Department of Minerals and Energy

Western Australia

Statistics Digest

Mineral and Petroleum Production

1999

DEPARTMENT OF MINERALS AND ENERGY WESTERN AUSTRALIA

"Our Resources • Our People • Our Future"

Corporate Policy, Planning and Services

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FOREWORD

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DIRECTOR GENERAL

Welcome to the Department of Minerals and Energy's 1999 Statistics Digest. This publication contains the most comprehensive statistical information available on the Western Australian resource industry.

The statistics in this Digest show that in 1999 the total value of Western Australia's minerals and petroleum fell by around 5% to $16.9 billion. The overwhelming reason for the negative growth in 1999 was low global commodity prices coupled with inconsistent economic conditions in major overseas markets throughout the first half of the year.

The resilience of the State's industry is shown by the fact that despite the adversities encountered in 1999, the value of minerals and petroleum has still come in at near record levels. It is also noteworthy that for the period 1990 to 1999 the industry achieved an average annual growth rate in value of 4%.

Despite the fall in value for 1999, the latest figures indicate that the mineral and petroleum sectors remain the pillar of the State's economy, accounting for approximately 26% of Gross State Product, 64% of its export income, half of its private capital investment and around one-sixth of its employment, both direct and indirect.

It has also been pleasing to see that a number of new projects were commissioned in 1999. Such examples include the Windimurra vanadium project (Australia's only operating vanadium mine), the three nickel laterite projects - Murrin Murrin, Bulong and Cawse, in addition to the expansion of existing facilities in the alumina and base metals sectors. I would like to make particular mention of the State's base metals sector – specifically the quantity and value of zinc sales, which increased dramatically (by 49% and 72% respectively) in 1999 due to significantly increased production and a much stronger zinc price. Overall, such developments arose because of Western Australia's fundamentally strong competitive position in world commodity markets.

Since June 1999 the outlook for global growth has improved significantly due to better than expected economic conditions in the Asian region and strong growth in the United States. This is particularly good news for commodity prices, as long-term recovery depends on increasing demand, which in turn, depends on rising global growth. It also augurs well for projects that had development plans delayed by the Asian economic crisis.

To maintain Western Australia's position as one of the world's prominent players in international mineral markets it is important that the State continues to build on its existing advantages. The State's plans for further deregulation of the energy sector will assist the mining industry in taking up downstream processing opportunities. It is also important that, where possible, the State continues its endeavours to reduce uncertainties in the local operating environment. Native title issues continue to be of major concern to industry and these and other issues are discussed in the Digest.

Lastly, I would like to thank the various resource companies operating in Western Australia, Australian Bureau of Agricultural and Resource Economics (ABARE), Australian Bureau of Statistics (ABS) and the Western Australian Treasury Department for their co-operation towards the preparation of the Digest.

1. ECONOMIC AND SOCIAL ENVIRONMENT

1.1 Economy Review

1.1.1 World Economy

Better than expected world economic growth in 1999.

Despite IMF forecasts that world economic growth would fall again in 1999, it appears to have rebounded to 3.3% from the 2.5% recorded in 1998. The fundamental reasons for this were the continued strength of the US economy coupled with a quicker recovery in Asia and stronger European growth. In addition the chronically slow Japanese economy recorded some growth in the first half of the year. The IMF notes that the global downturn resulting from the Asian economic crisis and problems in other emerging market countries (such as Latin America and Russia) since 1997 was relatively mild and brief compared with expectations.

World economic growth forecast to be even higher in 2000.

The improved outlook for world growth is evidenced in the IMF upgrading its forecasts of growth for 2000 from 3.5% to around 4.25%. The reason for the upward revision is that most qualifications to world economic performance are on the upside. For example, there is expected to be continued strong growth in the US, Europe and Asia coupled with positive growth in Japan and a modest turnaround in Latin America. In making their forecasts, the IMF notes from past experience that previous global business cycle upturns have, more often than not, turned out to be stronger than anticipated. However, the IMF does point out that downside risks to this scenario unfolding include the uncertainty hanging over the sustainability of expansion in some countries, most notably the United States.

The United States continues to drive world economic growth.

Throughout 1999 the US economy continued to expand rapidly, recording economic growth of 5.1%. Overall, private domestic demand is the dominant force driving economic growth which largely reflects continuing robust employment growth. In addition, business investment is still increasing rapidly. However, signs of an imbalance have emerged with a rapidly growing trade deficit in response to demand for imports. In addition, the United States' current account deficit has increased significantly to around 3.7% of GDP in 1999, after running at approximately 1.9% of GDP in 1997 and 2.5% of GDP in 1998. This reflects the widening gap between domestic savings and investment in the US economy and the consequent flow of funds into the US.

A change in US monetary policy strategy.

The crucial question for the US is how much longer can the expansion last without triggering the return of significant inflationary pressures. At this stage (May 2000) it appears that the US economy, in its tenth year of expansion, recorded growth of 5.4% in the first quarter of 2000. However, with an unemployment level of around 4% (a rate not witnessed since 1970 and prior to that 1957), the labour market is becoming increasingly tight. However, to date this has not caused significant inflationary pressure due to exceptionally high productivity gains in addition to moderate wage growth. There are worrying indications that US employers are being pressured by an extreme shortage of workers to pay higher wages and benefits. As a result of this evidence, amongst others, the US Federal Reserve (the Fed) increased interest rates by 50 basis points (or 0.5%) to 6.5% in mid May 2000. This represented

a deviation from the Fed's previous monetary policy movements as it had been cautious not to bring the economy to a grinding halt. Its policy was to opt for smaller incremental changes in official interest rates of 25 basis points, making five such increases since June 1999. This had done little to dampen household and business expenditure, thus increasing interest rates by 50 basis points was seen as an important move in that it might begin to slow things down to the more "comfortable" economic growth rate of 3.5% to 4% per annum.

Strong US growth expected in 2000.

The IMF has forecast United States' economic growth to be around 4.4% in 2000. However, this is contingent on a stabilisation in the current account deficit and no rapid stock market correction. If a large correction were to occur then this would significantly effect domestic demand. With a significant proportion of the US population owning shares, the booming stock market, has created a wealth effect which has in part fuelled domestic spending. Any collapse in share prices could in turn have a detrimental effect on domestic expenditure.

Japan

The recovery of the Japanese economy falters in 1999.

After falling throughout much of 1997 and 1998, economic growth rebounded in the first half of 1999, with private sector demand being positively influenced by government spending. In the second half of the year the reverse occurred with a decline in government expenditure being linked to a fall in private domestic expenditure. According to the IMF the Japanese economy contracted in the second half of the year at an annual rate of around 4%. This was largely due to falling real wages and uncertainty about future employment prospects. However, recent positive indicators include improvements in company profits in addition to increases in industrial production and business confidence. In particular, industrial production is estimated to have risen by 2.7% in the March quarter 2000 and has been rising since the end of 1998. This has been largely attributed to increases in exports of electrical machinery to the rest of Asia. Overall, after contracting by 2.5% in 1998, the IMF has estimated real economic growth in Japan to be around 0.3% in 1999.

The outlook for the Japanese economy in 2000 remains subdued.

The outlook for 2000 is not much brighter with the IMF forecasting economic growth to increase marginally to around 0.9% in 2000. The subdued outlook for 2000 is largely a result of continued concerns surrounding consumer expenditure. Consumer confidence has begun to improve in the beginning of 2000 but employment has fallen suggesting that consumers will be reluctant to increase expenditure. Another factor that is holding back the Japanese economy from a sustained recovery is structural reform. The IMF is concerned that without thorough financial and corporate restructuring, Japan's poor growth record in the 1990s, is likely to continue for some time.

Europe

Euro area economy grows strongly in 1999.

Economic growth in the Euro area (see over page for definition) began to pick up in the latter half of 1999 to record a rate of 3.5%, up from 2% in the first half of the year. Overall, growth was 3% for 1999 as a whole. Amongst the larger economies, growth remains strong in France and is steadily recovering in Italy and Germany. However, a much more rapid expansion is occurring in the smaller Euro area economies, in particular Ireland, Spain, Portugal and Finland.

Overall, the export sector has been an important contributor to economic growth, largely as a result of the depreciated Euro dollar against the US$, coupled with the general recovery in worldwide demand.

Higher Euro area growth expected in 2000.

The IMF has forecast Euro area growth to come in at around 3.2% in 2000. Indications to date are that the strong pace of growth witnessed in the second half of 1999 has continued into 2000. Apart from strong export growth mentioned above, business confidence is buoyant coupled with strong consumer confidence as a result of Euro area unemployment falling to below 10% in addition to rising stock and property prices.

***NOTE**: The Euro area refers to countries that are directly participating in the European Monetary Union (i.e. the European common currency the Euro dollar). These countries are Germany, France, Spain, Portugal, Italy, Austria, Finland, Ireland, the Netherlands, Belgium and Luxembourg.*

UK in its eighth year of expansion.

Following a slowdown in 1998, economic activity in the United Kingdom picked up significantly in 1999. Similar to the United States, the UK expansion that began in 1992 is now the longest on record. The United Kingdom recorded economic growth of 2% in 1999. This is largely a result of robust private consumption which is being supported by increasing asset prices and strong employment growth. In February 2000 the unemployment rate fell to 4%, the lowest level in 20 years. The IMF have forecast the pace of economic growth to pick up in 2000, with the rate of growth expected to be around 3%.

Non-Japan Asia

Economic activity has continued to expand across most countries in non-Japan Asia in the second half of 1999 and into 2000. Whilst a recovery in domestic consumption has contributed to the recovery, the overwhelming factor has been a dramatic improvement in exports.

China's economic growth is fuelled by increased exports.

China is the largest economy in the region. In 1999 it is estimated that the Chinese economy grew by 7%. Economic activity was supported by a strong increase in exports which is largely attributed to an improvement in regional economic conditions coupled with continued strong US demand for Chinese exports. In addition, the government implemented a fiscal stimulus package which began to take effect in the latter part of the year. This combination of factors assisted in compensating for the continued weakness in private domestic demand and, together with a moderate recovery in private investment, is expected to underpin economic growth of around 7% in 2000.

South Korea makes the strongest recovery of the Asian crisis countries.

In South Korea economic activity has picked up dramatically, with the economy recording growth of around 10% in 1999, compared with a contraction of around 5.8% in 1998. South Korea has made a considerable effort in restructuring its banking and corporate sectors in particular. Export performance has also strengthened considerably, driven largely by increased demand for electronic goods such as semiconductors and telecommunications equipment. However, in 2000 growth in South Korea is anticipated to moderate slightly to around 7%.

1.1.2 Australian Economy

Australian economy grew strongly in 1999.

The Australian economy continued to grow strongly in 1999, recording a growth rate of 4.4%, the seventh consecutive year of growth in excess of 3.5%. Notably, growth was stronger in the second half of the year largely as a result of a significant increase in exports as well as continued strong domestic demand. Private consumption expenditure grew by 5% in 1999, dwelling investment by 4.2%, public consumption by 4.3%, public investment by 18.6%, exports by 5% and imports by 9.4%. Total business investment remained unchanged from its 1998 level. Of this total, plant and equipment investment increased by 1.9% and other investment by 4.6%, however these were offset by a 5.1% drop in non-residential construction.

Net exports expected to fuel economic growth in 2000-01.

Commonwealth Treasury has forecast economic growth to be 4.5% in 1999-2000 and then to decrease slightly to 3.75% in 2000-01, while expecting a significant rebalancing of the contributing components to growth. Growth in domestic demand is expected to moderate. This is expected to be partially offset by stronger growth in business investment and a significant increase in net exports. Faster world growth and a moderation of domestic demand in addition to a boost in services exports associated with the Sydney Olympics is expected to underpin the growth in net exports. In addition, the low Australian dollar is also expected to contribute to a stronger net export performance in 2000-01.

Inflationary outlook uncertain due to Goods and Services Tax (GST).

The rate of inflation picked up slightly over 1999 despite subdued wages growth, with the consumer price index (CPI) increasing by around 1.8%. Some of the rise in inflation was due to the effect of higher international oil prices. However, with the introduction of the GST in July 2000, the inflation outlook has become somewhat uncertain. Commonwealth Treasury has forecast an average underlying inflation rate of 2.5% in 1999-2000, (i.e. the inflation rate ignoring the effects the tax changes will have on prices). Treasury has also argued that the inflationary effects of the tax reform package will not be felt evenly throughout 2000-01, with the main effects of the GST to filter through in the September quarter 2000. During this quarter the impact of the GST will only be partially offset by the removal of sales tax on some items. Commonwealth Treasury has therefore forecast the overall increase in the CPI in the September quarter 2000 to be as high as 4.5%, of which 3.75% could be solely attributed to the one-off price changes associated with tax reform. Taking together the estimate of ongoing inflation and the impact of tax reform on prices, Commonwealth Treasury has forecast the CPI to rise by around 5.75% in year-average terms in 2000-01.

Interest rates likely to remain stable in the near term.

The major influencing factors on the outlook for interest rates in the short term are the uncertain inflationary environment and the standing of the Australian dollar against the currencies of its trading partners. The RBA increased official interest rates by 25 basis points to 6% in early May 2000, however the immediate likelihood of any further increases is unlikely given evidence of a slow down in the Australian economy. This could change however if the inflation effect of the GST is more significant than anticipated.

1.1.3 Western Australian Economy

The domestic economy grew marginally in 1999.

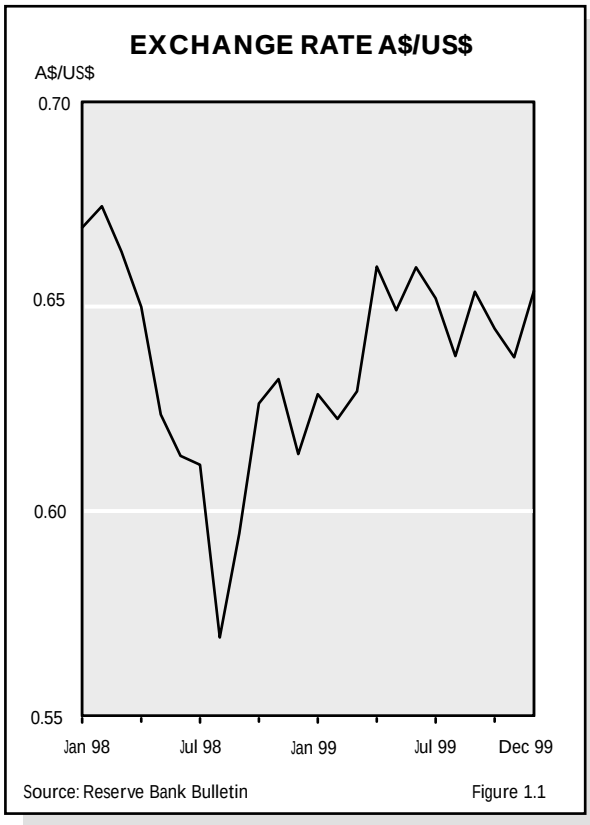
In 1999, Western Australia's domestic economy* grew by 0.4% in real terms, supported by increases in all components of growth except business investment. Of the main components of the domestic economy, private consumption grew (in real terms) by 2.4% in 1999; public consumption by 3.1%; dwelling investment by 9.2% and public capital expenditure by 26.6%. Business investment fell by 15.5% largely reflecting the downturn in mining investment. However, a number of projects are expected to commence construction in the first half of 2000, namely the Legendre oil project and the Carosue Dam gold project.

The value of the State's exports fell in 1999.

In 1999, both the value of exports and imports, in nominal terms, fell with the former dropping by 11.7% and the latter down by 8.4%. In addition, net exports (i.e. the value of exports less the value of imports) dropped by 13.9% in 1999. However, Western Australia still has the largest trade surplus of all Australian States.

WA economic growth expected to pick up in 1999-2000.

State Treasury has forecast overall economic growth in Western Australia to be around 4.0% in 1999-2000 following 2.1% growth in 1998-99. The increase in growth in 1999-2000 is expected to be underpinned by a pick up in both domestic activity and net exports. Growth in domestic demand in 1999-2000 is expected to be driven by a strong increase in dwelling investment, largely a result of construction being brought forward due to the commencement of the GST, increased public demand and to a lesser extent private consumption. The overall forecast for growth in domestic demand in 1999-2000 is 2.75%.



Source: Reserve Bank Bulletin

Figure 1.1

***NOTE**: The domestic economy represents around 80% of the State's total economy. It excludes the impact of overseas and interstate trade. Unfortunately we are unable to publish State economic growth figures on a calendar year basis as they are only available for financial years.*

1.2 Economic Factors Affecting the Mining Industry

World commodity prices have improved markedly since June 1999.

The downward pressure on world mineral and energy commodity prices that began in 1997 with the Asian economic crisis continued throughout the first half of 1999. The Asian crisis represented the most significant shock to commodity markets since the dissolution of the Soviet Union and the global economic slowdown in the early 1990s. Japan's poor economic performance also assisted in undermining world commodity markets.

Many commentators reached the consensus that in aggregate, commodity prices reached their cyclical lows around mid 1999 with a significant turnaround becoming apparent. The main reason for this turnaround was cutbacks in supply across most major commodity markets. This, coupled with recovering demand, led to dramatic increases in a number of commodity prices. Overall, the strong increases in demand were driven by improvements in the world economy in 1999, which have continued into 2000. The outlook remains favourable, however commodity prices are likely to settle at slightly lower levels as opposed to the highs that have been attained recently. This is largely due to producers starting to bring supply back on stream or the commencement of new projects in response to high commodity prices. In addition demand, whilst still growing, is unlikely to grow at the rates witnessed at the beginning of the recovery.

The most notable performers in world commodity markets have been oil and nickel. After reaching a twelve year, average monthly low of US$3,875 per tonne in October 1999, world nickel prices recovered by an astronomical 162% to average US$10,134 in May 2000. Oil, similarly reached a twelve-year average monthly low of around US$11 per barrel in December 1998, and also recovered by around 162% to average just under US$29 per barrel in May 2000.

However, US$ gold prices have largely been the general exception to the recovery in world commodity prices. European central banks' sales, and in particular the threat of these continuing at potentially high levels, have substantially dampened the international gold market over the last two and a half years. In late September 1998, the European central banks agreed to limit gold sales to approximately 400 tonnes a year over the next five years and cap the amount of gold they will lend to the market. This decision restored some confidence in the gold market and caused a surge in the gold price, with the price averaging US$310 per ounce in October 1999, its highest level since late 1997. However, this was short-lived with the gold price averaging around US$285 per ounce from November 1999 to May 2000.

Economic recovery in Asia provides positive outlook for the State's mineral and petroleum industries.

In 1999 the value of the State's mineral and petroleum exports was $13.4 billion, almost 80% (by value) of Western Australia's resources were exported. The most important trading partners were Japan, which received 30% of Western Australia's mineral and petroleum exports, followed by Europe (15%), South Korea (9%), Singapore (9%), China (8%), the United States of America (7%) and Taiwan (6%).

Australia's international competitiveness remains stable in 1999.

The A$ averaged US$0.65 over 1999, up by 2% on the 1998 average of US$0.63. Whilst the underlying A$/US$ exchange rate is of importance when assessing the relative cost of Australian exports overseas, a far more critical indicator is the Trade Weighted Index (TWI). The TWI is the average value of the A$ in

relation to the currencies of Australia's major trading partners. This index effectively provides an indication of Australia's international competitiveness. In 1999 the TWI fell marginally (by 0.7%), indicating that the competitiveness of Australia's exports relative to our major trading partners increased slightly.

Mining industry expected to benefit from the Goods and Services Tax (GST).

In August 1998 the Federal Coalition released its proposed tax reform package which, among others, included a 10% GST and reductions in personal income tax rates. In June 1999, after intense negotiations with the Democrats, the package was passed in the Senate after it was agreed that food would be removed from the GST base and changes would be made to the then proposed credit scheme for diesel fuel. Given that the changes will result in lower GST receipts that can be distributed by the Commonwealth to the States, in return for the latters acceptance to remove a number of its taxes and charges on business, the timeframe for the removal of some of these has now shifted outwards.

The main benefits to the mining industry of the GST package result from:

- Exports being zero-rated for GST purposes. This means that no GST is paid on the final sale of those products; and
- Despite the changes to the initial diesel fuel credit scheme (outlined in August 1998) the mining industry will still benefit from lower diesel fuel excise. The initial diesel scheme would have effectively reduced the on-road diesel excise from 43 cents per litre to zero, and for larger transport users (including rail) from 43 cents per litre to 18 cents per litre. Following the Government's acceptance of the Democrats' changes, vehicles used in urban areas have been prevented from claiming the rebate. The changes effectively reduce the diesel excise for on-road use of diesel by trucks operating outside the metropolitan area and major rail corridors from 43 cents a litre to 20 cents a litre. A 100% diesel excise rebate has also been given for rail transport and the off-road diesel subsidies to farmers and miners have been extended.

Benefits of the GST package for some producers could be negated through the abolition of accelerated depreciation.

In mid 1998 the Commonwealth Government appointed Mr John Ralph to conduct an Inquiry on the business tax reform proposals released as part of the tax reform package. In March 1999 the Inquiry released a draft report which proposed a reduction in the corporate tax rate to 30%. This was to be funded primarily through the abolition of accelerated depreciation.

The State Government's submission to the draft report argued that the mining and petroleum industries were highly capital intensive and that the proposed abolition of accelerated depreciation concessions would adversely affect its international competitiveness. The State Government therefore argued for both a retention of accelerated depreciation and a lowering of the company tax rate to 30%.

However, the Ralph Inquiry's Final Report to the Commonwealth Government (handed over in July 1999) again recommended a reduction in the company tax rate to 30% and the scaling back of accelerated depreciation. On 21 September 1999 the Commonwealth Government provided its long awaited response to the Ralph Inquiry into business taxation. Its statement represented the "first stage" of its response to the Report. The "second-stage" involved an

examination of the other recommendations contained in the Report on which Federal Cabinet announced its position in November 1999. The most notable of these is the Review's recommendation for a fundamental change in the method of determining taxable income for business. If adopted this recommendation would claw back a substantial proportion of the benefit derived to all companies by the proposed move to a 30% corporate tax rate. In its initial release the Federal Government anticipates having the "second stage" reforms in place by 1 July 2001.

In relation to the "first stage" reforms, which were passed by Parliament in December 1999, the most notable changes to the tax arrangements for mining companies are:

- The corporate tax rate will be reduced from 36% to 34% for the 2000-01 income tax year and to 30% thereafter.
- The immediate deductibility of expenditure on the removal of overburden has been retained. (The Commonwealth Government has rejected the Inquiry's recommendation for the abolition of the immediate deductibility of overburden removal expenditures.)
- Immediate deductibility for prospecting and exploration expenditure in addition to the research and development tax concession have also been retained.
- From 1 July 2001, expenditures incurred by the mining industry, such as those for export market development, defending native title and mine closures will be immediately deductible. This is provided that such costs do not create or improve an asset. These so-called "blackhole" costs are currently non-deductible.
- Only 50% of the capital gains of individuals will be subject to tax, while superannuation funds will have only two-thirds of their capital gains being taxed.
- Accelerated depreciation has been abolished for assets purchased after 9.45am, 21 September 1999. Depreciation will be based on the "effective life" of the asset.

As a result of the removal of accelerated depreciation, less capital-intensive sectors, small companies and those companies not planning to undertake any large-scale capital investments will gain significantly from the proposed reduction in the company tax rate to 30%. Small companies will benefit from the Commonwealth Government retaining accelerated depreciation for companies with an annual turnover of less than $1 million.

The decision to abolish accelerated depreciation will affect the economic viability of companies planning significant capital expenditures over the next few years. While these companies will obtain a partial benefit from a lower company tax rate this will not compensate them for the loss of accelerated depreciation. Loss of accelerated depreciation will reduce the internal rate of return of large-scale developments and its removal could render some projects uneconomic. Despite the proposed new arrangements for the tax treatment of capital gains, the attractiveness of these types of projects to investors will also be reduced. Overall the decision to abolish accelerated depreciation is expected to shift shareholder investments towards less capital-intensive sectors.

Also in defence of removing accelerated depreciation the Commonwealth Government has indicated that overall the mining industry is "in front" thanks to the proposed 30% corporate tax rate and the benefits from the GST package that was passed by Parliament in June 1999.

It is nonetheless apparent that the benefits of the tax reform process initiated by the Commonwealth will be unequally spread across the mining industry. Companies planning large-scale capital expenditures will likely have the benefits derived from the proposed lowering in the company tax rate and the GST package outweighed by the negative aspects of the 21 September 1999 tax reform changes.

In recognition of this the Commonwealth Government has set up the Strategic Investment Co-ordination Process. Such investment incentives that could be provided under this scheme include grants, tax relief or the provision of infrastructure services. For very large capital intensive projects of national significance that have net economic, specifically employment benefits, the Process will also take into consideration the impact of tax reform on the viability of the project and offer tax-based incentives accordingly. It has been speculated in the media that the North West Shelf partners have made an application to the process for $100 million worth of assistance towards the expansion of their gas to liquids plant.

Deregulation of the domestic gas market increases private sector involvement.

The staged deregulation of the domestic gas market has brought about significant efficiency benefits to the mining industry, particularly in the Goldfields, the Mid West and the Pilbara regions. In addition, local towns have benefited through the opportunity to access gas as an alternative energy source.

The benefits of deregulation were highlighted throughout the year with the completion of Australian Gas Light Company's $48 million Mid West pipeline. The pipeline starts from a junction of the Dampier to Bunbury pipeline stretching 355 kilometres inland via Mount Magnet to the new Windimurra vanadium project. The second stage of the project is to extend the line to Cue and Meekatharra once further customers are secured.

In addition, Anaconda Nickel and StateWest Power have also reached agreement to build a $100 million pipeline from the Dampier to Bunbury pipeline, near Geraldton, inland to the Mount Margaret area. If proceeded with the pipeline could further reduce tariffs in the region. The new pipeline could also aid the development of additional projects in the region via the supply of competitively priced gas, creating an alternative energy source to the Goldfields Gas Transmission pipeline owned by the Australian Gas Light Company.

Epic Energy also completed construction of a stand-alone pipeline from the Burrup Peninsula to Port Hedland. The pipeline supplies gas to BHP's Hot Briquetted Iron plant.

Water supply concerns re-emerge amongst the Goldfields mining industry.

An issue that has re-emerged recently is concern amongst the Goldfields mining industry regarding future water supply. The vast majority of gold producers utilise hypersaline water in their production processes, however some other mines, including those in the nickel industry, need low salinity water. A private consortium known as UtiliLink, which is made up of Macquarie Bank,Thiess Contractors and the Water Corporation, is currently investigating the feasibility of piping seawater from Esperance to the Goldfields for around $300 million, with estimates that saltwater could be supplied to industry for around $1.20 per kilolitre. There is also the added possibility that a desalination

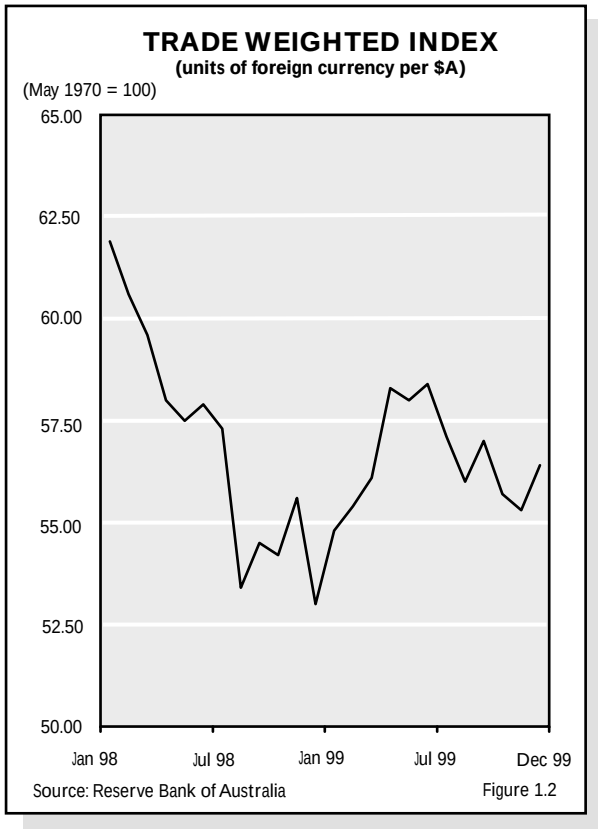
plant could be built in Kalgoorlie if there is sufficient demand from customers for desalinated water. Another option is the utilisation of a slightly saline water resource located in the underground Officer Basin, around 400 kilometres north-east of Kalgoorlie-Boulder. However further investigation of this resource is needed before it could be exploited sustainably.

Legislation for the privatisation of Westrail freight passes through State Parliament.

Legislation paving the way for the privatisation of Westrail freight passed through State Parliament in May 2000. Expressions of interest from potential bidders were called not long after this. It is intended that Westrail Freight will be sold as a fully integrated business, incorporating both rolling stock and track. The business will not be sold to another government operator and the private operator is required to comply with the State's rail access regime. This regime provides a guaranteed right for other operators to negotiate track access on fair terms and conditions. The privatisation and track access offers the potential to enhance the efficiency of rail operations which in turn will be beneficial to those industries that use the State's rail services, in particular minerals and agricultural producers.

International mining companies embrace the internet for improved operating efficiencies

In May 2000 it was announced that 14 of the world's largest resource companies had joined forces to form an independently operated, internet-based, supply procurement marketplace worth an estimated $350 billion (US$200 billion). The partners include Anglo American, Brazil's Companhia Vale do Rio Doce (CVRD), De Beers, Alcan Aluminium, Alcoa, Inco, BHP, Rio Tinto and WMC. The initiative is expected to bring about a more transparent supply chain which would lead to improved market efficiencies brought about by reduced transaction costs, reduced inventories and the convenience of automated ordering. In addition there is potential for not only supply initiatives but marketing commodities directly over the internet. WMC have utilised this tool to sell nickel, copper and cobalt directly to the market.



Source: Reserve Bank of Australia

Figure 1.2

1.3 Social and Political Factors affecting the Mining Industry

Native title continues to be a major issue impacting on the industry.

The Western Australian Government has been using the future act procedures of the Federal Native Title Act (NTA) since March 1995.

Native title claims covering approximately 81% of the State had been registered with the National Native Title Tribunal (NNTT) by 30 April 2000. The distribution of these claims is such that about 98% of all mineral title applications in Western Australia must now be processed via the future act regime of the NTA.

In the period from 16 March 1995 to 30 April 2000, the Department referred 18,490 mining and petroleum tenement applications to the NTA future act procedures. Of these, 10,036 (54%) have been cleared for grant after a delay of about 6 months.

With respect to exploration and prospecting titles, the State routinely applies the Expedited Procedure. If an objection to this process is made by a registered native title claimant and the objection is upheld by the NNTT, then the matter must proceed in accordance with the 'right to negotiate' procedure.

In the case of mining leases and general purpose leases, applications over areas that are the subject of a registered native title claim must undergo the right to negotiate procedure. The right to negotiate procedure involves negotiation meetings between parties in relation to the grant of tenements. These negotiations must be carried out in accordance with NTA procedures which require that negotiations be "in good faith" with a view to achieving an agreement with the tenement applicants, native title parties and the State Government (i.e. the Department of Minerals and Energy). Where no agreement results from negotiations within the prescribed six-month time frame, any of the parties may apply for a determination by the NNTT.

The delays experienced with mining leases have been much greater than compared to exploration licences. To 30 April 2000, 4,544 applications for mineral titles are subject to the right to negotiate procedures under the NTA. Over this period 449 agreements have been finalised involving 360 mining leases.

Passage of the Commonwealth Government's Native Title Act Amendment Bill 1997 reduces native title applications but the area of the State under claim remains largely unchanged.

In July 1998, the Native Title Act Amendment Bill 1998 (i.e. the Wik Amendment) was passed by the Federal Parliament. It enables the State governments to establish their own procedures, subject to Federal Government approval, to deal with future acts on all land tenures including pastoral lease and vacant crown land.

In October 1999 the NNTT announced that there had been a 45% drop in the number of native title claims in Western Australia over the past year. This is mainly the result of the new registration test in the Federal Native Title Act that requires claimants to meet certain criteria before the right to negotiate procedure of the Act can be triggered. Some of the conditions that need to be satisfied under the new registration test include:

- at least one member of the applicant group has or had a traditional physical connection with the area;

- no member of the native title claim group was a member of a native title claim group for a previous application; and
- the applicant was a member of the claim group and authorised to make the application on behalf of everyone else in the claim group.

While the new registration test has led to a consolidation of claimant groups the actual area of the State under claim has remained largely unchanged.

State Parliament passes legislation to establish State Native Title Commission

In accordance with the passage of the Commonwealth Government's Native Title Act Amendment Act 1998, on 15 October 1998 three native title Bills were introduced into the Western Australian Parliament comprising:

i.) The Titles (Validation) and Native Title (Effect of Past Acts) Bill 1998;

ii.) The Native Title (State Provisions) Bill 1998; and

iii.) The Acts Amendment (Land Administration, Mining and Petroleum) Bill 1998.

The Titles (Validation) and Native Title (Effect of Past Acts) Bill validates mining and petroleum grants made and confirms extinguishment of native title by past acts.The Bill ensures ongoing security of tenure and investment for titles issued under the Government's previous land titles regime. The Bill was passed by State Parliament in mid 1999 and essentially validated 9,000 land and mining titles that were issued between January 1994 and December 1996 (High Court's Wik Decision).

The Acts Amendment Bill 1998 was passed by Parliament and assented to in December 1998. It provides consequential amendments to existing State Acts and imposes native title liability compensation obligations on industry for future acts.

The Native Title (State Provisions) Act, passed by State Parliament in December 1999, reflects the Federal amendments to the Native Title Act. It provides for alternative consultation procedures on leasehold land (e.g. pastoral) in lieu of the right to negotiate, improved right to negotiate procedures on Crown land, and procedures to deal with infrastructure. It also facilitates the establishment of a State Native Title Commission to administer these and other procedures. Under the Act the National Native Title Tribunal will be left to deal with the registration, mediation and determination of native title claims.

Commonwealth Senate rejects the Northern Territory's state-based native title regime having implications for Western Australia.

There is the distinct possibility that although the Native Title (State Provisions) Bill 1999 was passed by the State's Parliament the Commonwealth Senate will reject it. Under the Commonwealth's Native Title Act Amendment Act 1998, Senate approval for a State-based native title regime is required. The State Provisions Bill was sent to the Federal Attorney General in March 2000, as it must be approved as being compliant with the Act before it can be put before both houses of Federal Parliament for approval. The State Government expects to hear back from the Federal Attorney General by July 2000.

The Commonwealth Senate has already rejected the Northern Territory's native title regime, even though the NT Parliament had accepted the regime. Labor and the minor parties combined in the Senate to reject the NT model because they believe that under the Commonwealth Native Title Act there is a loophole

that allows the States and Territories to water down their respective native title regimes at a later time without obtaining Commonwealth Senate approval for those actions. This issue has yet to be resolved with the added possibility that Queensland's State-based regime could also be rejected by the Senate.

New protocol for negotiating in "good faith" has been developed in Western Australia.

A new protocol for Western Australia's participation in the negotiation of mining and petroleum tenements has been developed in consultation with industry and Aboriginal representative bodies. The protocol recognises that all parties, and not just the State Government, must negotiate in good faith. The establishment of the new protocol has enabled companies to take their own initiative in negotiations and significantly increased the number of cases the Department of Minerals and Energy is able to support. The new protocol assists all parties to deal with a greater number of tenements in the negotiation process.

Miriuwung and Gajerrong Native Title decision largely overturned by Full Federal Court.

On 24 November 1998 the Federal Court made its first court contested determination on native title in mainland Australia. The Court confirmed that native title could co-exist with other forms of land tenure. The native title claim by the Miriuwung and Gajerrong people covered 7,000 square kilometres of the East Kimberley. It included a claim over Lake Argyle and the Ord River and extended into the Northern Territory.

Virtually all the area claimed was allowed with a few exceptions. The Court decided, among others, that native title was extinguished over certain roads, community reserves the Ord River dam and power station, telephone stations and, in general, the town of Kununurra. The Court also ruled, among others, that the native title holders had access rights and the right to trade in resources and to receive a portion of resources taken from the area claimed.

On 26 July 1999, the Full Federal Court commenced hearing an appeal against the Miriuwung and Gajerrong decision, with the preliminary judgement being handed down on 3 March 2000. The final decision was handed down on 11 May 2000. By a majority of 2 to 1, the Full Federal Court substantially upheld the appeal and made some important findings about the nature of native title, its proof and extinguishment. Particular findings of the decision pertinent to the minerals industry are:

- The Miriuwung and Gajerrong people's claim to native title over the area in question was upheld, but native title had been extinguished to a greater extent than previously determined;
- Native title was akin to a "bundle of rights", generally amounting to personal rights and not an interest in land;
- Pastoral leases extinguish native title where they have been enclosed or improved;
- Major projects such as the Ord Irrigation and the Argyle Diamond projects extinguished native title;
- Native title rights to minerals and petroleum were extinguished by legislation; and
- The State's mining leases extinguished native title.

Applications have been made for leave to appeal the decision to the High Court. (Note – late information – the Premier announced on 16 June 2000 that the State will grant mineral and petroleum titles where title applicants can demonstrate that native title has been extinguished according to the principles set out in the Miriuwung Gajerrong appeal decision by the Full Federal Court.)

The Framework Convention on Climate Change (FCCC) establishes the mechanism for international co-operative action on greenhouse gases

The Framework Convention on Climate Change (FCCC) established the mechanisms for international co-operative action on greenhouse gases. The Convention sets out a broad framework and initiated a process covering all aspects of climate change. The international commitments under the FCCC were concluded at the Third Conference of the Parties held at Kyoto, Japan in December 1997.

The FCCC provides a two-point strategy to combating greenhouse. Signatories to Annex 1 of the FCCC - which essentially are developed countries - are expected to be at the forefront of reducing their greenhouse gas emissions. Those countries that are not signatories to Annex 1 are expected at a later stage to pursue FCCC commitments (i.e. once they are considered to be developed countries).

Australia is a signatory to Annex 1 of the FCCC while its main resource sector competitors (e.g. China and India) are not.

Kyoto outcome satisfactory for Australia.

In regard to the Kyoto discussions, Australia was able to successfully lobby countries into supporting the concept of differentiation. Differentiation means that in deciding what contribution a country should make to the international effort to reduce greenhouse gas emissions, FCCC outcomes should take into consideration the individual circumstances of that country. In other words, Australia should not have to pay a higher economic price because it happens to be more economically dependent on industries that increase greenhouse gas emissions.

From an Australian perspective the Kyoto outcome was satisfactory. Whilst the agreement, if ratified, will lead to a 5.2% reduction in world greenhouse emissions below 1990 levels by 2012, Australia was one of three countries permitted to increase emissions. Under the deal Australia is allowed a 8% increase in greenhouse emissions between 1990 and 2012. In total the European Union has agreed to cut its greenhouse gases by 8%, the USA by 7% and Japan 6% between 1990 and 2012. However, according to the OECD's *1999 Compendium of Environmental Data*, released in February 2000, Europe's emissions of greenhouse gases have remained stable since 1990 with predictions that they will rise in the coming years. The survey also shows that greenhouse emissions rose by 10% in Japan, 12% in North America, 16% in Australia and 81% in South Korea since 1990.

In developing a State response, Western Australia is pursuing the concept of differentiation within the national context. Some of the State's export goods have high greenhouse emissions and the State's belief is that it should not be unduly penalised for producing these. The problem largely stems from the Kyoto outcome whereby greenhouse emissions are sourced back to the country where the good is produced rather than where it is consumed. For example, even

though LNG is exported and substitutes for energy sources with greater carbon emissions abroad, the emissions associated with its production are allocated to Australia, and this is despite the importing country benefiting from a general lowering of its emission levels through the utilisation of LNG. In addition, the State's LNG producers' major competitors are in countries that are not signatories to the Kyoto protocol giving them a distinct competitive advantage. This is especially the case if new LNG developments are to bear the additional cost of greenhouse offsetting measures such as carbon trading and/or investment in tree plantations.

This case for differentiation for Western Australia became particularly apparent in August 1999 when the Industry and Waste Management Technical Panel, which was established by the Western Australia Greenhouse Council (WAGC) and made up of industry and State Government representatives, provided its Report to the WAGC. The study shows that if the Federal Government enforces the Kyoto target equally across all States this would lead to a loss in resource investments in Western Australia of up to $10 billion and around 17,000 jobs. It is yet to be decided how the reduction target will be divided amongst the States.

In addition, the Report found that Western Australia alone is forecast to account for around three-quarters of Australia's 8% permitted increase under the Kyoto agreement in 2012. This indicates that unless the Commonwealth Government enforces greenhouse policies beyond "no-regrets" it will not be able to meet its Kyoto protocol commitments. In essence the Commonwealth Government needs to decide whether Australia should forego economic growth in pursuit of its Kyoto obligations.

What is becoming increasingly clear is that Australia, in particular Western Australia, will need to rely heavily on the use of carbon sinks (i.e. tree plantations and forests) in order to meet its Kyoto commitments. This was highlighted at an international forum held in Perth in May 2000. The forum, hosted by the Federal and State Ministers for the Environment, provided an avenue for discussion on how land use and forests should be treated in climate change talks. Officials from around 25 countries attended with the aim of exchanging ideas prior to the United Nations sixth Conference of the Parties (COP6) to be held in Holland, in November 2000. The aim of this will be to reach decisions on the limits to apply to carbon trading and the utilisation and definition of carbon sinks with respect to the Kyoto protocol. The Federal Minister for the Environment has indicated that he will be pushing for a broad definition and acceptance of carbon sinks as being a genuine method to reduce greenhouse gas emissions in addition to the uncapped trading of carbon credits.

However, a report to the United Nations by the Intergovernmental Panel on Climate Change has thrown doubt over the carbon credit value of tree plantations. This is largely due to the complexity involved in measuring the carbon reduction associated with tree plantations making them a problematic source of carbon credits. As a result there is likely to be increasing pressure on Australia to make an actual reduction in the use of fossil fuels in order to meet its commitments and not rely solely on carbon sinks and emissions trading to meet the Kyoto protocol.

New Commonwealth Bill streamlines State/ Commonwealth environmental approval process.

The Environment Protection and Biodiversity Conservation Bill was passed by Federal Parliament in June 1999. Passage of the Act represents the most comprehensive reform of Australian environmental laws for 20 years.

Under the old system the Commonwealth's role in environmental impact assessments arose only when the proposal involved a Commonwealth Act or decision, such as an approval for Commonwealth funding, an export licence or foreign investment. The overall effect of the new Act is to clarify Commonwealth and State Government responsibilities, with Commonwealth assessment and approval processes triggered only by projects or activities that will have a significant impact on six matters of environmental significance. These include the Commonwealth marine environment, world heritage properties, the 1971 Ramsar convention on wetlands of international importance, nationally threatened species, migratory species and nuclear activities.

Under the new Act the Commonwealth Government will delegate the regulation of assessments to State Governments. This will occur after it completes a round of bilateral agreements with the States, aimed at setting the standard for State Government environmental assessment processes and management plans. This will ensure that consistent environmental evaluation criteria and standards will be applied across Australia. The Commonwealth Government hopes to finalise a significant number of bilateral agreements by the time the new Act comes into effect on 1 July 2000.

Essentially, after 1 July 2000, if a business is planning to undertake a project with a potential impact on issues of national environmental significance, it will be able to, under the new Act, seek advice from the Federal Minister for the Environment on whether the activity will trigger Commonwealth involvement. If Commonwealth involvement is warranted, an accredited State process will conduct the assessment. If no accredited State process is in place then the environmental assessment will be evaluated by the Commonwealth. Nonetheless, under either approach it is the Federal Minister for the Environment that will grant final project approval.

However, in May 2000, Federal Cabinet indicated that it was considering adding a seventh trigger to the Environment Protection and Biodiversity Conservation Act. This would occur if a new project was expected to produce greenhouse gas emissions in excess of 500,000 tonnes annually. The Federal Government could either veto the project or force it to undertake greenhouse gas emissions offsetting measures such as investment in tree plantations or the utilisation of renewable energy in order for it to proceed.

2. RESOURCE FOCUS 1999

2.1 Overview and Outlook

The 1999 statistics for the quantity and value of minerals and petroleum originating from Western Australia show that the value of minerals and petroleum has declined from the previous year for the first time since 1992, with the performance in the first half of the year being rather subdued whereas the second half heralded an impressive recovery.

In 1999, the total value of Western Australia's minerals and petroleum fell by around 5% to just over $16.9 billion. It must be emphasised however that the value of minerals and petroleum for 1999 has still come in at near-record levels.

The overwhelming reason for the negative growth in 1999 is poor global commodity prices and inconsistent economic conditions in major overseas markets experienced during the first half of that year. However, since June 1999, world economic performance improved significantly due to better than expected economic conditions in the Asian region. This was particularly good news with most commodity prices strengthening during the latter half of the year and the evidence points to the recovery being sustained throughout 2000.

The mining and petroleum industry's resilience, largely due to an industry-wide push to lower costs and increase productivity, was demonstrated in the ABS company profits figures. These figures show that nominal mining company profits (before tax) increased by 25% in 1999. On the other hand nominal manufacturing profits, which take into account basic metal industries and petroleum related products (i.e. liquefied natural gas or LNG), fell marginally by around 0.6% in 1999.

Overall, it is noteworthy that over the period 1990 to 1999 the nominal annual growth rate of the value of minerals and petroleum in Western Australia averaged 4%.

Petroleum, the State's largest resource sector by value, witnessed a turnaround in 1999 with its value increasing by nearly 8% to just over $4.8 billion. After weathering a period of record low prices in 1998, the average yearly US$ oil price was some 36% higher in 1999. However, in sales volume terms only the natural gas sector increased with crude oil, condensate and liquefied petroleum gas falling. The quantity of liquefied natural gas sold remained virtually unchanged.

The volume of iron ore sales in 1999 decreased by nearly 1% to approximately 143 million tonnes, with the value dropping by just over 15% to $3.48 billion. This result was due to lower prices attained during the round of negotiations with the Japanese held in early 1999. The slightly lower volume was due to a combination of factors, but mostly from unseasonable wet weather in the Pilbara.

The State's gold production dropped during 1999 by nearly 9% to just over 211 tonnes. The overwhelming factors for the lower production were interruptions and damage caused by Cyclone Vance in March 1999, the closure of some projects due to depleted reserves and/or high operating costs. Overall the value of production fell by nearly 16% to $2.93 billion, which was partially due to the 8% decline in the Australian dollar gold price relative to 1998.

In 1999 the sales volume of alumina increased by 2% to 8.93 million tonnes, outstripping the record high achieved in 1998. The associated value, however, decreased by just under 5% to $2.31 billion, just down on the 1998 record of $2.43 billion. The decrease in value was primarily due to a 7% fall in the average US$ alumina price received in 1999 relative to 1998.

Over 1999, the quantity of nickel matte, metal and concentrate products dropped by nearly 15% to around 122,000 tonnes of contained metal. This was largely due to WMC having to reduce, suspend or divert production from its Mt Keith, Leinster and Kambalda operations as a result of the need to repair a furnace leak at its Kalgoorlie nickel smelter in addition to bringing forward a furnace relining. However, the value of contained metal for the year increased by 4% to $1.1 billion, highlighting the strength of the nickel price. In 1999, the average US$ denominated nickel price was 30% higher than its 1998 level.

The State's heavy mineral sands industry contracted slightly in 1999, with the value of sales down by 1% to around $688 million. Overall, the rutile sector performed well, increasing its sales quantity and

associated value by 17% and 8% respectively. The sales quantity of leucoxene increased by around 9% and, due to stronger prices, the value increased by nearly 19%. The quantity of zircon also increased by around 7%, but due to falling prices there was a drop in value of nearly 10%. The quantity of ilmenite sold decreased by 4%, however, its value increased slightly by around 1%. The sales quantity of upgraded ilmenite dropped by 1%, with a marginal drop in value (0.6%).

The Western Australian diamond industry fell slightly short of breaking sales and volume records in 1999. The value of diamonds sold decreased marginally by just over 1% to $633 million, with sales volume also decreasing by around 1% to just under 52 million carats. A portion of these sales were sourced from stocks, with all output from the Argyle operation.

The base metals (copper, lead and zinc) sector increased its sales value by just over 41% to $283 million in 1999. During the year, there were substantial increases in the sales volumes and value of lead and zinc, largely due to significant increases in production and in the case of zinc, higher prices. However, the copper sector contracted significantly in terms of both volume and value, due to decreased production and lower prices.

In 1999, the sales value of coal increased by just over 7% to $268 million. The associated sales volume increased by 11% to 6.2 million tonnes. All of the State's coal supplies are sold in the domestic market, with the vast majority used for electricity generation by Western Power.

The salt industry increased its sales quantity in 1999 by just under 5% to around 8.9 million tonnes. However, the overall value of sales decreased by nearly 12% to around $186 million.

As shown by the data, 1999 was a difficult year for the State's mining industry. Nonetheless, in spite of these adversities faced by the industry, the sustained turnaround in commodity prices and improved world economic conditions in the second half of 1999 augurs well for the growth prospects of the State's minerals and petroleum industry in 2000 and beyond. This scenario has been particularly supported by the IMF, which has revised its forecast for world economic growth in 2000. After an unexpected rebound in the world economy in 1999 and early 2000, largely due to the continuing strength of the US economy coupled with the sharp recovery in Asia, the IMF expects world economic growth to reach 4.25% in 2000 after previously forecasting it to be 3.5%.

2.2 Petroleum

After weathering a period of record low prices in 1998, petroleum, the State's largest resource sector by value, witnessed a turnaround in 1999 with its value increasing by nearly 8% to just over $4.8 billion.

Approximately 66% (by value) of the State's petroleum products are exported. The major destinations are Japan (60%), South Korea (11%), USA (8%), Taiwan (6%), China (6%) and Singapore (5%).

Western Australia accounts for around 47% of Australia's oil and condensate production.

1999 Petroleum Industry Highlights

After declining almost continuously for 16 months, the world average trade weighted price of crude oil bottomed at US$9.50 a barrel in early February 1999 – the lowest price in real terms since 1973. However, by early May 1999, prices had increased by more than 70% to US$16.20 per barrel. This initial recovery in price occurred in the weeks prior to and after the May 1999 announcement by OPEC cartel members, as well as Norway and Mexico, that they would restrict supply as a means to increase the oil price.

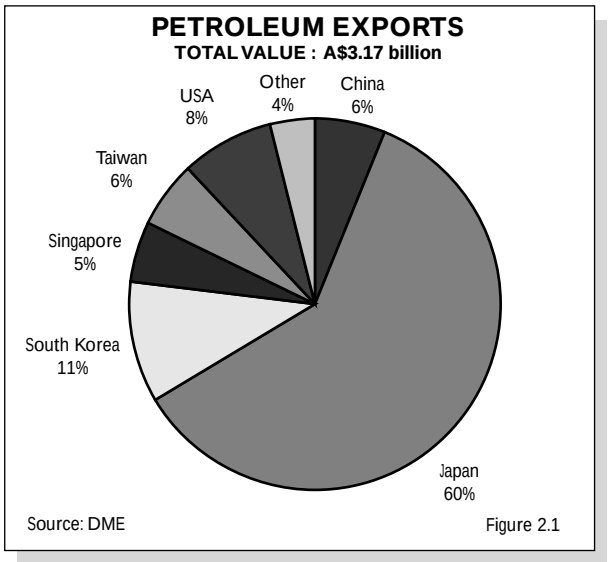


Figure 2.1

Overall, average yearly oil prices were nearly 36% higher in 1999, at just under US$19 per barrel.

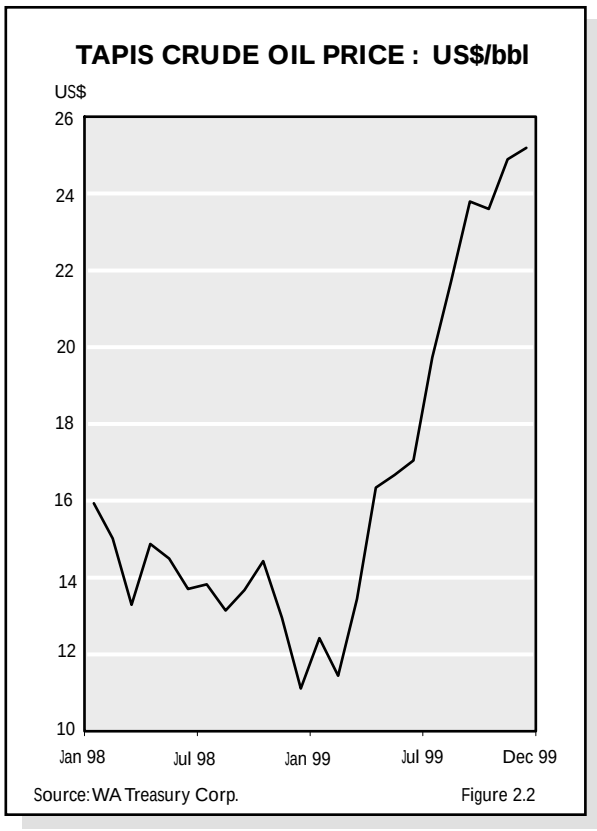
In 1999, crude oil was the State's most significant petroleum product, surpassing LNG and accounting for 32% of total petroleum sales. Overall, the quantity of crude oil sold decreased by nearly 23% during the year. However, due to the turnaround in the oil price, the corresponding value increased by 4% to nearly $1.56 billion. Overall, most oil-producing projects decreased sales quantities in 1999. For example, the Cossack Pioneer floating production vessel was shut down in early 1999 when it was sent to Dubai for a $190 million refit that took six months. The refit was to enable maximum oil production capacity to be increased from 85,000 to 115,000 barrels per day and for maximum gas production to increase from 94 to 143 terajoules per day. In addition, sales quantities from the Griffin and Wandoo facilities fell during the year. However, 1999 did see the first full year of production from Apache Energy's Stag field.

The quantity of LNG sold in 1999 decreased marginally (by 0.15%) to 7.2 million tonnes. Despite this, the value of LNG sales increased by around 6% to just under $1.5 billion. Western Australia is regarded as a significant supplier on the world market, accounting for approximately 10% of world trade, with Japan being the major purchaser of the State's LNG. 132 LNG shipments were made during the year, with 126 going to Japan, five to the United States and one to South Korea.

The quantity of condensate sold dropped by nearly 14% in 1999, however when combined with the strong oil price throughout the year, the value rose by around 13% to just over $1 billion. The drop in production was largely due to decreased output from the Goodwyn project due to technical difficulties with extraction and falling reserves from the North Rankin project. The State's future output of condensate is likely to be aided by other developments in the North West Shelf Gas Project area.

Increased sales contract volumes in addition to higher prices resulted in the quantity of natural gas sold increasing by around 4% in 1999, whereas the value increased by nearly 8% to nearly $570 million.

The quantity of liquefied petroleum gas (LPG – propane and butane) sold in 1999 decreased by nearly 7% to around 606,000 tonnes. Its associated value increased by 30% to $185 million again emphasising the impact of stronger prices. Whilst the vast majority of LPG production is exported to Japan, other export destinations included China and South Korea.



World Oil Market Outlook

At the time of writing, West Texas Intermediate oil was trading at around US$26 per barrel (5 April 2000). However, just prior to this, oil had been trading as high as US$32 per barrel as a result of the market's interpretation that OPEC-instigated supply cuts were largely being adhered to, coupled with strong demand. The slight fall in price occurred when OPEC, excluding Iran and Iraq, announced a quota increase of 1.45 million barrels, after the much anticipated OPEC meeting on 27 March 2000. Including Iran, this is an increase of 1.716 million barrels, or a 7% increase on OPEC's quota of just under 23 million barrels per day. Iran refused to be a party to the agreement to increase quotas leaving the agreement difficult to interpret as an actual increase in production.

According to analysts, OPEC was already producing around 1.25 million barrels more than the 23 million barrels per day quota. Assuming 100% OPEC compliance and no increase in Iranian production, the new quota increase of 1.45 million barrels per day

will effectively add only 200,000 barrels per day. As this is not a significant amount of oil the market has remained relatively tight thus explaining why oil was still trading at around US$26 per barrel after the announcement. Adding to this, analysts do not expect significant OPEC overproduction, relative to the new quota, as most OPEC producers, with the exception of Saudi Arabia, United Arab Emirates and Kuwait, have very little spare production capacity. Thus, the oil market is likely to remain relatively tight, but not to the same degree as prior to the OPEC agreement.

Leading up to the OPEC meeting, the US government placed a significant degree of pressure on member countries, particularly Saudi Arabia, to increase production by two million barrels per day. The US felt that such an increase would see oil prices trade in a more 'normal' range of around US$20 per barrel. The fundamental reason for US concern was that high oil prices have led to inflationary pressure throughout the world and have the potential to hinder world economic growth.

On the non-OPEC supply front, Mexico is expected to increase production by 200,000 to 300,000 barrels per day in 2000, with the expectation that other non-OPEC members and Iraq, will also increase supply or fast-track new production to take advantage of the strong oil price. Non-OPEC producers are estimated to account for around 65% of world oil supply.

According to ABARE (March 2000), world oil production fell by nearly 2% to 74 million barrels per day in 1999. It is estimated to increase to 77.2 million barrels per day in 2000 and then rise further to 78.8 million barrels per day in 2001. World oil consumption increased by just over 1% in 1999 to 75.3 million barrels per day, with ABARE forecasting world oil consumption to rise to 77.1 million barrels per day in 2000 and 78.7 million barrels per day in 2001.

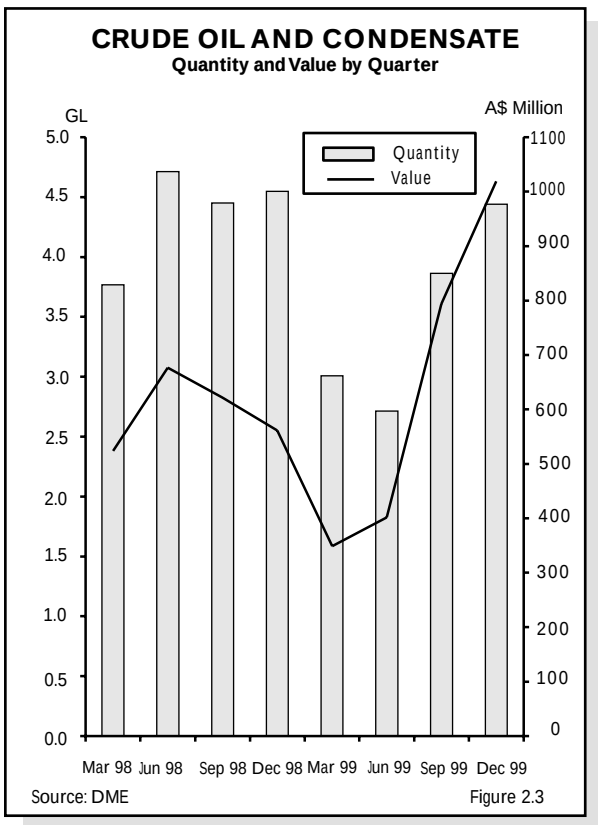
Owing to the above factors, it is anticipated that the oil price is likely to average in excess of US$25 per barrel in 2000, due largely to continued tight supplies, low inventories and strong global demand.

State Outlook

Given the recent strength of the oil price, the continuation of the Asian economic recovery and the generally upbeat outlook for the world economy, Western Australia's petroleum industry is poised to undergo a further period of continued growth and development.

The potential for further development was highlighted with the visit to Australia of China's President Jiang Zemin in September 1999. The visit focused mainly on the strengthening of commercial interests with the signing of five memoranda of understanding. The most significant was the negotiations over the possible sale of LNG to China's Guangdong province, with potential sales commencing at three million tonnes of LNG a year from about 2004. This could be worth up to $15 billion over 20 years and was given a further boost in mid-January 2000 when it was announced that the Chinese Government had formally approved the construction of a $500-million LNG import terminal and pipeline. The state-owned China National Offshore Corporation will now spend the next three months choosing an international partner to help build the project, after which the LNG supply contract will be put out to tender in the second half of 2000.

Depending on the degree to which China decides to utilise LNG for power generation, there is potential for sales to escalate to $50 billion over 10 years. The Premier of Western Australia has indicated that this scenario would require investment in the LNGindustry



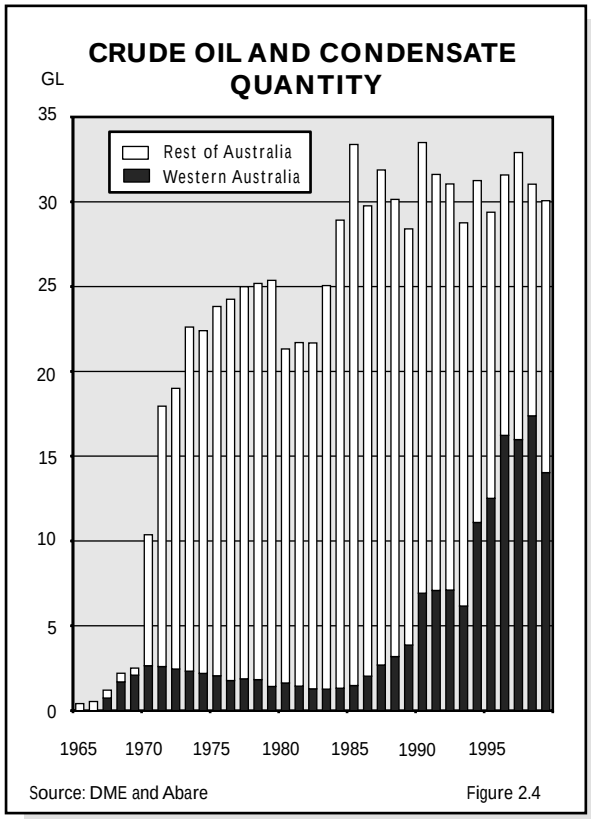
of around $16 billion. It would provide the requisite impetus for the proposed expansion of the North West Shelf LNG project and the development of the Gorgon LNG project.

In early 1999, Australia LNG (ALNG) was set up to market LNG from the North West Shelf Gas Project. It is a Perth-based consortium of BHP Petroleum, BP, Shell, Chevron, Woodside and MIMI. In mid-November 1999, the consortium signed a memorandum of understanding with Tuntex Gas Corporation, a Taiwanese utility group, to supply four million tonnes of LNG per year for 20 years, worth $1 billion annually. In addition, the consortium is also examining the scope for supplying the burgeoning Chinese LNG market. If the consortium is able to secure any of these contracts, the go-ahead for expanding the existing North West Shelf Project is likely. Currently, expansion plans totalling $7.8 billion are under consideration. If proceeded with, a fourth and fifth train will be added to the existing LNG project with ALNG indicating that if it won the contract to supply China's Guangdong province, as previously mentioned, the three million tonnes required annually would virtually guarantee the construction of the fourth train on the North West Shelf Project. However, ALNG is expected to face stiff competition to win the Chinese contract from Indonesia, Malaysia and Qatar in addition to LNG newcomer – Alaska. Even so, the construction of a fourth train could occur anyway if the North West Shelf partners win firm agreements with its Japanese customers for a major new LNG contract by mid-2000.

Australia LNG has also been pursuing marketing opportunities in India. In early 1999, the consortium signed an exclusive agreement with Abu Dhabi's Al Manhal International Group to investigate long-term LNG supply opportunities from Australia for an LNG project in eastern India. If proceeded with, the project will begin receiving LNG in 2003-2004, eventually consuming more than five million tonnes annually.

Competition for the Indian market comes not only from other LNG suppliers, but also potential pipelines, such as those from the Caspian Basin (through Pakistan), the Persian Gulf (under the Arabian Sea) and Bangladesh (via the Bay of Bengal).

The $8-billion (assuming full development) Gorgon project could also proceed if attempts by its partners – Texaco, Chevron, Mobil, Shell and BP to secure long-term contracts with large industrial gas customers within Western Australia succeed. Further to this point, Texaco announced in late October 1999 that it had joined energy utility group CMS Energy to investigate the viability of a second gas pipeline from Onslow to Geraldton, with Texaco's belief that some domestic gas consumers are hindered by the strict quality requirements and consequently higher tariff of the Dampier-to-Bunbury pipeline. Texaco are of the opinion that there is a potentially large gas market in Western Australia for lower quality and hence cheaper gas to supply industrial needs. Potential customers could include Dow-Shell's $3-billion Pilbara petrochemical plant, which is currently under consideration. The planned pipeline is estimated to cost between $700 million and $1 billion and would duplicate 1,000 kilometres of the existing Dampier-to-Bunbury pipeline. It would also join the existing Parmelia pipeline, which is owned and operated by CMS Energy. The pipeline is a key component in the strategy adopted by the Gorgon partners to further investigate ways to support the development of the field. To be successful however, the proposed pipeline would require a minimum of 300 terajoules per day of contracted gas demand. This would support the development of a domestic gas phase of Gorgon which would cost approximately $2.3 billion. A larger-scale



Source: DME and Abare

Figure 2.4

development would require demand from customers of up to an additional 500 terajoules per day to be viable. The Gorgon partners have indicated, however, that they will still continue their efforts to secure long-term LNG customers from Korea, China and other parts of Asia.

Current forecasts indicate that crude oil production in Western Australia could decline after 2002 unless new fields are discovered and/or come into production. Nonetheless, the maintenance of crude oil production received a boost with Woodside's announcement in October 1999 that it would proceed with development plans for the Legendre oilfields located in the North West Shelf area. The $110 million project is expected to come on stream in 2001, with initial production commencing at 40,000 barrels per day. The fields contain probable reserves of 40 million barrels with an expected project life of five to eight years.

Despite the availability of significant resources, Western Australia's gas production is dictated to a significant extent by domestic demand in the power generation sector. The gas sector is anticipated to grow strongly over the next 10 years due to rising gas demand by the industrial sector. This was highlighted in December 1999 when the North West Shelf partners revealed they had won a $200 million contract to supply Alinta Gas with an extra 40 terajoules per day of natural gas over ten years, starting from 2002. The partners beat competition from eight other suppliers to gain the contract that adds to contracts already held with Alinta Gas. Existing contracts include an agreement to supply Alinta Gas with 118 terajoules per day until 2005, when a contract for 80 terajoules per day until 2020 comes into effect.

A highlight for the petrochemical sector was the announcement in December 1999 that the State Government had given Dow Chemical Company and Shell Chemicals Limited an 18-month extension on their right to develop proposals for the construction of a $3-billion integrated petrochemical plant. At this stage Dow Chemical Company has identified West Island, off the Burrup Peninsula, as its preferred site for the project.

In February 2000, the North West Shelf partners, the Federal Government and a US-based technology company - Syntroleum Corporation, announced a deal that has the potential for Australia's first gas-to-synthetic liquids plant to be built in the Pilbara. The proposed $600 million plant is expected to produce around 10,000 barrels per day of synthetic products, including synthetic fuel oils, lubricants and waxes that are of higher value and superior quality to those derived from crude oil. The North West Shelf partners have signed a gas sales agreement with Syntroleum Corporation for the supply of gas to the proposed plant on the Burrup Peninsula. This was selected as the preferred site after consideration of alternative sites in Trinidad and the USA. The Federal Minister for Industry, Science and Resources indicated that a $30 million licence agreement between the Federal Government and Syntroleum Corporation would give Australia access to its proprietary technology for converting natural gas to liquid synthetic fuels. In addition, the Federal Government has approved a $40 million conditional loan to the US consortium to support further research, development and demonstration work to commercialise the technology. Prior to the decision, the State Government had already agreed to contribute $30 million towards new multi-user infrastructure on the Burrup Peninsula. If Syntroleum Corporation commit to the project, construction should begin in late 2000.

2.3 Iron Ore

The volume of iron ore sales in 1999 decreased by nearly 1% to approximately 143 million tonnes, with the value dropping by just over 15% to $3.48 billion. This result was due to lower prices attained during the round of negotiations with the Japanese held in early 1999. The slightly lower volume was due to a combination of factors, but mostly from unseasonable wet weather in the Pilbara.

Iron ore is the State's most important export commodity, by value, worth $3.13 billion in 1999. Western Australia is the world's third largest producer after China and Brazil. The vast majority (90%) of Western Australia's iron ore was exported overseas in 1999, with 49% (by value) going to Japan, followed by China (20%), South Korea (13%) and Europe (10%).

Western Australia accounts for approximately 92% of Australia's iron ore production.

1999 Iron Ore Industry Highlights

The overwhelming reason for the 15% fall in the value of iron ore sales in 1999 was the outcome of the February 1999 negotiations with the Japanese. For the Japanese fiscal year (April 1999 to March 2000), the State's three major producers accepted lower US$ prices. BHP and Hamersley received an 11% and 10.2% cut in the price received for lump ore and fine ore respectively. In addition, they had to accept lower export volumes with BHP taking an 8% cut and Hamersley 4%. North Limited's Robe River operations accepted a 13.4% cut, due to its poorer quality product, but maintained volumes. The price-cuts stemmed from lacklustre conditions in world steel and pig iron markets in the last half of 1998 and into 1999, which was primarily due to the Asian economic crisis.

As a result of the price cuts, the State's producers were forced to look at further ways to minimise production costs to ensure their operations remained internationally competitive. This is why the revelation, in June 1999, that BHP and Rio Tinto had been holding discussions for some time regarding the possibility of the two companies merging their respective iron ore operations, was of little surprise. The combined entity, if proceeded with, would have produced an estimated 120 million tonnes of iron ore annually. In addition, the unified operations would have become the dominant player in the world's US$10 billion (approximately A$16 billion) iron ore export market, making it even bigger than the current leader, Brazil's Companhia Vale do Rio Doce (CVRD). Essentially, the combined operations would have accounted for more than one-quarter of the world's annual 400 million tonne iron ore trade. However, discussions regarding the $14 billion merger collapsed due, in part, to a disagreement between the two companies regarding the value to be ascribed to Hamersley's Pilbara iron ore assets.

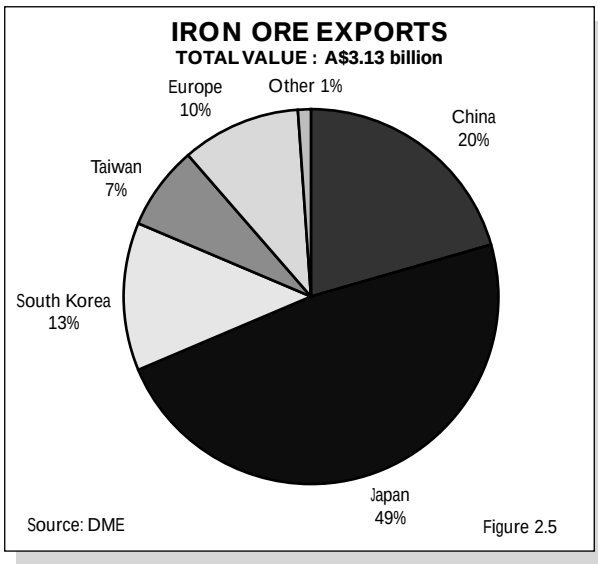
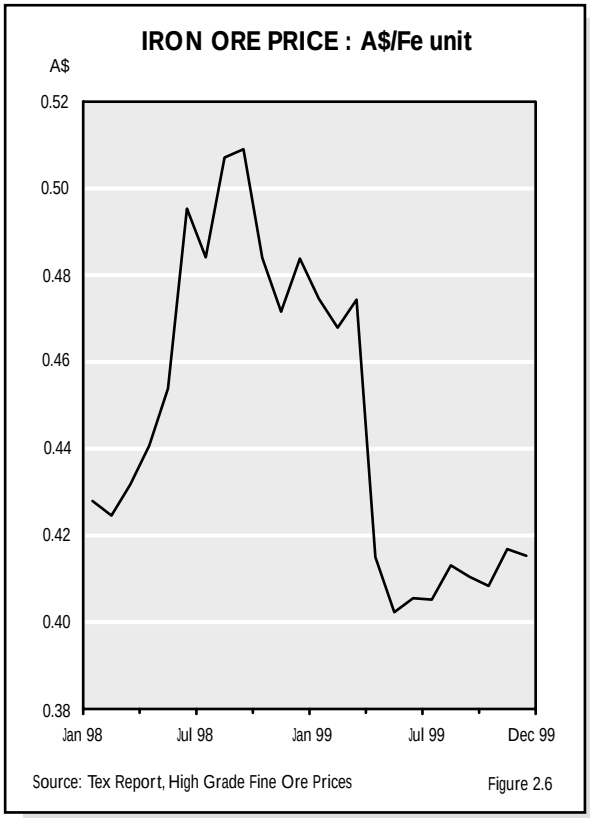


Figure 2.5

After merger talks broke down, BHP, in an effort to drive down costs, offered individual contracts to workers at its Pilbara iron ore operations in November 1999. The offer was instigated after BHP realised that it cost Hamersley Iron approximately $2.50 less to produce one tonne of iron ore. The refusal of BHP to negotiate a new collective bargaining agreement with unions representing its workforce resulted in significant rolling stoppages at BHP operations Australia-wide in early 2000. Approximately half of the 1,000-strong workforce signed contracts. However, in early February 2000, the unions won a comprehensive victory in the Federal Court restraining BHP from offering any more individual contracts to its workforce until a full trial into the matter. Subsequently, BHP has commenced negotiations with the unions. At the time of writing (20 March 2000) the full trial over the matter had not commenced.

The push to lower costs in the global iron ore industry was further highlighted in late December 1999 with the release by AME Mineral Economics of a detailed cost analysis of the global iron ore industry. The report covers the period 1995 to 2004 and studies operations that account for approximately 90% of western world production. The study found that between 1997 and 1999, average global FOB costs fell by nearly 14% from US$15.22 per tonne to US$13 per tonne. The decline in costs is attributed to operational reforms, examples of which include; improvements in technology; management practices and process re-engineering. The study also suggests that the pursuit of economies of scale across operations has increased in importance as iron ore is mined and processed at the highest possible rates so as to minimise capital and operating costs. In 1999, ore transport and port costs were estimated at 42% of total FOB costs. The study also found that the two major iron ore exporting countries, Australia and Brazil, continue to dominate the world seaborne trade in iron ore. In 1999, Australia's producers maintained their lowest ranking cost position with an estimated weighted average FOB cost of US$7.77 per tonne. This represents about a 16% drop from the average 1997 FOB cost of US$9.28 per tonne. The freight cost differential between Australia/



Source: Tex Report, High Grade Fine Ore Prices

Figure 2.6

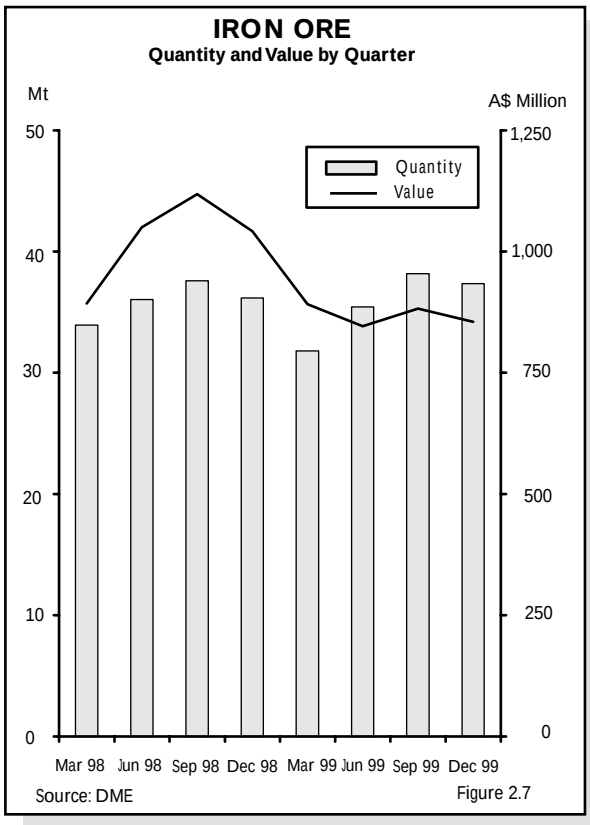
Japan and Brazil/Japan was about US$1 per tonne at the beginning of 1999 compared with US$5 per tonne in the third quarter of 1999. The study concluded that this widening differential has enabled Australian producers to deliver iron ore to Japan at a more competitive price than Brazilian producers.

Calendar 1999 heralded the first full year of production from Hamersley Iron's $700 million Yandicoogina mine. The mine is located approximately 90 kilometres north-west of Newman. Hamersley commenced mining at Yandicoogina in August 1998, with the first shipment loaded in January 1999. Development of the mine also involved improving and expanding Hamersley's Dampier port facilities to increase its capacity by about 10 million tonnes per annum. A railway line linking the mine to existing rail facilities was also constructed, bringing the total project cost to $900 million.

Another significant development was the commissioning of BHP's $2.45 billion HBI iron ore processing project at Port Hedland. This is the first project of its type in Australia and represents one of the most significant value-adding projects ever undertaken in Western Australia's resources industry. The plant has a design capacity to produce up to 2.5 million tonnes of briquettes annually. The HBI product is utilised as a feedstock for electric arc furnaces with those from Port Hedland selling for around US$105 per tonne. The first shipment of briquettes left Finucane Island, Port Hedland in May 1999, bound for South Korea. The iron ore figures in this Digest do not include sales quantities or the value of HBI produced in 1999. (Note – late information on this project shows BHP having a number of costly technical difficulties putting the long-term future of the operation under scrutiny.)

Outlook

Iron ore contract negotiations for the next Japanese fiscal year (April 2000 to March 2001) were settled with the Japanese steel mills in March 2000.The State's iron ore producers agreed to a price increase of 4.35% for iron ore fines, including Yandi fines and a 5.77% increase in the price of lump ore. For North's Robe River operations this means a fines price of 22.15 US cents per dry long ton unit (dltu), with Hamersley Iron and BHP both receiving 27.79 US cents/dltu. For BHP and Hamersley's Yandi ore, the agreed price is 26.12 US cents/dltu. For lump ore the new price will be 36.84 US cents/dltu, increasing the lump ore premium over fines ore from 8.2 US cents to 9.05 US cents/dltu.



Source: DME

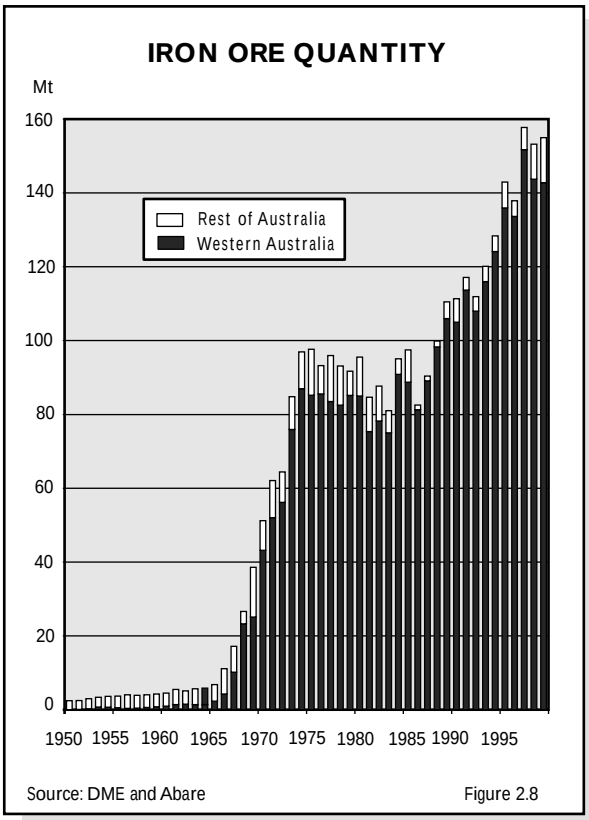
Figure 2.7

Overall, the most recent round of negotiations focused on an expected continuation of strong growth in steel demand in addition to the need of the Japanese steel mills to secure iron ore supply. Other influential factors include the need, over the long-term, to generate a favourable environment for the substantial investment required to develop new iron ore mines and associated infrastructure. The expected turnaround in Japanese steel production for 2000 was particularly relevant to these negotiations. After falling by 10% in 1998 and flat output in 1999, ABARE expects Japan's steel production to increase by 3.5 million tonnes to 97 million tonnes in 2000. This anticipated increase is a result of rising demand in steel intensive infrastructure spending, which has been driven by several years of government stimulus packages, in addition to rising demand for imports in the rest of Asia. Underpinning this, ABARE expects Japan's industrial production to increase by 4.4% in 2000.

ABARE has forecast world iron ore consumption to increase by 27 million tonnes to 1,078 million tonnes in 2000 as a result of increased demand for feed blast furnaces. World seaborne trade is anticipated to increase by 21 million tonnes to 449 million tonnes in 2000, again as a result of rising blast furnace production, particularly in Japan, China and other East Asian countries.

ABARE also expects world iron ore production to rise by 29 million tonnes to 1,080 million tonnes in 2000, with virtually all of the projected rise in iron ore supplies expected to come from Australia and Brazil – which account for over 75% of the world's iron ore exports.

In 1999, increased steel consumption in China, East Asia and Eastern Europe led to healthy growth in world steel demand. Although anti-dumping cases resulted in reduced imports into Western Europe and North America in 1999, the two regions are still anticipated to be substantial importers of steel over the medium term. In 2000, ABARE anticipates that world steel production will increase by 22 million tonnes to 814 million tonnes. This is largely attributed to a recovery in steel demand in Asia which has in turn provided a market for many steel producers around the world. More specifically, the recovery in steel demand in the Asian region is timely for steel makers in Japan, Brazil and Russia – the countries that bore the brunt of the anti-dumping actions taken by the US Government in 1999. Diminished export opportunities in the US market are now expected to be more than offset by growing steel demand in Asia over the next few years.



Source: DME and Abare Figure 2.8

In other important news, North Limited announced in January 2000 that it had secured letters of intent from Japanese steel mills to support the development of Robe River's West Angelas project. The mine will initially produce five million tonnes of iron ore per year before rising to a capacity of 20 million tonnes annually. Development includes a new 340-kilometre rail link to the company's existing railway in addition to an upgrade of its existing port and handling facilities at Cape Lambert. The total project cost is estimated to be $1 billion.

In addition, BHP announced in mid-February 2000 that it had decided to proceed with the development of Mining Area C and expects the project to be producing about five million tonnes annually in approximately 2001-2002. Mining Area C is 100 kilometres from BHP's Mount Whaleback operation and 35 kilometres south-west of its Yandi project. BHP expects the cost of development to be less than $50 million due to vital infrastructure already being in place, as a result of the deposit's close proximity to Yandi. The project

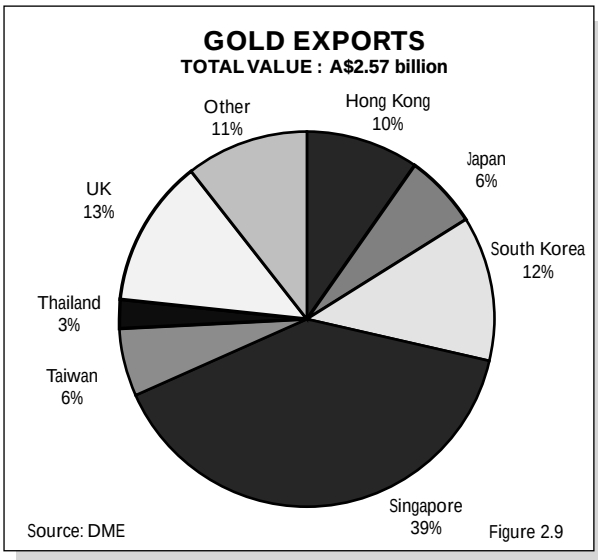
cost mentioned is specifically for the installation of a crushing plant with an initial capacity of five million tonnes annually.

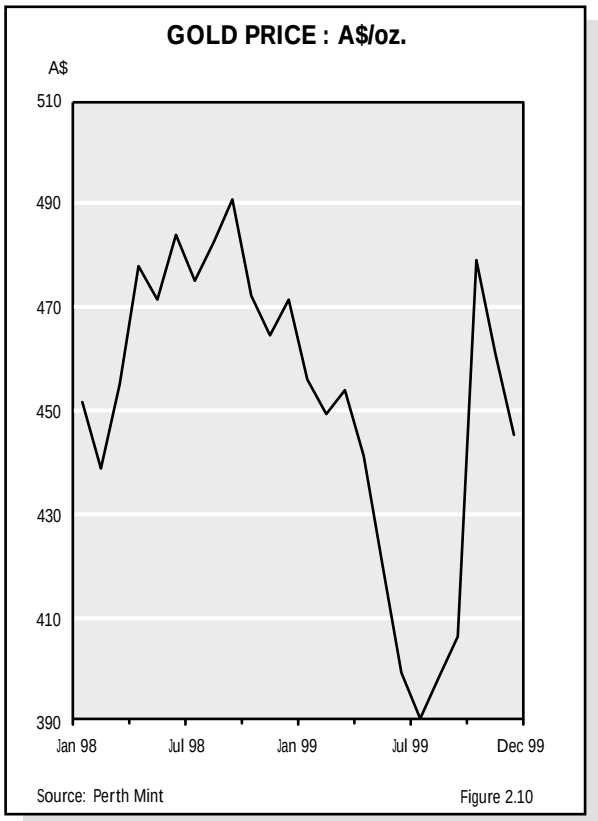
Both of the new projects are based on Marra Mamba ore, which is beginning to increase in prominence due to the depletion of the premium Brockman ores that have underpinned the development of the State's iron ore industry to date. Marra Mamba ore tends to produce a finer and softer product which has made it less popular than the harder Brockman ore and the coarser-grained pisolites. However, the Marra Mamba ore has the advantage that it has a lower alumina content which improves the chemical nature of the blend for steel making.

2.4 Gold

Negative market sentiment surrounding gold continued throughout most of 1999, making the sector one of the few not to witness a significant recovery in price in the latter half of the year. This resulted in the industry continuing moves to rationalise and amalgamate operations as a means to reduce costs.

The State's gold output dropped during 1999 by around 9% to just over 211 tonnes. The overwhelming factor responsible for lower production was interruptions and damage caused by Cyclone Vance in March 1999, as well as the closure of some projects due to depleted reserves and/or high operating costs. Overall the value of production fell by nearly 16% to $2.93 billion, which was partially due to the 8% decline in the Australian dollar gold price relative to 1998.





The international gold price averaged US$279 per ounce in 1999. This was down by 5% on the previous year and, more notably, was 16% lower than its 1997 average price of US$331 per ounce. As a result of the A$ appreciating by 2% in 1999, the A$ average gold price decreased to $433 per ounce, down from approximately $470 per ounce in 1998.

In 1999 the value of the State's gold exports totalled $2.57 billion. Major gold export markets included Singapore (39%), the UK (13%), South Korea (12%), Hong Kong (10%), Japan (6%) and Taiwan (6%).

Western Australia accounts for around 72% of Australia's gold production.

1999 Gold Industry Highlights

Around 52% of Western Australia's gold output in 1999 originated from the following 10 projects:

- Golden Mile/Super Pit (Normandy, Homestake) – 21.57 tonnes;
- Granny Smith (Placer, Delta) – 15.06 tonnes;
- St Ives (WMC) – 12.34 tonnes;
- Jundee–Nimary (Great Central Mines) – 11.92 tonnes;

- Telfer (Newcrest) – 10.09 tonnes;
- Bronzewing (Great Central Mines) – 8.95 tonnes;
- Kanowna Belle (North, Delta) – 8.65 tonnes;
- Boddington (Newcrest, Normandy, Acacia) – 7.26 tonnes;
- Plutonic (Homestake) – 6.95 tonnes; and
- Tarmoola (PacMin) – 6.63 tonnes.

Over the last two years low US$ gold prices have inevitably seen the gold mining industry in Western Australia undergo some rationalisation. This has manifested itself through tenement/lease rationalisation, closures and consolidation of operations, improvements in plant efficiencies and processing capabilities and also the expansion of some mining companies via corporate takeovers and acquisitions. Many of these strategies were aimed at improving economies of scale in an effort by the industry to reduce costs.

As an illustration, cash costs at the Tarmoola gold mine were reduced by 26% in 1998-99, and to $279 per ounce in the last half of 1999. Gold production from Tarmoola has increased to the extent that it now ranks as one of the top-ten producing projects in the State. PacMin Mining have also announced that they will spend $34 million to revert to an owner-operated fleet at Tarmoola with the expectation that this will reduce cash costs by a further $20 per ounce once fully implemented. The Super Pit partners, Normandy Mining and Homestake Gold of Australia, have also gone down this route, spending $100 million on the switch to owner-mining with the expectation that cash costs will fall by $40 per ounce.

Takeover activity has seen an increased presence of overseas gold mining companies in the State's gold industry. One influencing factor has been the relative weakness of the A$ over the last two years, which has acted to increase the attractiveness of local gold companies to overseas buyers. Examples of this occurred in early 2000 when large South African miner, Harmony Gold, acquired a stake in Goldfields Limited and international mining giant AngloGold took over Acacia Resources.

Recently there has been an increasing trend for small mining companies to go "dot com" in order to cash-in on the vast amount of money chasing the "new economy" stocks in the information technology and telecommunications sectors. It has been estimated that approximately 100 of the 300 junior Australian gold producers and explorers have gone "dot com" already with predictions that a further 50 to 100 have plans to follow suit.

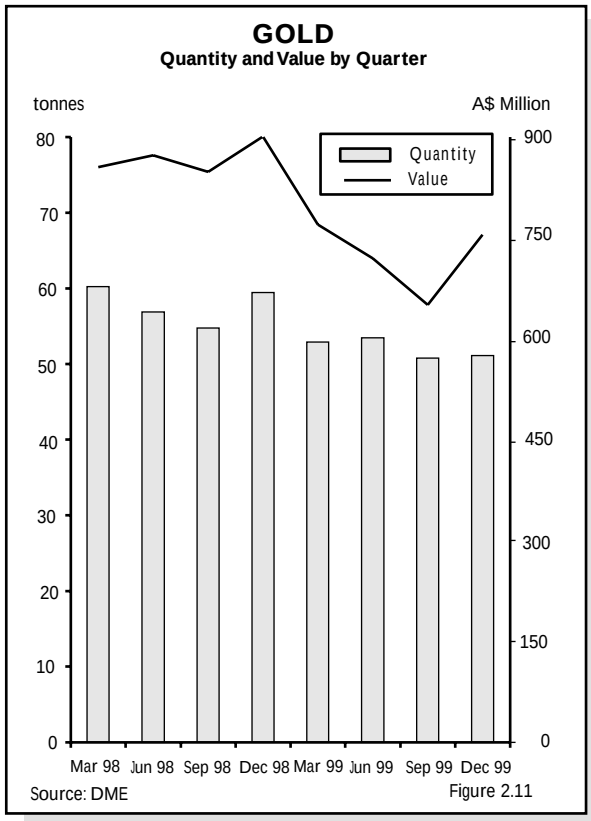


Figure 2.11

On the exploration front, poor international gold prices were the primary catalyst for a 33% fall in the State's gold exploration expenditure in 1999. Over the last two years the State's gold exploration expenditure fell from a peak of $511 million in 1997 to $272 million in 1999.

World Gold Market

In 1999 the world's mine production of gold totalled 2,569 tonnes compared to demand of 4,079 tonnes. The supply shortfall was essentially made up by official sector sales (i.e. central bank sales), sales of scrap gold in addition to supply from forward sales, private disinvestment, option hedging and gold loans. Central bank sales, and in particular the threat of these continuing at potentially high levels, have substantially dampened the international gold market over the last two years.

According to a survey undertaken by the IMF, aboveground world gold stocks, held by the banking sector, totalled just under 33,000 tonnes at the end of

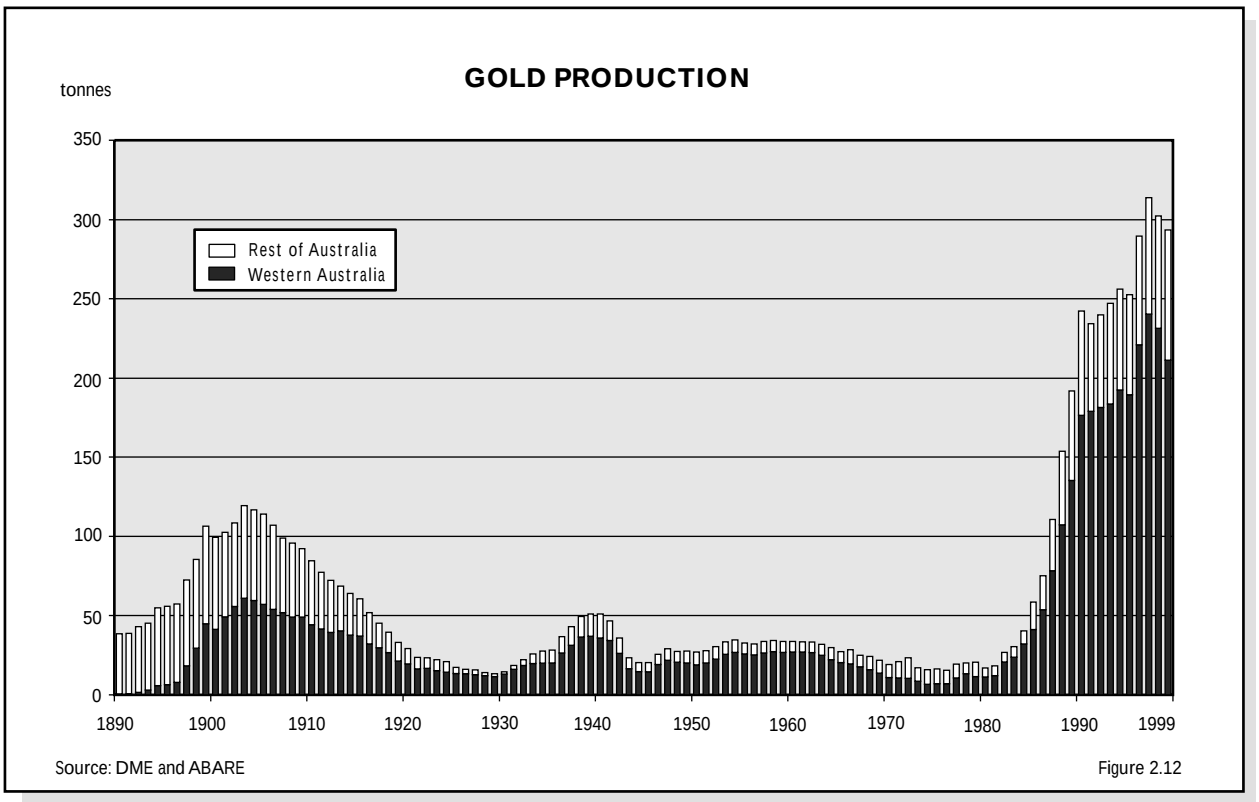
1999, beginning of 2000. Therefore, at the 1999 fabrication consumption rate of around 3,700 tonnes, gold stocks held by the banking sector equate to approximately nine years supply. This over-hang in supply is unique to gold in the commodity market and is increasingly being questioned by potential investors.

Over most of 1999 the general consensus among analysts was that member nations of the European Central Bank (ECB) had gold reserves in excess of their requirements. This view gained impetus when the Bank of England announced in May 1999, its intention to sell by auction, 415 tonnes of gold over the medium-term. The Bank stated that it would sell 25 tonnes of gold every two months with the first sale taking place on 6 July 1999. When the announcement was made, gold was trading at around US$285 per ounce. The Bank's decision resulted in the gold price trending down to a twenty-year low of US$253 per ounce on 25 August 1999.

The Bank of England's decision had confirmed the perception within the international gold market that the European banks were beginning a strategy to divest themselves of gold. Prior to this considerable uncertainty had already existed within the gold market by the proposed sale of half, or about 1,300 tonnes, of the gold stocks held by the Swiss National Bank over the next 10 years. In addition, the IMF had also proposed to sell around 300 tonnes of gold as a means to fund its debt relief commitment to those countries which qualify under its Heavily Indebted Poor Countries (HIPC) program.

For some time the international gold market had been seeking direction from, in particular, the European Central Bank as to the monetary role of gold within the central banks of member nations. Analysts believed that such a statement would provide the market a clear direction on gold's growth prospects, thus removing the main uncertainty that had shadowed the market over the last two years.

This was forthcoming in late September 1999 when the international gold market was provided the requisite information that it had been seeking to restore confidence. Wim Duisenberg, president of the ECB, stated that the ECB in association with the central banks of Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, Switzerland and England would limit gold sales to 400 tonnes per annum over the next five years. The 400 tonne per annum limit would include the proposed Swiss gold sales and the remainder of those gold sales initially announced by the Bank of England in May 1999. In addition, he



Source: DME and ABARE

Figure 2.12

indicated that European Union member nations would not increase gold lending and derivative operations above current levels. In total the aforementioned European banks hold around 16,000 tonnes of gold or around 48% of the world's official gold holdings. In addition the USA, Japan and the Bank for International Settlements have agreed to abide by the conditions set down by the Washington Agreement. Together they account for around 12,300 tonnes of gold, or around 37% of the world's official gold holdings.

In September 1999, the IMF also announced that it intended to fund its commitment to fulfilling its obligations under its HIPC program by selling gold to those countries meeting their scheduled debt repayments (such as Brazil and South Korea) and to then buy that gold back at market prices. The proceeds would then be channelled to the HIPC program. Effectively these IMF gold sales would not enter the market place. The possible reasoning behind this IMF strategy would be to increase the book value of its gold from US$35 per ounce, being its purchase price under the Bretton Woods monetary system, to a price that reflected current market value.

As a result of these key international statements the US$ price of gold rose significantly in late September/ early October 1999, peaking briefly at around US$330 per ounce on 4 October 1999. This was its highest level since the latter half of 1997. Since then the US$ gold price trended downwards, settling at around US$285 per ounce in March 2000.

Outlook

If the ECB in association with the national European banks and the IMF hold to the commitments made during 1999, the gold price is most likely to average around US$280 per ounce in 2000. ABARE (March 2000) has estimated world mine production of gold at around 2,587 tonnes compared to demand of 4,034 tonnes in 2000. As a result there is scope for the market to absorb the proposed gold sales of the national European banks and the IMF without hindering the gold price.

On the other hand a higher gold price relative to 1998 could lead to central banks outside the European Union selling gold onto the market. The market was certainly reminded of this possibility in March 2000 when it was revealed that Brazil had sold forward or swapped 26 tonnes of gold in December 1999. Whilst prices did not fall on the news, it did remind the market that around 5,200 tonnes, or 15% of the world's official gold holdings, are not governed by the Washington Agreement moratorium.

On the local scene, the gold industry received a boost with the announcement in February 2000 that PacMin Mining was going to proceed with the development of the $40 million Carosue Dam project, 110 kilometres north-east of Kalgoorlie-Boulder. PacMin anticipate production in the vicinity of 110,000 to 140,000 ounces annually at a cash cost of $300 per ounce. The project is expected to commence operation in early 2001 and have a life of approximately 10 years. In addition, St Barbara Mining announced it would resume production at its Meekatharra operations after being closed for 18 months. New Hampton Goldfields Ltd also announced they would re-start operations at Big Bell, which was purchased from Normandy Mining in 1999. Regardless of these announcements, it is estimated that the State's gold output will remain at around its 1999 level into 2000 due to the new developments replacing operations that have closed due to high costs and/or depleted reserves. Nationally, ABARE has also forecast that Australia's gold production will remain relatively constant into 2000.

2.5 Alumina

The quantity of alumina sales in 1999 increased by 2% to 8.93 million tonnes, outstripping the record high achieved in 1998. The associated sales value however, decreased by just under 5% to $2.31 billion, down on the 1998 record of $2.43 billion.The decrease in value was primarily due to a 7% fall in the average US$ alumina price received in 1999 relative to 1998.

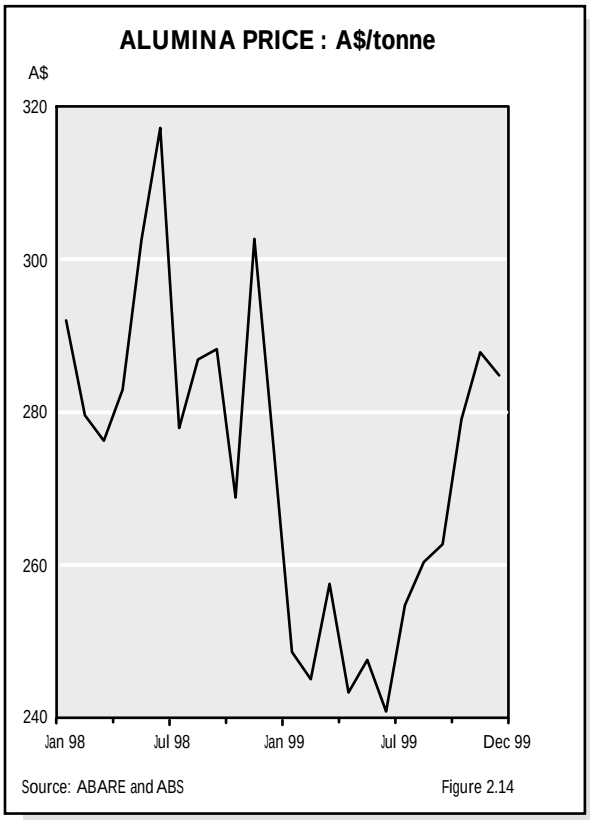
Around 90% of the State's alumina (by value) was exported in 1999. The main export destination was USA (22%), with other significant destinations being South Africa (16%), Bahrain (15%), Canada (13%) and China (10%).

Western Australia accounted for 61% of Australia's alumina production in 1999.

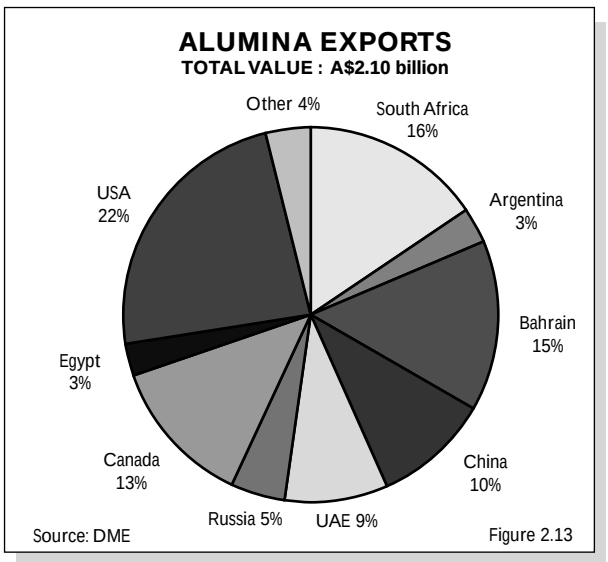
1999 Alumina Industry Highlights

Historically there has been a very close correlation between alumina and aluminium prices. This is largely due to the fact that the majority of the world's alumina production is sold under contract, usually between associated companies, with roughly 5% of alumina sales occurring on a spot basis. From 1970 to 1997 contractual and spot alumina prices have averaged around 12.9% and 12.8% of the London Metal Exchange aluminium price respectively. However, there have been substantial deviations from this rule of thumb over time, largely as a result of shocks to the world market that resulted in supply/demand imbalances. This was the case in July 1999 when an explosion closed Kaiser Aluminium's Gramercy alumina refinery in the United States. This closure resulted in the potential loss of one million tonnes of alumina per year from the market, which represents approximately 2% of the world's alumina supply. As a result, the spot alumina price recovered dramatically after trading at a rather lacklustre US$160 per tonne just before the accident and then skyrocketed to where it is currently (February 2000) trading at around US$350-400 per tonne. On the other hand, the contract alumina price (i.e. the average export price received by Australian producers) averaged around US$168 per tonne in 1999, which was down by 7% on 1998, but since the closure of Gramercy, it has only reached a high of around US$190 per tonne in January 2000 (monthly average price).

The aluminium market, on the other hand, after enduring lower demand from Asia in the earlier part of 1999, was in surplus as production increased faster than consumption. Thus the beginning of 1999 heralded a depressed aluminium market, with oversupply of up to 500,000 tonnes and the lowest prices since the recession of the early 1990s. However, things started to pick up in July 1999 and after averaging around US$1,400 for the month, the aluminium price reached a high in January 2000, averaging US$1,680 per tonne. However, since then it has settled at a slightly lower level, averaging US$1,670 per tonne in February 2000. The January 2000 price was its highest monthly average since August 1997. On an overall basis, the aluminium price averaged US$1,358 per tonne in 1999, virtually unchanged from its 1998 average. It must be noted however that weak Asian aluminium demand was partially offset by moderate to strong growth in aluminium demand in the United States and some European countries.

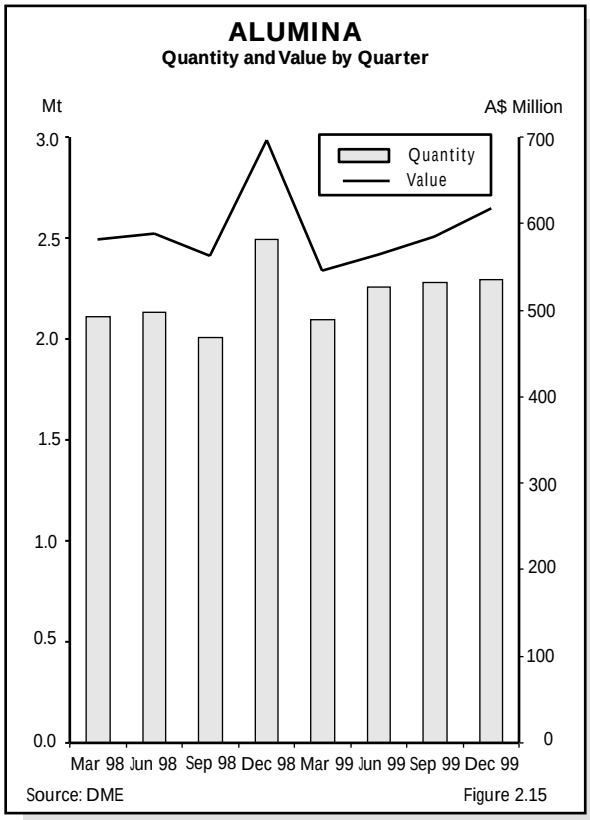


Source: ABARE and ABS Figure 2.14



Source: DME Figure 2.13

Throughout 1999, work on the $800 million expansion of the Worsley Alumina refinery continued. This is the largest resource development project in the State's South-West region for over a decade. Worsley plans to increase alumina production from the present level of around 1.8 million tonnes to 3.1 million tonnes annually, by the first half of 2000.

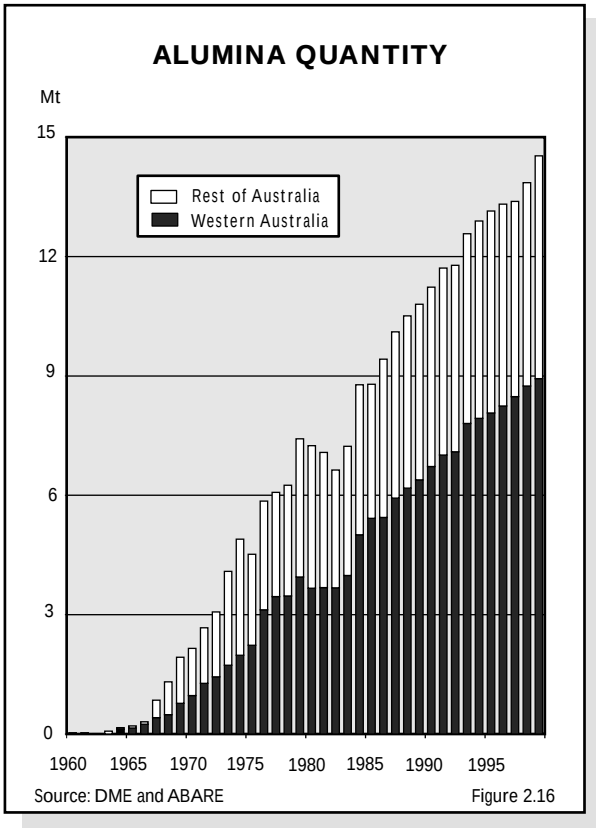


In February 2000 the expansion was nearly 90% complete. At the peak of construction the project employed approximately 2,100 people. The project involves the installation of additional equipment and upgrades throughout the mining and alumina refinery operations including the mine site, overland conveyor and the systems for digestion, separation, calcination and handling. Bauxite is mined near the town of Boddington from where it is transported by overland conveyor to the alumina refinery (near Collie) for processing. The alumina is then transported by rail to the Port of Bunbury for export.

The State's other alumina producer, Alcoa, completed work on its $258-million Wagerup refinery expansion, with the official opening taking place in mid-October 1999. The Wagerup refinery previously had a production capacity of 1.75 million tonnes a year and following the expansion capacity was increased to 2.2 million tonnes per year. The expansion is the first stage of an overall program to increase the Wagerup refinery's capacity to 3.3 million tonnes per annum. With environmental approval granted for the latter expansion, the final go-ahead is contingent on market conditions. Alcoa operate two other alumina refineries in Western Australia, namely Pinjarra and Kwinana, which have production capacities of 3.2 and 1.9 million tonnes per year respectively.

In other news, a new treatment process developed at Alcoa's Kwinana alumina refinery is anticipated to spread across the company's worldwide operations within the next two years. The process, known as causticisation, converts sodium carbonate back into reactive caustic soda. Alcoa estimates that by applying the process to its refineries worldwide, production will increase by around 500,000 tonnes annually. Other benefits include improved lime efficiency and a decrease of alkalinity in the mud residue. The Western Australian operations are expected to increase production by 300,000 tonnes as a result of the process. Pinjarra will be the first refinery to utilise the process, with an expected production increase of 165,000 tonnes per annum by early 2001, with Kwinana and Wagerup to follow. Overall, the additional tonnage, as a result of the new process, can be added at a relatively low capital cost of around $200 per tonne, compared to $590 a tonne for the recently completed Wagerup expansion and $600 to $700 per tonne for the next phase of the Wagerup expansion.

In other developments, Alichem continued work on its plans to establish Australia's first aluminium fluoride plant in Kwinana. A feasibility study, for processing alumina hydrate to produce 40,000 tonnes per annum



of aluminium fluoride, has been completed with the project expected to cost $70 million. Alichem has been granted environmental approval for the project, however the company has not yet committed to the project. Aluminium fluoride is an input into the production process for aluminium.

Outlook

According to ABARE, in 1998, global consumption of aluminium was concentrated in North America (38%), Europe (29%),Asia (25%) Latin America (5%), Oceania (2%) and Africa (1%). Major end-uses, by sector, of aluminium within these regions include transportation (automotive, aircraft and shipbuilding), packaging (containers, cans, foil), building materials (roofing, window frames) and electrical (cabling). In 1999, world consumption of aluminium was estimated to be 23.3 million tonnes. In 2000,ABARE expect this to increase to around 23.8 million tonnes. Overall, changes in world primary aluminium demand have a tendency to reflect changes in global economic growth. Thus the forecast increase in world aluminium consumption reflects an assumed strengthening in economic activity in Asia and Europe in addition to the sustenance of growth in the US. On a regional scale however, changes in regional economic growth rates are likely to lead to changes in the composition of aluminium consumption.

On the production front, ABARE anticipates world production of primary aluminium will increase by around 2% to 23.8 million tonnes in 2000. This follows an increase of around 4% in 1999 to 23.4 million tonnes.

Overall, ABARE considers that the forecast strong growth in aluminium demand in addition to constraints facing additions to aluminium supply in the short-term, are anticipated to lead to world aluminium consumption exceeding production in 2000. Therefore, with stocks anticipated to fall from 5.2 weeks of consumption at the end of 1999 to 5 weeks at the end of 2000, prices are forecast to increase strongly. Thus the average LME aluminium price is forecast to increase by 28% in 2000 to US$1,750 per tonne.

With respect to alumina, ABARE anticipates world production of alumina to come in at around 49.5 million tonnes in 2000, after reaching approximately 48.9 million tonnes in 1999. Due to an anticipated increase in aluminium production, as mentioned above, ABARE has forecast a spot alumina price of US$315 in 2000, nearly a 54% increase on the 1999 price of US$205 per tonne.

In other important news, the global aluminium-alumina industry is currently undergoing a phase of consolidation after the outcome of two mergers became clearer. The first involved Alcan Aluminium Ltd, Pechiney SA and Alusisse Lonza Group AG (Algroup) which announced plans to merge in August 1999 to form a new company called APA. After initial expectations that the new company would control approximately 11% of total global aluminium production capacity, it emerged in April 2000 that Pechiney (the largest of the three companies) had pulled out of the deal after it could not reach agreement with Alcan over which assets to sell to satisfy European competition regulators. Alcan and Algroup will proceed with the merger but the ramifications for the global industry will be less significant. The second merger involves Alcoa's American parent company's US$6.3 billion bid for rival US-based producer, Reynolds Metals. This would have had significant ramifications for the Western Australian industry because Alcoa would have gained control of the Worsley alumina refinery. However, in order for the deal to be approved by European and US competition regulators, Alcoa must sell the 56% share in Worsley currently owned by Reynolds. The likely contender for the share is Worsley's current 30% owner – Billiton, the world's fifth largest aluminium producer.

2.6 Nickel

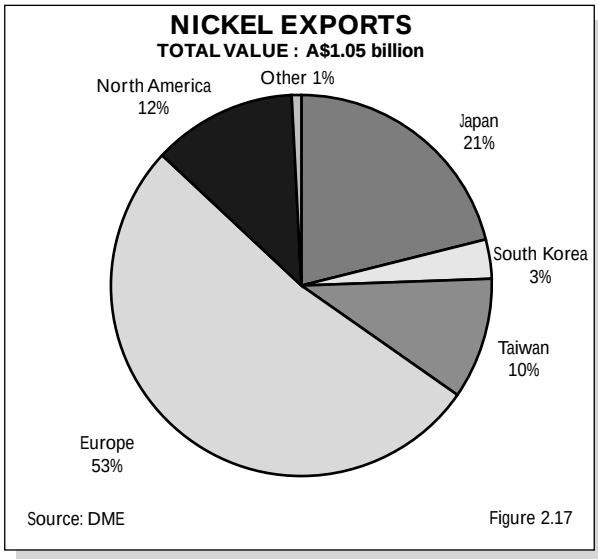
After six years of growth, the quantity of Western Australian contained nickel metal sold was down by nearly 15% to approximately 122,000 tonnes in 1999. However, due to a dramatic recovery in the world nickel price, the sales value actually increased by just over 4% to around $1.1 billion.

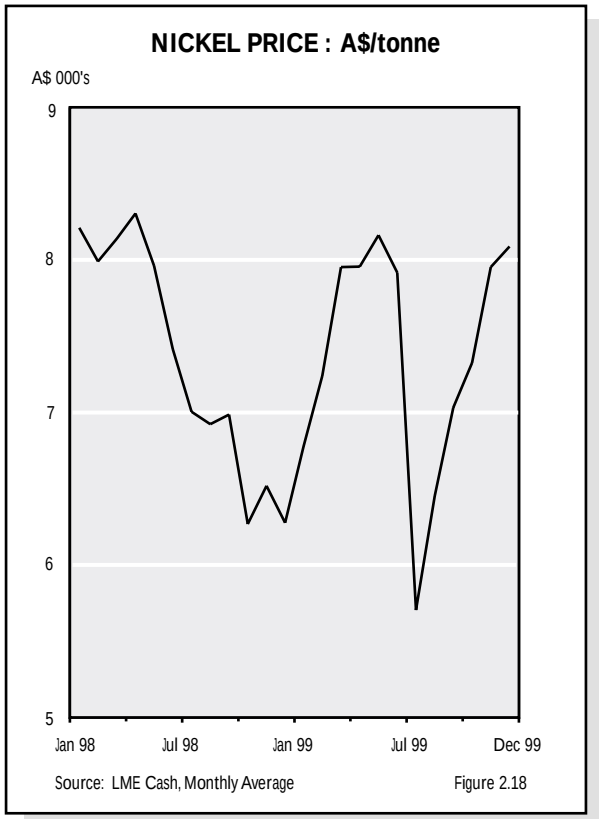
In 1999 Western Australia accounted for all of Australia's nickel production. Around 95% of the State's nickel (by value) was exported overseas with the main export destinations being Europe, which received 53% of the State's nickel exports, Japan (21%), North America (12%), Taiwan (10%) and South Korea (3%).

1999 Nickel Industry Highlights

The nickel market had been subdued in recent years due to surplus stocks, lacklustre demand from stainless steel producers, the ready availability of nickel and steel scrap from Russia plus the imminent start-up of new, low-cost nickel supplies, most of which will come from Western Australia. However, since reaching an average monthly low of US$3,875 per tonne in October 1998, the LME spot nickel price increased strongly to average US$6,015 per tonne in 1999, up by a massive 30% on 1998. The fundamental reasons for the strong recovery in price were a pick up in Asian demand for stainless steel in the second half of 1999 which in turn led to increased production of stainless steel in the region. The strength of Asian demand for stainless steel resulted in a decrease in exports to North America and Western Europe, in turn providing a boost for domestic production in those regions. These factors effectively underpinned an increase in world nickel consumption. In addition, world production of nickel had been cut in response to poor nickel prices. Also, Canadian production was significantly affected due to prolonged strike action.

Western Australia's lower nickel output in 1999 was mainly due to WMC reducing its nickel concentrate output after smelting operations at the Kalgoorlie nickel smelter were stopped in early January 1999 due to a furnace leak. Following an inspection, it was decided to bring forward a relining of the furnace to improve safety and technical reliability.





In September 1999, Outokumpu announced it was closing the Forrestania nickel mine due to a depletion of reserves. During the project's seven-year life, it produced around 55,000 tonnes of contained nickel metal, in concentrate form, which were exported to Outokumpu's Harjavalta nickel smelter in Finland for further processing. Outokumpu has moved the Forrestania processing plant to its Black Swan nickel project, located 45 kilometres north-east of Kalgoorlie. Outokumpu is currently upgrading the existing processing plant at Black Swan, at a cost of $13 million, to cope with increased production from the Cygnet and Silver Swan mines. As of February 2000, it is anticipated that Black Swan's annual production will be approximately 18,000 tonnes of contained nickel metal in concentrate form.

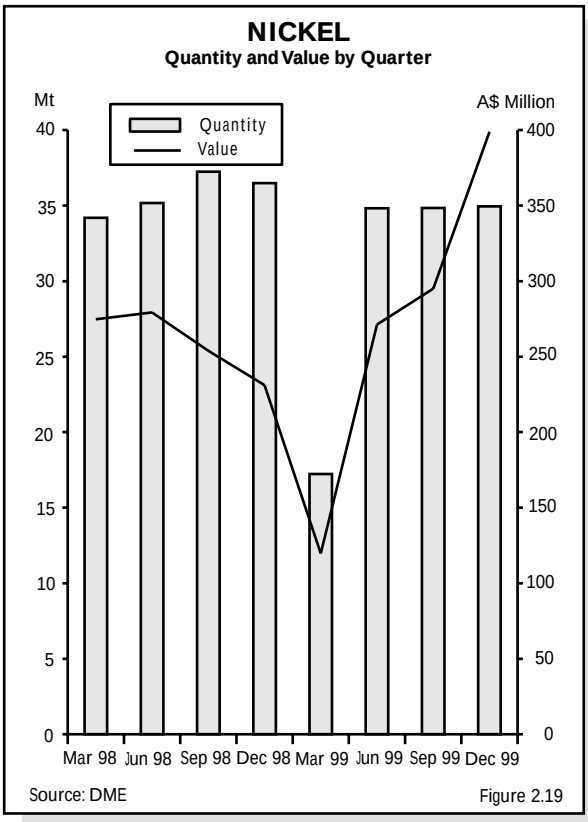
Western Australia's three new lateritic nickel projects - Cawse, Bulong and Murrin Murrin, all entered the final stages of commissioning in the first quarter of 1999. The three projects, which were previously due to be commissioned in 1998, have experienced difficulties in reaching production capacity.

Centaur Mining and Exploration's Cawse nickel project was the first of the new operations to deliver

nickel to the market. The Cawse operation has a designed annual capacity of around 9,000 tonnes of nickel metal and 2,000 tonnes of cobalt sulphide. Nickel production started in January 1999 with the first commercial shipment of nickel metal dispatched from the site in February 1999.

Preston Resources' Bulong operation is of similar size to Cawse with an annual capacity of 9,000 tonnes of nickel metal and around 1,000 tonnes of cobalt metal. The company announced in February 2000 that it had achieved the highest plant utilisation rate to date of 65%.

Anaconda Nickel's Murrin Murrin facility near Leonora is the largest of the new lateritic nickel operations. The construction of this project (i.e. Stage I) was completed in January 1999. Anaconda announced in early December 1999 that the Murrin Murrin plant had been declared mechanically complete. It is expected that the plant will be running at maximum capacity by 2001, which will result in annual production of 45,000 tonnes of nickel metal and 3,000 tonnes of cobalt metal. Anaconda also received a further boost in August 1999 when it was announced that international mining house Anglo American had taken a 23% stake in the company. Anaconda's next biggest shareholder is Swiss based commodity trader Glencore International AG, which holds around 20% of the company in addition to directly owning 40% of Murrin Murrin.



In January 2000, Inco Limited announced that it had been unable to reach agreement with the provincial government of Newfoundland and Labrador in Canada, regarding the commercial development of the Voisey's Bay deposit. The government's requirement that Inco provide a guarantee to construct a commercial processing facility, even if it were uneconomic, was the key factor in the company not being able to reach an agreement. As a result, Inco will not be in a position to commence construction of a mining and milling operation at Voisey's Bay until this impasse can be resolved. The Voisey's Bay deposit remains the largest undeveloped nickel deposit in the world and the threat of its development provided the impetus for the development of many nickel projects, in particular the Western Australian laterite projects, to be fast-tracked.

Outlook

In line with improving conditions in stainless steel markets, ABARE has forecast world nickel consumption to come in at around 1.1 million tonnes in 2000, up by 4% on 1999. However, ABARE considers that stainless steel stocks are relatively low combined with increased demand for stainless steel and a rebuilding of stocks, could lead to final nickel consumption being higher than forecast. ABARE anticipates that stainless steel production will continue to grow in 2000, but at a slower rate than that witnessed in the second half of 1999.

According to ABARE, world nickel production is anticipated to grow by around 8%, in 2000, to 1.1 million tonnes after dropping by 1.5% in 1999. The expected increase in 2000 is largely attributed to increased output from the Western Australian laterite projects coupled with a rise in production from established producers in response to increased demand and hence stronger nickel prices.

On an overall basis, ABARE has forecast the world nickel price to rise significantly in 2000 to average US$9,000 per tonne. However, ABARE expressed

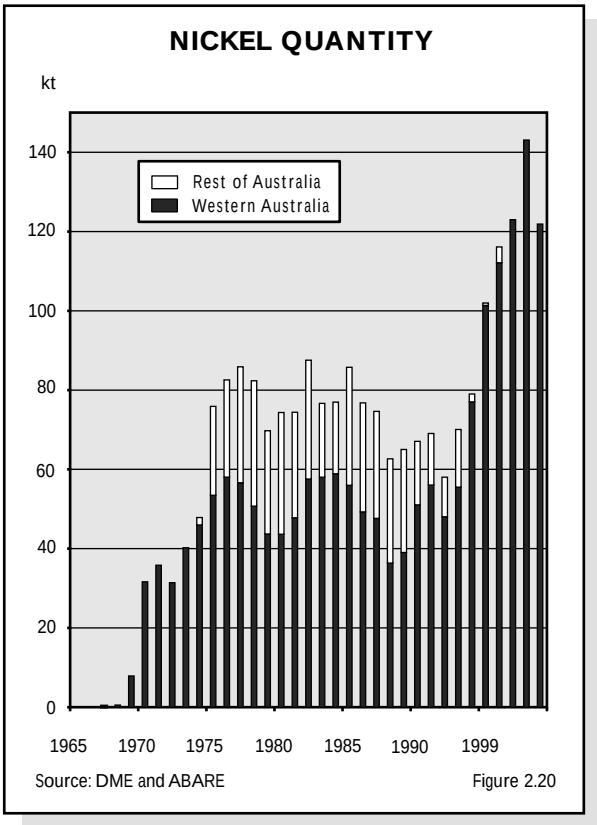
concern that the nickel price could demonstrate volatility during 2000 due to supply-side factors such as an increased supply of scrap and a restart of idle capacity.

In 2000, Western Australia's nickel production is forecast to rise significantly providing the three laterite projects produce close to full capacity. In addition, Tectonic Resources announced in the second half of 1999 that it would develop the RAV 8 nickel deposit, located near Ravensthorpe. Mining commenced in April 2000 with the expectation that RAV 8 would produce approximately 8,700 tonnes of contained nickel metal annually over a two-year mine-life. In addition, after giving the formal go-ahead in October 1999, Jubilee Gold Mines expect its $38 million Cosmos nickel project, near Leinster, to be commissioned in the second quarter of 2000. Jubilee has an agreement to supply Inco Limited of Canada with approximately 10,000 tonnes of contained nickel in concentrate form annually. With the initial open-cut operation, the mine-life was expected to be around three years. However, following the delineation of additional reserves in early 2000, there is the possibility for an underground operation to also be developed at Cosmos.

In the longer term, the State's production will be further boosted if the proposed expansion of the new laterite projects and the development of additional new mines proceed. In the case of the Murrin Murrin project in particular, following the successful delineation of high grade ore at Murrin Murrin East, Anaconda Nickel Limited and Glencore International AG have committed to the expansion of the project (i.e. Stage II). However, at present the first priority is to get Murrin Murrin Stage I operating at full capacity. Stage II will increase total capacity to 115,000 tonnes of nickel metal and 9,000 tonnes of cobalt metal per annum and it is anticipated that production will be phased in. This would result in Murrin Murrin becoming the second largest nickel operation in the world (behind Canada's Sudbury nickel-project) and entrench Western Australia's position as one of the world's largest nickel-producing regions. With Stage II, total capital investment in Murrin Murrin will be over $2 billion.

Anaconda Nickel has also entered into strategic alliances with Preston Resources and Centaur Mining and Exploration in relation to the planned expansions of Bulong and Cawse respectively. Under the strategic alliances, Anaconda is responsible for undertaking the feasibility studies for the expansion of both facilities creating the possibility of developing economic synergies between the projects. In the case of Cawse, Anaconda will earn a 60% share in the operation providing total nickel production is over 50,000 tonnes annually. With respect to Bulong, Anaconda's study will focus on reviewing the existing project and expanding production to a minimum of 40,000 tonnes of nickel annually. In return Anaconda will receive a 60% interest in the expanded operation in addition to managing the joint venture and accepting responsibility for the marketing of the expanded production.

Comet Resources has announced plans to develop a $720 million nickel laterite project about 35 kilometres from Ravensthorpe. It is anticipated that the project will produce 35,000 tonnes per annum of nickel metal with cobalt sulphide production of 1,900 tonnes per annum. The possibility of construction of the Ravensthorpe nickel project beginning in the first quarter of 2001 received a boost in early April 2000 after United Kingdom- based company, Billiton Public Limited, injected $36 million into the project. Billiton



Source: DME and ABARE

Figure 2.20

will secure 40% of the project through its subsidiary QNI Limited.

In other news, LionOre Australia (Nickel) Limited announced, in April 2000, that it had negotiated a long-term off-take agreement with Canada's Inco Limited for the sale of nickel concentrate from the Emily Ann nickel sulphide project. In addition, a $25 million limited recourse financing facility has been negotiated with Inco, signalling a step forward in the development of the project, although a final decision to go-ahead is still pending. The deposit, west of Norseman, is expected to be an underground operation capable of producing 6,700 tonnes of contained nickel metal annually.

2.7 Heavy Mineral Sands

In 1999, the value of sales for the State's heavy mineral sands industry contracted marginally (by 1%) to $688 million.

Around 72%, or $493 million worth, of the State's mineral sands was exported in 1999. The State's predominant export markets were the USA (31%), Netherlands (15%) and Japan (10%).

Western Australia accounts for approximately 86% (by value) of Australia's mineral sands production.

1999 Heavy Mineral Sands Industry Highlights

In 1999, the world market for heavy mineral sands was mixed. In Europe and USA in particular, despite continuing growth in their economies, demand for mineral sands products over most of 1999 remained static whilst Asian demand fell. Japanese pigment producers have faced a slump in the construction, engineering and automobile production sectors, which has reduced demand. However, in the latter half of 1999, demand for titanium dioxide pigments strengthened in the Asian region whilst in Europe and the USA the market remained tight.

The performance of the State's mineral sands industry sector was also relatively mixed in 1999. The largest sector (by value) of the State's mineral sands industry is upgraded ilmenite (synthetic rutile). In 1999, sales quantities of upgraded ilmenite remained relatively stable, dropping by 1% to come in at around 523,000 tonnes. The sales value decreased marginally (by 0.6%) to $288 million.

The quantity of ilmenite sold in 1999 declined by around 4% to just over 1.2 million tonnes, but its sales value rose by just over 1% to around $153 million. This was due to average ilmenite prices received (in Australian dollar terms) being up by 6% in 1999.

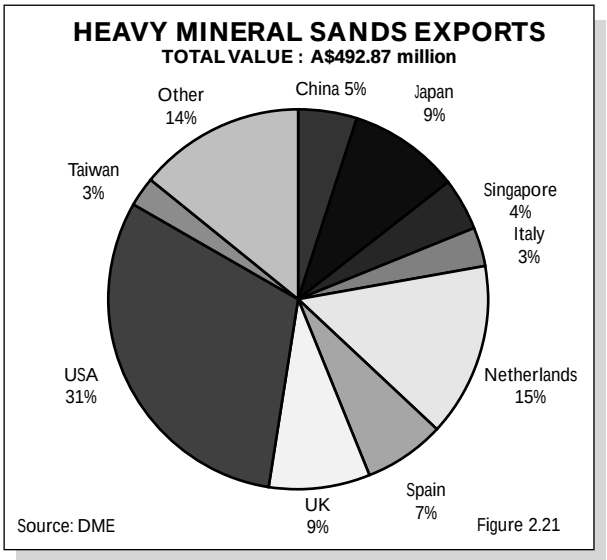
In 1999, zircon sales quantities increased by approximately 7% to around 323,000 tonnes. However, the value dropped by nearly 10% to $139 million in response to a 16% drop in average prices received in 1999.

The rutile sector performed well in 1999, increasing sales quantity by 17% to 113,000 tonnes and achieving an increase in value of around 8% to $82 million. The less than proportionate increase in value was indicative of average rutile prices received dropping by 8% in 1999.

Leucoxene sales were up by nearly 9% to just under 32,000 with the sales value increasing by around 19% to nearly $14 million. This was a result of average leucoxene prices received increasing by an average of 9% in 1999.

The value of garnet sales in 1999 dropped by around 15% to around $12 million with the corresponding quantity down by nearly 19% to approximately 96,000 tonnes. The average price received by garnet producers was up by 4% in 1999.

Western Australia's heavy mineral sands industry underwent major consolidation in December 1998



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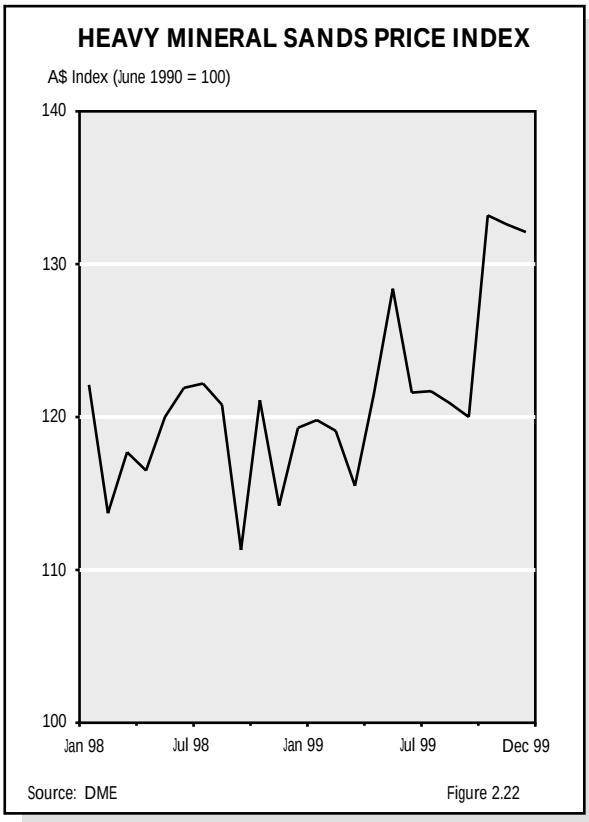


with the merger of RGC and Westralian Sands to create Iluka Resources. Iluka Resources is expected to dominate the State's mineral sands industry and, in production terms, is likely to rank amongst the world's largest producers, accounting for approximately one third of the global titanium dioxide market. The merger brings not only increased market power but also a range of rationalisation measures aimed at reducing costs. In August 1999, the company announced it would bring forward the closure of RGC's South Capel mine and synthetic rutile plant from mid-2000 to October 1999. The closure was primarily due to depleted reserves and deterioration of the plant. The company decided against upgrading the synthetic rutile plant due to the fact that production could be maintained using Westralian Sands' more efficient plant next door in addition to the Narngulu plant near Geraldton. Iluka also announced plans in September 1999 to spend $30 million to upgrade its Eneabba operations. This will involve the phasing-out of its high-cost dredge mining operations at Eneabba West in favour of using open pit mining at its southern leases, and later mining at Pharaoh's Flats, north of Eneabba.

Whilst BHP's $200 million Beenup project contributed to the State's ilmenite and zircon sales in 1999, it was nevertheless plagued with problems and was only able to operate at around 40% of its capacity. In April 1999 the operation was closed. The decision followed an extensive study into technical problems caused by the high clay content of the Beenup orebody which impacted on the management of tailings and the mine's ability to reach satisfactory levels of production.

In the first half of 1999 ISK, a Japanese mining company, and Itochu Australia established a joint venture agreement to develop a $40 million heavy mineral sands mine at Dardanup. The deposit has an anticipated life of at least nine years with development of the mine expected to commence in 2000. Itochu will act as the marketing agent for the product. The mine will produce around 100,000 tonnes of ilmenite per annum and minor amounts of rutile and zircon. The mine has already received environmental approval, however, development is still subject to the companies satisfactorily finalising joint venture issues.

Outlook

The demand for titanium minerals is derived from its usage as a pigment in the colouring of paints and plastics. Overall, world pigment consumption is driven by demand from the major developed economies of the United States, Europe and Asia. Therefore, given the strong economic outlook for these economies it is expected that demand for titanium minerals will be robust. Titanium feedstock prices are expected to increase largely as a result of pigment plants worldwide running at close to full capacity.

In 2000, ABARE anticipates that the price of ilmenite will continue to increase due to a continuation of strong demand. Worldwide supply is forecast to remain tight until around 2003 when new production capacity is expected to come on line. ABARE has in turn forecast average Australian export ilmenite prices to average $136 per tonne over the remainder of 1999-2000 before rising slightly to $140 per tonne in 2000-01.

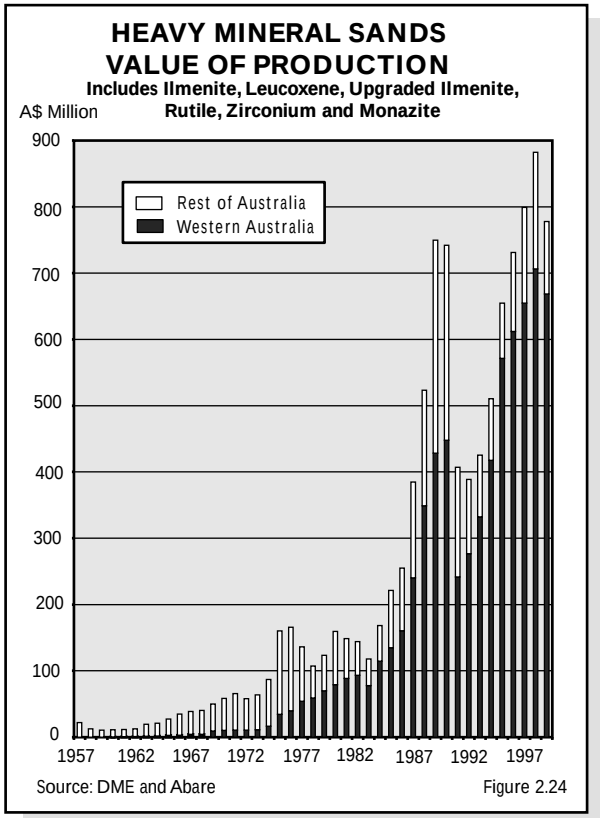
According to ABARE, rutile demand has slowed due to lower demand from the aerospace sector, however, with the world economic outlook strong, rutile demand is expected to increase over the next few

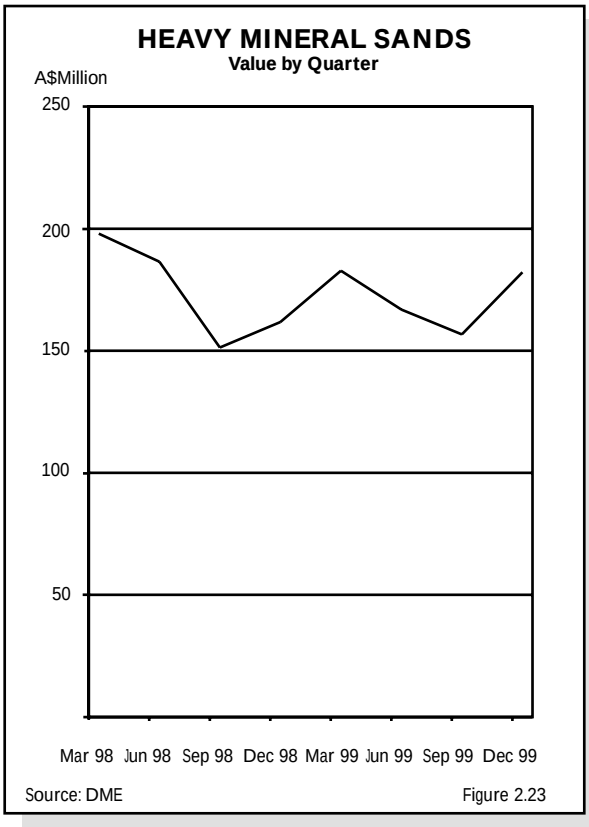
years. ABARE has forecast Australian export prices for rutile to average $748 per tonne in 1999-2000 before rising to $825 per tonne in 2000-2001.

Demand for zircon is anticipated to show continued growth over the near term due largely to an expansion in industrial production in Asia coupled with continued economic growth in Europe and the US. ABARE has forecast Australian export prices for zircon to average $477 per tonne over the remainder of 1999-2000 before increasing to $525 per tonne in 2000-2001.

ABARE also anticipates that average Australian synthetic rutile and leucoxene export prices will strengthen over the near term. ABARE has forecast synthetic rutile prices to increase from an anticipated $728 per tonne in 1999-2000 to $762 per tonne in 2000-2001. The average Australian leucoxene export price is expected to average $447 per tonne in 1999-2000 before increasing to $550 per tonne in 2000-2001.

There are a number of potential new mineral sands projects currently under consideration in Western Australia. These include Cable Sands' Jangardup South and Kemerton mines, the expansion of Millennium Inorganic Chemicals' titanium dioxide pigment plant at Kemerton and Tiwest's Kwinana pigment plant expansion. A decision to proceed on any of these developments is dependent on a continuation and/or improvement in prevailing market conditions.





2.8 Diamonds

In 1999, the Western Australian diamond industry retreated slightly from the sales and volume records of the previous year. The value of diamonds sold decreased marginally by around 1% to $633 million, with sales volume also decreasing by around 1% to just under 52 million carats. Approximately 43% of these sales were sourced from rough (i.e. uncut) stocks, with all output from the Argyle operation. Argyle produces around 35% of the world's diamonds but only accounts for approximately 6% by value.

The Argyle Joint Venture partners (Rio Tinto and Ashton Mining) have faired well over the last two years in comparison to the slump experienced in most parts of the gem market due, in particular, to weak sales in Asia.

1999 Diamond Industry Highlights

In 1999, the type of diamonds marketed by the Argyle operation was important in maintaining physical sales

quantities. Ironically, market developments stemming from the economic downturn in Asia have been a factor in the strong growth in demand for lower value diamond products. While strong demand continued in the US, a key market for the Argyle product, benefits have also arisen from "trading down" evident in the traditionally higher value markets of Japan, India and other parts of Asia.

In early 2000, De Beers, the world's biggest diamond miner, announced that sales through its London-based Central Selling Organisation (CSO), reached an all-time high of US$5.24 billion. This was an increase of 57% on the 1998 sales value. Thus 1999 witnessed a turnaround after the CSO's sales volumes had been severely hampered by the Asian crisis. The CSO controls approximately 60% to 70% of the trade in rough diamonds, effectively setting diamond prices. Overall, according to the CSO, 1999 was a positive year in all the major retail markets with continued strength in the US, increased diamond imports into Japan, some recovery in South-East Asia and steady growth in Europe.

With respect to retail markets, the CSO indicated that 1999 was a strong year after achieving the highest growth rate of the decade, reflecting both the improved economic environment in addition to the success of De Beers' millennium-focused marketing programs. Globally, according to the CSO, retail sales increased by about 11%. All markets, with the exception of Japan, experienced impressive growth led by India, which was up by 21%, the US (12%), Asia-Pacific (13%) and Europe (10%).

The strong demand in the Indian diamond market has been good news for Argyle as it is a major supplier. Overall, it is estimated that India imports around 100 million carats of rough diamonds per year. From January to May 1999, Indian rough diamond imports and polished diamond exports were up about 46% and 17% respectively compared to the corresponding period in 1998. Argyle sells the vast majority of its diamonds (at around $10 a carat) to India, which in turn cuts, polishes and sets them for supply to the US. Argyle has also played a major part in proving and promoting Indian jewellery in American stores.

In the first half of 1999, Argyle increased reserves by 45% to more than 71 million tonnes of gem-bearing material. The delineation of these additional reserves supported the Argyle Joint Venture's decision to begin extending the giant open pit, extending the mine's life by at least four years to 2006. The first stage of the $290 million expansion involves a substantial cutback of an existing pit wall. In addition, a second phase expansion of the pit, if given the go-ahead, will expose enough new ore to keep the mine operational for another 7 to 10 years. Prior to these expansion plans, ore reserves in the Argyle operation were scheduled for depletion in 2003.

In a further boost for plans of underground mining at Argyle, Ashton Mining announced in November 1999 that it would re-examine the potential for an underground mine at Argyle after discovering an extension of the AK1 diamond pipe to the south of the existing orebody. Indications at this stage are that the new resource could sustain diamond production beyond 2006, once open-pit mining ceases. If the go-ahead is given to mine underground it will be on a much more significant scale than the original underground operation envisaged for Argyle.

During 1999, there were a number of new mines internationally that came into production, the most significant of which was the opening of Canada's Ekati mine. This project is a joint venture between BHP (51%), Dia Met Minerals (29%), Charles Fipke (10%), and Stuart Blussom (10%). The mine, commissioned in the last quarter of 1998, is expected to produce about three million carats of good-quality diamonds annually worth close to US$400 million. Under a Memorandum of Understanding signed in March 1999, BHP and its joint venture partners have agreed to sell 35% of the mine production to the CSO for the next three years.

In other news, it has been speculated that the commissioning of the $1.4 billion Diavik mine, inside the Arctic Circle in Canada, could be delayed by a year to mid 2004. The completion of the eight million carat per year mine is facing delays after owners, Rio Tinto and Aber Resources, struck trouble in settling a dispute over environmental monitoring and reporting requirements with Canadian authorities.

Outlook

Oversupply of diamonds has been reduced during 1999 and a broad balance between overall production and retail demand is expected to occur in the near term. If economic conditions in the Asian region

continue to improve, Asia's demand for diamonds should increase in 2000. Nonetheless, given that the US market absorbs nearly half of the world's diamond production, the outlook for the diamond industry will largely depend on continued strong demand for jewellery in the US market.

After significantly reducing stocks of rough and polished diamonds in the market by 18% to US$3.98 billion in 1999, the CSO has indicated that stocks are beginning to be replenished. Coupled with strong demand in India and recovering demand in Japan, this will lead to an increase in the price of low-quality diamonds. The higher price is likely to be aided by an expected cut in Argyle's diamond production in 2000. This production cut is largely the result of mine disruptions caused by the expansion of the mine currently underway, but higher prices will be assisted by confirmation from Ashton Mining that rough stocks are at an all time low due to strong demand for Argyle product in 1998 and 1999. According to Ashton Mining, Argyle produced around 30 million carats in 1999, down by 27%, from 41 million carats in 1998. Ashton expects reduced diamond production of 25 million carats in 2000 and 2001 before recovering to around 30 million carats annually beyond 2001.

2.9 Other Minerals

Base Metals

The total value of the State's base metal sales increased by an impressive 41% to $283 million in 1999. The most significant contributors to this were increases in zinc and lead sales but with the copper sector contracting.

The quantity of Western Australian zinc sold in 1999 was up by 73,000 tonnes, or 49%, to around 223,000 tonnes. The value of zinc sales increased by an impressive 72%, or $92 million, to $220 million. This was primarily the result of increased production and a stronger zinc price over 1999, with the spot LME price increasing by an average 5% over the year.

Zinc production in Western Australia comes from two main sources, Normandy's Golden Grove and Western Metals' Lennard Shelf mining operations, both of which significantly increased output in 1999. In late 1997 Normandy decided to develop the Gossan Hill mine, situated four kilometres south-east of the Scuddles mine, at Golden Grove, and proceed with the development of the zinc and copper orebodies. Ore production commenced in mid-1998 and the Golden Grove treatment plant upgrade was completed by October 1998 to a capacity of 1.2 million tonnes of ore per year. This will extend the operational life of Golden Grove to at least 2007.

Western Metals' stand-alone 1.5 million tonne per year Pillara mine and processing plant reached full capacity in 1999. The underground Pillara mine is located 60 kilometres west of the Cadjebut treatment plant. At full capacity, Pillara is capable of producing 165,000 tonnes of zinc concentrate and 35,000 tonnes of lead concentrate per annum. Western Metals announced in February 2000 that it had decided to close the Cadjebut plant and centralise its operations at Pillara. The fundamental reason for this decision was a 33% increase in reserves at Pillara. The ore from the Kapok and Goongewa mines, which was milled at Cadjebut, will be trucked to the Pillara plant for processing. The Goongewa mine is running out of ore and is expected to be closed by the end of 2000. Another potential mine near Cadjebut, Kutarta, was originally going to be developed, with the ore being processed at Cadjebut. Instead Western Metals has decided to delay the development of Kutarta and focus on upgrading the Pillara plant to process 2.4 million tonnes of ore annually. The $9.6 million expansion is expected to be completed by January 2001.

ABARE has forecast world mine production of zinc to increase by around 8% in 2000, after rising by nearly 6% in 1999. The major contributors to this forecast increase are expected to be the Century mine in Queensland and Lisheen in Ireland, both of which commenced production in early 2000. On the back of an anticipated rise in world demand, this production will most likely be absorbed in world markets without placing too much downward pressure on prices. Overall, ABARE expects the world zinc price to rise by around 12% in 2000 to average US$1,200 per tonne.

The quantity of lead sales from Western Australia in 1999 was around 55,000 tonnes, up by 40% on the previous year. The associated value increased by 14% to just over $17 million due to subdued lead prices compared to 1998. In 1999, all of the State's lead sales originated from Western Metals' Lennard Shelf

operations. However, the State's lead output will receive a boost if Magellan Metals proceed with the $23 million Wiluna lead project. Development of the mine is anticipated to commence in the fourth quarter of 2000, providing the appropriate environmental approvals are obtained. The mine would be the State's only stand-alone lead operation and is expected to produce 100,000 tonnes of lead concentrate annually.

While copper and zinc prices recovered in mid-1999, lead prices remained subdued. The LME spot price for lead averaged US$503 per tonne, down by 5% on 1998. In March 2000 it averaged US$441 per tonne. The price softness has been attributed to increased Chinese exports throughout the year. ABARE has forecast the lead price to pick up slightly after its lows at the beginning of 2000 to average US$500 per tonne over the rest of the year. This is due to an anticipated increase in domestic demand for Chinese lead coupled with improved market sentiment as a result of increased Asian and European consumption, increased stock purchases and a slowing in the rate of supply growth.

Western Australian copper sales quantities decreased by 7% during the year to come in at just over 26,000 tonnes. This was predominantly due to reduced copper production from the Golden Grove and Nifty projects. The average world copper price in 1999 was down by around 5% (in US dollar terms) on the previous year, which, when combined with decreased production, resulted in the value of the State's copper sales dropping by 19% to $46 million. However, the State's copper production is anticipated to increase significantly following Straits Resources' announcement in late December 1999 that it would spend $16 million expanding copper production at its Nifty project from 16,500 to 25,000 tonnes annually. The expansion is expected to be complete in October 2000. In addition, Straits is also investigating the feasibility of developing the Maroochydore copper mine and integrating it with its Nifty operations. The cost of such an option is estimated to be $200 million.

In the second half of 1999, improved demand for copper in Western Europe and some parts of Asia coupled with a reduction in mine output resulted in a recovery in the copper price. The LME spot price, after trading at a low of US$1,378 a tonne in March 1999 rose to average US$1,573 a tonne for the year. In March 2000, it had strengthened to US$1,739 per tonne. ABARE has forecast the copper price to average US$1,820 in 2000 in response to an anticipated matching of copper supply and demand.

Coal

In 1999, the quantity of coal sold increased by 11% to just over six million tonnes. The associated sales value increased by approximately 7% to $268 million, with the less than proportionate increase reflecting lower prices received. All of the State's coal supplies are sold on the domestic market, with the vast majority used for electricity generation by Western Power.

During 1999, operations at Wesfarmers' Premier mine continued to undergo consolidation of pits and the introduction of new coal-handling equipment. Coal production from the Premier mine will play an integral part in providing feedstock for the recently commissioned 300-MW, coal-fired power station at Collie. Wesfarmers' seven-year, 1.2 million tonnes per year contract to supply the new Collie power station commenced in July 1999.

The Griffin Coal Mining Company operates two mines in the Collie Basin – Muja and Ewington. Muja has been operational since the 1950s, with its output solely dedicated to supplying Western Power's Muja power station. Mine output from Muja is expected to decline from around 2005 with operations expected to cease in 2010. The Ewington mine ended up being developed on a smaller scale than originally envisaged due to the capacity of the new Collie power station being decreased from 600 MW to 300 MW. As a result, the Ewington II mine was developed to supply private-sector customers. Larger- scale development of the Ewington I mine is scheduled to take place around 2003 to compensate for the expected decline in output from Muja.

Salt

In 1999 the quantity of salt sold increased by 5% to just under nine million tonnes but the corresponding value dropped by 12% to just under $186 million as a result of lower prices. The State's salt industry is poised to undergo a significant expansion over the next five years in line with an anticipated increase in demand stemming from new chemical projects both locally and in Asia. In recent years Dampier Salt has been

expanding its operations by 100,000 to 200,000 tonnes annually to its current capacity of four million tonnes per annum. Over the next five years, Shark Bay Salt will be expanding its production capacity from 800,000/900,000 tonnes annually to 1.6 million tonnes. The State's salt production will also increase when the new $80 million Onslow project comes on-stream. The Dutch company Akzo Nobel has invested in the project, which is expected to produce 400,000 tonnes annually beginning in 2001 before expanding to 2.5 million tonnes of salt over the following five years. The development of the project encountered a setback in March 1999 when Cyclone Vance caused severe damage.

Tantalum, Spodumene and Tin

In 1999, the quantity of tantalum sold increased by around 1% to 405 tonnes. In combination with higher prices, this translated to a sales value of around $64 million, up by some 9% on 1998. Tantalum is chiefly sourced from Sons of Gwalia's Greenbushes and Wodgina operations. The sales quantity of spodumene, which is also sourced from Greenbushes, totalled 54,000 tonnes in 1999, worth some $11 million. The Greenbushes and Wodgina mines are reportedly the world's largest known tantalum resources, with the two mines producing approximately 25% of the world's annual tantalum requirements. In 1999, the quantity of tin sold came in at 466 tonnes worth just under $4 million. Sons of Gwalia's tantalum production is forecast to increase due to the upgrade of the Wodgina tantalum plant in addition to increased productivity and higher grade ore at Greenbushes.

Gypsum

The quantity of Western Australian gypsum sold increased by an impressive 24% in 1999 to just over 1.3 million tonnes. The associated value was up by 26% to $23 million. The rise in quantity was a result of increased shipments from the new Lake MacLeod gypsum operation. Lake MacLeod Gypsum is 68% owned by Rio Tinto and is an offshoot of the parent company, Dampier Salt. The gypsum and salt projects share an operational base at Lake MacLeod (north of Carnarvon) and shipping port facilities at nearby Cape Cuvier. Lake MacLeod Gypsum accounted for the vast majority of the 1999 sales quantities, making it Australia's largest producer.

Manganese

In May 1999, the State's sole manganese operation, Consolidated Minerals'Woodie Woodie project in the Pilbara, recommenced production after being closed since early 1997. In 1999, the project recorded sales totalling around 108,000 tonnes of manganese worth $13 million. Consolidated Minerals expect to produce 250,000 tonnes of manganese annually and presently has around 90% of output sold under contract to Japan, China and Europe.

Vanadium

After commencing construction in November 1998, Precious Metals Australia (PMA) and its joint venture partner, Xstrata AG of Switzerland, commissioned their $121 million vanadium project at Windimurra, near Mt Magnet, in October 1999. The first shipment of vanadium pentoxide occurred in February 2000 with the expectation that the mine's production will supply markets in Japan, Europe and the United States. The operation has the capacity to produce 7,200 tonnes per annum of vanadium pentoxide or around 12% of world production. Vanadium pentoxide is utilised as an alloy for strengthening specialist steel for use in the aerospace, petroleum, construction and tool-making industries. Windimurra is Australia's only operating vanadium project. The main producers of vanadium are South Africa, Russia and China. PMA will manage and operate the project with Xstrata AG and PMA owning 51% and 49% respectively of the operation. Xstrata AG owns 41% of international commodity trader Glencore International AG and runs two of the world's largest vanadium operations, both located in South Africa.

3. EXPLORATION, INVESTMENT AND EMPLOYMENT

Mineral Exploration

Australian Bureau of Statistics (ABS) mineral exploration expenditure figures for Western Australia fell to $428 million in 1999, down by 32% on the 1998 level of $627 million. Overall this is certainly not a surprising result given the recent spate of record low commodity prices. This fall should also be seen in the context of historically high levels of exploration expenditure over the previous three years, with a record of $701 million attained in 1997 and expenditure of around $620 million in both 1998 and 1996. Prior to that, mineral exploration expenditure for the State had averaged $386 million from 1989 to 1995.

Western Australia still attracted approximately 60% of total Australian mineral exploration expenditure of around $719 million in 1999, down from 65% in 1998.

Depressed gold prices impacted on the State's exploration effort in the sector with expenditure falling by around 33% to $272 million in 1999. It was therefore the dominant factor behind the overall fall in the State's exploration. Gold accounted for 63% of Western Australia's mineral exploration in 1999, down from 64% in 1998. The State received 67% of Australia's total gold exploration funds, down from 71% in 1998.

Exploration expenditure on base metals in Western Australia (by ABS definition - copper, silver-lead-zinc, nickel and cobalt), decreased by around 30% from $112 million to $79 million in 1999. The 1999 expenditure accounted for 50% of Australia's total base metals exploration, down from 55% in 1998. Most of this expenditure is on nickel prospects, with copper and silver-lead-zinc exploration believed to be stagnant or falling.

The State recorded iron ore exploration expenditure of $24 million in 1999 however, this figure is not comparable to the 1998 figure of $44 million, as the ABS published expenditure for only three quarters of the year. Of the reported expenditure in 1999,Western Australia accounts for close to 100% of Australian exploration for iron ore. A gradual depletion of reserves of low-phosphorous Brockman type ores is forcing the State's major iron ore producers to take a long-term view of the industry. In particular major producers are evaluating the economic potential of both Marra Mamba and Robe River pisolite resources in the State's Hamersley Basin.

State diamond exploration expenditure in 1999 totalled $28 million, down by 22% from the 1998 level of $36 million. Western Australia accounted for around 83% of Australia's total diamond exploration funds, up from 80% in 1998. Activity was mainly centred in the Kimberley region.

Heavy mineral sands exploration expenditure came in at $7 million in 1999. The State accounted for 38% of total Australian expenditure for mineral sands, down from 50% in 1998.

The State's mineral sands exploration effort may be hindered in the near term as expenditure is directed to other areas perceived as having greater prospectivity. During the year there were predictions that the Murray Basin (which straddles New South Wales, South Australia and Victoria), currently undergoing extensive exploration, particularly in Victoria and New South Wales, could overtake Western Australia as the nation's largest producer of mineral sands in the next ten years. This was in light of several recent discoveries of high-grade heavy mineral sands deposits located near the surface that allow for low-cost mining and processing. However, it is possible that because the Murray Basin is essentially a rutile-zircon province the distance involved in transporting low-value ilmenite to the nearest port would make the development of such deposits uneconomic.

***NOTE**: For more in-depth information on mineral exploration in Western Australia please refer to the Geological Survey of Western Australia's Annual Review.*

Petroleum Exploration

According to the ABS, the State's petroleum exploration expenditure in 1999 decreased by 9% to $500 million, compared to $550 million in 1998. National expenditure dropped by 22% from $1.05 billion in 1998 to $817 million in 1999. Western Australia's share of Australia's petroleum exploration expenditure increased from 53% in 1998 to 61% in 1999. The amount quoted includes expenditure on Western Australian leases located within Area B of the Zone of Cooperation with East Timor.

The State's petroleum exploration activity in 1999, was concentrated in the Carnarvon, Perth, Canning, Bonaparte and Browse Basins.

In terms of the national total, 15% of exploration expenditure was devoted to production leases in 1999, up from 10% in 1998. The remaining expenditure went towards exploration permit areas. ABS data also shows that Australia-wide, 85% of exploration expenditure was directed to offshore areas in 1999, compared to 78% in the previous year.

***NOTE**: For more in-depth information on petroleum exploration in Western Australia please refer to Department of Minerals and Energy's, Petroleum Division publication, Petroleum in Western Australia.*

Mining Investment

ABS private new capital expenditure statistics for 1999 indicate that mining accounted for 50% of Western Australia's total investment, compared to 60% in 1998. Total State investment decreased by 28% from the 1998 level of $8.42 billion to $6.07 billion in 1999. The actual level of mining investment in Western Australia was $3.01 billion in 1999, down by 41% on the 1998 record amount of $5.09 billion.

In 1999, Western Australia accounted for 43% of national mining investment of $7.03 billion. This compares to the 1998 outcome when Western Australia accounted for 49% of Australia's mining investment of $10.48 billion.

ABS mining investment figures, however, need to be treated cautiously as they do not capture all mining investment. The ABS utilises classifications according to those specified in the 1993 edition of the *Australian and New Zealand Standard Industrial Classification (ANZSIC)* (ABS catalogue number 1292.0). Accordingly, mining is broadly defined as the extraction of minerals occurring naturally as solids such as coals and ores, liquids such as crude petroleum or gases such as natural gas. Downstream mining activities such as smelting of minerals or ores (other than preliminary smelting of gold) or refining are classified as manufacturing activities by ANZSIC. In addition, products of mineral origin, e.g. coke and alumina are included in manufacturing although these operations are dependent on output from mining. A breakdown of the manufacturing investment figures into resource processing and other categories is not available.

Western Australia has essentially completed one phase of another significant investment boom. The nominal level of investment in the State's resource sector accelerated strongly from $2.47 billion in 1992 to reach a record of $5.09 billion in 1998. The result for 1999 can be interpreted as a return to somewhat "normal" levels of mining investment, with the 1999 outcome comparable to that of 1993. Prior to the take-off, the State's mining investment averaged around $2 billion per annum from 1985 to 1992.

The new highs reached in the 1990s mining investment cycle for the resources sector have been unique compared to previous cycles. Past investment booms have been associated with the discovery or viability of a single commodity, whilst the 1990s cycle has seen investments spread across most of the State's major mineral products with gold perhaps the most notable exception.

The diversity associated with the 1990s investment boom in the resources sector has cushioned the State somewhat from the risk associated with investment being undertaken in sharp bursts and targeted to one specific mineral.

Prominent examples of projects with significant investment in the 1990s include:

- The $2.4 billion hot briquetted iron project in Port Hedland;
- Three new nickel laterite projects, Murrin Murrin ($1 billion), Cawse ($217 million) and Bulong ($200 million);
- The $700 million Yandicoogina iron ore project;
- The $1.6 billion Goodwyn project, phase three; and
- The $740 million Wanaea/Cossack project.

The Delta Electricity and Access Economics Investment Monitor for December 1999, indicated that there were approximately $35.8 billion worth of mining projects in Western Australia either under construction, committed, under consideration or possible. Western Australia accounts for about 46% of such projects nation-wide. When including projects with linkages to mining, i.e. further processing and infrastructure projects, the Western Australian figure

increases to around $61 billion.

Focusing on the value of mineral and petroleum projects under construction or committed, the Investment Monitor for December 1999 recorded this at around $1.3 billion, the lowest level for some time. This indicates not only the end of the State's mining investment boom, but also the lagged effect that the Asian economic crisis and low commodity prices have had on mining investment in Western Australia. Nevertheless, some of the more notable projects include:

- The $190 million refurbishment of the Cossack-Pioneer floating production facility by the North West Shelf Consortium (Woodside, BP, Shell, Chevron, BHP and MIMI);
- The $176 million final stage of the expansion of the Worsley alumina refinery, which is near completion at a total capital cost of $800 million;
- The $200 million development of BHP's Mining Area C iron ore project. It is important to note that this project will initially be developed at a cost of $50 million to produce 5 million tonnes of iron ore annually before full scale development which will see it produce around 20 million tonnes annually; and
- The $110 million development of the Legendre oil field by Woodside Petroleum (45.9%), Apache Energy (31.5%) and Santos (22.6%).

In the short-to-medium-term mining investment is likely to rebound. The outlook for global growth has improved significantly over the last year, largely because of the continued strength of the US economy in addition to a recovery in most Asian economies. This is particularly good news for commodity prices, as long-term recovery will depend on increasing demand, which in turn, depends on rising global growth. It also augurs well for those projects which had their development plans delayed by the Asian economic crisis.

Mining Employment

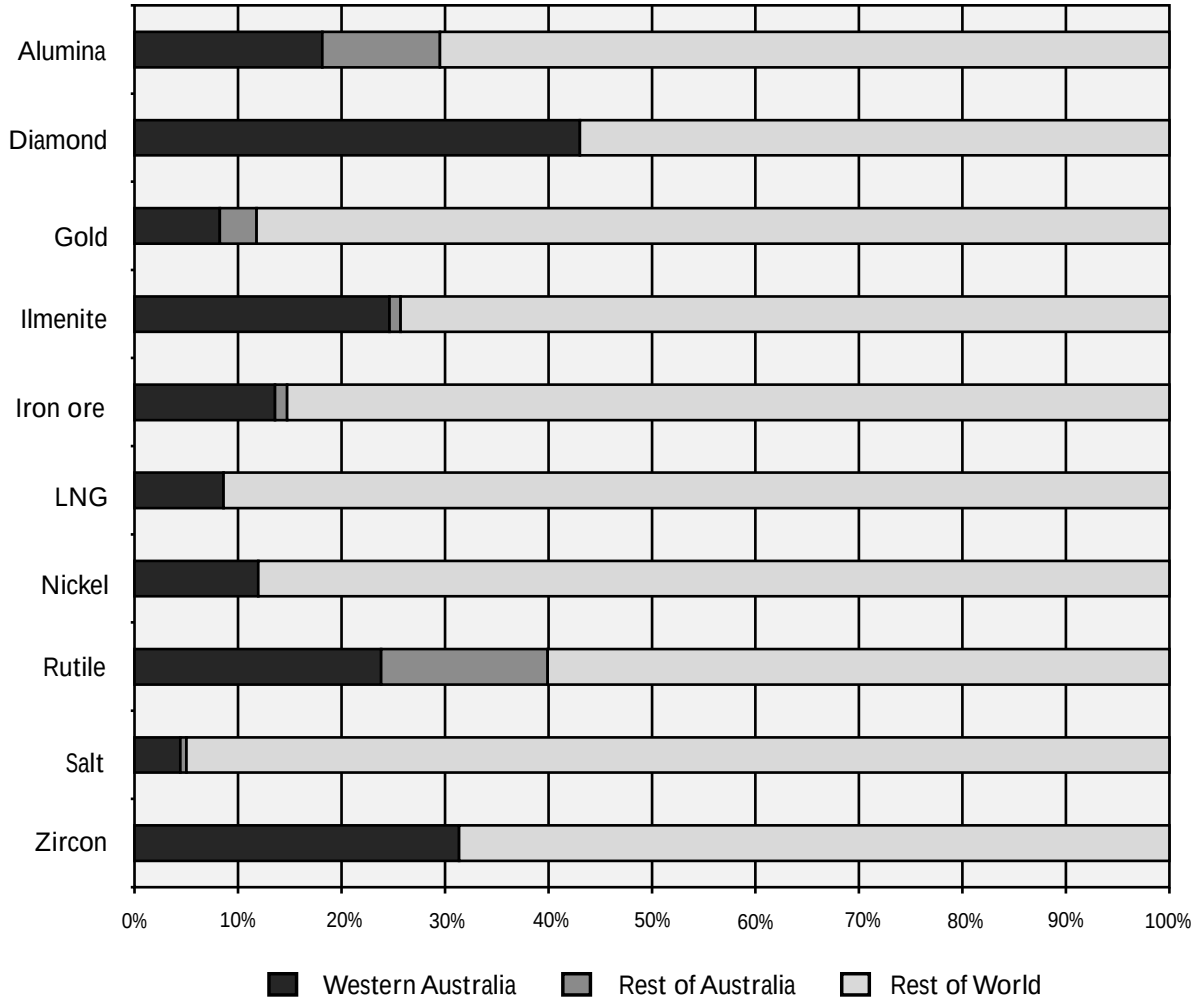
The Department of Minerals and Energy's employment statistics are compiled from monthly industry returns supplied for the purpose of monitoring the number and nature of workplace accidents. The employment figures published reflect the number of workers on the mine-site at any point in time, including contract workers.

In 1999, employment in the State's mineral and petroleum industries increased by 4% to 42,741 persons. Please note however that the statistics provided are estimates only.

Of the major sectors to record significant increases, employment rose by 13% in the bauxite-alumina industry due mainly to the expansion of the Worsley alumina refinery. An increase of 12% was recorded in the salt industry due to the expansion of Dampier Salt's operations. Employment rose by 9% in the heavy mineral sands sector due to an increase in employment at Iluka Resources' Narngulu synthetic rutile plant and TiWest's Cooljarloo operation. The number of workers employed in the iron ore sector was up by 3% due to increases at most of Hamersley Iron's operations and the commencement of BHP's HBI project. Employment also rose by 1% in the gold sector.

Decreases in employment were recorded in the nickel sector, down by 9% due to the completion of the Murrin Murrin plant, i.e. the construction workforce was greater than the operational workforce. A drop of 11% was also recorded at the State's sole diamond project, Argyle.

SELECTED WA COMMODITIES (BY QUANTITY) RELATIVE TO WORLD PRODUCTION ENDING 1999



Source: DME, ABARE and USGS

Figure 2.25

The latest comparable data shows that the Western Australian share (by quantity) of the world's output of the following products was: alumina 18%, diamonds 43% (mainly industrial grade), gold 8%, ilmenite 25%, iron ore 14%, LNG (World Trade) 9%, nickel 12%, rutile 24%, salt 4%, and zircon 31%.

TABLE 1 QUANTITY AND VALUE OF MINERALS AND PETROLEUM

COMMODITY/Mineral	UNIT	1998 QUANTITY	1998 VALUE (A$)	1999 QUANTITY	1999 VALUE (A$)
BASE METALS					
Copper Metal	t	28,239 (r)	57,131,277 (r)	26,229	46,254,543
Lead Metal	t	39,518	15,085,665	55,281	17,225,446
Zinc Metal	t	149,330 (r)	127,850,728 (r)	222,540	219,593,277
TOTAL BASE METALS			**200,067,669 (r)**		**283,073,266**
BAUXITE-ALUMINA					
Alumina	t	8,748,182 (r)	2,429,704,528 (r)	8,930,010	2,311,377,165
CHROMITE					
Chromite	kg	29,645	7,006,547 (r)	27,478	4,967,522
CLAYS					
Attapulgite	t	15,670	2,882,617 (r)	5,639	588,994
Clay Shale	t	5,541	55,410	26,615	266,150
Fire Clay	t	56,663	67,995	72,059	86,471
Kaolin	t	352	41,571	1,708	203,314
TOTAL CLAYS			**3,047,593**		**1,144,929**
COAL	**t**	**5,609,555**	**249,348,279 (r)**	**6,231,484**	**268,018,086**
CONSTRUCTION MATERIALS					
Aggregate	t	310,670 (r)	2,580,202 (r)	294,885	2,029,283
Gravel	t	182,314 (r)	1,116,035 (r)	269,133	1,762,752
Rock	t	416,078	2,715,818	273,068	1,889,434
Sand	t	1,689,533 (r)	7,590,537 (r)	1,817,701	8,493,901
TOTAL CONSTRUCTION MATERIALS			**14,002,592 (r)**		**14,175,370**
DIAMOND	**ct**	**52,274,315 (r)**	**642,392,647 (r)**	**51,641,931**	**632,813,896**
DIMENSION STONE					
Granite	t	2,876 (r)	490,050 (r)	4,082	772,800
Jasper	t	884 (r)	544,880 (r)	100	50,000
TOTAL DIMENSION STONE			**1,034,930 (r)**		**822,800**
GEM & SEMI-PRECIOUS STONE					
Chalcedony	kg	8,053	4,027	0	0
Chrysoprase	kg	0	0	53	3,986
Emerald	kg	0	0	0	10,420
Jasper	kg	0	0	6	3,600
Variscite	kg	0	0	60	36,000
TOTAL GEM & SEMI-PRECIOUS STONE			**4,027**		**54,006**
GOLD	**kg**	**231,426 (r)**	**3,477,733,002 (r)**	**211,246**	**2,934,009,070 (e)**
GYPSUM	**t**	**1,074,742**	**18,342,182**	**1,335,992**	**23,080,010**
HEAVY MINERAL SANDS					
Garnet	t	117,397	14,447,079 (r)	95,623	12,241,014
Ilmenite	t	1,287,196	150,848,771	1,237,485	152,947,445
Upgraded Ilmenite (a)	t	529,484 (r)	289,787,359 (r)	522,933	288,013,090
Leucoxene	t	28,971	11,680,489	31,528	13,887,830
Rutile	t	96,928	76,449,238	113,401	82,261,111
Zircon	t	300,467	154,374,737	322,940	139,138,916
TOTAL HEAVY MINERAL SANDS			**697,587,673 (r)**		**688,489,406**

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

COMMODITY/Mineral	UNIT	1998 QUANTITY		1998 VALUE (A$)		1999 QUANTITY	1999 VALUE (A$)
INDUSTRIAL PEGMATITE MINERALS							
Feldspar	t	59,835	(r)	2,242,642	(r)	44,073	1,734,040
IRON ORE							
Domestic	t	6,939,914	(r)	200,462,609	(r)	7,015,521	188,894,160
Exported	t	136,811,715	(r)	3,903,459,152	(r)	135,778,453	3,286,525,240
TOTAL IRON ORE		**143,751,629**	**(r)**	**4,103,921,761**	**(r)**	**142,793,974**	**3,475,419,400**
LIMESAND-LIMESTONE-DOLOMITE							
Dolomite	t	3,624		86,372		3,086	67,892
Limesand-Limestone	t	3,002,887	(r)	12,916,212	(r)	2,942,990	13,049,821
TOTAL LIMESAND-LIMESTONE-DOLOMITE				**13,002,584**	**(r)**		**13,117,713**
MANGANESE ORE	**t**	**79,430**		**8,129,205**		**108,155**	**13,201,137**
NICKEL INDUSTRY							
Cobalt by-product	t	1,269		84,579,343		1,010	37,681,102
Nickel Concentrate	t	952,901		1,039,122,520	(r)	790,080	1,046,218,365
Nickel Metal	t	-		-		3,801	39,093,390
Palladium by-product	kg	827	(r)	10,096,972	(r)	816	10,566,069
Platinum by-product	kg	155	(r)	2,852,073		90	1,700,645
TOTAL NICKEL INDUSTRY				**1,136,650,908**	**(r)**		**1,135,259,570**
PETROLEUM							
Condensate	kl	6,406,169	(r)	887,059,959	(r)	5,532,258	1,005,025,073
Crude Oil	kl	10,977,222	(r)	1,497,550,122	(r)	8,492,051	1,558,103,095
LNG	Btu 10^6	387,956,097	(r)	1,402,124,380	(r)	387,373,535	1,488,230,564
LPG - Butane	t	384,535	(r)	86,631,007	(r)	368,769	110,426,365
LPG - Propane	t	263,815		55,870,605	(r)	236,957	74,950,938
Natural Gas	$000m^3$	6,328,179	(r)	527,964,048	(r)	6,600,275	569,333,371
TOTAL PETROLEUM				**4,457,200,121**	**(r)**		**4,806,069,405**
PIGMENTS							
Red Oxide	t	1,570		298,300		331	62,890
SALT	**t**	**8,477,039**	**(r)**	**210,174,154**	**(r)**	**8,862,978**	**185,592,069**
SILICA-SILICA SAND							
Silica	t	91,821		918,215		92,739	927,387
Silica Sand	t	654,451		6,262,395		458,218	5,522,111
TOTAL SILICA-SILICA SAND				**7,180,610**			**6,449,498**
SILVER	**kg**	**52,858**	**(r)**	**12,932,735**	**(r)**	**81,812**	**18,758,837**
SPONGOLITE	**t**	**5,380**		**430,353**		**9,292**	**743,045**
TALC	**t**	**176,144**	**(r)**	**13,984,701**	**(r)**	**152,195**	**16,502,660**
TIN-TANTALUM-LITHIUM							
Spodumene	t	42,337		10,243,876		54,023	11,453,258
Tantalite	t	400		58,503,807		405	63,843,890
Tin Metal	t	588		4,894,812		466	3,768,893
TOTAL TIN-TANTALUM-LITHIUM				**73,642,495**			**79,066,041**
TOTAL VALUE				**17,780,062,238**	**(r)**		**16,914,001,829**

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

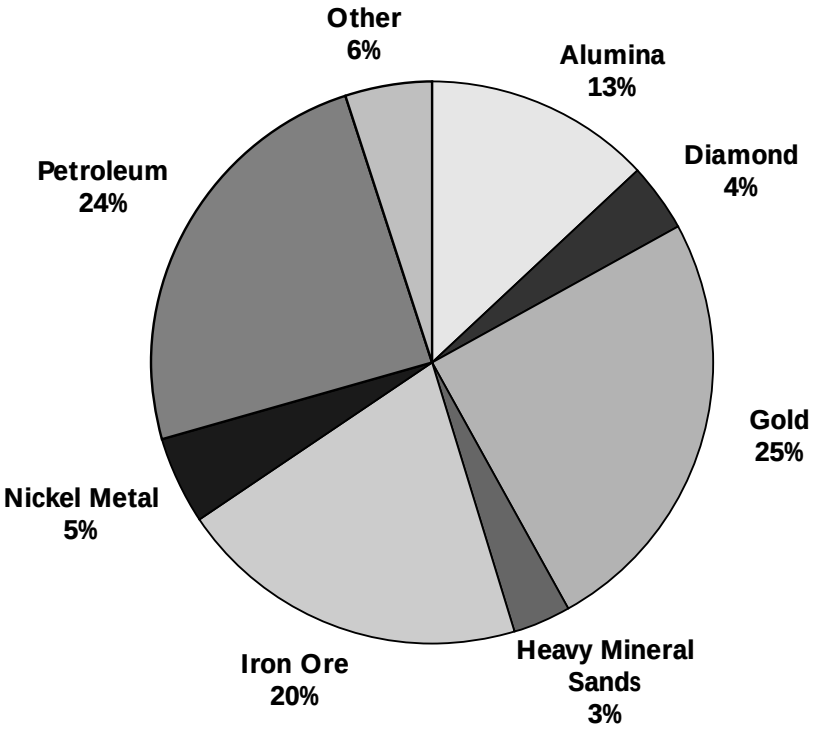
TABLE 2 **QUANTITY AND VALUE OF SELECTED MAJOR COMMODITIES**

		1990		1991		1992		1993	
	Unit	**Quantity**	**Value $M**	**Quantity**	**Value $M**	**Quantity**	**Value $M**	**Quantity**	**Value $M**
ALUMINA	Mt	6.72	2,358.95	7.01	1,844.03	7.08	1,689.72	7.80	1,891.86
BASE METALS									
Copper Metal	kt	14.96	22.55	11.79	17.92	12.09	18.68	28.98	30.21
Lead Metal	kt	13.61	7.18	10.70	4.35	20.96	7.43	32.28	7.84
Zinc Metal	kt	51.70	61.55	112.01	94.69	141.39	132.98	141.10	87.02
TOTAL BASE METALS			91.28		116.96		159.09		125.07
COAL	Mt	4.83	214.25	5.11	228.56	5.66	251.76	5.47	248.44
DIAMOND	M ct	31.18	429.93	33.36	456.93	41.15	565.06	22.65	486.77
GOLD	tonnes	176.35	2,794.00	186.34	2,800.18	182.10	2,751.38	183.47	3,139.61
HEAVY MINERAL SANDS									
Ilmenite	Mt	0.99	86.20	0.94	81.50	1.04	87.30	1.01	85.40
Rutile	kt	76.07	57.91	59.13	39.66	68.96	39.05	56.60	29.97
Upgraded Ilmenite	kt	275.00	133.24	330.00	168.91	376.00	177.48	375.00	174.42
Zircon	kt	224.46	126.68	204.33	79.16	265.17	51.46	299.76	46.26
Other HMS			9.37		5.14		10.26		6.49
TOTAL HEAVY MINERAL SANDS			413.40		374.37		365.55		342.54
IRON ORE	Mt	103.85	2,426.81	114.17	2,978.72	108.15	2,921.98	116.34	2,996.73
MANGANESE ORE	kt	364.58	57.93	209.64	37.77	402.84	72.20	247.86	43.40
NICKEL METAL	kt	50.91	557.97	55.76	569.24	48.04	461.54	55.46	437.74
PETROLEUM									
Condensate	Gl	1.72	333.90	1.87	313.74	2.06	366.70	2.17	359.86
Crude oil	Gl	5.20	1,023.22	5.21	901.42	5.05	917.36	4.05	709.32
LNG	btu 10^{12}	153.14	508.10	204.80	957.95	237.64	966.47	264.75	997.88
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	3.70	366.43	3.74	372.20	3.78	368.96	4.21	422.96
TOTAL PETROLEUM			2,231.65		2,545.31		2,619.49		2,490.02
SALT	Mt	6.12	130.77	6.83	149.36	6.67	155.39	6.53	159.57
OTHER			99.56		91.69		132.36		112.77
TOTAL			**11,806.50**		**12,193.12**		**12,145.52**		**12,474.52**

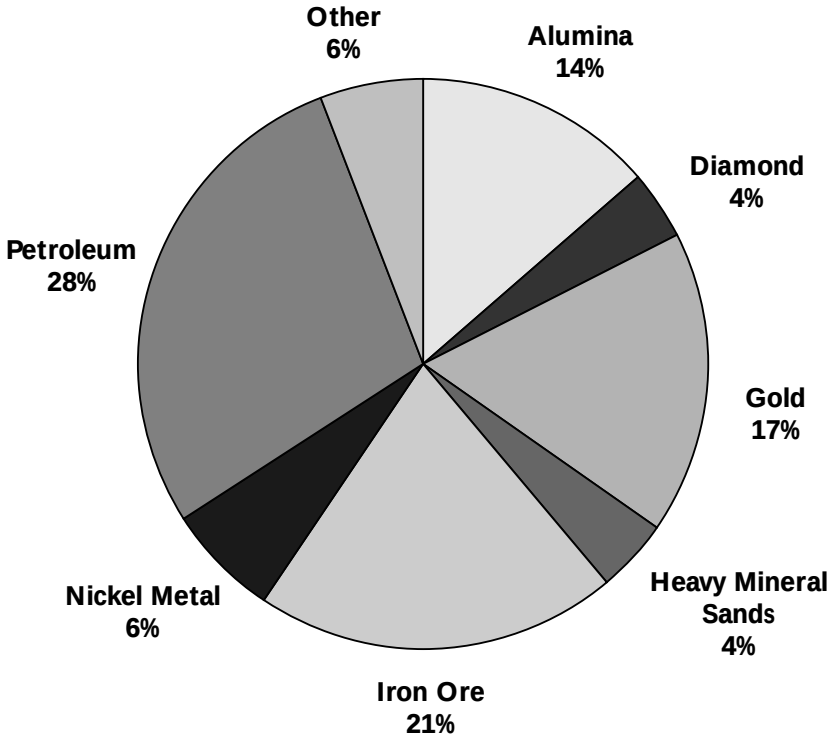
1994		1995		1996		1997		1998		1999	
Quantity	Value $M	Quantity	Value $M	Quantity	Value $M	Quantity	Value $M	Quantity	Value $M	Quantity	Value $M
7.93	1,684.58	8.07	1,757.36	8.25	1,967.81	8.48	2,084.71	8.75	2,429.70	8.93	2,311.38
35.11	68.13	24.31	73.29	23.07	51.28	28.32	62.46	28.24	57.13	26.23	46.25
20.29	7.32	15.64	8.25	17.08	9.90	23.20	9.91	39.52	15.09	55.28	17.23
123.62	85.14	126.34	87.73	106.86	71.28	117.20	118.10	149.33	127.85	222.54	219.59
	160.59		169.27		132.46		190.47		200.07		283.07
5.03	234.02	6.06	280.66	5.81	268.38	5.69	260.53	5.61	249.35	6.23	268.02
27.72	470.34	23.45	480.15	47.43	442.01	40.42	421.19	52.27	642.39	51.64	632.81
192.98	3,265.93	189.48	3,163.66	221.18	3,528.64	238.34	3,414.61	231.43	3,477.73	211.25	2,934.01
1.08	93.52	1.00	96.27	1.08	114.29	1.23	133.59	1.29	150.85	1.24	152.95
87.16	44.46	124.87	68.14	110.65	79.17	111.78	78.53	96.93	76.45	113.40	82.26
453.00	208.47	535.00	254.58	522.00	258.23	581.00	292.86	529.48	289.79	522.93	288.01
444.26	99.00	458.44	152.54	372.70	197.54	292.79	160.34	300.47	154.37	322.94	139.14
	6.62		8.07		25.26		22.86		26.13		26.13
	452.07		579.60		674.49		688.18		697.59		688.49
124.26	2,630.61	135.97	2,980.69	133.65	2,924.48	151.72	3,633.34	143.75	4,103.92	142.79	3,475.42
202.52	22.74	227.90	28.42	296.81	32.67	176.99	22.15	79.43	8.13	108.16	13.20
77.00	630.13	101.36	1,094.17	108.38	1,033.88	122.99	1,136.00	143.08	1,039.12	121.89	1,085.31
2.34	331.19	3.83	564.91	4.97	773.72	6.44	1,103.31	6.41	887.06	5.53	1,005.03
8.75	1,299.75	8.68	1,384.83	11.26	1,958.82	9.54	1,719.80	10.98	1,497.55	8.49	1,558.10
335.11	1,080.17	375.37	1,390.75	377.82	1,391.20	375.60	1,595.47	387.96	1,402.12	387.37	1,488.23
0	0	19.42	4.73	158.96	37.44	320.43	93.17	384.54	86.63	368.77	110.43
0	0	14.14	3.44	150.84	36.93	253.82	73.83	263.82	55.87	236.96	74.95
4.92	441.96	5.83	421.92	6.62	494.68	7.33	571.51	6.33	527.96	6.60	569.33
	3,153.07		3,770.58		4,692.80		5,157.09		4,457.20		4,806.07
6.86	153.49	7.29	155.81	7.21	143.61	8.12	172.12	8.48	210.17	8.86	185.59
	149.67		182.81		207.71		186.27		264.29		230.63
	13,007.24		**14,643.18**		**16,048.94**		**17,366.66**		**17,780.06**		**16,914.00**

5 YEAR VALUE COMPARISON

1994 Total : A$13.01 billion



1999 Total : A$16.91 billion



Source: DME

Figure 0.1

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

MINERAL	LOCAL GOVERNMENT AREA	QUANTITY TONNES	METALLIC CONTENT	VALUE A$	Ref. (p.70)
BASE METALS					
			Cu tonnes		
Copper By-Product	Coolgardie		5,381	7,535,009	(a)
	Roebourne		1,070	1,216,175	(a),(b)
Total Copper By-Product			**6,451**	**8,751,183**	
			Cu %		
Copper Concentrates	East Pilbara	10,405	24.71	2,491,185	
	Yalgoo	21,957	12.92	1,562,834	
Total Copper Concentrates		**32,362**		**4,054,018**	**(a)**
			Cu tonnes		
Copper Cathode	East Pilbara		14,369	33,449,342	
Total Copper				**46,254,543**	**(a)**
			Pb %		
Lead	Derby-West Kimberley	75,002	71.38	17,225,446	(a)
			Zn %		
Zinc	Derby-West Kimberley	246,896	50.49	133,387,610	
	Yalgoo	232,744	42.06	86,205,667	
Total Zinc		**479,640**		**219,593,277**	**(a)**
TOTAL BASE METALS				**283,073,266**	
BAUXITE - ALUMINA					
Alumina	Boddington	1,728,141		469,982,310	
	Murray	2,991,359		758,543,058	
	Serpentine-Jarrahdale	2,315,419		597,172,808	
	Waroona	1,895,091		485,678,988	
TOTAL BAUXITE - ALUMINA		**8,930,010**		**2,311,377,165**	**(c),(d)**
CHROMITE			Cr_2O_3 %		
Chromite Ore	Meekatharra	71,886	38.23	4,967,522	(a)
CLAY					
Attapulgite	Mullewa	5,639		588,994	
Clay Shale	Collie	26,615		266,150	
Fire Clay	Chittering	72,059		86,471	
Kaolin	Bridegetown-Greenbushes	1,708		203,314	
TOTAL CLAY		**106,021**		**1,144,929**	**(e)**
COAL	Collie	6,231,484		268,018,086	(f)
CONSTRUCTION MATERIALS					
Aggregate	Broome	13,788		367,619	
	Port Hedland Town	211		1,266	
	Roebourne	218,593		1,295,320	
	Wyndham-East Kimberley	62,293		365,078	
Total Aggregate		**294,885**		**2,029,283**	

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

MINERAL	LOCAL GOVERNMENT AREA	QUANTITY TONNES	METALLIC CONTENT	VALUE A$	Ref. (p.70)
Gravel	Broome	5,040		24,164	
	Coolgardie	35,221		210,552	
	Coorow	273		1,638	
	East Pilbara	24,850		128,700	
	Kalamunda	174,437		1,221,059	
	Kalgoorlie-Boulder	24,385		146,309	
	Port Hedland Town	1,454		14,536	
	Shark Bay	80		400	
	Wyndham-East Kimberley	3,393		15,394	
Total Gravel		**269,133**		**1,762,752**	
Rock	Broome	5,258		283,359	
	Kalgoorlie-Boulder	267,021		1,602,123	
	Wyndham-East Kimberley	790		3,952	
Total Rock		**273,068**		**1,889,434**	
Sand	Broome	23,517		171,092	
	Collie	5,022		30,131	
	Coolgardie	242,100		1,417,338	
	Coorow	1,788		8,940	
	Dandaragan	2,264		9,159	
	Derby-West Kimberley	13,983		90,901	
	Kalgoorlie-Boulder	11,143		66,860	
	Leonora	5,714		28,569	
	Meekatharra	3,590		23,472	
	Menzies	523		2,615	
	Northam	53,426		160,279	
	Port Hedland Town	19,313		124,798	
	Roebourne	23,302		146,066	
	Wanneroo	1,400,319		6,155,192	
	Wyndham-East Kimberley	8,291		41,456	
	Yilgarn	3,406		17,033	
Total Sand		**1,817,701**		**8,493,901**	
TOTAL CONSTRUCTION MATERIAL				**14,175,370**	**(e)**
DIAMOND		carats			
	Wyndham-East Kimberley	51,641,931		632,813,896	(a)
DIMENSION STONE					
Granite	Coolgardie	491		118,720	
	Dundas	3,297		639,380	
	Roebourne	294		14,700	
Total Granite		**4,082**		**772,800**	
Jasper	Port Hedland Town	100		50,000	
TOTAL DIMENSION STONE				**822,800**	**(e)**
GEM & SEMI-PRECIOUS STONE		**kg**			
Chrysoprase	Kalgoorlie-Boulder	53.35		3,986	
Emerald	Mt Magnet	0.0041		10,420	
Jasper	Ashburton	6.00		3,600	
Variscite	Carnarvon	60.00		36,000	
TOTAL GEM & SEMI-PRECIOUS STONE				**54,006**	**(f)**

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

MINERAL	LOCAL GOVERNMENT AREA	QUANTITY TONNES	METALLIC CONTENT	VALUE A$	Ref. (p.70)
GOLD			**Au kg**		
	Boddington		7,512	104,607,751	
	Coolgardie		20,684	288,719,729	
	Cue		5,645	78,316,342	
	Dundas		3,485	48,414,320	
	East Pilbara		10,398	144,201,689	
	Kalgoorlie-Boulder		53,232	738,804,118	
	Laverton		16,333	227,501,486	
	Leonora		39,936	554,323,006	
	Meekatharra		14,148	196,290,621	
	Mt Magnet		6,924	96,217,124	
	Sandstone		945	13,437,417	
	Wiluna		16,229	224,549,576	
	Yalgoo		485	6,655,737	
	Yilgarn		15,290	211,970,153	
TOTAL GOLD			**211,246**	**2,934,009,070**	**(g)**
GYPSUM	Bruce Rock	1,208		9,664	
	Carnarvon	1,062,825		19,827,415	
	Dalwallinu	87,816		1,869,770	
	Dandaragan	10,997		109,970	
	Dundas	17,024		102,145	
	Esperance	14,562		87,372	
	Koorda	220		2,640	
	Lake Grace	43,484		346,795	
	Merredin	645		6,450	
	Mt Marshall	1,977		18,720	
	Nungarin	26,786		160,716	
	Ravensthorpe	9,484		66,388	
	Wyalkatchem	56,745		453,955	
	Yilgarn	2,220		18,010	
TOTAL GYPSUM		**1,335,992**		**23,080,010**	**(f)**
HEAVY MINERAL SANDS					
Garnet Sand	Bunbury City	2		320	(h)
	Northampton	95,621		12,240,694	(a)
Total Garnet Sand		**95,623**		**12,241,014**	
			TiO_2 %		
Ilmenite	Augusta-Margaret River	219,366	55.94	26,191,134	
	Bunbury City	485,888	56.08	66,686,844	
	Capel	313,531	51.06	38,469,311	
	Carnamah	208,462	58.40	20,351,375	
	Northampton	10,237	29.91	1,248,781	
Total Ilmenite		**1,237,485**		**152,947,445**	**(a)**
			TiO_2 %		
Upgraded Ilmenite	Capel	203,238	92.00	108,827,290	
	Carnamah	120,920	92.00	50,596,955	
	Dandaragan	198,775	92.00	128,588,845	
Total Upgraded Ilmenite		**522,933**		**288,013,090**	**(a)**
			TiO_2 tonnes		
Leucoxene	Bunbury City	7,055	5,534	3,884,989	
	Capel	12,668	4,267	6,712,780	
	Dandaragan	11,805	8,783	3,290,061	
Total Leucoxene		**31,528**	**18,583**	**13,887,830**	**(a)**

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

MINERAL	LOCAL GOVERNMENT AREA	QUANTITY TONNES	METALLIC CONTENT	VALUE A$	Ref. (p.70)
			TiO_2 tonnes		
Rutile	Bunbury City	9,829	5,882	5,487,579	
	Carnamah	87,892	57,793	66,331,753	
	Dandaragan	15,680	13,440	10,441,779	
Total Rutile		**113,401**	**77,115**	**82,261,111**	**(a)**
			ZrO_2 tonnes		
Zircon	Augusta-Margaret River	2,300	736	631,605	
	Bunbury City	44,137	12,333	17,096,387	
	Capel	67,219	1,140	28,240,966	
	Carnamah	147,812	27,023	63,610,837	
	Dandaragan	61,472	23,139	29,559,121	
	Yogonup	57,434	9,598	23,986,298	
Total Zircon		**322,940**	**73,969**	**139,138,916**	**(a)**
TOTAL HEAVY MINERAL SANDS				**688,489,406**	
INDUSTRIAL PEGMATITE MINERALS					
Feldspar	Marble Bar	43,712		1,726,207	
	Mukinbudin	361		7,833	
Total Feldspar		**44,073**		**1,734,040**	**(e)**
IRON ORE			Fe%		
Domestic Ore	East Pilbara	7,015,521	64.64	188,894,160	(a)
			Fe%		
Exported Ore	Ashburton	73,549,503	63.63	1,702,591,292	
	Derby-West Kimberley	256,735	65.97	4,927,195	
	East Pilbara	60,686,713	62.90	1,551,819,335	
	Yilgarn	1,285,502	46.96	27,187,418	
Total Exported Ore		**135,778,453**		**3,286,525,240**	**(a)**
TOTAL IRON ORE				**3,475,419,400**	
LIMESAND-LIMESTONE-DOLOMITE					
Dolomite	Lake Grace	3,086		67,892	
Limesand-Limestone	Carnamah	21,952		87,808	
	Cockburn	1,752,723		5,170,533	
	Coorow	11,473		57,365	
	Dandaragan	19,045		85,704	
	Dundas	137,008		2,055,120	
	Gingin	37,743		580,160	
	Irwin	179,841		504,635	
	Kwinana	487,363		1,301,822	
	Manjimup	12,623		189,345	
	Shark Bay	1,319		169,063	
	Wanneroo	281,901		2,848,266	
Total Limesand-Limestone		**2,942,990**		**13,049,821**	
TOTAL LIMESAND-LIMESTONE-DOLOMITE				**13,117,713**	**(e)**
MANGANESE ORE			Mn%		
	East Pilbara	108,155	48.65	13,201,137	(a)

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

MINERAL	LOCAL GOVERNMENT AREA	QUANTITY TONNES	METALLIC CONTENT	VALUE A$	Ref. (p.70)
NICKEL INDUSTRY			Co tonnes		
Cobalt By-Product	Coolgardie		654	26,175,835	
	Kalgoorlie-Boulder		300	8,370,189	
	Roebourne		56	3,135,078	
Total Cobalt By-Product			**1,010**	**37,681,102**	**(a),(b)**
			Ni%		
Nickel Concentrates	Coolgardie	152,389	12.33	158,988,340	
	Kalgoorlie-Boulder	45,631	19.68	82,221,855	
	Kondinin	64,245	13.82	75,507,939	
	Leonora	278,182	12.92	324,320,008	
	Roebourne	40,544	10.35	39,697,699	
	Wiluna	209,089	19.75	365,482,524	
Total Nickel Concentrates		**790,080**		**1,046,218,365**	**(i)**
Nickel Metal	Kalgoorlie-Boulder		3,801	39,093,390	(i)
			Pd kg		
Palladium By-Product	Coolgardie		816	10,566,069	(a),(b)
			Pt kg		
Platinum By-Product	Coolgardie		90	1,700,645	(a),(b)
TOTAL NICKEL INDUSTRY				**1,135,259,570**	
PETROLEUM					
		Kilolitres			
Condensate	Ashburton	232,266		42518307	
	Carnamah	177		13,613	
	Irwin	1,467		224,665	
	Roebourne	5,298,348		962,268,487	
Total Condensate		**5,532,258**		**1,005,025,072**	
		Kilolitres			
Crude Oil	Ashburton	3,969,025		697,180,520	
	Derby-West Kimberley	10,323		1,371,577	
	Irwin	7,977		1,238,382	
	Roebourne	4,504,726		858,312,616	
Total Crude Oil		**8,492,051**		**1,558,103,095**	
		Btu 10^6			
Liquified Natural Gas	Roebourne	387,373,535		1,488,230,564	
		Tonnes			
LPG - Butane	Roebourne	368,769		110,426,365	
		Tonnes			
LPG - Propane	Roebourne	236,957		74,950,938	
		'000 m^3			
Natural Gas	Ashburton	811,593		68,287,288	
	Carnamah	38,213		5,476,816	
	Irwin	171,545		19,123,907	
	Roebourne	5,578,924		476,445,360	
Total Natural Gas		**6,600,275**		**569,333,371**	
TOTAL PETROLEUM PRODUCTS				**4,806,069,405**	**(d)**

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

MINERAL	LOCAL GOVERNMENT AREA	QUANTITY TONNES	METALLIC CONTENT	VALUE A$	Ref. (p.70)
PIGMENTS					
Red Oxide	Cue	331		62,890	(a)
SALT					
	Carnarvon	1,516,388		37,952,122	(a)
	Esperance	10,274		501,131	(h)
	Port Hedland Town	3,019,695		44,239,608	(a)
	Roebourne	3,718,008		88,520,468	(a)
	Shark Bay	478,988		9,547,460	(a)
	Wyalkatchem	155		12,408	(h)
	Yilgarn	119,470		4,818,872	(h)
TOTAL SALT		**8,862,978**		**185,592,069**	
SILICA-SILICA SAND					
Silica	Moora	92,739		927,387	
Silica Sand	Albany	88,474		1,484,642	
	Cockburn	100,147		1,101,618	
	Swan	269,597		2,935,851	
Total Silica Sand		**458,218**		**5,522,111**	
TOTAL SILICA-SILICA SAND				**6,449,498**	**(a)**
SILVER BY-PRODUCT			Ag kg		
	Coolgardie		122	29,052	(a),(j)
	Derby-West Kimberley		2,205	597,274	(a),(b)
	East Pilbara		421	101,313	(a),(j)
	Roebourne		5,939	1,345,358	(a),(j)
	Statewide		31,112	7,460,092	
	Yalgoo		42,013	9,225,748	(a),(l)
TOTAL SILVER			**81,812**	**18,758,837**	
SPONGOLITE	Plantagenet	9,292		743,045	
TALC					
	Meekatharra	12,791		895,366	
	Three Springs	139,404		15,607,294	
TOTAL TALC		**152,195**		**16,502,660**	**(f)**
TIN-TANTALUM-LITHIUM					
			Li_2O_5 %		
Spodumene	Bridgetown-Greenbushes	54,023	5.54	11,453,258	
			Ta_2O_5 kg		
Tantalite	Bridgetown-Greenbushes	405	212,625	63,843,890	
			Sn Tonnes		
Tin	Bridgetown-Greenbushes		466	3,768,893	
TOTAL TIN-TANTALUM-LITHIUM				**79,066,041**	**(a)**
			VALUE OF MINERALS	**9,173,923,354**	
			VALUE OF PETROLEUM	**4,806,069,405**	
			VALUE OF GOLD	**2,934,009,070**	
			TOTAL VALUE	**16,914,001,829**	

TABLE 4 **ROYALTY RECEIPTS 1998, 1999**

COMMODITY/Mineral	1998 Total $A	1999 Total $A	1999 Growth $A	1999 Growth %
BASE METALS				
Copper	1,849,497	1,505,225	-344,272	(19)
Lead	584,181	1,009,237	425,056	73
Zinc	6,401,076	10,278,218	3,877,142	61
TOTAL BASE METALS	**8,834,754**	**12,792,680**	**3,957,926**	**45**
BAUXITE-ALUMINA				
Alumina	38,281,457	39,021,615	740,158	2
CHROMITE	**332,544**	**207,213**	**-125,331**	**(38)**
CLAYS	**226,754**	**98,677**	**-128,077**	**(56)**
COAL	**13,339,498**	**13,891,849**	**552,351**	**4**
CONSTRUCTION MATERIALS				
Aggregate	65,610	118,276	52,666	80
Gravel	50,683	85,583	34,900	69
Rock	133,418	91,250	-42,168	(32)
Sand	480,626	594,599	113,973	24
TOTAL CONSTRUCTION MATERIALS	**730,337**	**889,708**	**159,371**	**22**
DIAMOND	**45,192,711**	**53,713,094**	**8,520,383**	**19**
DIMENSION STONE	**477**	**5,002**	**4,525**	**949**
GEM & SEMI-PRECIOUS STONE	**1,610**	**4,050**	**2,440**	**152**
GOLD	**9,270,938**	**35,152,990**	**25,882,052**	**279**
GYPSUM	**376,626**	**491,219**	**114,593**	**30**
HEAVY MINERAL SANDS				
Garnet	647,689	690,440	42,751	7
Ilmenite	9,461,924	8,651,767	-810,157	(9)
Leucoxene	512,940	150,079	-362,861	(71)
Rutile	3,970,639	3,768,604	-202,035	(5)
Zircon	7,838,210	6,857,020	-981,190	(13)
TOTAL HEAVY MINERAL SANDS	**22,431,401**	**20,117,910**	**-2,313,491**	**(10)**
INDUSTRIAL PEGMATITE MINERALS				
Feldspar	89,593	351	-89,242	(100)
IRON ORE	**235,063,436**	**204,971,947**	**-30,091,489**	**(13)**
LIMESAND-LIMESTONE-DOLOMITE				
Dolomite	1,087	926	-161	(15)
Limesand-Limestone	636,869	1,211,764	574,895	90
TOTAL LIMESAND-LIMESTONE-DOLOMITE	**637,957**	**1,212,690**	**574,733**	**90**

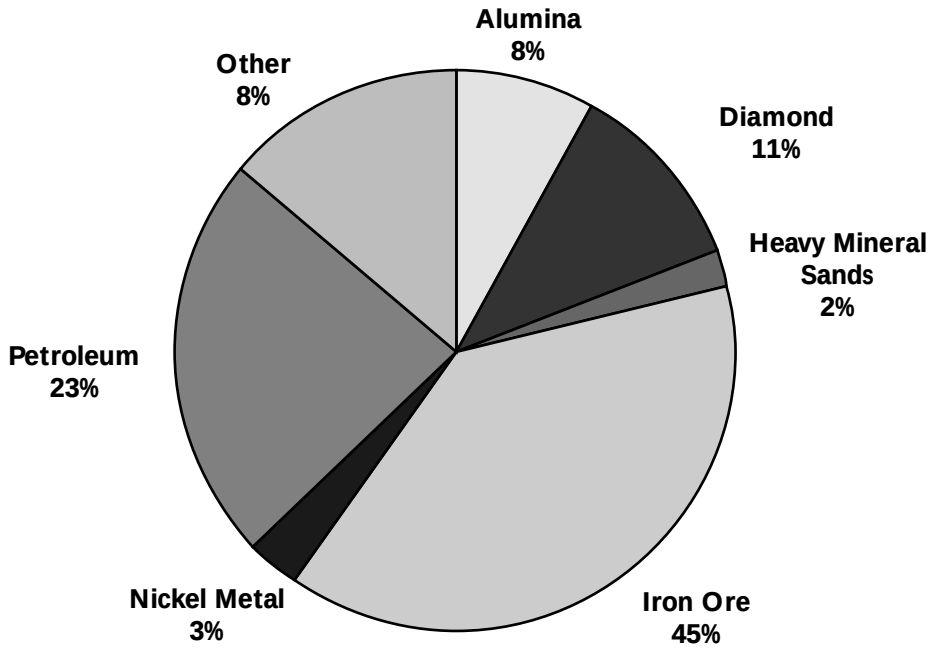
TABLE 4 (cont.) **ROYALTY RECEIPTS 1998, 1999**

COMMODITY/Mineral	1998 Total $A	1999 Total $A	1999 Growth $A	1999 Growth %
MANGANESE	**1,176,647**	**646,167**	**-530,480**	**(45)**
NICKEL INDUSTRY				
Cobalt by-product	1,810,637	694,807	-1,115,830	(62)
Nickel	24,603,510	20,268,521	-4,334,989	(18)
Palladium by-product	184,818	215,079	30,261	16
Platinum by-product	94,660	85,731	-8,929	(9)
TOTAL NICKEL INDUSTRY	**26,693,625**	**21,264,138**	**-5,429,487**	**(20)**
PETROLEUM				
Condensate	53,529,490	44,674,729	-8,854,761	(17)
Liquified Natural Gas	88,846,086	71,228,740	-17,617,346	(20)
LPG - Butane	4,412,447	5,545,007	1,132,560	26
LPG - Propane	3,251,059	3,871,295	620,236	19
Natural gas	26,284,039	26,062,759	-221,280	(1)
Oil	52,451,819	38,745,701	-13,706,118	(26)
TOTAL PETROLEUM	**228,774,940**	**190,128,231**	**-38,646,709**	**(17)**
PIGMENTS				
Red oxide	65,645	3,144	-62,501	(95)
SALT	**1,933,821**	**2,139,776**	**205,955**	**11**
SILICA SAND	**337,193**	**280,571**	**-56,622**	**(17)**
SILVER	**366,831**	**350,754**	**-16,077**	**(4)**
SPONGOLITE	**90,624**	**25,388**	**-65,236**	**(72)**
TALC	**107,549**	**54,776**	**-52,773**	**(49)**
TIN-TANTALUM-LITHIUM				
Spodumene	521,677	533,659	11,982	2
Tantalite	1,295,490	1,662,750	367,260	28
Tin	110,504	107,326	-3,178	(3)
TOTAL TIN-TANTALUM-LITHIUM	**1,927,671**	**2,303,735**	**376,064**	**20**
TOTAL REVENUE	**636,284,639**	**599,767,675**	**-36,516,964**	**(6)**

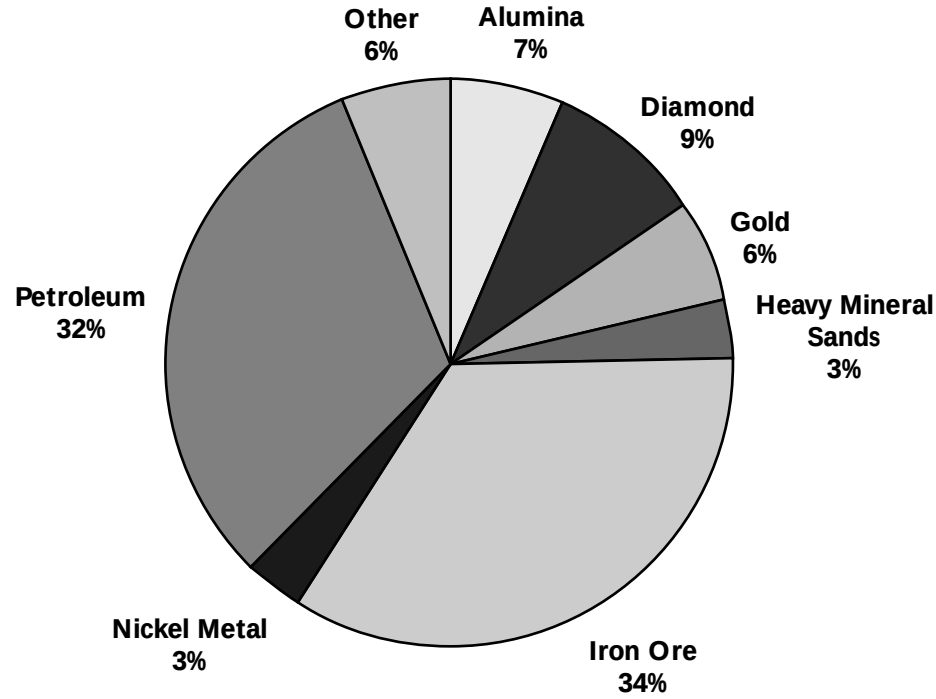
Note: All Royalty Receipts above are only those paid to the Consolidated Revenue Fund

5 YEAR ROYALTY COMPARISON

1994 Total : A$362.36 million



1999 Total : A$599.77 million



Source: DME

Figure 0.2

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

MINERAL/Company	Operating Site	1998	1999
BASE METALS			
Normandy Mining Ltd	Scuddles	361	376
Straits Resources Ltd	Nifty	281	296
Western Metals Ltd	Pillara	568	533
TOTAL BASE METALS		**1,210**	**1,205**
BAUXITE - ALUMINA			
Alcoa of Australia Ltd	Huntly	410	471
	Jarrahdale	186	79
	Kwinana Alumina Refinery	1,416	1,393
	Pinjarra Refinery	1,430	1,476
	Wagerup Alumina Refinery	1,255	1,145
	Willowdale	182	241
Australian Fused Materials Pty Ltd	Rockingham Fused Alumina Plant	75	67
Worsley Alumina Pty Ltd	Worsley - includes Mt Saddleback	170	191
	Worsley Refinery	1,594	2,542
TOTAL BAUXITE - ALUMINA		**6,718**	**7,605**
COAL			
Griffin Coal Mining Co. Pty Ltd	Muja	344	341
Wesfarmers Coal Ltd	Premier/WCL	349	355
TOTAL COAL		**693**	**696**
DIAMOND			
Argyle Diamond Mines Pty Ltd	Lake Argyle	900	800 (e)
GOLD			
Australian Resources Pty Ltd	Gidgee	170	35
	Mt McLure	158	103
Australian Gold Fields NL	Bannockburn	2	0
Australian Gold Resources Ltd	Perth Mint	66	72
Barminco Pty Ltd	Jenny Wren	0	25
Border Gold NL	Karonie	13	0
Camelot Resources NL	Tarmoola	321	280
Centaur Mining & Exploration Ltd	Mt Pleasant	497	390
	Ora Banda	0	1
Central Norseman Group	Norseman	266	254
Como Engineers	O'Conner - Carbon Stripping Plant	3	4
Consolidated Gold NL	Bardoc - Davyhurst	55	39
Croesus Mining NL	Binduli	56	56
Dalrymple Resources NL	Sandstone	0	39
Delta Gold NL	Golden Feather Group	226	149
Equigold NL	Dalgaranga	135	148
Goldfields Kalgoorlie Ltd	Kundana	262	245
	Paddington	216	237
Golden West Refining Corporation Ltd	Kewdale - Golden West Refinery	26	23
Great Central Mines NL	Bronzewing	223	232
	Jundee-Nimary	542	531
	Wiluna	368	376
Hedges Gold Pty Ltd	Hedges	67	22
Herald Resources Ltd	Sandstone	33	0
	Three Mile Hill	63	61
Hill 50 Gold NL	Hill 50	314	395
	Mt Magnet	0	213
Homestake Mining Company	Darlot	482	368
	Lawlers	194	205
	Plutonic	382	385

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

MINERAL/Company	Operating Site	1998	1999
Gold Continued			
Kalgoorlie Consolidated Gold Mines Pty Ltd	Golden Mile - Super Pit	1,228	1,089
Lionore Australia Pty Ltd	Bounty	262	222
Lynas Gold NL	Mt Olympus	34	44
Morning Star Mines NL	Hannan South	17	18
Mount Mine Joint Venture	Mount Group	3	3
New Hampton Goldfields NL	Dawns Hope	245	228
	Jubilee	0	218
Newcrest Mining Ltd	New Celebration	206	251
	Telfer	609	605
Normandy Mining Ltd	Big Bell	397	374
	Kaltails	107	65
North Gold (WA) Ltd	Kanowna Belle	360	392
	Peak Hill	35	44
Perilya Mines NL	Fortnum	85	98
Placer Dome Inc	Granny Smith	328	397
Resolute Ltd	Chalice	113	79
	Higginsville	0	37
Sons of Gwalia NL	Barnicoat	0	31
	Copperhead	56	60
	Cornishman	75	60
	Golden Pig and Frasers	49	58
	Marvel Loch	216	310
	Ruapehu	0	13
	Sons of Gwalia	234	213
	Yilgarn Star	170	178
St. Barbara Mines Ltd	Bluebird	134	90
Stockdale Prospecting Ltd	Sunrise Dam	125	212
WMC Resources Ltd	Emu	588	588
	Kambalda/St. Ives	756	865
Worsley Alumina Pty Ltd	Boddington	573	569
TOTAL GOLD		**12,145**	**12,299**
HEAVY MINERAL SANDS			
BHP Titanium Minerals Pty Ltd	Beenup	184	39
Cable Sands Pty Ltd	Bunbury	339	339
GMA Garnet Pty Ltd	Narngulu Garnet Plant	23	23
	Port Gregory - Hutt Laggoon	22	15
Hanwah Advanced Ceramics Australia Pty Ltd	Rockingham Zirconia Plant	19	19
Iluka Resources Limited	Capel	695	613
	Eneabba	0	345
	Narngulu Synthetic Rutile Plants	162	196
	Narngulu Dry Plant	61	63
TiWest Pty Ltd	Chandala-Muchea	200	207
	Cooljarloo	258	288
TOTAL HEAVY MINERAL SANDS		**1,963**	**2,147**
IRON ORE			
BHP Iron Ore (Goldsworthy) Ltd	Finucane Island	281	248
	Yarrie	274	189
BHP Iron Ore (Jimblebar) Ltd	Jimblebar	151	104
BHP Iron Ore Ltd	Mt Newman Railway	539	457
	Mt Whaleback	1,390	1,185
	Nelson Point	918	773
	Orebody 25	116	99

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

MINERAL/Company	Operating Site	1998	1999
Iron Ore Continued			
	Port Hedland HBI Plant	0	686
	Yandi	238	269
Hamersley Iron Pty Ltd	Brockman No. 2 Detritals Group	155	175
	Dampier Port Operations	610	839
	Hismelt/Kwinana	114	98
	Marandoo	161	184
	Paraburdoo/Channar	574	623
	Hamersley Railway	305	326
	Tom Price	954	858
	Yandicoogina	0	176
Koolyanobbing Iron Pty Ltd	Cockatoo Island	13	30
	Koolyanobbing	25	28
Robe River Mining Co. Pty Ltd	Cape Lambert	576	433
	Pannawonica Deepdale	417	301
	Robe River Railway	100	103
TOTAL IRON ORE		**7,911**	**8,184**
NICKEL			
Anaconda Nickel Ltd	Murrin Murrin Plant	1,293	433
Murrin Murrin Operations	Murrin Murrin	463	810
Centaur Mining & Exploration	Cawse	210	288
Outokumpu Mining Australia Pty Ltd	Black Swan	121	182
	Forrestania	161	106
Preston Resources Ltd	Bulong	241	253
Titan Resources NL	Radio Hill	51	77
Western Mining Corporation Ltd	Kalgoorlie Nickel Smelter	460	708
	Kambalda/Blair	684	428
	Kwinana Refinery	322	407
	Leinster	721	755
	Mt Keith	978	772
TOTAL NICKEL		**5,705**	**5,219**
PETROLEUM PRODUCTS			
Apache Energy Ltd	Campbell, Agincourt, East Spar, Harriet, Rosette, Sinbad, Tanami, Stag, Chervil, North Herald, South Pepper, Airlie Island	151	153
ARC	Dongara	6	6
BHP Petroleum (Australia) Pty Ltd	Griffin	71	66
	Tubridgi	28	27
Boral	Beharra Springs, Tubridgi	12	10
Kimberley Oil	Blina, Boundary, Lloyd, Sundown, West Terrace	4	4
Mobil Exploration & Producing Australia Pty Ltd	Wandoo	36	34
Phoenix	Woodada	12	8
Premier Oil Australia Pty Ltd	Mt Horner	7	7
Chevron Australia Pty Ltd	Barrow Island, Cowle, Crest, Roller-Skate, Saladin, Yammaderry	202	202
Woodside Energy Ltd	Cossack, Goodwyn, Hermes, North Rankin, Wanaea	1,291	1,311
TOTAL PETROLEUM PRODUCTS		**1,820**	**1,828**

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

MINERAL/Company	Operating Site	1998	1999
SALT			
Cargill Salt Co.	Port Hedland	112	110
Dampier Salt Ltd	Dampier	212	249
	Lake MacLeod	163	177
Onslow Solar Salt Pty Ltd	Onslow	117	140
Shark Bay Salt JV	Useless Loop	73	80
TOTAL SALT		**677**	**756**
TOTAL CLAYS		**55**	**55**
TOTAL CONSTRUCTION MATERIALS		**347**	**326**
TOTAL DIMENSION STONE		**30**	**72**
TOTAL INDUSTRIAL PEGMATITE MINERALS		**30**	**30**
TOTAL LIMESTONE - LIMESAND		**156**	**176**
TOTAL MANGANESE ORE		**6**	**45**
TOTAL PHOSPHATE		**186**	**187**
TOTAL SILICA - SILICA SAND		**207**	**218**
TOTAL TALC		**37**	**89**
TOTAL TIN - TANTALUM		**255**	**310**
TOTAL VANADIUM		**0**	**391**
ALL OTHER MATERIALS		**148**	**103**
TOTAL		**41,199**	**42,741 (e)**

(SOURCE:AXTAT REPORTING SYSTEM, MINING OPERATIONS DIVISION - 1999 ESTIMATE ONLY)

TABLE 6 **PRINCIPAL MINERALS AND PETROLEUM PRODUCERS 1999**

BASE METALS

Copper

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

Newcrest Mining Ltd, Level 2, 30 Terrace Road, East Perth WA 6004 (08) 9270 7070, Telfer, http://www.newcrest.com.au

Straits Resources Ltd, 33 Colin Street, West Perth WA 6005 (08) 9322 9200, Nifty, http://www.straits.com.au

WMC Ltd, 250 St George's 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, Golden Grove, 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 of Australia (WA) Ltd, cnr Davey and Marmion Streets, Booragoon WA 6154, (08) 9316 5111, Del Park, Jarrahdale, Willowdale, Huntly, http://www.alcoa.com/business/units/australia.asp

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

CHROMITE

Chromite Ore

Danelagh Resources Pty Ltd, 32 Kings Park Road, West Perth WA 6005, (08) 9486 7640: Coobina.

CLAY

Attapulgite

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

Clay Shale

Griffin Coal Mining Co. Ltd, 28 The Esplanade, Perth WA 6000, (08) 9261 2800: Collie.

Fire Clay

Midland Brick Co. Pty Ltd, Bassett Road, Middle Swan WA 6056, (08) 9273 5522: Bullsbrook.

Kaolin

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

COAL

Griffin Coal Mining Co. Ltd, 28 The Esplanade, Perth WA 6000, (08) 9261 2800: Collie.

Wesfarmers Coal Ltd, 276 Leach Highway, Myaree WA 6153, (08) 9333 0391: Collie.

CONSTRUCTION MATERIALS

Aggregate

The Readymix Group (WA), 75 Canning Highway, Victoria Park WA 6100, (08) 9212 2000: Boodarrie, Burrup-Dampier.

Gravel

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, Maitland River, Nickol Bay, Gnarlbine, http://www.boral.com.au

Rocla Quarry Products, 1 Newburn Road, Kewdale WA 6105, (08) 9353 3030: Gnangarra.

Scorpion Mining Pty Ltd, P O Box 10047, Kalgoorlie, WA 6433, (08) 9091 3586: Cawse, Coolgardie.

The Readymix Group (WA), 75 Canning Highway, Victoria Park WA 6100, (08) 9212 2000: Comet Vale, Maitland River, Pinnacles, Sandy Creek, Sandy Hill, Sullivan's Creek, Turner River, Widgiemooltha.

DIAMOND

Argyle Diamond Mines, 2 Kings Park Road, West Perth WA 6005, (08) 9482 1166, Argyle, http://www.ashton.net.au/argyle/index.html

TABLE 6 (cont.) **PRINCIPAL MINERALS AND PETROLEUM PRODUCERS 1999**

DIMENSION STONE

Granite

Fraser Range Holdings Ltd, Level 1, 220 St George's Terrace, Perth WA 6000, (08) 9322 9044: Drydens Find Granite, Mungari Granite.

Jasper

J.Van Uden, PO Box 723, Port Hedland, WA, 6721, (08) 9173 3375, Ord River.

GOLD

Acacia Resources Ltd, 60 City Road, South Melbourne VIC 3006, (03) 9684 4999, Sunrise Dam, http://www.acacia.com.au

Australian Resources Ltd, 100 Williams Street, East Sydney NSW 2001, (02) 9326 9277: Gidgee, Mt McClure.

Centaur Mining & Exploration Ltd, 210 Kings Way, South Melbourne VIC 3205, (03) 9234 1122,

Mt Pleasant-Golden Kilometre, http://www.cme.com.au

Central Norseman Gold Corp. NL, Level 37, 250 St George's 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, http://www.croesus.com.au

Delta Gold NL, 99 Walker Street, North Sydney NSW 2060, (02) 9903 4000, Golden Feather, http://www.deltagold.com.au

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

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

Great Central Mines NL, 210 Kings Way, Sth Melbourne VIC 3205, (03) 9234 1111, Bronzewing, Jundee-Nimary, Wiluna, http://www.gcm.com.au

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 6430, (08) 9022 1100, Golden Mile, http://www.kalgold.com.au

LionOre Australia Pty Ltd, Level 2, 10 Ord Street, West Perth WA 6005, (08) 9481 5656: Bounty.

Lynas Gold NL, 50 Colin Street, West Perth WA 6005, (08) 9481 3400, Paraburdoo, http://www.lynasgold.com.au

Newcrest Mining Ltd, Level 2, 30 Terrace Road, East Perth WA 6004, (08) 9270 7070, New Celebration, Telfer, http://www.newcrest.com.au

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

Normandy Mining Ltd, 100 Hutt Street, Adelaide SA 5000, (08) 8303 1700, Big Bell, http://www.normandy.com.au

North Ltd, 476 St Kilda Road, Melbourne VIC 3004, (03) 9207 5111, Kanowna Belle, Peak Hill, http://www.north.com.au

Pacific Mining Corporation Ltd, 35 Ventnor Avenue, West Perth WA 6005, (08) 9321 0616: Tarmoola.

Perilya Mines NL, 31 Ventnor Avenue, West Perth WA 6005, (08) 9423 1700, Fortnum, http://www.perilya.com.au

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

Resolute Ltd, 28 The Esplanade, Perth WA 6000, (08) 9261 6100, Chalice, http://www.resolute-ltd.com.au

Sons of Gwalia NL, 16 Parliament Place, West Perth WA 6005, (08) 9263 5555, Bullfinch, Marvel Loch-Southern Cross, Sons of Gwalia, Yilgarn Star, http://www.sog.com.au

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

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

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

TABLE 6 (cont.) **PRINCIPAL MINERALS AND PETROLEUM PRODUCERS 1999**

GYPSUM

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

Swan Cement Ltd, PO Box 528, Kwinana WA 6966, (08) 9499 2222: Lake Hillman.

Westdeen Holdings Pty Ltd, 7 Armstrong Road, Applecross WA 6153 (08) 9364 4951: Lake Cowcowing.

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

BHP Titanium Minerals Pty Ltd, PO Box 22, Karridale WA 6288, (08) 9758 2500, Beenup, http://www.bhp.com.au

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

Iluka Resources Ltd, Private Mail Bag 5010, Geraldton WA 6530, (08) 9956 8444: 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 George's Terrace, Perth WA 6000, (08) 9320 4444, Nimingarra-Yarrie, http://www.bhp.com.au

BHP Iron Ore Ltd, 200 St George's Terrace, Perth WA 6000, (08) 9320 4444, Newman, Yandicoogina, http://www.bhp.com.au

Channar Mining Pty Ltd, 152 St George's Tce, Perth WA 6000, (08) 9327 2327: Channar.

Hamersley Iron Pty Ltd, 152 St George's Terrace, Perth WA 6000, (08) 9327 2327: Brockman, Marandoo, Paraburdoo, Tom Price, Yandicoogina.

Koolyanobbing Iron Pty Ltd, 1 William Street, Perth WA 6000, (08) 9426 3388: Cockatoo Island, Koolyanobbing.

Robe River Iron Associates, 12 St George's Terrace, Perth WA 6000, (08) 9421 4747: Pannawonica.

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, Yanchep.

Westlime (WA) Ltd, PO Box 442, Dongara WA 6525, (08) 9927 2475: Dongara.

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.

Black Swan Nickel Pty Ltd, Locked Bag 50, Kalgoorlie Business Centre, Kalgoorlie WA 6430 (08) 9024 0240: Black Swan, Silver Swan.

Centaur Mining and Exploration Ltd, 23 Ventnor Avenue West Perth WA 6005, (08) 9481 7777, Cawse, http://www.cme.com.au

Outokumpu Australia Pty Ltd, 141 Burswood Road, Burswood WA 6100, (08) 9334 7333, Black Swan, Silver 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

TABLE 6 (cont.) **PRINCIPAL MINERALS AND PETROLEUM PRODUCERS 1999**

WMC Ltd, 250 St George's Terrace, Perth WA 6000, (08) 9442 2000, Kambalda, Leinster, Mt Keith, http://www.wmc.com.au

PALLADIUM

WMC Ltd, 250 St George's Terrace, Perth WA 6000, (08) 9442 2000, Kambalda, http://www.wmc.com.au

PETROLEUM

Apache Energy Ltd, Level 3, 256 St George's Terrace, Perth WA 6000, (08) 9422 7222: East Spar, Harriet, Stag, Airlie Island, Campbell, Agincourt, Rosette, Sinbad, Tanami, Chervil, North Herald, South Pepper.

ARC Energy NL, 35 Ventnor Avenue, West Perth WA 6005, (08) 9486 7333, Dongara, http://www.arcenergy.com.au

BHP Petroleum Pty Ltd, Central Park, 152-158 St George's Terrace, Perth WA 6000, (08) 9278 4888, Griffin, http://www.bhp.com.au

Boral Energy Resources Ltd, 339 Coronation Drive, Milton QLD 4064, (07) 3858 0600, Beharra Springs, Tubridgi, http://www.boral.com.au

Chevron Australia Pty Ltd, Level 24, QV1 Building, 250 St George's Terrace, Perth WA 6000, (08) 9261 4000: Barrow Island, Crest, Roller-Skate, Saladin, Cowle, Yammaderry.

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

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

Phoenix Energy Pty Ltd, 10th Floor, The Griffin Centre, 28 The Esplanade, Perth WA 6000, (08) 9261 2800: Woodada.

Premier Oil Australia Pty Ltd, Level 3, 31 Ventnor Avenue, West Perth 6005, (08) 9480 4100: Mt Horner.

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

PLATINUM

WMC Ltd, 250 St George's 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 George's Terrace, Perth WA 6000, (08) 9327 2257, Dampier, Lake MacLeod, http://www.dampiersalt.com.au

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 Newburn Road, Kewdale WA 6105, (08) 9353 3030: Gnangarra.

The Readymix Group (WA), 75 Canning Highway, Victoria Park WA 6100, (08) 9212 2000: Jandakot.

TT Sand Pty Ltd, 55 St George's Tce, Perth WA 6000, (08) 9221 2304: Mindijup.

SPONGOLITE

Supersorb Minerals NL, 55 Collie Street, Albany WA 6330, (08) 9842 1955: Woogenellup.

TALC

Commercial Minerals Ltd, 26 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

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
A$	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		

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 (lbs)
	1 tonne	(t)	= 1.10231 United States short ton [1 US short ton =2,000 lbs]
	1 tonne	(t)	= 0.98421 United Kingdom long ton [1 UK long ton = 2,240 lbs]
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

Coal	19.7 GJ/t
Condensate	32.0 MJ/L
Crude oil	37.0 MJ/L
LNG	25.0 MJ/L
Natural gas	38.2 MJ/m^3
LPG-butane	28.7 MJ/L (1tonne LPG-butane = 1,720 litres)
LPG-propane	25.4 MJ/L (1tonne LPG-propane = 1,960 litres)

Prefix

kilo (k)	10^3
mega (M)	10^6
giga (G)	10^9
tera (T)	10^{12}
peta (P)	10^{15}

LOCAL GOVERNMENT BOUNDARIES

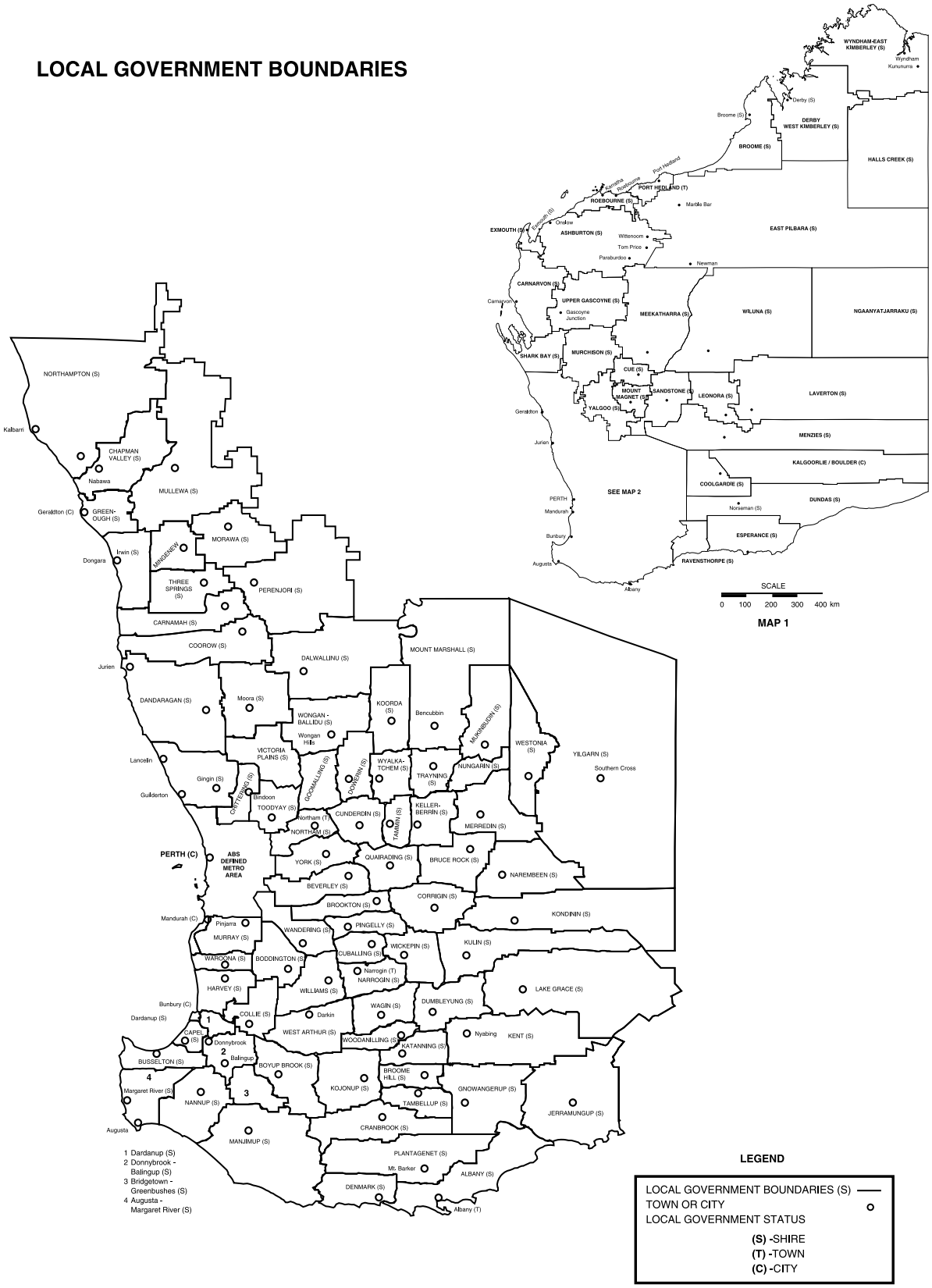


Figure 0.3

MAJOR MINERAL AND PETROLEUM PROJECTS IN WESTERN AUSTRALIA

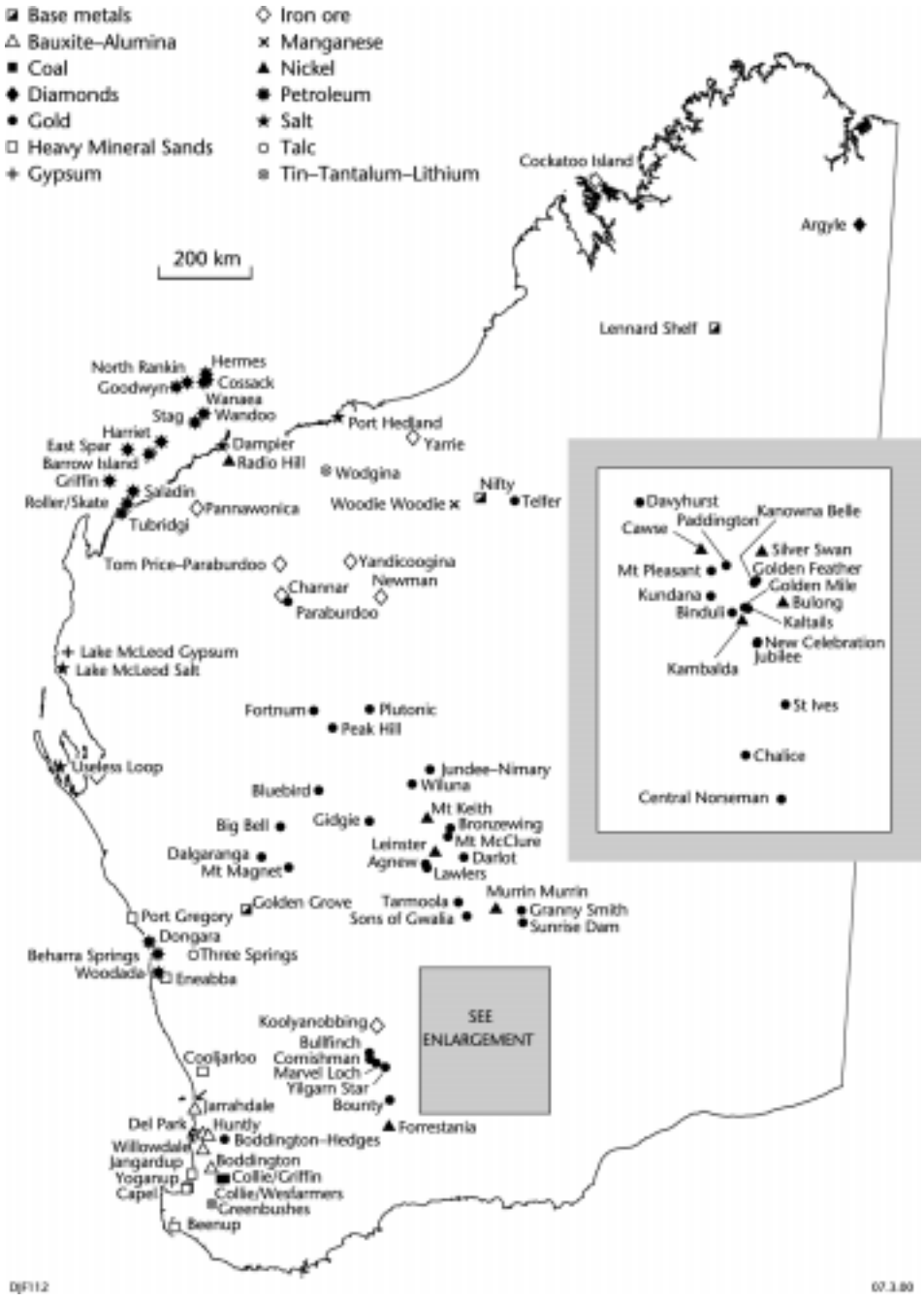


Figure 0.4

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www.dme.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

DEPARTMENT OF
MINERALS AND ENERGY
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