bunbury WA 6231  
(08) 9721 0200  
Jangardup, Sandalwood, Ludlow  
Tutunup  
www.cablesands.com.au

Doral Mineral Sands  
Lot 7 Harris Road  
PICTON WA 6229  
(08) 9725 4899  
Dardanup  
www.doral.com.au

Iluka Resources Ltd  
Level 23, 140 St Georges Terrace  
Perth WA 6000  
(08) 9360 4700  
Capel, Eneabba, Yoganup  
www.iluka.com

TiWest Pty Ltd  
1 Brodie-Hall Drive  
Bentley WA 6102  
(08) 9365 1333  
Cooljarloo  
www.tiwest.com.au

**IRON ORE**

BHP Billiton Iron Ore (Goldsworthy) Ltd  
200 St Georges Terrace  
Perth WA 6000  
(08) 9320 4444  
Mining Area C, Nimingarra-Yarrie  
www.bhpbilliton.com

BHP Billiton Iron Ore Ltd  
200 St Georges Terrace  
Perth WA 6000  
(08) 9320 4444  
Jimblebar, Newman, Yandicoogina  
www.bhpbilliton.com

Channar Mining Pty Ltd  
152 St Georges Terrace  
Perth WA 6000  
(08) 9327 2327  
Channar.

Hamersley Iron Pty Ltd  
152 St Georges Terrace  
Perth WA 6000  
(08) 9327 2327  
Brockman, Marandoo, Paraburdoo,  
Tom Price, Yandicoogina  
www.hamersleyiron.com

Mount Gibson Iron Limited  
1st Floor  
7 Havelock Street  
West Perth WA 6005  
(08) 9426 7500  
Tallering Peak  
www.mtgibsoniron.com.au

Portman Iron Ore Ltd  
Level 11, 1 William Street  
Perth WA 6000  
(08) 9426 3333  
Cockatoo Island, Koolyanobbing  
www.portman.com.au

Robe River Iron Associates  
Level 27 Central Park  
152-158 St Georges Terrace  
Perth WA 6000  
(08) 9327 2800  
Pannawonica, West Angeles  
www.roberiver.com.au

**LIMESAND-LIMESTONE**

Cockburn Cement Ltd  
Lot 242, Russell Road East  
East Munster WA 6163  
(08) 9411 1000  
Cockburn, Dongara  
www.cockburncement.com.au

Limestone Resources Australia Pty Ltd  
Parkland Road, Cnr Hasler Street  
Osborne Park WA, 6017  
(08) 9445 3433  
Wanneroo, Moore River, Carabooda  
www.limestone-resources.com.au

Loongana Lime Pty Ltd  
PO Box 808  
Kalgoorlie WA 6430  
(08) 9021 8055  
Loongana

WA Limestone Co.  
41 Spearwood Avenue  
Bibra Lake WA 6163  
(08) 9434 2299  
Postans

Gypsum Industries of Australia  
PO Box 952  
Canning Bridge WA 6153  
(08) 9364 4951  
Dongara-Denison, Cervantes, Lancelin  
Jurien

**MANGANESE**

Pilbara Manganese Pty Ltd  
28 Ventor Avenue  
West Perth WA 6005  
(08) 9321 3633  
Woodie Woodie  
www.consminerals.com.au

**NICKEL**

Fox Resources Ltd  
Suite 1 and 2  
614 Newcastle Street  
Leederville WA 6007  
(08) 9318 5600  
Radio Hill  
www.foxresources.com.au

Minara Resources Ltd  
Level 4, 30 The Esplanade  
Perth WA 6000  
(08) 9212 8400  
Murrin Murrin  
www.minara.com.au

Independence Group NL  
PO Box 893  
South Perth WA 6951  
(08) 9367 2755  
Long Nickel  
www.independencgroup.com.au

LionOre (Australia) Pty Ltd  
Level 3, 88 Colin Street  
West Perth WA 6005  
(08) 9426 0100  
Black Swan, Emily Ann  
www.lionore.com

Mincor Resources NL  
Level 1, 1 Havelock Street  
West Perth, WA 6005  
(08) 9321 7125,  
Miitel, Mariners, Redross, Wannaway  
www.mincor.com.au

OMG Cawse Pty Ltd  
Cawse Nickel Operations  
Locked Bag 32,  
Kalgoorlie WA 6433  
(08) 9024 8800  
Cawse  
www.omgi.com

Sally Malay Mining Ltd  
Level 22, Allendale Square  
77 St Georges Terrace  
Perth WA 6000  
(08) 9225 0999  
Sally Malay  
www.sallymalay.com

**TABLE 6: Principal Mineral and Petroleum Producers effective 1 December 2005**

**Sir Samuel Mines NL**  
3rd Floor, 24 Outram Street  
West Perth WA 6005  
(08) 9213 1588  
Cosmos  
www.jubileemines.com.au

**Tectonic Resources NL**  
Suite 4, 100 Hay Street  
Subiaco WA 6008  
(08) 9388 3872  
RAV8  
www.tectonicres.com.au

**View Resources Ltd**  
Level 12, London House  
216 St Georges Terrace  
Perth WA 6000  
(08) 9226 4611  
Carnilya Hill  
www.viewresources.com.au

**BHP Billiton (Nickel West)**  
191 Great Eastern Highway  
Belmont WA 6104  
(08) 9479 0500  
Kambalda, Leinster, Mt Keith  
Kalgoorlie, Kwinana  
www.wmc.com

#### PALLADIUM

**BHP Billiton (Nickel West)**  
191 Great Eastern Highway  
Belmont WA 6104  
(08) 9479 0500  
Kambalda,  
www.wmc.com

#### PETROLEUM

**Apache Energy Ltd**  
Level 3, 256 St Georges Terrace  
Perth WA 6000  
(08) 9422 7222  
Agincourt, Albert, Artreus, Bambra,  
Double Island, East Spar, Endymion,  
Gudrun, Gipsy, John Brookes, Harriet,  
Hoover, Linda, Little Sandy, Mohave,  
Monet, North Alkimos, North Pedirka,  
Pedirka, Rose, Simpson, Sinbad,  
South Plato, Stag, Tanami, Victoria,  
Wonnich  
www.apachecorp.com

**ARC Energy Ltd**  
Level 4, 679 Murray Street  
West Perth WA 6005  
(08) 9486 7333  
Dongara, Hovea-Eremia, Woodada  
Mt Horner, Xyris  
www.arcenergy.com.au

**BHP Billiton Petroleum  
(North West Shelf) Pty Ltd**  
Level 42, Central Park  
152-158 St Georges Terrace  
Perth WA 6000  
(08) 9278 4888  
Chinook-Scindian, Griffin  
www.bhpbilliton.com

**ChevronTexaco Australia Pty Ltd**  
Level 24, QV1 Building  
250 St Georges Terrace  
Perth WA 6000  
(08) 9216 4000  
Barrow Island, Cowle, Crest  
Roller-Skate, Saladin, Yammaderry  
www.chevrontexaco.com

**ENI Australia Limited**  
Level 3, 40 Kings Park Road  
West Perth WA 6005  
(08) 9320 1111  
Woollybutt

**Kimberley Oil NL**  
Suite 12B, 573 Canning Highway  
Alfred Cove WA 6154  
(08) 9330 8876  
Blina  
www.kimberleyoil.com.au

**Origin Energy Resources Ltd**  
34 Collins Street  
West Perth WA 6005  
(09) 9324 6111  
Beharra Springs, Jingemina  
www.originenergy.com.au

**Santos Limited**  
Level 29 Santos House  
91 King William Street  
Adelaide SA 5000  
(08) 8218 5111  
Mutineer-Exeter  
www.santos.com.au

**Vermillion Oil and Gas Pty Ltd**  
Level 7, BNZ House  
30 The Esplanade  
Perth WA 6000  
(08) 9480 0300  
Wandoo  
www.vermillionenergy.com

**Woodside Energy Ltd**  
240 St Georges Terrace  
Perth WA 6000  
(08) 9348 4000  
Athena, Cossack, Echo-Yodel, Goodwyn,  
Hermes, Lambert, Laminaria, Legendre,  
North Rankin, Perseus, Wanaea  
www.woodside.com.au

#### PLATINUM

**BHP Billiton (Nickel West)**  
191 Great Eastern Highway  
Belmont WA 6104  
(08) 9479 0500  
Kambalda  
www.wmc.com.au

#### SALT

**Dampier Salt Pty Lt**  
37 Belmont Avenue  
Belmont WA 6104  
(08) 9270 9270  
Dampier, Lake MacLeod, Port Hedland  
www.dampiersalt.com.au

**Onslow Salt Pty Ltd**  
PO Box 23  
Onslow WA 6710  
(08) 9184 9000  
Onslow Salt  
www.onslowsalt.com

**Shark Bay Salt Joint Venture**  
Level 16, 2 The Esplanade  
Perth WA 6000  
(08) 9265 8000  
Useless Loop.

**WA Salt Supply Ltd**  
Cockburn Road  
Hamilton Hill WA 6163  
(08) 9430 5495  
Lake Deborah East, Pink Lake  
www.wasalt.com.au

#### SILICA-SILICA SAND

##### Silica

**Simcoa Operations Pty Ltd**  
PO Box 1389  
Bunbury WA 6231  
(08) 9780 6666  
Dalaroo  
www.simcoa.com.au

##### Silica Sand

**Rocla Quarry Products**  
180 Fauntleroy Avenue  
Kewdale WA 6105  
(08) 9475 2555  
Gnangarra  
www.rocla.com.au

**Austsand Pty Ltd**  
PO Box 1373  
Albany WA 6330  
(08) 9846 1222  
Mindijup

#### SPONGOLITE

**Supersorb Minerals NL**  
55 Collie Street  
Albany WA 6330  
(08) 9842 1955  
Woogenellup  
www.supersorb.com.au

#### TALC

**Luzenac Australia Pty Ltd**  
GPO Box A42  
Perth WA 6837  
(08) 9327 2277  
Three Springs  
www.luzenac.com

**TABLE 6: Principal Mineral and Petroleum Producers effective 1 December 2005**

**Unimin Australia Ltd**  
26 Tomlinson Road  
Welshpool WA 6106  
(08) 9362 1411  
Mt Seabrook  
www.unimin.com.au

**TIN-TANTALUM-LITHIUM**

**Spodumene**

**Sons of Gwalia Ltd**  
16 Parliament Place  
West Perth WA 6005  
(08) 9263 5555  
Greenbushes, Wodgina  
www.sog.com.au

**Tantalite-Tin**

**Sons of Gwalia Ltd**  
16 Parliament Place  
West Perth WA 6005  
(08) 9263 5555  
Greenbushes, Wodgina  
www.sog.com.au

**Haddington Resources Ltd**  
PO Box 1909  
West Perth WA 6872  
(08) 9488 5100  
Bald Hill  
www.haddington.com.au

## Abbreviations

A\$	Australian Dollar	km	kilometres
ABARE	Australian Bureau of Agricultural and Resource Economics	km <sup>2</sup>	square kilometres
ABS	Australian Bureau of Statistics	LME	London Metal Exchange
AFR	Australian Financial Review	Mbbl	thousand barrels of oil
ANZ	Australia and New Zealand bank	MMbbl	million barrels of oil
bbl	barrels of oil	Mct	million carats
Bcm	billion cubic metres	Moz	million ounces
BMR	Bureau of Mineral Resources	Mt	million tonnes
cons	concentrates	Mt/a	million tonnes per annum
CSO	Central Selling Organisation	n/a	not applicable
ct	carat	oz	ounce
DRI	Direct Reduced Iron	RBA	Reserve Bank of Australia
ECB	European Central Bank	SARS	Severe Acute Respiratory Syndrome
f.o.b.	free-on-board	t	tonnes
f.o.t.	free-on-truck	t/a	tonnes per annum
GDP	Gross Domestic Product	Tcf	trillion cubic feet
HBI	Hot Briquetted Iron	US\$	United States dollar
IMF	International Monetary Fund	WTI	West Texas Intermediate

## References Table 3

(a)	Estimated f.o.b. value	(g)	London PM Gold Fix price as supplied by WA Treasury Corporation
(b)	Metallic by-product of nickel mining	(h)	Estimated f.o.t. value
(c)	Value based on the average Australian value of alumina as published by the ABS	(i)	Estimated f.o.b. value based on the current price of nickel-containing products
(d)	Delivered/shipped value	(j)	By-products of gold mining
(e)	Value at works	(r)	Revised from previous edition
(f)	Estimated ex-mine value		

## Units and Conversion Factors

	Metric Unit	Symbol	Imperial Unit
Mass	1 gram	g	= 0.032151 troy (fine) ounce (oz)
	1 kilogram	kg	= 2.204624 pounds (lb)
	1 tonne	t	= 1.10231 United States short ton [1 US short ton = 2,000 lb]
	1 tonne	t	= 0.98421 United Kingdom long ton [1 UK long ton = 2,240 lb]
	1 tonne LNG	t	= 52,000,000 British Thermal Units (Btu)
Volume	1 kilolitre	kl	= 6.28981 barrels (bbl)
	1 cubic metre	m <sup>3</sup>	= 35.3147 cubic feet (ft <sup>3</sup> ) [1 kilolitre (kl) = 1 cubic metre (m <sup>3</sup> )]
Energy	1 kilojoule	kJ	= 0.94781 British Thermal Units (Btu)
	Energy Content		Prefix
Coal	19.7 GJ/t		kilo (k) 10 <sup>3</sup>
Condensate	32.0 MJ/L		mega (M) 10 <sup>6</sup>
Crude oil	37.0 MJ/L		giga (G) 10 <sup>9</sup>
LNG	25.0 MJ/L		tera (T) 10 <sup>12</sup>
Natural gas	38.2 MJ/m <sup>3</sup>		peta (P) 10 <sup>15</sup>
LPG-butane	28.7 MJ/L (1tonne LPG-butane = 1,720 litres)		
LPG-propane	25.4 MJ/L (1tonne LPG-propane = 1,960 litres)		

## Data Sources

Quantities for minerals and petroleum in this publication are collected by the Department's Royalty Branch and are based on information provided by the producers in royalty and production returns. The quantities specified relate to either mine production or sales as listed below for each commodity.

Mine Production
Clays
Coal
Construction Materials
Dimension Stone
Gold
Gypsum
Limesand–Limestone–Dolomite
Silica – Silica Sand
Talc
Sales
Bauxite Alumina
Base Metals (Copper, Lead and Zinc)
Chromite
Diamonds
Gem and Semi-Precious Stones
Heavy Mineral Sands
Industrial Pegmatite Minerals
Iron Ore
Manganese
Nickel Industry (Nickel, Cobalt, Platinum and Palladium)
Petroleum
Pigments
Salt
Silver
Spongolite
Tin–Tantalum–Lithium
Vanadium

## Classification of Countries

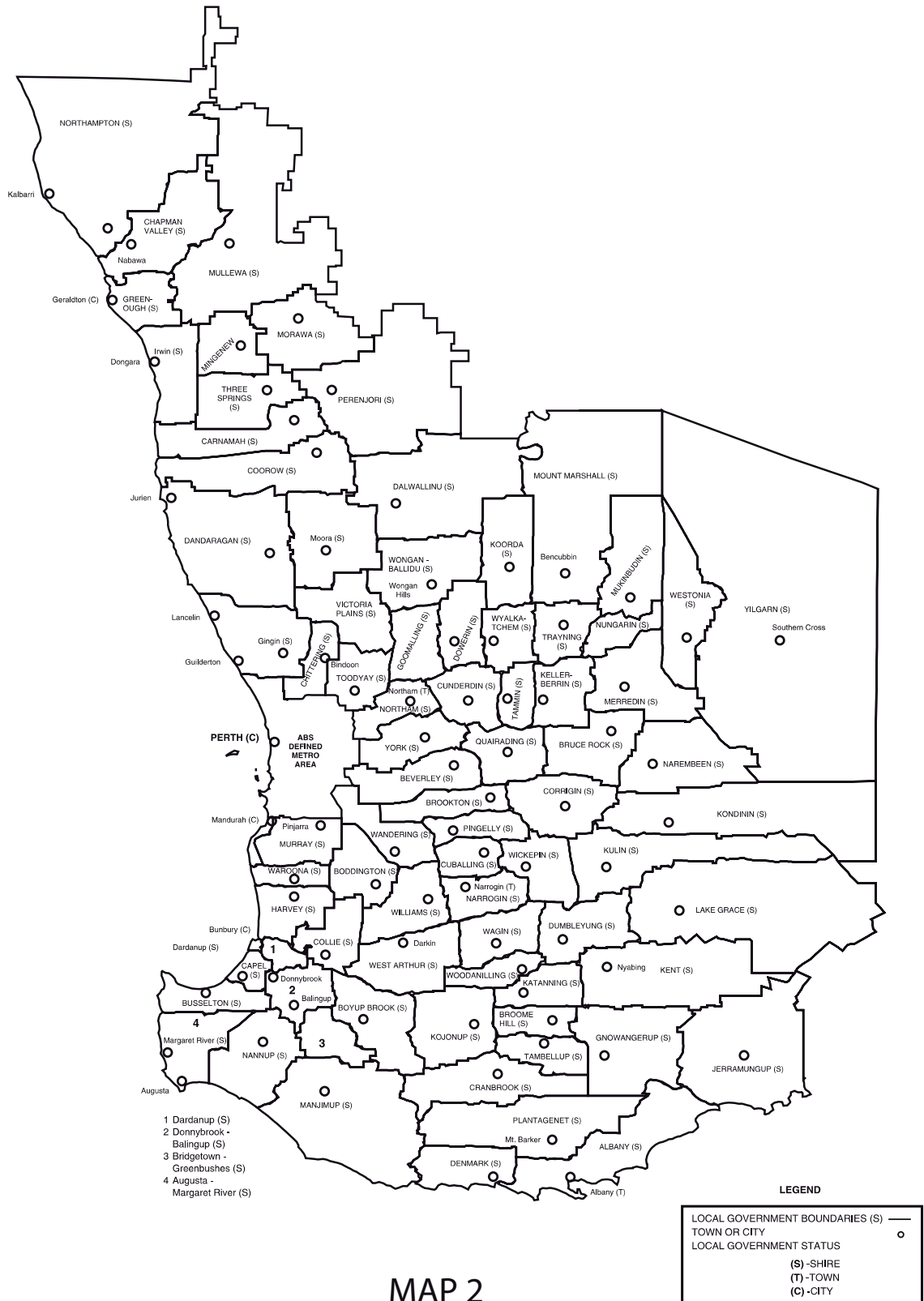
Euro area <sup>1</sup> / European Union	
<i>Austria</i>	Latvia
<i>Belgium</i>	Lithuania
Cyprus	<i>Luxembourg</i>
Czech Republic	Malta
Denmark	<i>Netherlands</i>
Estonia	Poland
<i>Finland</i>	<i>Portugal</i>
<i>France</i>	Slovakia
<i>Germany</i>	Slovenia
<i>Greece</i>	<i>Spain</i>
Hungary	Sweden
<i>Ireland</i>	United Kingdom
<i>Italy</i>	
Non-Japan Asia	
Afghanistan	Nepal
Bangladesh	Pakistan
Bhutan	Papua New Guinea
Brunei Darussalam	Philippines
Cambodia	Samoa
China	Solomon Islands
Fiji	Sri Lanka
India	Thailand
Indonesia	Tonga
Kiribati	Vanuatu
Lao PD Republic	Vietnam
Malaysia	Newly industrialised Asia
Maldives	Mongolia
Myanmar	
Newly Industrialised Asia	
Hong Kong	Singapore
South Korea	Taiwan

<sup>1</sup>Italics indicate countries that are members of the euro area.

Local government boundaries

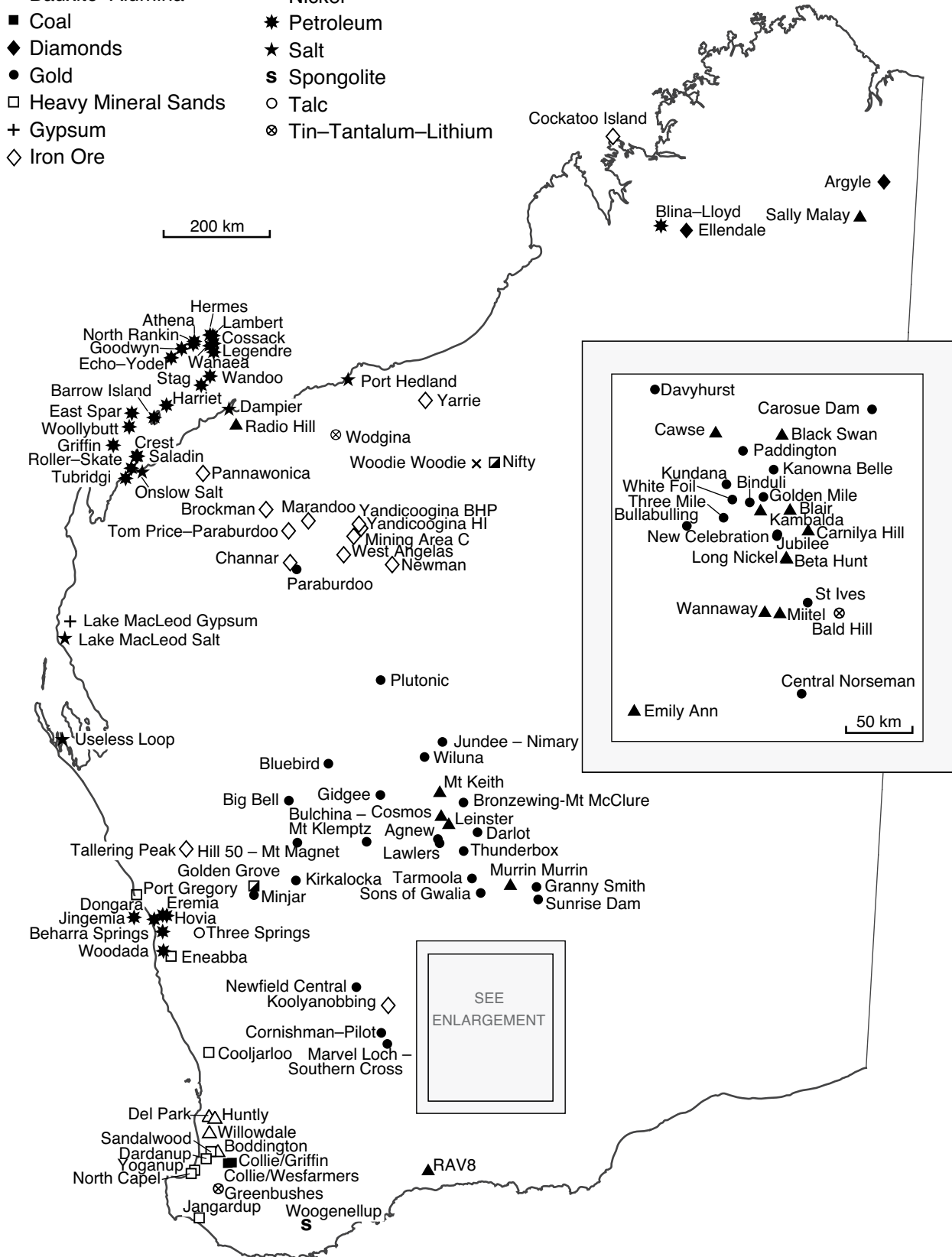


## Local government boundaries



## MAJOR MINERAL AND PETROLEUM PROJECTS IN WESTERN AUSTRALIA

- |                       |                        |
|-----------------------|------------------------|
| ▣ Base metals         | × Manganese            |
| △ Bauxite–Alumina     | ▲ Nickel               |
| ■ Coal                | ★ Petroleum            |
| ◆ Diamonds            | ☆ Salt                 |
| ● Gold                | Ⓢ Spongolite           |
| □ Heavy Mineral Sands | ○ Talc                 |
| + Gypsum              | ⊗ Tin–Tantalum–Lithium |
| ◇ Iron Ore            |                        |





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Mineral House  
100 Plain Street  
East Perth WA 6004

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Email: [enquiries@doir.wa.gov](mailto:enquiries@doir.wa.gov)