

Mineral and Petroleum Statistics Digest

2000-01

Record breaking year for
State's resources sector

... value of mineral and
petroleum sales increased
by 29% to \$27.6 billion

Petroleum sales worth

10.6 Billion
...an increase of 39%



Department of
Mineral and Petroleum Resources

Investment Attraction Division

CONTENTS

	Page
FOREWORD	1
1. ECONOMIC AND SOCIAL ENVIRONMENT	2
1.1 Economy Review	2
1.2 Economic Factors Influencing the Mining Industry	4
1.3 Social and Political Factors Affecting the Mining Industry	6
2. RESOURCE FOCUS 2000-01	9
2.1 Overview and Outlook	9
2.2 Petroleum	11
2.3 Iron Ore	12
2.4 Alumina	14
2.5 Gold	16
2.6 Nickel	18
2.7 Heavy Mineral Sands	20
2.8 Diamonds	22
2.9 Other Minerals	22
TABLES	
1. Quantity and Value of Minerals and Petroleum	26
2. Quantity and Value of Selected Major Commodities	28
3. Quantity and Value of Minerals and Petroleum by Local Government Area	30
4. Royalty Receipts 1999-00 and 2000-01	36
5. Average Number of Persons Employed in the WA Minerals and Petroleum Industries	38
6. Principal Minerals and Petroleum Producers 2000-01	42
Abbreviations, References, Units and Conversion Factors	46
Data Sources	47

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LIST OF FIGURES

Figures	Page
1.1 Exchange Rate US\$/A\$	3
1.2 Trade Weighted Index	5
2.1 Petroleum Exports	11
2.2 TAPIS Crude Oil Price	11
2.3 Crude Oil and Condensate - Quantity and Value by Quarter	12
2.4 Crude Oil and Condensate Quantity	12
2.5 Iron Ore Exports	13
2.6 Iron Ore Price	13
2.7 Iron Ore - Quantity and Value by Quarter	13
2.8 Iron Ore Quantity	14
2.9 Alumina Exports	14
2.10 Alumina Price	15
2.11 Alumina - Quantity and Value by Quarter	15
2.12 Alumina Quantity	16
2.13 Gold Exports	16
2.14 Gold Price	16
2.15 Gold - Quantity and Value by Quarter	17
2.16 Gold Production	17
2.17 Nickel Exports	18
2.18 Nickel Price	18
2.19 Nickel - Quantity and Value by Quarter	19
2.20 Nickel Quantity	19
2.21 Heavy Mineral Sands Exports	20
2.22 Heavy Mineral Sands Price Index	20
2.23 Heavy Mineral Sands - Value by Quarter	21
2.24 Heavy Mineral Sands - Value of Production	21
2.25 Selected WA Commodities Relative to World Production	25
0.1 Local Government Boundaries (map)	48
0.2 Major Mineral and Petroleum Projects in Western Australia (map)	Inside Back Cover

FOREWORD



Jim Limerick
DIRECTOR GENERAL

A handwritten signature in cursive script that reads "J. Limerick".

As the Director General of the new Department of Mineral and Petroleum Resources, I am pleased to be able to release the latest edition of the Western Australian Minerals and Petroleum Statistics Digest 2000-01.

This Digest offers the most comprehensive compilation of statistics associated with the State's extensive resource sector.

Western Australia is one of the great mineral provinces of the world. There are more than 300 commercial mining and petroleum projects in operation producing over 50 different mineral and petroleum products for distribution to markets across the globe.

2000-01 was a significant year for the State's mineral sector. The total value of sales increased by an impressive 29% from \$21.3 billion in 1999-00 to a new record of \$27.6 billion in 2000-01. The principal contributor to this increase was, once again, the petroleum sector with the value of sales increasing by 39% to \$10.6 billion, accounting for 38% of the total value of resource sales. The benefit of stronger oil prices combined with a weaker Australian dollar was largely responsible for this growth. Other major contributors to the State's record resource sales were iron ore (\$4.9 billion), alumina (\$3.6 billion), gold (\$3.2 billion) and nickel (\$2.2 billion).

The mineral and petroleum sector continues to be a major driver of the State's economy, accounting for close to 80% of its export income and around 37% directly and indirectly of Gross State Product. Royalties to the State Government from the resource sector totalled a record \$1.2 billion for 2000-01.

Despite the robust nature of the Western Australian resource industry, many challenges confront the sector. Mergers and acquisitions, coupled with rapid technological advances clearly indicate that Western Australia is entering a new era.

Against this background, the Government is currently reviewing a range of issues associated with the resources sector in order to improve the investment climate in the State. This includes a review of Native Title processes to establish a system based on mutual trust, cooperation and less litigation. Other initiatives include an investigation of how land title applications can be processed more efficiently, simplifying the State's approvals processes in order to bring projects from conception to fruition expeditiously without compromising environmental or other standards, and an investigation regarding the State's electricity industry.

The resource industry is also experiencing difficulties with easing world economic growth. However, the Western Australian mineral and petroleum sector is strategically well positioned to build on its strengths as a reliable supplier of quality minerals at world cost-competitive prices, within close proximity to some of the world's largest and fastest growing markets.

This report provides the statistical information necessary to consider all these issues. Compilation of this document has relied on input from a broad range of agencies outside the Department. I would like to express my appreciation to the many companies who have contributed, the Australian Bureau of Agricultural and Resource Economics (ABARE), the Australian Bureau of Statistics (ABS) and the Western Australian Treasury Department for their cooperation and assistance in preparing this Digest.

1. ECONOMIC AND SOCIAL ENVIRONMENT

1.1 *Economy Review*

1.1.1 *World Economy*

According to the International Monetary Fund (IMF), world economic growth averaged 3.5% in 2000–01. Projections for 2001–02 have been slashed, reflecting a number of factors, including a greater-than expected impact of the global slowdown in a number of regions, a recession in the United States following the September 11th terrorist attack, a softening in demand in the European Union (EU) and a Japanese economy also in recession.

The US economy slowed sharply during the second half of 2000 and the first half of 2001. However, following the September 11th terrorist attack, the economy fell into recession, triggered principally by a fall in consumer confidence.

Very few areas of the US economy escaped the aftermath of the terrorist attacks. Apart from a drop in consumer spending, a soft manufacturing and construction sector had an adverse impact on the labour market, where lay-offs and plant closures were reported in many industries, including financial services.

The stagnation in the US economy has spread to the European Union and also had a negative effect on the once-dynamic emerging Asian economies.

The Asian economies are critically dependent on economic developments in the US. According to Australian Bureau of Agricultural Research and Economics (ABARE), after attaining around 5% to 7% economic growth in 2000 and 2001, growth in Asia was forecast to be moderate, at around 6% in 2002.

China's economy continues to power ahead. The country's GDP grew by 8% in the first half of 2001 following an 8% growth in 2000. The IMF argues that it will be difficult for the Chinese economy to remain insulated from the world slowdown and that

growth rates could fall to around 6% in 2002. However, while the outlook for China's export performance has weakened, domestic demand is likely to accelerate, supported by the expansionary fiscal measures implemented by the Chinese Government.

In Korea, industrial production fell sharply from 17% in 2000 to 3% in the first eight months of 2001. Although retail spending increased year on year by 5% in the first half of 2001, there are strong concerns that this could contract as consumer confidence plummets. Economic growth in Korea is assumed to have reached 3% in 2001, and is forecast to increase to around 5% in 2002. This compares with the 9% growth in 2000.

In Taiwan, economic conditions continued to be weak during the first half of 2001. Exports and industrial production contracted by 20% and 11%, respectively, in June 2001. A fall in the demand for electronic and information technology equipment was the principal contributing factor. According to ABARE, Taiwan's economy was expected to attain 4% growth in 2002.

In Japan, Western Australia's major trading partner, the economic malaise continues. The principal reason for this decline is the global slowdown in demand for information technology equipment and sophisticated manufactured products, resulting in a significant drop in industrial production. Increasing bankruptcies and a contraction in the construction industry have triggered a substantial increase in unemployment not seen in the country since World War II.

The outlook remains negative. On the positive side, the adoption of a new monetary framework in March 2001, which pegged interest rates back to zero, has helped the economy. However, private consumption remains weak, reflecting declining incomes and concerns for unemployment and future corporate

restructuring. While Gross Domestic Product (GDP) rose moderately in the first quarter of 2001 due to increased private consumption, output fell sharply in the second quarter with significant falls in public and private investment offsetting the earlier rise in private consumption.

Japan's economy grew by only 0.1% in the March quarter 2001. IMF and World Bank estimates indicated that the country's GDP could have contracted by -0.5% in 2001 but forecast to reach around 0.5% growth in 2002.

The US is the major export destination for Asian manufactured goods, importing close to 32% of the region's exports. Since mid-2001, reduced demand from the US, specifically in the high-technology sector has severely affected exports from these regions. Therefore, in the Association of South East Asian Nations (ASEAN) countries, economic growth rates have also been downgraded, principally because of the weakness of the US economy.

1.1.2 Australian Economy

Against a savage global slowdown, the Australian economy grew at 1.9% in 2000-01. There has also been a significant improvement in the nation's balance of trade figures assisted by favourable exchange rates. Combined with a solid trade surplus, Australia's current account deficit, as a percentage of GDP has declined from 5.3% in 1999-00 to 2.8% in 2000-01. The September quarter 2001 even saw the figure reaching just 1.6%, the lowest level since March 1980.

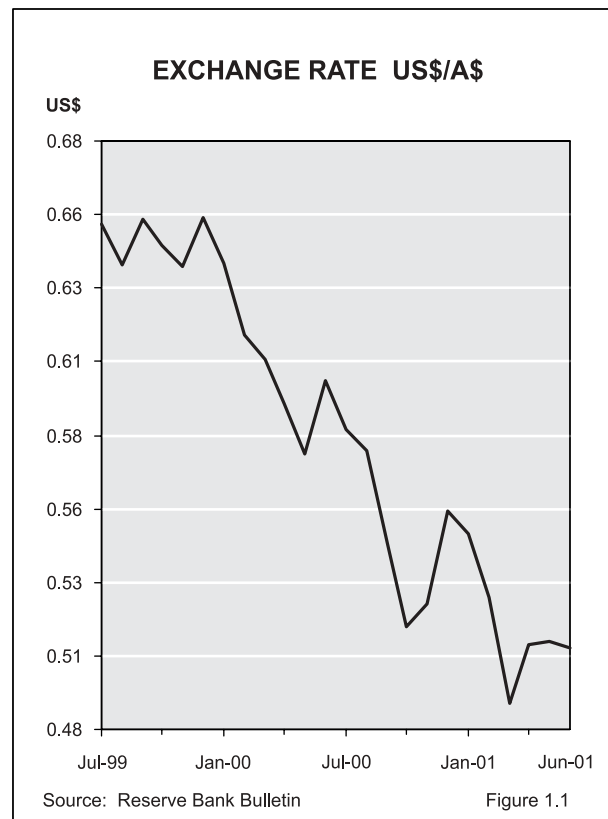
The economic outlook for Australian economy remains favourable in 2002 underpinned by a solid domestic demand. Latest forecasts by IMF released in December 2001 indicate that the Australian economy will grow by 3.3% in 2002, compared with the world growth forecast of 2.4%. However, given the uncertainty of the recovery in the global

economy, risks to Australian economy's growth remain in 2002-03.

The Consumer Price Index rose by 6% in 2000-01, compared with an increase of 2.4% in 1999-00. Food, alcohol and tobacco, housing, insurance costs and the significant depreciation of Australian currency are major driving forces underlying inflation pressures. However, given a weaker labour market and deflationary pressures from a slower global economy with uncertain recovery prospects, inflationary pressures in Australia are likely to stay modest in 2002.

The Reserve Bank of Australia cut official interest rates six times in 2001 from 6.3% to 4.5%. The last move was in December 2000.

The principal concern for Australian interest rates is the perceived outlook for global economic growth and inflation. Australia's economic growth



rate is dependent on developments in the world economy. Given the forecasts of a sharp contraction in world growth and modest inflationary pressures at a domestic level, Australia's interest rates are expected to remain low in the short term. According to ABARE, Australia's prime lending rates are forecast to average 8.3% in 2001-02 compared to an average of 9.3% in 2000-01.

The Australian dollar continued to undergo significant depreciation in 2000-01. On 14 March 2001, the dollar dropped below US\$0.50 for the first time and hit a new all-time low of US\$0.486. Since then, the Australian dollar has been trading at around US\$0.51. For 2000-01 as a whole, on average, the Australian dollar was trading at US\$0.54, which was 14.5% lower than the 1999-00 level. The Australian dollar also weakened against other major currencies. However, no record lows had been hit except in the case of US dollar.

A weaker Australian dollar against the US dollar in large part mirrors appreciation of the US currency. Despite the impending recession in the US, the US dollar appreciated in the first half of 2001. This is a reflection of the ironic fact that, because a global economic downturn usually triggers a "flight to safety" in US dollar assets, the US dollar can appreciate even if the easing and impending recession in the US itself is the reason for expecting a global economic malaise.

1.1.3 Western Australian Economy

The Western Australian economy has been forecast to grow by 4% in 2001-02, compared to a fall of 1.2% in 2000-01. The forecast growth rate remains below the long-term average rate of 4.5%. However, growth is expected to strengthen further, peaking at 5% in 2002-03 as the global economy recovers, accompanied by the return of higher commodity prices.

Domestic demand, led by business and dwelling investment, is expected to drive growth in 2001-02. Business investment is expected to increase by

17% in 2001-02, driven by major resource projects. The resultant increase in production capacity, coupled with an expected recovery in global demand and reduced inventories, is expected to lead to an increase in exports over the ensuing period.

Private capital expenditure in Western Australia fell by over 27% in the six months to June 2001 compared to the previous six months. The medium term outlook for investment remains positive, with a number of resource projects expected to come on stream over the next 12 - 18 months and some improvements in surveys of business confidence and positive investment intentions, the State's economy is expected to gather momentum.

1.2 Economic Factors Influencing the Mining Sector

Weaker global demand for a range of metals and energy-related commodities has been the principal feature during the first nine months of 2001. The fall in demand reflects a sharp downturn in world economic activity, particularly in the US and Asia and to a lesser degree in the European Union.

Economic recovery in the US and growth in the major metals and energy market will determine the global economic environment in 2002. For example, during the first six months of 2001, there was a sharp fall of 24% in nickel consumption due principally to a severe fall in stainless steel consumption. US primary aluminium consumption dropped 19%, zinc down 27% and copper 6%. Consumption of aluminium and zinc also fell sharply in Japan and the European Union.

According to ABARE, world demand and increased industrial production is expected to gather momentum after the slow growth of 2001. Global GDP growth is assumed to reach 3.5% in 2001-02. Against this background, demand for minerals and energy-related commodities is expected to improve. Consumption of metals in 2002 is forecast to grow by 3-5% and consumption of crude oil by 1%.

However, global inventory build-ups in late 2001 will inhibit the recovery in commodity prices during 2002.

In AS terms, following a 21% increase in metal and energy prices during 2000-01, prices of minerals and energy exports are forecast to ease by around 25% in 2001-02.

Australian mine output is also expected to rise marginally in 2001-02, by 1%. This compares with the 7% achieved in 2000-01.

ABARE expects total energy production to remain relatively flat in 2001-02. They see a small expansion in the production of coal, uranium and gas industries that will be offset by a contraction in the output of crude oil and condensate.

The modest outlook for a rise in Australian mine production is partly the consequence of the fall in the levels of spending in exploration and investment in the mining sector in recent years. Annual new capital expenditure in these areas plummeted by more than half, to \$5.3 billion per annum in the two years to 1999-00. In 2000-01, new capital investment remained flat, at \$5.3 billion. However, based on the

Australian Bureau of Statistics (ABS) survey undertaken in July-August 2001, new capital expenditure is forecast to recover by nearly 50% to \$7.8 billion in 2001-02.

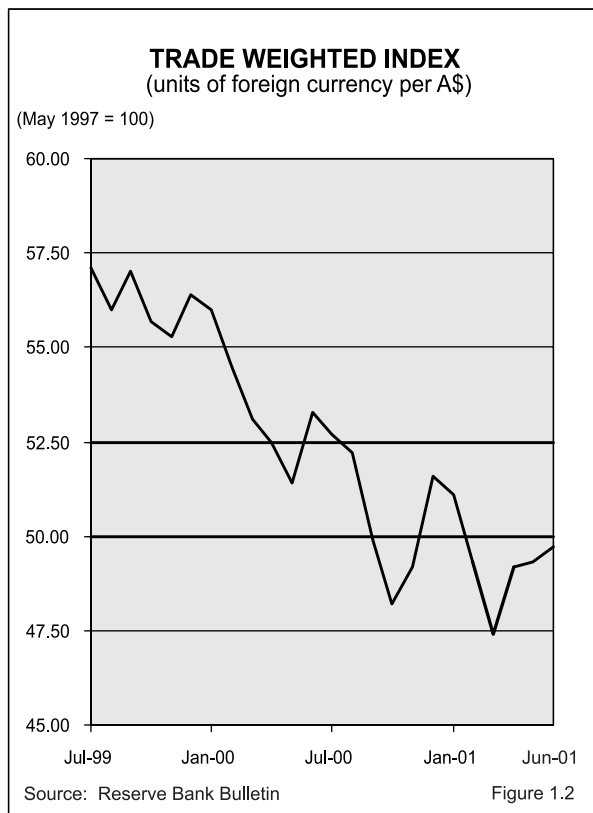
Western Australia's prospectivity is highlighted by the continuing high proportion (61%) of Australian mineral exploration expenditure that the State attracts. Nevertheless, exploration activity levels are now around 36% below the peak of activity in 1996-97 when \$692 million was spent with mineral exploration expenditure (excluding petroleum) in Western Australia reaching \$438.9 million, an increase of \$23.9 million or 5.8% on the previous year.

After three years of substantial and depressing falls the modest increase is heartening and hopefully will be sustained. Mineral exploration expenditure in Western Australia, on a quarterly basis, is showing signs of forming a base for a more sustained recovery in the future.

Notionally, the current level of mineral exploration activity in Australia is well below the record levels of over \$1 billion that were achieved in 1996-97 and 1997-98. Australia-wide expenditure figures for 2000-01 showed a modest increase of \$45 million (7%) to \$721 million. The percentage increase is similar to that experienced in Western Australia, which continues to attract the greatest portion of all Australian exploration expenditure (61%). This proportion has remained relatively constant at 60-62% over the last five years, despite the large cutbacks that have occurred in exploration expenditure, especially those in the gold sector.

The 2000-01 estimates of expenditure on petroleum exploration in Australia and Western Australia are the highest reported since 1975 when the ABS first began collecting statistics on petroleum exploration expenditure.

During the financial year 2000-01, reported expenditure on petroleum exploration in Australia



was \$1,044 million, an increase of 44% (\$321 million) from 1999-00.

Western Australia was the main contributor to the 2000–01 increase, up by 56% (\$249 million) to \$693 million, a new record for this State. Around 66% of all Australian petroleum exploration activity is in Western Australia (onshore and offshore combined) – and this also represents a new record.

About 83% of all petroleum exploration expenditure in Australia is offshore.

1.3 Social and Political Factors Affecting the Mining Industry

The State election in February 2001 saw a change of Government which set in motion a series of initiatives to address native title issues. These initiatives included important changes to the former Government's submission in the landmark Miriuwung Gajerrong Native Title Appeals Case which commenced in March 2001. The new State Government's amendments to the submission to the High Court reduced the State's points of appeal and contentions from 31 to 19.

Significantly however, the position was held firm on Government ownership and control of minerals, petroleum and water resources.

The decision of the court with respect to the Appeals Case is expected in March or April 2002.

The Government also established a Cabinet Standing Committee on Native Title (CSCNT), which comprises senior members of the Cabinet and the Minister for State Development. The CSCNT enables key Ministers whose portfolios are directly involved with the native title process to be updated on a monthly basis regarding the progress of native title claims throughout the State and any relevant associated issues.

The CSCNT processes provide for a considered and coordinated approach to matters that arise and encourages an across-government response and strategic direction. Native title proposals endorsed by the CSCNT are then placed before State Cabinet for final consideration and approval.

In April 2001 the Government announced an expert review (the "Wand Review") of native title negotiating principles in a bid to speed up the settlement of the State's 130 native title applications. This review was conducted by retired mining executive Mr Paul Wand with the aim of providing the Government with recommendations on the best way to achieve native title agreements. Issues considered by the review included:

- the level of evidence required in reports on indigenous connection to country;
- the scope for cooperation between Government and native title claimants in the production of reports;
- potential for joint planning and prioritisation of claims; and
- the applicability of negotiation principles and practices of other states.

The Wand Review was completed and presented to the State Government in mid-November 2001. It backed the State Government's view of negotiating settlement of native title applications and recommended sweeping legislative and policy changes to achieve more agreements.

The Wand review found that \$10 million was spent each year by the State on native title issues, with half of the money soaked up by legal action. Significantly, in Western Australia 44 applications are already heading for trial in the Federal Court. This is more than every other State and Territory put together.

Recommendations of the Wand Review include:

- applying rigorous assessment of evidence of connection to country;
 - enhancing access to Government records that could assist claimants in compiling evidence in support of their application;
 - overhauling State land-use and management laws to integrate processes for the recognition of native title and other rights of traditional land owners; and
 - initiating a public education campaign to encourage arriving at an agreement.
- making legislative changes to the prospecting and exploration licence provisions so that these titles are held for as long as prospecting/ exploration is continuing. Mining leases would only need to be applied for when mining is proposed ; and hence
 - implementing a process that all existing and new applicants for prospecting and exploration licences enter into a Heritage Protection Agreement before proceeding through to the expedited procedure process of the Native Title Act;

As at the end of 2001 the State Government was seeking comments on the final report before considering its response to the recommendations of the review.

In April 2001 the State Government also announced the establishment of a technical taskforce to examine ways to speed up the processing of mining, exploration and land title applications in areas where native title might survive. The taskforce was also to consider options to reduce the volume of outstanding tenement applications that had accumulated. This technical taskforce was chaired by National Native Title Tribunal Member Bardy McFarlane and included representatives of Government, industry and indigenous groups.

In December 2001, the technical taskforce completed its final report and submitted it to the CSCNT. Again, the State Government called for public comment which closed at the end of January 2002. The report recommends sweeping reforms of land access procedures to clear a backlog of 11,000 mineral tenement applications in Western Australia.

Options considered in the report to progress mineral titles include:

- allowing existing applicants for mining leases to apply for new exploration/prospecting licences;
- environment;
 - Aboriginal heritage;
 - land tenure;
 - mining tenure and operations;
 - petroleum tenure and operations; and
 - planning and land-use.

In reaching its recommendations, the taskforce endeavoured to ensure that the ultimate recommendations did not lose sight of day-to-day issues. For example, the taskforce considered the application of statewide template agreements, regional agreements and Indigenous Land-Use Agreements as instruments for processing mineral tenement and land title applications. However, in doing this, the taskforce remained cognisant of the broad range of existing regional agreements in operation.

In September 2001, the State Government announced that a review of the approvals system for the development of major projects within the State would be undertaken by an independent Review Committee (IRC).

The IRC is considering all elements of Government decision-making necessary to bring projects from conception to fruition without compromising environmental or other standards. The following key decision areas are included:

The Review covers projects in any sector of investment that fall broadly within the State Development portfolio (outside major urban centres). Notably, in relation to the resources sector, exploration is also included.

The terms of reference permit the IRC to make recommendations to the State Government with respect to:

- improving the integration of decision-making within different State Government portfolios and levels of government (i.e. State, Local and Federal);
- reducing the complexity of the Government decision-making system, without compromising the quality of the decisions;
- avoiding duplication in different statutory/administrative processes;
- identifying:
 - specific Government decisions required;
 - scope of issues to be addressed;
 - accountability for decisions on each issue; and
 - improving predicability of approval timeframes;
- appropriate avenues for the community to express views to Government and developers in a timeframe and manner that allow those views to be properly taken into account in the decision-making process; and
- educating the community and project developers as to the processes and steps necessary for project approval.

The interim report, canvassing a number of options for change to the existing approvals processes was released for public comment in January 2002. It is expected that the IRC will deliver its final report to the State Government in April 2002.

In August 2001, the State Government established the Electricity Reform Task Force to develop detailed recommendations regarding the extent and phasing

of the disaggregation of Western Power; the structure of the electricity market to be established in Western Australia; the establishment of a Western Australian Electricity Code; and arrangements for full retail contestability.

In line with these recommendations the Electricity Reform Task Force will also consider removing impediments to effective competition.

The main objective of the Task Force is to achieve, where practicable, sustainable lower electricity prices for all customers while maintaining a uniform tariff for residential and small business customers together with adequate reliability, security, quality and safety of electricity supply.

The Electricity Reform Task Force will also give consideration to the role that sustainable/renewable energy has in reducing greenhouse gas emissions.

The Electricity Reform Task Force is expected to submit its recommendations to the Minister for Energy in late 2002.

2. RESOURCE FOCUS 2000-01

2.1 Overview and Outlook

Western Australia is one of the great mineral provinces of the world. There are around 300 commercial projects producing over 50 different minerals. The State has significant world market shares over a range of strategic minerals. During 2000, the State supplied (by quantity) over 14% of the world's iron ore, 20% of alumina, 37% of diamond production, 32% of zircon, 24% of rutile, 14% of nickel and 8% of LNG.

2000-01 was a record-breaking year for the State's resources sector. The total value of mineral and petroleum sales increased by 29.6% to \$27.6 billion from the previous year's total of \$21.3 billion.

The State's petroleum sector again performed impressively with the value of sales increasing by 39% to \$10.6 billion. The percentage share of petroleum against total production value increased from 36% in 1999-2000 to 38% in 2000-01. Other major commodities contributing to this record included iron ore with sales of \$4.9 billion, alumina \$3.6 billion, gold \$3.2 billion and nickel \$2.2 billion. Petroleum, iron ore, alumina and gold collectively accounted for 81% or \$22.3 billion of the total production value of \$27.6 billion.

The State's resources sector continues to be the principal driver for the State's economy. During 2000-01, the Western Australian mining sector enjoyed an upturn as global consumption increased and the Australian dollar fell to record levels. Forecasts for the medium term indicate a softening in world demand for commodities due to a sharp contraction in the international economy. However, commodity prices are forecast to increase in late 2002 as the world economy gathers momentum.

The Western Australian iron ore industry continued to perform strongly in 2000-01. Iron ore sales volumes increased by just over 7% to 162 million tonnes and the value of sales increased by a stunning 32% to \$4.9 billion.

For the Japanese Fiscal Year (April to March 2001), the three major producers accepted price increases of 4.4% and 5.8% respectively for fines and lump ore. Robe River was the first Western Australian iron ore company to settle with the Japanese steel makers, establishing a 4.4% increase for its fines product.

2000-01 was a momentous year for the Western Australian iron ore industry. The acquisition by Rio Tinto of North Limited, which owns a majority stake in Robe River, was certainly the dominating story. Other highlights include the announcement in March 2000 of the go-ahead for the development of the \$1 billion West Angelas project. The plan is to develop large reserves of Marra Mamba ore (440 million tonnes) at a production rate of 20 million tonnes per annum. A mine life of at least twenty years is forecast.

Other major greenfield iron ore deposits being advanced towards development commitment include BHP Iron Ore's Mining Area C and the Hope Downs deposit, with the latter being evaluated through an alliance of Hancock Prospecting Ltd and the South African mining company, Iscor Ltd. Also during the year, Portman Limited, Western Australia's smallest iron ore producer, expanded its Koolyanobbing iron ore operation from 1.7 to 2.3 million tonnes per annum. The company's final target is to increase annual output in the next five years to over 8 million tonnes per annum.

The global market for alumina was robust in 2000-01 with prices increasing by around 160% from July 1999 to March 2000, but then showed signs of easing back as the production of alumina increased in some refineries. The major reason for the high alumina price was due to the loss of production from Kaiser's Gramercy refinery in the US which was shutdown because of an explosion and recommissioned later in 2000.

Against this background the Western Australian alumina industry continues to power ahead. During

2000-01, production increased by 12% to 10.5 million tonnes and the sales value by a massive 35% to \$3.6 billion.

The principal reasons for this substantial rise in production was additional output from the Worsley refinery, following a major capacity expansion of 1.25 million tonnes per annum in 2000. Total capacity is currently 3.4 million tonnes per annum, ranking it the third largest in Australia, behind Rio Tinto's Gladstone refinery in Queensland and the Pinjarra refinery in Western Australia.

The Western Australian gold industry continues to be a vital component in the State's economy, but in 2000-01, gold production dropped by 2% to 201 tonnes. Average gold prices expressed in Australian dollars, were relatively high in 2000-01, reflecting the weakness of the Australian currency. The fall in production can be attributed to a lack of major investor interest in the industry and inadequate levels of exploration, which put it under severe pressure and consequently resulted in the closure of a number of smaller, higher cost mines.

Depressed gold prices have had a major impact on gold exploration in the State and indeed throughout Australia. With the low international gold price the immediate outlook for the industry continues to be subdued.

The Western Australian gold industry continues to reduce costs by embracing new technologies and fine tuning efficiencies at its mines. However, the low level of exploration is of concern to the Western Australian economy and the community because the results in the next few years will be felt in regional areas where employment, investment and infrastructure rely on gold mining and exploration.

Australia is the world's third-largest nickel producer, with the majority of the mines concentrated in the Kalgoorlie and Leonora regions of Western Australia.

During 2000-01, the State produced 167,539 tonnes of nickel, representing a 16% increase on the previous year's total of 143,934 tonnes. The value

of sales increased by an impressive 24% to \$2.2 billion.

Continued declines in stainless steel demand coupled with rising nickel supply and rising inventories, and the absence of any cut to global mine output has delayed any meaningful recovery in the nickel market for 2001-02.

The WA minerals sands sector performed relatively well during 2000-01. In sales-value terms, the industry increased by 25% from \$732 million in 1999-00 to \$917 million in 2000-01. Upgraded ilmenite continues to be the largest contributor in this sector, for which sales value increased by 26% from \$325 million in 1999-00 to \$409 million in 2000-01.

The rutile component of the mineral sands industry had an outstanding year with sales value increasing by 51% from \$73 million in 1999-00 to \$110 million in 2000-01, principally on the back of increased demand and higher prices.

During 2000-01, the sales value of diamonds from the Argyle Joint Venture diamond mine in the Kimberley fell by 13% from \$704 million in 1999-00 to \$614 million. Sales fell by 50% from 51 million carats in 1999-00 to 25.4 million carats in 2000-01. Declining global demand was a major factor behind the contraction in sales.

Western Australia's base metals sector (copper, lead and zinc) performed impressively during 2000-01. The value of base metals rose by 28% to \$429 million from the 1999-00 value of \$336 million. Robust demand and moderately improved prices contributed to this improved performance.

The salt industry increased its sales value by 12% from \$209 million in 1999-00 to \$233 million in 2000-01. Additional sales to Japan was the principal reason for this improvement.

There was a 7% fall in sales value for the coal sector, which decreased from \$272 million in 1999-00 to \$252 million in 2000-01.

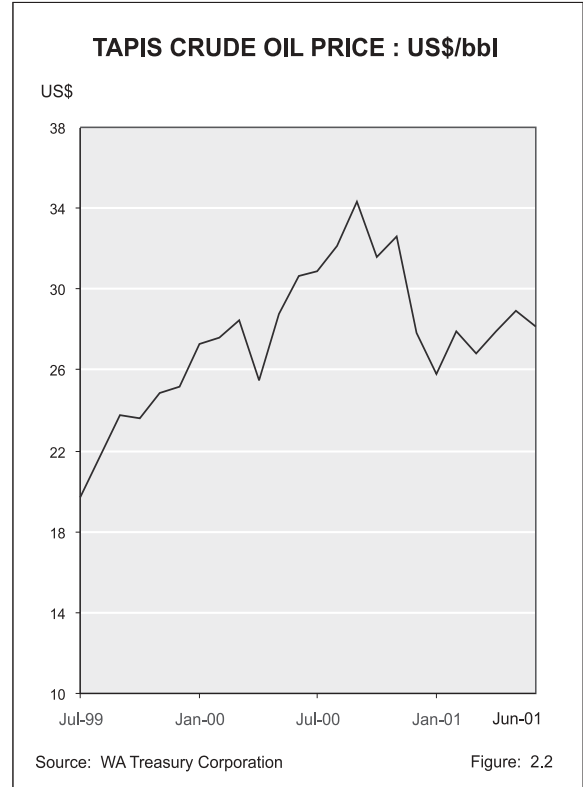
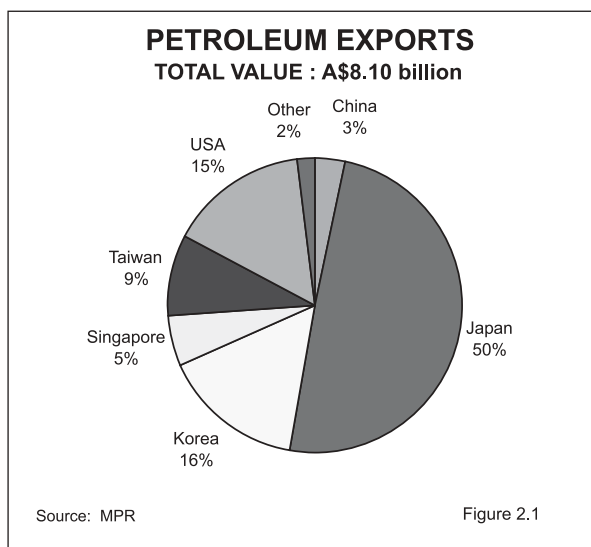
In 2000-01 sales of tantalum increased by over 84% with a market value of close to \$145 million. Remaining commodities such as gypsum and vanadium for example, each had sales values of less than \$100 million.

2.2 Petroleum

Following a record breaking 1999-00, the State's petroleum sector again proved to be the largest contributor in 2000-01, accounting for 38% of Western Australia's total value of mineral and petroleum sales. Petroleum by sales value increased 39%, from \$7.6 billion in 1999-00 to \$10.6 billion in 2000-01.

The combined effects of robust oil prices and a weaker Australian dollar helped boost the State's earnings from its petroleum industry. During the year, world oil prices averaged around US\$29 per barrel, a relatively substantial increase on the previous year's average of US\$19 per barrel. Prices peaked in November 2000 at US\$35 per barrel, the highest in many years.

Furthermore, the value of the Australian dollar against the US dollar declined to record lows in 2000-01, which meant that Australian petroleum exports sold in US dollars were worth considerably more in Australian dollar terms than in 1999-2000.



During 2000, crude oil was once again the principal contributor, surpassing LNG and condensate. Crude oil production during the year increased by 16% from the previous year accounting for \$4.8 billion, or 45% of total petroleum sales in Western Australia.

Owing to a temporary shutdown, LNG production during 2000-01 fell by 5% to 7 million tonnes. Nevertheless, value of sales increased by 39% to \$2.7 billion. Western Australia's major markets for petroleum exports are the countries in East Asia. The Japanese power utilities are the principal purchasers of the State's LNG exports.

As with the initial LNG export program, the construction of the \$2.4-billion Train 4 to the Burrup Peninsula is being underpinned by 25-30-year contracts with the Japanese utilities that were signed in October 2001. The agreements are with Tokyo Gas and Toho Gas for the purchase and supply of 1.37 million tonnes per annum of LNG.

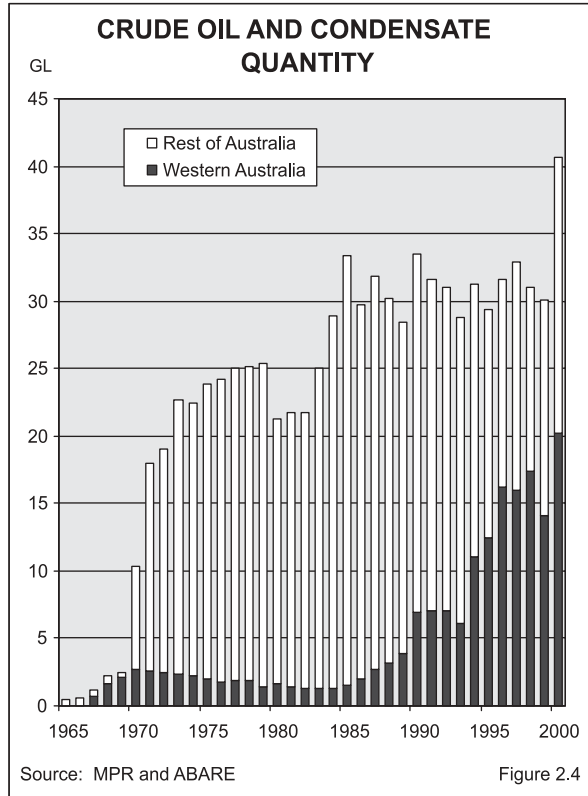
Tokyo Gas distributes gas to more than eight million customers in the Tokyo metropolitan area and is the

largest gas utility in Japan, accounting for around 40% of total Japanese sales. The company buys about 6.5 million tonnes of LNG per annum from producers around the world, of which 0.79 million tonnes per annum is supplied by Western Australia.

After a dramatic rise in the previous year, the volume of Western Australian condensate sales decreased by 8%. However, higher prices and the low value of the Australian currency saw sales value rise by 25% to \$2 billion in 2000-01.

The sales value of natural gas production also increased, by 8.9% in 2000-01 to \$630 million.

The total volume of liquefied petroleum gas (butane and propane) sales decreased slightly in 2000-01 by 2% to 762,370 tonnes. Again however, higher prices and the low value of the Australian dollar saw the value of sales rise by a dramatic 16% and 29% for butane and propane respectively. Most production was exported to Japan with spot sales to some other countries.



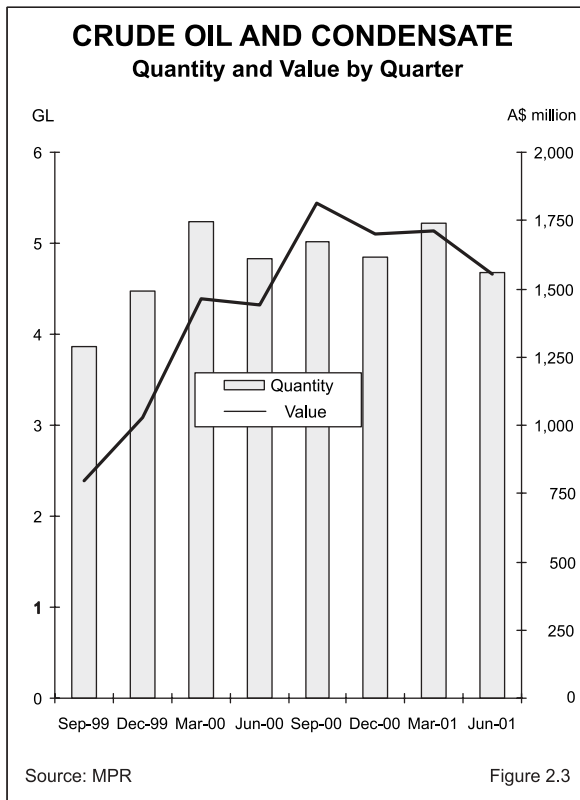
2.3 Iron Ore

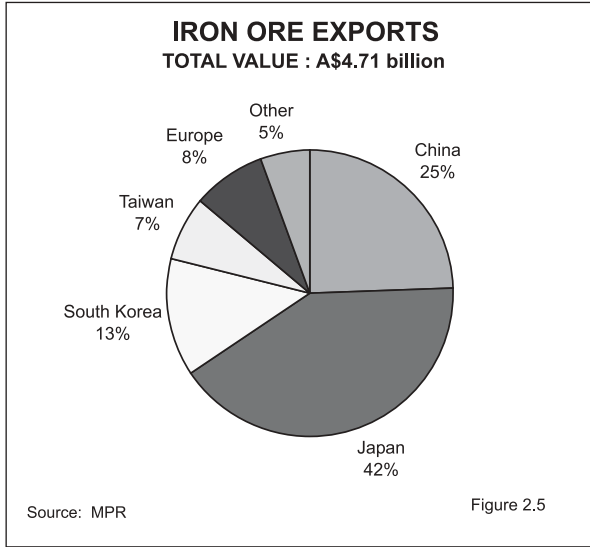
After petroleum, iron ore is the second most valuable commodity in Western Australia. In 2000-01, iron ore sales totalled \$4.9 billion, a 32% increase from the 1999-00 figure of \$3.7 billion.

During 2000-01, Western Australia accounted for 14% of the world's total iron ore production and 34% of world seaborne trade in iron ore.

Over 82% or 129 million tonnes of Western Australian iron ore was shipped to East Asia. Japan is Western Australia's largest customer accounting for 44% of the State's production, China is second with 21%, Korea third with 13.2% and Taiwan next with 5.1%. Iron ore sales to Europe have been steady, accounting for around 18% of Western Australian exports over the last decade.

Western Australia's iron ore industry has grown impressively over the last decade, with output increasing by around 50%. This has principally been

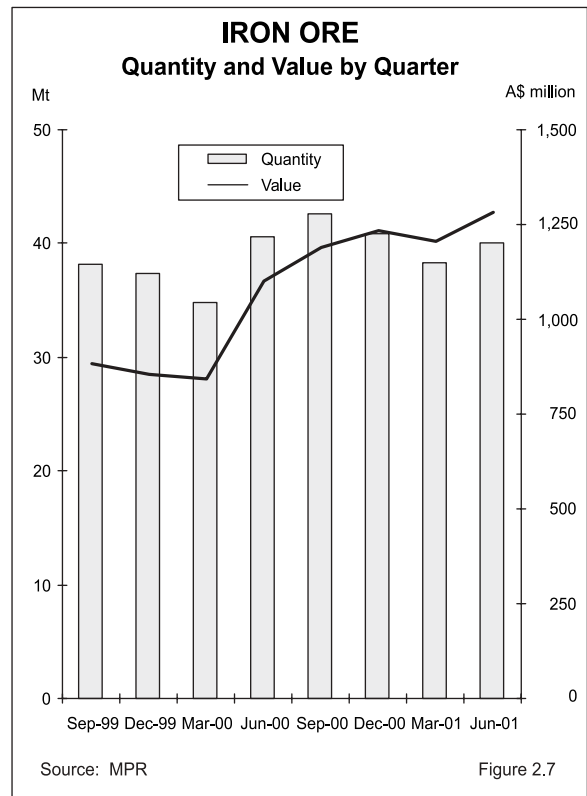
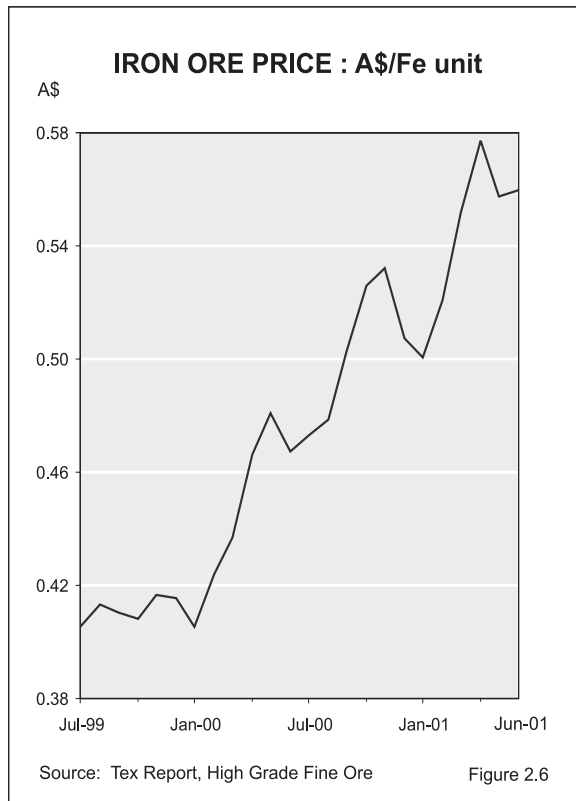




A noteworthy feature of this growth is the progressive move in product mixes to reflect the remaining long-term resource-base of the State. The plans ensure that premium quality ores are exploited at rates which are commensurate with the continuing longer term demand for high quality blends and product varieties required by customers.

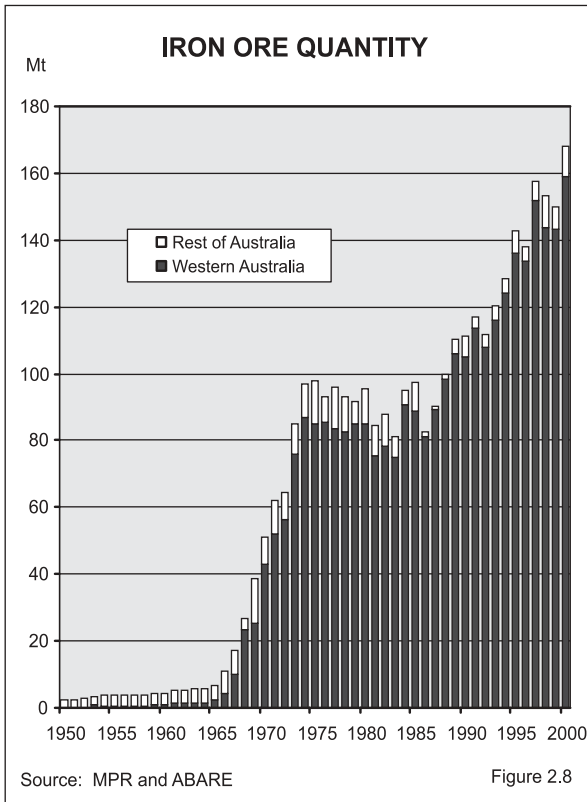
With the acquisition by Rio Tinto of North Ltd in late 2000, the State's iron ore industry is now dominated by two major companies, BHP and Rio Tinto, although the Robe Joint Venture continues to operate as a separate, independent entity.

achieved through the development of satellite orebodies and some "greenfield" mines being integrated with existing infrastructure. Over the past ten years some of the notable greenfield iron ore mines that have been developed in the Pilbara are Marandoo, BHP Yandi and HI Yandi. Another three are planned to come into operation in the next five to six years including West Angelas, Mining Area C and the Hope Downs development.



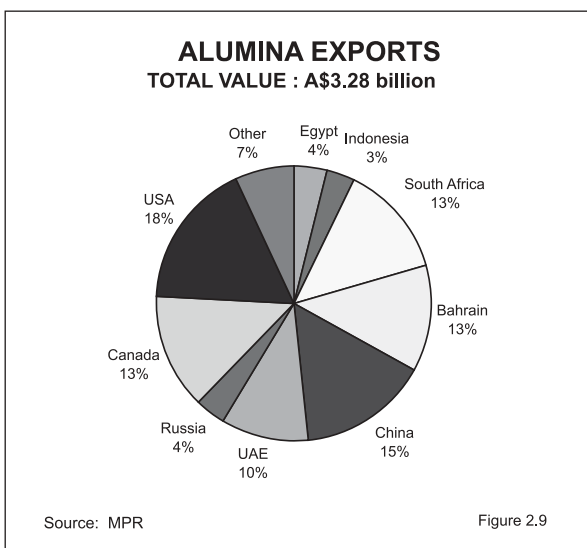
With nearly 14% of the world's total iron ore production and over 34% of world seaborne trade, Western Australia, alongside Brazil, continues to dominate the global iron ore export market. This leading position by these two regions is expected to be maintained and even enhanced in the foreseeable future.

Forecasts by ABARE suggest that Western Australian iron ore exports could increase by around 10% to



between 165 and 177 million tonnes by 2005. The State's close proximity to the expanding markets of Asia, its reputation as a reliable supplier, and its competitive cost structures are expected to underpin modest increases in the market share in East Asia over the next five to six years.

To achieve this growth, Western Australian suppliers and potential suppliers continue to pursue



development plans for new generation iron ore mines aimed at maximising further opportunities for exports. These projects include four Marra Mamba developments:

- Robe River's West Angelas;
- BHP's Mining Area C;
- Hancock Prospecting/Isacor's Hope Downs; and
- Hamersley Iron's Nammuldi/Silvergrass.

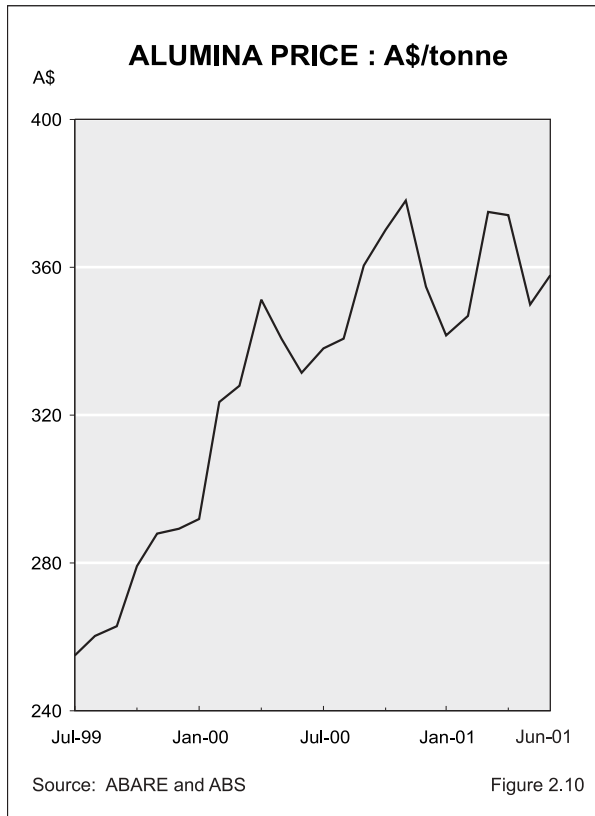
In July 2000, Western Australia's smallest iron ore producer, Portman Limited, completed the first stage of its expansion program that will increase production from 2.2 million tonnes per annum in 2000 to 3.5 million tonnes per annum in 2001. The company's ultimate target is to see production rise to 8 million tonnes per annum over a five-year period.

In summary, 2000-01 has seen an all-time record steel production worldwide. This has been reflected through excellent demand for iron ore. However, iron ore demand is forecast to fall in 2000-02 as economic growth contracts in the US, Japan and other parts of the world.

2.4 Alumina

Western Australia hosts four world-class alumina refineries, comprising Worsley alumina and Alcoa's Kwinana, Pinjarra and Wagerup operations. In 2000-01 The State produced around 20% of the world's alumina and accounted for over 60% of Australian production. Most of the alumina is exported, with the major destinations being aluminium smelters in the US, where over 18% of the State's production is shipped. Other countries include South Africa (13%), China (15%), Canada (13%), Bahrain (13%) and the United Arab Emirates (10%).

In 2000-01, the value of Western Australian alumina sales increased by 35% from \$2.7 billion in 1990-00 to \$3.6 billion due principally to the



weakness of the Australian currency against the US dollar. This saw the alumina sector move into third position behind petroleum and iron ore in terms of the relative size of its value of sales.

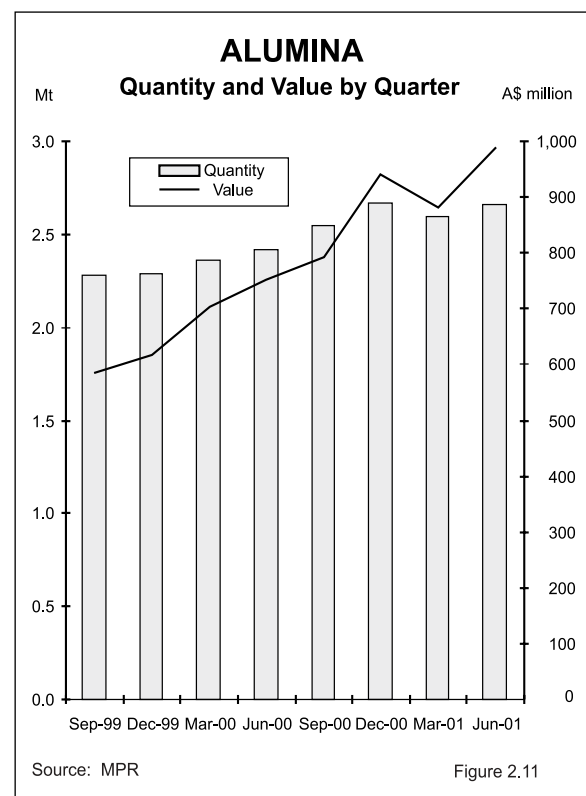
The volume of alumina sales also increased by 12% to 10.5 million tonnes in 2000-01. Completion in September 2000 of Worsley's refinery expansion was a contributor to this growth and the last twelve months has seen Worsley Alumina ramp up its alumina production to a maximum capacity of 3.1 million tonnes per annum. On the other hand, Alcoa shelved plans to expand the Wagerup refinery due to prevailing market conditions and concerns about environmental matters at the refinery.

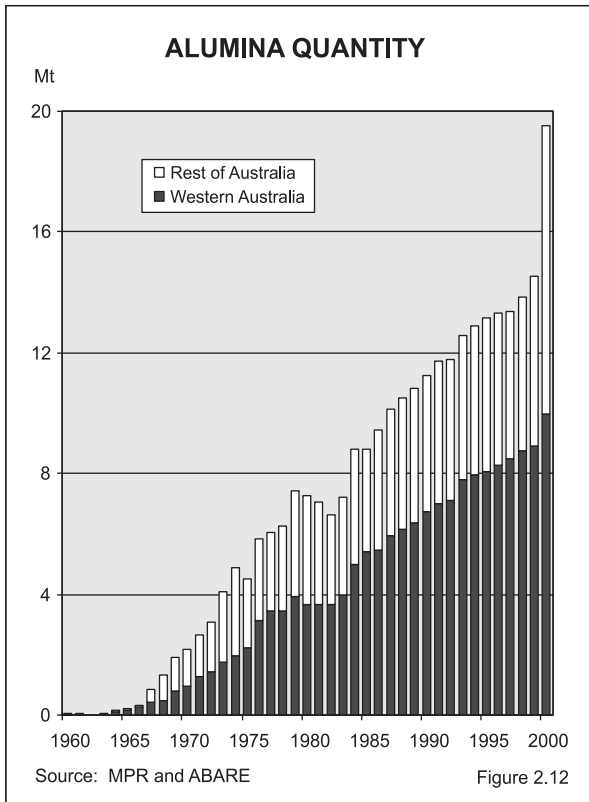
For Australia as a whole, alumina production increased by 7% to 16.1 million tonnes during 2000-01. Increased production at Australian refineries offset falls in other regions such as North America, resulting from a decline in demand from aluminium smelters in the United States and Brazil. Therefore, on balance, world alumina production remained relatively stable in the period. According to ABARE, Australia's production of alumina is projected to increase only slightly in 2000-02.

Although the average alumina price in 2000-01 was US\$191.80 per tonne or 2% higher on 1999-00, the weakening demand for alumina in North America and expanded refineries in Australia has led to excess production capacity in the global alumina market. As a result, alumina prices continued to fall in the late period of 2000-01.

A significant local development saw US-based Alcoa Inc acquire Reynolds Metal's 56% interest in the Worsley alumina project in Western Australia as part of its takeover of the company. However, Alcoa was later forced to sell this 56% by the US regulatory authorities and the European Union Commission who had concerns regarding the company's dominance in the industry and the possibility of anti-competitive practices.

Following an auction process that attracted bids from a variety of aluminium industry participants, Alcoa sold its 56% to BHP-Billiton, which already had a 30% shareholding in the Worsley project. BHP-Billiton now holds 86% of the Worsley alumina project with the remaining 14% owned by Kobe Steel, Nissho Iwai and Itochu.





200 tonne mark. In 2000-01 the State's gold output fell by 2%, down to 201 tonnes. This compares with 205 tonnes in 1999-00. The value of the State's sales however, rose during the year to \$3.2 billion or 10% above that of the previous year.

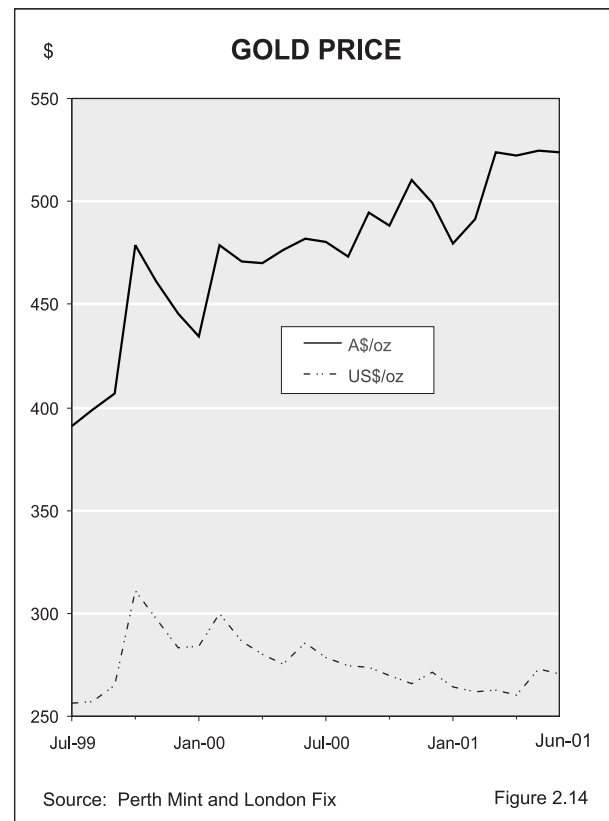
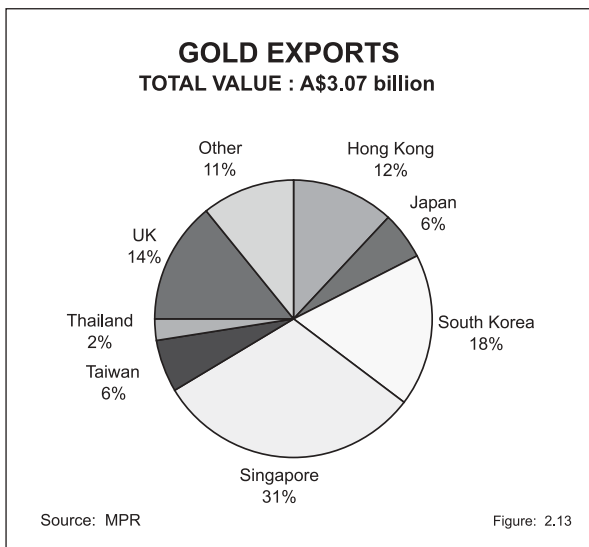
According to ABARE, while output of gold is not expected to contract significantly over the short term, production is nevertheless expected to fall marginally in the next few years, principally because of the reduced levels of investment in exploration over the past three years. However, this resource depletion will be partly offset by production from a number of new projects and expansions currently expected to commence over the medium term.

Western Australia accounts for about 71% of Australia's, and more than 8% of the world's, gold production. Companies are maintaining profits as a result of the weak Australian dollar by implementing greater economies of scale and reducing exploration expenditure.

With the completion of Worsley's refinery expansion, total employment in the alumina sector dropped back to 6,413 persons in 2000-01. This was 12% below the 1999-2000 figure of 7,296.

2.5 Gold

After peaking in 1997, Western Australia's gold production appears to have plateaued at around the

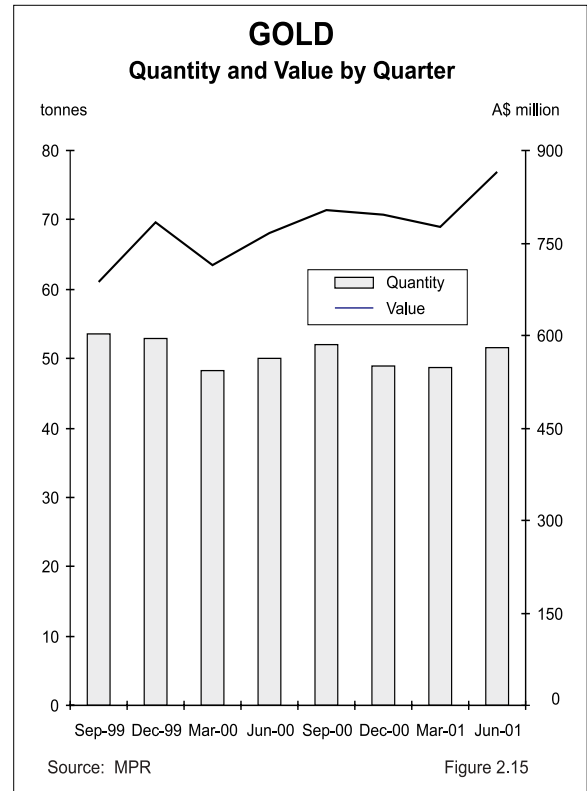


A significant feature of the gold industry has been the diminishing number of companies involved in the industry. In particular, fewer large companies are involved in the industry than probably at any time in history. Data supplied by stock exchange authorities in Australia and South Africa show that in 1990 there were 48 gold-producing companies listed on the Australian Stock Exchange compared with 44 in 2001. In South Africa, the reduction has been even more dramatic with the number having shrunk from 37 in 1990 to just six in 2001.

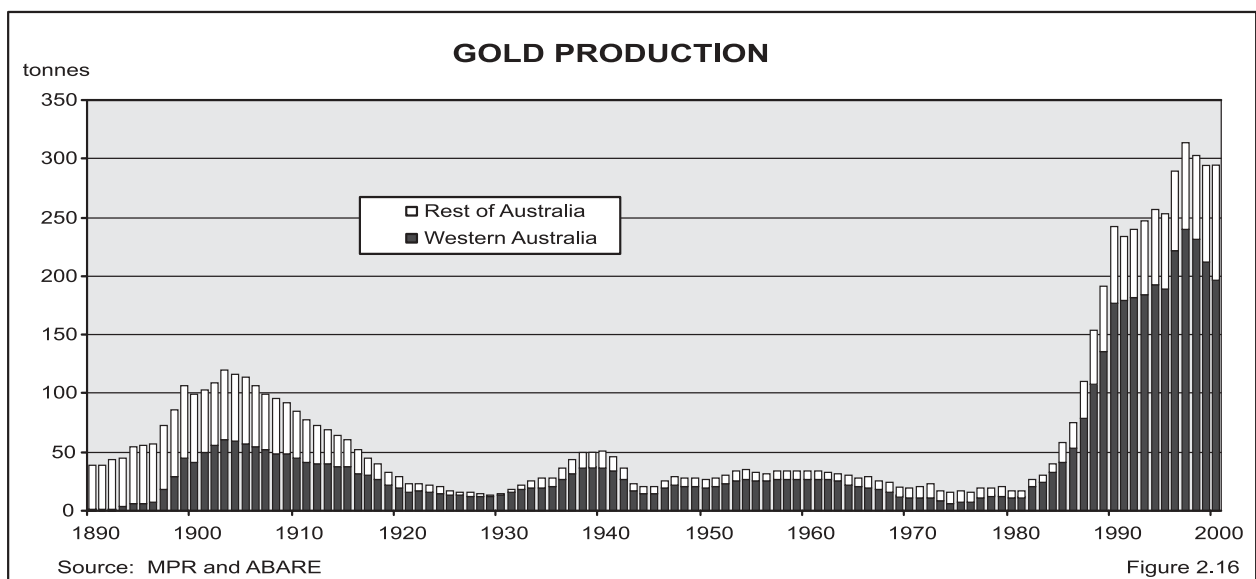
Locally, a similar story is told in terms of Kalgoorlie-Boulder's Golden Mile where in the 1970s four companies operated (North Kalgurli; Gold Mines of Kalgoorlie; Great Boulder Mines; Lake View and Star Limited). Today, only one gold mining company operates, Kalgoorlie Consolidated Gold Mines Pty Ltd, which mines from the SuperPit.

Apart from the takeovers, and mergers at the top end, numerous gold mining operations in the Murchison, Yilgarn and Eastern Goldfields have also merged their treatment operations to save on costs. These include Jundee and Nimary, Bronzewing and Mt McLure, and several others that are now treating their ore at central processing plants.

Despite the smaller number of large companies involved in gold mining in Western Australia, the



industry remains a significant employer. In 2000-01 the gold industry accounted for 11,488 or 28% of all people employed in the State's mining and petroleum industry. Although this was only marginally up on the previous year's employment figure, it represents a 10% increase on the gold industry's employment a decade earlier.



According to ABARE, Australian gold mine production is forecast to total around 296 tonnes in 2001-02, three tonnes lower than 2000-01.

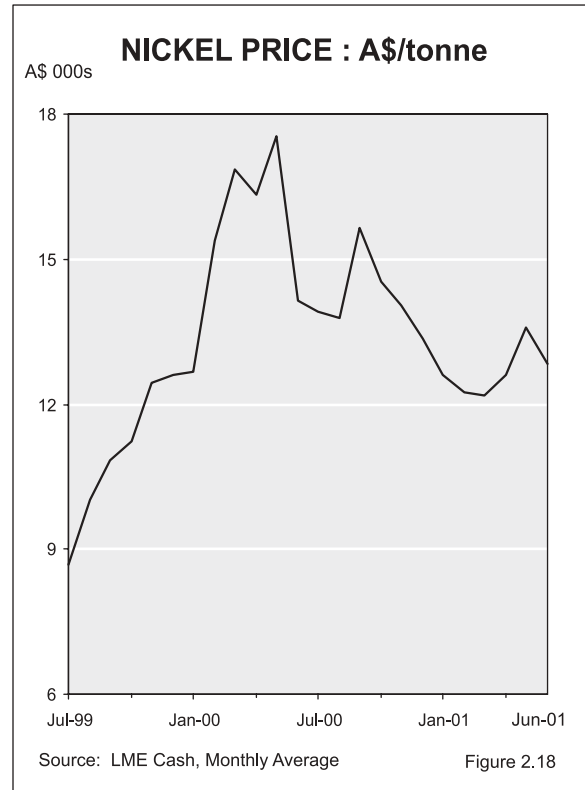
Average gold prices expressed in Australian dollars, have been relatively high in 2001, reflecting the weakness of the Australian currency. In the first half of the year, Australian dollar gold prices averaged \$509 an ounce compared with \$467 an ounce in the same period in 2000.

Exports of gold from Australia in 2000-01 totalled 302 tonnes. In 2001-02, export volumes are forecast to increase by almost 12% to 338 tonnes. This increase in exports is expected to result from a significant increase in re-exports of gold of overseas origin, specifically from Asia. As a result, the total value of gold exports is forecast to rise by 9% in 2001-02, to over \$5.3 billion.

2.6 Nickel

2000-01 saw a fall in nickel prices. The average LME price for nickel in 2000-01 was US\$7,239, representing a 12% decrease on 1999-00. However, the average nickel \$A price rose slightly by 2% to \$13,443 during the year, reflecting a 14.5% depreciation in the Australian dollar. The major reason for the fall in international nickel prices was weaker demand for primary nickel, resulting from a stall in production of stainless steel associated with

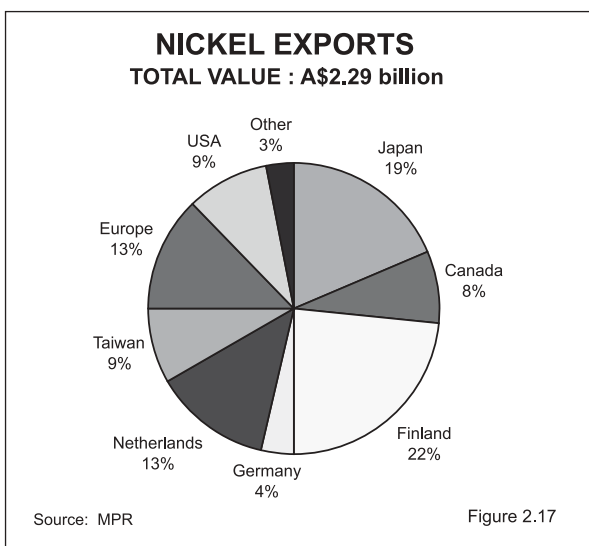
easing industrial production in Japan, the US and western Europe. An increase in the availability of nickel scrap incurred by the high nickel prices in early 2000 further weakened demand for primary nickel.



During 2000-01, nickel production in Western Australia increased by 16% from 143,934 tonnes in 1999-00 to 167,539 tonnes in 2002-01. The sales value of nickel increased by an impressive 24% to \$2.2 billion over the same period.

Western Australia currently accounts for all of Australia's nickel production and most of Western Australia's nickel is exported. The main export destinations currently are Finland (22%), Japan (19%), USA (9%) and Netherlands (13%).

The increase in Western Australia's nickel output in 2000 was largely driven by stronger production from WMC's operations, together with the new nickel laterite projects (Cawse, Murrin Murrin and Bulong) gearing up to full capacity production. The continued development of these projects together with a

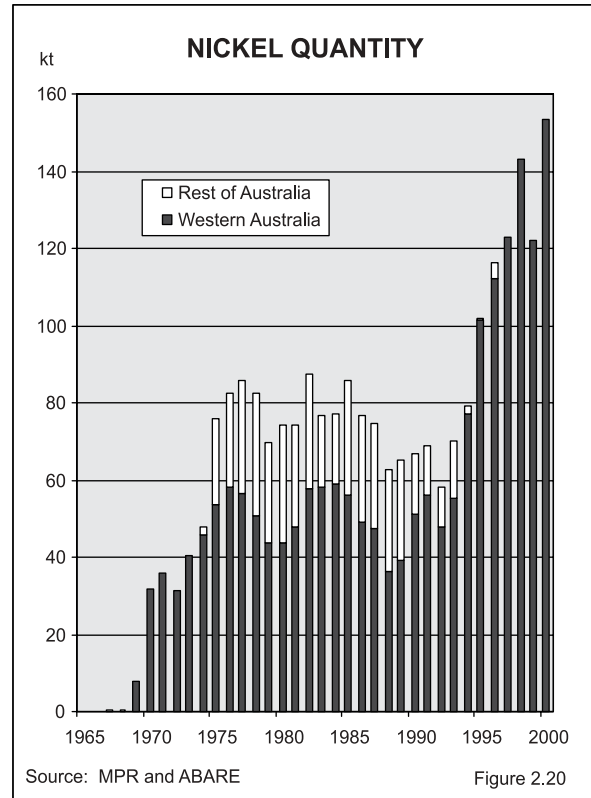
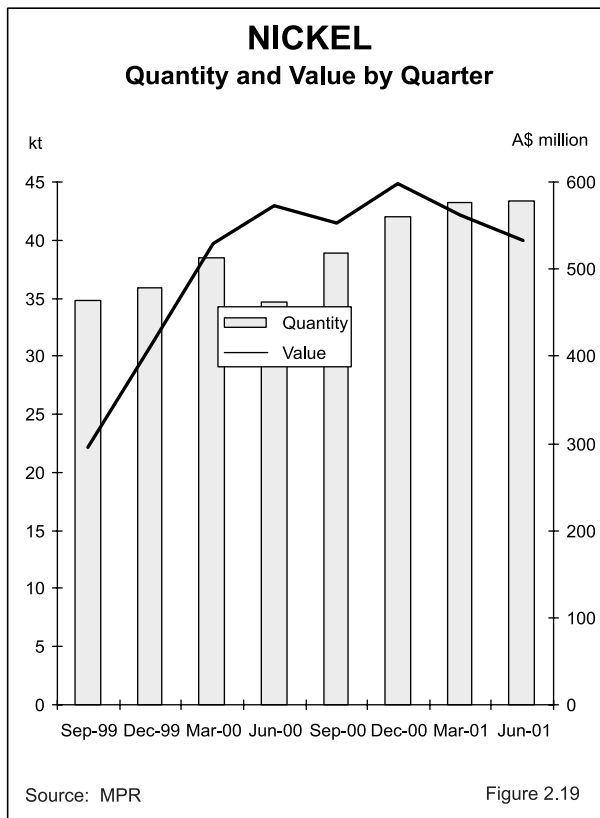


number of other planned project expansions looks set to support continued future increases in these sales volumes.

In local developments, LionOre Australia (Nickel) Ltd proceeded with the development of the Emily Ann nickel sulphide project which commenced operation in August 2001. The mine is located 540 kilometres east of Perth. It uses an on-site nickel sulphide concentrate plant with an annual throughput of 250,000 tonnes of ore producing concentrates containing an average of 6,700 tonnes of nickel per year.

Research into the treatment of nickel laterite also progressed with the opening of an ore pilot testing plant in Kewdale. This pilot plant has been commissioned to optimise the process configurations for the Ravensthorpe project and will provide leading-edge test facilities for other new laterite nickel deposits within Western Australia awaiting development.

In September 2000, Anaconda Nickel Limited announced its "Three Nickel Province Strategy"



reflecting the sealing of a strategic alliance between Anaconda and a number of companies including Goldfields Limited, Homestake Gold of Australia Limited, and Centaur Mining and Exploration Limited. This alliance provides Anaconda access to the world's largest nickel resource with a target of over 4 billion tonnes of nickel laterite. This strategy is based on the Mount Margaret project, the Murrin Murrin and Cawse operations.

Improved nickel prices also prompted the purchase of the Miitel, Mariners and Redross mines in Kambalda by a consortium of Mincor Resources NL (76%), Clough Mining Pty Ltd and Donegal Resources Pty Ltd (each 12%) from WMC. Operations from these mines commenced in 2001.

Titan Resources also announced the successful development of the BioHeap process used for the biological recovery of nickel from low-grade base metal sulphide ores, with a large-scale pilot plant constructed and operating adjacent to Titan's Radio Hill underground mine, near Karratha. Titan also received a \$1.9-million Commonwealth Government Research and Development Start Grant

to assist in the funding of the final phase of field development trials.

Following significant technical difficulties since the completion of the Bulong processing plant, located in Kalgoorlie, Preston Resources was forced to give its US bondholders, headed by London bank Barclays, a 95% stake in the project.

The setback in nickel prices experienced in 2000-01 continued in the third quarter of 2001 as a result of weakening demand, high stainless stocks and rising production. However, latest available data shows encouraging signs of strengthening nickel prices in the world market. There is great potential for continued fast growth in demand for nickel in the medium term. According to ABARE (2001), world nickel consumption and production is expected to grow at average annual rate of 4.7% and 4.5% respectively, over the period to 2005-06. With growth in world consumption expected to outpace growth in production, nickel prices are forecast to recover in 2002. However, ongoing improvements in the operational efficiency of the world nickel industry and additional low-cost capacity coming into production are likely to ease the increase in nickel prices in the longer term.

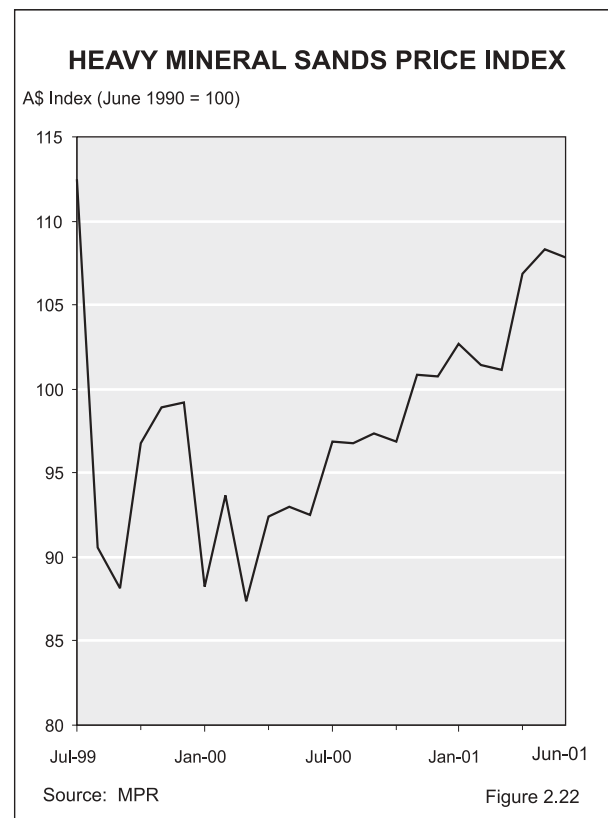
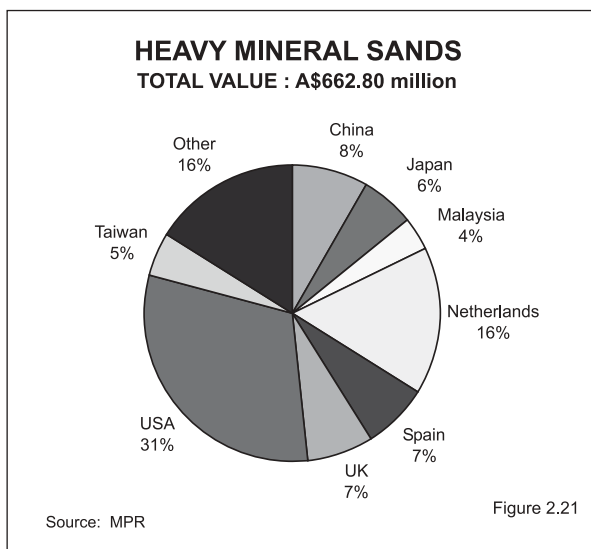
In terms of future local output, following the discovery of a high-grade nickel resource at the Cosmos nickel mine, 40 kilometres north of Leinster, Jubilee Mines commenced the development of the

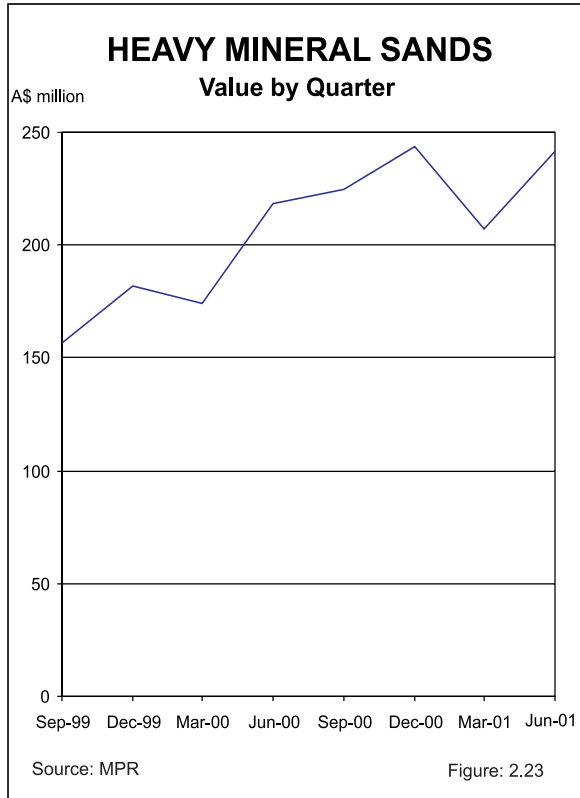
Cosmos Deeps underground mine. This development will more than double the life of the present project which came on-stream earlier in mid-2000, increasing its mine life to seven years.

In other expansion developments, WMC launched a feasibility study into the expansion of its Mount Keith nickel operation near Leinster. The planned expansion would entail both the company's nearby North Six Mile deposit and Yakabindie nickel deposit which WMC acquired from Rio Tinto in early 2001.

2.7 Heavy Mineral Sands

After exceptional growth in 1999-00, significant deterioration occurred in demand for titanium feedstocks in 2000-01. According to TZ Minerals International Pty Ltd (TZMI), world demand for titanium feedstocks in 2001 was 3.2% below that in 2000, dropping from 4.6 million titanium dioxide (TiO₂) units to 4.4 million TiO₂ units. This decrease was largely attributable to weakening demand for TiO₂ pigment in the US where in August 2001 for example, apparent consumption of TiO₂ pigment in





The largest sector (by value) of the State's mineral sands industry is upgraded ilmenite (synthetic rutile). Sales output increased by over 16% to 643,000 tonnes and stronger demand coupled with improved prices saw the value of sales improve by 26% to \$409 million.

Output of ilmenite however, fell by 6%, but the value of sales increased by 11% to \$169 million.

The State's rutile sector saw sales increase by 29% to 127 million tonnes and the value of sales increased by a stunning 51% from \$73 million to \$110 million in 2000-01. Leucoxene sales were also up marginally by 2% to 40,000 tonnes and the sales value increased by 10% to \$18 million.

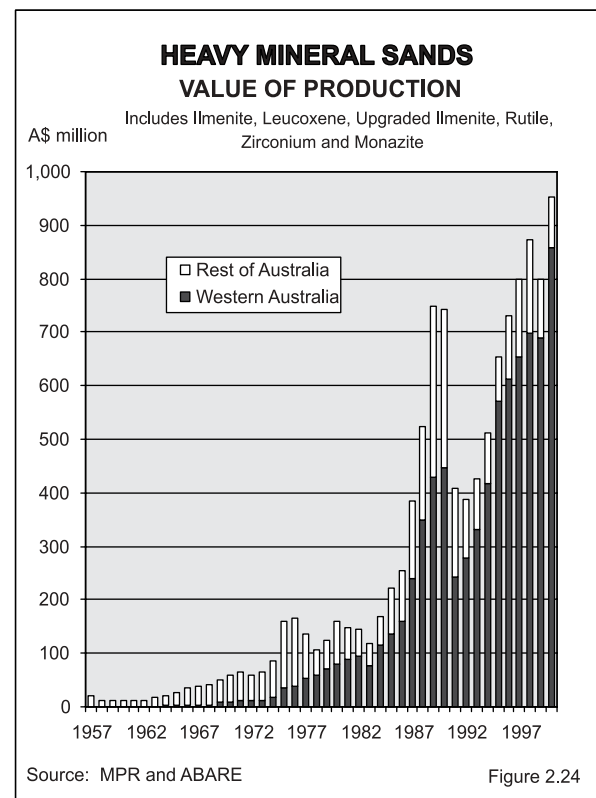
Outside the titanium group, Western Australia's zircon sales decreased marginally by 1% from 348,000 tonnes in 1999-00 to 343 thousand tonnes in 2000-01. In terms of value however, there was an increase of 30% to \$199 million. A steady increase in prices coupled with demand outstripping supply were the principal factors in this increase.

the US was down 6% year-on-year due to slower economic growth in the country. This is significant as the country's pigment industry consumes approximately 95% of world titanium feedstocks and the US TiO₂ pigment industry accounts for 40% of world production.

World consumption of zircon on the other hand, increased by 3% in 2001 over 2000. However, this represents a slowdown in the growth of demand from a growth rate of over 5% in the previous year. A major factor in the continuous increase in world demand for zircon was China where over the last decade, China's zircon consumption has grown at an average rate of 12% per annum, becoming the world's largest zircon consumer in 2001.

For Western Australia, the dominant markets for the State's heavy mineral sands are the USA, Netherlands and the United Kingdom. Other export destinations include Japan, Taiwan, China and Spain.

Against this global backdrop, Western Australia nevertheless managed a healthy 25% sales value increase in 2000-01, rising to \$917 million.



Due to poor prices, the value of garnet sales fell nearly 3% to \$12 million even though quantities increased by 8% to 112,000 tonnes.

While relatively very small in value, it is noteworthy that 2000-01 also saw the first exports of staurolite worth over \$37,000. Staurolite is used as a blasting abrasive and can be described as an aluminium silicate with physical qualities similar to garnet. The product was previously regarded as a contaminant mineral and trash by-product of Tiwest's titanium operations from its Cooljarloo orebodies and Chandala processing plant.

The strength of the US TiO₂ pigment industry remains critical to the world titanium feedstocks market in 2002. Hence, the recovery of global demand for titanium feedstocks is unlikely to occur in the short term given the uncertainty associated with the forecast recovery of the US economy in particular and the global economy as a whole. The latest TZMI forecasts show that world demand for titanium feedstocks and zircon will be 4.4 million TiO₂ units and 1 million tonnes, respectively, in 2002, more or less the same as in the previous year. World supply of titanium feedstocks and zircon is projected to be slightly higher, resulting in a small forecast surplus in 2002.

2.8 Diamonds

In 2000-01, the Western Australian diamond industry was unable to sustain the record-breaking levels set in the previous years, with sales falling by 13% from \$704 million to \$614 million. Volume of sales also fell substantially by 50% to 25.4 million carats.

The Argyle Joint Venture originally sold its output through the Anglo-De Beers Central Selling Organisation (CSO), which until recently managed the sale of more than 75% of the western world's diamonds. However, since 1996 the Argyle partners opted to market their production independently of the CSO. The major portion of the diamonds are exported to Antwerp and sold to 15-16 customers in India. Ashton Mining was acquired by Rio Tinto in November 2000.

Significantly, at the end of 2001 the Western Australian Government cleared the way for a second diamond mine in the State by amending legislation to free the Ellendale Mining Lease for development by Kimberley Diamond Company NL. Amendments comprised changes to the *Diamond (Argyle Diamond Mines Joint Venture) Agreement Act 1981-1983* to excise the Ellendale lease area formerly held by owners of the Argyle diamond mine for transfer to the Perth-based Kimberley Diamond Company.

The Kimberley Diamond Company is now able to proceed with plans to develop a two-stage mining operation at Ellendale. The first stage would begin operating in mid-2002 and see around half a million tonnes of ore processed per annum. If the operation is successful and diamond reserves in the region are proven, the company is considering increasing throughput at the mine with an additional \$26 million investment to expand the mine and extend the life of the project by ten years.

After a hesitant start in 2000, world diamond exploration gained momentum during 2000-01 according to the consensus at the Prospectors and Developers Association of Canada's annual international convention held in early 2001.

During the year, De Beers initiated a review of its operations in response to sluggish growth in diamond sales, with the Central Selling Organisation (for decades the principal controller of rough diamond sales to world markets) being dismantled and replaced by the Diamond Trading Company, aimed at streamlining the marketing system for rough diamonds.

Future prospects for the global diamond industry remain encouraging, with demand outstripping supply, despite the release of a considerable volume of stones from the De Beers stockpile. Global production has increased by six times since 1950 to 125 million carats per annum. Some industry observers have forecast that this output could surge to 160 million carats by 2008 in response to increased world demand.

2.9 Other Minerals

Base Metals

Global production of base metals (copper, lead and zinc) increased by 1.8% to 30.8 million tonnes in 2000-01. Global consumption of base metals decreased slightly, by 1.1%, falling from 30.4 million tonnes in 1999-00 to 30.1 million tonnes in 2000-01. This decline in demand for base metals was due to easing economic growth in the US and other major consumption regions. Contraction in demand for copper and zinc was larger relative to that for lead. In 2000-01, world consumption of copper and zinc contracted by 1.2% and 1.5% respectively and stocks of the two metals increased by 21% and 41% respectively. As a result of weakening demand, by June 2001 the average LME monthly prices for copper and zinc had fallen 8% and 20% respectively on the equivalent period of the previous year. The forecast recovery of the global economy in 2002 is expected to improve world demand and prices for base metals.

In Western Australia the value of base metals sales (copper, lead, zinc) increased by 28% to \$429 million in 2000-01.

Zinc continues to be the major contributor with the value of sales in 2000-01 increasing by 12% to \$280 million. The two major producers of zinc in Western Australia are Normandy's Golden Grove project and Western Metal's Lennard Shelf mining operations.

The State's copper sector recovered strongly in terms of both value and quantity. In 2000-01, sales volume increased by 39% to 42,631 tonnes and the value of sales increased by a massive 72% to \$111 million.

The sales value of lead also rose spectacularly, up by 84% in 2000-01 to \$37 million. This was due to a 28% increase in sales volume to 82,326 tonnes and lead prices which were boosted for local producers by the devaluation of the Australian dollar.

Coal

Production in the State's coal industry fell by 6% in 2000-01 to 6.1 million tonnes and its associated value also dropped, by 7% from \$272 million in 1999-00 to \$252 million in 2000-01.

The drop in output was mainly due to a fall in purchases of coal by Western Power as a result of general efficiencies in the Western Australian energy sector.

Salt

During 2000-01 the quantity of salt produced decreased by 6% from 8.8 million tonnes in 1999-00 to 8.3 million tonnes. This was primarily due to a drop in output from Dampier Salt's operations. However, the overall value of Western Australian sales increased by 12% from \$209 million to \$233 million over the same period.

Significantly, in July 2001 Dampier Salt purchased Cargill's Port Hedland salt operation. The Port Hedland operation presently produces and exports around three million tonnes of salt per annum and the acquisition significantly expands Dampier Salt's current production capacity to make it the world's largest salt exporter.

Dampier Salt's production is exported, principally to Asia, with its largest customers in the chemical industry in Japan, Korea, Taiwan and Indonesia. A proportion of output is used for food processing and domestic consumption in Malaysia and the Philippines.

Dampier Salt, a majority-owned company of Rio Tinto originally established the Dampier salt field in 1972 and purchased the Lake MacLeod operation in 1978. Dampier Salt also has a gypsum operation at Lake MacLeod. Cargill Australia is wholly-owned by Cargill Inc., a private company with significant salt interests in North and South America.

The State's salt production can be expected to be boosted in 2001-02 with Onslow Salt having commenced production in 2001 and making its first shipments in the latter half of 2001. The Onslow salt project is now the seventh solar salt field in Western Australia. It is expected that Onslow will gradually ramp up to full production of 2.5 million tonnes per annum by mid-2003.

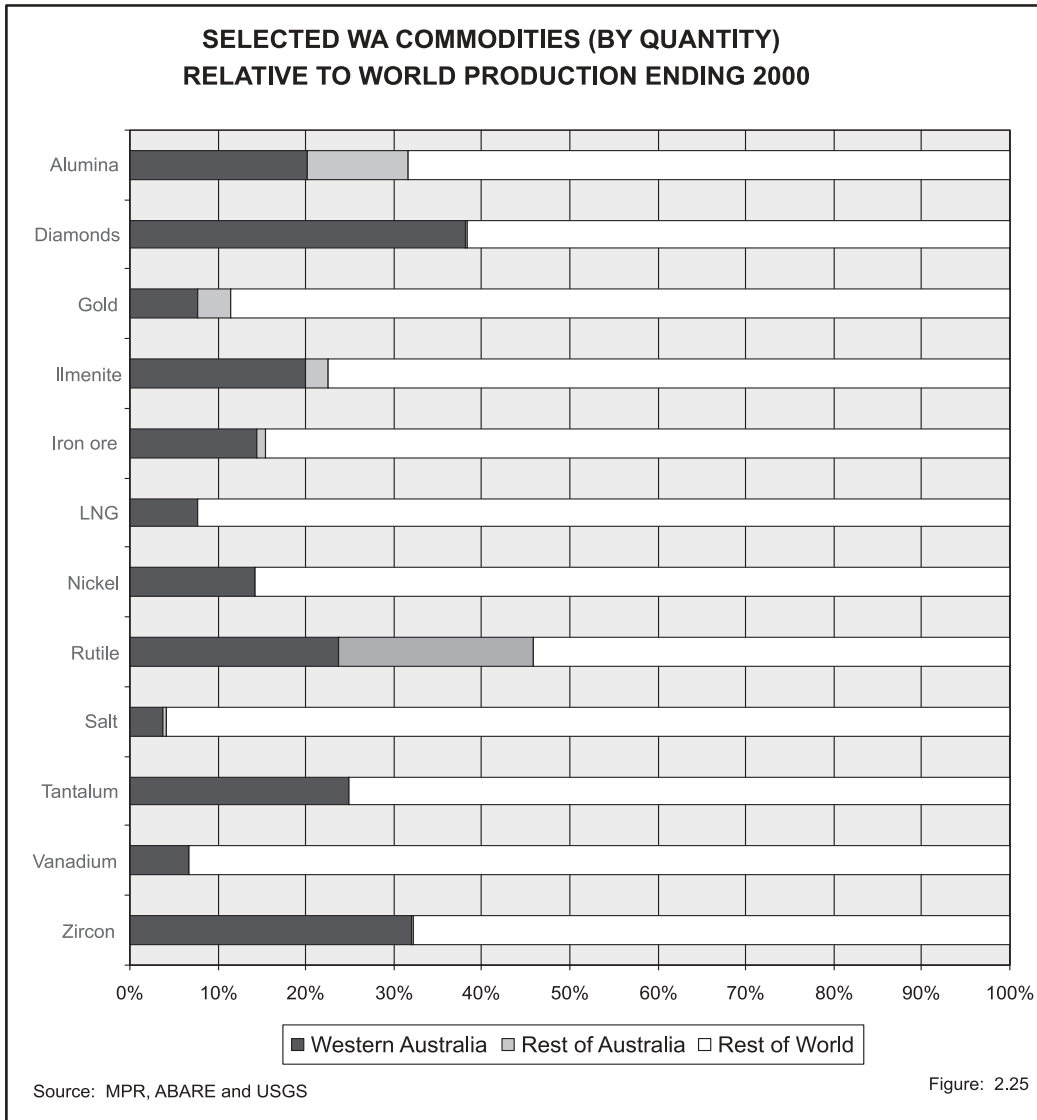
Tantalum

During 2000-01 sales of tantalum increased by a massive 44% from 514 tonnes to 738 tonnes. In terms of sales value, the increase was even more impressive with the value rising by 84% from \$79 million to \$145 million in 2000-01.

Manganese

2000-01 was a spectacular year for the State's manganese industry. Western Australia's only producer, Consolidated Minerals' Woodie Woodie project increased the value of its sales by 127% from \$26 million in 1999-2000 to \$58 million in 2000-01. Production also increased substantially by 89% from 212,382 tonnes to 401,358 tonnes.

The principal markets for the manganese are China, Russia and Korea.



The latest comparable data shows that the Western Australian share (by quantity) of the world's output of the following products was: alumina 20%, gold 8%, ilmenite 20%, iron ore 14%, LNG (World Trade) 8%, nickel 14%, rutile 24%, salt 4%, tantalum 25%, vanadium pentoxide 7%, zircon 32% and 38% of diamond sales (mainly industrial grade).

TABLE 1 QUANTITY AND VALUE OF MINERALS AND PETROLEUM

COMMODITY	UNIT	1999-00		2000-01	
		QUANTITY	VALUE (A\$)	QUANTITY	VALUE (A\$)
ALUMINA	t	9,354,252	2,657,894,317	10,479,429	3,600,668,963
BASE METALS					
Copper Metal	t	30,732 (r)	64,618,092 (r)	42,631	111,244,795
Lead Metal	t	64,465	20,242,917	82,326	37,308,480
Zinc Metal	t	232,585	251,013,207	236,089	280,239,658
TOTAL BASE METALS			335,874,216 (r)		428,792,933
CHROMITE	t	17,547	3,249,086	33,014	6,898,498
CLAYS					
Attapulgite	t	11,513	1,202,424	12,366	1,291,319
Clay Shale	t	28,478	284,780	11,783	117,830
Fire Clay	t	98,706	118,448	69,670	140,864
Kaolin	t	2,478	206,974	440	45,508
Saponite	t	358	24,970	1,273	91,582
TOTAL CLAYS			1,837,596		1,687,103
COAL	t	6,504,506	271,531,464	6,102,813	252,281,765
CONSTRUCTION MATERIALS					
Aggregate	t	301,267 (r)	2,248,441 (r)	284,164	2,776,441
Gravel	t	222,579 (r)	1,411,177 (r)	161,947	1,059,089
Rock	t	221,596	1,551,019	251,360	2,074,419
Sand	t	1,705,099 (r)	7,830,707 (r)	1,147,197	5,724,514
Sandstone	t	0	0	1,100	55,000
TOTAL CONSTRUCTION MATERIALS			13,041,344 (r)		11,689,463
DIAMONDS	ct	50,984,633	703,669,937	25,419,431	614,453,364
DIMENSION STONE					
Granite	t	2,990 (r)	621,780 (r)	1,340	361,595
Marble	t	0	0	131	48,640
TOTAL DIMENSION STONE			621,780 (r)		410,235
GEM & SEMI-PRECIOUS STONES					
Agate	kg	7,186	4,312	0	0
Chalcedony/Mookaite	kg	0	0	4,344	2,172
Chrysoprase	kg	178	4,369	16,171	36,315
Emerald	kg	4 (r)	10,420	12	20,000
Jasper	kg	20,748	16,045	14,430	8,658
Variscite	kg	100	60,054	111,830	67,098
TOTAL GEM & SEMI-PRECIOUS STONES			95,200		134,243
GOLD	kg	204,959 (r)	2,951,257,683 (r)	200,852 (e)	3,239,503,841 (e)
GYPSUM	t	1,336,916 (r)	23,394,311 (r)	913,231	18,074,648
HEAVY MINERAL SANDS					
Garnet	t	103,815	12,471,320	111,637	12,105,058
Ilmenite	t	1,161,389 (r)	151,655,393 (r)	1,088,613	168,745,136
Upgraded Ilmenite (a)	t	552,505 (r)	324,646,688 (r)	643,274	409,192,214
Leucoxene	t	39,064	16,378,713 (r)	39,814	18,052,535
Rutile	t	98,493 (r)	72,778,349 (r)	127,213	110,036,230
Staurolite	t	0	0	192	37,407
Zircon	t	348,109 (r)	153,271,253 (r)	343,080	198,837,333
TOTAL HEAVY MINERAL SANDS			731,201,716 (r)		917,005,913
INDUSTRIAL PEGMATITE MINERALS					
Feldspar	t	42,998	1,649,003	56,245	2,482,243

TABLE 1 (Cont.) QUANTITY AND VALUE OF MINERALS AND PETROLEUM

COMMODITY	UNIT	1999-00		2000-01	
		QUANTITY	VALUE (A\$)	QUANTITY	VALUE (A\$)
IRON ORE					
Domestic	t	6,037,470	154,209,360	6,646,444	207,408,487
Exported	t	145,120,868 (r)	3,567,914,626	155,123,446	4,705,295,055
TOTAL IRON ORE		151,158,338 (r)	3,722,123,986	161,769,890	4,912,703,542
LIMESAND-LIMESTONE-DOLOMITE					
Dolomite	t	2,932	64,504	0	0
Limesand-Limestone	t	3,007,559 (r)	14,523,824 (r)	3,808,372	15,643,843
TOTAL LIMESAND-LIMESTONE-DOLOMITE			14,588,328 (r)		15,643,843
MANGANESE ORE	t	212,382	25,684,859	401,358	58,318,807
NICKEL INDUSTRY					
Cobalt By-Product	t	994 (r)	49,064,798 (r)	1,952	96,335,820
Cobalt Metal	t	340 (r)	14,101,071 (r)	1,322	54,656,716
Cobalt Sulphide	t	732 (r)	23,090,295 (r)	921	25,096,601
Nickel Concentrate	t	871,262	1,613,510,211 (r)	899,618	1,865,352,302
Nickel Metal	t	14,200 (r)	192,774,850 (r)	27,969	381,234,256
Palladium By-Product	kg	791 (r)	17,154,394 (r)	863	39,173,885
Platinum By-Product	kg	116 (r)	2,581,065 (r)	188	6,062,098
TOTAL NICKEL INDUSTRY			1,912,276,684 (r)		2,467,911,678
PETROLEUM					
Condensate	kl	6,347,648	1,583,938,449	5,809,460	1,984,526,940
Crude Oil	kl	12,054,819	3,144,766,638 (r)	13,957,274	4,792,052,082
LNG	Btu 10 ⁶	393,613,100	1,971,060,425	374,069,238	2,739,993,609
LPG-Butane	t	443,576	190,900,705	428,900	221,968,789
LPG-Propane	t	334,573	145,937,645	333,470	187,540,575
Natural Gas	'000m ³	6,546,244	578,766,829	7,625,011	630,363,197
TOTAL PETROLEUM			7,615,370,691 (r)		10,556,445,192
PIGMENTS					
Red Oxide	t	1,000 (r)	670,441 (r)	1,065	36,218
SALT	t	8,809,769	208,578,472 (r)	8,303,628	233,081,734
SILICA-SILICA SAND					
Silica	t	97,687	976,872	92,375	923,746
Silica Sand	t	501,908 (r)	6,066,213 (r)	464,952	5,850,341
TOTAL SILICA-SILICA SAND			7,043,085 (r)		6,774,087
SILVER	kg	110,117 (r)	24,985,174 (r)	154,196	39,947,086
SPONGOLITE	t	9,915	1,909,370	12,660	1,714,507
TALC	t	169,135	13,569,779	164,320	13,405,119
TIN-TANTALUM-LITHIUM					
Spodumene	t	62,116	14,448,602	68,944	17,139,066
Tantalite	t	514	78,670,971	738	144,838,709
Tin Metal	t	576	4,756,778	885	7,930,963
TOTAL TIN-TANTALUM-LITHIUM			97,876,351		169,908,738
VANADIUM	t	757	4,981,932 (r)	4,034	24,695,581
TOTAL VALUE			21,344,976,804 (r)		27,594,669,345

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

- (a) Also known as Synthetic Rutile
- (e) Estimate
- (r) Revised from previous edition

2000-01 STATISTICS DIGEST

TABLE 2 QUANTITY AND VALUE OF SELECTED MAJOR COMMODITIES

	Unit	1991-92		1992-93		1993-94		1994-95	
		Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M
ALUMINA	Mt	7.13	1,758.15	7.55	1,818.12	7.83	1,784.32	7.91	1,684.60
BASE METALS									
Copper Metal	kt	12.02	17.44	22.92	27.44	32.46	40.26	29.20	76.54
Lead Metal	kt	21.68	7.30	22.30	6.65	21.11	4.98	21.10	9.20
Zinc Metal	kt	142.92	125.58	127.96	104.11	136.39	79.54	132.85	95.84
<i>TOTAL BASE METALS</i>			150.32		138.20		124.78		181.58
COAL	Mt	5.49	243.54	5.43	244.77	5.15	236.29	5.86	274.75
DIAMOND	M ct	47.49	564.77	24.83	519.98	28.86	476.75	23.93	480.03
GOLD	tonnes	182.04	2,689.92	179.80	2,834.19	193.60	3,415.06	187.85	3,132.87
HEAVY MINERAL SANDS									
Ilmenite	Mt	0.97	83.15	0.99	81.66	1.07	92.32	0.99	89.65
Rutile	kt	47.47	26.88	75.93	42.14	68.93	35.76	107.78	56.13
Upgraded Ilmenite	kt	375.00	188.19	396.00	184.67	402.00	185.84	490.00	228.29
Zircon	kt	226.93	61.11	302.46	49.19	349.13	63.10	477.05	129.77
Other HMS			12.04		10.29		13.92		14.56
<i>TOTAL HEAVY MINERAL SANDS</i>			371.37		367.95		390.94		518.40
IRON ORE	Mt	111.64	2,953.27	111.73	2,991.14	119.69	2,865.16	133.13	2,794.31
MANGANESE ORE	kt	395.30	71.86	251.53	46.89	315.79	42.01	71.91	8.84
NICKEL	kt	50.17	489.51	53.27	472.17	61.11	458.62	92.99	897.12
PETROLEUM									
Condensate	Gl	2.00	338.98	2.00	363.04	2.35	348.71	2.64	398.34
Crude oil	Gl	5.43	941.29	4.54	855.69	5.33	815.33	9.90	1,559.65
LNG	Btu 10 ¹²	219.70	846.33	254.47	1,025.06	296.36	1,015.68	356.11	1,262.51
LPG-Butane	kt	0	0	0	0	0	0	0	0
LPG-Propane	kt	0	0	0	0	0	0	0	0
Natural Gas	Gm ³	3.77	349.26	3.96	407.02	4.46	413.37	5.37	445.71
<i>TOTAL PETROLEUM</i>			2,475.86		2,650.81		2,593.09		3,666.21
SALT	Mt	6.93	153.14	6.63	158.38	6.16	149.18	7.18	155.14
OTHER			122.55		105.14		119.60		164.52
TOTAL			12,044.26		12,347.74		12,655.80		13,958.37

2000-01 STATISTICS DIGEST

1995-96		1996-97		1997-98		1998-99		1999-00		2000-01	
Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M
8.23	1,918.34	8.35	1,955.77	8.51	2,260.54	8.86	2,367.03	9.35	2,657.89	10.48	3,600.67
23.69	65.42	27.73	58.98	29.43	61.12	24.44	43.71	30.73	64.62	42.60	111.24
21.28	12.64	13.49	6.09	27.00	10.45	51.55	17.25	64.47	20.24	82.33	37.31
113.49	75.32	88.37	75.12	124.00	117.11	194.90	170.73	232.59	251.01	236.01	280.24
	153.39		140.19		188.68		231.69		335.87		428.79
5.90	270.36	5.56	257.30	5.71	257.28	5.80	256.74	6.50	271.53	6.10	252.28
33.52	525.21	52.52	395.79	42.48	537.87	51.23	610.44	50.98	703.67	25.42	614.45
205.89	3,404.65	228.02	3,409.61	239.46	3,468.95	219.26	3,219.52	204.96	2,951.26	200.85	3,239.50
1.10	111.18	1.10	117.28	1.31	149.14	1.32	158.59	1.16	151.66	1.10	168.75
119.14	75.06	110.96	77.74	104.13	78.58	119.71	90.97	98.49	72.78	127.21	110.04
517.00	252.56	545.00	270.48	688.00	355.79	475.54	275.23	552,505	324.65	643,274	409.19
410.03	181.21	324.09	177.99	321.38	169.13	284.53	136.07	348.11	153.27	343.08	198.84
	18.50		26.51		24.63		19.44		28.85		30.19
	638.51		670.00		777.27		680.30		731.20		917.01
132.90	2,924.06	141.29	3,159.65	149.74	3,930.77	141.03	3,898.53	151.16	3,722.12	161.77	4,912.70
347.04	41.34	324.11	37.62	86.30	9.39	27.40	3.42	212.38	25.68	401.36	58.32
103.30	1,097.30	114.10	1,051.11	135.19	1,146.64	125.77	876.62	143.93	1,806.29	167.54	2,246.59
4.65	685.74	5.73	943.15	6.76	1,065.84	5.55	743.91	6.35	1,583.94	5.81	1,984.53
9.65	1,535.67	10.47	1,915.93	9.85	1,567.16	9.16	1,189.64	12.05	3,144.77	13.96	4,792.05
379.79	1,350.92	370.50	1,528.77	379.54	1,591.94	391.90	1,434.42	393.61	1,971.06	374.07	2,740.00
100.24	22.71	209.69	59.67	376.09	90.47	388.69	90.62	443.58	190.90	428.90	221.97
87.02	19.73	185.74	55.66	263.26	61.26	259.21	57.63	334.57	145.94	333.47	187.54
6.31	454.76	6.89	534.65	6.88	557.47	6.44	549.83	6.55	578.76	7.63	630.36
	4,069.53		5,037.83		4,934.14		4,066.65		7,615.37		10,556.45
7.45	154.22	7.55	153.62	8.19	188.70	8.57	199.64	8.81	208.58	8.30	233.08
	192.44		192.18		234.85		245.00		315.52		534.83
15,389.35		16,460.67		17,935.08		16,655.58		21,344.98		27,594.70	

2000-01 STATISTICS DIGEST

TABLE 3 QUANTITY & VALUE OF MINERALS & PETROLEUM BY LOCAL GOVERNMENT AREA

COMMODITY	LOCAL GOVERNMENT AREA	QUANTITY TONNES	METALLIC CONTENT	VALUE A\$	Ref. (p. 46)
ALUMINA					
	Boddington	2,888,815		952,373,235	
	Murray	5,362,918		1,870,545,087	
	Waroona	2,227,696		777,750,641	
TOTAL ALUMINA		10,479,429		3,600,668,963 (c), (d)	
BASE METALS					
			Cu tonnes		
Copper By-Product	Coolgardie		6,649	11,542,343	(a)
	Ravensthorpe		187	608,966	(a)
	Roebourne		3,996	12,364,292	(a), (b)
	Wiluna		422	1,412,808	(a)
	Total		11,254	25,928,409	
			Cu %		
Copper Concentrates	East Pilbara	7,483	23.81	3,813,621	
	Roebourne	2,551	24.98	1,552,281	
	Yalgoo	51,503	17.07	17,466,770	
	Total	58,986		22,832,672 (a)	
			Cu tonnes		
Copper Cathode	East Pilbara		20,167	62,483,714	(a)
	Total Copper			111,244,795 (a), (b)	
			Pb %		
Lead	Derby-West Kimberley	102,806	71.84	33,371,909	
	Yalgoo	33,287	25.46	3,936,571	
	Total	88,677		37,308,480 (a)	
			Zn %		
Zinc	Derby-West Kimberley	270,599	57.09	187,042,484	
	Yalgoo	202,528	40.29	93,197,174	
	Total	473,127		280,239,658 (a)	
TOTAL BASE METALS				428,792,933	
CHROMITE					
Chromite Ore	Meekatharra	90,010	Cr ₂ O ₃ % 36.68	6,898,498	(a)
CLAY					
Attapulgite	Mullewa	12,366		1,291,319	
Clay Shale	Collie	11,783		117,830	
Fire Clay	Broome	2,700		60,500	
	Chittering	66,970		80,364	
	Total	69,670		140,864	
Kaolin	Bridgetown-Greenbushes	440		45,508	
Saponite	Coorow	1,273		91,582	
TOTAL CLAY		95,532		1,687,103 (e)	
COAL	Collie	6,102,813		252,281,765 (f)	
CONSTRUCTION MATERIALS					
Aggregate	Broome	39,467		1,349,011	
	Port Hedland Town	167,886		1,007,317	
	Roebourne	19,288		81,167	
	Wyndham-East Kimberley	57,523		338,946	
	Total	284,164		2,776,441	

TABLE 3 (cont.) QUANTITY & VALUE OF MINERALS & PETROLEUM BY LOCAL GOVERNMENT AREA

COMMODITY	LOCAL GOVERNMENT AREA	QUANTITY TONNES	METALLIC CONTENT	VALUE AS	Ref. (p.46)
Gravel	Broome	4,224		18,166	
	Coolgardie	46,812		277,731	
	East Pilbara	3,472		17,360	
	Kalamunda	98,068		686,476	
	Kalgoorlie-Boulder	498		2,492	
	Wyndham-East Kimberley	8,873		56,864	
	Total		161,947		1,059,089
Rock	Broome	1,649		92,182	
	Dundas	71,764		914,993	
	East Pilbara	702		4,214	
	Kalgoorlie-Boulder	176,808		1,060,851	
	Wyndham-East Kimberley	437		2,179	
	Total		251,360		2,074,419
Sand	Broome	30,114		235,413	
	Coolgardie	206,656		1,232,361	
	Coorow	13,087		65,435	
	Dandaragan	2,123		12,738	
	Derby-West Kimberley	5,540		32,908	
	Esperance	2,971		14,853	
	Kalgoorlie-Boulder	8,012		47,308	
	Leonora	16,587		99,005	
	Marble Bar	4,420		26,445	
	Meekatharra	31,798		190,791	
	Menzies	1,347		7,542	
	Northam	18,256		91,280	
	Port Hedland Town	70,913		407,415	
	Roebourne	37,898		324,738	
	Wanneroo	688,920		2,893,518	
	Wyndham-East Kimberley	4,191		20,947	
	Yilgarn	4,364		21,817	
	Total		1,147,197		5,724,514
Sandstone	Broome	1,100		55,000	
TOTAL CONSTRUCTION MATERIALS		1,845,768		11,689,463	(e)
DIAMONDS	Wyndham-East Kimberley		carats 25,419,431	614,453,364	(a)
DIMENSION STONE					
Granite	Coolgardie	417		98,650	
	Dundas	902		261,885	
	Roebourne	21		1,060	
	Total		1,340		361,595
Marble		131		48,640	
TOTAL DIMENSION STONE		1,472		410,235	(e)
GEM & SEMI-PRECIOUS STONES					
Chalcedony/Mookaite		kg			
	Carnarvon	2,344		1,172	
	Mt Magnet	2,000		1,000	
Total		4,344		2,172	
Chrysoprase	Kalgoorlie-Boulder	15,016		30,159	
	Meekatharra	1,155		6,156	
	Total		16,171		36,315
Emerald	Mt Magnet	12		20,000	

TABLE 3 (cont.) QUANTITY & VALUE OF MINERALS & PETROLEUM BY LOCAL GOVERNMENT AREA

COMMODITY	LOCAL GOVERNMENT AREA	QUANTITY TONNES	METALLIC CONTENT	VALUE A\$ (p.46)	Ref.
GEM & SEMI-PRECIOUS STONES (Cont.)					
Jasper	Marble Bar	1,470		882	
	Meekatharra	12,960		7,776	
	Total	14,430		8,658	
Variscite	Carnarvon	111,830		67,098	
TOTAL GEM & SEMI-PRECIOUS STONES		146,787		134,243	(d)
GOLD					
			Au kg		
	Boddington		7,142	115,287,628	
	Coolgardie		23,028	371,632,158	
	Cue		4,894	78,675,901	
	Dundas		3,742	60,359,053	
	East Pilbara		2,519	39,357,212	
	Kalgoorlie-Boulder		48,639	784,642,105	
	Laverton		9,865	158,991,509	
	Leonora		41,050	663,048,349	
	Meekatharra		18,049	291,627,664	
	Menzies		436	7,316,405	
	Mt Magnet		9,316	149,832,196	
	Sandstone		3,798	61,331,154	
	Wiluna		16,480	266,169,143	
	Yalgoo		202	3,332,221	
	Yilgarn		12,764	187,901,143	
TOTAL GOLD			201,924	3,239,503,841	(g)
GYPSUM					
	Bruce Rock	930		9,300	
	Carnarvon	719,134		16,178,195	
	Dalwallinu	39,222		597,678	
	Dandaragan	40,905		409,050	
	Dundas	26,902		161,412	
	Kent	15,600		202,794	
	Koorda	320		4,560	
	Lake Grace	6,985		64,114	
	Nungarin	15,329		91,974	
	Ravensthorpe	11,150		60,994	
	Wyalkatchem	35,325		282,605	
	Yilgarn	1,429		11,972	
TOTAL GYPSUM		913,231		18,074,648	(f)
HEAVY MINERAL SANDS					
Garnet Sand	Northampton	111,637		12,105,058	
Ilmenite	Augusta-Margaret River	7,754	TiO ₂ % 54.27	930,480	
	Bunbury City	419,721	55.90	74,055,743	
	Capel	352,668	54.71	52,639,401	
	Carnamah	190,445	59.05	21,120,592	
	Dandaragan	118,025	58.08	19,998,920	
	Total	1,088,613		168,745,136	
Upgraded Ilmenite	Capel	232,387	TiO ₂ % 92.00	135,048,888	
	Carnamah	205,833	92.00	122,873,938	
	Dandaragan	205,054	92.00	151,269,388	
	Total	643,274		409,192,214	

TABLE 3 (cont.) QUANTITY & VALUE OF MINERALS & PETROLEUM BY LOCAL GOVERNMENT AREA

COMMODITY	LOCAL GOVERNMENT AREA	QUANTITY TONNES	METALLIC CONTENT	VALUE A\$	Ref. (p.46)
HEAVY MINERAL SANDS (cont.)					
Leucoxene	Bunbury City	4,502	TiO ₂ tonnes 2,529	2,737,778	
	Capel	18,805	3,283	8,259,747	
	Dandaragan	16,507	4,837	7,055,010	
	Total	39,814	10,649	18,052,535	
Rutile	Bunbury City	3,279	TiO ₂ tonnes 3,066	2,328,879	
	Carnamah	91,939	86,589	81,189,914	
	Dandaragan	31,995	25,045	26,517,437	
	Total	127,213	114,699	110,036,230	
Staurolite	Dandaragan	192		37,407	
Zircon	Bunbury City	30,545	ZrO ₂ tonnes 4,090	14,204,746	
	Capel	60,600	10,308	36,766,528	
	Carnamah	160,220	29,912	94,035,961	
	Dandaragan	91,715	14,625	53,830,098	
	Total	343,080	58,935	198,837,333	
TOTAL HEAVY MINERAL SANDS		2,771,759		917,005,913	(a)
INDUSTRIAL PEGMATITE MINERALS					
Feldspar	Marble Bar	55,311		2,463,741	
	Mukinbudin	934		18,502	
	Total	56,245		2,482,243	(e)
IRON ORE					
Domestic Ore	East Pilbara	6,646,444	Fe% 63.11	207,408,487	
	Exported Ore	Ashburton	76,541,890	Fe% 61.40	2,236,017,961
	Derby–West Kimberley	1,067,033	63.97	35,395,544	
	East Pilbara	74,976,692	60.86	2,360,336,767	
	Yilgarn	2,537,831	63.79	73,544,783	
	Total	155,123,446		4,705,295,055	
TOTAL IRON ORE		161,769,890		4,912,703,542	(a)
LIMESAND–LIMESTONE					
Limesand–Limestone	Broome	4,122		20,610	
	Carnamah	8,773		35,092	
	Cockburn	1,793,959		5,292,178	
	Coorow	8,066		40,480	
	Dandaragan	19,945		321,996	
	Dundas	243,148		3,647,220	
	Gingin	33,227		567,222	
	Irwin	204,914		498,048	
	Kalgoorlie–Boulder	886,077		1,772,153	
	Kwinana	332,025		367,069	
	Manjimup	3,751		56,266	
	Shark Bay	2,287		320,004	
	Wanneroo	239,702		2,648,753	
	Wiluna	28,376		56,752	
	TOTAL LIMESAND–LIMESTONE		3,808,372		15,643,843
MANGANESE ORE					
MANGANESE ORE	East Pilbara	401,358	Mn% 49.58	58,318,807	(a)

2000-01 STATISTICS DIGEST

TABLE 3 (cont.) QUANTITY & VALUE OF MINERALS & PETROLEUM BY LOCAL GOVERNMENT AREA

COMMODITY	LOCAL GOVERNMENT AREA	QUANTITY TONNES	METALLIC CONTENT	VALUE A\$	Ref. (p.46)
NICKEL INDUSTRY					
Cobalt By-Product	Coolgardie		Co tonnes 1,290	62,943,481	
	Kalgoorlie-Boulder		186	8,941,501	
	Ravensthorpe		39	1,779,493	
	Roebourne		264	14,674,161	
	Wiluna		174	7,997,184	
	Total			1,952	96,335,820
Cobalt Metal	Kalgoorlie-Boulder		1,322	54,656,716	
Cobalt Sulphide	Kalgoorlie-Boulder		921	25,096,601	
TOTAL COBALT			4,194	176,089,137 (a), (b)	
Nickel Concentrates	Coolgardie	138,436	Ni% 12.60	237,102,547	
	Kalgoorlie-Boulder	84,653	18.94	198,055,679	
	Leonora	301,972	12.76	522,818,489	
	Ravensthorpe	17,183	18.57	39,929,647	
	Roebourne	47,974	10.00	61,866,526	
	Wiluna	309,401	19.25	805,579,414	
	Total		899,618		1,865,352,302
Nickel Metal	Kalgoorlie-Boulder		Ni tonnes 27,969	381,234,256	
TOTAL NICKEL				2,246,586,558 (i)	
Palladium By-Product	Coolgardie		Pd kg 775	35,021,125	
	Roebourne		88	4,152,760	
	Total		863	39,173,885 (b)	
Platinum By-Product	Coolgardie		Pt kg 188	6,062,098	(b)
TOTAL NICKEL INDUSTRY				2,467,911,678	
PETROLEUM					
Condensate	Ashburton	Kilolitres 458,548		124,962,852	
	Carnamah	114		17,987	
	Irwin	1,458		433,361	
	Roebourne	5,349,340		1,859,112,740	
	Total	5,809,460		1,984,526,940	
Crude Oil	Ashburton	Kilolitres 4,521,356		1,507,404,007	
	Derby-West Kimberley	9,435		2,059,295	
	Irwin	4,094		1,262,725	
	Roebourne	9,422,389		3,281,326,055	
	Total	13,957,274		4,792,052,082	
Liquified Natural Gas	Roebourne	Btu 10 ⁶ 374,069,238		2,739,993,609	
LPG-Butane	Roebourne	Tonnes 428,900		221,968,789	
LPG-Propane	Roebourne	Tonnes 333,470		187,540,575	
Natural Gas	Ashburton	'000 m ³ 1,503,680		103,412,907	
	Carnamah	43,445		4,074,514	
	Irwin	209,858		23,507,930	
	Roebourne	5,868,028		499,367,846	
	Total	7,625,011		630,363,197	
TOTAL PETROLEUM PRODUCTS				10,556,445,192 (d)	

TABLE 3 (cont.) QUANTITY & VALUE OF MINERALS & PETROLEUM BY LOCAL GOVERNMENT AREA

COMMODITY	LOCAL GOVERNMENT AREA	QUANTITY TONNES	METALLIC CONTENT	VALUE A\$ (p.46)	Ref.
PIGMENTS					
Red Oxide	Cue	1,065		36,218	(a)
SALT					
	Carnarvon	1,506,792		41,957,418	(a)
	Esperance	4,317		339,674	(h)
	Port Hedland Town	2,738,140		78,684,342	(a)
	Roebourne	3,085,734		86,083,616	(a)
	Shark Bay	847,110		20,585,417	(a)
	Wyalkatchem	102		8,156	(h)
	Yilgarn	121,433		5,423,111	(h)
TOTAL SALT		8,303,628		233,081,734	
SILICA-SILICA SAND					
Silica	Moora	92,375		923,746	
Silica Sand	Albany	80,675		1,674,890	
	Swan	384,277		4,175,451	
	Total	464,952		5,850,341	
TOTAL SILICA-SILICA SAND				6,774,087	(a)
SILVER BY-PRODUCT					
			Ag kg		
	Coolgardie		256	69,263	(a), (j)
	Derby-West Kimberley		1,326	286,448	(a), (b)
	East Pilbara		372	94,268	(a), (j)
	Roebourne		20,620	5,314,339	(a), (j)
	Statewide		28,232	7,082,529	
	Yalgoo		103,390	27,100,239	(a), (j)
TOTAL SILVER			154,196	39,947,086	
SPONGOLITE	Plantagenet	12,660		1,714,507	(h)
TALC					
	Meekatharra	8,947		626,350	
	Three Springs	155,373		12,778,769	
TOTAL TALC		164,320		13,405,119	(f)
TIN-TANTALUM-LITHIUM					
Spodumene	Bridgetown-Greenbushes	68,944	Li ₂ O % 4.718	17,139,066	
Tantalite	Bridgetown-Greenbushes	738		144,838,709	
Tin	Bridgetown-Greenbushes		Sn Tonnes 885.00	7,930,963	
TOTAL TIN-TANTALUM-LITHIUM				169,908,738	(a)
VANADIUM					
	Mt Magnet		V ₂ O ₅ tonnes 4,034	24,695,581	(f)
TOTAL VALUE				27,594,669,345	

TABLE 4 ROYALTY RECEIPTS 1999-00 AND 2000-01

COMMODITY	1999-00 Total A\$	2000-01 Total A\$	2000-01 A\$	Growth %
ALUMINA	40,738,370	55,512,739	14,774,369	36
BASE METALS				
Copper	1,707,404	2,756,502	1,049,098	61
Lead	1,043,327	1,415,710	372,383	36
Zinc	12,558,248	13,743,529	1,185,281	9
TOTAL BASE METALS	15,308,979	17,915,741	2,606,762	17
CHROMITE	210,106	295,110	85,004	40
CLAYS	131,013	121,172	-9,841	(8)
COAL	14,139,988	13,360,949	-779,039	(6)
CONSTRUCTION MATERIALS				
Aggregate	83,345	89,606	6,261	8
Gravel	56,021	53,532	-2,489	(4)
Rock	63,384	83,889	20,505	32
Sand	395,683	465,630	69,947	18
TOTAL CONSTRUCTION MATERIALS	598,433	692,657	94,224	16
DIAMONDS	62,496,275	88,054,636	25,558,361	41
DIMENSION STONE	2,478	691	-1,787	(72)
GEM AND SEMI-PRECIOUS STONES	4,079	13,054	8,975	100
GOLD	33,446,114	65,638,722	32,192,608	96
GYPSUM	485,960	381,215	-104,745	(22)
HEAVY MINERAL SANDS				
Garnet	640,900	537,933	-102,967	(16)
Ilmenite	8,872,246	9,685,771	813,525	9
Leucoxene	654,458	753,408	98,950	15
Rutile	4,110,177	5,005,295	895,118	22
Zircon	6,376,424	8,816,131	2,439,707	38
Staurolite	0	1,656	1,656	100
TOTAL HEAVY MINERAL SANDS	20,654,205	24,800,195	4,145,990	20
INDUSTRIAL PEGMATITE MINERALS				
Feldspar	238,815	82,115	-156,700	(66)
IRON ORE	198,952,265	270,188,217	71,235,952	36

2000-01 STATISTICS DIGEST

TABLE 4 (cont.) ROYALTY RECEIPTS 1999-00 AND 2000-01

COMMODITY	1999-00 Total A\$	2000-01 Total A\$	2000-01 A\$	Growth %
LIMESAND-LIMESTONE-DOLOMITE				
Dolomite	0	880	880	100
Limesand-Limestone	1,209,199	1,419,328	210,129	17
TOTAL LIMESAND-LIMESTONE-DOLOMITE	1,209,199	1,420,208	211,009	17
MANGANESE	1,298,666	2,842,057	1,543,391	119
NICKEL				
Cobalt By-Product	1,052,510	2,864,994	1,812,484	172
Nickel	34,814,528	56,743,210	21,928,682	63
Palladium By-Product	372,097	830,063	457,966	123
Platinum By-Product	73,594	130,956	57,362	78
Rhodium By-Product	0	4,577	4,577	100
TOTAL NICKEL INDUSTRY	36,312,729	60,573,800	24,261,071	67
PETROLEUM				
Condensate	97,986,735	123,475,405	25,488,670	26
Liquified Natural Gas	108,932,431	180,535,656	53,333,649	49
LPG-Butane	8,970,689	14,964,999	5,994,310	67
LPG-Propane	11,830,497	11,256,377	-574,120	(5)
Natural Gas	28,894,859	34,216,358	5,321,499	18
Oil	88,281,747	162,266,080	73,984,333	84
TOTAL PETROLEUM	344,896,958	526,714,875	181,817,917	53
PIGMENTS				
Red Oxide	0	34,758	34,758	100
SALT	2,268,362	1,932,536	-335,826	(15)
SILICA SAND	222,095	328,273	106,178	48
SILVER	398,238	989,532	591,294	148
SPONGOLITE	27,324	137,798	110,474	404
TALC	97,767	88,207	-9,560	(10)
TIN-TANTALUM-LITHIUM				
Spodumene	652,807	884,967	232,160	36
Tantalite	1,767,959	2,831,611	1,063,652	60
Tin	103,688	170,801	67,113	65
TOTAL TIN-TANTALUM-LITHIUM	2,524,454	3,887,379	1,362,925	54
VANADIUM	19,415	318,893	299,478	100
TOTAL REVENUE	776,682,287	1,136,325,529	359,643,242	46

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

2000-01 STATISTICS DIGEST

TABLE 5 AVERAGE NUMBER OF PERSONS EMPLOYED IN THE WA MINERALS & PETROLEUM INDUSTRIES

MINERAL/Company	Operating Site	1999-00	2000-01
ALUMINA			
Australian Fused Materials Pty Ltd	Rockingham Fused Alumina Plant	107	214
Alcoa World Alumina Australia	Huntly	498	615
	Jarrahdale	71	50
	Kwinana Alumina Refinery	1,423	1,442
	Pinjarra Refinery	1,389	1,426
	Wagerup Alumina Refinery	864	929
	Willowdale	240	253
	Worsley Alumina Pty Ltd	Worsley Tunnel Road	176
	Worsley Refinery	2,635	1,251
TOTAL ALUMINA		7,296	6,419
BASE METALS			
Normandy Mining Ltd	Scuddles	377	324
Straits Resources Ltd	Nifty	345	429
Western Metals Ltd	Lennard Shelf	553	555
Various	Other	0	9
TOTAL BASE METALS		1,275	1,317
COAL			
Griffin Coal Mining Co. Pty Ltd	Muja	335	313
Wesfarmers Coal Ltd	Premier/WCL	379	384
TOTAL COAL		714	697
DIAMONDS			
Argyle Diamond Mines Pty Ltd	Lake Argyle	854	956
GOLD			
AngloGold Australia Ltd	Sunrise Dam	198	404
Consolidated Gold Mines Limited	Bannockburn	4	6
Australian Gold Resources Ltd	Perth Mint	79	93
Barmenco Pty Ltd	Jenny Wren	13	0
	Newhaven	2	0
	Mt Pleasant	287	250
Centaur Mining & Exploration Ltd	Norseman	239	253
Croesus Mining NL	Binduli	46	21
	Mayday North	0	6
	Hannan South	16	28
	Davyhurst	74	43
	Golden Feather Group	64	0
Delta Gold NL	Lady Ida Group	37	66
	Kanowna Belle	375	344
	Dalgaranga	132	67
Equigold NL	Gidgee	58	91
Gidgee Gold Mine	Kundana	709	291
Goldfields Kalgoorlie Ltd	Paddington	205	225
	Bronzewing-Mt McClure	232	247
	Jundee-Nimary	505	594
Normandy Mining Ltd	Wiluna	268	276
	Hedges	1	0
Hedges Gold Pty Ltd	Sandstone	4	0
Herald Resources Ltd			

TABLE 5 (cont.) AVERAGE NUMBER OF PERSONS EMPLOYED IN THE WA MINERALS & PETROLEUM INDUSTRIES

MINERAL/Company	Operating Site	1999-00	2000-01	
GOLD (Cont.)				
Hill 50 Gold NL	Hill 50	418	381	
Homestake Mining Company	Darlot	200	129	
	Lawlers	205	206	
	Plutonic	354	419	
	Golden Mile-Super Pit	1,043	1,141	
Kalgoorlie Consolidated Gold Mines Pty Ltd	Golden Mile-Super Pit	1,043	1,141	
Marengo Mining Limited	Mt Olympus	44	40	
New Hampton Goldfields NL	Dawns Hope	30	0	
	Big Bell	323	405	
	Jubilee/New Hampton	203	222	
	Tuckabianna	7	4	
Newcrest Mining Ltd	Telfer	573	360	
Normandy Kaltails Pty Ltd	Kaltails	24	0	
North Gold (WA) Ltd	Peak Hill	18	0	
Perilya Mines NL	Fortnum	84	50	
Placer Dome Inc	Granny Smith	418	497	
Resolute Ltd	Chalice	56	0	
	Higginsville Group	12	0	
Sons of Gwalia NL	Barnicoat	34	0	
	Carosue Dam	21	197	
	Copperhead	15	0	
	Cornishman	12	0	
	Golden Pig and Frasers	10	0	
	Great Victoria Underground	13	11	
	Marvel Loch	367	341	
	Sons of Gwalia	190	232	
	Tarmoola	298	358	
	Yilgarn Star	171	132	
	South Kal Mines Pty Ltd	New Celebration	264	138
	St Barbara Mines Ltd	Bluebird Group	108	224
Troy Resources Ltd	Mt Kemptz	41	42	
Viceroy Resource Corporation	Bounty	228	229	
WMC Resources Ltd	Emu	600	895	
	Kambalda/St Ives	882	997	
	Boddington	536	502	
Worsley Alumina Pty Ltd	Boddington	536	502	
Other	Various	34	31	
TOTAL GOLD		11,384	11,488	

HEAVY MINERAL SANDS

BHP Titanium Minerals Pty Ltd	Beenup	37	31
Cable Sands Pty Ltd	Bunbury	327	347
GMA Garnet Pty Ltd	Narngulu Garnet Plant	24	24
	Port Gregory-Hutt Lagoon	15	15
	Rockingham Zirconia Plant	25	30
Hanwah Advanced Ceramics Australia Pty Ltd	Rockingham Zirconia Plant	25	30
Iluka Resources Limited	Capel	695	715
	Eneabba	310	304
	Narngulu Synthetic Rutile Plants	252	310
TiWest Pty Ltd	Chandala-Muchea	195	251
	Cooljarloo	311	281
	TOTAL HEAVY MINERAL SANDS		2,191

TABLE 5 (cont.) AVERAGE NUMBER OF PERSONS EMPLOYED IN THE WA MINERALS & PETROLEUM INDUSTRIES

MINERAL/Company	Operating Site	1999-00	2000-01	
IRON ORE				
BHP Iron Ore (Goldsworthy) Ltd	Finucane Island	198	211	
	Yarrie	243	213	
BHP Iron Ore (Jimblebar) Ltd	Jimblebar	111	109	
BHP Iron Ore Ltd	Mt Newman Railway	405	357	
	Mt Whaleback	981	1,014	
	Nelson Point	643	641	
	Orebody 25	83	77	
	Port Hedland HBI Plant	763	1,089	
	Yandi	228	204	
	Hamersley Iron Pty Ltd	Brockman No. 2 Detritals Group	202	193
		Dampier Port Operations	837	995
		Hismelt/Kwinana	72	109
		Marandoo	167	175
		Paraburdoo/Channar	698	768
		Hamersley Railway	372	393
		Tom Price	856	1,049
		Yandicoogina	210	216
West Angelas Rail		0	16	
West Angelas Plant		0	108	
Portman Iron Ore Ltd	West Angelas Port Facility	0	108	
	Cockatoo Island	34	27	
	Koolyanobbing	30	50	
Robe River Mining Co. Pty Ltd	Cape Lambert	426	455	
	Pannawonica Deepdale	279	289	
	Robe River Railway	97	108	
TOTAL IRON ORE		7,935	8,974	

NICKEL

Anaconda Nickel Ltd	Murrin Murrin	829	610
Centaur Mining & Exploration	Cawse	311	296
LionOre Australia (Nickel) Ltd	Emily Ann	0	48
MacMahon Holdings	Blair	30	58
Outokumpu Mining Australia Pty Ltd	Black Swan	226	259
	Forrestania	29	0
	Bulong	288	287
Resolute Ltd	Cosmos	80	73
Sir Samuel Mines NL	Rav 8	27	102
Tectonic Resources NL	Radio Hill	80	83
Titan Resources NL	Kalgoorlie Nickel Smelter	730	850
Western Mining Corporation Ltd	Kambalda	353	375
	Kwinana Refinery	366	539
	Leinster	794	911
	Mt Keith	696	803
TOTAL NICKEL		4,839	5,294

TABLE 5 (cont.) AVERAGE NUMBER OF PERSONS EMPLOYED IN THE WA MINERALS & PETROLEUM INDUSTRIES

MINERAL/Company	Operating Site	1999-00	2000-01
PETROLEUM			
Apache Energy Ltd	East Spar, Harriet, Stag, Campbell, Chervil, Agincourt/Wonnich, Sinbad, Tanami, North Herald, South Pepper	154	208
ARC Energy NL	Dongara	7	7
BHP Billiton Petroleum (North West Shelf) Pty Ltd	Griffin, Buffalo	106	110
Hardman Oil & Gas Pty Ltd	Woodada	5	5
Kimberley Oil NL	Lloyd	4	4
Mobil Exploration & Producing Australia Pty Ltd	Wandoo	34	20
Origin Energy Resources Ltd	Beharra Springs, Tubridgi	10	10
Petro Energy Pty Ltd	Mt Horner	7	2
ChevronTexaco Pty Ltd	Barrow Island, Cowle, Roller-Skate, Saladin, Yammaderry	165	165
Woodside Energy Ltd	Cossack, Goodwyn, Hermes, North Rankin, Wanaea, Lambert, Legendre	739	767
TOTAL PETROLEUM		1,231	1,298
SALT			
Cargill Salt Co.	Port Hedland	109	104
Dampier Salt Ltd	Dampier	225	249
	Lake MacLeod	203	210
Onslow Solar Salt Pty Ltd	Onslow	127	48
Shark Bay Salt JV	Useless Loop	75	74
TOTAL SALT		739	685
TOTAL CLAYS		44	68
TOTAL CONSTRUCTION MATERIALS		368	414
TOTAL DIMENSION STONE		69	89
TOTAL INDUSTRIAL PEGMATITE MINERALS		24	29
TOTAL LIMESTONE-LIMESAND		147	164
TOTAL MANGANESE ORE		68	87
TOTAL PHOSPHATE		182	168
TOTAL SILICA-SILICA SAND		201	201
TOTAL TALC		114	92
TOTAL TIN-TANTALUM- LITHIUM		298	332
TOTAL VANADIUM		222	129
ALL OTHER MATERIALS		119	122
TOTAL		40,314	41,331

(SOURCE: AXSTAT REPORTING SYSTEM, MINING OPERATIONS DIVISION)

Figures are as provided to the Department by the various operating companies

TABLE 6

PRINCIPAL MINERALS AND PETROLEUM PRODUCERS 2000-01

BASE METALS

Copper

Murchison Zinc Co. Pty Ltd, 100 Hutt Street, Adelaide SA 5000, (08) 8303 1700, Golden Grove, Scuddles, <http://www.normandy.com.au>

Straits Resources Ltd, Level 1, 35 Ventnor Avenue, West Perth WA 6005, (08) 9480 0500, Nifty, <http://www.straits.com.au>

WMC Ltd, 250 St Georges Terrace, Perth WA 6000, (08) 9442 2000, Kambalda, <http://www.wmc.com.au>

Lead-Zinc

Murchison Zinc Co. Pty Ltd, 8 Kings Park Road, West Perth WA 6005, (08) 9480 3232, Scuddles, <http://www.normandy.com.au>

Western Metals Ltd, 263 Adelaide Terrace, Perth WA 6000, (08) 9221 2555, Lennard Shelf, <http://www.westernmetals.com.au>

BAUXITE-ALUMINA

Alumina

Alcoa World Alumina Australia, 181-205 Davey Street, Booragoon WA 6154, (08) 9316 5111, Del Park, Willowdale, Huntly, <http://www.alcoa.com.au>

Worsley Alumina Pty Ltd, PO Box 344, Collie WA 6225, (08) 9734 8311, Boddington, <http://www.wapl.com.au>

CHROMITE

Chromite Ore

Pilbara Chromite Pty Ltd, 62 Colin Street, West Perth WA 6005, (08) 9321 3633, Coobina.

CLAY

Attapulгите

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

Clay Shale

The Griffin Coal Mining Company Pty Limited, 28 The Esplanade, Perth WA 6000, (08) 9261 2800, Collie <http://www.griffincoal.com.au>

Fire Clay

Midland Brick Co. Pty Ltd, 102 Great Northern Highway, Middle Swan WA 6056, (08) 9273 5522, Bullsbrook, <http://www.midlandbrick.com.au>

Kaolin

Gwalia Consolidated Ltd, 16 Parliament Place, West Perth WA 6005, (08) 9263 5555, Greenbushes, <http://www.sog.com.au>

Saponite

Watheroo Minerals Pty Ltd, PO Box 353, Dunsborough, WA 6281, (08) 9756 6121, Watheroo Clays

COAL

The Griffin Coal Mining Company Pty Limited, 28 The Esplanade, Perth WA 6000, (08) 9261 2800, Collie <http://www.griffincoal.com.au>

Wesfarmers Premier Coal Ltd, 276 Leach Highway, Myaree WA 6154, (08) 9333 0391, Collie <http://www.wesfarmers.com.au>

CONSTRUCTION MATERIALS

Aggregate

The Readymix Group (WA), 75 Canning Highway, Victoria Park WA 6100, (08) 9212 2000, Boodarrie, Burrup-Dampier, <http://www.readymix.com.au>

Gravel

Boral Resources (WA) Ltd, 63 Abernethy Road, Belmont WA 6104, (08) 9333 3400, Grosmont, <http://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 Abernethy Road, Belmont WA 6104, (08) 9333 3400, Grosmont, <http://www.boral.com.au>

Downe and Milne, PO Box 10047, Kalgoorlie, WA 6433, (08) 9091 3586, Coolgardie.

Rocla Quarry Products, 1 Casella Place, Kewdale WA 6105, (08) 9353 3030, Gnangarra, <http://www.rocla.com.au>

The Readymix Group (WA), 75 Canning Highway, Victoria Park WA 6100, (08) 9212 2000, Marble Bar, Sullivan's Creek, Turner River, Widgiemooltha, <http://www.readymix.com.au>

DIAMONDS

Argyle Diamond Mines, 2 Kings Park Road, West Perth WA 6005, (08) 9482 1166, Argyle, <http://www.riotinto.com>

DIMENSION STONE

Granite

Allied Granites Pty Ltd, 4 Koojan Avenue, South Guildford WA 6055, Drydens Find Granite.

Mungari Quarries Pty Ltd, Level 2, 343 Pacific Highway, North Sydney NSW 2060, (02) 9957 2002, Mungari Granite.

FELDSPAR

Unimin Australia Ltd, 26-28 Tomlinson Road, Welshpool WA 6106, (08) 9362 1411, Pippingarra, Mukinbudin.

TABLE 6 (cont.)

PRINCIPAL MINERALS AND PETROLEUM PRODUCERS 2000-01

GOLD

AngloGold Australia Ltd, Level 13, 44 St Georges Terrace, Perth WA 6000, (08) 9425 4600, Sunrise Dam, <http://www.anglogold.com>

Central Norseman Gold Corp. NL, Level 37, 250 St Georges Terrace, Perth WA 6000, (08) 9442 2000, Central Norseman, <http://www.wmc.com.au>

Croesus Mining NL, 39 Porter Street, Kalgoorlie WA 6430, (08) 9091 2222, Binduli, Davyhurst, <http://www.croesus.com.au>

Delta Gold NL, PO Box 1662, Kalgoorlie WA 6430, (08) 9080 6281, Golden Feather, Kanowna Belle, Lady Ida, <http://www.deltagold.com.au>

Equigold NL, 7 Sleat Street, Applecross WA 6153, (08) 9316 3661, Dalgara.

Gidgee Gold Mine, PO Box 685, West Perth WA 6872, (08) 9485 1476, Gidgee.

Goldfields Kalgoorlie Ltd, Level 16, 1 Castlereagh Street, Sydney NSW 2000, (02) 9223 2400, Kundana, Mt Pleasant, Paddington.

Hill 50 Gold NL, 10 Ord Street, West Perth WA 6005, (08) 9485 0070, Hill 50-Mt Magnet, <http://www.hill50.com.au>

Homestake Mining Company, 2 Mill Street, Perth WA 6000, (08) 9212 5777, Darlot, Lawlers, Plutonic, <http://www.homestake.com>

Kalgoorlie Consolidated Gold Mines Pty Ltd, Private Bag 27, Kalgoorlie WA 6433, (08) 9022 1100, Golden Mile, <http://www.kalgold.com.au>

Marengo Mining Limited, 50 Colin Street, West Perth WA 6005, (08) 9481 3400, Paraburdoo, Mt Olympus, <http://www.lynasgold.com.au>

New Hampton Goldfields Ltd, 9 Havelock Street, West Perth WA 6005, (08) 9321 0611, Big Bell, Jubilee, <http://www.newhampton.com.au>

Normandy Mining Ltd, 100 Hutt Street, Adelaide SA 5000, (08) 8303 1700, Bronzewing-Mt McClure, Jundee-Nimary, Wiluna, <http://www.normandy.com.au>

Placer Dome Inc, 1 Alfred Street, Sydney Cove NSW 2000, (02) 9256 3800, Granny Smith, <http://www.placerdome.com>

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

South Kalgoorlie Mines Pty Ltd, PO Box 2125, Boulder WA 6432, (08) 9021 9222 New Celebration, <http://www.hill50.com.au>

St Barbara Mines Ltd, 2 The Esplanade, Perth WA 6000, (08) 9323 3333, Meekatharra.

GOLD (Cont.)

Troy Resources Ltd, 44 Ord Street, West Perth WA 6005, (08) 9481 1277, Bulchina-Mt Klemptz, <http://www.try.com.au>

Viceroy Australia Pty Ltd, PO Box 585, Victoria Park WA 6979, (08) 9039 4502, Bounty.

WMC Ltd, 250 St Georges Terrace, Perth WA 6000, (08) 9442 2000, Agnew, Kambalda-St Ives, <http://www.wmc.com.au>

Worsley Alumina Pty Ltd, PO Box 48, Collie WA 6390, (08) 9883 8260, Boddington.

GYPSSUM

Cockburn Cement Ltd, Russell Road, East Munster WA 6166, (08) 9411 1000, Lake Hillman.

Dampier Salt (Operations) Pty Ltd, 152 St Georges Terrace, Perth WA 6000, (08) 9327 2257, Lake MacLeod, <http://www.dampiersalt.com.au>

Gypsum Industries, 7 Armstrong Road, Applecross WA 6153, (08) 9364 4951, Lake Cowcowing.

Quantum Holdings Pty Ltd, 15 Havelock Street, West Perth WA 6872, (08) 9321 1616, Jurien Bay North.

HEAVY MINERAL SANDS**Garnet Sand**

GMA Garnet Pty Ltd, PO Box 188, Geraldton WA 6530, (08) 9923 3644, Port Gregory,

<http://www.gmagarnet.com>

Ilmenite, Leucoxene, Rutile and Zircon

Cable Sands (WA) Pty Ltd, PO Box 133, Bunbury WA 6230, (08) 9721 0200, Busselton, Jangardup, Waroona, Sandalwood.

Iluka Resources Ltd, 5th Floor, 553 Hay Street, Perth WA 6000, (08) 9221 7611, Busselton, Capel, Eneabba, Yoganup.

TiWest Pty Ltd, 1 Brodie-Hall Drive, Bentley WA 6102, (08) 9365 1333, Cooljarloo.

IRON ORE

BHP Iron Ore (Goldsworthy) Ltd, 200 St Georges Terrace, Perth WA 6000, (08) 9320 4444, Nimingarra-Yarrie, <http://www.bhp.com.au>

BHP Iron Ore Ltd, 200 St Georges Terrace, Perth WA 6000, (08) 9320 4444, Jumblebar, Newman, Yandicoogina, <http://www.bhp.com.au>

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

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

TABLE 6 (cont.)

PRINCIPAL MINERALS AND PETROLEUM PRODUCERS 2000-01

IRON ORE (Cont.)

Portman Iron Ore Ltd, 1 William Street, Perth WA 6000, (08) 9426 3388, Cockatoo Island, Koolyanobbing, <http://portman.com.au>

Robe River Iron Associates, 12 St Georges Terrace, Perth WA 6000, (08) 9421 4747, Pannawonica, <http://riotinto.com>

LIMESAND-LIMESTONE

Cockburn Cement Ltd, Russell Road, East Munster WA 6166, (08) 9411 1000, Cockburn, Dongara.

Limestone Resources Australia Pty Ltd, Parkland Road, Cnr Hasler Street, Osborne Park WA, 6017, (08) 9443 4244, Wanneroo, Moore River, Carabooda.

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.

Westdeen Holdings Pty Ltd, 7 Armstrong Road, Applecross WA 6153, (08) 9364 4951, Dongara-Denison, Cervantes, Lancelin, Jurien.

MANGANESE

Pilbara Manganese Pty Ltd, 62 Colin Street, West Perth WA 6005, (08) 9321 3633, Woodie Woodie, <http://www.consminerals.com.au>

NICKEL

Anaconda Nickel Ltd, Level 12, 2 Mill Street, Perth WA 6000, (08) 9212 8400, Murrin Murrin, <http://www.anaconda.com.au>

Australian Nickel Mines, 1st Floor, 24 Outram Street, West Perth WA 6005, (08) 9481 6040, Radio Hill, <http://titanresources.com.au>

Centaur Mining and Exploration Ltd, 7 Ventnor Avenue West Perth WA 6005, (08) 9481 7777, Cawse.

Outokumpu Mining Australia Pty Ltd, 1st Floor, 15 Joel Terrace, East Perth WA 6004, (08) 9328 9777, Black Swan, <http://www.outokumpu.com>

Preston Resources Ltd, Level 1, 16 Ord Street, West Perth WA 6005, (08) 9322 4166, Bulong, <http://www.prestonres.com.au>

Sir Samuel Mines NL, 24 Outram Street, West Perth WA 6005, (08) 9213 1588, Cosmos.

Tectonic Resources NL, Suite 4, 100 Hay Street, Subiaco WA 6008, (08) 9388 3872, RAV8, <http://www.tectonicres.com.au>

WMC Ltd, 250 St Georges Terrace, Perth WA 6000, (08) 9442 2000, Blair, Kambalda, Leinster, Mt Keith, <http://www.wmc.com.au>

PALLADIUM

WMC Ltd, 250 St Georges Terrace, Perth WA 6000, (08) 9442 2000, Kambalda, <http://www.wmc.com.au>

PETROLEUM

Apache Energy Ltd, Level 3, 256 St Georges Terrace, Perth WA 6000, (08) 9422 7222, East Spar, Harriet, Stag, Campbell, Agincourt/Wannich, Sinbad, Tanami, Chervil, North Herald, South Pepper.

ARC Energy NL, Level 1, 46 Ord Street, West Perth WA 6005, (08) 9486 7333, Dongara, <http://www.arcenergy.com.au>

BHP Billiton Petroleum (North West Shelf) Pty Ltd, Central Park, 152-158 St Georges Terrace, Perth WA 6000, (08) 9278 4888, Buffalo, Griffin, <http://www.bhp.com.au>

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

Empire Oil & Gas NL, 9 O'Beirne Street, Claremont WA 6010, (08) 9385 3810, Rough Range <http://www.empireoil.com.au>

Hardman Oil and Gas Pty Ltd, 5 Ord Street, West Perth WA 6005, (08) 9321 6881, Woodada, <http://www.hdr.com.au>

Kimberley Oil NL, Suite 12B, 573 Canning Highway, Alfred Cove WA 6154, (08) 9330 8876, Blina, Boundary, Lloyd.

Mobil Exploration & Producing Australia Pty Ltd, Level 29, QV1 Building, 250 St Georges Terrace, Perth WA 6000, (08) 9424 9200, Wandoo.

Origin Energy Resources Ltd, 34 Collins Street, West Perth WA 6005, (09) 9324 6111, Beharra Springs, Tubridgi, <http://www.originenergy.com.au>

Petro Energy Pty Ltd, 242 Railway Parade, West Leederville WA 6007 (08) 9 310 8989, Mt Horner.

Woodside Energy Ltd, 1 Adelaide Terrace, Perth WA 6000, (08) 9348 4000, Cossack, Goodwyn, Hermes, Lambert, Legendre, North Rankin, Wanaea, <http://www.woodside.com.au>

PLATINUM

WMC Ltd, 250 St Georges Terrace, Perth WA 6000, (08) 9442 2000, Kambalda, <http://www.wmc.com.au>

SALT

Cargill Salt, North West Coastal Hwy, Port Hedland WA 6721, (08) 9173 0200, Port Hedland.

Dampier Salt (Operations) Pty Ltd, 152-158 St Georges Terrace, Perth WA 6000, (08) 9327 2257, Dampier, Lake MacLeod, <http://www.dampiersalt.com.au>

TABLE 6 (cont.)

PRINCIPAL MINERALS AND PETROLEUM PRODUCERS 2000-01

SALT (Cont.)

Shark Bay Salt Joint Venture, 22 Mount Street, Perth WA 6000, (08) 9420 4320, Useless Loop, <http://www.clough.com.au>

WA Salt Supply Ltd, Cockburn Road, Hamilton Hill WA 6163, (08) 9335 9911, Lake Deborah East, Pink Lake.

SILICA-SILICA SAND

Silica

Simcoa Operations Pty Ltd, PO Box 1389, Bunbury WA 6231, (08) 9780 6666, Dalaroo.

Silica Sand

Rocla Quarry Products, 1 Casella Place, Kewdale WA 6105, (08) 9353 3030, Gnangarra, <http://rocla.com.au>

TT Sand Pty Ltd, PO Box 1664, Fremantle WA 6959, (08) 9319 1371, Mindijup.

SPONGOLITE

Supersorb Minerals NL, 55 Collie Street, Albany WA 6330, (08) 9842 1955, Woogenellup, <http://www.supersorb.com.au>

TALC

Unimin Australia Ltd, 26-28 Tomlinson Road, Welshpool WA 6106, (08) 9362 1411, Mt Seabrook.

WMC Ltd, PO Box 116, Three Springs WA 6519, (08) 9954 5047, Three Springs, <http://www.wmc.com.au>

TIN-TANTALUM-LITHIUM

Spodumene

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

Tantalite-Tin

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

VANADIUM

Vanadium Australia Pty Ltd, Level 7, 26 St Georges Terrace, Perth WA 6000, (08) 9218 5900, Windimurra, <http://www.pmal.com.au>

ABBREVIATIONS, REFERENCES, UNITS AND CONVERSION FACTORS

As the document makes use of abbreviations and references, an explanation of each has been included below. A conversion table, relating the units by which various commodities are measured, has also been provided.

ABBREVIATIONS

cons	concentrates	n/a	not applicable
f.o.t.	free on truck	f.o.b.	free on board
AS	Australian Dollar	¥	Japanese Yen
ABS	Australian Bureau of Statistics	US\$	United States Dollar
AFR	Australian Financial Review	GDP	Gross Domestic Product
CSO	Central Selling Organisation	BMR	Bureau of Mineral Resources
DRI	Direct Reduced Iron	HBI	Hot Briquetted Iron
RBA	Reserve Bank of Australia	IMF	International Monetary Fund
ABARE	Australian Bureau of Agricultural and Resource Economics	LME	London Metal Exchange

REFERENCES TABLE 3

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

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 TiO ₂ Unit		= 1 tonne of contained metal
Volume	1 kilolitre	(kl)	= 6.28981 barrels (bbls)
	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
Gypsum
Limesand–Limestone–Dolomite
Silica–Silica Sand
Talc

Sales

Alumina
Base Metals (Copper, Lead and Zinc)
Chromite
Diamonds
Gem and Semi-Precious Stones
Gold
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

LOCAL GOVERNMENT BOUNDARIES

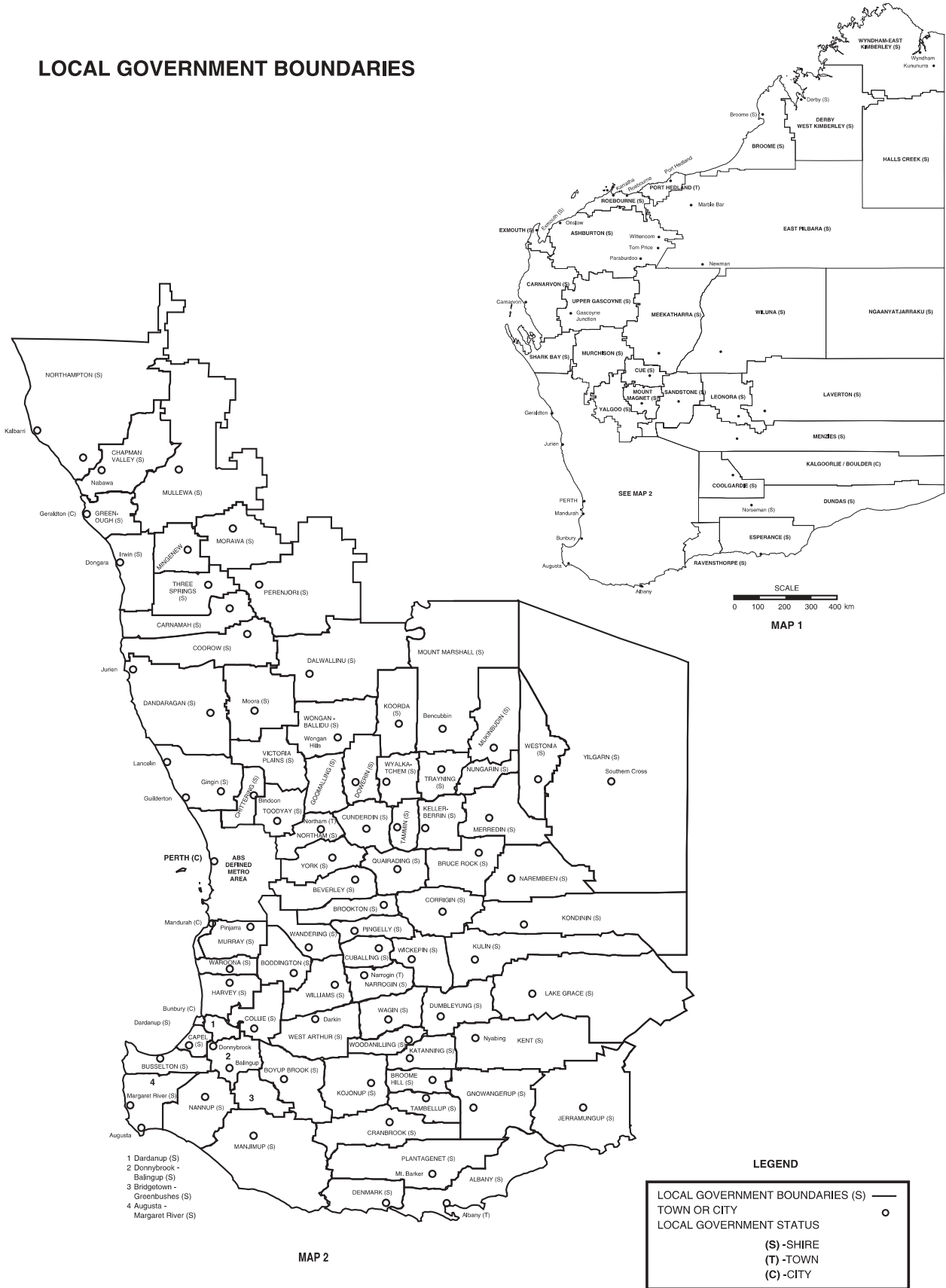
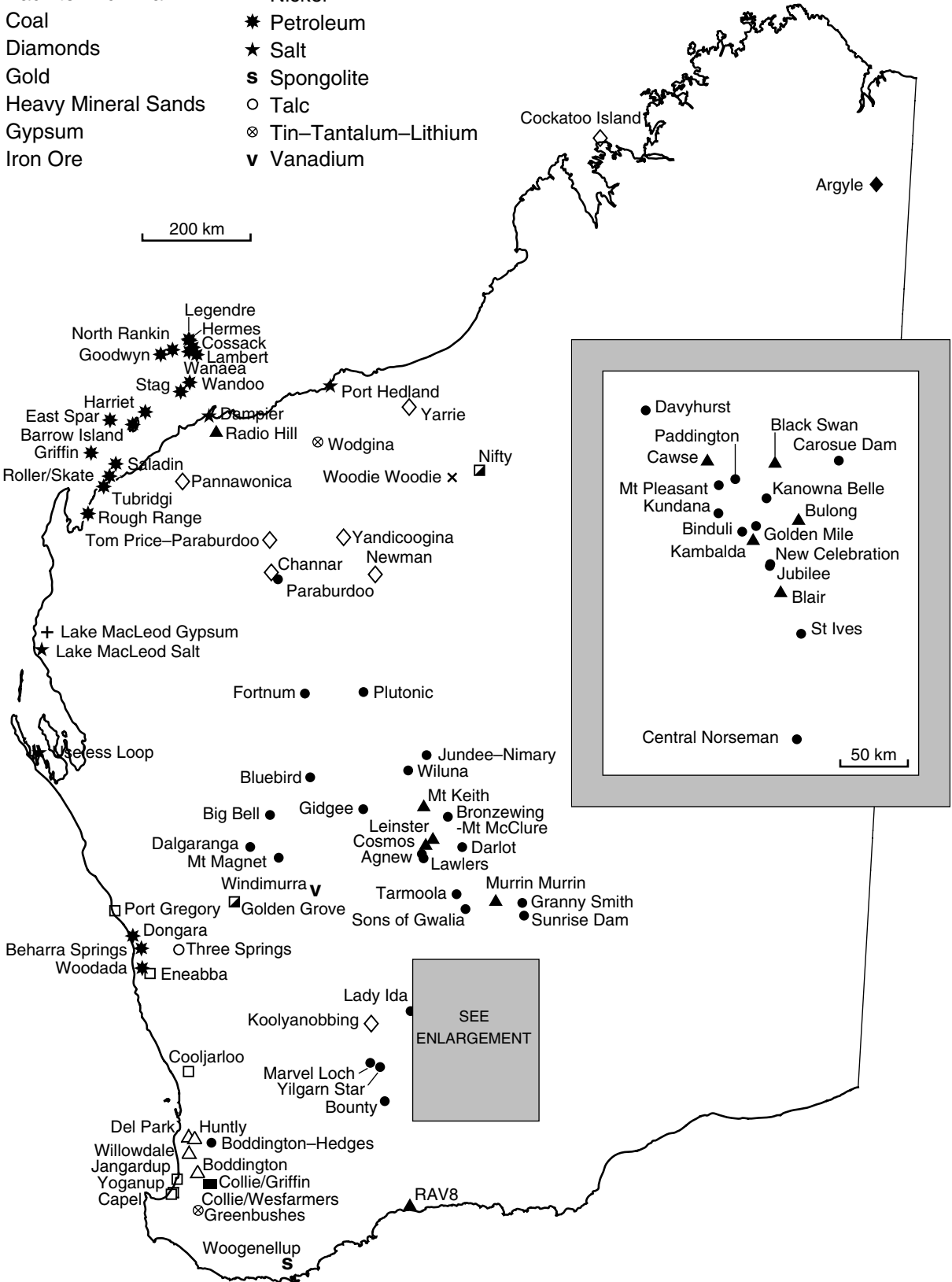


Figure 0.3

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 | ▼ Vanadium |





This publication is now available on our web site

www.mpr.wa.gov.au

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

- Mineral and Petroleum Exploration and Development
- Atlas of Mineral Deposits and Petroleum Fields



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