

Western Australian Mineral and Petroleum Statistics Digest **2004**



Department of
Industry and Resources

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Jim Limerick
Director General

FOREWORD

Welcome to the Department of Industry and Resources' 2004 Statistics Digest. This publication contains the most comprehensive statistical 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 this 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.

Booming international commodity prices and record sales volumes of iron ore, salt, cobalt and manganese resulted in the total value of Western Australian mineral and petroleum sales achieving a record high of \$28.4 billion in 2004. Major contributors to the increase in value were the iron ore, petroleum and nickel industries, which collectively added \$2.4 billion to the value of the State's resources sector during the year.

However, during 2004 the Australian dollar strengthened further relative to the US dollar. Prices for most mineral and petroleum commodities are denominated in US dollars so the appreciation thwarted what would have been even greater sales value increases.

Healthy prices and Chinese demand pushed the value of iron ore sales to a new record. Significantly higher international prices also helped the nickel sector attain a new status as the State's second most valuable mineral sector after iron ore. High international crude oil prices played a similar role in the State's petroleum industry with the total value of its sales climbing 7 per cent to \$10.4 billion. However, the overall sales value increase would have been larger had it not been for significant drops in production for the State's gold and base metals (copper, lead and zinc) industries. There was also a decline in the physical sales quantities of crude oil and condensate due to reduced output from mature fields.

Overall, the outcome emphasises the importance of the petroleum and minerals 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 petroleum and minerals sector has also experienced nominal growth of around 8 per cent per annum during the last ten years.

In releasing the Western Australian Mineral and Petroleum Statistics Digest for 2004, 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 slowed moderately in mid-2004, following annual growth of around 6 per cent in the second half of 2003 and early 2004. The slowdown was, in part, a reversion to more sustainable growth reflected in a significant slowdown in industrial production and global trade.

The slowdown was short-lived however and the outlook is one of further, above-trend, global growth. Nevertheless there are some important risks surrounding that scenario. These risks include the excessive dependence of world growth on US and Chinese demand for imports from other regions, where domestic demand is providing little stimulus to activity, notably Japan and Europe. The potential for financial market instability due to the US' fiscal and current account deficits and the risk that high oil prices may lift inflation and weaken consumer demand are two other important uncertainties clouding the outlook.

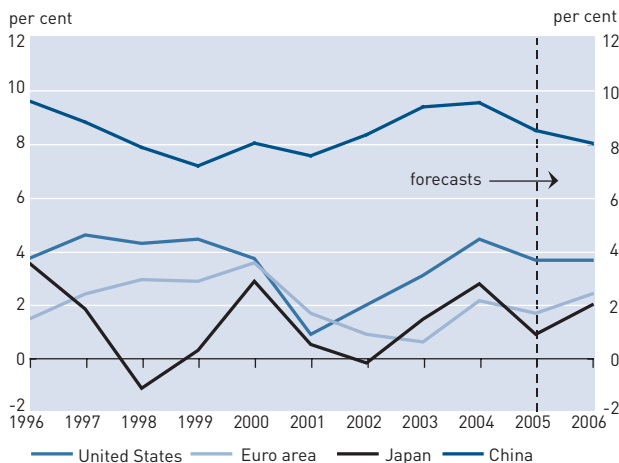


Figure 1 Global Economic Growth – Major Economies

Source: International Monetary Fund – World Economic Outlook April 2005

Triggering some concerns about the sustainability of global recovery, mid-2004 saw a divergence in activity across economic regions with an easing in growth in the US and Japan driving the modest slowdown in global growth. At the same time, other regions including Latin America and Eastern Europe continued to grow strongly. Growth in the East Asian region continued, driven by the booming Chinese economy's demand for imports, while, for a short time at least, euro area growth looked as though it might be becoming more broadly based.

In aggregate terms, the overall slowdown in global activity was short-lived and in the second half of 2004, growth picked up again as US activity accelerated. Despite the improvement in aggregate growth over the period, growth patterns remained geographically divergent and highly dependent on sustained growth in the US and China.

After showing early signs of a broad based pick up in activity, growth in Europe and Japan disappointed in the second half of 2004 with ongoing export growth providing the only sizeable stimulus to activity in a climate of stagnant domestic demand.

For the outlook, the International Monetary Fund is forecasting growth of 4.3 per cent for the world economy in 2005, down moderately from the three-decade high performance of 2004, which saw growth of 5.1 per cent. It is expected that the world economy will remain dependent on the US and China for much of this growth and this is an important risk to the outlook. For 2006, however, Japan and the euro area are forecast to grow more quickly with greater synchronisation of global growth.

United States

The US economy saw a modest slowdown in growth in mid-2004 as household consumption weakened sharply. However, momentum was regained in the second half of 2004 as consumption rebounded due to softer oil prices, rising equity prices and increased household wealth derived from rising house prices.

Providing support for the rebound, growth in corporate profitability was underpinned by strong, though slowing, rises in productivity and very low real interest rates. These factors lifted business investment, though investment growth remained lower than might be expected at this stage of the economic cycle.

In aggregate, the US economy grew by 4.4 per cent in 2004 and this strong growth was maintained heading into 2005, with GDP growing by 0.7 per cent in the first quarter to give an annual growth rate of 3.5 per cent.

A key element of this ongoing recovery into 2005 has been a lift in employment growth, which had been disappointing in the second half of 2004. By March 2005, jobs growth was slightly better than trend growth in the labour force, averaging about 160 000 jobs per month. This allowed unemployment to drop from its mid-2003 peak of 6.3 per cent to 5.2 per cent in March.

Stronger employment growth and the associated increase in incomes helped lift consumption growth to 0.9 per cent in the March quarter 2005 and 3.6 per cent over the year. Further assisting consumption, household wealth continued to rise due to significantly higher equity and housing prices.

Supportive macroeconomic policy settings (despite a 200 basis-point tightening in monetary policy), high levels of business confidence and a high profits to GDP share, combined with low levels of corporate debt, should provide the climate for further growth in US investment over 2005.

An important risk to the US and thus global economy that has emerged at the same time as growth has been strong, is that of low domestic saving. Rather than financing strong growth out of savings, growth has been financed through borrowing. Households have borrowed heavily to finance consumption and government borrowed heavily to finance tax cuts and military spending. This decline in domestic saving at a time of strong investment growth has been reflected in a rapid increase in the current account to GDP ratio – reaching a record 6.3 per cent of GDP in the December quarter 2004.

Japan

Like the US, Japan's economy slowed after the strong growth it experienced at the start of 2004. In the June quarter 2004, Japanese output was 3.2 per cent higher than a year ago. However, in the September quarter, output fell by 0.3 per cent, which brought the annual growth rate back to 2.6 per cent. The picture of a Japanese economy struggling to gain any momentum was compounded in the December quarter when output remained flat and annual growth moderated to 0.6 per cent.

In part, special factors including typhoons and an earthquake explained the softening of growth over 2004. In addition, Japan's exports and manufacturing sector suffered from a downturn in the global information, technology and communications (ITC) cycle. This softness was consistent with other indicators such as industrial production, merchandise exports and machinery orders, which slowed in mid-2004.

Though some uncertainty about the strength of the recovery has persisted, the outlook for Japan's economy remains one of continued growth. March quarter 2005 GDP data showed an unexpected acceleration in Japanese economic activity with growth in the quarter of 1.3 per cent lifting the annual growth rate to 1.2 per cent. Importantly, a key driver behind the lift in growth was an improvement in domestic demand, due to stronger consumer demand and business investment, two missing pieces of the recovery to date.

Providing further evidence of the potential for Japan's economy to continue along a modest growth path, business sentiment reported in the Shoko Chukin and PMI surveys are at above-trend levels, likely reflecting improved levels of consumer spending. In line with this improvement, capacity utilisation levels are high and profits are strong, rising by 13 per cent over the year to the December quarter 2004 with profit margins at 10-year highs. This return to profitability has allowed significant repair to Japanese corporate balance sheets, such that corporate debt levels have fallen to levels (as a share of Japan's GDP) last seen in the late 1980s. Taken together, these factors augur well for ongoing capital spending.

Providing support for consumer spending, consumer confidence has improved, underpinned by improvements

in the jobs market. In terms of the latter, employment growth firmed to 0.5 per cent over the year to March and the ratio of job offers to applicants measured by business survey rose to high levels. Consistent with an improving jobs market, unemployment fell to 4.5 per cent in March 2005, a six-year low.

China

During 2004, despite some modest slowing in annual growth to 9.1 per cent in the year to the September quarter 2004, the Chinese economy, along with that of the US, continued to provide the driving force for global growth. This has been based on its demand for inputs of resources and simply transformed manufactures which has supported export growth in economies such as Japan, Australia and East Asia.

Economic growth accelerated modestly in the March quarter 2005 to be 9.5 per cent higher than a year ago, the seventh consecutive quarter where annual growth was above 9 per cent. Confirming ongoing strength in the economy, industrial production rose by over 15 per cent in the year to March an acceleration on the growth of over 14 per cent in the previous quarter. Importantly, in an economy where growth has been substantially driven by exports growth, domestic retail sales growth remained buoyant rising by nearly 14 per cent in the year to March, boosted by rising per capita incomes.

Government measures to slow the Chinese economy including tighter credit restrictions and controls on over-investment produced a modest slowdown in targeted sectors such as the aluminium, real estate, automotive, construction and steel-making industries. As a result, China's aggregate fixed capital investment growth fell from rates of over 50 per cent a year in early 2004 to 26 per cent in the year to April 2005. However, concerns remain that investment had not slowed as much as desired, with the Chinese authorities' investment growth target being around 16 per cent a year. An important worry is that current strong rates of fixed capital investment will lead to excess capacity, which, in turn, may lead to a marked softening of Chinese growth.

Upstream price pressures in the economy appear to have eased, though sharp rises in input prices and wage pressures in the tight coastal labour market, may keep upward pressure on consumer price inflation. Consumer prices rose by 2.7 per cent in the year to March, up from 2.4 per cent in the year to December.

Non-Japan East Asia

Growth in East Asia since mid-2003, reflected the boost to demand from increasing US, Chinese and Japanese demand for goods as well as the general lift in demand from stronger global growth. Regional economies with high trade intensities with China, for example Malaysia, have done relatively well. Growth in the region was a strong 4.5 per cent over the year to December quarter 2004, with exports destined for China being key driving

factors. Domestic demand, in a climate of low interest rates, improving labour markets and low capacity utilisation rates, also provided support for growth across most regional economies with the exception of South Korea where domestic demand remained weak.

Into 2005, growth in the region had slackened moderately, driven by softening in those economies, notably Taiwan and Singapore, exposed to the moderate slowdown in global ITC trade that emerged in the second half of 2004. Other economies in the region have seen growth firm, including Korea, where domestic demand appears to be improving.

The slowdown in global ITC growth has retarded expansion of exports from the region, though merchandise exports as a whole showed signs of recovery in the March quarter 2005, increasing by 12 per cent during the year. Slower ITC demand has affected industrial output more significantly as inventories were wound down as a result of slower demand growth. Signs of improvement in global demand for semi-conductors in early 2005 augur well for a lift in regional exports and growth more generally.

Importantly, given uncertainties about global growth and an increasing reliance on China as an export market, the climate for domestic demand in the region remains strong. Capacity utilisation remains at high levels and expansionary macroeconomic policies, rising property and equity prices and rising employment will provide support to business investment and consumer demand.

High crude oil prices remain a key risk to the outlook for the region's economy because of its relatively intensive use of oil. Overall, inflationary pressures in the region have built a little over recent months driven in large part by the cost of oil (and other commodities). While core inflation remains modest, there is the risk that second round effects of higher fuel prices will build into inflation more generally. In this context, regional central banks have raised interest rates over recent months.

Europe

The European economies benefited from the general lift in global trade beginning in mid-2003, but growth remained constrained to the export sector, with only a limited response from domestic demand and employment.

Europe's recovery picked up speed in the second half of 2004, though it remained highly dependent on exports and was geographically uneven. France performed best with strong domestic demand supplementing exports, while the other major economies of Germany, Italy and the Netherlands experienced only modest domestic demand. In the year to December quarter 2004 GDP rose by a modest 1.6 per cent.

Moving into 2005, growth remained tentative as domestic demand remained subdued until a modest improvement in the December quarter. Compounding this, net exports softened under the erosion of competitiveness caused by a strong euro. Within Europe, performance remained geographically divergent with France returning to stronger growth driven by domestic demand while Germany and Italy saw output contractions.

Industrial production growth has reflected the softness in euro area demand, ending the year to February 2005 at only 0.7 per cent, with manufacturing mirroring this performance by softening since the second half of 2004.

Domestic demand remained weak in much of Europe, with the exception of France and Spain, where strong house price rises and consequent increases in household wealth and borrowing supported consumer spending. In other economies, notably Germany where house prices and real incomes have been falling and no employment growth, consumer spending has remained moribund.

In line with weak growth, inflation has remained subdued, with the consumer price inflation of around 2 per cent in the year to December. Consequently, the European Central Bank (ECB) has left monetary policy on hold and its policy rate at 2 per cent.

The UK economy has slowed as housing price rises have moderated since mid-2004 under the weight of rising interest rates. Domestic demand growth is expected to soften as manufacturing production and merchandise exports have weakened. On the positive side, business and consumer sentiment remains high and labour market conditions are strong.

The Global Outlook

While global growth is expected to remain solid over the near term, with the IMF forecasting growth of 4.3 per cent for 2005 and 4.4 per cent in 2006, there are significant long-term risks to the outlook. These risks relate largely to the reliance of the world economy on the maintenance of strong growth in the US and China to support growth in most other regions, the degree of sustainability of the Chinese economy's current rapid growth, low levels of domestic saving in the US economy and the excessive role being played by increasing housing prices to support wealth creation and consumer spending in a number of economies.

In terms of China, there are three important risks to the strong growth expected over the near term. The first is that the surge in business investment may lead to excess capacity and then a protracted period of slow growth in investment as the capital stock adjusts to more appropriate levels. Secondly, the level of non-performing loans in the Chinese banking sector remains high and analysts have argued that a significant proportion of the investment funded by such loans may be uneconomic.

Recent official estimates put the number at 45 per cent of China's 2002 GDP (US\$570 billion), informal estimates suggest a higher number (US\$815 billion, or over 60 per cent of 2002 GDP). Consequently a shock to the Chinese financial system, perhaps related to an early revaluation of the yuan, may lead to a significant contraction in finance available to support viable investments. The third risk is that with exports growth having been the key driver of growth in the Chinese economy, a broadening of activity to boost domestic demand will be required to sustain the strong growth rates.

The decline in United States saving has been reflected in a sharp deterioration in the US current account deficit. To date the deficit has been easily financed. However, in part this financing reflects the willingness of Asian region central banks to recycle current account surpluses and invest in low interest rate US long-term bonds and take on the risk of losses due to a falling US dollar. This willingness stems from a desire to maintain low regional exchange rates, by buying US currency denominated assets, in order to maintain export competitiveness. In the absence of US policy to lift domestic saving, if these central banks decide to reduce their exposure to US denominated assets and diversify their portfolio of foreign currency-based assets, the ensuing outflow of capital from the US would potentially cause a rapid destabilising fall in the US\$ and a consequent rise in US interest rates to attract capital back to the US to finance the current account deficit. Given the high correlation between US long-term interest rates and those of other economies this would have a significant negative impact on global economic activity.

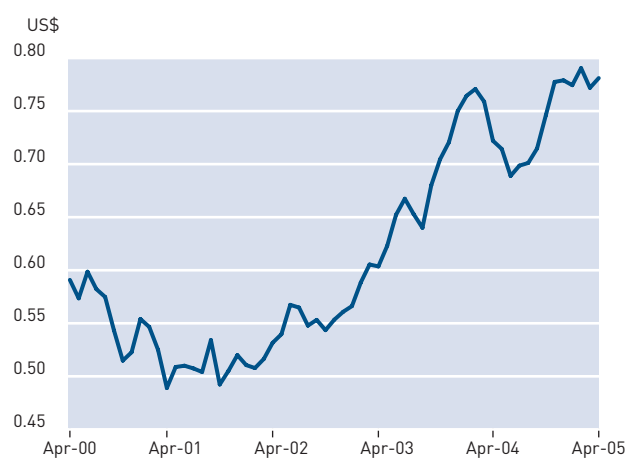


Figure 2 Exchange Rate US\$/A\$ Source: Reserve Bank of Australia

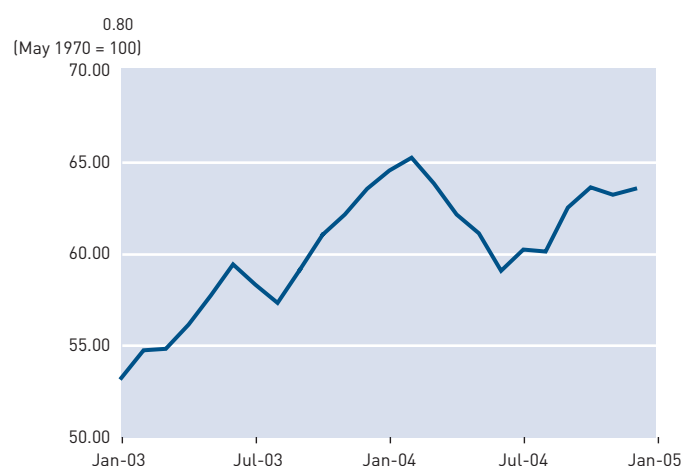


Figure 3 Exchange Rate Trade Weighted Index Source: Reserve Bank of Australia

Tenements in Force 1978 Act																
	1996-97		1997-98		1998-99		1999-00		2000-01		2001-02		2002-03		2003-04	
	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	635	4,566	575	4,561	568
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
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
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
Mineral Claims & Other 1904 Act	310	34	309	34	307	34	194	22	186	21	186	22	186	22	186	22
Total	19,647	41,515	19,029	39,255	17,567	26,838	16,280	23,751	17,326	23,829	16,487	23,988	16,006	26,781	15,967	26,317

Figure 4

* Includes Other
Source: DoIR

2. EXPLORATION AND INVESTMENT

2.1 Mineral Exploration

Overview

Western Australia continues to attract the major proportion of mineral exploration expenditure in Australia (59 per cent). In 2004, mineral exploration expenditure (excluding petroleum) figures for Western Australia rose by 25 per cent (\$107 million) to \$539.9 million. This was a significant rise on top of the 11 per cent increase already experienced in 2003. However, Western Australian mineral exploration is still well below the peak calendar-year level in 1997, when more than \$700 million was spent.

The Western Australian trend is consistent with the Australian trend. The 2004 level of mineral exploration expenditure within Australia was \$921 million, which was 24 per cent (\$179 million) higher than during 2003. However, mineral exploration expenditure in Australia is still well below the peak calendar-year level of 1997, when \$1167 million was spent.

Unfortunately, the recovery in exploration expenditure in Australia and Western Australia has not been as strong as the world-wide recovery, with Australia and Western Australia having lost market share in the expanded pool of exploration capital. During the last decade, the proportion of the world's non-ferrous mineral exploration expenditure in Australia has dropped from 23 per cent to 15 per cent of the total, whereas that for Western Australia has dropped from 13 per cent to 9 per cent.

The situation was starkly illustrated in a survey of 1138 global mining companies' exploration budgets prepared by the Canadian-based Metals Economic Group. This showed that Australia, once the global leader in mineral exploration, is now outpaced by Latin America, Canada, Africa and countries classified in the 'Rest of the World' category. This result continues a trend that has seen Australia slip dramatically from the world's second-largest explorer in the period 1994–2001, to fifth place today.

The comparison with the situation in Canada is striking, with the proportion of world-wide mineral exploration expenditure spent in Canada recovering strongly after the mid-1990s whereas the proportion has continued to fall in Australia and Western Australia. This clearly illustrates what can be achieved with the combination of high-profile discoveries, ongoing exploration success, and favourable government regimes (including fiscal incentives to exploration).

In an effort to increase exploration expenditure, Regional Standard Heritage Agreements were endorsed in 2004 between native title representative bodies, the

Chamber of Minerals and Energy and the Association of Mining and Exploration Companies, to set out rules for Aboriginal Heritage surveys in respect to exploration in all Western Australian regions, other than the Kimberley. The new policy has been showing some interesting trends. In the three months to January 2004, 425 objections to using the expedited procedure under the *Native Title Act 1993* were recorded. For the three months ending June 2004, only 36 objections were recorded.

Western Australia also accounts for the major proportion of the exploration dollars expended in Australia for many of the significant commodities such as iron ore, nickel, cobalt, gold, diamonds, heavy mineral sands and silver-lead-zinc.

Within Western Australia, \$284 million was expended on gold exploration, which was only marginally up (plus 9 per cent or \$33 million) from the \$260 million spent in 2003. The level of gold exploration expenditure has barely recovered and is still at the recessionary levels of the early 1990s and 2001–02. Gold nevertheless remains the main focus of mineral exploration, accounting for about 53 per cent of all exploration expenditure in 2004.

Exploration for nickel and cobalt (Ni-Co) recovered very strongly in 2004, rising by 72 per cent (\$44 million) to \$104 million. Exploration expenditure for Ni-Co has risen strongly over the last two years and there was even talk of a 'nickel boom', with a shortage of skilled personnel and available drill rigs, but a comparison with the long-term trends shows that Ni-Co exploration is still well below other boom periods of around 1980–81 and 1997–98. Data from the Australian Bureau of Statistics for the earlier years is for base metals generally (as an undifferentiated group), but these booms were undoubtedly dominated by exploration for Ni-Co. The recovery during the last couple of years has been principally led by junior companies exploring for and developing nickel sulphide deposits (particularly in the Kambalda area) and by BHP Billiton (BHPB) completing the feasibility study of the Ravensthorpe lateritic nickel project.

Iron ore exploration expenditure in Western Australia has also risen very strongly, by 97 per cent to \$100 million in 2004 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. In addition, the Fortescue Metals Group (FMG) emerged as a new force in the Pilbara iron ore industry, and there was renewed interest in exploration for magnetite deposits in primary banded iron formations on the Yilgarn Craton.

However, diamond exploration in Western Australia is now at the lowest level for at least 25 years, with diamond exploration expenditure decreasing by a further 7 per cent during 2004, falling by more than \$1 million

to only \$16.1 million for the year. The fall was primarily due to reduced resource-reserve drilling at Argyle, the Ellendale project at the 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 \$134 million in 1981-82 (in 2003-04 dollar terms), reflecting the general lack of exploration success in Western Australia. Unfortunately, the success of Kimberley Diamond at Ellendale has had only a limited impact on other companies' ability to raise capital specifically for diamond exploration in Western Australia.

Exploration expenditure on heavy mineral sands in Western Australia also slumped during 2004. 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 very 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 around less than a third, but recovered during 2003-04 to 44 per cent of the total. The main greenfield exploration project is Coburn (south of Shark Bay), which is at the bankable feasibility study stage.

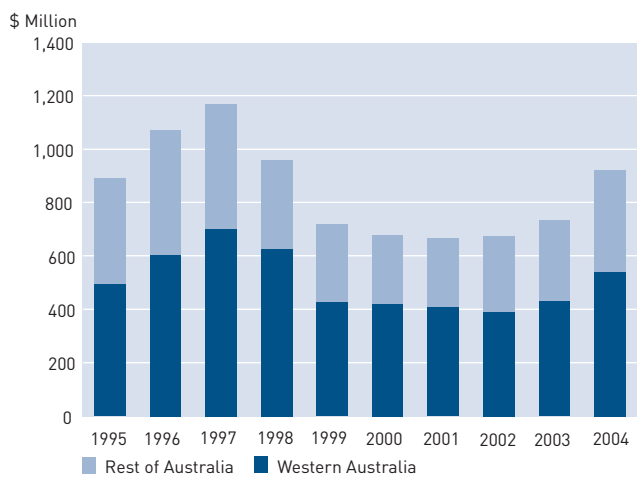


Figure 5 Mineral Exploration Expenditure Source: ABS

2.2 Petroleum Exploration

Western Australian petroleum exploration expenditures reached a record high in 2003 of \$709 million. In 2004, petroleum expenditure in Western Australia saw a slump during the March quarter to \$107 million, a strong rebound in the June quarter (\$198 million) and a slump back in the third and fourth quarters to \$130 million and \$113 million respectively. Nevertheless, overall total State petroleum expenditure for 2004 was a respectable \$547 million.

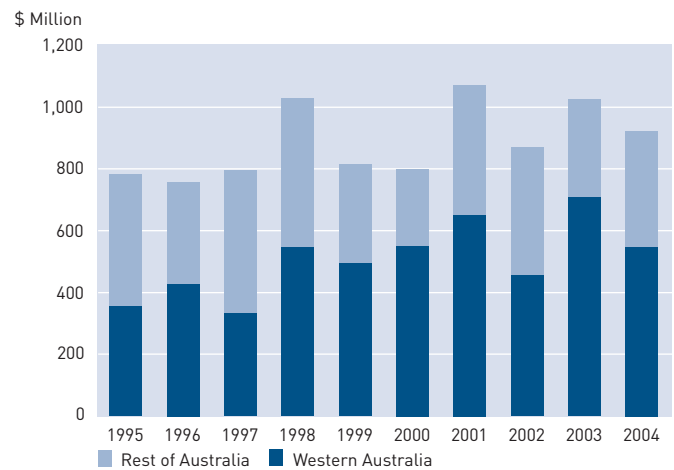


Figure 6 Petroleum Exploration Expenditure Source: ABS

Total Australian petroleum exploration expenditure decreased by 10 per cent in 2004 to \$922 million. As Western Australia's petroleum exploration expenditure decreased by 23 per cent in 2004, the State's share of national petroleum expenditure fell from 69 per cent in 2003 to 59 per cent in 2004.

Expenditure on onshore petroleum exploration in Australia increased during 2004. In 2003, national onshore petroleum expenditure amounted to \$191 million, or 19 per cent of total expenditure. In 2004, national onshore petroleum expenditure increased to \$259 million and represented a substantially higher 29 per cent of total expenditure. However, it is important to interpret these statistics with some caution due to the relatively much more expensive nature of offshore exploration.

Despite high oil and gas prices and high-retained earnings, many companies have been taking a conservative approach and have been primarily exploring in proven basins. In 2004, 76 wells were drilled, representing a one per cent decrease on the previous year's total of 77. Significant discoveries were made in the Northern Carnarvon, Browse and Perth Basins. Successful new developments in the 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.

It is difficult to attribute levels of exploration expenditure directly to the increase in oil price because of the lead-time required to undertake exploration programs. As such, it is fair to assume that in the coming years, exploration expenditure should increase in response to the high oil prices if these prices are sustained.

3. RESOURCE FOCUS 2004

3.1 Overview

In 2004, Western Australia's resources industry experienced booming international commodity prices, coupled with record sales volumes of iron ore, salt and manganese. As a result, the total value of Western Australian mineral and petroleum sales increased by 6 per cent to a record high of \$28.4 billion.

Major contributors to the increase in value were the iron ore, petroleum and nickel industries which collectively added \$2.4 billion to the value of the State's resources sector during the year. Driven by Chinese demand, iron ore sales reached record volumes for a fifth consecutive year, increasing by 12 per cent to 217 Mt. In addition to the increased shipments, healthy prices also helped push iron ore sales values to a new record high of \$6.2 billion.

Thanks to soaring international nickel prices, for the first time in the State's history, the local nickel industry attained the new status of being the State's second most valuable, mineral sector after iron ore. In 2004 the value of sales from the Western Australian nickel industry grew by 20 per cent to reach a record high of \$3.2 billion. The significance of high international nickel prices was underlined by achievement of the impressive sales outcome despite an actual decline in physical sales volumes and adverse currency movements.

With the international price of crude oil up by more than a third in 2004, commodity prices played a similar role in the State's petroleum industry which saw its total sales value climb by 7 per cent to \$10.4 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 declined due to reduced output from mature fields.

During the course of 2004, the Australian dollar strengthened further relative to the US dollar, on average being 13 per cent higher compared with 2003. With prices for most mineral and petroleum commodities denominated in US dollars, growth in the value of the Australian currency thwarted what would have been even greater sales value increases, particularly for the few commodities which experienced less than exceptional price increases and where physical output had fallen.

For example, despite an increase in international gold prices during the past year, appreciation in the value of the Australian dollar translated to gold prices in local currency terms remaining unchanged. Compounded by the lowest level of gold output since 1989, this translated to a 13 per cent drop in Western Australian gold sales in 2004 to \$2.9 billion. Similarly for alumina, after continuous record production growth since 1980, appreciation of the Australian dollar together with

consolidation of output at 11.0 Mt, meant that the value of alumina sales in local currency terms only managed a marginal increase of a little more than one per cent to \$3.2 billion.

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. Similarly, a significant decline, by almost a third, in the volume of diamond sales combined with the Australian dollar appreciation also resulted in the value of diamond sales falling by more than 36 per cent in 2004 to \$421 million.

The State's mineral and petroleum industry has recorded a very positive outcome based on strong world demand flowing through to 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 nominal 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 include:

- In 2004, the total value of Western Australian mineral and petroleum exports are estimated to have amounted to \$28.31 billion. This represents a little over 80 per cent of the State's total merchandise exports.
- In 2004, the total value of Australian mineral and petroleum exports are estimated to have amounted to \$57.2 billion. This represented 48.6 per cent of the nation's total merchandise exports.
- The total value of Western Australia's mineral and petroleum sales in 2004 (\$28.4 billion) represented approximately 51 per cent of the estimated total Australian value of mineral and petroleum sales in 2004. Excluding coal, Western Australia's mineral sales in 2004 (\$28.1 billion) represented an estimated 63 per cent of the total Australian value of mineral and petroleum resources.
- It is incorrect to express the value of mineral and petroleum sales directly as a proportion of gross state product. Nevertheless, by way of background the nominal value of Western Australian gross state product in 2003-04 was \$88.9 billion.

The above figures are based on data from the ABS, ABARE and DoIR estimates.

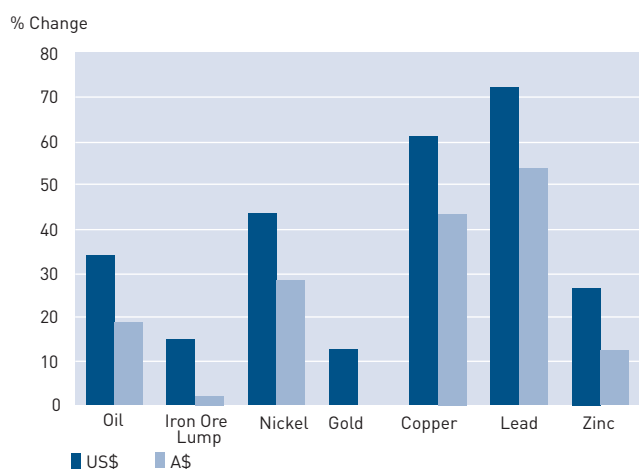


Figure 7 Average Price Comparison 2003 and 2004

Source: LME, Kitco, TEX report, Metal Prices

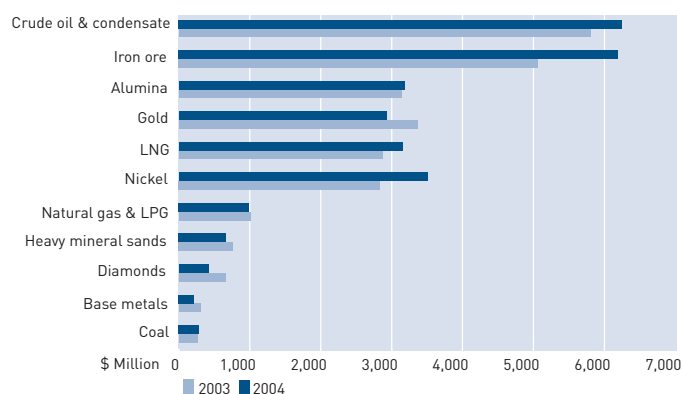


Figure 8 Major Commodities by Value 2003 and 2004

Source: DoIR

3.2 Commodity Prices

In 2004, the Australian dollar continued to appreciate against the US dollar. In annual average terms one Australian dollar was worth US73.50 cents, a 13 per cent increase compared to the previous year (US65.28 cents). Although the appreciation of the Australian dollar is partly driven by the imbalances in the global economy, as manifested by the US current account deficit and the general depreciation of the US dollar, the Australian dollar also appreciated against a range of other currencies. In trade-weighted terms, the Australian dollar appreciated by almost 8 per cent.

The chief highlight of 2004 was the very strong performance of resource commodity prices. The cumulative impact of several years of strongly growing demand in China coupled with healthier demand growth in other big consuming regions during 2004 resulted in very tight commodity markets. Oil prices continue to tread a tightrope of high demand and controlled supply, currencies and interest rates supported the gold price and 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

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.

performed much better than most analysts expected in 2004 with commodities such as copper, aluminium, lead and tin all exceeding even the highest forecasts presented at the start-of-year analyst surveys.

Strong demand growth from China continued to drive demand for minerals and the average value of the Reserve Bank of Australia's (RBA) US dollar, non-rural commodity price index was 26 per cent higher in 2004 compared to 2003. Due to the continued appreciation of the Australian currency, the RBA's non-rural commodity price index in local currency terms was 11 per cent higher in 2004 compared to 2003.

The appreciation of the Australian dollar was also insufficient to outweigh the impact of geo-political uncertainty, low stocks, demand from China and supply discipline on the US dollar oil price. As a result, the price of oil, which is not included in the RBA's commodity price

index, increased by 19 per cent in Australian dollar terms during 2004.

Base metals, such as copper, lead and nickel continued to experience strong price growth in US dollar terms, with the RBA's base metal price index higher on average by 36 per cent during 2004. In Australian dollar terms, the same price index was 20 per cent higher in annual average terms.

Influenced by the activity in commodity trade, spot-ocean freight prices have 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 has been a result of global demand for resources underpinned by China's demand for coal and iron ore to produce steel for its construction programs.

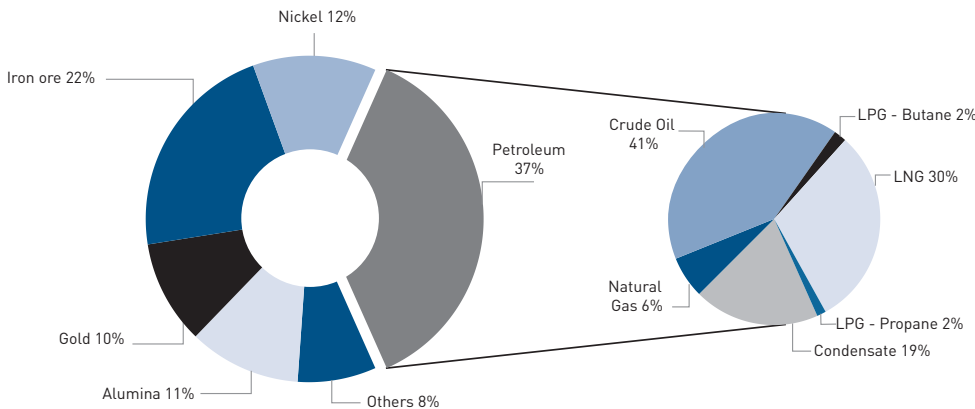


Figure 9 Sales by Commodity 2004 Source: DoIR

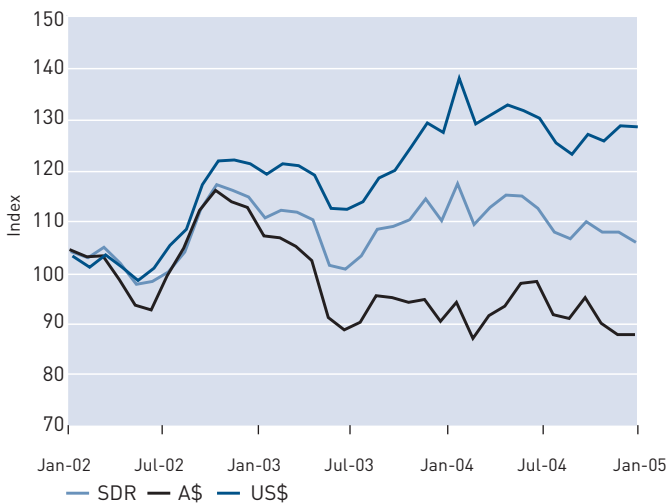


Figure 10 Non-Rural Commodity Price Index March (2001-02 = 10) Source: Reserve Bank of Australia

4. 2004 RESOURCE INDUSTRY ANALYSIS

4.1 Petroleum

World oil prices in 2004 averaged US\$40.25/bbl (combination of Brent, Tapis and West Texas). This represented a 34 per cent increase above the equivalent average price in 2003. Locally, this increase was ameliorated because in 2004 the average value of the Australian dollar appreciated against the US dollar by 13 per cent. This meant that in local currency terms, local producers and consumers faced world oil prices which were almost 19 per cent higher on average in 2004 compared to the previous year.

Key factors supporting oil prices have been strong demand, supply disruptions and geopolitical disturbances. 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 has emanated from production cuts by OPEC producers, strikes in Venezuela and Nigeria, continuing sabotage of Iraq's oil supply infrastructure, natural disasters and other geopolitical risks. These conditions have generated considerable concerns about disruptions to oil supply and served to encourage speculative activity in the market.

In 2004, the total value of Western Australian petroleum sales amounted to \$10 385 million. This represented an increase of more than 7 per cent and reversed the declining trend of the past two years. The strength of oil prices in 2004 and an 11 per cent increase in liquefied natural gas (LNG) shipments were the key factors responsible for the increase, as the sales quantities of crude oil and condensate declined. Reduced volumes from mature fields meant that in volume terms, crude oil sales fell by more than 13 per cent and the volume of condensate sales dropped by 7 per cent.

Crude oil was the principal contributor to total petroleum sales, accounting for 41 per cent of total petroleum sales value, followed by LNG (30 per cent) and condensate (19 per cent). Together these commodities account for about 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, the sales value of crude oil reached \$4.24 billion, which compared with 2003, was \$207 million or 5 per cent higher. The reason for the increased sales value was higher global oil prices, which on average, increased by more than a third during the course of 2004. This increase in international oil prices was of sufficient magnitude to counteract the appreciation of the Australian dollar in the same year, which resulted in local oil prices in Australian dollars increasing by 19 per cent.

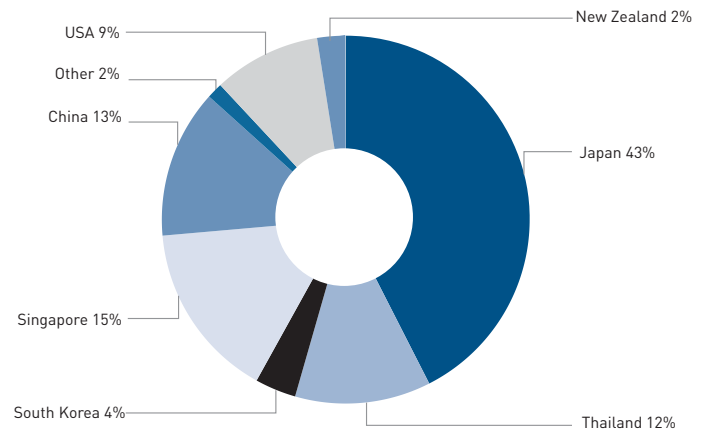


Figure 11 **Petroleum Exports**
Total Value \$8.62 billion Source: DoIR

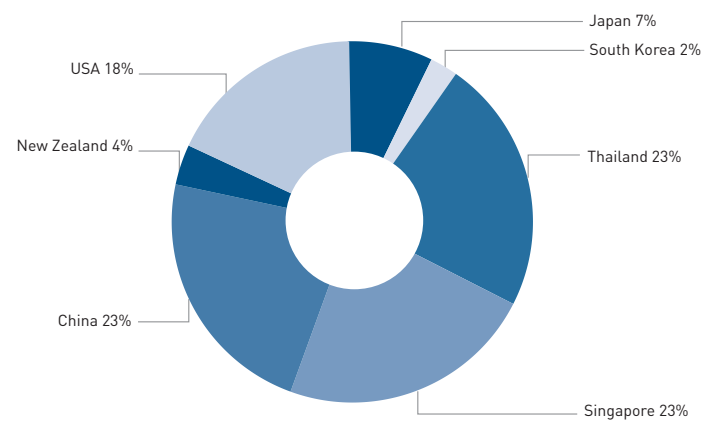


Figure 12 **Crude Oil Exports**
Total Value \$3.52 billion Source: DoIR

Strong growth in oil prices also counteracted a drop in sales volumes of crude oil from Western Australia. In 2004 Western Australia produced 76.8 million barrels of crude oil, down 13 per cent on the previous year. Total gross reduction (which does not take into account output increases in some fields) in oil output was 14.8 million barrels. The production decrease was due to several mature fields experiencing depleting reserves, namely Stag, Griffin, Harriet area, Cossack, Lambert, Legendre, Wandoo and Wanaea. Together, these fields accounted for almost all of the drop in output in 2004.

Falls in oil production levels were partially ameliorated by output increases from a number of new fields such as Hermes, Hovea, Woollybutt, Jingemia, Buffalo and Saladin. Total increase in oil output from these new fields was 2.9 MMbbl. The Hermes, Hovea and Woollybutt fields were the most important contributors to the additional output. In 2004, combined production from these three fields increased by 15 per cent. The three fields accounted for 75 per cent of total additional output. Nevertheless,

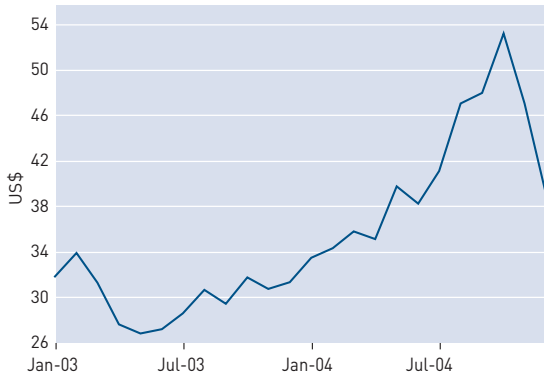


Figure 13 **Tapis Crude Oil Price US\$/bbl**
Source: WA Treasury Corporation

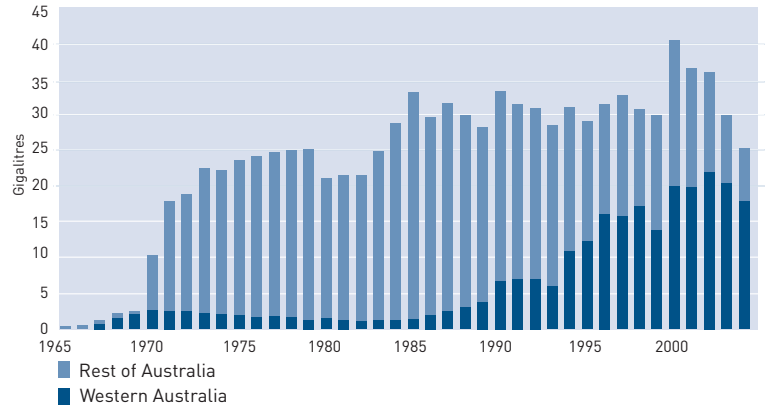


Figure 15 **Crude Oil and Condensate Quantity** Source: DoIR and ABARE

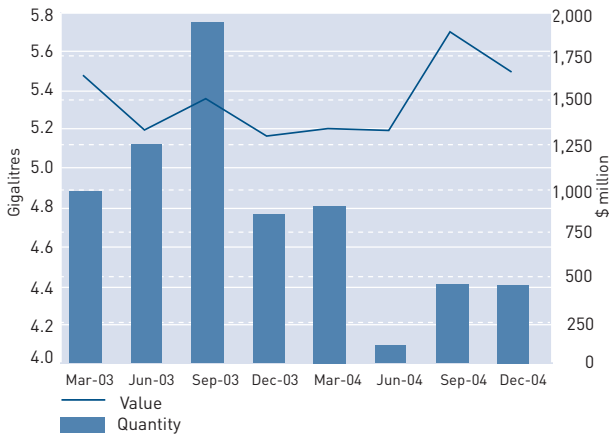


Figure 14 **Crude Oil and Condensate Quantity and Value by Quarter** Source: DoIR

Condensate

Sales volumes of condensate in Western Australia fell by seven per cent to 37.4 MMbbl in 2004. This was largely due to production decreases in the Goodwyn and Perseus–Athena fields. The production of condensate in the two fields fell by 19 per cent and 38 per cent respectively in 2004. The combined reduction in production from Goodwyn and Perseus–Athena was 3.5 MMbbl, accounting for about 95 per cent of the State’s total gross fall in condensate production.

However, the lower sales volumes were insufficient to counteract stronger oil prices which translated to the overall sale values of condensate in Western Australia increasing by 14 per cent to \$2 billion in 2004.

output increases were not sufficient to offset production falls, resulting in a net oil production decrease of 12 MMbbl.

Although a number of significant oil discoveries have been made, it is anticipated that oil production in the short term will continue to decline. This decline will continue until new oil fields come online alleviating the fall in production from mature oil fields. New oil fields expected to boost output from Western Australia include Santos’ Mutineer–Exeter oil field development, located in the Carnarvon Basin, which was expected to commence production in mid-2005. Also expected to come on-stream, but later in 2006 is Woodside’s Enfield oil field in the Carnarvon offshore basin.

About half of Western Australia’s crude oil is exported, with Japan the largest overseas market for the State’s crude oil. Other major export destinations include the US, Singapore, South Korea, Indonesia, China and Thailand.

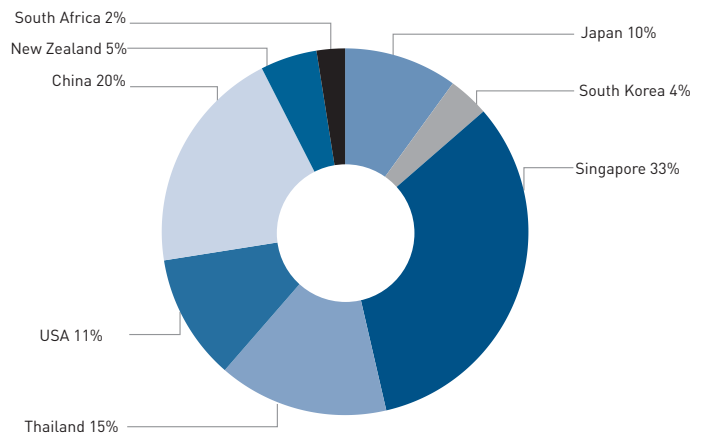


Figure 16 **Condensate Exports**
Total Value \$1.60 billion Source: DoIR

Condensate is a by-product from offshore gas fields. Woodside Energy Ltd. is Western Australia's largest condensate producer. The top-three condensate fields operated by Woodside, namely Goodwyn, North Rankin and Echo-Yodel, produced 34 MMbbl of condensate in 2004, accounting for 92 per cent of the State's total. New fields, which commenced condensate production in 2004, include Linda, Xyris, Gudrun and Monet. Although Goodwyn remains Western Australia's largest producer of condensate, generating 12.4 MMbbl in 2004, production levels have significantly decreased, dropping by 19 per cent compared with the previous year.

Almost all of Western Australia's total condensate sales in 2004 were exported. The major destinations for the State's condensate exports were Singapore, South Korea, Japan and the US.

Liquefied natural gas (LNG)

LNG is Western Australia's second most valuable petroleum product after crude oil, accounting for 30 per cent of the State's total petroleum sales in 2004. In contrast to crude oil and condensate, volume of LNG sales increased, by 11 per cent to 8.7 Mt.

All of Western Australia's LNG is exported. In 2004, the value of LNG sales was \$3.15 billion and represented a 10 per cent increase compared to the previous year. Japan remains the dominant overseas market for LNG, accounting for about 95 per cent of the State's total LNG exports. Other LNG export destinations have included South Korea 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 just over 130 km off the Pilbara coast of Western Australia, the NWSV project began LNG exports to Japan in 1989 under a long-term contract. Japanese power utilities have been the principal purchasers. In July 2003, the NWSV project reached a key milestone by delivering its 1500th LNG cargo to customers Osaka Gas and Kansai Electric Power. 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.

2004 marked 15 years of LNG supply from Western Australia. A new LNG sale and purchase agreement between the NWSV LNG sellers and Kansai Electric Power, which is Japan's second-largest power company and one of the original customers when LNG shipments began in 1989, was signed in July 2004, formalising a heads of agreement signed in September 2003. The agreement is for the supply and purchase of 0.5 Mt/a of LNG between 2009 and 2014 and 0.925 Mt/a of LNG between 2015 and 2023.

The \$2.7-billion expansion of the NWSV's gas-processing facilities, which commenced in 2001, was largely completed in 2004 with the new fourth LNG train successfully commenced production in September 2004. The new fourth train was expected to reach full capacity of 4.2 Mt/a of LNG by early 2005 in addition to the existing annual 7.5 Mt of production.

Contingent on future market conditions, the NWSV may consider constructing a fifth LNG train to meet growing Asian energy markets. Preliminary site works for Train-5 have been completed and a decision to proceed with the \$1.6-billion fifth train was expected in 2005. A fifth LNG train would lift total LNG capacity above 14 Mt/a.

Whilst the NWSV gas project is currently the only LNG project in Western Australia, an additional LNG facility is being considered in the form of the Gorgon gas project. This centres on the development of an LNG facility on Barrow Island, which will supply LNG for distribution to markets abroad. In September 2003, the State Government granted in-principle approval for the restricted use of Barrow Island as part of the \$11-billion Gorgon gas project, conditional on the Gorgon partners meeting State and Commonwealth environmental safeguards. The agreement is a major milestone in Western Australia's economic development.

The Gorgon Joint Venture, comprising ChevronTexaco (4/7 interest), Shell (2/7 interest) and ExxonMobil (1/7 interest), plans to build an initial five Mt/a LNG plant on Barrow Island at an upfront cost of \$6 billion. Natural gas feedstock for the LNG facility would initially be supplied from the Gorgon Field via a 26-inch, 70-km subsea trunkline. Other sources of gas supply for the project will be from other fields in the Greater Gorgon Area.

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. Massive new demand for diversified and clean energy in South Korea, China and the US has presented new opportunities for Western Australian LNG producers. In October 2003, the Gorgon Joint Venture Participants and China National Offshore Oil Corporation (CNOOC) signed a non-binding agreement based on CNOOC acquiring a 12.5 per cent stake in the field's reserves while contracting the delivery of up to 100 Mt of LNG over 25 years.

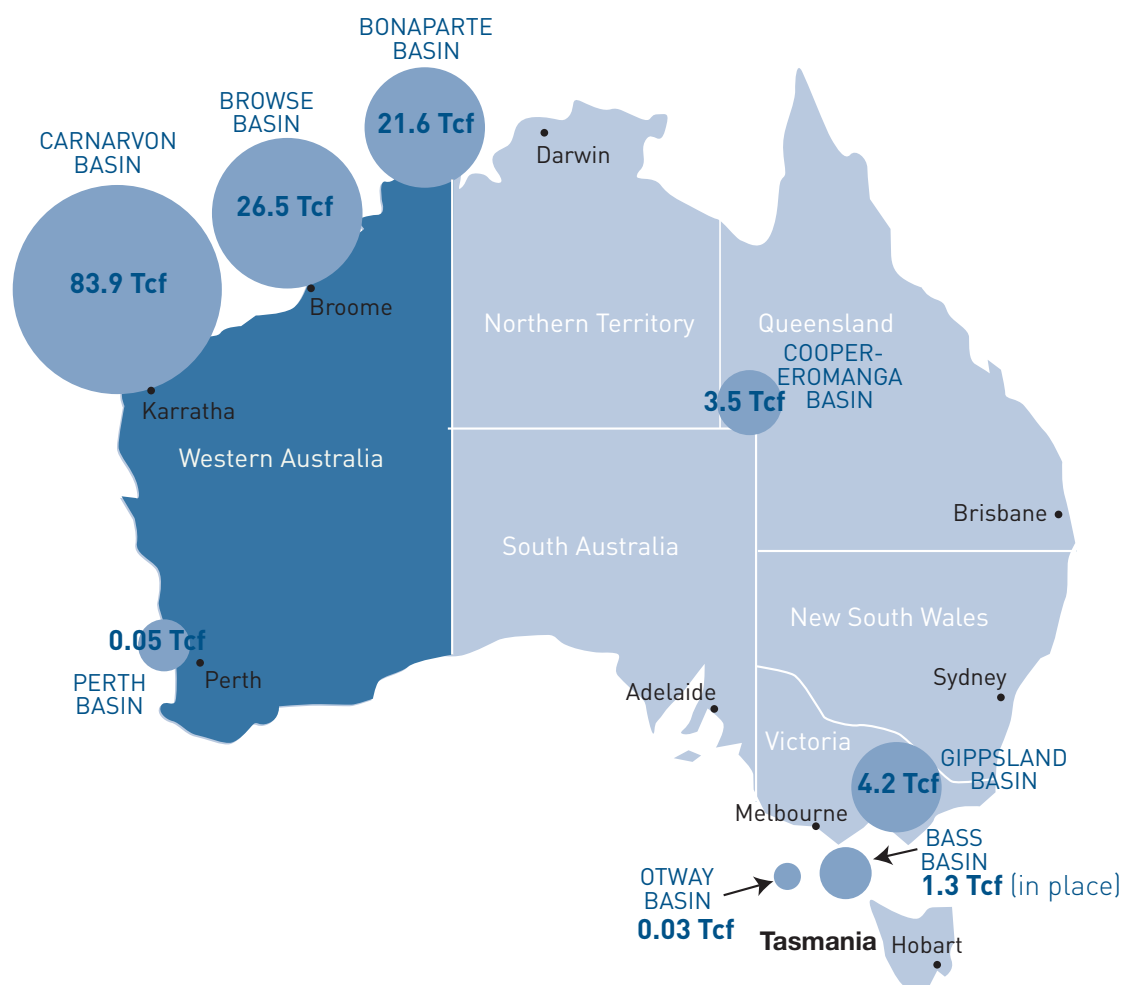


Figure 17 Australia's Gas Resources

Natural gas

Outside of gas used as feedstock for LNG production, all remaining natural gas produced in Western Australia is for domestic industrial and household consumption. In 2004, natural gas sales for domestic purposes accounted for 6 per cent of the State's total petroleum sales. In 2004, natural gas sales increased by 13 per cent to 9.2 Bcm, worth \$648 million.

As at the end of 2004, the gas reserves for Australia were:

- Bonaparte Basin 21.6 Tcf (Western Australian portion 2.34 Tcf, Northern Territory portion 19.26 Tcf)
- Browse Basin 26.5 Tcf
- Carnarvon Basin 83.9 Tcf
- Perth Basin 0.05 Tcf
- Otway Basin 0.03 Tcf
- Bass Basin 1.3 Tcf
- Gippsland Basin 4.2 Tcf
- Cooper-Eromanga Basin 3.5 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 65 per cent of the nation's natural gas.

Reserves for Western Australia are calculated on the basis of a 50 per cent probability of recovery level as well as unbooked resources. 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. Reserve figures for the rest of Australia are calculated on a 50 per cent probability only.

Liquefied petroleum gas (LPG)

In 2004, sales volumes of LPG (including butane and propane) fell by 3 per cent to 722 000 t compared to 2003. Despite the lower sales volume and appreciating Australian currency, the total sales values of LPG was up by 5 per cent on the previous year to \$340 million.

The majority of all LPG produced in the State is for export and Japan is the primary destination for Western Australia's LPG.

4.2 Iron Ore

In 2004, the Western Australian iron ore industry expanded greatly and the State's prominence in the global iron ore industry continued to gather momentum. This is based on the State's large reserves of high-grade iron ore, the industry's ability to produce metallurgically acceptable fines and lump ores, its close proximity to Asia and sophisticated infrastructure.

The State's iron ore industry plays a pivotal role in the export-driven economy, with the industry contributing \$6.2 billion or around 22 per cent of the total value of mineral and petroleum sales in 2004. Driven by Chinese demand, iron ore sales reached record volumes for a fifth consecutive year, increasing by an impressive 12 per cent to 217 Mt, pushing sales values to a new record of \$6.2 billion. All of the State's iron ore producers made a significant contribution to this impressive performance.

Notably China's demand for iron ore has been such that the value of Western Australian iron ore exports to China exceeded \$2.6 billion in 2004. This represented 43 per cent of the value of the State's total iron ore exports in 2004 and compares with 35 per cent exported to Japan, 12 per cent to South Korea, 5 per cent to Taiwan and 5 per cent to Europe.

For the Japanese fiscal year 2004-05 (April-March) negotiated prices for iron ore into Japan increased by 19 per cent. Prices increased by this amount because of strong demand for iron ore coupled with capacity constraints in Australia, South Africa and Brazil. The strong demand for iron ore principally emanated from China where imports are estimated to have increased by 60 Mt to 208 Mt in 2004.

To a great degree, the increased prices received by local iron ore producers were eroded in 2004 by the 13 per cent appreciation in the Australian dollar relative to its US counterpart. Nevertheless, the appreciation was insufficient to totally counteract the price increase, which, compounded with the growth in output, resulted in the value of sales attaining a new record of \$6,190 million.

However, reflecting unprecedented demand, prices increases were far more dramatic for the Japanese fiscal year 2005-06 (April-March) with negotiated prices for iron ore increasing by a record 71.5 per cent for Australian ores. This brought BHP Billiton Mt Newman High Grade Lump up to 78.77 US cents per dry metric tonne unit and Mt Newman High Grade Fines up to 61.72 US cents per dry metric tonne unit. Rio Tinto's Hamersley Iron products likewise increased to 78.77, 61.72 and 58.02 US cents per dry metric tonne unit for Lump, Fine and Yandi ore respectively.

The bulk of Western Australia's iron ore industry is centred on operations in the Pilbara where two of the world's richest ore deposits were found by geologists and prospectors - Tom Price (found in 1962), the heart

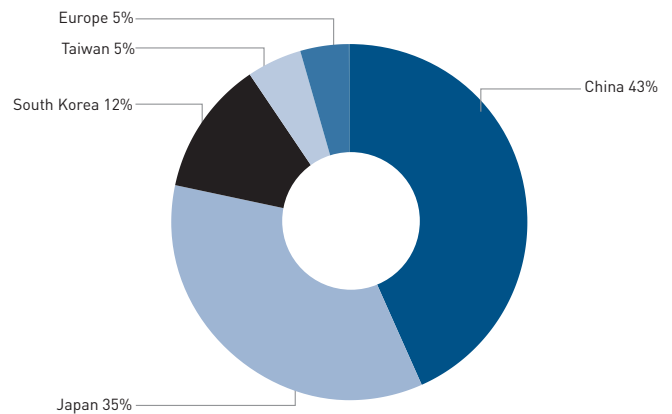


Figure 18 **Iron Ore Exports**
Total Value \$6.05 billion Source: DoIR



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

of the group of mines now operated by Rio Tinto and Mount Whaleback (1957), the centre of BHP Billiton's operations. In the 1990s, a process of consolidation began in the Pilbara, which reduced the number of operating companies from four to two in that region, although there are now many more mines. Related to this process, in January 2005, Premier Geoff Gallop signed documents enabling Hamersley Iron and Robe River Mining to share rail, power and port facilities in the Pilbara and to blend their iron ores to improve the overall efficiency of their operations. The combined operation is to be known as 'Pilbara Iron'. While Hamersley and Robe will continue to own their respective mines and infrastructure, all operations will now be operated by Pilbara Iron Pty Ltd.

Significantly, in response to China's emergence as the world's biggest steel producer, Western Australia's iron ore production from the Pilbara region has doubled in the past five years to exceed 200 t.

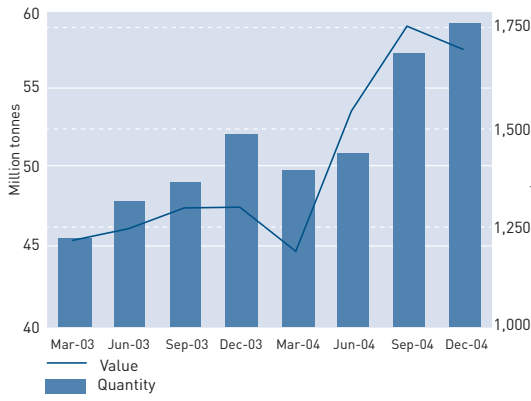


Figure 20 Iron Ore Quantity and Value by Quarter
Source: DoIR

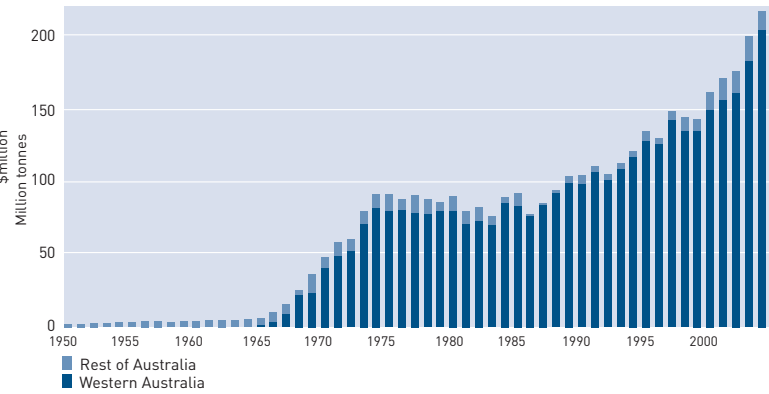


Figure 21 Iron Ore Quantity Source: DoIR and ABARE

Whilst the Western Australian iron ore industry is principally based in the Pilbara region, production and potential is not confined to that area. The Yilgarn region has also witnessed the emergence of smaller operations and contains areas of development currently being evaluated. Furthermore, Yampi Sound, in the West Kimberley region, was the source of some of the initial iron ore developments in the State on Koolan and Cockatoo Islands. Mining continues to this day on a limited scale with redevelopment of the Cockatoo Island mine. Studies are also advanced for redevelopment on Koolan Island.

In addition to the iron ore producers in the Pilbara region (comprising Hamersley Iron, Robe River and BHP Billiton Iron Ore), there are also operators in the Yilgarn, and Kimberley regions (comprising Portman Mining Limited and Mount Gibson Iron Limited). Portman operates two mine sites, one at Koolyanobbing in the Yilgarn, 400 km east of Perth and another on Cockatoo Island in the Kimberley region, in the north of the State. Mount Gibson Iron commenced shipping from its Tallering Peak mine site in February 2004.

Hamersley Iron, a 100 per cent owned subsidiary of Rio Tinto, produced 73.3 Mt of iron ore in 2004, an increase of 5 per cent compared to 2003. Production came from the company's operations at Marandoo, Tom Price, Paraburdoo, Channar and the Brockman No. 2 mine. The output from these mines is blended to produce saleable lump and fine ore products, while the company's Yandicoogina operation produces a fine ore pisolitic product. Robe River produced 47.9 Mt of iron ore in 2004, a 16 per cent increase compared to 2003. The expansion resulted from the move towards capacity of the West Angelas operation.

During 2004, the Rio Tinto Group continued to invest considerable capital in the upgrade of rail and port capacity to meet new developments in its iron ore operations in the Pilbara. In April 2004, construction was

completed of the Eastern Range deposit near Paraburdoo in which Hamersley Iron has a 54 per cent equity and Shanghai-Baosteel 46 per cent. The Eastern Range mine will supply Shanghai-Baosteel, one of China's largest steel mills, with an estimated 200 Mt of iron ore during a twenty-year period.

Furthermore, in early 2004, Rio Tinto signed a Heads of Agreement with the same company for an additional iron ore supply contract, commencing in 2006. This deal involves the shipment of 7 Mt/a of products from its Hamersley operations and the Robe River Joint Venture.

The new sale arrangements mean that from 2006–07, Hamersley 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/a of this tonnage under long-term contracts to China.

The merger of Hamersley Iron and Robe River rail systems into a joint operation, through the Pilbara Rail Company has also added significant flexibility in rail haulage and the potential use of Dampier and Cape Lambert port facilities. The company has also upgraded port facilities at Dampier and Cape Lambert and Hamersley has commenced shipping iron ore through Robe River's port at Cape Lambert.

The other major producer in the Pilbara, BHP Billiton (BHPB) also continued to evaluate different expansion options in order to fine-tune its operations in 2004 to meet world demand. The company's major operations comprise Newman, Marillana Creek (Yandi), Mining Area C (MAC), Yarrie and Jimblebar. In 2004, BHPB produced 89.3 Mt of iron ore, an increase of 12 per cent compared to 2003.

In February 2004, BHPB indicated that it would evaluate the possibility of increasing iron ore output to 145 Mt/a by the end of the decade to specifically feed the rapidly

expanding steel industry in China. This announcement was made after the company said it would spend A\$145 million to lift capacity to 110 Mt/a by the end of 2004, up from the initial 100 Mt/a. BHPB has more recently also suggested that it may expand beyond 145Mt/a. A significant part of the expansion will be the concentration of crushing and screening operations at the mine sites as opposed to the current focus on Port Hedland. As part of its growing iron ore trading links with China, BHPB announced in March 2004 that it had secured a record 25-year US\$9-billion export deal to ship 12 Mt/a of iron ore to Chinese steel mills. The agreement saw the establishment of the Wheelara Joint Venture, with four Chinese mills collectively taking a 40 per cent interest in a sub-lease of the Jimblebar mine located near Newman. BHPB has a 51 per cent equity and the Japanese joint venture partners 9 per cent.

During 2004, Portman Iron Ore Ltd produced 5.5 Mt of iron ore at its mining operations in Koolyanobbing, 400 km east of Perth in the Yilgarn region and Cockatoo Island in the Kimberley region. The Koolyanobbing operation has been expanded, by developing the Windarling and Mount Jackson deposits 100 km north of Koolyanobbing. This allows the operation to increase production and sustain it at around 5 to 6 Mt/a for an extended period, with the ability to blend the range of ore qualities to allow full exploitation of the resource base within market-acceptable quality limits. In addition, in October 2004, the company indicated it was committing \$55 million to further expand production at its Koolyanobbing operation to around 8 Mt/a from the current 5.2 Mt/a with full capacity expected to be attained in late 2006. This expansion follows an upgrading of reserves at Koolyanobbing that has extended the life of the mine by 13 years, with additional upside potential from exploration.

Furthermore, the Portman-Henry Walker Eltin Joint Venture on Cockatoo Island in the north of the State (the Kimberley Region) has switched from a dumps reprocessing operation to redevelopment of the old Cockatoo mine site below sea level. A tonnage of 4 Mt/a has been delineated, and it is proposed to exploit at a rate of 1 Mt/a.

A new producer in the State's iron ore shipments industry is Mount Gibson Iron Limited (MGI) which commenced the mining of hematite at Tallering Peak, 130 km northeast of Geraldton early in 2004. Ore is transported either by road for the whole distance to Geraldton or 55 km by road to a rail load-out facility at Mullewa to be subsequently transported by rail to a 150 000-t-capacity storage shed at Geraldton Port. The first ore was shipped through the Geraldton Port on 23 February 2004 and production output of 1.3 Mt in 2004 is to be increased to 3 Mt/a during 2005. The life of the mine is expected to be eight to ten years, dependent on the results of further drilling. All ore has been sold forward for the life of the Tallering Peak mine, with about 50 per cent going to two

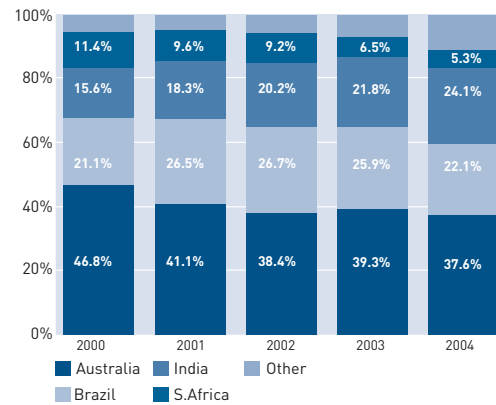


Figure 22 **China's Iron Imports by Source**
Source: China Customs and The TEX Report

trading companies, Stemcore (S.E.A.) Pty Ltd and Sinom (Hong Kong) Ltd, and 50 per cent to end-users through, Glencore International AG and Prosperity Minerals (Asia) Limited. The 3 Mt/a hematite output will include a combination of output from Tallering Peak and a new mine to be developed at Extension Hill at Mt Gibson.

Asia Iron, a new company with MGI as a significant shareholder, is progressing development plans for the exploitation of the primary banded iron formations at Extension Hill at Mt Gibson involving concentration and pelletising. This option is based on a defined resource of around 200 Mt of low-grade magnetite at Extension Hill and potentially significantly more within nine deposits in the immediate area of Mt Gibson. A production of 5 Mt/a of magnetite concentrate is planned for shipment to pelletising facilities in China.

In other developments, Fortescue Metals Group (FMG), a new entrant into the State's iron ore sector, is conducting feasibility studies into a new iron ore development in the Pilbara based on prospects centred on the Chichester Ranges with Christmas Creek being the principal resource base so far identified. In late 2004, negotiations between the State Government, FMG and The Pilbara Infrastructure (TPI - a subsidiary of FMG) were completed for a State Agreement that will facilitate new \$1.4-billion multi-user railway and port facilities in the Pilbara. Under the agreement, TPI proposes to construct a 520-km multi-user railway from iron ore deposits in the eastern and central Pilbara to Port Hedland and to develop new multi-user facilities at the port.

Further advances in the development planning for the Hope Downs project, a long evaluated high-grade ore development in the central Hamersley Ranges, have taken place over recent months. Finalisation of many of the government approvals and land access matters were pursued. There was also further progress on ownership issues between Hancock Prospecting and alliance partner, Kumba Resources, as well as potential Chinese participants. This significantly brought forward a potential development decision in the near future.

There are a number of other new developments at various stages of evaluation being proposed to meet booming Chinese demand for iron ore, including, Koolanooka, Weld Range, Mt Karara (Blue Hills project), Koolan Island and Southdown. 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 supply base of Japan will underpin significant increases in Western Australia's iron ore sales well into the next decade. Against a backdrop of enormous industrial growth forecast in China and other countries in Asia, the State's iron ore industry is poised for a long-term future at high production rates. It is therefore, an industry diversifying into new mines and into a changing product mix with the major iron ore companies continuing to improve product quality and infrastructure and others establishing new infrastructure bases.

4.3 Nickel

During 2004, the price of nickel grew very strongly on the international stage, with its average price in 2004 at US\$13 830/t (US\$6.27/lb). This represented an increase of 44 per cent compared to the previous year. Therefore, despite the impact of the local currency's appreciation, local producers received very healthy price increases. Therefore, although nickel sales volumes receded by 7 per cent, to 177 029 t, the value of Western Australian nickel production reached a record for the second consecutive year, growing by 20 per cent to \$3 229 million. As a result, for the first time nickel attained the new status of being the State's second most valuable mineral after iron ore.

Nickel sales volumes were down, seemingly paradoxically, partly as a result of expansion by nickel miners, which resulted in temporary production reductions. WMC's

Mount Keith mine, for instance, only returned to full production in the September quarter 2004 after a major cutback process to access new ore. In addition, lower quality stockpiles and bad weather disrupted production, contributing to lower sale volumes.

Western Australia remains Australia's only nickel mining State. Despite the increasing number of nickel miners and emerging projects, the Western Australian nickel industry also remains heavily concentrated with the largest four miners contributing to more than 66 per cent of the value of all the State's nickel sales. The chief supplier remains Western Mining Corporation (WMC) with its Mount Keith, Leinster, Kambalda and Kwinana operations. It produced almost 84 000 t in 2004. As a result of the associated lower concentrate supply, smelting was reduced and a planned maintenance shutdown of the Kalgoorlie smelter for 2005 was pulled forward to 2004.

Minarra Resources (Murrin Murrin) produced 28 240 t of nickel in 2004 which was down on the previous year due to the impact of flooding in February and a planned shutdown to complete the capital program and maintenance problems in the hydrogen sulphide plant. A \$100-million capital program was completed in June/July 2004.

The third-largest producer was Jubilee Mines (Cosmos) which at 12 407 t was also down on the previous year, due to developments in moving from open-pit to underground mining.

Other major producers include Mincor Resources (Mittel-Wannaway) and LionOre (previously MPI Mines - Black Swan). Production at Mittel and Wannaway was affected by various operational constraints with Wannaway operating at a reduced production rate as mining moved to a remnant phase. However, strong nickel prices extended the mine life of Wannaway which was originally due to close in December 2003. Operational problems also affected production from Black Swan.

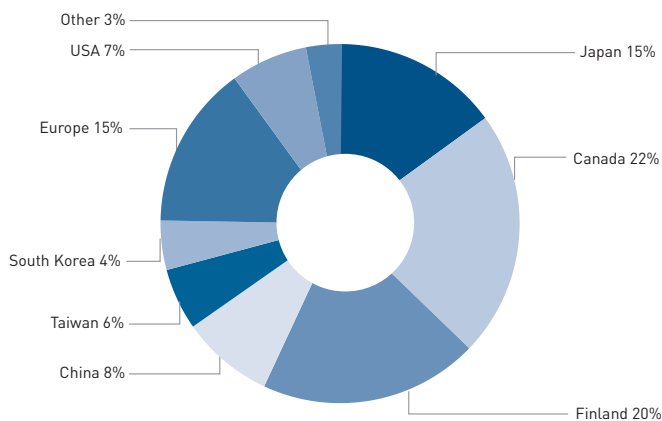


Figure 23 **Nickel Exports**
Total Value \$3.02 billion Source: DoIR

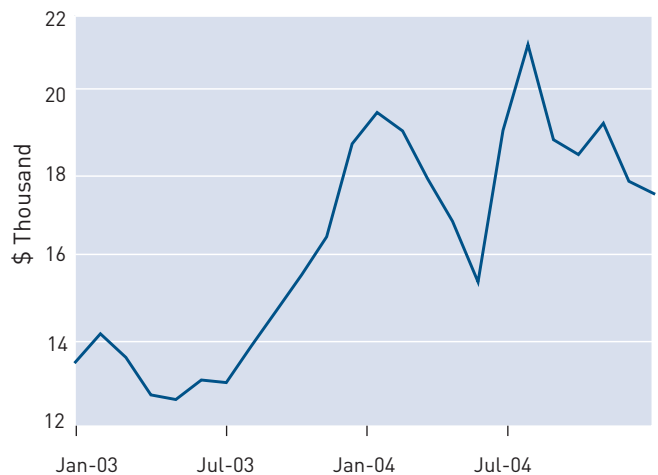


Figure 24 **Nickel Price A\$/tonne** Source: LME Cash, Monthly Average

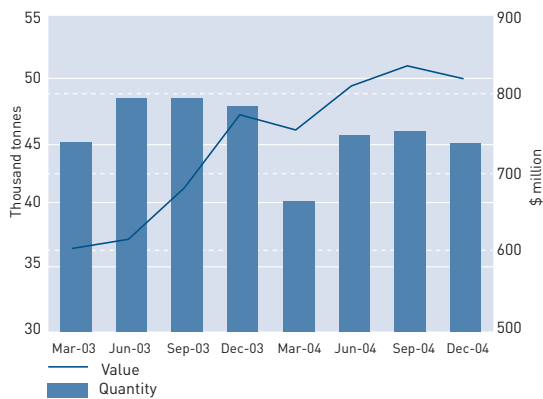


Figure 25 Nickel Quantity and Value by Quarter
Source: DoIR

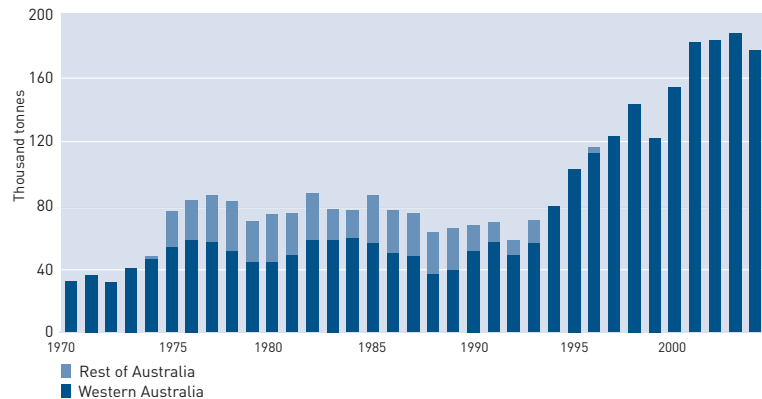


Figure 26 Nickel Quantity Source: DoIR and ABARE

The combination of Western Australia's large nickel reserves and very strong nickel prices has catalysed a range of new development activities. Among the most significant is BHPB's \$1.4-billion Ravensthorpe nickel laterite project that is envisaged to ship 45 500 t/a of Ni-Co hydroxide. Construction began in late 2004 with Ravensthorpe nickel expected to reach the market in late 2007 and with full production in the second half of 2008. The mine life is currently expected to be 25 years. The Western Australian Government is to contribute about \$48 million to common-user infrastructure in the region. Globally, the development could see BHPB become the world's third-largest nickel producer. Locally, Ravensthorpe will rival Murrin Murrin as Western Australia's second-largest nickel mine.

LionOre is also in the process of establishing itself as a major nickel producer in Western Australia. It is developing the Maggie Hays deposit as an integrated development with its nearby Emily Ann mine near Lake Johnston. Construction at Maggie Hays is nearing completion with the main decline having reached the upper massive sulphide level and ore from the mine initially processed in late 2004. Production at Maggie Hays will double LionOre's production in the region to about 10 000 to 12 000 t/a of contained nickel. Nickel in concentrate will be shipped to Inco Ltd of Canada under a life-of-mine offtake agreement negotiated for the Emily Ann mine. In addition, LionOre acquired MPI Nickel Mines nickel assets including the Black Swan-Silver Swan operation which was forecast to produce around 12 000 t of nickel in 2005. LionOre is also trying to develop the giant Honeymoon Well deposit with a resource of about one Mt of contained nickel.

Another new project, Sally Malay (nickel plus copper and cobalt), in the East Kimberley, began mining in September 2003 with ore processed in August 2004 and the first shipment to China in September 2004. Production is to subsequently ramp-up to around 8000 t/a

with a whole-of-life sales agreement with two Chinese companies. In addition, a Sally Malay (75 per cent) and Donegal Resources (25 per cent) JV acquired WMC's Lanfranchi mine with production to begin during early 2005 and with mine reserves totalling about 25 600 t of contained nickel.

A range of other nickel sulphide miners have toll treatment and concentrate purchase agreements in place with WMC, trucking ore to be concentrated at WMC's Kambalda operation, including:

- Australian Mines which re-opened the Blair mine in March 2004 and according to company reports produced around 1500 t in 2004;
- Independence Group which currently produces nickel from its Long Nickel and Gibb South and was expected to expand considerably with further developments at its Gibb and Victor developments;
- Reliance Mining which produces from remnant ore in the Hunt deposit with additional sulphide ore coming from the new Beta Hunt deposit that was recommissioned in July 2004;
- Tectonic Resources operating the RAV8 mine at Ravensthorpe;
- View Resources, commenced mining at the Carnilya Hill mine near Kambalda in November 2003 and delivered the first ore to WMC in January 2004. Mining also commenced at Zone 29 of its Carnilya Hill Tenements in January 2004 with nickel production expected in May 2004;
- Mincor Resources NL which mines nickel from its Miitel, Redross, Mariners and Wannaway deposits in the Kambalda region.

In addition to these projects, buoyant nickel demand and prices have resulted in a significant number of nickel sulphide projects being progressed by a range of nickel juniors, including Breakaway Resources (off-take agreement with LionOre), Discovery Nickel,

Titan Resources and Western Areas. As per the developments in the iron ore industry, Fox Resources became the third Western Australian nickel company to sign supply agreements with China and its first shipment was made in August 2004 after beginning production in July. Annual production is expected to be around 3000 t.

While current Western Australian production is chiefly based on nickel sulphide deposits, most of Western Australia's nickel resources are laterite. However, operational problems in laterite processing have plagued Western Australia's three initial laterite operations Bulong, Cawse and Murrin Murrin. Indeed, two of these companies have ceased operation in their original form. The Bulong laterite nickel operations went into voluntary administration in 2003, with LionOre subsequently acquiring the refinery and infrastructure, which it does not intend to use for laterite but to expand its sulphide operations in Western Australia, possibly using its Activox technology.

Heron Resources purchased the Bulong tenements with the aim of establishing a 50 000 t/a nickel laterite operation. Further processing of an intermediate nickel product could take place through the Murrin Murrin and Cawse nickel treatment facilities.

The Cawse operation was placed in receivership in 2001 and was subsequently purchased by US-owned OMG. OMG closed the refinery in 2002 but has since shipped output from the Cawse mine to its Finland refinery. OMG's sales of nickel sulphide product were 5459 t in 2004. This is regarded as nickel produced from 'laterite nickel' source. It is a nickel sulphide product or precipitate (produced by treatment of laterite nickel) and is regarded separately from operations that mine nickel sulphide ore.

Similar to MPI's (now LionOre) Black Swan nickel sulphide, Breakaway Resources' nickel-cobalt oxide ore stockpile at Spargoville has been processed at Cawse. As a part of the scoping study for Honeymoon Well, joint venture partners MPM and OMG are considering the addition of a low pressure, oxidation leach system to OMG's Cawse nickel refinery, employing the sulphide autoclave process used at OMG's Finnish Kokkola operations.

Together with the Murrin Murrin operation, the Ravensthorpe and Heron's laterite projects could see the revitalisation of the nickel laterite industry, particularly in light of Western Australia's large laterite reserves.

4.4 Alumina

Western Australian alumina output has continually increased annually since 1980. In 2004 however, after so many years of record production growth, alumina sales seem to have reached at least a temporary plateau with a marginal decrease of 2 per cent to 11.0 Mt.

Prices received by local alumina producers averaged US\$219/t in 2004. This represented a 24 per cent increase compared to the average annual price in 2004. However, despite this recovery in the alumina market, with solid US dollar price growth, the value of alumina sales in local currency terms only managed a marginal increase of one per cent to \$3179 million.

The alumina industry is Western Australia's fourth-largest resources sector in terms of sales (after iron ore, crude oil and nickel), accounting for 11 per cent of the total value of mineral and petroleum sales. The industry in this State comprises four alumina refineries operated by Alcoa and Worsley Alumina, located within close proximity to bauxite mines.

Alcoa's Pinjarra refinery is the State's largest and the world's second-largest producer of alumina. This refinery has been operating since 1972 with bauxite feedstock brought into the refinery by conveyor from Alcoa's Huntly mine and alumina exported through the Kwinana and Bunbury shipping terminals. In early February 2004, the Western Australian Government approved Alcoa's \$440-million efficiency-upgrade of the Pinjarra refinery. The upgrade will increase the production of alumina by 0.6 Mt/a to a total of 4.2 Mt/a, reduce production costs and boost annual export revenues by around \$160 million. This is already Alcoa's lowest cost refinery and it is expected that the additional capacity made possible through the upgrade will come fully on-stream by the end of 2005.

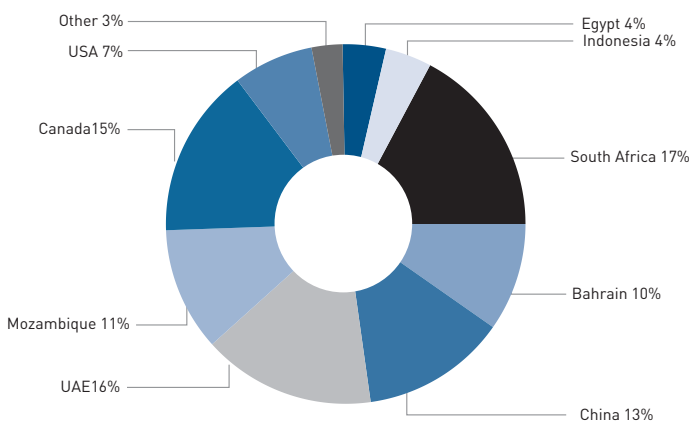


Figure 27 Alumina Exports
Total Value \$2.82 billion Source: DoIR



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

Alcoa is also considering expansion of its Wagerup refinery. The Wagerup refinery has been in operation since 1984. It sources its bauxite by conveyor from the Willowdale mine, with a current alumina production capacity of 2.4 Mt/a and exports through the Bunbury shipping terminal. Alcoa's expansion plans for Wagerup encompass construction of a third production train to expand output to more than 4 Mt/a.

Alcoa's oldest refinery is its Kwinana operation, which commenced in 1963. It has a production capacity of 2Mt/a, which is shipped out of Kwinana port. Alcoa's first mine, at Jarrahdale, likewise began operations in 1963 and for 35 years, until its closure in 1998, supplied bauxite to the Kwinana refinery. The Huntly mine, established in the early 1970s to supply the Pinjarra refinery, now also supplies the ore (by rail) for Kwinana. Expanded capacity of the Huntly mine makes it the largest bauxite mine in the world.

BHPB's Worsley Alumina refinery is Western Australia's second-largest refinery with annual production of 3.25 Mt/a. It was commissioned in 1984 and sources its feedstock by a 52-km overland conveyor from its Boddington bauxite mine. Alumina from Worsley is exported through the Bunbury shipping terminal. The

Worsley refinery is also undergoing a capacity expansion of 250 000 t/a to enable output to increase to 3.5 Mt/a over the next two years. This expansion program will expand the refinery's capacity to the maximum provided for by Worsley's current environmental approval. BHPB is also studying the possibility for incrementally expanding annual production at Worsley to more than 4 Mt/a.

World aluminium production grew by 6 per cent (or almost 1.8 Mt) in 2004 with China accounting for over half of this increase. Prices increased 20 per cent in 2004 to average US\$1 716/t. This translated to received alumina prices in Australia increasing by 10 per cent to average A\$299/t during 2004. Strong prices are expected to encourage companies to reopen previously idle aluminium smelting capacity, as currently experienced at a number of Alcoa's US operations.

In China, the government export tax rebate on aluminium was recently reduced from 15 per cent to eight per cent. The effect of this export tax rebate measure is to reduce the incentive for Chinese companies to produce aluminium for the export market. However, with excess capacity in the Chinese aluminium industry and increased electricity availability and reliability, China's aluminium production is forecast to nevertheless increase by around 9 per cent in 2005.

During 2004, the first new alumina refinery in the world in 20 years was opened in Gladstone (Queensland) with Comalco's \$1.5 billion Gladstone refinery. This refinery, with an initial annual capacity of 1.4 Mt, will maintain Australia's place as the world's leading supplier of smelter-grade alumina. The Gladstone refinery is estimated to add about 8 per cent to Australia's output of alumina and maintain Australia's dominant position in the international bauxite and alumina markets. In total, Australia produces about one-third of the world's total alumina and about 36 per cent of all bauxite.

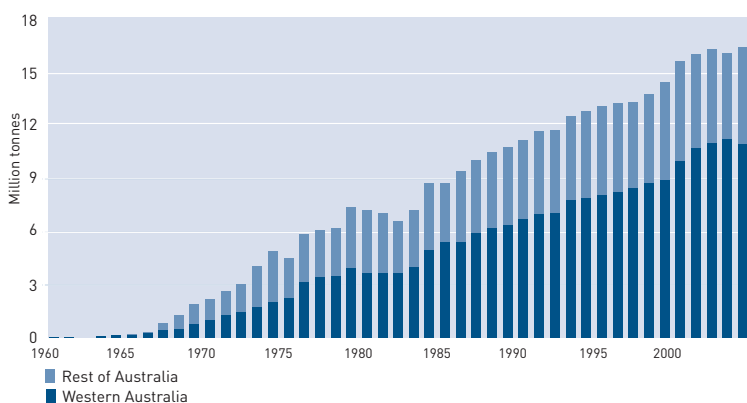


Figure 29 Alumina Quantity Source: DoIR and ABARE

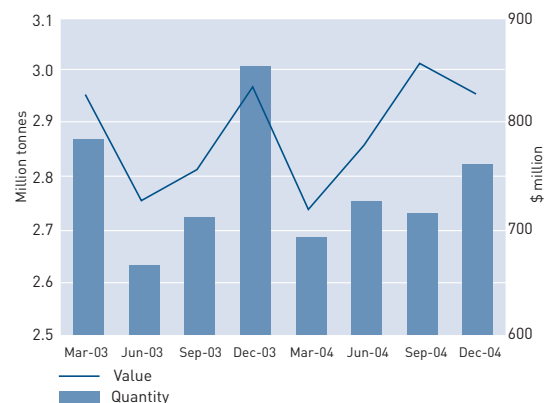


Figure 30 Alumina Quantity and Value by Quarter Source: DoIR

4.5 Gold

Output of the State's gold industry continued to fall in 2004 with sales decreasing by more than 23 t (764 840 oz) or 13 per cent to 164 t (5.3 Moz). This represented the seventh consecutive year of decreasing volumes with the largest annual percentage decrease since 1979 and the lowest level of gold output since 1989.

Exceptionally wet weather in early 2004 affected the West Australian goldfields, closing a large number of mines and cutting production. There were also permanent closures, for example, Harmony Gold closed its Big Bell mine because of high costs and depletion of ore reserves and its New Celebration plant was also placed on care and maintenance.

Additionally, Sons of Gwalia's Tarmoola operation was closed, while Bronzewing owner View Resources deferred reopening the mine due to high contractor rates and skilled labour shortages. Legend Mining also placed its Gidgee operation temporarily on care and maintenance in early 2005, however, mining and milling will be resumed when sufficient additional resources are delineated.

It was not until late 2004 that any new capacity was commissioned in Western Australia, at St Ives and Telfer. Therefore, these operations were unable to contribute significantly to Western Australia's production in 2004.

Western Australia's ten largest projects produced 3.5 Moz or 110 t of gold and accounted for 67 per cent of the State's total gold production in 2004. These projects comprised:

- Super Pit (KCGM – Newmont and Barrick Gold) – 906 393 oz (28.2 t)
- St Ives (Gold Fields) – 503 155 oz (15.6 t)
- Sunrise Dam (AngloGold Ashanti Limited) – 402 703 oz (12.5 t)
- Jundee-Nimary (Newmont) – 298 947 oz (9.3 t)
- Plutonic (Barrick Gold) – 293 390 oz (9.1 t)
- Granny Smith (Placer Dome) – 266 733 oz (8.3 t)
- Paddington (Placer Dome) – 244 463 oz (7.6 t)
- Kanowna Belle (Placer Dome) – 232 514 oz (7.2t)
- Agnew (Gold Fields) – 197 813 oz (6.2 t)
- Hill 50 – Mount Magnet (Harmony Gold) – 188 495 oz (5.9 t)

Ownership of these ten projects is split amongst the world's 6 top gold companies.

The depreciation of the US dollar against other major currencies (particularly the euro) was the main driver behind the rise in the US dollar gold price during 2004. As depreciation of the US dollar against other major currencies led to an increase in the purchasing power of those currencies, a weaker US dollar increased the gold price denomination in US dollars. The US dollar depreciated by around eight per cent against the euro and five per cent against the yen during the course of 2004.

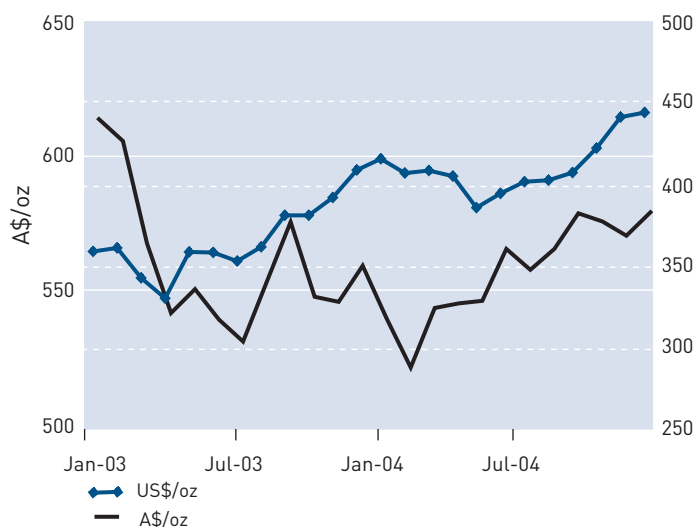


Figure 31 Gold price Source: Perth Mint and London Fix

For 2004 as a whole, the US-denominated gold price averaged US\$409/oz, a 13 per cent increase on the 2003 average price. In the March quarter of 2004, the US dollar gold price averaged US\$408.44/oz. The price trended downwards to reach a low of US\$375/oz in the June quarter but rose to US\$454.20/oz in December, averaging US\$433.84/oz during the December quarter.

The Australian dollar gold price averaged A\$557/oz in 2004, which was less than a one per cent increase on the average price in 2003. During the March quarter, the Australian dollar gold price slowly declined and fell as low as A\$508.67/oz in February. However, it recovered in March reaching a high of A\$569.36/oz. The Australian dollar gold price benefited from a weakening Australian dollar throughout the June quarter averaging A\$552/oz and remained relatively stable throughout the December quarter reaching a high of A\$583.15/oz in December.

Despite an upturn in the US dollar gold price, the 13 per cent price appreciation in the Australian dollar left gold prices in local currency terms remaining unchanged. As a result, Western Australian gold sales amounted to just \$2.9 billion, down from \$3.4 billion in 2003.

A number of factors supported the international gold price in 2004, including lower world mine production and an increase in gold consumption. According to ABARE, world gold production is estimated to have fallen by 4 per cent in 2004 to 2480 t.

From an investment perspective, there is a positive outlook for gold substitutes, particularly if US interest rates continue to nudge upwards. The outlook for equities is also encouraging. These factors can place downward pressure on gold prices, however, gold's safe haven status may support its price at least in the short term due to high oil prices and continued geo-political uncertainty. If and when gold prices fall, increasing consumption, particularly from Asia in the context of appreciating Asian currencies, could moderate the decline.

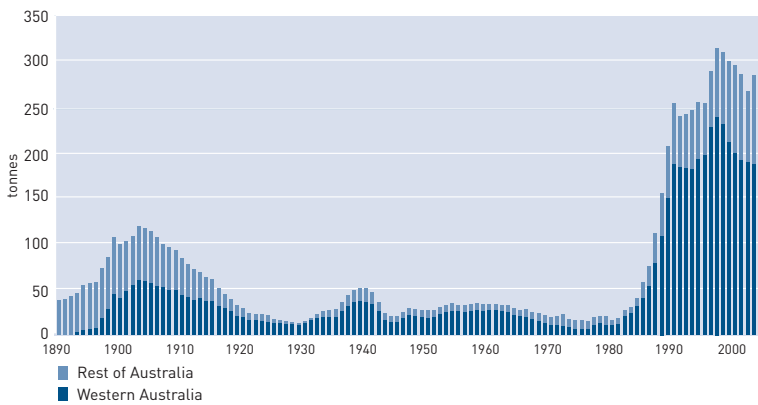


Figure 32 Gold Production Source: DoIR and ABARE

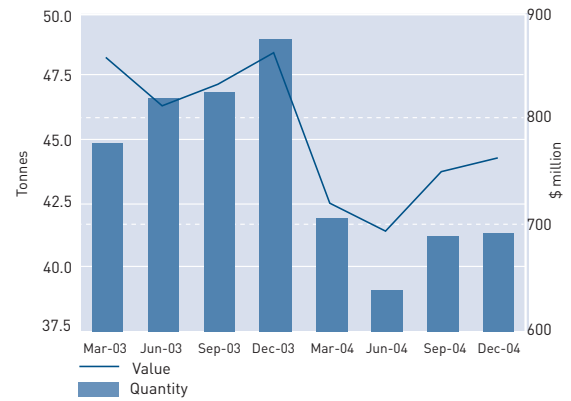


Figure 33 Gold Quantity and Value by Quarter Source: DoIR

Gold Export update 2004

The Australia Bureau of Statistics (ABS) release trade data that 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, WA 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 amounted to approximately \$5.6 billion. Approximately 52 per cent or \$2.9 billion was gold produced in Western Australia. The remaining 48 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.

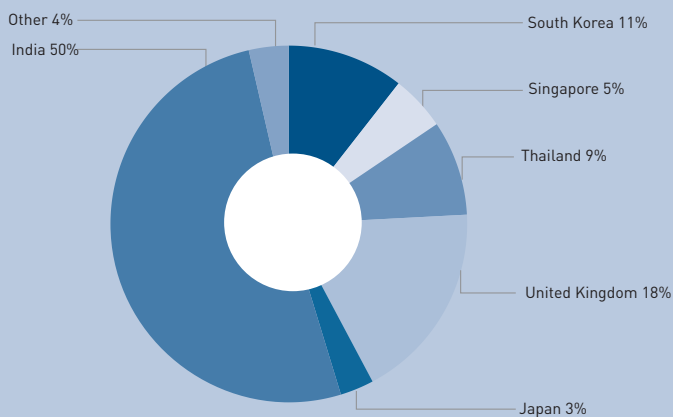


Figure 34 Gold Exports Total Value \$2.93 billion Source: DoIR

On the supply side, the extension of the European Central Bank Gold Sales Agreement is moderating the impact of European central bank sell-offs. In addition, Asian central banks may increase their purchases while strong local currencies in Australia and South Africa can act to discourage production.

Producer dehedging is also set to continue in the short term. Gold Fields Metal Statistics has reported that gold producers cut an estimated 424 t from their outstanding hedge positions in 2004. For example, Sons of Gwalia contributed significantly to the fall in the amount of gold hedged after the company went into voluntary administration, cutting an estimated 66 t.

Western Australia exported 50 per cent and 18 per cent of its gold to India and the UK respectively. According to ABARE, China’s gold consumption is forecast to grow strongly but is not expected to increase at the rate witnessed in India following the deregulation of the gold market. Gold remains an important investment instrument in the Middle East and Indian subcontinent. One of the reasons for high demand in emerging markets is that, in the absence of alternatives, gold continues to play a key role as a hedge against inflation and currency weakness.

ABARE forecasts world gold production to increase in 2005, with higher output from Australia and Indonesia. Australian gold mine production has been forecast to grow by 4.5 per cent to 279 t in 2004–05, with the Telfer mine expected to be one of the major contributors to this growth, producing an estimated 800 000 oz of gold per annum at full production.

4.6 Mineral Sands

Decreases in output of key mineral sand products and poor prices received by local producers saw this industry experience another decrease in sales value with a 13 per cent drop in 2004 to \$665 million. Significant mineral sands such as ilmenite, rutile and zircon experienced relatively large decreases in sales quantities of between 15 per cent and 25 per cent. Only synthetic rutile and leucoxene saw quantity increases of 10 per cent and 15 per cent respectively. Prices received by local producers for titanium-based minerals such as rutile and ilmenite were also down, by around 3 per cent and 12 per cent respectively. Prices received for zircon however, were at least up, by more than eleven per cent which ameliorated the fall in output.

The total value of titanium feedstock mineral sands (ilmenite, rutile, synthetic rutile or upgraded ilmenite and leucoxene) amounted to \$435 million in 2004. This was 16 per cent down on sales value in 2003 and was due in particular to decreases in the sales value of ilmenite, synthetic rutile and rutile. The sales quantity of ilmenite decreased 25 per cent to 651 000 t in 2004 while synthetic rutile production was up by ten per cent to 611 000 t, though lower prices translated to a 9 per cent fall in the value of synthetic rutile sales to \$282 million. Received prices for titanium feedstock minerals like rutile and ilmenite were down in 2004 compared with the previous year. This 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. However, the price fall for synthetic rutile is complicated by the presence of contracts denominated in Australian dollars.

Western Australia's rutile sales decreased by 18 per cent in quantity terms to 101 000 t in 2004, but fell in value terms by 23 per cent to \$62 million. This was chiefly due

to the effect of the Australian dollar appreciation as rutile prices have gone against the general downward trend due to restricted supply and increased demand from the welding industry. Rutile prices are expected to show moderate increases in 2005 – as indeed they already had in the second half of 2004. This is due to continuing tight supply, which thus far is not totally being impacted upon by additional production from new projects.

Closely associated with the mining of titanium minerals is zircon. All commercially produced zircon is a co-product of titanium minerals production, i.e. ilmenite and rutile (occasionally leucoxene). However, during the last 40 years zircon has evolved from being a low-value by-product of titanium mineral production to an important product in its own right that may account for 15-35 per cent of total revenue. Zircon has widespread industrial applications such as, for example, its use in television picture tubes, but its main use is in the ceramics industry, which accounts for about 52 per cent of total zircon consumption. Its use in this area is as an additive to glazes used mainly on ceramic tiles and sanitary ware to provide opacity.

In Western Australia, the volume of zircon sales decreased by 15 per cent in 2004 to 359 000 t. Unlike most titanium minerals, prices for zircon have increased in the past two to three years. Despite the strength of the Australian dollar, Western Australian producers have been able to capitalise on the healthier prices, which ameliorated the fall in sales volume. As a result, the value of zircon sales in 2004 decreased by 5 per cent to \$230 million.

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 plus Imdex in Jandakot.

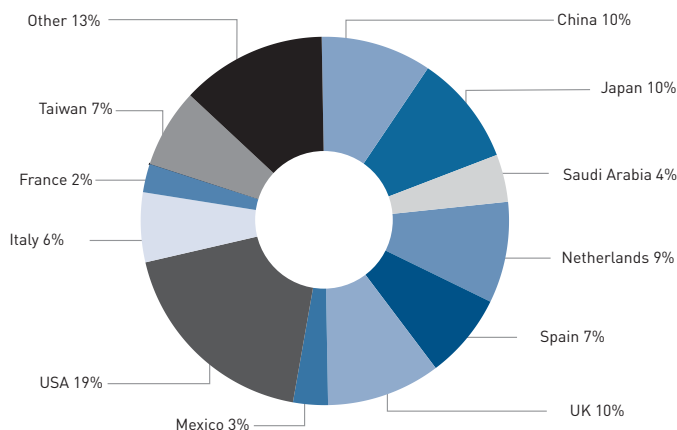


Figure 35 Heavy Mineral Sands Exports Source: DoIR



Figure 36 Heavy Mineral Sands Value by Quarter Source: DoIR

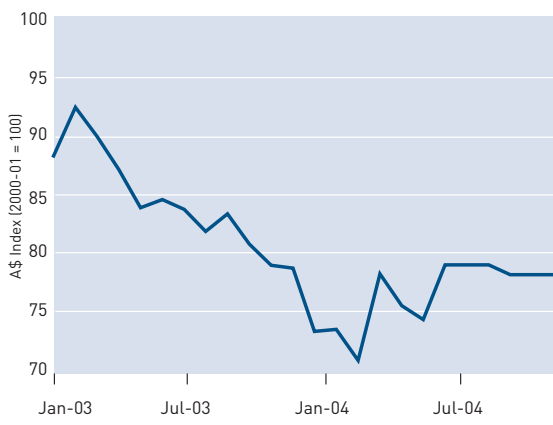


Figure 37 **Heavy Mineral Sands Price Index**
Source: WA Treasury Corporation

The majority of Western Australia's heavy mineral sands industry is located in the State's southwest region. Western Australian production is now confined to a small number of companies, focused around the Eneabba and Capel regions. These comprise Iluka Resources, BeMaX (Cable Sands), the Tiwest Joint Venture and Doral Mineral Sands. Deposits north of Perth provide ilmenite of a 'high-titania altered variety' suitable for synthetic rutile production and the chloride route for titanium dioxide (TiO₂) pigment production. South of Perth, deposits are ilmenite-dominant and contain grades suitable for both the sulphate route (53–56 per cent TiO₂) and the chloride route (>57 per cent TiO₂).

Iluka Resources operates from two locations, Capel 200 km south of Perth, which was Iluka's first mining and processing site when the company's operations began in the late 1950s and Eneabba, approximately 260 km north of Perth. Production facilities in the Capel area include three mine sites, two dry separation plants, a synthetic rutile processing plant and an administration complex. The Eneabba operation contains one of the world's major zircon and rutile deposits and is also the principal source of ilmenite for Iluka's processing plants at Narngulu, which is the processing centre for Iluka's operations in the mid-west and is located on the outskirts of Geraldton, 410 km north of Perth. Titanium minerals and zircon from Iluka's mid-west mining operations are processed at Narngulu before export through the Geraldton Port.

Iluka also plans to construct and operate a 2.8 Mt/a mineral sands mine approximately 2.5 km north of Gingin. Production from the mine was to begin in the middle of 2005 with heavy mineral concentrate separated on site prior to transportation to Iluka's processing operation in Geraldton.

Significantly, in early 2004 the industry was consolidated with the merger of BeMaX Resources, Nissho Iwai's RZM Cable Sands Group and Sons of Gwalia. As a result, the mineral sands assets were unified under BeMaX with Cristal Australia (27 per cent), Nissho Iwai (20 per cent), Sons of Gwalia (15 per cent), Imperial One (6 per cent) and other existing BeMaX shareholders (31 per cent) as major

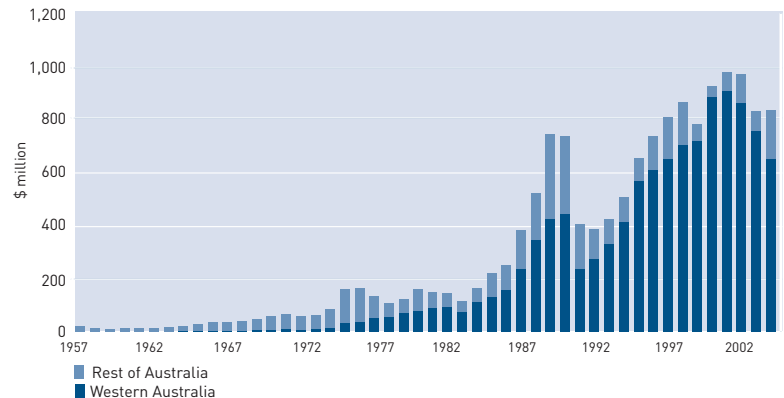


Figure 38 **Heavy Mineral Sands Value of Production**
Includes Ilmenite, Leucoxene, Upgraded Ilmenite, Rutile, Zircon and Monazite
Source: DoIR and ABARE

shareholders. The resulting entity makes it Australia's third-largest titanium dioxide feedstock producer, accounting for 11 per cent of world ilmenite output and almost 4 per cent of world titanium dioxide output.

BeMaX's operations in Western Australia include the Bunbury dry minerals separation plant which has a capacity in excess of 700,000 t/a and recently commissioned Tutunup mine in the southwest. The Bunbury separation plant produces a range of mineral sands products including ilmenite, zircon, rutile and leucoxene. Feedstock treated in the plant has been sourced from the Jangardup and Tutunup mines along with concentrates from storage at Waroona and Murray Basin Titanium's mine at Wemen, southeast of Mildura in the Murray Basin. Active rehabilitation is underway at the exhausted Jangardup, Yarloop and Sandalwood mines.

The TiWest Joint Venture, (co-owned by Ticor and Kerr McGee Chemical Corporation) operates a large-scale mine at Cooljarloo, 180 km north of Perth and a synthetic rutile plant at Chandala, about 60 km north of Perth. Some synthetic rutile is exported while another portion is used as feedstock into Tiwest's titanium dioxide pigment plant in Kwinana. There is also a stand-alone mineral sands chemical plant operated by Millennium Inorganic Chemicals located at Kemerton, 20 km north of Bunbury. The company manufactures titanium dioxide pigment by the chlorination, purification and oxidation of synthetic rutile obtained from local producers.

Western Australia's fourth mineral sands producer is Doral Mineral Sands. Doral has a mineral sands mining operation near Dardanup which treats the titanium-based minerals at a processing plant in Picton.

In other developments, Gunson Resources has continued its work in developing its Coburn deposit, which is located near Shark Bay. A bankable feasibility study for the project has been completed. The zircon-rich Coburn project has an inferred resource estimate of 710 Mt, with zircon constituting 22 per cent of the heavy mineral fraction.

4.7 Diamonds

International diamond market conditions were buoyant in 2004. Global retail sales of diamond jewellery in 2004 were about 6 per cent higher than the previous year. Strong areas of demand growth were Asia-Pacific, India, and the Middle East. Japan also recorded modest growth for the second year. However, Western Australia's diamond industry experienced a substantial fall in sales during the year with sales volumes dropping by 32 per cent, to 24.2 million carats. Combined with the strengthening local currency this contributed to the value of diamond sales decreasing by more than 36 per cent in 2004 to \$421 million. This was in contrast to other major producers around the world, for example South Africa achieved record production volumes in 2004.

Rio Tinto's Argyle mine accounts for the bulk of diamond sales from Western Australia. The Argyle project is the world's largest supplier of diamonds and its output of mostly industrial-grade stones accounts for almost all of Australia's diamond production and around a fifth of world production. In 2004, Argyle's production of 20.6 million carats (Mct) was down by 33 per cent on its 2003 production level. Most of the drop in production occurred in the first three-quarters of the year and were the result of geo-technical problems at the pit, which have now been resolved. First quarter 2005 production results from the Argyle mine showed a 139 per cent increase to 8.6 Mcts, compared to the first quarter of 2004, when lower grade ore was processed. But compared to the fourth quarter of 2004, output at Argyle declined by 4 per cent.

Currently, the Argyle open pit operation is expected to continue until 2007 and a feasibility study is underway investigating underground mining options. This could extend the mine's life to 2020. A decision regarding an underground mine development is expected in 2005.

Diamond production also continued at Western Australia's only other diamond mine, Kimberley Diamond Company's Ellendale mine near Derby. Ellendale-9, the first stage of Kimberley Diamond's Ellendale mine, reached full production in 2004. The operation at Ellendale-9 comprises the recently commissioned 2.2 Mt/a East Plant, the existing 600 000 t/a West Plant and the Pipe-9 mining operations and infrastructure.

Kimberley Diamond expects to continue expanding and predicts that it will be amongst the world's top-five diamond producers within the next three years. Production from Ellendale Pipe-9 is forecast to reach a level of close to 200 000 carats for 2005 with the commissioning of a new 2.2 Mt/a diamond production plant at Ellendale 9. This is expected to be a precursor to even more significant production with the commencement of mining at Ellendale Pipe-4, 15 km to the south, in April 2005. The establishment of a second mining and production centre at Pipe-4 would underpin a further

increase in production to well over 500 000 carats per annum in the next 2-3 years. Thus far, a record production grade of 43 carats per hundred tons has been achieved at Kimberly Diamond Company's Ellendale Pipe 4, with the average stone size now reported is 0.21 carats, some 75 per cent more than previously derived from exploration sampling.

Over 50 per cent of the end-product diamond market is accounted for by the US. Therefore, the strength of consumer demand in the US will determine the extent of diamond market prosperity in 2005.

4.8 Base Metals

The overall value of Western Australia's base metals production (copper, lead and zinc) fell sharply in 2004 to \$218 million from \$309 million in 2003. The fall was principally due to reduced production. Copper was the only base metal commodity in 2004 to experience an increase in its value of sales. In 2004, copper accounted for 72 per cent of total base metal sales, while zinc accounted for 28 per cent and lead sales were miniscule.

Copper

Western Australia produces three copper products; copper cathode, copper concentrates and copper by-product. The volume of copper by-product and copper cathode produced during 2004 was down by 22 per cent to 22 118 t. The volume of copper concentrate produced during 2004 also fell, by 32 per cent to 20 769 t.

Overall, the quantity of copper sold on a 'contained copper basis' decreased by 27 per cent to 42 887 t in 2004 compared with 58 777 t in 2003. However, in 2004, the average LME price of copper was US\$2 866/t or US\$1.30/lb compared to US\$1 799/t or US\$0.82/lb in 2003 - an increase of more than 61 per cent. This meant that for Western Australian producers, the actual value of copper sold increased, with the value of sales rising by 8 per cent in 2004 to \$156 million from \$145 million in the previous year.

In addition, there was a reduction in treatment costs for the copper concentrates which increased returns to local producers. The reduction in treatment costs was driven by both supply and demand factors. World supply was restricted due to several copper producers either closing mines, such as BHP's Tintaya operation on standby since January 2002, or reduced production from Escondida and Phelps Dodge. Smelter demand was high due to strong consumption particularly from China. It is anticipated that as copper prices remain firm and operations resume full-scale production, the treatment costs associated with copper concentrates will increase.

Zinc

The LME price of zinc in 2004 increased by 27 per cent, averaging US\$1 048/t compared with US\$828/t in 2003. Zinc prices have increased during 2004 principally due

to strong Chinese demand and relatively good OECD economic growth. However, the quantity of zinc sold in Western Australia fell by 57 per cent to 75 146 t in 2004 compared with 174 550 t in 2003. This was the second consecutive annual fall in tonnage and compares with a peak tonnage in 2000 of almost 258 000 t. The value of zinc also fell substantially by 57 per cent from \$140 million in 2003 to \$61 million in 2004.

Until recently, zinc was mined at two operations in Western Australia, at Newmont's Golden Grove operation and Western Metals' Lennard Shelf operations. However, the Lennard Shelf lead-zinc mine, acquired in October 2003 by Teck Cominco of Vancouver, British Columbia from the receiver of Western Metals, ceased operations in early 2004.

Lead

Lead and zinc are often found together in deposits, therefore it is not uncommon that the same operation produces lead as a co-product of zinc. After being in the doldrums for several years, in 2004, lead prices underwent a remarkable recovery, increasing by 72 per cent to an average of US\$887/t or US\$40/lb. Fundamentals behind this reflected strong demand for electrical battery storage and under-investment in mine production. With demand for lead continuing to rise strongly in 2004, 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 U.S. Overall global production rose by 0.6 per cent and consumption rose by 3.4 per cent.

Since lead from the Golden Grove and Lennard Shelf operation is produced in association with zinc, the reduced level of zinc production also caused a massive reduction in the level of lead output. In 2004, total lead production sales in Western Australia dropped by 55 318 t (98 per cent) to almost nil. This was principally due to the closure of the Lennard Shelf zinc-lead mine in early 2004.

Western Australia should however see a resurgence in lead output with the establishment of the Magellan lead mine, 30 km west of Wiluna. This mine was expected to come on-stream in early 2005. The Magellan lead mine represents the State's first stand-alone lead mine in more than 30 years when the Wheal Ellen North mine at Northampton ceased production in 1973. The Magellan project is being developed by Canadian miner Ivernica and is based on reserves totalling 16.2 Mt grading 6.2 per cent lead based on a price of US\$700/t. The mine is expected to produce some 60 000 t of lead in 2006 at which point the mine is due to rank among the top three lead producers in the world. For the first 18-24 months Magellan will produce lead concentrates, which will be exported to smelters overseas until the refinery is built.

Fruition of ultimate plans could see lead metal production rates of 70 000 to 90 000 t.

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. In 2004, the value of Western Australian coal sales increased by 6 per cent to \$282 million and the tonnage sold was 6.3 Mt.

The Griffin Group is progressing plans for its Bluewaters 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 100 per cent dedicated to the Muja power station.

Cobalt

In US dollar-terms, cobalt prices increased by 129 per cent during 2004 to record an average of US\$56 886/t (US\$25.80/lb) with price increases even far exceeding those for nickel. This resulted in the average price of cobalt in Australian dollar terms growing by 106 per cent. Price increases have been driven by strong demand, particularly from China.

Reflecting buoyant demand and strong prices, Western Australian cobalt sales increased by 81 per cent in 2004 to \$262 million despite a 12 per cent decrease in sales tonnage to 4551 t. The value of cobalt sales in 2004 meant that the cobalt sector has now jumped to take position as the second most valuable 'other minerals' sector after coal.

There are some question marks over how long such high prices for cobalt can be sustained. Cobalt prices appeared to stabilise at around the mid to high US\$50 000 mark during July to October 2004 but in November fell sharply to around US\$36 000. The impetus of economic growth behind the demand for metals such as cobalt appeared to have slowed and there is no question that the growth rates experienced in cobalt prices during 2004 are unlikely to be repeated in the coming year.

The main issue remains the supply response and whether the narrowing of the gap between supply and demand actually leads to surplus markets and further price drops. Analysts point out that as for most metals, the deficits may remain in place through the first half of 2005 with perhaps a final surge in prices taking place over that period.

Salt

Western Australia accounts for approximately 93 per cent of the nation's salt production and is the country's predominant exporter of salt. In 2004, Western Australian salt sales continued to increase, growing by 7 per cent to 10.4 Mt. However, a drop in received prices and appreciation in the Australian dollar resulted in a deterioration of the value of sales, which fell by 6 per cent to \$185 million.

Dampier Salt's operations are the State's chief producer and the world's largest producer of solar salt (Dampier Salt is also Australia's largest producer and exporter of natural gypsum). Dampier Salt is majority-owned by Rio Tinto (65 per cent), Marubeni Corporation (20.5 per cent), Nissho-Iwai Corporation (10.1 per cent) and Itochu Corporation (4.5 per cent). It has operations at Dampier, Lake McLeod and Port Hedland. The major export destinations for Dampier Salt are Japan, Taiwan, Philippines and South Korea. It also exports to other regions of Asia, the Middle East, North America and Africa.

Onslow Salt, majority-owned by Akzo Nobel, is Western Australia's second-largest salt producer. All of Onslow Salt's production is exported with major markets being Japan, South Korea and Indonesia.

A potential new entrant into Western Australia's salt industry is Straits Resources, which is undertaking a feasibility study, in combination with an EPA assessment and approval processes in regard to the Exmouth Gulf Solar Salt project. The company proposes to produce up to 10 Mt/a of salt, which would make the project one of the world's largest. Capital expenditure for this project has been estimated to be in the order of \$120 million.

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

In 2004, Western Australian tin, tantalum and lithium sales declined 11 per cent to \$180 million, as the sector was negatively affected by the rising local currency and a fall in the sales quantity of spodumene and tin.

The tantalum market has been subdued since spot prices of tantalum exceeding US\$200/lb were attained in 2000 during the 'tech-boom'. Tantalum supply comes mainly from a few large mines and unlike other commodities, no central market exists for tantalum products. Tantalum products also vary significantly subject to the tantalum content of the ore with prices set in the context of long-term supply contracts. It is therefore difficult to obtain

robust price information. Currently, it is understood that prices have steadied, but remain low due to the overcapacity created by the price spike in 2000 and in early 2005 remain below US\$40/lb.

Western Australia has the world's largest tantalum mines with Sons of Gwalia's (SOG) Greenbushes and Wodgina operations. SOG is the world's largest producer of tantalum concentrate providing 50 per cent of global supply from the two mines that hold around 70 per cent of global reserves. Tantalum production is also sourced from Haddington Resources' Bald Hill project in Western Australia's Eastern Goldfields. Haddington Resources operates Bald Hill under a licence agreement with SOG, which purchases all concentrate under a take-or-pay licence agreement that runs through to 31 March 2006. This agreement gives Haddington the exclusive rights to develop the Bald Hill and Cattlin Creek tantalite deposits.

In August 2004, SOG went into voluntary administration, mainly as the result of hedging and technical problems with the gold aspects of the company's operation. Whilst this created some uncertainty in the global tantalum market, in December 2004, it was announced that new supply arrangements had been locked in until September 2005 with SOG advising Haddington Resources that it will be required to supply 150 000 lb (more than 168 t) of the mineral between January and September of 2005.

Whilst Haddington has continued to supply tantalum as usual since SOG went into administration, prospective restructure of SOG's business and its possible effect on the global supply of tantalum raw materials provides an opportunity for Haddington with the potential to enter the market in its own right as a tantalum supplier. All of the tantalum Haddington produces is currently sourced from tenements currently held by SOG. However, the company holds extensive tantalum exploration project areas in its own right. In December, it announced it was raising \$1.6 million in a rights issue to finance new tantalum exploration with the aim of establishing its own independent mine. Exploration targets include 185 km² at Bald Hill, 650 km² in the Pilbara and tenements at Shoebridge in the Northern Territory. It is initially proposed to drill a total of 120 RC holes on Haddington's tenements, which are adjacent to the SOG leases. The proximity of these targets to the current Bald Hill operations ensures that ore can easily be transported for treatment to the Bald Hill located treatment plant.

SOG is also one of three dominant global producers of spodumene (lithium concentrate), accounting for approximately 60 per cent of the world's supply. Its Greenbushes lithium operations contain the largest and highest-grade lithium mineral resource in the world.

Subsequent to significant expansion projects initiated in response to the price spike in 2000, tantalite projects in

both Western Australia and globally have been placed on hold subject to improving prices. For instance, the underground mine development at the Greenbushes Cornwall pit was suspended, awaiting an upturn in the market.

Western Australia's third tantalum producer, Tantalum Australia, kept its Dalgaranga operation on care and maintenance due to the low tantalum prices.

Demand for tantalum can improve, but it depends on a sustained recovery of the OECD, and strength in the US economy. Due to tantalum's non-corrosiveness and quality as a conductor, tantalum is mainly used in the electronics industry, e.g. in capacitors for mobile phones and computers. It is also used in hi-tech alloys and medical applications. In addition, new technologies using tantalum are emerging.

On the supply side, however, high stocks and over-capacity are likely to moderate price. It is understood that the tantalum industry approached the US Defence National Stockpile Centre in 2003 to delay stockpile sales until 2004 due to excess commercial stocks. Analysts also estimate that current producers have the capacity to meet annual demand growth of 20 per cent per annum until 2005. A range of projects, currently on hold due to the price slump, could re-emerge if prices increase significantly. In addition, there are some large, advanced projects nearing development including the Abu Dabbab deposit in Egypt, Ghurayyah in Saudi Arabia and the Big Whopper and Fir/Verity projects in Canada.

As for lithium demand, it is expected to continue to grow at a moderate pace with strong growth in the secondary batteries sector offsetting reduced consumption in the aluminium industry.

In volume terms, tin sales fell by 39 per cent to 397 t. As a result, the value of tin sales remained constant at \$4.2 million despite the 74 per cent increase in average international tin prices in 2004. In Western Australia, tin is only produced as a by-product of tantalum mining. SOG is also Western Australia's largest tin producer and its Greenbushes operation also produces kaolin.

Manganese

China accounts for 40 per cent of the world's manganese consumption and the boom in global steel production has been strongly assisted by Chinese demand, which has driven the market for manganese. In 2004, Western Australia's manganese sales increased marginally by two per cent to 598 000 t. While the sales volume increased only slightly, the value of sales increased in Australian dollar terms by 59 per cent to \$104 million. This largely reflected very healthy price gains, which counteracted the appreciation of the Australian dollar.

Consolidated Minerals' (CSM's) Woodie Woodie operation in the Pilbara is Western Australia's sole manganese producer and represents 5 per cent of the world's high-grade manganese exports. In May 2004, the Woodie Woodie mine celebrated its fifth anniversary of the re-commencement of mining operations. In response to buoyant prices and strong Chinese demand, CSM has been undertaking a \$7-million expansion to increase production capacity from 600 000 t/a to 800 000 t/a.

It is estimated that Australia has now overtaken Brazil and is the third-largest producer of manganese after South Africa and Gabon. With increased shipping freight rates, Western Australia may benefit from closeness to the Asian markets.

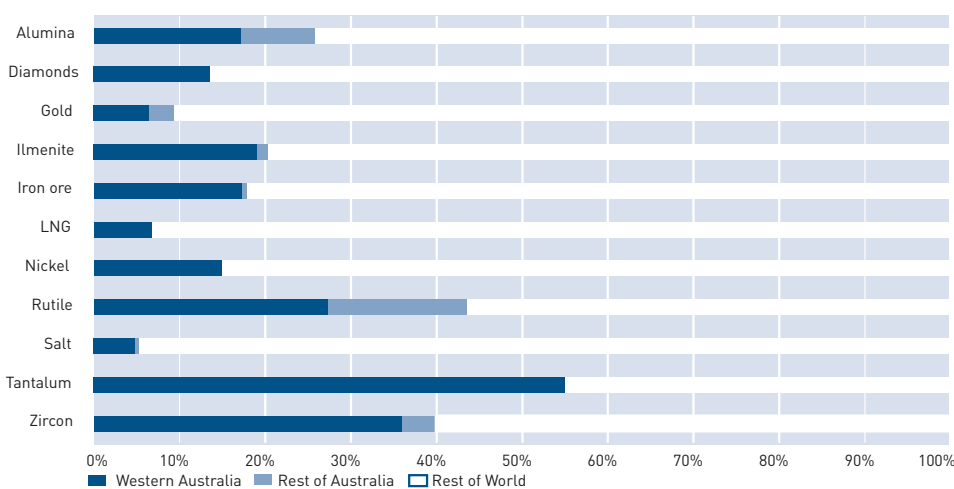


Figure 39 Selected WA Commodities relative to world production ending 2004 by quantity
Source: DoIR, ABARE and USGS

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)

Table 1 Quantity and Value of Minerals and Petroleum

COMMODITY	UNIT	2003		2004	
		QUANTITY	VALUE	QUANTITY	VALUE
ALUMINA	t	11,228,615	3,140,479,497	10,988,386	3,178,952,435
BASE METALS					
Copper Metal	t	58,777 (r)	145,094,919 (r)	42,887	156,337,055
Lead Metal	t	56,492 (r)	24,317,218 (r)	1,174	313,649
Zinc Metal	t	174,550 (r)	139,734,516 (r)	75,146	61,028,878
TOTAL BASE METALS			309,146,653 (r)		217,679,582
CHROMITE	t	67,271	16,050,607	104,317	33,185,550
CLAYS					
Attapulgite	t	11,187	1,168,258	10,142	1,059,130
Clay Shale	t	10,825	96,912	16,786	134,284
Fire Clay	t	16,113	254,745 (r)	54,973	825,675
Kaolin	t	1,891	158,266	203	22,659
Saponite	t	577	49,749	1,057	91,698
TOTAL CLAYS			1,727,930 (r)		2,133,446
COAL	t	6,026,581	266,405,945	6,312,011	281,912,097
CONSTRUCTION MATERIALS					
Aggregate	t	479,468	3,712,516	422,261	3,351,336
Gravel	t	118,305 (r)	823,364 (r)	223,116	977,921
Rock	t	299,143 (r)	2,814,594 (r)	288,475	1,733,573
Sand	t	1,648,382 (r)	8,037,588 (r)	2,496,006	12,733,454
TOTAL CONSTRUCTION MATERIALS			15,388,061 (r)		18,796,284
DIAMONDS	ct	35,478,981 (r)	661,857,630 (r)	24,225,475	420,534,391
DIMENSION STONE					
Granite	t	1,487 (r)	445,555 (r)	1,886	548,850
Marble	t	464	160,461	1,060	444,902
TOTAL DIMENSION STONE			606,016 (r)		993,752
GEM & SEMI-PRECIOUS STONES	kg	180,669 (r)	219,320	291,614	249,248
GOLD	kg	187,498 (r)	3,364,962,855 (r)	163,709 (e)	2,927,576,742
GYPSUM	t	1,570,660	25,312,796	1,134,844	19,593,270
HEAVY MINERAL SANDS					
Garnet	t	127,975	n/a	125,404	n/a
Ilmenite	t	862,391	110,463,553 (r)	650,849	75,254,042
Upgraded Ilmenite (a)	t	556,253	310,349,364 (r)	611,446	282,312,320
Leucoxene	t	46,673 (r)	17,280,177 (r)	53,499	15,764,431
Mineral Sands Concentrate	t	0	0	25,786	276,495
Rutile	t	123,633 (r)	80,279,524 (r)	101,893	61,868,643
Staurolite	t	2,129	279,802	739	86,083
Zircon	t	420,545 (r)	242,096,974 (r)	358,822	229,810,803
TOTAL HEAVY MINERAL SANDS			760,749,394 (r)		665,372,817
INDUSTRIAL PEGMATITE MINERALS					
Feldspar	t	21,963	986,583	23,974	1,288,881

Table 1 Quantity and Value of Minerals and Petroleum cont.

COMMODITY	UNIT	2003		2004	
		QUANTITY	VALUE	QUANTITY	VALUE
IRON ORE					
Domestic	t	8,004,155	189,790,259	5,415,346	143,610,171
Exported	t	186,743,301 (r)	4,871,266,951 (r)	211,848,622	6,046,141,926
TOTAL IRON ORE		194,747,456 (r)	5,061,057,210 (r)	217,263,968	6,189,752,097
LIMESAND-LIMESTONE-DOLOMITE					
Dolomite	t	7,585	65,984	11,490	226,345
Limesand-Limestone	t	5,416,874 (r)	28,410,365 (r)	3,898,438	33,755,425
TOTAL LIMESAND-LIMESTONE-DOLOMITE			28,476,349 (r)		33,981,770
MANGANESE ORE	t	587,836	65,180,987	597,777	103,813,221
NICKEL INDUSTRY					
Cobalt By-Product	t	1,779 (r)	52,756,999 (r)	1,523	87,815,893
Cobalt Metal	t	3,005	79,296,234	2,588	151,166,702
Cobalt Sulphide	t	381 (r)	12,985,078 (r)	441	23,199,362
TOTAL COBALT			145,038,311 (r)		262,181,957
Nickel Concentrate	t	1,501,997 (r)	2,158,863,411 (r)	79,476	1,479,196,490
Nickel Metal	t	38,213	521,380,522	97,554	1,749,343,927
Palladium By-Product	kg	477	4,002,358	846	6,849,997
Platinum By-Product	kg	133	4,306,903	196	3,717,783
TOTAL NICKEL INDUSTRY			2,833,591,505 (r)		3,501,290,154
PETROLEUM					
Condensate	kl	6,393,743	1,765,463,476	5,938,402	2,004,342,355
Crude Oil	kl	14,119,334	4,034,630,921 (r)	12,215,712	4,241,792,135
LNG	Btu 10 ⁶	408,272,004	2,874,614,163	454,123,757	3,150,809,630
LPG - Butane	t	425,199	182,825,510	398,836	189,283,501
LPG - Propane	t	319,970	142,721,362	322,852	151,134,456
Natural Gas	'000m ³	8,112,617	690,454,885	9,163,059	647,514,892
TOTAL PETROLEUM			9,690,710,317 (r)		10,384,876,969
PIGMENTS					
Red Oxide	t	1,254 (r)	540,521 (r)	2,575	703,040
SALT	t	9,752,885	197,008,925	10,388,350	184,955,822
SILICA-SILICA SAND					
Silica	t	96,431	964,298	105,433	1,054,337
Silica Sand	t	617,752 (r)	6,791,890 (r)	596,062	5,741,230
TOTAL SILICA-SILICA SAND			7,756,188 (r)		6,795,567
SILVER	kg	68,576 (r)	16,320,099 (r)	84,105	24,580,391
SPONGOLITE	t	9,919	1,258,601	8,020	1,496,897
TALC	t	142,736	13,291,592	133,915	11,754,883
TIN-TANTALUM-LITHIUM					
Spodumene	t	124,410	n/a	118,451	n/a
Tantalite	t	973	n/a	1,019	n/a
Tin Metal	t	653	4,184,604	405	5,016,941
TOTAL TIN-TANTALUM-LITHIUM			202,174,629		181,198,647
VANADIUM	t	694 (r)	4,665,521	220	3,624,201
TOTAL VALUE			26,685,925,730 (r)		28,397,092,153

Table 2 Quantity And Value Of Selected Major Commodities

	Unit	1995		1996		1997		1998	
		Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M
ALUMINA	Mt	8.07	1,757.36	8.25	1,967.81	8.48	2,084.71	8.75	2,429.70
BASE METALS									
Copper Metal	kt	24.31	73.29	23.07	51.28	28.32	62.46	28.24	57.13
Lead Metal	kt	15.64	8.25	17.08	9.90	23.20	9.91	39.52	15.09
Zinc Metal	kt	126.34	87.73	106.86	71.28	117.20	118.10	149.33	127.85
TOTAL BASE METALS			169.27		132.46		190.47		200.07
COAL	Mt	6.06	280.66	5.81	268.38	5.69	260.53	5.61	249.35
COBALT	kt	0.82	56.37	0.94	63.52	1.27	84.58	1.22	58.77
DIAMONDS	M ct	23.45	480.15	47.43	442.01	40.42	421.19	52.27	642.39
GOLD	tonnes	189.75	3,163.66	221.18	3,528.64	238.34	3,414.61	231.38	3,477.73
HEAVY MINERAL SANDS									
Ilmenite	Mt	1.00	96.27	1.08	114.29	1.23	133.59	1.29	150.85
Rutile	kt	124.87	68.14	110.65	79.17	111.78	78.53	96.93	76.45
Upgraded Ilmenite [Synthetic Rutile]	kt	452.74	215.43	522.00	258.23	581.00	292.86	529.48	289.79
Zircon	kt	458.44	152.54	372.70	197.54	292.79	160.34	277.35	154.37
Other HMS			16.08		25.26		22.86		26.13
TOTAL HEAVY MINERAL SANDS			548.46		674.49		688.18		697.59
IRON ORE	Mt	135.97	2,980.69	133.65	2,924.48	151.72	3,633.34	143.75	4,103.92
MANGANESE ORE	kt	227.90	28.42	296.81	32.67	176.99	22.15	79.43	8.13
NICKEL METAL	kt	101.36	1,094.17	108.38	1,033.88	122.99	1,136.00	143.08	1,039.12
PETROLEUM									
Condensate	Gl	3.83	564.91	4.97	773.72	6.44	1,103.31	6.41	887.06
Crude oil	Gl	8.68	1,384.83	11.26	1,958.82	9.54	1,719.80	10.98	1,497.55
LNG	Btu 10 ¹²	375.34	1,827.78	377.82	1,789.40	377.11	2,037.60	387.96	2,044.37
LPG - Butane	kt	19.42	4.73	158.96	37.44	320.43	93.17	384.54	86.31
LPG - Propane	kt	14.14	3.44	150.84	36.93	253.82	73.83	263.82	55.87
Natural Gas	Gm ³	5.83	421.92	6.62	494.68	7.33	571.51	6.33	527.96
TOTAL PETROLEUM			4,207.61		5,090.99		5,599.22		5,099.12
SALT	Mt	7.29	155.81	7.21	143.61	8.12	172.12	8.48	210.17
OTHER			118.46		144.19		101.69		206.14
TOTAL			15,041.09		16,447.13		17,808.79		18,422.20

1999		2000		2001		2002		2003		2004	
Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M
8.93	2,311.38	10.00	3,187.47	10.75	3,766.55	11.00	3,339.25	11.23	3,140.48	10.99	3,178.95
26.23	46.25	34.04	82.61	50.24	120.71	64.29	145.49	58.78	145.01	42.89	156.34
55.28	17.23	73.08	25.76	91.38	44.90	70.40	32.69	56.49	24.32	1.17	0.31
222.54	219.59	257.72	290.11	210.84	208.72	218.80	173.06	174.55	139.73	75.15	61.03
	283.07		398.48		374.33		351.24		309.15		217.68
6.23	268.02	6.20	257.84	6.20	258.21	6.26	266.40	6.03	266.41	6.31	281.91
1.01	37.68	3.59	157.66	4.26	146.27	4.70	118.95	5.17	145.04	4.55	262.18
51.64	640.06	42.30	713.68	21.68	499.53	34.37	650.34	35.48	661.86	24.23	420.53
211.76	2,939.98	199.50	3,078.65	192.20	3,236.20	188.86	3,460.87	187.50	3,364.96	163.71	2,927.58
1.24	152.95	1.30	185.47	0.83	137.32	0.85	131.26	0.86	110.46	0.65	75.25
113.40	82.26	122.15	100.58	112.93	99.01	125.41	102.66	123.63	80.28	101.89	61.87
522.93	288.01	617.53	377.50	646.46	418.66	586.99	353.67	556.25	310.35	611.45	282.31
322.94	139.14	347.93	172.11	353.17	230.00	369.92	246.74	420.55	242.01	358.82	229.81
	26.13		27.27		24.23		21.54		17.60		16.13
	688.49		862.93		909.22		855.87		760.79		665.38
143.01	3,517.17	158.87	4,365.19	162.25	5,245.93	171.77	5,064.62	194.75	5,061.06	217.26	6,189.75
108.16	13.20	259.53	33.61	498.60	76.09	578.39	75.63	587.84	65.18	597.78	103.81
121.89	1,084.96	153.51	2,243.28	181.17	2,074.48	183.00	2,242.55	190.21	2,680.24	177.03	3,228.54
5.57	1,013.30	6.20	1,946.37	6.02	1,787.91	6.88	1,928.58	6.39	1,765.46	5.94	2,004.34
8.49	1,559.29	13.74	4,472.42	14.06	4,246.65	15.29	4,502.72	14.12	4,034.63	12.22	4,241.79
387.38	1,934.44	385.61	2,986.97	389.57	3,482.87	394.11	2,791.22	408.27	2,874.61	454.12	3,150.81
390.08	116.55	450.57	225.36	475.25	217.54	458.15	197.56	425.20	182.83	398.84	189.28
260.44	81.77	364.53	183.36	385.83	185.08	357.41	165.88	319.97	142.72	322.85	151.13
6.60	569.33	6.93	607.64	7.67	642.08	7.75	650.20	8.11	690.45	9.16	647.51
	5,274.68		10,422.12		10,562.13		10,236.16		9,690.71		10,384.88
9.02	212.74	7.71	197.32	8.58	249.24	9.17	250.53	9.75	197.01	10.39	184.96
	192.81		297.01		379.55		389.16		343.04		350.94
17,464.24		26,215.24		27,777.73		27,301.57		26,685.93		28,397.09	

Table 3: Quantity and Value by Local Government Area					
COMMODITY	LOCAL GOVERNMENT AUTHORITY	QUANTITY (TONNES)	CONTENT	VALUE	REF (p51)
ALUMINA	Boddington	3,152,146		879,793,213	
	Murray	5,463,132		1,603,088,379	
	Waroona	2,373,108		696,070,843	
TOTAL ALUMINA		10,988,386		3,178,952,435	(c), (d)
BASE METALS			Cu tonnes		
Copper By-Product	Coolgardie		1,947	6,410,619	
	Dundas		518	1,606,028	
	Halls Creek		1,285	4,592,124	
	Kalgoorlie-Boulder		535	1,760,301	
	Ravensthorpe		100	327,437	
	Roebourne		599	2,253,439	
	Wiluna		470	1,519,036	
	Total			5,454	18,468,984
			Cu tonnes		
Copper Concentrates	Yalgoo		20,769	71,931,324	(a)
			Cu tonnes		
Copper Cathode	East Pilbara		16,664	65,936,747	(a)
	Total Copper		42,887	156,337,055	(a), (b)
			Pb tonnes		
Lead	Yalgoo		1,174	313,649	(a)
			Zn tonnes		
Zinc	Yalgoo	62,368	75,146	61,028,878	(a)
TOTAL BASE METALS				217,679,582	(a), (b)
CHROMITE			Cr ₂ O ₃ tonnes		
Chromite Ore	Meekatharra	248,969	104,317	33,185,550	(a)
CLAY					
Attapulgitite	Mullewa	10,142		1,059,130	
Clay Shale	Collie	16,786		134,284	
Fire Clay	Chittering	54,865		822,975	
	Broome	108		2,700	
	Total	54,973		825,675	
Kaolin	Bridgetown-Greenbushes	203		22,659	
Saponite	Coorow	1,057		91,698	
TOTAL CLAY		83,161		2,133,446	(e)
COAL	Collie	6,312,011		281,912,097	(f)
CONSTRUCTION MATERIALS					
Aggregate	Ashburton	6,269		31,345	
	Broome	67,650		1,578,288	
	East Pilbara	53,470		267,350	
	Port Hedland Town	55,852		279,261	
	Roebourne	148,529		742,646	
	Wyndham-East Kimberley	90,491		452,446	
	Total		422,261		3,351,336
Gravel	Broome	8,076		109,300	
	Coolgardie	6,416		32,081	
	Exmouth	25		250	
	Halls Creek	20,000		100,000	
	Kalamunda	161,830		570,271	
	Kalgoorlie-Boulder	2,064		10,320	
	Port Hedland Town	6,720		33,800	
	Wyndham-East Kimberley	17,985		121,899	
Total		223,116		977,921	

Table 3: Quantity and Value by Local Government Area continued

COMMODITY	LOCAL GOVERNMENT AUTHORITY	QUANTITY (TONNES)	CONTENT	VALUE	REF (p51)
Rock	Broome	3,324		76,388	
	Derby-West Kimberley	797		8,465	
	East Pilbara	269,794		1,348,972	
	Port Hedland Town	14,310		298,500	
	Wyndham-East Kimberley	250		1,248	
	Total	288,475		1,733,573	
Sand	Ashburton	1,835		29,125	
	Broome	40,307		330,569	
	Cockburn	17,698		83,181	
	Coolgardie	89,988		463,516	
	Coorow	4,477		18,822	
	Dandaragan	1,930		9,886	
	Derby-West Kimberley	11,291		62,130	
	East Pilbara	23,232		116,160	
	Esperance	2,267		11,334	
	Exmouth	6,000		42,000	
	Gingin	167		667	
	Kalgoorlie-Boulder	3,139		15,695	
	Kwinana	400,982		2,004,909	
	Marble Bar	47,899		239,498	
	Meekatharra	12,537		21,081	
	Menzies	29,667		148,334	
	Northam	105,117		525,589	
	Port Hedland Town	40,293		201,467	
	Roebourne	65,712		449,451	
	Wanneroo	1,582,897		7,914,470	
Wyndham-East Kimberley	4,215		23,787		
Yilgarn	4,356		21,783		
	Total	2,496,006		12,733,454	
TOTAL CONSTRUCTION MATERIAL		3,429,858		18,796,284	(e)
DIAMONDS	Derby-West Kimberley		83,903	27,288,800	
	Wyndham-East Kimberley		24,141,572	393,245,591	
TOTAL DIAMONDS			24,225,475	420,534,391	(a)
DIMENSION STONE					
Granite	Dundas	1,485		519,750	
	Roebourne	401		29,100	
	Total	1,886		548,850	
Marble	Ashburton	1,060		444,902	
TOTAL DIMENSION STONE		2,946		993,752	(e)
GEM & SEMI-PRECIOUS STONES					
			kg		
Agate	Marble Bar	61,260		37,937	
Amethyst	Upper Gascoyne	156		950	
Chalcedony/Mookaite	Carnarvon	3,821		2,210	
Jasper	Marble Bar	193		221	
	Meekatharra	42,584		12,180	
	Total	42,777		12,401	
Tourmaline	Upper Gascoyne	1,288		7,820	
Variscite	Carnarvon	182,312		187,930	
TOTAL GEM & SEMI-PRECIOUS STONES		291,614		249,248	(d)

Table 3: Quantity and Value by Local Government Area continued

COMMODITY	LOCAL GOVERNMENT AUTHORITY	QUANTITY (TONNES)	CONTENT	VALUE	REF (p51)
			Au kg		
GOLD	Coolgardie		24,082.535	430,144,746	
	Dundas		4,233.931	75,894,446	
	East Pilbara		26.345	479,190	
	Kalgoorlie-Boulder		49,125.581	879,574,630	
	Laverton		8,296.313	149,427,048	
	Leonora		35,278.217	629,780,682	
	Meekatharra		9,818.070	174,910,360	
	Menzies		2,319.031	41,198,589	
	Mt Magnet		7,608.712	136,225,518	
	Sandstone		2,097.396	37,268,775	
	Sundry producers		669.725	12,103,858	
	Wiluna		12,686.242	227,031,234	
	Yalgoo		1,085.667	19,329,558	
	Yilgarn		6,381.354	114,208,108	
TOTAL GOLD			163,709.119	2,927,576,742	(g)
GYPSUM	Carnarvon	849,850		15,082,162	
	Corrigin	4,060		56,834	
	Dalwallinu	83,365		1,340,597	
	Dandaragan	48,118		1,583,307	
	Dundas	20,869		188,428	
	Esperance	9,203		83,920	
	Irwin	6,169		123,422	
	Kent	27,745		388,413	
	Koorda	180		3,600	
	Lake Grace	23,780		246,333	
	Nungarin	18,790		187,910	
	Perenjori	448		4,928	
	Ravensthorpe	17,840		108,000	
	Wyalkatchem	24,427		195,416	
TOTAL GYPSUM		1,134,844		19,593,270	(f)
HEAVY MINERAL SANDS					
Garnet Sand	Northampton	125,404		n/a	
			TiO ₂ tonnes		
Ilmenite	Bunbury City	162,843	81,948	19,335,662	
	Capel	208,882	55,300	23,147,943	
	Carnamah	132,215	25,287	13,552,820	
	Dandaragan	56,597	20,958	7,498,255	
	Dardanup	90,312	43,374	11,719,362	
	Total	650,849	226,867	75,254,042	
			TiO ₂ tonnes		
Synthetic Rutile	Capel	215,753	198,493	111,634,352	
	Carnamah	180,626	166,175	93,552,878	
	Dandaragan	215,067	197,862	77,125,091	
	Total	611,446	562,530	282,312,320	
			TiO ₂ tonnes		
Leucoxene	Bunbury City	3,595	2,804	1,806,697	
	Capel	22,357	4,287	6,998,029	
	Dandaragan	26,963	19,683	6,643,671	
	Dardanup	584	2,791	316,034	
	Total	53,499	29,565	15,764,431	

Table 3: Quantity and Value by Local Government Area continued

COMMODITY	LOCAL GOVERNMENT AUTHORITY	QUANTITY (TONNES)	CONTENT	VALUE	REF (p51)
Mineral Sands Concentrate	Bunbury City	25,786		276,495	
			TiO ₂ tonnes		
Rutile	Bunbury City	665	715	492,355	
	Carnamah	70,197	31,132	42,074,018	
	Dandaragan	31,031	28,603	19,302,270	
	Total	101,893	60,450	61,868,643	
Staurolite	Dandaragan	739		86,083	
			ZrO ₂ tonnes		
Zircon	Bunbury City	19,572	14,432	11,546,292	
	Capel	41,408	27,219	27,531,417	
	Carnamah	240,840	156,546	155,714,299	
	Dandaragan	47,340	30,771	29,196,216	
	Dardanup	9,662	6,280	5,822,579	
	Total	358,822	235,248	229,810,803	
TOTAL HEAVY MINERAL SANDS				665,372,817	(a)
INDUSTRIAL PEGMATITE MINERALS					
Feldspar	East Pilbara	23,630		1,284,813	
	Mukinbudin	344		4,068	
	Total	23,974		1,288,881	(e)
IRON ORE					
Domestic Ore	East Pilbara	5,412,502		143,545,947	
	Yilgarn	2,844		64,224	
	Total	5,415,346		143,610,171	
Exported Ore	Ashburton	72,169,337		1,939,246,951	
	Derby-West Kimberley	660,701		21,292,219	
	East Pilbara	132,893,539		3,891,107,771	
	Mullewa	1,301,226		43,956,535	
	Yilgarn	4,823,819		150,538,450	
	Total	211,848,622		6,046,141,926	
TOTAL IRON ORE		217,263,968		6,189,752,097	(a)
LIMESAND-LIMESTONE-DOLOMITE					
Dolomite	Lake Grace	6,599		145,178	
	Yilgarn	4,891		81,167	
	Total	11,490		226,345	
Limesand-Limestone	Broome	25		250	
	Carnamah	17,774		71,096	
	Cockburn	2,113,138		6,205,999	
	Coorow	18,632		54,211	
	Dandaragan	39,838		232,219	
	Dundas	170,921		17,796,485	
	Exmouth	10,230		109,577	
	Gingin	42,659		632,436	
	Irwin	152,721		411,665	
	Kwinana	33,902		87,842	
	Laverton	725,878		1,451,756	
	Manjimup	3,391		50,858	
	Shark Bay	1,905		266,711	
	Wanneroo	526,063		6,271,416	
	Wiluna	40,497		80,994	
	Wyndham-East Kimberley	864		31,910	
	Total	3,898,438		33,755,425	
TOTAL LIMESAND-LIMESTONE-DOLOMITE		3,909,928		33,981,770	(e)

Table 3: Quantity and Value by Local Government Area continued

COMMODITY	LOCAL GOVERNMENT AUTHORITY	QUANTITY (TONNES)	CONTENT	VALUE	REF (p51)
			Mn tonnes		
MANGANESE ORE	East Pilbara	597,777	289,211	103,813,221	(a)
NICKEL INDUSTRY			Co tonnes		
Cobalt By-Product	Coolgardie		193.216	6,983,990	
	Dundas		187.241	10,800,203	
	Halls Creek		132.600	7,068,810	
	Kalgoorlie-Boulder		164.140	11,436,642	
	Laverton		296.168	19,809,965	
	Leonora		102.640	6,519,210	
	Ravensthorpe		5.350	339,981	
	Roebourne		29.300	1,815,264	
	Wiluna		411.873	23,041,828	
	Total		1,522.528	87,815,893	
Cobalt Metal	Coolgardie		593	42,073,515	
	Laverton		1,995	109,093,187	
	Total		2,588	151,166,702	
Cobalt Sulphide	Kalgoorlie-Boulder		441	23,199,362	
TOTAL COBALT			4,551	262,181,957	(a), (b)
			Ni tonnes		
Nickel Concentrates	Coolgardie		15,754	299,364,896	
	Dundas		9,579	176,466,674	
	Halls Creek		2,315	41,685,676	
	Kalgoorlie-Boulder		21,762	395,000,912	
	Laverton		1,655	31,177,217	
	Ravensthorpe		2,366	45,052,741	
	Roebourne		765	13,827,069	
	Wiluna		25,280	476,621,305	
	Total		79,476	1,479,196,490	
			Ni tonnes		
Nickel Metal	Coolgardie		69,314	1,311,076,025	
	Laverton		28,240	438,267,902	
	Total		97,554	1,749,343,927	(i)
TOTAL NICKEL			177,030	3,228,540,417	(i)
			Pd kg		
Palladium By-Product	Coolgardie		846	6,849,997	(b)
			Pt kg		
Platinum By-Product	Coolgardie		196	3,717,783	(b)
TOTAL NICKEL INDUSTRY				3,501,290,154	
PETROLEUM		Kilolitres			
Condensate	Ashburton	289,484		78,397,017	
	Carnamah	142		20,300	
	Irwin	864		247,333	
	Roebourne	5,647,912		1,925,677,705	
	Total	5,938,402		2,004,342,355	
		Kilolitres			
Crude Oil	Ashburton	3,010,752		1,077,783,867	
	Irwin	470,974		148,226,701	
	Roebourne	8,733,986		3,015,781,567	
	Total	12,215,712		4,241,792,135	
		Btu 10 ⁶			
LNG	Roebourne	454,123,757		3,150,809,630	

Table 3: Quantity and Value by Local Government Area continued

COMMODITY	LOCAL GOVERNMENT AUTHORITY	QUANTITY (TONNES)	CONTENT	VALUE	REF (p51)
		Tonnes			
LPG - Butane	Roebourne	398,836		189,283,501	
		Tonnes			
LPG - Propane	Roebourne	322,852		151,134,456	
		'000 m ³			
Natural Gas	Ashburton	1,108,948		75,977,452	
	Carnamah	30,550		2,723,267	
	Irwin	117,741		13,178,337	
	Roebourne	7,905,820		555,635,836	
	Total	9,163,059		647,514,892	
TOTAL PETROLEUM PRODUCTS				10,384,876,969	(d)
PIGMENTS					
Red Oxide	Cue	2,575		703,040	
SALT	Ashburton	1,815,746		27,634,000	(a)
	Carnarvon	1,791,959		33,441,183	(a)
	Esperance	12,227		491,618	(h)
	Port Hedland Town	2,865,452		51,050,082	(a)
	Roebourne	2,846,337		49,686,069	(a)
	Shark Bay	937,777		16,234,740	(a)
	Wyalkatchem	207		19,661	(h)
	Yilgarn	118,645		6,398,469	(h)
TOTAL SALT		10,388,350		184,955,822	
SILICA-SILICA SAND					
Silica	Moora	105,433		1,054,337	
Silica Sand	Albany	119,266		2,308,097	
	Cockburn	53,336		266,680	
	Coolgardie	174,457		427,420	
	Swan	249,003		2,739,033	
	Total	596,062		5,741,230	
TOTAL SILICA-SILICA SAND				6,795,567	
			Ag kg		
SILVER BY-PRODUCT	Coolgardie		202	33,072	(a), (j)
	Kalgoorlie-Boulder		27,903	8,162,630	(a)
	Statewide		22,039	6,378,122	
	Yalgoo		33,961	10,006,567	(a), (j)
TOTAL SILVER			84,105	24,580,391	
SPONGOLITE	Plantagenet	8,020		1,496,897	
TALC	Meekatharra	14,628		1,742,724	
	Three Springs	119,287		10,012,159	
TOTAL TALC		133,915		11,754,883	
TIN-TANTALUM-LITHIUM			Li ₂ O tonnes		
Spodumene	Bridgetown-Greenbushes	118,451	3,765	n/a	
			Ta ₂ O ₅ kg		
Tantalite	Bridgetown-Greenbushes	915		n/a	
	Coolgardie	104		n/a	
	Total	1,019		156,708,565	
			Sn tonnes		
Tin	Bridgetown-Greenbushes		405	5,016,941	
TOTAL TIN-TANTALUM-LITHIUM				181,198,647	(a)
			V ₂ O ₅ tonnes		
VANADIUM	Mt Magnet		220	3,624,201	(f)
TOTAL VALUE				28,397,092,153	

Table 4 Royalty Receipts 2003 and 2004

COMMODITY	2003 Total Value	2004 Total Value	2004 Growth	
			A\$	%
ALUMINA	51,081,238	52,514,256	1,433,018	3
BASE METALS				
Copper	4,804,046	6,257,836	1,453,790	30
Lead	1,618,765	157,101	-1,461,664	(90)
Zinc	8,036,022	3,240,062	-4,795,960	(60)
TOTAL BASE METALS	14,458,833	9,654,999	-4,803,834	(33)
CHROMITE	626,696	1,367,507	740,811	118
CLAYS	58,484	98,366	39,882	68
COAL	13,677,342	14,219,233	541,891	4
CONSTRUCTION MATERIALS				
Aggregate	117,262	141,348	24,086	21
Gravel	35,052	31,265	-3,787	(11)
Rock	89,887	102,762	12,875	14
Sand	434,753	707,844	273,091	63
Sandstone	284	0	-284	100
TOTAL CONSTRUCTION MATERIALS	677,238	983,219	305,981	45
DIAMONDS	72,794,517	36,539,966	-36,254,551	(50)
DIMENSION STONE	807	1,339	532	66
GEM & SEMI-PRECIOUS STONES	23,190	15,038	-8,152	(35)
GOLD	83,599,622	74,334,582	-9,265,040	(11)
GYPSUM	602,333	513,803	-88,530	(15)
HEAVY MINERAL SANDS				
Garnet	771,222	791,700	20,478	3
Ilmenite	7,996,304	8,079,998	83,694	1
Leucoxene	652,735	1,003,830	351,095	54
Rutile	5,330,870	3,753,329	-1,577,541	(30)
Staurolite	13,486	9,721	-3,765	100
Zircon	11,606,980	13,446,004	1,839,024	16
TOTAL HEAVY MINERAL SANDS	26,371,597	27,084,582	712,985	3
INDUSTRIAL PEGMATITE MINERALS				
Feldspar	101,435	47,653	-53,782	(53)
IRON ORE	290,647,904	330,194,487	39,546,583	14
LIMESAND-LIMESTONE-DOLOMITE				
Dolomite	2,214	3,538	1,324	60
Limesand-Limestone	2,274,361	1,655,344	-619,017	(27)
TOTAL LIMESAND-LIMESTONE-DOLOMITE	2,276,575	1,658,882	-617,693	(27)
MANGANESE	3,795,357	4,399,222	603,865	16

Table 4 Royalty Receipts 2003 and 2004 continued

COMMODITY	2003 Total Value	2004 Total Value	2004 Growth	
			A\$	%
NICKEL				
Cobalt	4112011	5061504	949,493	23
Nickel	63,881,419	82,189,511	18,308,092	29
Palladium by-product	135,265	120,190	-15,075	(11)
Platinum by-product	104,613	70,536	-34,077	(33)
TOTAL NICKEL INDUSTRY	68,233,308	87,441,741	19,208,433	28
PETROLEUM				
Condensate	102,785,974	109,519,987	6,734,013	7
Liquified Natural Gas	138,988,327	141,768,161	2,779,834	2
LPG - Butane	11,538,592	10,391,732	-1,146,860	(10)
LPG - Propane	8,968,288	8,246,154	-722,134	(8)
Natural gas	37,022,026	34,279,312	-2,742,714	(7)
Crude Oil	142,043,651	185,130,590	43,086,939	30
TOTAL PETROLEUM	441,346,858	489,335,936	47,989,078	11
PIGMENTS				
Red oxide	21,889	57,555	35,666	163
SALT	2,321,168	2,404,016	82,848	4
SILICA SAND	308,666	347,593	38,927	13
SILVER	530,415	444,998	-85,417	(16)
SPONGOLITE	84,865	75,458	-9,407	(11)
TALC	70,563	61,835	-8,728	(12)
TIN-TANTALUM-LITHIUM				
Spodumene	964,959	741,084	-223,875	(23)
Tantalite	5,486,403	6,075,469	589,066	11
Tin	122,823	120,494	-2,329	(2)
TOTAL TIN-TANTALUM-LITHIUM	6,574,185	6,937,047	362,862	6
VANADIUM	176,951	502,951	326,000	100
TOTAL REVENUE	1,080,462,036	1,141,236,264	60,774,228	6

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

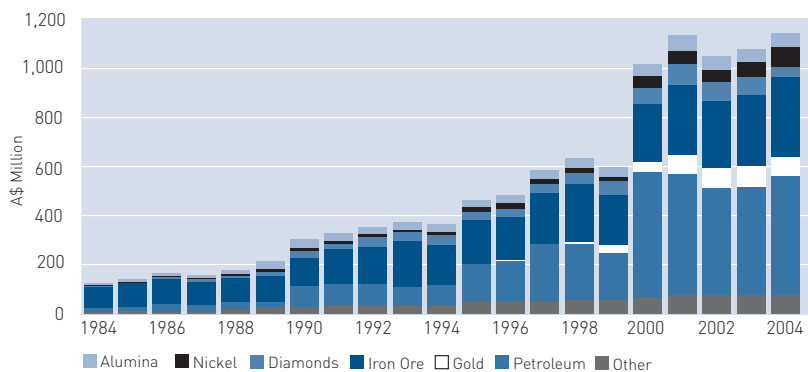


Figure 40 Royalty receipts by commodity Source: DoIR

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

MINERAL/Company	Operating Site	2003	2004
BASE METALS			
Barminco Pty Ltd	Elizabeth Hill	1	0
Newmont Mining Company	Golden Grove	359	419
Straits Resources Ltd	Nifty	315	429
Teck Cominco WA Pty Ltd	Pillara	425	40
TOTAL BASE METALS		1,100	888
BAUXITE - ALUMINA			
Alcoa of Australia Ltd	Huntly	839	964
	Kwinana Alumina Refinery	1,492	1,554
	Pinjarra Refinery	1,400	1,466
	Wagerup Alumina Refinery	966	1,052
	Willowdale	345	396
Australian Fused Materials Pty Ltd	Rockingham Fused Alumina Plant	215	214
Worsley Alumina Pty Ltd	Worsley — includes Mount Saddleback	236	278
	Worsley Refinery	1,522	1,689
TOTAL BAUXITE - ALUMINA		7,015	7,613
COAL			
Griffin Coal Mining Co. Pty Ltd	Muja	308	307
Wesfarmers Coal Ltd	Premier/WCL	333	344
TOTAL COAL		641	651
DIAMONDS			
Argyle Diamond Mines Pty Ltd	Lake Argyle	995	1,213
Kimberley Diamond Company NL	Ellendale	99	184
TOTAL DIAMONDS		1,094	1,397
GOLD			
Agincourt Resources Limited	Wiluna	187	218
Agnew Gold Mining Co Pty Ltd	Agnew-Emu	892	901
AGR Matthey	Perth Mint	112	123
AngloGold Australia Ltd	Sunrise Dam	758	847
Barminco Pty Ltd	Lights of Israel Underground	42	21
Barrick Gold Corporation	Darlot	126	147
Burnakura Joint Venture	Burnakura	0	9
	Lawlers	270	251
	Plutonic	623	588
Worsley Alumina Pty Ltd	Boddington	46	47
Coolgardie Mining Company Pty Ltd	Coolgardie	151	155
Croesus Mining NL	Central Norseman	229	225
	Davyhurst	93	86
	Hannan South	30	27
Equigold NL	Kirkalocka	116	97
Gindalbie Gold NL	Minjar	70	21
Harmony Gold (Australia) Pty Ltd	Big Bell	180	333
Hill 50 Gold NL	Hill 50, Mt Magnet	396	414
Jervois Mining Limited	Bullabulling	9	9
Kalgoorlie Consolidated Gold Mines Pty Ltd	Golden Mile - Superpit	1,352	1,328
Legend Mining Limited	Gidgee	91	143
LionOre Australia Pty Ltd	Thunderbox	168	194

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

MINERAL/Company	Operating Site	2003	2004
Lynas Gold NL	Mt Olympus	55	9
Mines and Resources Australia Pty Ltd	White Foil	94	0
	Frogs Leg	0	161
Newcrest Australia Ltd	Telfer	1,007	1,800
Newfield Central Pty Ltd	Newfield Central	10	10
Newmont Yandal Operations Ltd	Jundee, Nimary	445	542
	Bronzewing, Mt McClure	347	79
Nustar Mining Corp Ltd	Paulsens	0	24
Perilya Daisy-Milano Pty Ltd	Daisy-Milano	25	53
Placer Dome Inc	Granny Smith	455	592
Placer Dome Asia Pacific Limited	Kanowna Belle	514	419
	Paddington	544	461
Siberia Gold Operation Pty Ltd	Siberia	0	34
Sons of Gwalia NL	Carosue Dam	381	407
	Marvel Loch	514	470
	Sons of Gwalia	453	183
South Kal Mines Pty Ltd	South Kal - New Celebration	468	333
St. Barbara Mines Ltd	Bluebird	113	39
St Ives Gold Mining Company Pty Limited	Kambalda-St Ives	1,358	1,547
Troy Resources Ltd	Bulchina-Mt Klemptz	55	44
Other		22	7
TOTAL GOLD		12,801	13,398
HEAVY MINERAL SANDS			
BHP Titanium Minerals Pty Ltd	Beenup	17	11
Cable Sands Pty Ltd	Bunbury	296	287
Doral Mineral Sands Pty Ltd	Dardanup	136	136
GMA Garnet Pty Ltd	Narngulu Garnet Plant	32	29
	Port Gregory	20	24
Hanwah Advanced Ceramics Australia Pty Ltd	Rockingham Zirconia Plant	23	24
Iluka Resources Limited	Capel	482	478
	Eneabba	317	277
	Narngulu Synthetic Rutile Plants	362	556
TiWest Pty Ltd	Chandala-Muchea	212	263
	Cooljarloo	327	350
TOTAL HEAVY MINERAL SANDS		2,224	2,435
IRON ORE			
BHP Iron Ore (Goldsworthy) Ltd	Finucane Island	214	268
	Yarrie	220	235
BHP Iron Ore (Jimblebar) Ltd	Jimblebar	146	179
BHP Iron Ore Ltd	Mining Area C	254	210
	Mt Newman Railway	618	428
	Mt Whaleback	1,237	1,424
	Nelson Point	601	667
	Mt Newman Orebody 25	115	152
	Port Hedland HBI Plant	1,230	1,136
	PACE	332	158
	Yandi	379	364

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

MINERAL/Company	Operating Site	2003	2004
Hamersley Iron Pty Ltd	Brockman No. 2 Detritals Group	142	154
	Dampier Port Operations	736	1,249
	Eastern Range	118	55
	Hismelt - Kwinana	449	919
	Marandoo	200	206
	Paraburdoo	672	608
	Tom Price	1,070	1,121
	Yandicoogina	385	524
Koolyanobbing Iron Pty Ltd	Cockatoo Island	87	110
	Koolyanobbing	197	260
Mount Gibson Mining Ltd	Tallering Peak	0	96
Pilbara Railway Company	Hamersley, Robe River and West Angelas Rail	450	452
Robe River Mining Co. Pty Ltd	Cape Lambert	647	726
	Pannawonica Deepdale	419	441
	West Angelas Plant	266	443
TOTAL IRON ORE		11,184	12,585
NICKEL			
Australian Mines Ltd	Blair Group	0	52
Australian Nickel Mines NL	Armstrong	0	30
BHP Billiton Minerals Pty Ltd	Ravensthorpe Group	0	95
Fox Resources Ltd	Radio Hill	0	53
Goldfields Mine Management Pty Ltd	Kambalda	115	131
Kimberley Nickel Mines Pty Ltd	Sally Malay Group	0	132
Lanfranchi Nickel Mines	Lanfranchi	0	1
Lightning Nickel Pty Ltd	Long Nickel	92	123
LionOre Australia (Nickel) Ltd	Emily Ann	170	265
LionOre Australia (Avalon) Pty Ltd	Bulong	321	13
Mincor Resources NL	Miitel	135	201
	Wannaway	56	9
MPI Mines Ltd	Black Swan	201	248
Murrin Murrin Operations	Murrin Murrin	683	1,058
OMG Cawse Pty Ltd	Cawse	203	192
Reliance Operations Limited	Beta-Hunt	7	68
Sir Samuel Mines NL	Cosmos	96	101
Tectonic Resources NL	RAV 8	73	71
Western Mining Corporation Ltd	Carnilya Hill	0	26
	Kalgoorlie Nickel Smelter	888	922
	Kambalda Group	197	231
	Kwinana Refinery	347	448
	Leinster	1,097	1,231
	Mt Keith	1,033	1,003
TOTAL NICKEL		5,714	6,704

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

MINERAL/Company	Operating Site	2003	2004
PETROLEUM PRODUCTS			
Apache Energy Ltd	Agincourt, Campbell, Double Island, East Spar, Endymion, Gibson, Gipsy, Harriet, Hoover, Little Sandy, North Pedirka, Pedirka, Rosette, Simpson, Sinbad, South Plato, Stag, Tanami, Victoria, Wonnich	187	245
ARC Energy NL	Dongara, Hovea-Erechia, Mt Horner, Woodada	18	20
BHP Billiton Petroleum (North West Shelf) Pty Ltd	Griffin, Chinook-Scindian	46	82
ChevronTexaco Australia Pty Ltd	Barrow Island, Cowle, Crest, Roller, Skate, Saladin, Yammaderry	125	124
Eni Australia Limited	Woollybutt	65	65
Kimberley Oil NL	Lloyd	4	4
Mobil Exploration & Producing Australia Pty Ltd	Wandoo	30	28
Nexen Petroleum Australia Pty Ltd	Buffalo	40	20
Origin Energy Resources Ltd	Beharra Springs, Tubridgi, Jingemia	23	457
Woodside Energy Ltd.	Athena, Cossack, Echo-Yodel, Goodwyn, Hermes, Lambert, Legendre, North Rankin, Wanaea	2,219	2,528
TOTAL PETROLEUM PRODUCTS		2,757	3,573
SALT			
Dampier Salt Ltd	Port Hedland	96	102
	Dampier	234	203
	Lake MacLeod	157	183
Onslow Solar Salt Pty Ltd	Onslow	96	109
Shark Bay Salt JV	Useless Loop	65	70
WA Salt Supply Koolyanobbing Pty Ltd	Lake Deborah East	10	12
TOTAL SALT		658	679
TOTAL CLAYS		65	68
TOTAL CONSTRUCTION MATERIALS		302	334
TOTAL DIMENSION STONE		105	126
TOTAL INDUSTRIAL PEGMATITE MINERALS		21	22
TOTAL LIMESTONE - LIMESAND		111	114
TOTAL MANGANESE ORE		128	215
TOTAL PHOSPHATE		148	131
TOTAL SILICA - SILICA SAND		197	204
TOTAL TALC		89	127
TOTAL TIN - TANTALUM - LITHIUM		450	483
TOTAL VANADIUM		26	19
ALL OTHER MATERIALS		418	376
TOTAL		47,149	51,958

(Source: AXTAT Reporting System, Mining Operations Division)

Table 6 Principal Mineral and Petroleum Producers Effective 1 May 2005

BASE METALS

Copper

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

Newmont Australia,
PO Box 1123,
West Perth WA 6872,
(08) 9366 3232,
Golden Grove.
www.newmont.com

Straits Resources Ltd,
Birla Minerals Pty Ltd,
Level 2, 23 Ventnor Avenue.
WEST PERTH WA 6005,
Nifty,
www.adityabirla.com

WMC Resources Ltd,
191 Great Eastern Highway,
Belmont WA 6104,
(08) 9479 0500,
Kambalda.
www.wmc.com.au

Lead-Zinc

Newmont Australia,
PO Box 1123,
West Perth WA 6872,
(08) 9366 3232,
Golden Grove.
www.newmont.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 Ave,
West Perth WA 6005,
(08) 9321 3633,
Coobina,
www.consminerals.com.au

CLAY

Attapulgit

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

Clay Shale

The Griffin Coal Mining Company Pty Limited,
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,
(08) 9756 6121,
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,
www.readymix.com.au

Gravel

Boral Resources (WA) Ltd,
63-69 Abernethy Road,
Belmont WA 6104,
(08) 9333 3400,
Grosmont,
www.boral.com.au

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,
Grosmont,
www.boral.com.au

Rocla Quarry Products,
180 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
The Lakes, Mundaring

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

Allied Granites Pty Ltd,
4 Koojan Avenue,
South Guildford WA 6055,
Fraser Range Granite.

Table 6 Principal Mineral And Petroleum Producers Effective 1 May 2005

FELDSPAR

Unimin Australia Ltd,
26 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

Legend Mining Limited,
Level 5, 50 Colin Street,
West Perth WA 6005,
(08) 9322 3700
Gidgee,
www.legendmining.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,
Binduli, Central Norseman,
Davyhurst,
www.croesus.com.au

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

Gindalbie Gold NL,
PO Box 512,
West Perth WA 6872,
(08) 9480 8700
Minjar,
www.gindalbie.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

Herald Resources Ltd,
50 Colin Street,
West Perth WA 6005,
(08) 9322 2788,
Coolgardie - Three Mile.

Jervois Mining Limited,
PO Box 64,
Coolgardie WA 6429,
(08) 9024 2534
Bullabulling
www.jervoismining.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,
White Foil.

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 6430
(08) 9021 7234,
Mobile: 041 999 1713
Newfield Central.

Newmont Australia,
PO Box 1123,
West Perth WA 6872,
(08) 9366 3232,
Bronzewing-Mt McClure, Jundee-
Nimary,
www.newmont.com

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 Belle,
www.placerdome.com

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

Siberia Mining Corporation Ltd
12 Leura Street
Nedlands WA 6009
(08) 9389 8411
Siberia - Sand King

Sipa Resources Limited
Level 2, 87 Colin Street,
West Perth WA 6005,
(08) 9481 6259,
Paraburdoo,
www.sipa.com.au

Sons of Gwalia Ltd,
16 Parliament Place,
West Perth WA 6005,
(08) 9263 5555,
Carosue Dam, Cornishman,
Marvel Loch-Southern Cross,
Sons of Gwalia, Tarmoola,
www.sog.com.au

St Barbara Mines Ltd,
Level 2, 16 Ord Street,
West Perth WA, 6005
(08) 9476 5555,
Bluebird.
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

Table 6 Principal Mineral and Petroleum Producers Effective 1 May 2005

GYPSUM

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,
Dampier, Lake MacLeod, Port
Hedland,
www.dampiersalt.com.au

Gypsum Industries,
PO Box 952,
Canning Bridge, 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 3644,
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, Yarloop,
www.cablesands.com.au

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

Iluka Resources Ltd,
Level 23, 140 St Georges Terrace,
Perth WA 6000,
(08) 9360 4700
Capel, Eneabba, Yoganup, Stratham,
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,
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,
Marandoo, Paraburdoo, Tom Price,
Yandicoogina,
www.hamersleyiron.com

Mt Gibson Iron Limited,
1st Floor,
7 Havelock Street,
West Perth WA 6005,
(08) 9485 2355,
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 6000
(08) 9327 2800
Pannawonica, West Angelas
www.roberiver.com.au

LIMESAND-LIMESTONE

Cockburn Cement Ltd,
Lot 242, Russell Road East,
East Munster WA 6163,
(08) 9411 1000,
Cockburn, Dongara, Wanneroo
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,
6 Kings Park Road,
West Perth WA 6005,
(08) 9420 7300,
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.independencegroup.com.au

Table 6 Principal Mineral and Petroleum Producers Effective 1 May 2005

LionOre (Australia) Nickel Ltd,

Level 2, 10 Ord Street,
West Perth WA 6005,
(08) 9481 5656,
Emily Ann,
www.lionore.com

Mincor Resources NL,

Level 1, 1 Havelock Street,
West Perth 6005,
(08) 9321 7125,
Miitel, Wannaway,
www.mincor.com.au

MPI Mines Ltd,

Level 8, 10-16 Queen Street,
Melbourne Vic 3000,
(03) 9628 2222,
Black Swan,
www.mpimines.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

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

WMC Resources Ltd,

191 Great Eastern Highway,
Belmont WA 6104,
(08) 9479 0500,
Kambalda, Leinster, Mt Keith,
www.wmc.com

PALLADIUM

WMC Resources Ltd,

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, Campbell, Double Island,
East Spar, Endymion, Gibson, Gipsy,
Harriet, Hoover, Little Sandy, North
Gipsy, North Pedirka, Pedirka,
Rosette, 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) Ptd 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

Mobil Exploration & Producing Australia Pty Ltd

Level 7, 30 The Esplanade,
Perth WA 6000,
(08) 9480 0300,
Wandoo.
www.mobil.com.au

Origin Energy Resources Ltd,

34 Collins Street,
West Perth WA 6005,
(09) 9324 6111,
Beharra Springs, Jingmia.
www.originenergy.com.au

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

WMC Resources Ltd,

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

SALT

Dampier Salt Pty Ltd,

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,

22 Mount Street,
Perth WA 6000,
(08) 9420 4320,
Useless Loop.

WA Salt Supply Ltd,

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

Table 6 Principal Mineral And Petroleum Producers Effective 1 May 2005

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 2844,
Three Springs,
www.luzenac.com

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) 9226 1550,
Bald Hill,
www.haddington.com.au

Abbreviations

A\$	Australian Dollar	km	kilometres
ABARE	Australian Bureau of Agricultural and Resource Economics	km ²	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 ³	= 35.3147 cubic feet (ft ³) [1 kilolitre (kl) = 1 cubic metre (m ³)]
Energy	1 kilojoule	kJ	= 0.94781 British Thermal Units (Btu)
	Energy Content	Prefix	
Coal	19.7 GJ/t	kilo (k)	10 ³
Condensate	32.0 MJ/L	mega (M)	10 ⁶
Crude oil	37.0 MJ/L	giga (G)	10 ⁹
LNG	25.0 MJ/L	tera (T)	10 ¹²
Natural gas	38.2 MJ/m ³	peta (P)	10 ¹⁵
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.

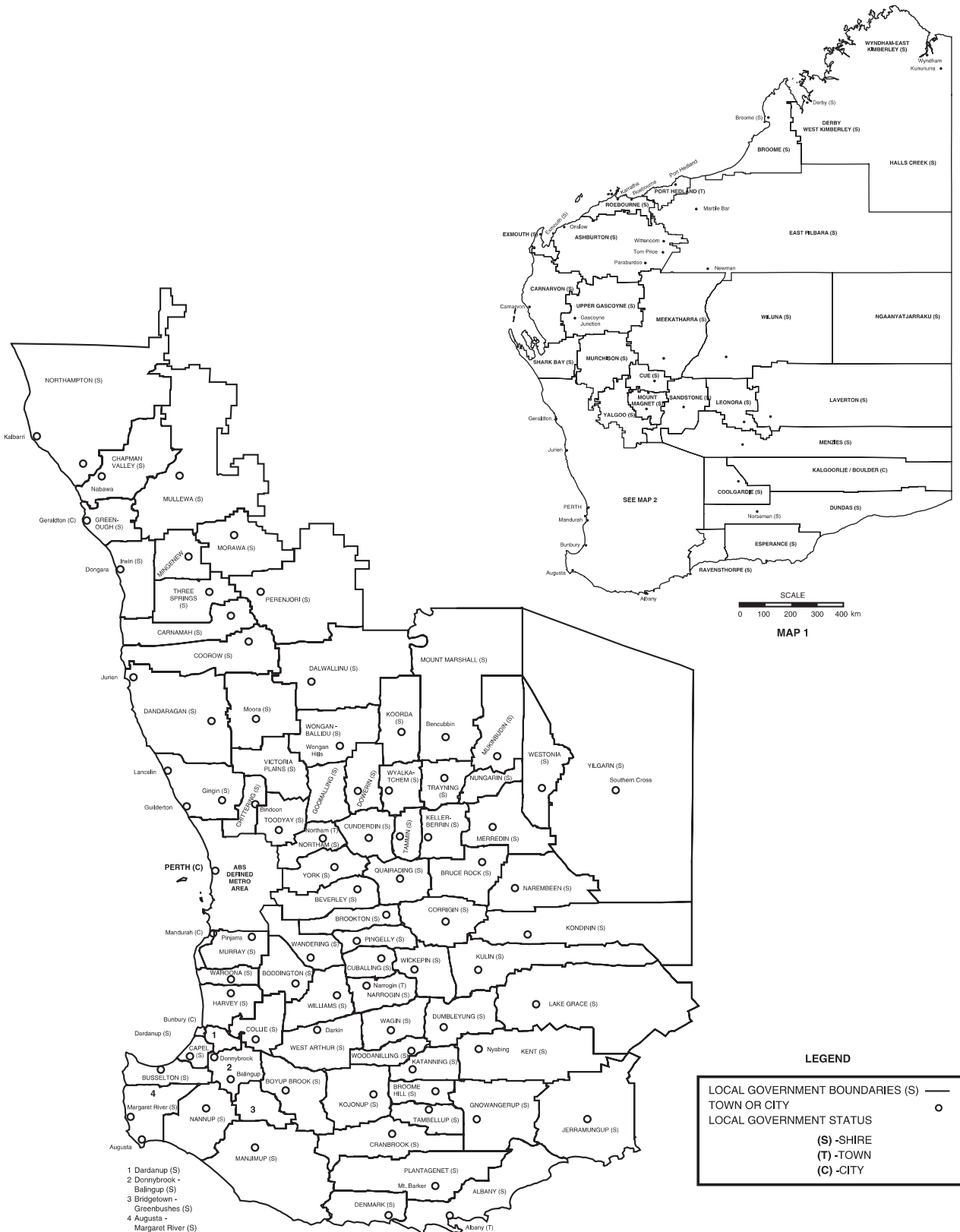
Mine Production
Clays
Coal
Construction Materials
Dimension Stone
Gold
Gypsum
Limesand -Limestone -Dolomite
Silica - Silica Sand
Talc
Sales
Alumina
Base Metals (Copper, Lead and Zinc)
Chromite
Diamonds
Gem and Semi-Precious Stones
Heavy Mineral Sands
Industrial Pegmatite Minerals
Iron Ore
Manganese
Nickel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

Classification of Countries

Euro area ¹ / European Union	
<i>Austria</i>	<i>Italy</i>
<i>Belgium</i>	Latvia
Cyprus	Lithuania
Czech Republic	<i>Luxembourg</i>
Denmark	Malta
Estonia	<i>Netherlands</i>
<i>Finland</i>	Poland
<i>France</i>	<i>Portugal</i>
<i>Germany</i>	Slovakia
<i>Greece</i>	Slovenia
Hungary	<i>Spain</i>
<i>Ireland</i>	Sweden
	United Kingdom
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
Republic of Korea	Taiwan

¹Italics indicate countries that are members of the euro area.

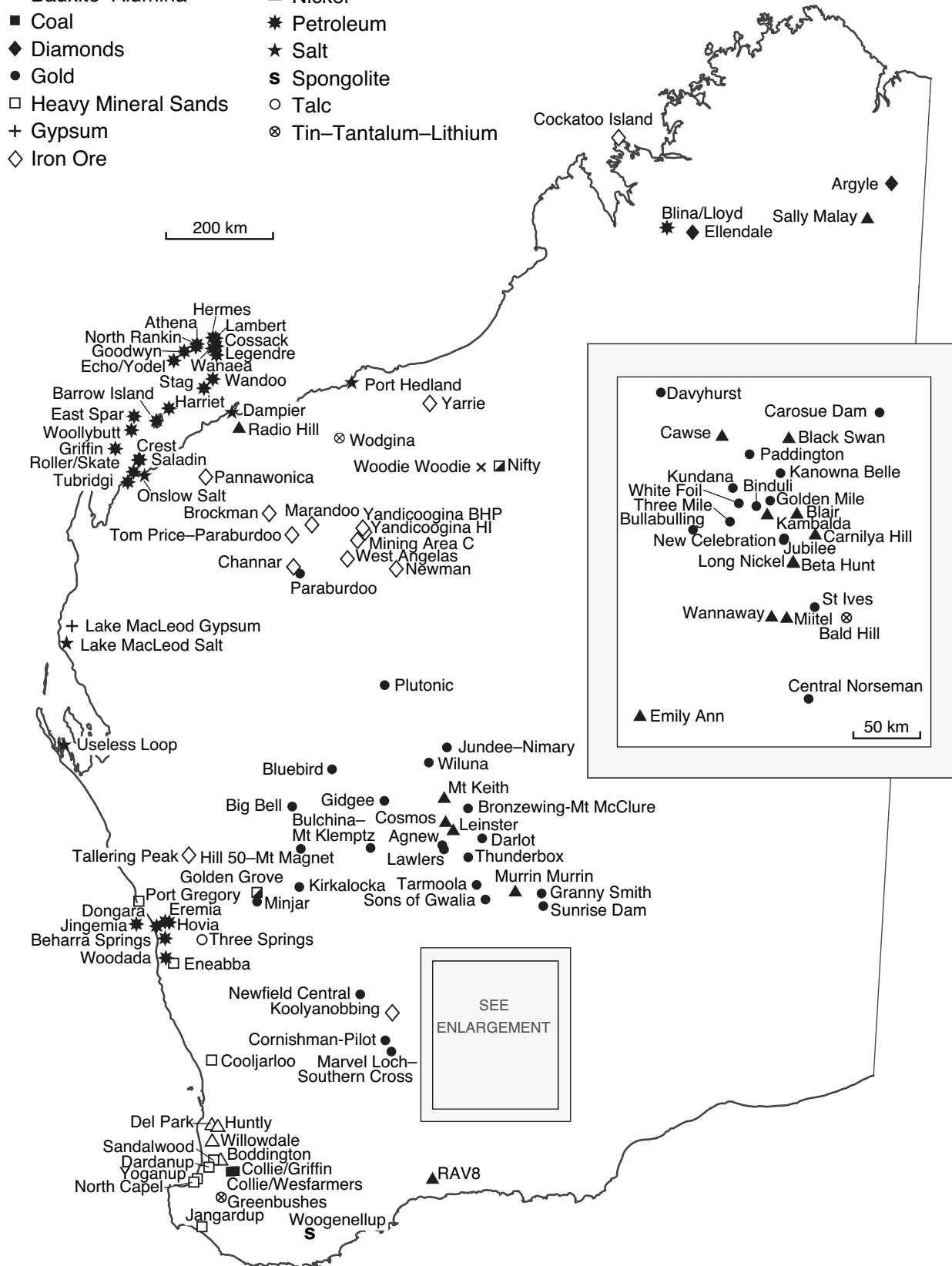
LOCAL GOVERNMENT BOUNDARIES



MAP 2

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 | |





This publication is available on our website www.doir.wa.gov.au

For further information on the mineral and petroleum resources of Western Australia to complement this publication please refer to:

Western Australia Mineral Exploration and Development

Western Australia Atlas of Mineral Deposits and Petroleum Fields 2005

Western Australian Oil and Gas Review 2005

Western Australian Iron Ore Industry 2003

A Guide to Petroleum Exploration and Production in Western Australia 2004

Petroleum in Western Australia

Prospect magazine

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