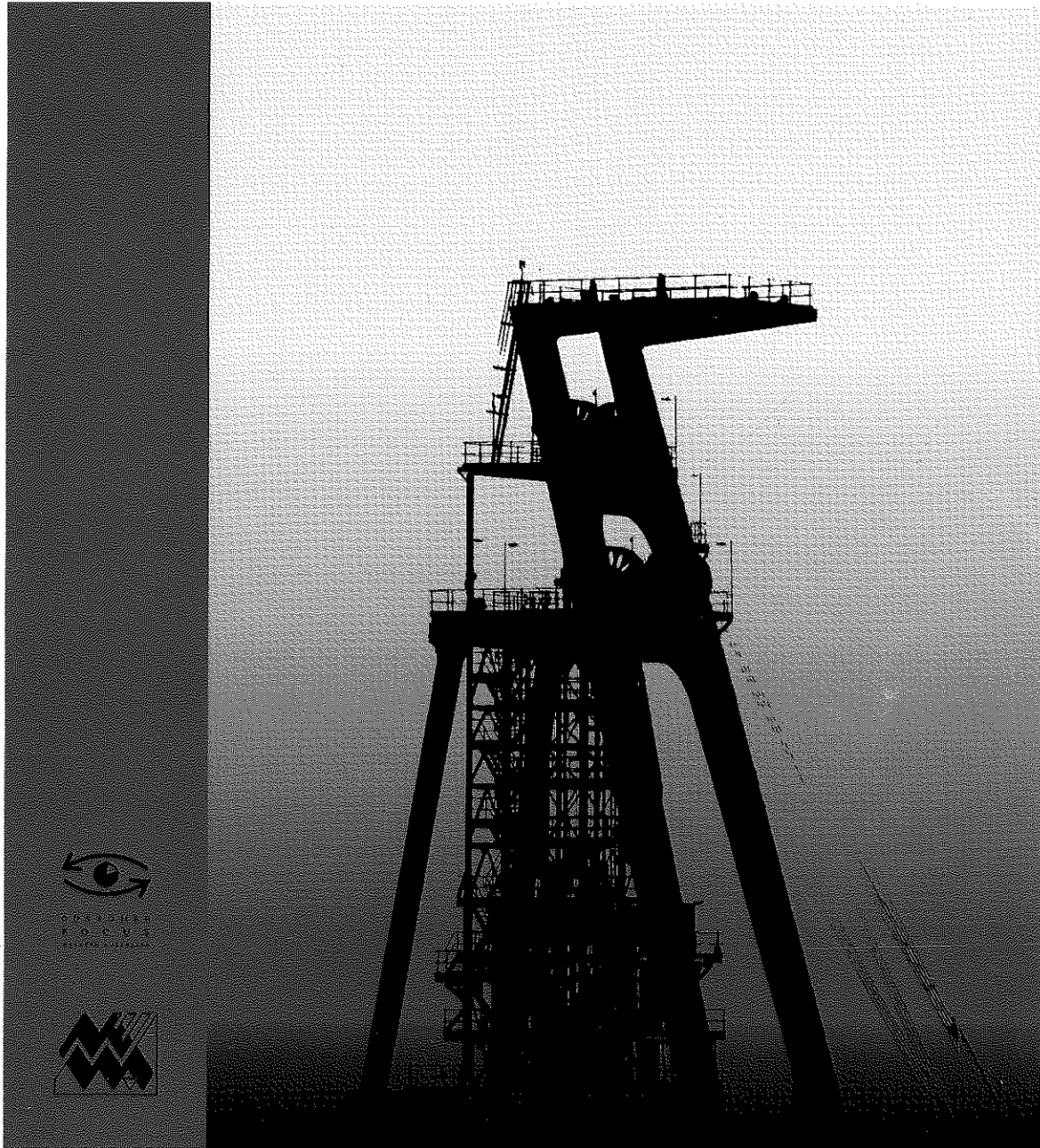


1994

MINERAL AND PETROLEUM PRODUCTION

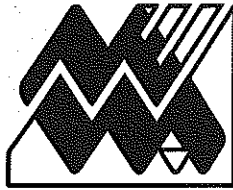
STATISTICS DIGEST



Policy and Planning Division

DEPARTMENT OF MINERALS AND ENERGY

WESTERN AUSTRALIA



DEPARTMENT OF
MINERALS AND ENERGY
WESTERN AUSTRALIA

**DIGEST OF MINERAL AND
PETROLEUM STATISTICS
1994**

The purpose of this Digest is to show the significance of mineral and petroleum production in the economy of Western Australia, and the interaction of the industry with the global economy.

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JULY 1995



FOREWORD

Welcome to the 1994 issue of the Mineral and Petroleum Statistics Digest. This Digest contains the most comprehensive statistical information available on the West Australian mining industry.

The statistics on mineral and petroleum exports were assembled by the Department of Minerals and Energy with input from the Australian Bureau of Statistics and resource companies. I would particularly like to thank all producers for their contribution to the Digest, as it would be impossible to publish such a comprehensive document without their help.

The previous issue of the Digest included a survey canvassing readers' views on the publication. I am pleased to say that there was a strong and overwhelmingly positive response, demonstrating that readers find the Digest useful and are happy with its content and format.

Not surprisingly however, it is apparent that you would like to receive the Digest as soon as possible after the calendar or financial year has ended. Unfortunately, the speed at which the Digest can be produced is determined by the final collection of statistics from our large and diverse industry. Nevertheless, we endeavour to complete the Digest as soon as possible. In this issue, you will find that timeliness was addressed by giving increased emphasis in the narrative to up-to-date events, rather than a historical look at the period covered by the statistics (which only relate to the 1994 calendar year).

To increase customer satisfaction, the text presentation was enhanced to improve readability, and an executive summary is included.

The Digest plays an important role in the mining industry and is used by companies and Government to assist in the making of their management and investment decisions. I am confident the Digest will continue to improve and incorporate new ideas in future issues to ensure its readers get the information they require. We would like to hear from you with suggestions on how we can further improve our service and this publication.

K R Perry
DIRECTOR GENERAL

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ABBREVIATIONS, REFERENCES, UNITS AND CONVERSION FACTORS

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

ABBREVIATIONS

cons	concentrates	f.o.t.	free on truck
f.o.b.	free on board	n.a.	not available
f.o.r.	free on rail	n.ap.	not applicable
\$A	Australian Dollar	\$US	United States Dollar
ABS	Australian Bureau of Statistics	LME	London Metals Exchange
AFR	<i>Australian Financial Review</i>	BMR	Bureau of Mineral Resources
ABARE	Australian Bureau of Agricultural and Resource Economics		

REFERENCES

- N.A. Not available for publication.
- (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) Value at works.
 - (e) Estimated ex-mine value.
 - (f) Value based on monthly production and average gold price of that month as supplied by Gold Corp.
 - (g) Estimated f.o.t value.
 - (h) Estimated f.o.r value.
 - (i) Estimated f.o.b value based on the current price of nickel containing products.
 - (j) Delivered value.
 - (k) Metallic by-product of copper 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)	= 2.20462 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 kilolitre	(kl)	= 1 cubic metre (m ³)
	1 cubic metre	(m ³)	= 35.3147 cubic feet (ft ³)
Energy	1 kilojoule	(kJ)	= 0.94781 British Thermal Units (Btu)
	1 gigajoule	(GJ)	= 0.94781 million British Thermal Units (MBtu)
	1 petajoule	(PJ)	= 0.94781 million million British Thermal Units (MMBtu)

Prefix:	kilo (k)	10 ³
	mega (M)	10 ⁶
	giga (G)	10 ⁹
	tera (T)	10 ¹²
	peta (P)	10 ¹⁵

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EXECUTIVE SUMMARY

1. OVERVIEW**1.1 Review of the World Economy**

- In terms of value, more than 82% of all minerals and petroleum produced in WA was exported overseas
- The world economy moved out of recession in 1994
- Overall, the outlook for the international economy is positive
- The US economy exhibited clear signs of strength throughout 1994
- The Japanese economy continues to stall
- Prolonged strength of the yen may cause some Japanese exporters to shift their manufacturing activities offshore
- A recovery in most Western European economies occurred during 1994
- The continuing reforms in the CIS and South Africa resulted in another subdued economic year for these countries
- Germany showed signs that it was recovering from the prolonged effects of unification
- However, as with Japan, a strong German currency has the potential to hinder further expansion
- The United Kingdom enjoyed a well balanced recovery
- Strong economic growth in Asian countries supports a positive outlook for WA's mining sector
- Importantly, commentators have noticed a shift in the growth process in many Asian countries
- The Chinese economy grew at a rapid 11.8% in 1994
- Singapore's rate of economic growth fell during 1994 to about 10%
- During 1994 the South Korean economy recovered from a slump
- Indonesia experienced strong export growth, which stimulated general economic growth
- Thailand has experienced substantial growth over recent years
- The Vietnamese economy continued its frenzied growth
- The Indian Government targeted poverty and unemployment by encouraging economic growth

1.2 Review of the Western Australian and National Economies

- Economic growth in WA was a very strong 7.6% in 1994
- WA's foreign trade surplus for 1994 was 8.9% higher than for 1993
- The national economy grew strongly in 1994 at a real rate of 4.9%
- However, a widening of the current account deficit did eventuate
- Underlying inflation remained at around 2%
- Business investment eventually increased by 20% in real terms during 1994

1.3 Economic Factors Affecting the Mining Industry

- The large rise in the value of the A\$ against the US\$
- The resurgence of the world economy was generally welcomed by the mining industry
- Differing views within the Asia-Pacific Economic Co-operation forum (APEC) arose during 1994, signalling the possibility of difficult trade conditions ahead
- The World Trade Organisation (WTO) came into operation on 1 January 1995
- Financial markets were sent into a spin
- Australia's continued low inflation rate boosted the mining industry
- A number of Federal fiscal initiatives could have an adverse impact on the mining industry
- The WA Government's reform of the gas market has impacted positively on the mining industry

1.4 Social and Political Factors Affecting the Mining Industry

- Undoubtedly the most pressing non-economic factor affecting the mining industry is the native title issue
- The High Court decided in March 1995 that the Federal Native Title Act was valid
- The issuing of Miners' Rights was suspended between 16 March and 1 May, 1995
- The offshore area under Australian jurisdiction increased
- The Commonwealth Government continued to expand its influence in the environmental arena

EXECUTIVE SUMMARY

2. REVIEW OF MAJOR MINERALS AND PETROLEUM

2.1 Overview and Outlook

- The value of mining and petroleum production increased by 3.8% in 1994 to reach A\$12.9 billion
- In US\$ terms, average price increases were recorded for gold, iron ore, aluminium, LNG, nickel, ilmenite, rutile, zircon, lead, zinc, and copper
- Much of the gains in prices last year were countered by the stronger Australian dollar
- The State's energy market changed dramatically over the course of 1994
- Difficult conditions in the diamond market
- The outlook for WA's resources sector in 1995 is positive
- WA's mineral exploration expenditure in 1994 increased by 20%
- Gold continued to dominate exploration expenditure

2.2 Gold

- Production increased by 4.7%
- The value of gold production increased by 3.6%
- The 11 biggest producing gold projects accounted for half the State's production
- WA's gold exports amounted to over A\$2.8 billion
- Australia's gold exports increased by 21%
- The gold price remained steady
- The movement of the gold price caused major variations in world supply
- A positive outlook for the gold market
- Significant announcements were made by local producers
- Production commenced at the Youanmi Deeps underground project
- The trend for companies to increase viable reserves and reduce input costs has resulted in a number of changes in WA's gold industry:
 - An increase in underground mining
 - More refractory ore being processed
 - New exploration techniques

- The Yandal greenstone belt becoming a focus of attention
- Cheaper energy sources for the Goldfields
- The outlook for WA's gold industry is generally positive

2.3 Iron Ore

- Production increased by 7%
- Value of production decreased by over 12%
- Japanese steel mills continued to dominate WA exports
- Price increases were negotiated for the year starting 1 April, 1995
- Steel production capacity continued to shift away from Western industrialised countries
- World crude steel production has been forecast to rise
- Major growth in steel consumption over the next decade is expected in Asia
- A focus on customer specifications by local producers
- The deregulation of the gas market had a major impact on the viability of further iron ore processing
- Projects under consideration include:
 - BHP's A\$750 million direct reduced iron (DRI) plant
 - Re-opening of Robe River Iron's pellet plant
 - Mineralogy group's DRI plant
 - Compact Steel's steel plant
 - Kingstream's Midwest iron and steel project
 - A A\$1 billion iron ore enrichment plant
- Iron ore output is expected to grow in 1995
- The A\$362 million Marandoo mine officially opened
- Production also commenced from the Koolyanobbing and Cockatoo Island projects
- Hamersley Iron's Paraburdoo fines ore treatment plant is expected to start in 1995
- During 1994 Hamersley Iron also continued to test its new Hismelt technology
- BHP Steel, however, closed its Kwinana steel rolling mill

EXECUTIVE SUMMARY

2.4 Petroleum

- Total value of all petroleum production increased by 27%
- A massive 116% increase in oil production occurred
- LNG production increased by 27%
- The total value of WA's petroleum exports amounted to A\$2,150 million
- World oil production increased
- Non-OPEC (Organisation of Petroleum Exporting Countries) producers supplied nearly 70% of the additional production
- In \$A terms, the average monthly oil price reached a three-year low early in 1994
- OPEC nations have wielded less influence on price
- A new higher price for Liquefied Natural Gas (LNG) was negotiated for the North West Shelf (NWS) project
- Oil and condensate produced from the NWS region will soon overtake that of Bass Strait in Victoria
- Deregulation of the domestic gas market has stimulated activity in WA's gas industry
- The Goldfields' Gas Transmission line has resulted in the linking of mineral and gas ventures
- First specification gas was delivered from the A\$600 million Griffin project
- The commissioning of the Goodwyn A project occurred in February 1995
- Development of the Cossack-Wanaea oil fields is ahead of schedule
- Increased production from the Wandoo oil field is expected in 1995
- Production of Liquefied Petroleum Gas (LPG) from the NWS is due to start in 1995
- Expansions to natural gas reserves at the NWS project occurred in early 1995
- The Perseus gas field was a significant find in 1994
- Another major gas field (Chrysaor) was found
- WA could become a major player in the LNG market
- Improvements in exploration and drilling techniques
- The latest discoveries in the north of WA are promising

2.5 Alumina

- Production of alumina increased by 1.7%
- Value of production fell by 10%
- WA exported about 85% of its alumina production
- A sustained increase in aluminium prices occurred in 1994
- A draw down in aluminium stocks also occurred
- Early in 1995 aluminium prices fell slightly
- The outlook for the aluminium industry is positive
- World alumina stocks fell
- World alumina consumption is expected to rise
- WA's alumina production is expected to increase marginally
- In the long term, production is expected to expand further and diversify due to several developments in the industry including:
 - Alcoa's new hydrated alumina project which is still under construction
 - Alichem's feasibility study into the processing of alumina hydrate
 - A feasibility study into expanding the Worsley alumina refinery
 - Alcoa's feasibility study into expanding the Wagerup alumina refinery

2.6 Nickel

- WA's nickel production increased by a significant 40%
- The increase in value of production was even greater, at 45%
- WA's nickel exports amounted to 70,000 tonnes of contained nickel worth A\$587 million
- After a steady start to the year, nickel prices increased rapidly
- World consumption of nickel grew strongly
- The Mt. Keith nickel mine began production in the December quarter of 1994
- The high price levels at the end of 1994 weakened slightly
- Buoyant nickel prices at the end of 1994 led to renewed interest in several projects under consideration
- Production in the long term should also be enhanced

EXECUTIVE SUMMARY

2.7 Diamonds

- The volume of diamond sales increased by 22%
- However, the value of sales fell by 3.4%
- As usual, almost all diamonds were sold to overseas markets
- The world market is dominated by the Central Selling Organisation (CSO)
- The CSO achieved slightly higher sales
- Further pressure of increased potential supply became apparent
- Worldwide retail diamond sales increased
- Prices for cut and polished diamonds, however, have remained static
- The CSO has maintained relatively high prices for rough diamonds
- Another difficult year is expected for diamond cutters
- The market influence of the Commonwealth of Independent Nations (CIS) continues to increase
- Difficulties have occurred in re-negotiating the sales agreement between the CSO and Russia
- Significant illicit sales from Angola and Zaire added to the CSO's market difficulties
- India's rise as a major diamond cutting centre also put pressure on the CSO
- Exploration is also active in India
- Locally, the large Argyle operation maintained high production levels
- The grade at Argyle has fallen
- Normandy Poseidon managed to extend the life of its Bow River alluvial operation
- However, sub-economic results were returned from the Phillips Range (Mt Elizabeth - Aries Pipe) project
- Diamond exploration in WA has increased dramatically in recent years
- While demand for titanium pigment was increasing in 1994, the demand for titanium metal stagnated
- The value of sales of the titanium based products was up 15%
- The new Jangardup mine opened in June 1994
- The production of most heavy mineral sands is expected to increase
- Production in the long term should also increase
- During 1994, WA's zircon production increased by 50%
- Australia's production of zircon represented 57% of world supply in 1993, with WA's production accounting for 45% of world supply
- The increase in zircon prices during 1994 was mainly a response to a rise in demand from the ceramics industry worldwide
- The outlook for world zircon demand is positive
- Monazite production in WA ceased in 1994
- Garnet production volumes and sales both increased by 25%

2.9 Other Minerals

- Coal production decreased by about 8%, while value of production fell by 5%
- Salt production increased by 5%, but the value of production fell by 4%
- Production of all base metals decreased in 1994
- The Horseshoe Lights operation, once the State's largest copper producer, ceased production early last year
- The State's zinc production fell in 1994
- Tin and spodumene production doubled
- Spodumene production is expected to increase over the next few years
- Manganese production fell by 8%
- Other significant projects of the future include silica sands, graphite, diatomaceous earth and rare earth mines

2.8 Heavy Mineral Sands

- The value of heavy mineral sands production increased by 32%
- Exports of heavy mineral sands from WA were worth about A\$384 million
- Growth in the demand for titanium dioxide pigment occurred during 1994
- On the world market, the price level of heavy mineral sands increased steadily

3. EMPLOYMENT IN THE MINERAL AND PETROLEUM INDUSTRIES

- A modest 1.4% fall in the level of employment was recorded in 1994

1. OVERVIEW

1.1 Review of the World Economy

In terms of value, more than 82% of all minerals and petroleum produced in WA were exported overseas. This makes changes in the economic conditions of other countries of great importance to WA's mining sector.

The world economy moved out of recession in 1994, but world economic growth is expected to moderate over the next few years. After the worst economic downturn since the 1930s, the Organisation for Economic Co-Operation and Development (OECD) countries came out of recession with average growth estimated at 3% in 1994.

Overall, the outlook for the international economy is positive, with some world economic growth forecasts as high as 3.5% for 1995, and 4% for 1996. It also has been forecast that the OECD economies will grow by an average of about 3% in 1995 and 1996. However, recent heated trade negotiations between Japan and the US have cast a shadow on such forecasts, as have the strength of the yen and the frailty of the financial markets.

The US economy exhibited clear signs of a strong economy throughout 1994. However, after growing strongly in 1994 at a rate of 3.9%, growth in the US economy is expected to slow to around 3% in 1995 and 2% in 1996. Retail sales rose by 7.7% during 1994, while consumer credit increased by 9.8%. More importantly for WA's mining sector, industrial production increased by 6.1% in the past year and the labour market remained strong with the annual unemployment rate remaining below 6%. However, the total trade deficit for 1994 was more than \$100 billion, the largest since 1988.

The Japanese economy continues to stall, with a growth rate of only 1% estimated for 1994. Japan's economy was forecast to continue to grow at around 3% in 1995. However, this could be undermined with the recent surge in the value of the yen. The strength of the yen against its major trading currencies, particularly the US\$, is a major

constraint on Japanese economic growth since it has reduced the competitiveness of Japanese exports, particularly in the automotive industries, and has reduced profits in the corporate sector.

Prolonged strength of the yen may cause some Japanese exporters to shift their manufacturing activities offshore, probably to neighbouring South East Asian countries. While this may subdue Japan's growth, the movement of activities offshore is expected to have spin-off benefits for the Australian economy since increased economic activity of our local trading partners would result in greater Australian exports to these areas.

A recovery in most Western European economies occurred during 1994, although in a less dramatic form than the recent US recovery. Most Western European countries experienced rises in real GDP and industrial output, which is a positive sign for Australia's commodity prices.

The continuing reforms in the Commonwealth of Independent States (CIS) and South Africa resulted in another subdued economic year for these countries. The turmoil in the CIS and Eastern block countries striving for independence has the potential to disrupt world mineral supply, either from dumping by a cash strapped country or sudden reductions in output due to civil unrest. Declining labour productivity, general labour unrest and the increased number of statutory public holidays in South Africa could result in a reduction in gold output from one of Australia's largest competitors in the gold market.

Germany showed signs that it was recovering from the prolonged effects of unification. The country recorded robust export performance and a GDP growth rate for 1994 of more than 2.5%. The unemployment rate fell only marginally over the year to reach 10% by the end of 1994. Unemployment was particularly high in the eastern half of the country. Inflationary pressures also have returned, with the inflation rate moving from slightly negative at the end of 1993 to almost 2% by the end of 1994.

However, as with Japan, a strong German currency has the potential to hinder further expansion. It should be remembered that last year's rebound in the German economy was due mainly to rapid growth in exports (especially to the US and Asia) and the rebuilding of inventories,

which were cut severely during the downturn. Any dramatic rise in the value of the deutschemark would reduce the competitiveness of German exporters and consequently add to fears of an economic slow down.

The United Kingdom enjoyed a well balanced recovery. Real GDP grew by 4% in 1994, and looks set to do so again in 1995. Encouragingly, the growth impetus is shifting under the influence of fiscal tightening away from consumer spending towards business investment and exports. A decline in core inflation and a swing of payments from current account deficit to surplus also have been positive features, while the unemployment rate has continued a downward trend.

Strong economic growth in Asian countries supports a positive outlook for WA's mining sector. The economic performance of the Asia-Pacific region is vitally important to WA's mineral and petroleum sector. Not including Japan, about 40% of WA's mineral and petroleum exports are sent to this area each year. With Taiwan growing consistently at about 6.5%, the Malaysian, Thai and South Korean economies expected to continue growing at around 8% through to at least the end of 1995, and the Chinese economy expected to continue growing even quicker, the outlook for WA's mining sector is positive.

Importantly, commentators have noticed a shift in the growth process in many Asian countries from an export-led one, to one more dependent on personal consumption. This has the potential to sustain growth in these countries.

The Chinese economy grew at a rapid 11.8% in 1994, but seems to be coming off the boil slightly in early 1995. China's future growth and political stability is important to Australia's economic outlook as China is a major purchaser of the industrial output of other Asian countries which consume a lot of Australia's minerals and energy. It is expected that the Chinese economy will grow at a rate of about 9.5% in 1995. The falling inflation rate and the high rate of expansion in industrial output in 1994/95 should encourage the Chinese Government to continue with its tight fiscal and investment policies. However, the Chinese Government's resolve will be challenged by continued strong growth in direct foreign investment, which may result in a temporary expansion of money supply.

Singapore's rate of economic growth fell during 1994 to about 10%, and is expected to fall further to about 7-8% in 1995. While the external sector has been providing much of the impetus for growth, export growth is likely to moderate over 1995 as the increasing trade surplus appreciates the currency. Reflecting the strength of the domestic economy, inflation in Singapore was around 6%. High interest rates are expected as the Singapore Government seeks to push the inflation rate down to bring it in line with competitors in the region.

During 1994 the South Korean economy recovered from a slump in which economic growth fell to 5.8% in 1993. The growth rate in 1994 rose to 8.4%, which was the best performance since the economy grew at a rate of 9.1% in 1991. However, the South Korean Government seems to have shifted its emphasis from promoting growth to capping inflation below 6% by lowering food prices and tightening monetary policy.

Indonesia experienced strong export growth, which stimulated general economic growth to around 7% for 1994. The Indonesian Government's expansionary fiscal policy also led to a rise in capital expenditure during the year. The country's growth rate is forecast to be sustained at about the 7% level during 1995.

Thailand has experienced substantial growth over recent years and is expected to strengthen even further in 1995. An acceleration in growth to around 9% in 1995 is likely to be underpinned by continued strong export demand, particularly from the US. Thailand recorded an impressive 18% growth in exports during 1994 with the assistance of a depreciation in the Thai baht. In addition, foreign capital inflow has increased the money supply, pushing domestic interest rates down. These lower interest rates, when coupled with Thailand's conservative fiscal policy, are likely to stimulate economic growth in 1995.

The Vietnamese economy continued its frenzied growth since the US Government resumed economic relations with the country more than 12 months ago. Consumer spending grew by 27% in 1994, while inflation reached 14% (compared to 5% in 1993). Over the past two years there also has been outstanding export growth, with a 21% growth last year. This growth has occurred

without the benefit of the US's "Most Favoured Nation" status, nor membership of the General Agreement on Tariffs and Trade (GATT) or the Association of South East Asian Nations (ASEAN) Free Trade Area.

The Indian Government targeted poverty and unemployment by encouraging economic growth. It implemented significant changes to its financial regime in an attempt to achieve 8% growth in GDP. Importantly for WA's mining industry, these changes included cuts to import duties on non-metallic, ferrous and non-ferrous metals. WA's current low level of mineral and petroleum exports to India may therefore increase in the near future.

1.2 Review of the West Australian and National Economies

Economic growth in WA was a very strong 7.6% in 1994, following growth of 6.9% in 1993. WA's growth remained the highest of all States and was well above the national rate. WA's outstanding performance was underpinned by a rise in private business investment and a strong contribution from net exports. Private final consumption expenditure also remained buoyant while public sector expenditure was unchanged.

WA's foreign trade surplus for 1994 was 8.9% higher than for 1993, reaching A\$11 billion for the year. Exports rose by 4.4% to A\$15.8 billion, while imports fell 4.6% to A\$4.8 billion. WA's major exports include gold, iron ore, alumina, crude oil, wheat, LNG and wool.

The national economy grew strongly in 1994 at a real rate of 4.9%. Many commentators, including the Federal Government, considered this to be unsustainably fast and fears of a blow out in the current account deficit arose. This induced 'pre-emptive' tightening of monetary policy in the second half of 1994, forcing up domestic interest rates.

However, a widening of the current account deficit did eventuate in 1994/95. The expansion in domestic demand drew in more imports of investment and consumer goods while the drought in the Eastern States of Australia caused a fall in agricultural exports. In addition, higher world

interest rates pushed up the cost of servicing foreign debt. These factors combined to cause the sharp widening in the current account deficit.

Underlying inflation remained at around 2%. However, there is evidence of inflationary pressure building in survey and expectations data. Strong domestic demand, an increase in unit labour costs and rising raw material input costs in early 1995 all indicate a probable rise in inflation rates. As such, forecasters have revised their underlying inflation forecasts upwards to 3-4% for 1995.

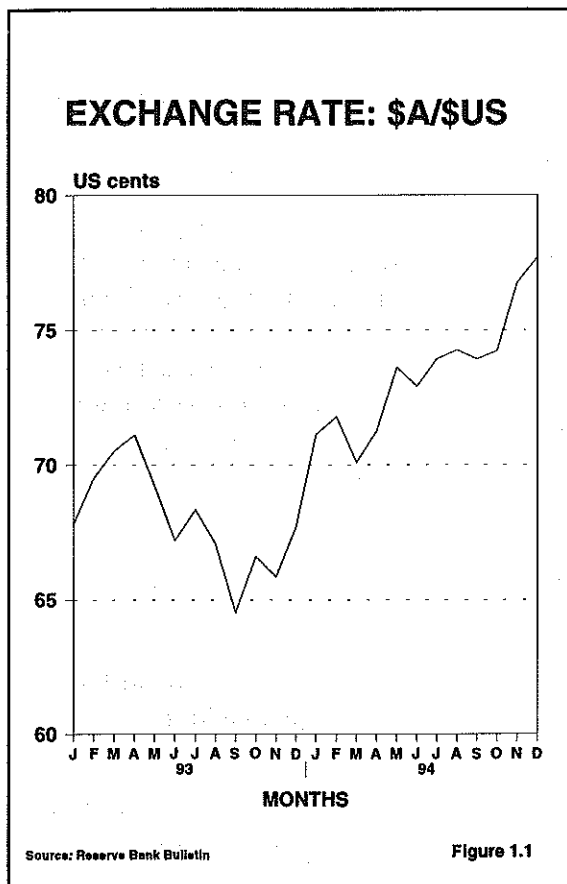
Business investment eventually increased by 20% in real terms during 1994 and business profits increased by around 10%. This reflected greater efficiency on the part of companies as they moved out of the recession with a leaner structure and goals of expanding production in line with the growth in market opportunities.

1.3 Economic Factors Affecting the Mining Industry

The large rise in the value of the A\$ against the US\$ during 1994 had a significant impact on the mining industry. As many supply contracts are denominated in \$US terms, the rising \$A reduced the \$A return on many of WA's mineral and petroleum exports. This trend reversed in the first half of 1995, due mostly to a negative reaction to widening current account deficit.

The resurgence of the world economy was generally welcomed by the mining industry. In particular, the increase in commodity prices has given the industry new confidence to expand and invest in new projects. Though the lift in commodity prices had its speculative side, the fundamental supply and demand conditions of the growing world economy have driven much of the price rises.

Differing views within Asia-Pacific Economic Co-operation forum (APEC) arose during 1994, signalling the possibility of difficult trade conditions ahead. Although leaders of the APEC agreed last year to free and open trade and investment in the region by 2020, they left unanswered the fundamental question of whether they would discriminate against non-APEC countries. Japan, Australia and several Asian



countries prefer an open approach. However, the US and Canada prefer a discriminatory system along the lines of the North American Free Trade Agreement (NAFTA). Further negotiation throughout 1995 will determine the eventual shape of APEC.

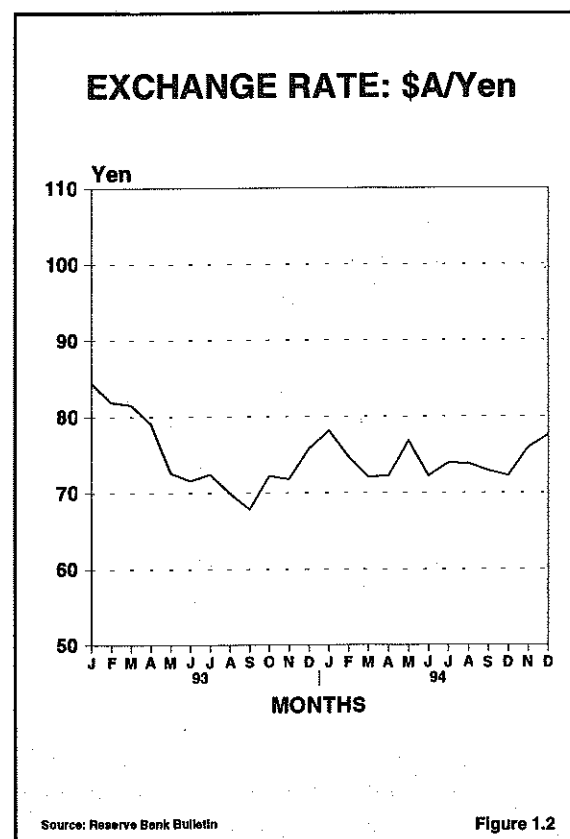
The World Trade Organisation (WTO) came into operation on 1 January 1995. It supersedes the GATT which served as the main international trade forum since its establishment in 1947. The WTO broadens the range of items on the trade negotiation agenda to services and intellectual property and sets trade deals within a more stringent and legalistic framework.

It was argued that the exclusion of China as a member the WTO and that the increasing number of regional trade agreements will reduce the WTO's effectiveness. However, a WTO study released in May 1995 found that regional and multilateral integration initiatives complement each other in the pursuit of more open trade. The effectiveness of the organisation will be tested in 1995 with the difficult trading relations developing between Japan, the US and China.

Financial markets were sent into a spin when the Latin American debt problem re-surfaced in the form of the Mexican peso crisis. The huge US injection of funds into Mexico to hold up the peso also had the effect of devaluing the US\$ as large amounts of US currency entered the market. Though the peso crisis did not directly affect the A\$ to any great extent, it did focus the attention of the financial market on countries with high foreign debt to GDP ratios and deteriorating current account deficits. Thus, as Australia's current account deficit widened in early 1995, the market reacted quickly and the A\$ fell. This close scrutiny of Australia's position by the market is expected to continue.

Australia's continued low inflation rate boosted the mining industry by assisting the nation's international competitiveness. With interest rates now expected to level out, after the "pre-emptive" rises in 1994, there also should be less pressure on the "headline" inflation rate and a possible moderation in inflationary expectations.

A number of Federal fiscal initiatives could have an adverse impact on the mining industry. The most obvious of these is the increase in the corporate tax rate from 33% to 36% in the 1995/



96 Federal budget. A lengthy passage of the budget through the Senate may also affect the mining industry indirectly, especially if this creates uncertainty in the financial and exchange rate markets.

The WA Government's reform of the gas market has impacted positively on both the energy and mineral producing sectors. Further downstream mineral processing is now likely to develop in the energy rich Kimberley and Pilbara regions with the delivery of lower cost gas. The construction of the Goldfields' gas pipeline will improve the economics of existing operations and make potential projects more attractive.

1.4 Social and Political Factors Affecting the Mining Industry

Undoubtedly the most pressing non-economic factor affecting the mining industry has been the native title issue. Both the Commonwealth and State Governments responded to the High Court decision in the Mabo case (June 1992). In early December 1993 the State Government enacted the Lands (Titles and Traditional Usage) Act 1993. Later that month the Commonwealth passed the Native Title Act 1993. The WA Government then challenged the validity of the Native Title Act in the High Court.

The High Court decided in March 1995 that the Federal Native Title Act was valid. In addition, it ruled that the State Lands (Titles and Traditional Usage) Act was inconsistent with the Racial Discrimination Act and therefore invalid by reason of section 109 of the Constitution. The issuing of titles therefore became subject to the provisions of the Native Title Act and any native title claim over a title now has to be dealt by the Native Title Tribunal unless a negotiated settlement could be achieved.

The issuing of Miners' Rights was suspended between 16 March and 1 May, 1995 to allow time to assess the implications of the decision. However, the issuing of prospecting and exploration licences continued on a business as normal basis. Possible native title interests for these licences were determined in accordance with

normal procedures. Any proposals potentially in conflict with native title interests were brought to the attention of proponents and various actions taken in accordance with the Native Title Act. Whether or not pastoral leases extinguish native title has yet to be determined.

The offshore area under Australian jurisdiction increased from 12 nautical miles to up to 200 nautical miles on 16 November 1994. The change flowed from amendments made to Australia's maritime laws in line with the United Nations convention of the law of the sea. The area up to 200 nautical miles from shore is classified as the newly created Economic Exclusion Zone.

The Commonwealth Government continued to expand its influence in the environmental arena. In May 1992 all Australian Governments signed the International Agreement on the Environment (IGAE). An element of the IGAE was the establishment of a National Environment Protection Council (NEPC). This council is based in Adelaide with representation from all State's and Territories except WA. WA has refused to participate on the grounds that NEPC has the potential to adopt national standards which may be inappropriate to the local situation.

This expansionary process also is seen in the changes proposed for the Commonwealth Environmental Protection Agency (CEPA). There have been moves to expand the brief of CEPA to include projects that are considered inconsistent with Australia's international treaty obligations.

MAJOR MINERAL AND PETROLEUM PROJECTS IN WESTERN AUSTRALIA

WITH AN ANNUAL VALUE OF PRODUCTION IN EXCESS OF \$10 MILLION

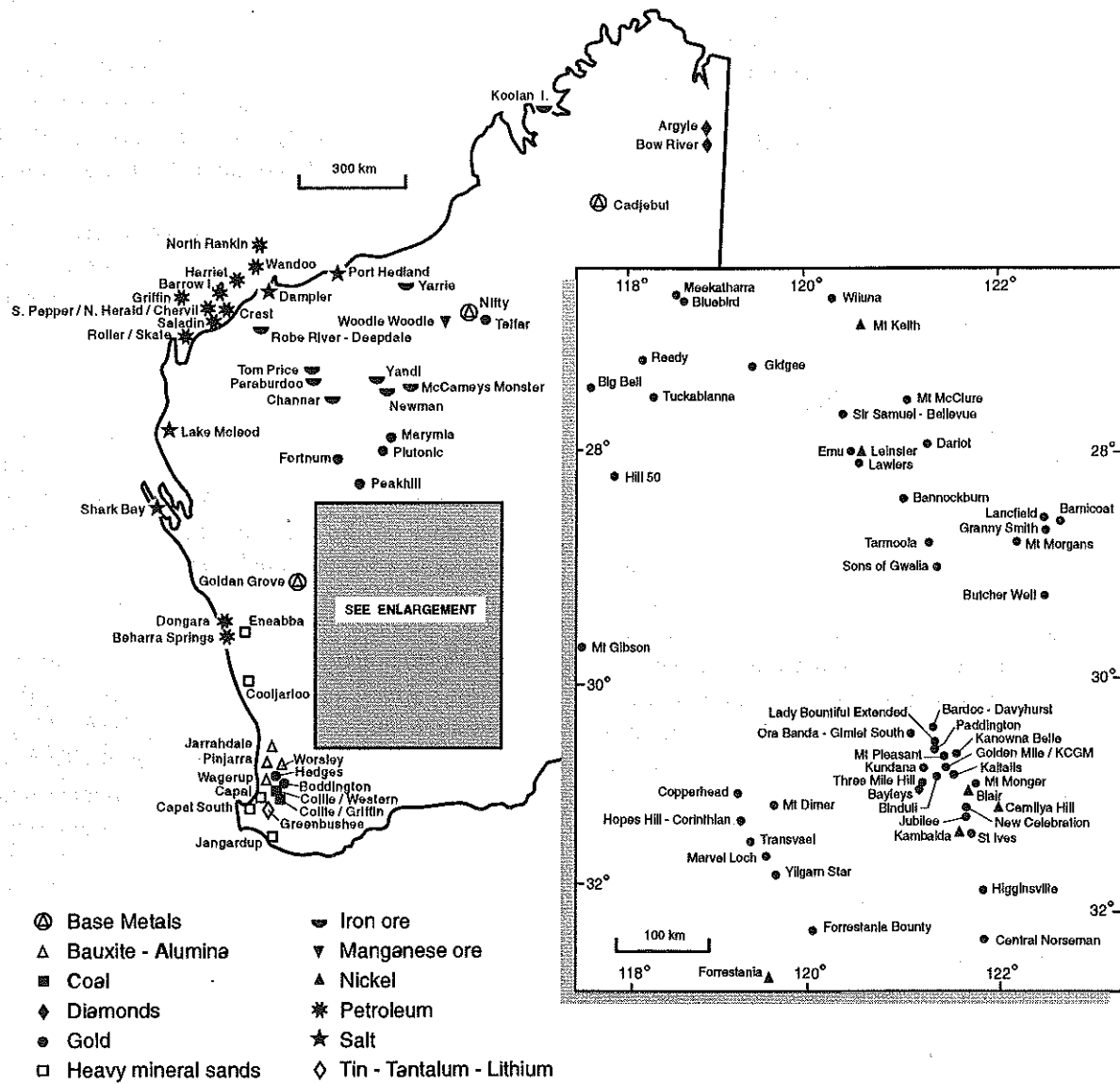


Figure 1.3

2. REVIEW OF MAJOR MINERALS AND PETROLEUM

2.1 Overview and Outlook

The value of mining and petroleum production increased by 3.8% in 1994 to reach A\$12.9 billion. The rise was due to an increase in production and prices. As signs emerged that the period of historically low commodity prices had ended, producers began to increase output for many of the major minerals. In particular, alumina, gold, nickel and heavy mineral sands producers expanded capacity to take full advantage of current and anticipated price rises.

In US\$ terms, average price increases were recorded for gold, iron ore, aluminium, LNG, nickel, ilmenite, rutile, zircon, lead, zinc, and copper. With institutional investors returning to the commodity markets, some mineral prices have fluctuated more significantly than the fundamentals of supply and demand alone would indicate. This trend is expected to continue as these investors seek shelter from the recent vagaries of the financial markets.

Much of the gains in prices last year were countered by the stronger A\$. Since the floating of the A\$, it has tended to move in unison with the US\$ and commodity prices. Therefore, expected further commodity price rises may not translate fully into increases in the value of production.

The State's energy market changed dramatically over the course of 1994, with the deregulation of the gas market and the commencement of construction of the Goldfields' gas pipeline. This had profound impacts on petroleum production plans and flow-on effects to mineral producers. Further deregulation and the completion of the pipeline in 1996 will provide low cost energy to the mining sector and facilitate further expansion in production.

Difficult conditions in the diamond market continued to plague the industry. Though significant exploration efforts were recorded, the

industry still struggled with a global over supply of diamonds.

The outlook for WA's resources sector in 1995 is positive. Given the number of major new mines being developed, the significant steps being taken towards further processing and the likelihood of continued strength in most markets, WA's value of production is expected to rise.

WA's mineral exploration expenditure in 1994 increased by 20% to A\$478 million and continued the upwards trend since 1992. The increase in 1994 was slightly below the 23% rise in Australia's exploration expenditure. WA's share of total Australian expenditure for the year was 56%. A major proportion of Australia's gold, diamond, iron ore, nickel and heavy mineral sands exploration effort is concentrated in WA.

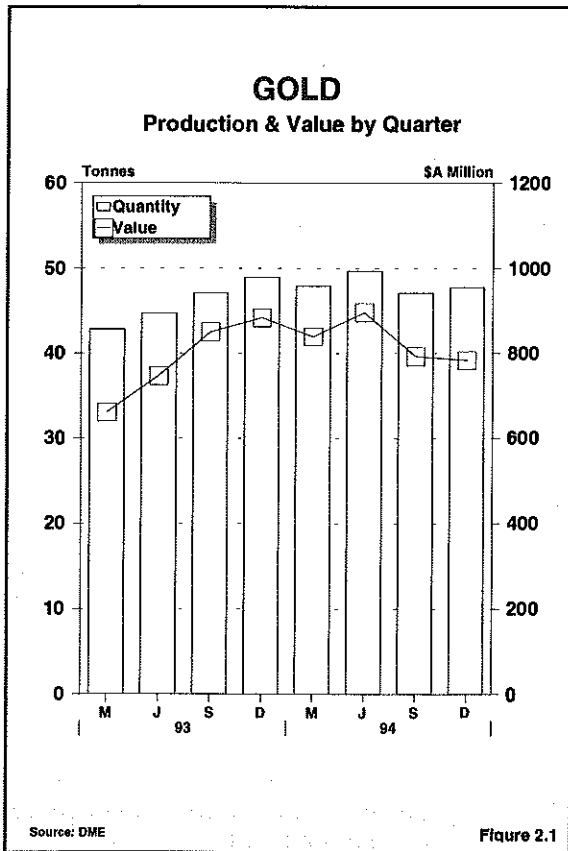
Gold continued to dominate the exploration expenditure figures, accounting for 75% (A\$358 million) of the total. Base metals (including nickel) exploration accounted for 11.6% of the total, while diamond exploration accounted for 9% of the State's total. All other minerals accounted for less than \$10 million each. While there was a significant amount of copper-lead-zinc exploration expenditure, a declining trend over the last year was recorded.

2.2 Gold

Production increased by 4.7% to 192 tonnes in 1994, representing 74% of Australia's total gold production and about 8% of the world's gold production. Only South Africa and the US produced more gold than Australia in 1994. Both countries suffered declines in production over the year while Australia's total gold production increased by about 6% to 260 tonnes, and could overtake US production by the end of the decade.

The value of gold production increased by 3.6% to A\$3,257 million in 1994, making it the highest value mineral commodity produced in WA for the second year running.

The 11 biggest producing projects in WA accounted for half the State's gold production in 1994. The largest projects, with gold production worth more than A\$100 million in 1994, were:



was slightly greater, trading between A\$575 and A\$488 with an average of A\$526.

The movement of the gold price towards the magical US\$400/oz level in the last quarter of 1994 caused an influx of gold from irregular sources onto the important Asian market. The unusual supply included gold from China that was usually sold on the Chinese black market and gold from hoarded stocks. This influx subsequently displaced Australian gold normally supplied to the Asian market.

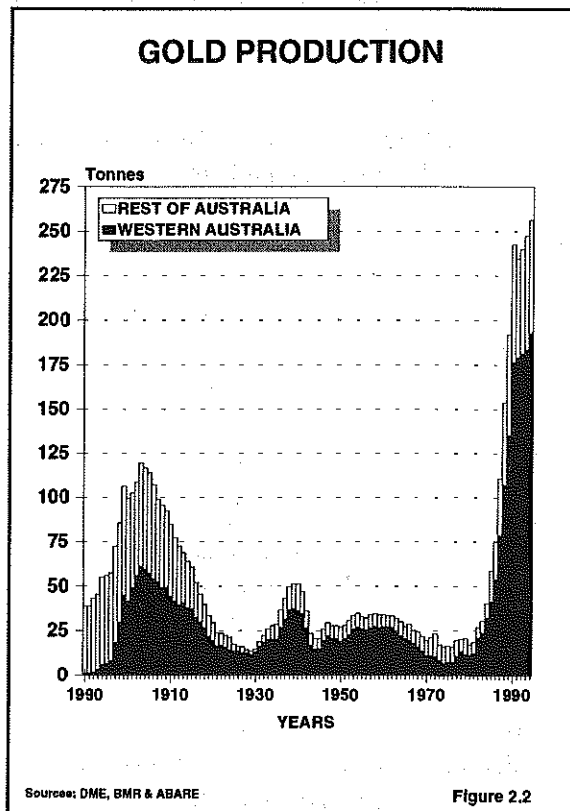
A positive outlook for the gold market is generally assumed since jewellery demand from the growing Asian, US and European markets is expected to pick up as they emerge from the global recession. However, heavy producer selling may retard rapid price increases. The fundamentals of physical demand and supply seem to be gaining greater importance in the market over speculative forces. This is reflected in the uncharacteristically stable gold price for 1994.

- Golden Mile-Kalgoorlie - 22.9 tonnes
- Boddington - 13.2 tonnes
- Telfer - 12.6 tonnes
- Kambalda-St Ives - 11.6 tonnes
- Hill 50-Mt Magnet - 6.4 tonnes
- Granny Smith - 6.3 tonnes

Western Australia's gold exports amounted to 165 tonnes worth A\$2,816 million in 1994. The main destinations for WA's gold were Singapore and Japan, each receiving 30% of WA's gold.

Australia's gold exports amounted to A\$5.2 billion in 1994, which included gold of overseas origin, an increase of 21% over 1993. This represented 8% of Australia's total export value and made gold exports the second largest export earner behind coal.

The gold price remained steady in 1994. In a year that displayed one of the narrowest trading bands, prices fluctuated between a high and low of US\$398 and US\$370 per ounce respectively. The average price was US\$384. In A\$ terms the range



Significant announcements in 1994 included:

- A\$6.8 million upgrade of Mt McClure by joint partners Australian Resources and Oresearch

which is expected to lift production to 110,000 oz/yr;

- the go-ahead for the establishment of a 50,000oz/yr gold mining operation at Orient Well, north of Kookynie, which commenced in May 1995 by Melita Mining; and
- the mining of Resolute Samantha Group's Bullabulling gold prospect, 60km west of Kalgoorlie, by shifting the treatment plant from its Southern Cross operation at Hopes Hill, which closed in February 1995.

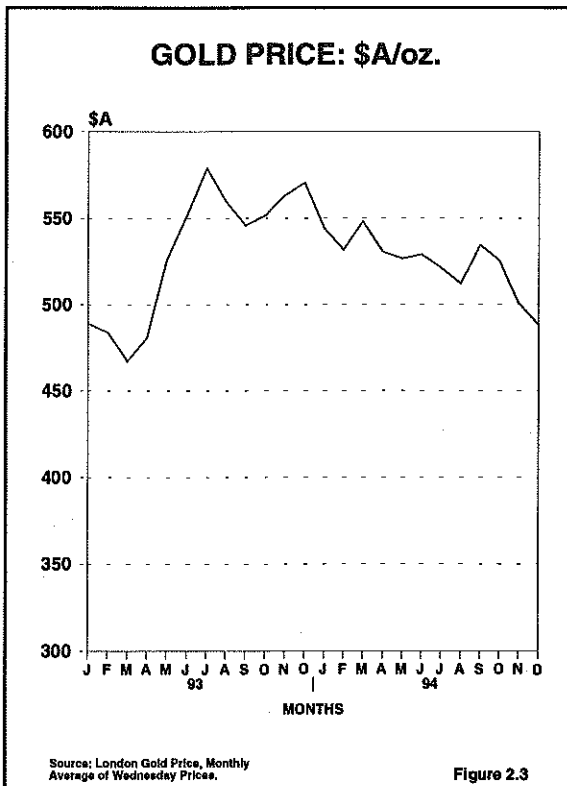


Figure 2.3

Production also commenced at the Youanmi Deeps underground project, owned and operated by Gold Mines of Australia. Smaller operations to start up included those at Sandstone and Mt. Dimer. However, the Labouchere operation was shut down.

The trend for companies to increase viable reserves and reduce input costs has resulted in a number of changes in the gold industry:

- **An increase in underground mining** over the past few years signals the beginning of a long life phase for the Australian gold industry,

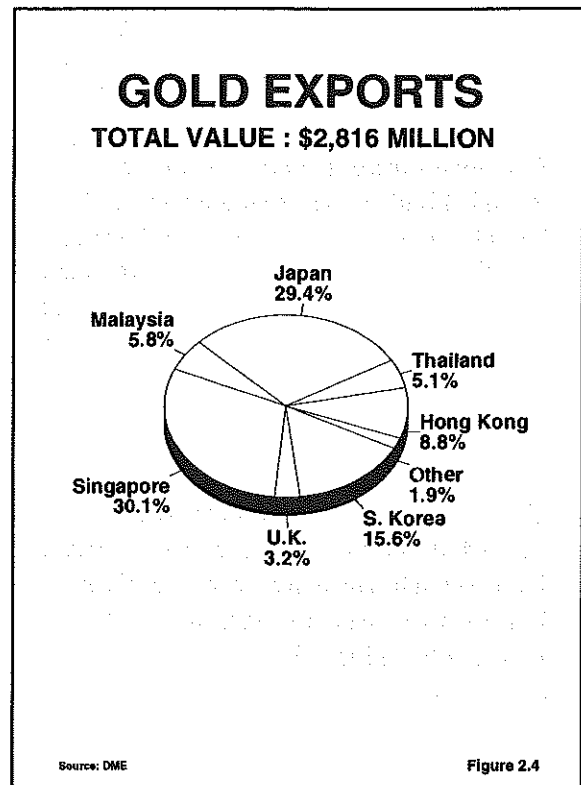


Figure 2.4

replacing the short-term shallow open pit mining that characterised the industry during the 1980s. Only 13% of Australia's gold output was from underground operations in 1992, compared to approximately 25% in 1994. Through modern underground methods, mines have developed into low cost, technology intensive and labour saving operations usually providing for healthy profit levels of between A\$100 and A\$300/oz (at late 1994 prices).

Mines extending underground in 1994 included those at the Big Bell, Youanmi, Wiluna, Reedy, and Boddington operations. It also was decided by joint owners North and Delta Gold to commence the underground phase of Kanowna Belle. Construction of a decline is planned to start in July 1995 with first ore production expected in 1998. Other projects expected to go underground include Bronzewing, Yilgarn Star, Plutonic and, possibly within the decade, the redevelopment of the Golden Mile under the Super Pit.

- **More refractory ore** is being treated in WA as mines exhaust the shallow oxide ores and go underground. Bacterial leaching processes have become a viable alternative to the traditional roasting method for treating these

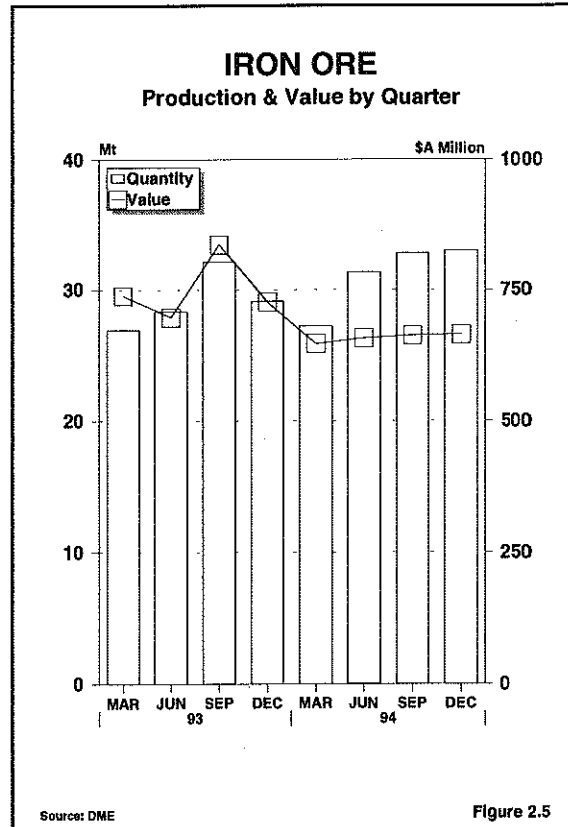
types of ores. The Wiluna and Youanmi operations are using the new extraction method in commercial operations.

- **New exploration techniques** are being used to find "blind" underground resources. These include inferred geology, remote sensing via satellites and aircraft, and the use of highly accurate equipment in assaying and geochemical assessments. Prominent examples of "blind" resources found by these techniques include Kanowna Belle and Bronzewing.
- **The Yandal greenstone belt** was for years regarded as having low prospectivity. However, it has recently emerged as the hottest exploration area in Australia. The new Bronzewing mine, which went into operation in 1994, is an example of the potential of the Yandal area.
- **Cheaper energy sources for the Goldfields** have been sought to reduce input costs. The Goldfields' Gas Pipeline is the latest example. With potential savings estimated to be between 15% and 30% for the Kalgoorlie Super Pit alone, the benefits to gold production in the region are expected to be significant.

The outlook for WA's gold industry is generally positive. In the short-term, unseasonal rain in February 1995 will have reduced first half production results. Overall, however, further expansions largely to underground developments, new projects and the possibility of a higher gold price will continue to stimulate interest in the industry. Further consolidation of ownership is likely over the next few years as junior miners begin to struggle with a lack of funds. This is to be expected, as it follows world trends. For example, the US's gold production of about 300 tonnes is accounted for mainly by 13 companies. This compares to Australian production of 260 tonnes, which is accounted for by over 200 companies.

2.3 Iron Ore

Production increased by 7% to 124 million tonnes in 1994, which was a new record and represented approximately 97% of Australia's production. Australia now accounts for about 13%

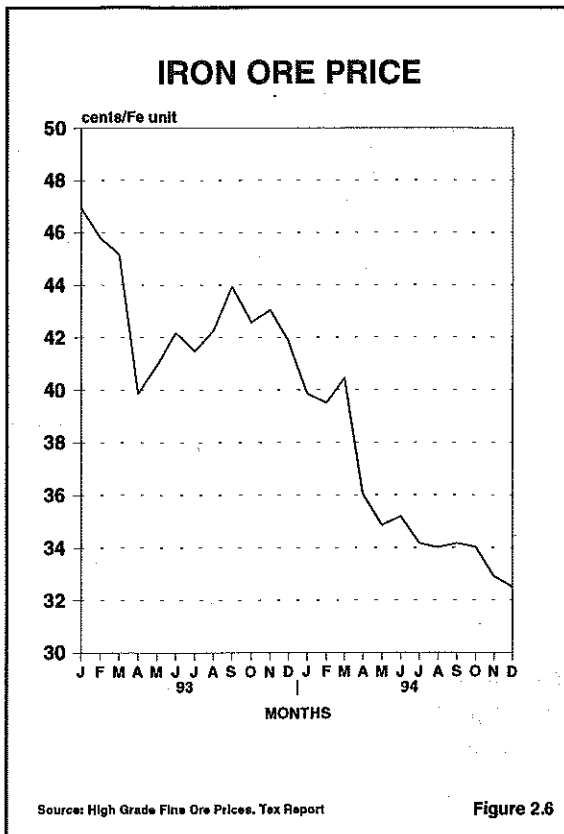


of global iron ore production, fourth behind China, the CIS and Brazil.

Value of production decreased by over 12% to A\$2,631 million due mainly to a strong Australian dollar and the average US\$ price reduction of 7% accepted by producers in early 1994. The price reductions in 1994 resulted not from lower demand, but were essentially to ease the financial losses of Japanese steel mills and was compensated for by guaranteed or increased market shares.

Japanese steel mills continued to dominate WA exports, representing 47% of total iron ore exports from WA, while Europe, China and South Korea each accounted for about 15%. For the year ending 31 March 1995 (the end of the Japanese financial year) the State's share of the Japanese iron ore market is expected to reach a record 51%.

Price increases negotiated in December 1994 for the year starting 1 April, 1995 were led by BHP who settled with the Japanese steel mills on prices. The US\$ price of fines rose 5.8% while the lump ore price rose by 7.9%. Other producers followed suit and these increases are expected to be carried



through to Asian and European mills. Thus, assuming only small fluctuations in the exchange rate, the value of production should increase during 1995.

Steel production capacity continued to shift away from Western industrialised countries in 1994, with east Asia and Japan accounting for more than a third of world capacity. This was despite strong production performances by the European Union and the US.

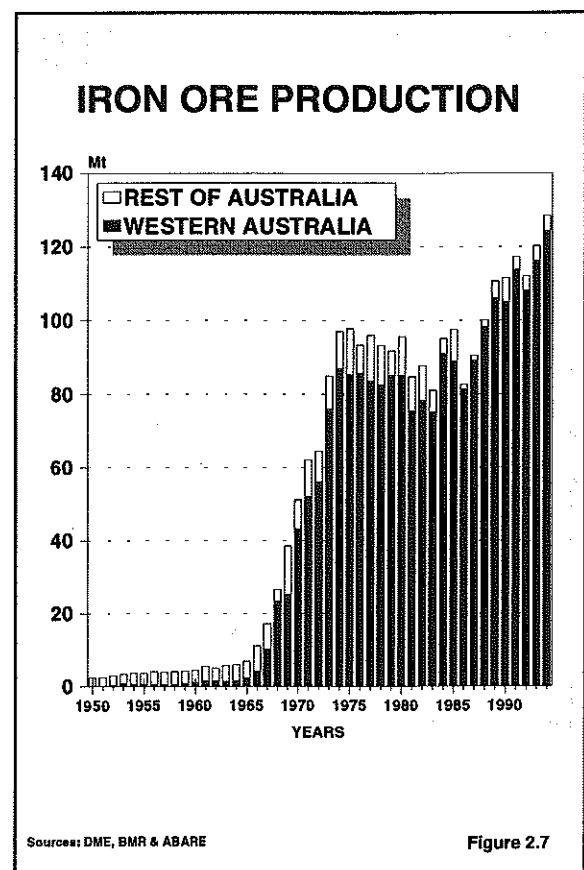
World crude steel production has been forecast to rise from 730 million tonnes in 1994 to 880 million tonnes by 2000, and to 975 million tonnes by 2005.

Major growth in steel consumption over the next decade will continue to take place in the Asian markets and it is widely recognised that demand will exceed existing and anticipated capacity in the area. The State's proximity to this market has given local producers an incentive to invest in WA steel projects.

A focus on customer specifications by WA producers also is expected to result in the State

becoming a major supplier of many types of raw material for the world steel industry, rather than simply supplying basic ore. These new products include direct reduced iron, iron pellets and enriched iron ore.

The deregulation of the gas market was another major factor in the rush to re-assess many steel and iron ore processing projects not considered viable in the past. Dis-aggregation of the 1980 supply contract between the State Energy Commission of WA (SECWA) and the NWS joint venture partners has effectively halved the price of gas in the region, making Pilbara gas the cheapest in the Asia-Pacific.



Projects under consideration include:

- *BHP's A\$750 million direct reduced iron (DRI) plant* in the Pilbara which is at an advanced stage of assessment. A State Agreement Act is expected to be signed in June 1995, and, assuming the BHP board gives its final approval, work could commence in the second half of 1995.

- **Re-opening of Robe River Iron's pellet plant.**
- **Mineralogy group's DRI plant** to be constructed on either the Burrup Peninsula or at Cape Preston. This would be supported by mining, beneficiating and pelletizing a magnetite deposit at Balmoral near Dampier. The magnetite ore is expected to be processed at a rate of 5 million tonnes per annum. Negotiations over a State Agreement Act are continuing and, subject to environmental approvals and adequate financing, construction could begin in early 1997.
- **A A\$1 billion iron ore enrichment plant** for the Pilbara has been proposed by former CRA executives Sir Roderick Carnegie and Sir Russel Madigan. The proposal is understood to be based on the Midrex process which has the capability to raise iron content above 90%. The proposal is still in the early stages of evaluation and a public announcement of details is expected only when a practical proposition is found.

Iron ore output is expected to grow in 1995. This increase will be assisted with the first full year of production from the new Marandoo mine, and the commencement of the Koolyanobbing and Cockatoo Island projects.

The A\$362 million Marandoo mine officially opened in October 1994, operating at its planned start-up rate of four million tonnes per year. Marandoo is a "second stage" mine as it leads the move to the replacement of the depleting 1960s deposits, has a relatively low capital cost and is based on Marra Mamba ore. In addition, the railway that services the mine will be a catalyst for the development of a number of deposits in the central Pilbara.

Production also commenced from the Koolyanobbing and Cockatoo Island projects in 1994 and 1995 respectively. The Cockatoo Island project involves re-treating tailings from the old deposits while the Koolyanobbing project treats natural ore.

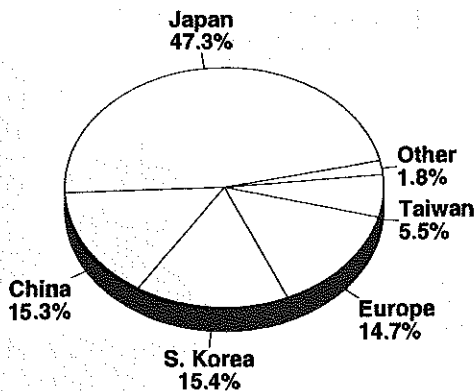
Hamersley Iron's Paraburdoo fines ore treatment plant is expected to start in 1995, and also will enhance production by further improving the product quality of the Hamersley blend.

During 1994 Hamersley Iron also continued to test its new HIs melt technology iron production pilot plant at Kwinana. HIs melt is one of a number of processes designed to produce iron directly from ore in moderately sized, modular economic units with advantages over the large scale blast furnace process.

BHP Steel, however, closed its Kwinana steel rolling mill in May 1995. The mill, built in 1956, could no longer compete in today's highly competitive and technologically advanced market.

IRON ORE EXPORTS

TOTAL VALUE : \$2,472 MILLION



Source: DME

Figure 2.8

- **Compact Steel's steel plant** at Rockingham. The plant would use the Corex technology to produce hot rolled coil.
- **Kingstream's Midwest iron and steel project,** which is based on a small iron-ore deposit at Tallering Peak, and a proposed A\$950 million mill designed to produce 1 million tonnes of steel products per year. In early 1995 Kingstream completed a feasibility study and drilling program to quantify iron ore reserves.

2.4 Petroleum

Total value of all petroleum production increased by 27% in 1994 to A\$3,153 million. This was mostly due to a large increase in oil production, as oil prices on average fell.

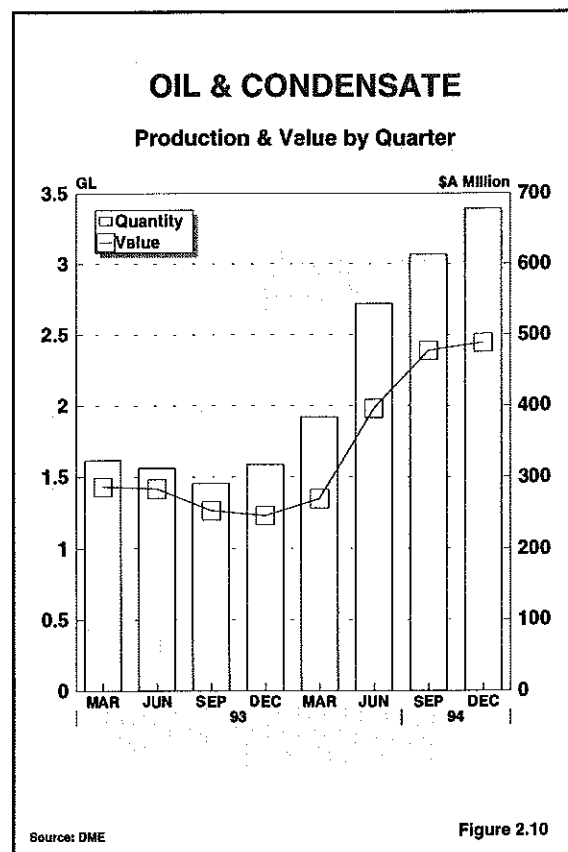
A massive 116% increase in oil production to almost 8.8 million kL was registered in 1994, mostly due to the first full year of production from the Griffin-Chinook-Scindian field and commencement of production from the Roller/Skate fields. The 83% increase in the value of oil production was less than the increase in volume due to a rising A\$ and an average fall in oil prices.

LNG production increased by 27%, in response to higher Japanese demand. Similar to 1993, some spot sales of LNG to other countries were made, but the majority was sold to Japan.



The total value of petroleum exports amounted to A\$2,150 million which represented 68% of the value of petroleum production. In terms of the value of exports, about 91% of total petroleum exports went to Asian markets. The most prominent importer was Japan, accounting for 62% of WA's petroleum exports.

World oil production increased by about 36 million tonnes (0.75m bbl/d) to 3,203 million tonnes (65.8m bbl/d) in 1994. This represented only a 1.14% increase over 1993 output, but significantly, this gain is the largest since 1990, when production advanced by over 1.53%.



Non-OPEC producers supplied nearly 70% of the additional production needed to meet the increase in world demand. Production from non-OPEC producers increased by 1.33% to 1,877m t in 1994, while OPEC production rose by only 0.88% to 1,325m t. The additional non-OPEC production mostly came from the UK (North Sea) and India. Production increases from non-OPEC nations were enabled by technological improvements that extended the lives of old fields and brought new fields on line more quickly, and from concessionary investment terms in developing countries.

In \$A terms, the average monthly oil price reached a three year low early in 1994, while the average annual oil price for 1994 was the lowest in five years. This has generally been the result of a structural shift in the oil market.

OPEC nations have wielded less influence on price as non-OPEC producers have increased their share of the market. However, continued buoyant worldwide economic conditions are expected to increase oil demand in 1995. Thus, depending on the production strategy of OPEC members, the increase in non-OPEC production may fail to force prices down much further.

formerly marginal fields will become viable. As at the end of 1994 there were 48 known oilfields discovered in the NWS region, plus 39 known gas fields, of which six are classed as super giant, four giant and five major gas fields, including those currently in production. The region also now boasts 21 offshore production structures which compare to 16 in Victoria.

Deregulation of the domestic gas market, announced in July 1994, has stimulated activity in the gas industry. Detailed work commenced in December 1993 on ways to introduce greater competition into the gas market. The result so far has been the split of the SECWA into separate gas and electricity utilities from 1 January 1995 and the transference of SECWA's advisory and

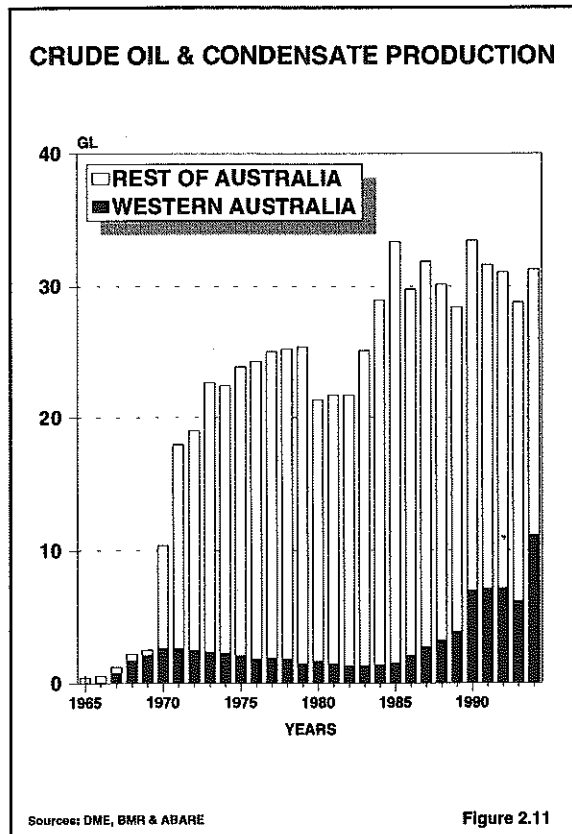
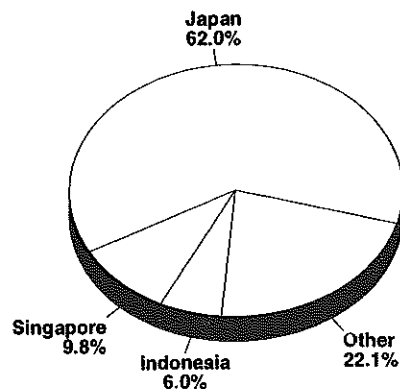


Figure 2.11

A new higher price for LNG supplied by the NWS project will be paid by the project's eight Japanese customers over the next five years. Negotiations were finalised in December 1994 and backdated to 1 April 1994 when the previous five year agreement expired. The price rise reflected a further tightening of the LNG market. Even greater rises are likely if additional supply fails to meet the massive shortage of LNG expected to occur at the end of the decade.

PETROLEUM EXPORTS

TOTAL VALUE : \$2,149 MILLION



Source: DME

Figure 2.12

Oil and condensate produced from the NWS region will soon overtake that of Bass Strait in Victoria. In 1994 WA accounted for 35.5% of total Australian oil and condensate production. Furthermore, as the amount of infrastructure in the NWS approaches a so called "critical mass",

regulatory roles to a new, independent agency called the Office of Energy. Also, the 1980 take-or-pay contract between the NWS joint venture partners and the former SECWA was replaced by direct contracts with the five major consumers - the two new utilities plus Alcoa, Hamersley Iron and Robe River Iron.

The Goldfields' Gas Transmission line has resulted in the linking of mineral and gas ventures. The transmission line will facilitate gas

use in iron ore, gold, nickel and other mineral treatment projects, as well as in gas-fired power stations along its 1,400km length from the NWS to Kalgoorlie. Construction work on the A\$400 million pipeline is expected to begin in June 1995, with gas expected to be available as far as Newman from early 1996 and supplied to the Eastern Goldfields in August 1996. The initial load is expected to be about 70 terajoules per day, but could be increased to 160 terajoules.

First specification gas was delivered from the A\$600 million Griffin project into the Dampier to Perth pipeline in November 1994. The gas is a by-product of oil production and would otherwise usually have been flared. The gas is piped ashore near Onslow where it is processed and delivered into the main transport pipeline.

The commissioning of the Goodwyn A project in February 1995 will further boost petroleum production. It is a major achievement after delays of 16 months due to engineering problems during installation of the platform's legs. The offshore gas and condensate platform is the largest production facility in the Southern Hemisphere. It is expected to produce 80,000 barrels a day of condensate (worth about A\$600 million annually in export revenue) and 25.4 million cubic metres of dry gas per day by mid-1996. Initially, much of the gas will be re-injected into the reservoir to maximise condensate production.

Development of the Cossack-Wanaea oil fields is ahead of schedule. Production from reserves of about 230 million barrels is expected to commence towards the end of 1995 at a minimum rate of 115,000 bbl per day from a floating production, storage and offloading vessel. The field will also support a A\$320 million LPG plant which is scheduled to start in February 1996.

Increased production from the Wandoo oil field is expected in 1995. Drilling of three additional horizontal production wells commenced in early 1995 as part of the A\$480 million Wandoo development program. This raised production from about 8,500 bbl per day to 16,500 bbl per day from five wells. Full field development in December 1996 is expected to achieve initial production of 40,000 bbl per day from estimated recoverable reserves of 75 million barrels.

Production of liquefied petroleum gas (LPG) from the NWS is due to start in 1995. Export availability of LPG from the NWS in 1996 is estimated at about 800,000 tonnes a year, with about 45% in propane and 55% in butane. There is expected to be a strong demand from Japanese buyers seeking to diversify their supply sources, especially since the Indonesian LPG fields are drying up.

Expansions to natural gas reserves at the NWS project in 1995 resulted from an extensive seismic program carried out in the area in 1994 and the testing of potential targets by drilling. Given strong world LNG demand, these increases in reserves improve the likelihood of one or more LNG trains being installed (estimated to cost at least A\$1 billion each).

The Perseus gas field was a significant find in 1994. Though too early to assess properly, the 112 metre gross gas column is expected to make a significant difference to Woodside's gas reserves. This is especially important since its proven reserves are virtually all committed to long-term LNG contracts and up to 30 years of domestic gas sales. Expansion to LNG output from the extra Perseus reserves has been seriously considered.

Another major gas field (Chrysaor) was found by the West Australian Petroleum Company (WAPET). The discovery adds to the large reserves at the nearby Gorgon field. Early indications suggest that the new field could rival the North Rankin field in terms of reserves and flow rate. In a production test early in 1995 the exploration well flowed gas at the rate of 63.5 million cubic feet per day. At 3597m, the Chrysaor-1 well is believed to be one of the deepest on the NWS.

WA could become a major player in the LNG market if the gas reserves of the two local gas joint ventures (NWS partners and WAPET) are combined in some way. When WAPET's Chrysaor field is combined with its Gorgon, West Tryal Rocks and Spar fields, its total gas reserves are larger than those of the NWS partners. A joint LNG production arrangement between WAPET and the NWS partners has been suggested. This would see the WA producers in a position to compete seriously for new LNG supply deals in opposition to LNG suppliers from Sakalin in

Siberia, Qatar, Natuna, Malaysia, and the Arun project on Indonesia.

Improvements in exploration and drilling techniques has reduced production costs in the NWS area. Long-reach or horizontal drilling techniques are tapping reservoirs up to 5km from a facility, which have saved the cost of building additional platforms. Three-dimensional seismic surveys are now giving more complete data over a larger area than from two-dimensional methods, thus adding to the prospectivity of the area. Strong interest in the area is indicated by the fact that 12 companies have undertaken to spend up to A\$40 million exploring the region over the next six years.

The latest discoveries, Laminaria, Elang and Stag, confirm the waters off northern Australia are rich in hydrocarbons and show exploration remains in its infancy. Continued exploration efforts are vital to the Australian industry since it is forecast that national production is set to halve within 10 years (assuming no major new discoveries are made in that time). With domestic oil demand over this period expected to rise by as much as 20%, the Australian oil industry is assured continued incentives for exploration.

2.5 Alumina

Production of alumina increased by 1.7% to 7.9 million tonnes. More than 27 million tonnes of bauxite ore was treated to achieve this level of alumina output.

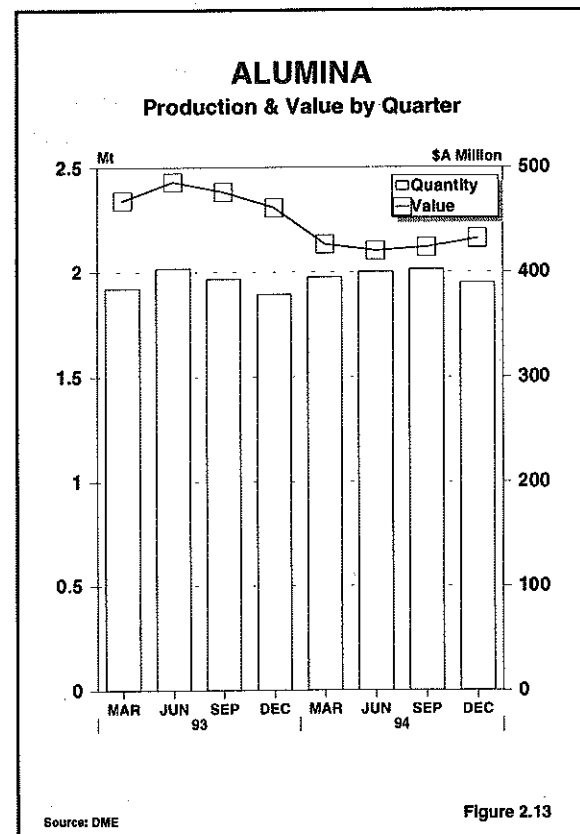
Value of production fell by 10% to A\$1,702 million, mostly due to the delayed flow-on of lower aluminium prices in 1993 and a stronger A\$. In terms of value, WA's alumina industry accounted for approximately 13% of the State's total mineral and petroleum output. Despite increased production, this is 10 percentage points lower than five years ago due to the production of alumina since the 1960s being over-shadowed by the rapid increases in production and prices of other minerals.

WA exported about 85% of its alumina production. This added A\$1,447 million to the current account in 1994. About 48% of alumina

was exported to Asia. Specific countries figuring prominently in alumina export destinations included the US (26%), followed by China (18%), Bahrain (13%) and Canada (12%). The large US consumption is to be expected with the dominance of US company ownership of the State's producers. The recent large increase in China's imports is a result of it taking advantage of very low market prices and building up large stockpiles.

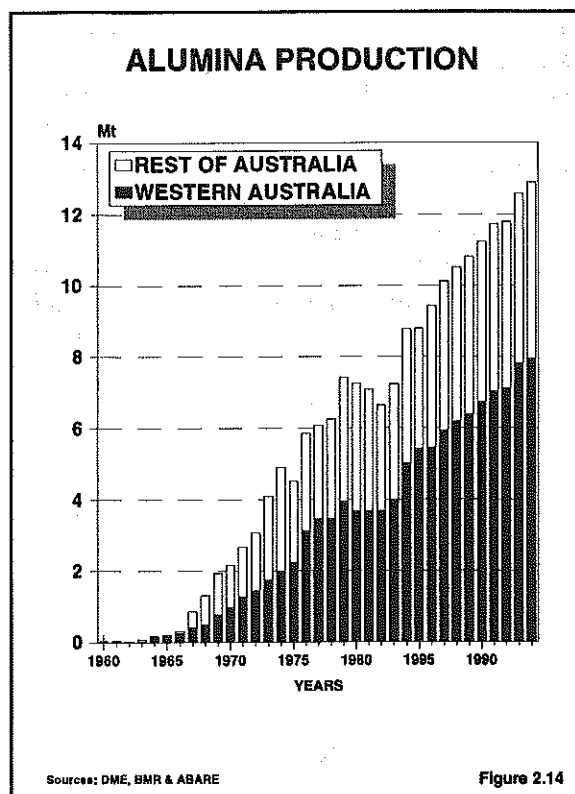
The sustained increase in aluminium prices in 1994, from their historic low in the last quarter of 1993, occurred mainly as a result of the following factors:

- speculative buying by large institutions;
- the Memorandum of Understanding (MOU) - a treaty signed earlier in the year by the governments of six leading aluminium producing nations to restrict output; and
- an increase in industrial activity in the US and Europe.



A draw down in aluminium stocks also occurred as a result of these factors, with the London Metal Exchange (LME) stockpile finishing the year at

about 1.5 million tonnes. The draw down in stocks due to the MOU was largely a result of reductions in the output by Western producers. Although the CIS was a signatory to the MOU, its refineries continued to produce at high levels, with costs estimated to be 10% higher than those in the West. Therefore, cuts in production by efficient Western smelters have, in effect, allowed inefficient Russian smelters to continue business.

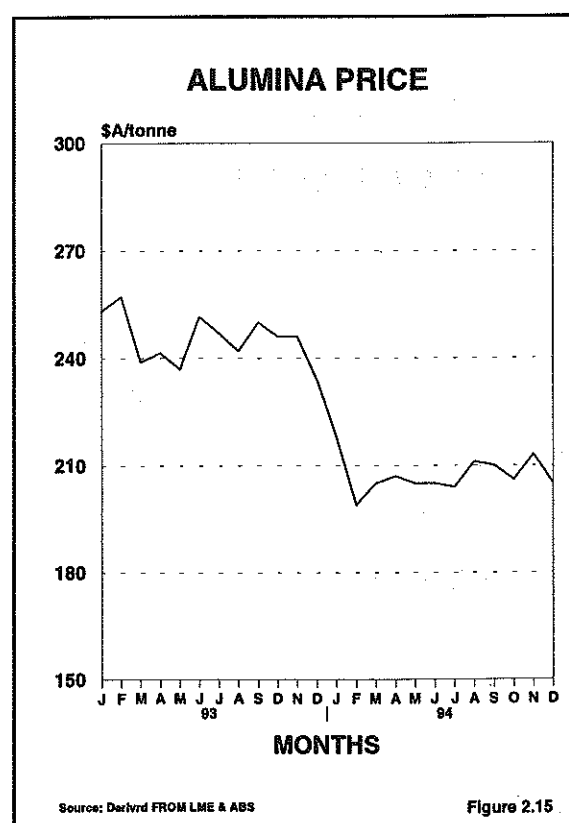


Early in 1995 aluminium prices fell slightly from their six year high of more than A\$2,100/tonne posted late in January, 1995. This occurred in spite of LME aluminium stocks heading below one million tonnes for the first time since 1991. One explanation is that investment funds began profit taking, suddenly selling their stocks rather than assessing the fundamental factors of supply and demand. Another explanation is that the market anticipated a swift re-activation of idle capacity combined with an economic slow down in the US. Indeed, evidence exists of significant re-starts of aluminium production in Spain, the US, Indonesia, Brazil and Iran.

The outlook for the aluminium industry is positive. Even the price decrease in early 1995 is considered a positive sign as inflated prices cause

end-users to search for substitutes. However, a finely balanced market exists which can be greatly influenced by speculative actions and/or production re-starts. One suggestion is that producers will choose to hold off from re-starting production until the aluminium market improves further. This will create more sustainable strength in the market.

World alumina stocks fell from 800,000 tonnes in 1993 to 400,000 tonnes in 1994. The alumina market also moved into balance towards the end of 1994 with demand outstripping supply by some 100,000 tonnes per quarter in 1995, thus further reducing the stockpile.



World alumina consumption is expected to rise. Higher worldwide economic growth is expected to lift demand for aluminium metal and for aluminium based chemicals. This could raise alumina consumption by as much as 7 million tonnes over the next 5 years, so that world alumina consumption would approach 40 million tonnes per annum by the beginning of the next century.

WA's alumina production is expected to increase marginally in 1995 in response to lower worldwide stock levels and higher prices. Efforts

to maintain a sustainable strong market for aluminium will limit any rapid production increase locally and abroad.

In the long-term, production is expected to expand further and diversify due to several developments in the industry including:

- *Alcoa's new hydrated alumina project which is still under construction* at the Kwinana Alumina Refinery. The project is expected to cost A\$42.9 million and produce a product with a gross market value of more than A\$45 million per annum. The hydrated alumina will be sold predominantly into Asian and European specialty alumina markets where it is used for water treatment, in paper manufacture, and in fillers;

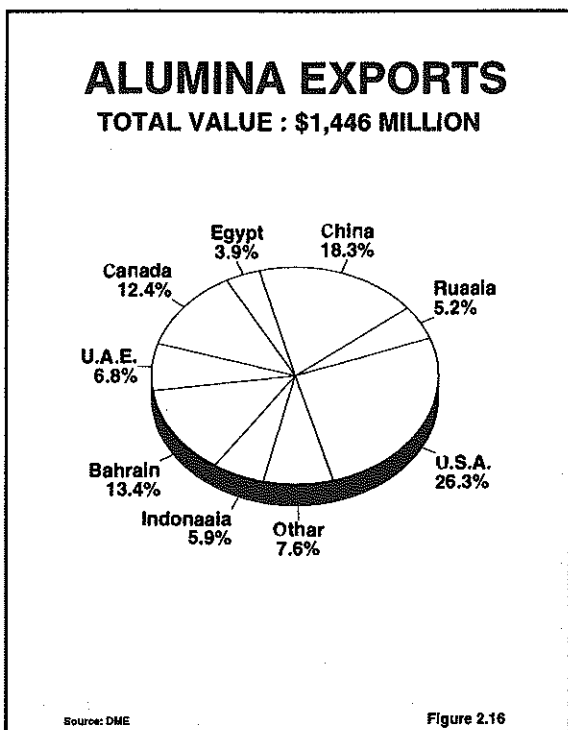
- *Alcoa's feasibility study into expanding the Wagerup alumina refinery.* The A\$960 million expansion would involve the addition of a third production unit and would increase capacity by 1.6 million tonnes to 3.3 million tonnes of alumina per annum.

2.6 Nickel

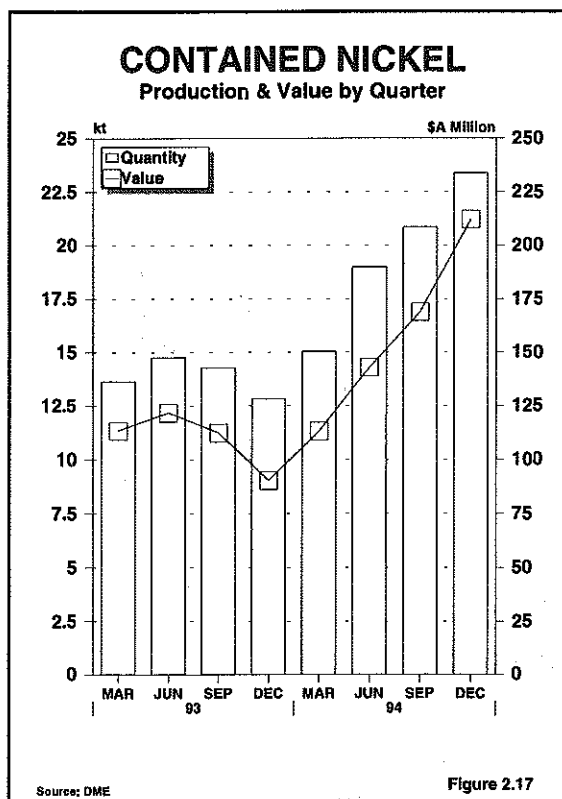
WA's nickel production increased by a significant 40% to reach 77,750 tonnes of contained nickel in matte, metal and concentrate products, thanks to expansion in production capacity undertaken by nickel producers in WA.

The increase in value of production was even greater, at 45% to reach A\$637 million. This reflected significant increases in world nickel prices during 1994. WA's nickel production represented more than 90% of Australia's total nickel production, and 6% of world output.

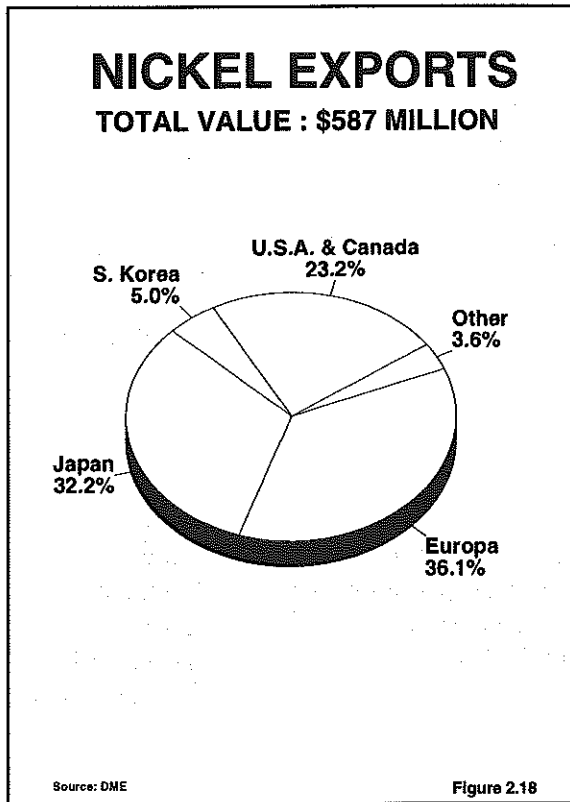
WA's nickel exports amounted to 70,000 tonnes of contained nickel worth A\$587 million in 1994. The main destinations for nickel exports were Asia 41% (Japan 32%), Europe 36% and North America 23%.



- *Alichem's feasibility study into the processing of alumina hydrate* to produce 200,000 tonnes per annum of aluminium fluoride at a cost of A\$35 million. The study is complete and all environmental and statutory approvals have been granted;
- *A feasibility study into expanding the Worsley alumina refinery.* The intention is to add a third train to increase production by 650,000 tonnes per annum of alumina at capital cost of A\$580 million; and

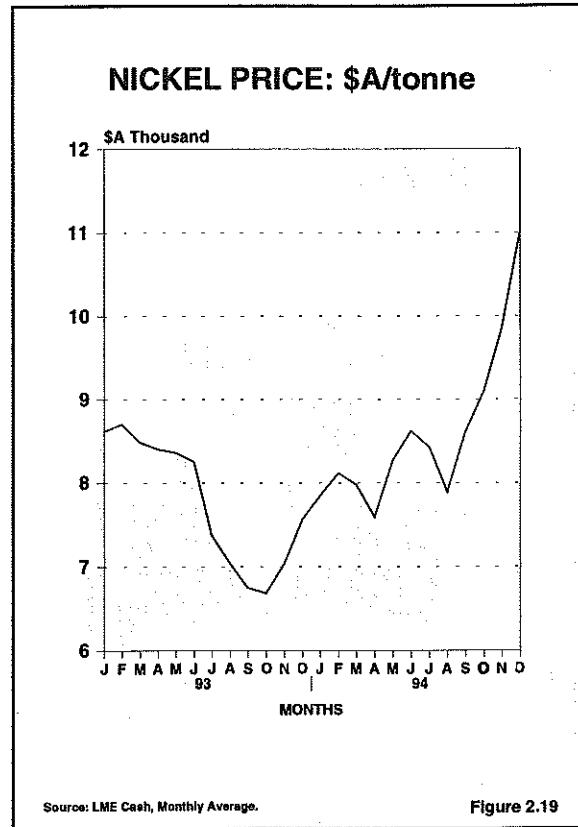


After a steady start to the year, nickel prices increased rapidly. Nickel prices were steady at around US\$5,800 per tonne during the first quarter of 1994. However, prices increased to US\$8,554 per tonne in December 1994, the highest level since July 1991. This was due to an increase in world demand during 1994, mainly from developing industrial countries in Asia, as well as activity in Germany, Japan and the US. Another factor was an explosion at the Norilsk nickel complex in Siberia which seriously disrupted production during the second half of the year. The complex is a major world nickel producer and accounted for approximately 15% of world output.



World consumption of nickel grew strongly in 1994, due mainly to strong demand for stainless steel in Asia and the US. World nickel consumption is expected to increase significantly over the next two years. This increase in world nickel consumption comes at a time when WA's production capacity has increased.

The Mt. Keith nickel mine began production in the December quarter of 1994, and is producing at near full capacity of 28,000 tonnes per annum of nickel in concentrates, taking advantage of the

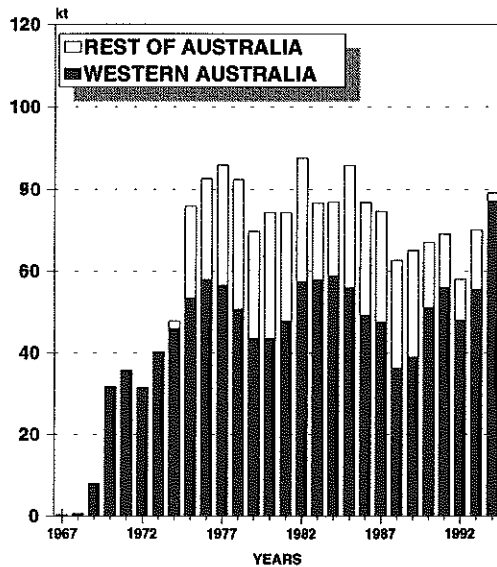


current high prices. Also, output at the Kwinana nickel refinery has been expanded to 42,000 tonnes per annum of nickel metal. Meanwhile, the upgrading of the Kalgoorlie nickel smelter is continuing and is expected to be completed at the end of 1995. Given the current high price levels, annual nickel production in WA could reach 100,000 tonnes by the end of 1995.

The high price levels at the end of 1994 weakened slightly during the first quarter of 1995, due to record stocks and possibly speculative profit taking. Despite the fall, prices remained higher than they have been for two years.

Buoyant nickel prices at the end of 1994 led to renewed interest in several projects under consideration. North Ltd completed a feasibility study as part of its farm-in to the Yakabindie project during 1994, and a 1000 tonne bulk sample was processed into concentrate for metallurgical testwork. A pilot plant was subsequently constructed in the first quarter of 1995. The North Ltd-Dominion Mining joint venture plan to produce around 100,000 tonnes of concentrate per annum of 20% nickel, with a projected capital expenditure of A\$400 million. Also, the joint

NICKEL PRODUCTION



Source: DME, BMR & ABARE

Figure 2.20

CRA-Outokumpu Honeymoon Well project continued to undergo economic assessment.

Production in the long-term should also be enhanced with projects such as Defiance Mining's Carr Boyd Rocks which are expected to produce nickel in early 1996. Development of the mine is due for completion at the end of 1995 and is designed to initially process 150,000 tonnes of ore and produce 20,000 tonnes per annum of nickel concentrate.

There are a number of long-term project potential developments, such as Anaconda Nickel's Central Bore lateritic nickel project, Maggie Hays, Scotia and Nepean.

2.7 Diamonds

The volume of diamond sales increased by 22% to 27.7 million carats. The sharp rise countered lack-lustre diamond prices and a falling A\$.

However, the value of sales fell by 3.4% to A\$470 million. This was mostly caused by a lower average US\$ price received by producers of industrial diamonds.

As usual, almost all diamonds were sold to overseas markets. About 77% went the Central Selling Organisation (CSO), which is based in London. Most of the remaining sales went to the major cutting centre at Antwerp in Belgium. A small amount of diamonds was sold within Australia in 1994.

The world market is dominated by the CSO which is controlled by the Swiss based company De Beers, which in turn is controlled by South Africa's Oppenheimer family. The CSO essentially controls the middle ground between the producers of rough diamonds and the diamond cutting industry.

The CSO achieved slightly higher sales during 1994 of around A\$4.6 billion. This represented an exceptional marketing effort considering the subdued world market and the problem of CIS sales outside of its agreement with the CSO. This has caused the CSO to adjust its buying strategy in order to keep the supply of diamonds on the market constant and maintain its prices.

Further pressure of increased potential supply also became apparent, especially from Canada, Russia, Finland and the Northern Territory where major discoveries have been reported.

Worldwide retail diamond sales increased by 4% to a new record of some A\$45 billion in 1994. This was driven by a buoyant US market where sales are estimated to have increased by around 8% to US\$13 billion. Sales in Japan, estimated at US\$14 billion, and in Europe were also higher than market expectations and a positive outlook for jewellery sales remains for 1995. Overall, world consumer demand has slowly improved, but its composition has changed, as consumers demand higher quality goods at the same price.

Prices for cut and polished diamonds, however, have remained static over recent years. A possible explanation for this is the establishment of a new polished diamond pricing system. With this system it is now standard practice for certification laboratories to provide grading certificates that detail quality and colour grades for individual diamonds. This information is then matched against a commonly used pricing schedule to determine the price of each diamond.

Previously, there was no universal price structure. Diamond dealers had to assess each diamond using their own skills, while maintaining an intimate knowledge of the diamond market.

The CSO has maintained relatively high prices for rough diamonds. However, polished prices have remained flat. This essentially means that the difference between the wholesale and retail prices of diamonds has narrowed.

Another difficult year is expected for diamond cutters as the CSO is expected to resist a drop in its prices and stocks in all major cutting centres continue to grow.

The CIS's market influence continues to increase, weakening the CSO's position. The country currently controls about a quarter of world diamond production capacity in addition to its large stockpiles. It also has new mines to come on stream.

Difficulties in re-negotiating the sales agreement between the CSO and CIS have been aggravated by the break-up of the former Soviet Union. Confusion still exists between the producers and the former Soviet States about who had the authority to decide on policy.

Significant illicit sales from Angola and Zaire also continued to weaken the CSO's position, even though the CSO managed to establish agreements with these countries.

India's rise as a major diamond cutting centre also has put pressure on the CSO. India's manufacturers are increasingly looking towards Russian supplies which are of higher quality for comparable price. This would weaken the CSO's position as it supplies Indian cutters with a majority of their diamonds. India now cuts 70% of the world supply of small stones, however its share of the overall diamond processing market is only 45% in value as larger stones still mainly go to Antwerp and Tel Aviv.

Exploration is also active in India. However, it is at an early stage and is unlikely to lead to significant import replacement in the near future. The CSO also has managed to secure a large area of prospective land in India for exploration.

Locally, the large Argyle operation maintained high production levels with an estimated

12.5 million tonnes of ore processed to recover 42.8 million carats in 1994. Production continues to be stockpiled while prices for industrial grade diamonds are low.

The grade at Argyle has fallen from its start up figure of eight carats a tonne to below five carats a tonne as a result of the pipe's geological characteristics. Under the present development program the mine is scheduled to close in 2004. A study into alternative mining techniques and efforts to increase efficiency will determine whether Argyle can remain a viable mine as an underground operation beyond the expected closure date of the open pit. In an effort to find a deposit to replace the declining Argyle mine, CRA has become involved in offshore exploration in the Cambridge Gulf area.

Normandy Poseidon managed to extend the life of its Bow River alluvial operation into 1996. Exploration is continuing for sources that would facilitate still further extensions of production.

However, sub-economic results from the Phillips Range (Mt Elizabeth - Aries Pipe) bulk sampling and pilot plant project has put a question mark on the viability of a commercial operation at this deposit. The pilot plant has been put under care and maintenance.

Diamond exploration in WA has increased dramatically in recent years. Virtually all areas of kimberlite indication and alluvial potential are being appraised, though much of the exploration is at an early stage. However, the euphoria in the sector did abate in the later part of the year, so that a more sensible, focussed effort is generally being conducted. Particular interest is being shown in the Beta Creek prospect where Striker Resources aims to determine whether a pilot plant is warranted. Encouraging results have also come from the Upper Beta Creek tenements where Moonstone Diamond Corp and Western Minerals are actively exploring.

While many other junior explorers also are active in the Kimberley area, stability in the diamond sector of the Australian stock market appears to have emerged. The complexities of diamond exploration now seem to be better understood by stock market investors, as is an appreciation of the large investment and particular grade standards that are needed to establish a commercial diamond mine.

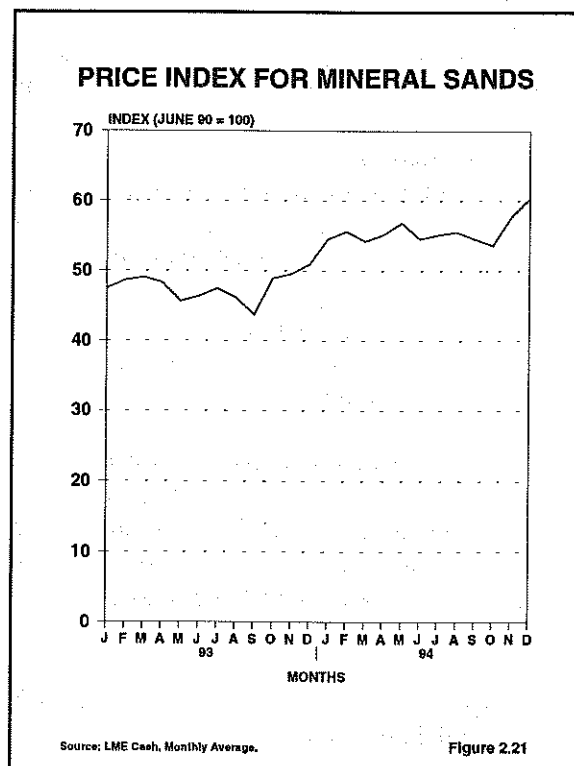
2.8 Heavy Mineral Sands

The value of heavy mineral sands production increased by 32% to A\$416 million heralding a long awaited improvement in the industry. This was mainly achieved through large increases in the volume of production. In addition, products such as zircon experienced strong price increases, although from a very low level.

Exports of heavy mineral sands from WA amounted to 1.9 million tonnes worth A\$384 million dollars in 1994. The main destinations for WA's heavy mineral sands exports were Asia 24% (Japan 14%), Europe 34% (U.K. 12%) and North America 41% (US 34%).

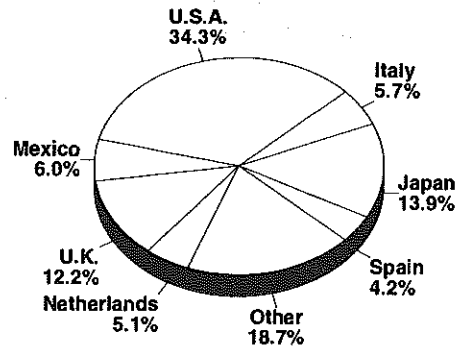
Growth in the demand for titanium dioxide pigment mainly came from North America and Asia during 1994. The Asian market is expected to reach 25% of world consumption by 1997, and grow twice as fast as markets in Europe and North America during the remainder of the decade.

On the world market, the price level of heavy mineral sands increased steadily over 1994. Titanium-based products experienced significant price increases in late 1994, due mainly to strong growth in the demand for pigment in Europe, North America and Asia.



HEAVY MINERAL SAND EXPORTS

TOTAL VALUE : \$383 MILLION



Source: DME

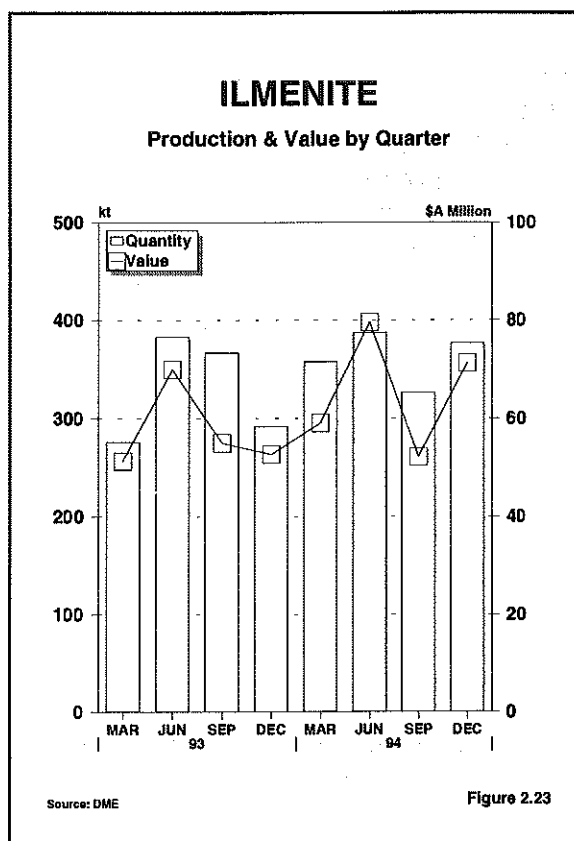
Figure 2.22

While demand for titanium pigment was increasing in 1994, the demand for titanium metal stagnated due to continued lack-lustre demand from the civil and defence aerospace industries. An influx of competitively priced imports of sponge, scrap and ferro-titanium from the CIS, and other former Eastern Bloc countries is further dampening demand for titanium metal processed from raw materials.

The value of sales of the titanium based products was up 15% on 1993 to reach A\$311 million. Synthetic rutile sales amounted to A\$165 million, up 15% on 1993 and as usual accounted for the largest share of value in the titanium industry. The value of ilmenite sales was also up, by 10% to reach A\$94 million in 1994. Significantly, WA accounted for about 27% of world titanium production in 1994.

The increase in output of titanium based mineral sands products was facilitated by higher utilisation of existing plant capacity and the start of production from Cable Sands' new Jangardup project in 1994.

The new Jangardup mine, opened in June 1994, was the first major mineral sands project completed anywhere in the world over the past four years and will produce predominantly ilmenite worth A\$20 million a year. With a design capacity of 236,000 tonnes per annum, it will increase Cable Sands' output to account for approximately 30% of WA's mineral sands output.



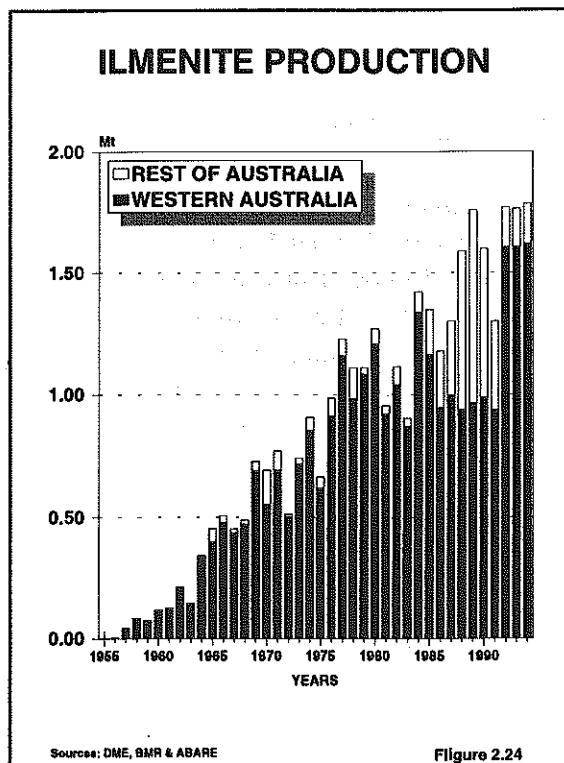
The production of most heavy mineral sands is expected to increase in 1995 as producers respond to an optimistic price outlook for most heavy mineral sands. This will occur through a number of projects including Tiwest increasing synthetic rutile production capacity at its Chandala plant which will allow increased pigment production, and Westralian Sands doubling its synthetic rutile production capacity.

Production in the longer term should also increase in the State with Westralian Sands' planned A\$134 million expansion of its synthetic rutile plant at North Capel. The expansion will increase synthetic rutile capacity to 230,000 tonnes per annum with first production expected in 1997.

Another project expected to begin production in 1997 is BHP's Beenup project in the lower South West of WA. Mining and processing at Beenup will produce about 600,000 tonnes of ilmenite and 32,000 tonnes of zircon per year.

During 1994, WA's zircon production increased by 50% to reach 444,000 tonnes. The increase in production, coupled with rising prices resulted in a 114% increase in sales value to reach A\$100 million in 1994. Zircon displaced ilmenite as the second most valuable sector of the heavy mineral sands industry in 1994.

Australia's production of zircon represented 57% of world supply in 1993, with WA's production accounting for 45% of world supply. This position as the dominant world supplier of zircon is being challenged by South Africa, which has increased its market share from 17% in 1984 to 26% in 1993. It is forecast that South African zircon production will almost equal Australian production by 2000.



The increase in zircon prices during 1994 was mainly a response to a rise in demand from the ceramics industry worldwide, but especially from China. The price increased steadily during the year, from A\$225 per tonne in January 1994 to about A\$340 per tonne in December 1994. Prices

reached A\$394 per tonne in March 1995. With zircon stocks low at the end of 1994 and few prospects for supply growth, prices are forecast to rise strongly in 1995 and 1996. However, the commodity is subject to substitution if prices rise too high.

The outlook for world zircon demand is positive. Consumption is expected to rise to more than 1 million tonnes by the year 2000. China is one of the world's largest importers of zircon and its increasing requirement for zircon as an opacifier in glazed ceramic tile manufacture is the stimulus to the growth in demand. Other applications for zircon, such as the manufacture of chemicals, also are providing growth in zircon demand.

Monazite production ceased in 1994. The French chemical group Rhone Poulenc is again considering plans to establish a monazite processing plant in WA.

Garnet production volumes and sales both increased by 25%.

2.9 Other Minerals

Coal production decreased by about 8%, while value of production fell by 5%. The closing of WA's last underground mine by Western Collieries will be countered by increases in production capacity from the new Premier mine and the Ewington II mine. Excavation of the A\$100 million Western Collieries' Premier mine is expected to commence in mid-1995. The mine will service a new A\$880 million 300MW Collie coal fired power station, due for completion in late 1999. Production from Griffin Coal's A\$100 million Ewington mine is expected to commence in late 1995.

Salt production increased by 5%, but the value of production fell by 4%. A difficult trading year was sustained, with an oversupplied market and rising Australian dollar. Most of WA's salt is exported, with the main destinations being Japan (57%), Korea (14%), Taiwan (12%) and Indonesia (8%). Proposals for an A\$85 million development at Onslow Salt's Onslow project are due by the end of 1995.

Production of all base metals decreased in 1994. Lead and zinc production both fell by more than 40%, while copper production fell by a modest 13%. However, a 50% increase in the value of copper production was recorded, due mainly to a surge in copper prices.

The Horseshoe Lights operation, once the State's largest copper producer, ceased production early last year after exhausting the deposit's initial mineable reserves. However, further exploration of the surrounding area may facilitate a re-start. In its first full year of production the Nifty copper mine has managed to replace much of the decrease in output from Horseshoe Lights. Production of cathode copper from Nifty is expected to increase in 1995 once leach pad problems have been solved. The State's copper production is therefore expected to increase in 1995.

The State's zinc production fell in 1994 due to lower zinc head grade from Golden Grove as Murchison Zinc mined transitional ore. Also, falling resources at the Cadjebut lead-zinc mine led to lower output and necessitates the development of a new mine nearby at Goongewa.

Tin and spodumene production doubled in 1994, mainly through expansion of production at Gwalia's Greenbushes mine and plant.

Spodumene production is expected to increase over the next few years as ore mined from the world's largest lithium deposit at Greenbushes will supply a further processing plant. Gwalia Consolidated expect the new plant to be commissioned in September 1995 and reach full production capacity in five years. At full capacity it will produce about 5,000 tonnes per annum of lithium carbonate and has the potential to produce nearly 10% of the world's demand for this product. Lithium carbonate is used in aluminium smelting, glass and ceramic manufacture, and as a feedstock to produce lithium metal and a range of lithium-based chemicals and alloys.

Manganese production fell by 8% but it is expected to rise in 1995. Though Woodie Woodie was put on care and maintenance in early 1994 due to low manganese prices, it began production again in early 1995. In addition, the first manganese ore from the Mike deposit was shipped in late 1994. Given both operations are expected to achieve a full year of production, manganese output will be higher in 1995.

About three quarters of the manganese ore produced in WA last year was exported. Of this, Japan received the majority (67%), followed by China (23%) and South Korea (10%). The fall in the value of manganese production (24%) was due to the fall in output and lower prices which were compounded by a stronger A\$.

Other significant projects include two proposed silica sands projects at Kemerton and Mindijup. These projects could almost double the State's production of silica sand used for the glass and foundry markets to over 1.2 million tonnes per annum worth up to A\$11 million by the end of 1995. Other projects under consideration include a graphite mine at Esperance, a diatomaceous earth processing plant at Gingin, and a rare earths mine at Mt Weld.

3. EMPLOYMENT IN THE MINERAL AND PETROLEUM INDUSTRIES

A modest 1.4% fall in the level of employment was recorded in 1994. According to statistics compiled from industry returns there were 34,898 people employed in the mineral and petroleum industry during 1994.

Significant increases in employment were recorded in the salt and other minor minerals sectors. A 16% increase in employment in the salt production industry occurred, reflecting a slow improvement in the world market for salt. This represents a turnaround in the salt sector after major cuts in employment over the last few years.

Significant reductions in employment were recorded in the nickel, coal and base metals industries. The reduction in employment in the nickel industry was mainly due to the shedding of 565 workers at the Kambalda/Blair operations and about 100 from the Kwinana refinery. The fall in employment in the coal mining industry mainly was due to the closure of WA's last underground coal mines. The closure of the Horseshoe Lights base metals mine accounted for most of the reduction in employment in the base metals industry.

Increases in employment in the petroleum, alumina and iron ore industries are possible as the new projects come on stream and expansions of capacity take place in the future. In particular, the further processing projects being considered also have the potential to draw greater numbers of employees into the mineral and petroleum sectors during construction and operation.

For the first time in the company's history, Hamersley Iron recorded no industrial lost time in 1994. This was a result of an improved work place culture and commitment of employees. This is an example of the changing state of WA's labour market. These changes are expected to continue and include greater application of contract labour and work place agreements plus the development of a co-operative work ethic.

TABLE 4.1 QUANTITY AND VALUE OF MINERALS AND PETROLEUM

MINERAL	UNIT	1993		1994	
		QUANTITY	VALUE(\$A)	QUANTITY	VALUE(\$A)
BASE METALS					
Copper Metal	t	28,980 (r)	30,210,245 (r)	25,259 (e)	45,225,676 (e)
Lead Metal	t	32,276 (r)	7,835,561	17,222 (e)	4,803,239 (e)
Zinc Metal	t	141,096 (r)	87,020,276	84,588 (e)	54,119,287 (e)
TOTAL BASE METALS			125,066,082 (r)		104,148,201 (e)
BAUXITE-ALUMINA					
Alumina	t	7,801,274	1,891,855,796	7,933,321	1,702,075,831
CLAYS					
Attapulgit	t	20,632	8,099,237	19,412	5,642,890
Clay Shale	t	0	0	74,351	148,700
Fire Clay	t	43,813	52,576	10,812	12,975
Kaolin	t	3,611	248,699	4,211	227,451
White Clay	t	22,984	249,946	67,077	656,898
TOTAL CLAYS			6,650,458		6,688,914
COAL	t	5,470,875(r)	248,439,413(r)	5,034,977	235,088,279
CONSTRUCTION MATERIALS					
Aggregate	t	259,859	1,435,187	110,173	659,783
Gravel	t	88,338(r)	438,168(r)	124,839	627,650
Rock	t	94,634	927,877	118,062	1,877,173
Sand	t	2,445,633(r)	10,268,681(r)	1,890,375	8,813,153
TOTAL CONSTRUCTION MATERIALS			13,069,913(r)		11,977,759
DIAMOND	ct	22,849,491	486,770,824	27,716,403	470,209,714
DIATOMITE	t	445	5,171	2,365	18,897
DIMENSION STONE					
Black Granite	t	2,034	559,171	1,028	316,058
Quartz Rock	t	390	17,538	795	35,746
TOTAL DIMENSION STONE			576,709		351,804
GEM, SEMI-PRECIOUS & ORNAMENTAL STONE					
Agate	kg	41,360	27,467	10,280	9,132
Amethyst	kg	25,352	308,045	0	0
Chalcedony	kg	36,775	28,137	0	0
Chrysoprase	kg	27,344	795,872	128,106	749,522
Jasper	kg	70,819	45,116	0	0
Malachite	kg	2,245	8,392	5,561	19,639
Tourmaline	kg	7	1,425	0	0
Variscite	kg	720	870	0	0
TOTAL GEM, SEMI-PRECIOUS & ORNAMENTAL STONE			1,215,324		778,293

TABLE 4.1 (cont)		QUANTITY AND VALUE OF MINERALS AND PETROLEUM			
		1993		1994	
MINERAL	UNIT	QUANTITY	VALUE(\$A)	QUANTITY	VALUE(\$A)
GOLD	kg	183,487(r)	3,139,858,203(r)	192,439(e)	3,256,792,805 (e)
GYPSUM	t	145,205	1,329,400	209,630	2,558,095
HEAVY MINERAL SANDS					
Garnet	t	48,202	4,582,615	60,382	5,738,224
Ilmenite	t	1,008,377	85,398,002	1,079,227	93,520,617
Upgraded Ilmenite (a)	t	308,601	143,534,559	357,528	164,534,101
Leucoxene	t	12,689	4,850,531	21,677	8,149,179
Monazite	t	6,654	1,914,960	3,093	876,904
Rutile	t	56,596	29,974,170	87,161	44,463,737
Zircon	t	299,761	46,256,774	444,264	99,000,474
TOTAL HEAVY MINERAL SANDS			316,511,611		416,283,235
INDUSTRIAL PEGMATITE MINERALS					
Felspar	t	18,748	694,865	36,169	1,451,195
IRON ORE					
Domestic	t	5,475,700	152,105,587	6,434,476	150,174,086
Exported	t	110,863,008	2,844,629,286	117,828,830	2,480,440,822
TOTAL IRON ORE		116,338,708	2,996,734,873	124,263,306	2,630,614,908
LIMESAND-LIMESTONE-DOLOMITE					
Dolomite	t	0	0	2,500	25,000
Limesand-Limestone	t	2,099,107	14,189,487	2,222,911	14,689,192
TOTAL LIMESAND-LIMESTONE-DOLOMITE			14,189,487		14,714,192
MANGANESE ORE	t	247,858	43,403,053	227,873	33,147,303
NICKEL INDUSTRY					
Cobalt by-product	t	297	10,916,333	486	33,327,376
Nickel Concentrate	t	529,997	437,744,354	678,667	637,004,125
Palladium by-product	kg	405	2,035,430	394	2,360,012
Platinum by-product	kg	79	1,142,319	84	1,176,044
TOTAL NICKEL INDUSTRY			451,838,436		673,867,557
PEAT	t	1,025	76,189	786	58,531
PETROLEUM					
Condensate	kl	2,168,549	359,859,020	2,341,459	331,191,631
Crude Oil	kl	4,048,865	709,316,334(r)	8,752,619	1,299,752,620
LNG	MMBtu	264,749,780	997,875,786	335,106,529	1,080,172,183
Natural Gas	'000m3	4,210,825	422,956,897	4,915,310	441,964,508
TOTAL PETROLEUM			2,490,008,037(r)		3,153,080,942
SALT	t	6,489,360	158,649,336	6,805,537	152,274,717

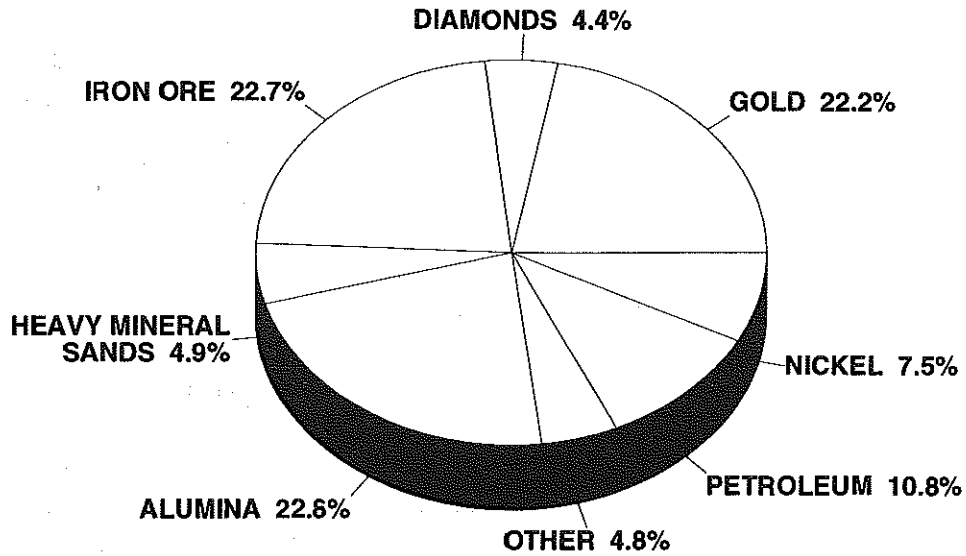
TABLE 4.1 (cont)		QUANTITY AND VALUE OF MINERALS AND PETROLEUM			
		1993		1994	
MINERAL	UNIT	QUANTITY	VALUE(\$A)	QUANTITY	VALUE(\$A)
SILICA-SILICA SAND					
Silica	t	67,732	687,362	78,552	785,526
Silica Sand	t	459,797	4,309,802	558,699	4,979,497
TOTAL SILICA-SILICA SAND			4,997,164		5,765,023
SILVER	kg	78,384(r)	14,966,683(r)	51,805	10,282,509
TALC	t	165,310	12,054,570	100,838	7,307,110
TIN-TANTALUM-LITHIUM					
Spodumena	t	33,353(r)	8,358,894(r)	66,298	11,246,613
Tantalite	t	337(r)	14,616,947(r)	240	22,116,946
Tin Metal	t	73(r)	848,271	209	1,408,719
TOTAL TIN-TANTALUM-LITHIUM			23,824,112(r)		34,772,278
TOTAL VALUE			12,442,785,709(r)		12,924,308,092 (e)

Nota: Quantities used in this table only apply to Minerals and Petroleum covered by the following Acts -
Mining Act 1978
Petroleum Act 1967
Petroleum (Submerged Lands) Act 1982
Commonwealth Petroleum (Submerged Lands) Act 1967
Commonwealth Petroleum Resources Rent Tax Assessment Act 1987
Barrow Island Royalties Variation Agreement Act
relevant State Agreement Acts

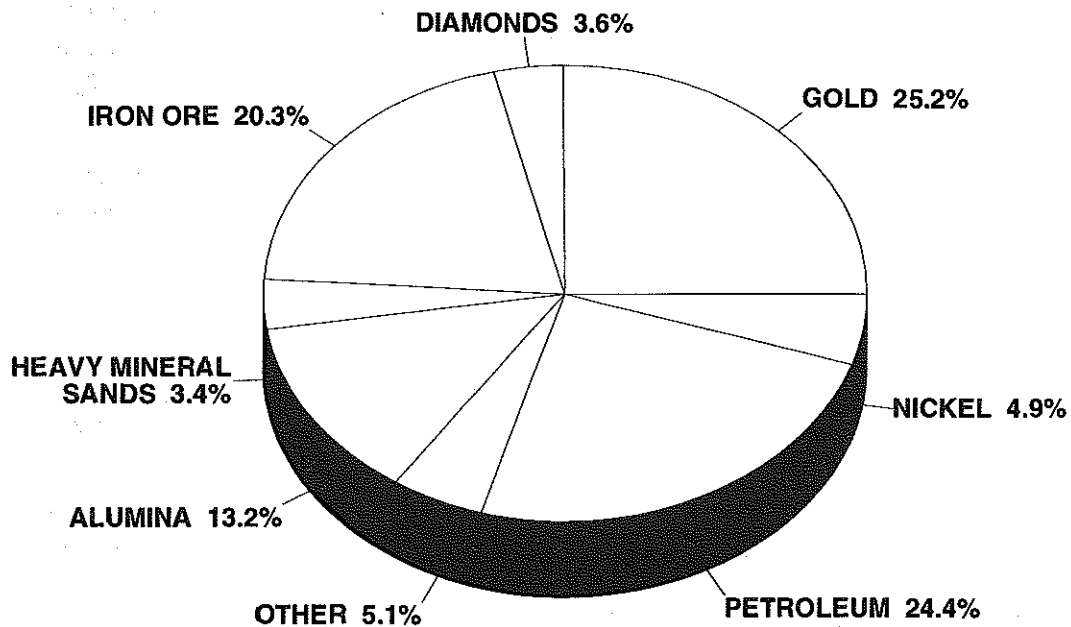
- (a) Also known as synthetic rutile.
- (e) Estimate.
- (r) Revised from previous edition.

COMPARATIVE VALUE OF PRODUCTION

1989 TOTAL : \$9,339 MILLION



1994 TOTAL : \$12,942 MILLION



Source: DME

Figure 4.1

TABLE 5.1 QUANTITY AND VALUE OF MINERALS AND PETROLEUM BY LOCAL GOVERNMENT AREA					
Mineral	Local Government Area	Quantity Tonnes	Metallic Content	Value \$A	Ref.
BASE METALS			Cu Tonnes		
Copper By-Product	Coolgardie		4,341.200	5,869,879	(a),(b)
			Cu %		
Copper Concentrates	East Pilbara	5,409	15.49	752,647	
	Meekatherra	20,803	20.21	1,767,431	
	Yalgoo	45,402	20.15	17,147,122	
		71,614		19,667,200	(a)
			Cu Tonnes		
Copper Cathode	East Pilbara		6,727.595	19,688,597	(a)
Total Copper				45,225,676	
			Pb %		
Lead	Derby-West Kimberley	21,368	80.60	4,803,239	(a)
			Zn %		
Zinc	Derby-West Kimberley	64,807	61.71	27,341,192	
	Yalgoo	107,337	41.55	26,778,095	
		172,144		54,119,287	(a)
TOTAL BASE METALS				104,148,201	
BAUXITE - ALUMINA					
Alumina	Boddington	1,755,957		417,050,084	
	Harvey	1,469,280		305,307,285	
	Murray	3,009,445		626,337,256	
	Serpentine-Jarrahdale	1,698,639		353,381,206	
		7,933,321		1,702,075,831	(c)
CLAYS					
Attapulgitite	Mullewa	19,412		5,642,890	(a)
Clay Shale	Collie	74,351		148,700	(a)
Fire Clay	Chittering	10,812		12,975	(d)
Kaolin	Bridgetown-Greenbushes	3,347		201,531	
	Goomalling	864		25,920	
		4,211		227,451	(d)
White Clay	Swan	67,077		656,898	(d)
TOTAL CLAYS		175,863		6,688,914	
COAL	Collie	5,034,977		235,088,279	(e)
CONSTRUCTION MATERIALS					
Aggregate	Kalgoorlie-Boulder	1,257		6,287	
	Port Hedland	98,055		588,330	
	Wyndham-East Kimberley	10,861		65,166	
		110,173		659,783	

1994 STATISTICS DIGEST

TABLE 5.1 (cont) QUANTITY AND VALUE OF MINERALS AND PETROLEUM BY LOCAL GOVERNMENT AREA

Mineral	Local Government Area	Quantity Tonnes	Metallic Content	Value \$A	Ref.
CONSTRUCTION MATERIALS (cont)					
Gravel	Broome	15,080		68,324	
	Coolgardie	27,564		142,902	
	Coorow	665		3,990	
	East Pilbara	2,100		10,500	
	Kalamunda	74,285		371,425	
	Port Hedland	4,484		26,904	
	Shark Bay	361		1,805	
	Wyndham-East Kimberley	300		1,800	
		124,839		627,650	
Rock	Broome	73,441		1,226,233	
	Exmouth	4,753		32,918	
	Port Hedland	75		1,650	
	Roebourne	39,793		616,372	
		118,062		1,877,173	
Sand	Ashburton	45,584		284,935	
	Broome	20,443		81,430	
	Canning	1,030,523		4,122,092	
	Cockburn	76,809		307,238	
	Collie	23,967		136,014	
	Coolgardie	114,018		632,932	
	Coorow	7,804		45,682	
	Dandaragan	380		2,280	
	Derby-West Kimberley	1,394		9,758	
	East Pilbara	4,413		26,478	
	Gingin	6,192		42,017	
	Kalgoorlie-Boulder	49,197		302,432	
	Leonora	116,886		589,461	
	Meekatharra	37,466		201,524	
	Menzies	25,348		126,740	
	Port Hedland	171,203		1,064,818	
	Roebourne	145,539		769,825	
	Swan	384		947	
Wyndham-East Kimberley	6,400		38,400		
Yilgarn	6,425		28,150		
		1,890,375		8,813,153	
TOTAL CONSTRUCTION MATERIALS				11,977,758	(d)
			Carats		
DIAMOND	Derby-West Kimberley	27,716,403		470,209,714	(a)
OIATOMITE	Danderegan	2,365		18,897	

1994 STATISTICS DIGEST

TABLE 5.1 (cont) QUANTITY AND VALUE OF MINERALS AND PETROLEUM BY LOCAL GOVERNMENT AREA					
Mineral	Local Government Area	Quantity Tonnes	Metallic Content	Value \$A	Ref.
DIMENSION STONE					
Black Granite	Dundas	1,028		316,058	(d)
Quartz Rock	Mukinbudin	795		35,746	(d)
TOTAL DIMENSION STONE		1,823		351,804	
GEM, SEMI-PRECIOUS AND ORNAMENTAL STONE					
Agate	East Pilbara	10,280	kg	9,132	
Chrysoprase	Menzies	128,106	kg	749,522	
Malachite	Meekatharra	5,561	kg	19,639	
Variscite	Meekatharra	440	kg	1,320	
TOTAL GEM, SEMI-PRECIOUS AND ORNAMENTAL STONE				778,293	(e)
GOLD					
			Au kg		
	Boddington		17,134.838	290,089,204	
	Coolgardie		23,352.464	394,743,361	
	Cue		8,185.550	138,634,532	
	Dundas		2,811.562	47,481,215	
	East Pilbara		13,285.535	224,627,092	
	Kalg.-Boulder		45,205.431	765,246,464	
	Laverton		10,250.209	173,696,085	
	Leonora		23,826.077	403,041,928	
	Meekatharra		15,247.628	257,908,541	
	Menzies		1,105.703	18,664,135	
	Mt Magnet		6,489.426	110,058,086	
	Sandstone		3,021.149	50,939,712	
	Wiluna		3,285.826	55,732,668	
	Yalgoo		2,639.239	44,578,044	
	Yilgarn		16,598.694	281,351,738	
			192,439.331	3,256,792,805	(f)
GYPSUM					
	Bruce Rock	2,719		13,595	(e)
	Delwallinu	77,563		1,725,387	(d),(a)
	Dundas	217		2,168	(e)
	Esperance	3,660		22,900	(a)
	Lake Grace	21,575		153,440	(e)
	Nungerin	30,909		184,514	(e)
	Plantagenet	14,514		88,716	(e)
	Ravensthorpe	11,482		76,208	(e)
	Wyalkatchem	40,196		238,894	(e)
	Yilgarn	6,795		52,273	(e)
		209,630		2,558,095	

TABLE 5.1 (cont) QUANTITY AND VALUE OF MINERALS AND PETROLEUM BY LOCAL GOVERNMENT AREA					
Mineral	Local Government Area	Quantity Tonnes	Metallic Content	Value \$A	Ref.
HEAVY MINERAL SANDS					
Garnet Sand	Bunbury City	78		8,370	(g)
	Northampton	60,304		5,728,854	(a)
		60,382		5,738,224	
			TiO2 %		
Ilmenite	Bunbury City	282,529	55.70	24,953,229	
	Capel	432,922	54.79	39,233,390	
	Carnamah	189,113	58.55	14,485,675	
	Dandaragan	174,663	61.06	14,848,323	
		1,079,227		93,520,617	(a)
			TiO2 %		
Upgraded Ilmenite	Capel	149,968	92.00	69,476,309	
	Carnamah	138,444	92.00	66,531,953	
	Dandaragan	69,116	92.00	28,525,839	
		357,528		164,534,101	(e)
			TiO2 Tonnes		
Leucoxene	Bunbury City	8,336	7,633	2,972,675	
	Capel	10,812	9,947	4,435,004	
	Dandaragan	2,529	2,323	741,500	
		21,677	19,903	8,149,179	(a)
			ThO2 Units		
Monazite	Bunbury City	360	2,340	84,240	
	Cepel	1,112	36,755	329,669	
	Cernamah	1,621	10,537	462,995	
		3,093	49,632	876,904	(a)
			TiO2 Tonnes		
Rutile	Cernemeh	62,139	59,152	31,915,487	
	Dandaragan	25,022	23,950	12,548,250	
		87,161	83,102	44,463,737	(a)
			ZrO2 Tonnes		
Zircon	Bunbury City	21,744	14,134	4,968,811	
	Capal	80,366	52,238	16,432,921	
	Cernemeh	280,188	182,945	64,673,798	
	Dandaragan	61,966	40,623	12,924,944	
		444,264	289,940	99,000,474	(a)
TOTAL HEAVY MINERAL SANDS				416,283,235	
INDUSTRIAL PEGMATITE MINERALS					
Felspar	Mukinbudin	8,179		279,809	
	Port Hedland	27,990		1,171,386	
		36,169		1,451,195	(h)

TABLE 5.1 (cont) QUANTITY AND VALUE OF MINERALS AND PETROLEUM BY LOCAL GOVERNMENT AREA					
Mineral	Local Government Area	Quantity Tonnes	Metallic Content	Value \$A	Ref.
IRON ORE			Fe%		
Domestic Ore	Ashburton	193,236	57.24	3,328,464	
	Derby-West Kimberley	537,060	65.45	12,566,855	
	East Pilbara	5,704,180	62.24	134,278,767	
		6,434,476		150,174,086	
Exported Ore	Ashburton	73,169,671	61.34	1,488,774,438	
	Derby-West Kimberley	355,172	65.00	5,752,148	
	East Pilbara	44,303,987	62.48	985,914,236	
		117,828,830		2,480,440,822	
TOTAL IRON ORE		124,263,306		2,630,614,908	(a)
LIMESAND - LIMESTONE - DOLOMITE					
Dolomite	Lake Grace	2,500		25,000	
Limesand - Limestone	Cockburn	1,725,800		8,971,800	
	Dandaragan	64,939		709,160	
	Dundas	62,021		798,865	
	Exmouth	442		7,264	
	Gingin	49,594		1,097,298	
	Irwin	2,997		11,069	
	Manjimup	2,166		21,660	
	Roebourne	420		23,000	
	Shark Bay	405		34,425	
	Wanneroo	314,127		3,014,651	
TOTAL LIMESAND-LIMESTONE		2,225,411		14,714,192	(d)
MANGANESE ORE			Mn %		
	East Pilbara	227,873	37.22	33,147,303	(a)
NICKEL INDUSTRY			Co Tonnes		
Cobalt By-Product	Coolgardie		486.183	33,327,376	
Nickel Concentrates	Coolgardie	278,481	11.64	263,844,822	
	Kalgoorlie-Boulder	28,562	11.45	26,847,084	
	Leonora	290,825	10.30	246,520,254	
	Wiluna	28,910	20.30	54,198,767	
	Yilgarn	51,889	12.00	45,593,198	
		678,667		637,004,125	(i)
Palladium By-Product	Coolgardie		Pd kg 394.420	2,360,012	(a),(b)
Platinum By-Product	Coolgardie		Pt kg 84.043	1,176,044	(a),(b)

1994 STATISTICS DIGEST

TABLE 5.1 (cont) QUANTITY AND VALUE OF MINERALS AND PETROLEUM BY LOCAL GOVERNMENT AREA					
Mineral	Local Government Area	Quantity Tonnes	Metallic Content	Value \$A	Ref.
PEAT	Manjimup	786		58,531	(d)
PETROLEUM		Kilolitres			
Condensate	Carnamah	359		14,002	(d)
	Irwin	4,456		520,513	(d)
	Roebourne	2,336,644		330,657,116	(a)
		2,341,459		331,191,631	
Cruda Oil	Derby-West Kimberley	19,579		2,335,214	
	Irwin	35,239		4,159,141	
	Roebourne	8,697,801		1,293,258,265	
		8,752,619		1,299,752,620	(a)
Liquified Natural Gas	Roabourne	335,106,529		1,080,172,183	(a)
		'000 m³			
Natural Gas	Ashburton	141,208		9,688,021	(j)
	Carnamah	43,581		5,267,350	(j)
	Irwin	354,025		41,072,402	(j)
	Roabourne	4,376,496		385,936,735	(d),(j)
		4,915,310		441,964,508	
TOTAL PETROLEUM				3,153,080,942	
SALT	Carnarvon	1,284,220		28,542,970	
	Esparanca	12,504		313,000	
	Lake Grace	600		24,000	
	Port Hadland	2,180,355		48,362,295	
	Roebourne	2,447,873		54,532,950	
	Shark Bay	784,885		16,756,702	
	Wyalkatchem	185		12,800	
	Yilgarn	94,915		3,730,000	
	6,805,537		152,274,717	(a)	
SILICA - SILICA SAND					
Silica	Moora	78,552		785,526	(a)
Silica Sand	Canning	92,918		1,022,098	(a)
	Cockburn	259,025		2,849,275	(a)
	Collie	2,306		25,366	(a)
	Coolgardie	112,987		276,818	(a)
	Swan	68,732		647,900	(a)
	Wanneroo	22,731		158,040	(a)
TOTAL SILICA - SILICA SAND		637,251		5,765,023	(a)

1994 STATISTICS DIGEST

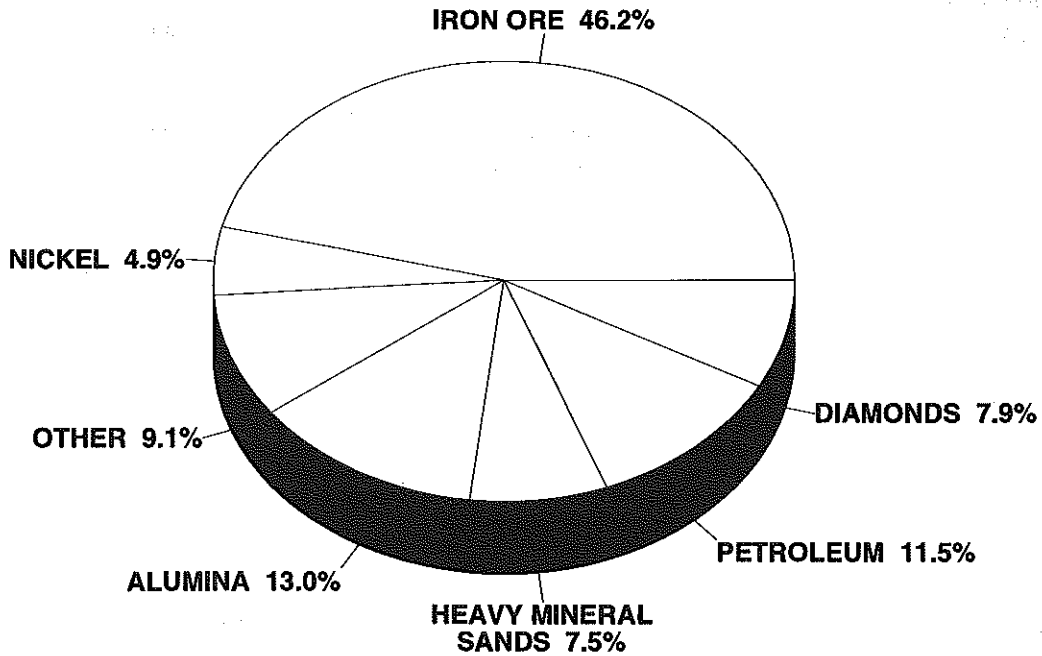
TABLE 5.1 (cont) QUANTITY AND VALUE OF MINERALS AND PETROLEUM BY LOCAL GOVERNMENT AREA					
Mineral	Local Government Area	Quantity Tonnes	Metallic Content	Value \$A	Ref.
		Ag kg			
SILVER: BY-PRODUCT	Coolgardie	215,446		51,348	(a),(b)
	Meekatharra	5,901,810		845,146	(a),(k)
	By-Product Gold Mining	30,981,237		6,207,307	
	Yalgoo	14,706,182		3,178,708	(a),(l)
		51,804,675		10,282,509	
TALC	Meekatharra	27,942		1,955,940	
	Three Springs	72,896		5,351,170	
			100,838		7,307,110
TIN - TANTALUM - LITHIUM			Li2O %		
Spodumene	Bridegetown-Greenbushes	66,298	4.53	11,246,613	(e)
			Ta2O5 kg		
Tantalite	Bridegetown-Greenbushes	109	52,593	14,214,902	
	East Pilbara	131	79,950	7,902,044	
			240	132,543	22,116,946
			Sn Tonnes		
Tin	Bridegetown-Greenbushes	n.ap.	203	1,365,649	
	East Pilbara	n.ap.	6	43,070	
			0	209	1,408,719
VALUE OF MINERALS				6,514,434,345	
VALUE OF PETROLEUM				3,153,080,942	
VALUE OF GOLD				3,256,792,805	
TOTAL VALUE				12,924,308,092	

Mineral	ROYALTY RECEIPTS			
	1993 \$A	1994 \$A	1994 GROWTH \$A %	
BASE METALS				
Copper	1,031,689.57	1,903,749.79	872,060.22	85
Lead	261,486.64	176,323.32	(85,163.32)	(33)
Zinc	4,109,595.93	4,315,390.85	205,794.92	5
TOTAL BASE METALS	5,402,772.14	6,395,463.96	992,691.82	18
BAUXITE-ALUMINA				
Alumina	30,723,077.11	29,077,739.10	(1,645,338.01)	(5)
CLAYS	354,211.22	324,413.65	(29,797.57)	(8)
COAL	12,267,136.05	11,043,351.29	(1,223,784.76)	(10)
CONSTRUCTION MATERIALS				
Aggregate	68,160.60	3,325.50	(64,835.10)	(95)
Gravel	29,816.08	43,683.17	13,867.09	47
Rock	19,806.89	39,882.07	20,075.18	101
Sand	668,237.58	643,463.89	(24,773.69)	(4)
Sandstone	28.00	0.00	(28.00)	(100)
TOTAL CONSTRUCTION MATERIALS	786,049.15	730,354.63	(55,694.52)	(7)
DIAMOND	40,152,290.21	39,937,640.68	(214,649.53)	(1)
DIMENSION STONE	1,701.28	4,057.88	2,356.60	139
GEM, SEMI-PRECIOUS & ORNAMENTAL STONE	93,053.94	49,574.10	(43,479.84)	(47)
GOLD	274,016.12	352,126.87	78,110.75	29
GYPSUM	44,830.34	63,001.33	18,170.99	41
HEAVY MINERAL SANDS				
Garnet	229,093.79	261,290.07	32,196.28	14
Ilmenite	4,960,192.46	3,754,734.49	(1,205,457.97)	(24)
Leucoxene	177,876.94	247,465.14	69,588.20	39
Monazite	127,096.38	81,712.33	(45,384.05)	(36)
Rutile	1,488,178.91	1,519,749.17	31,570.26	2
Zircon	2,335,068.43	2,460,723.49	125,655.06	5
TOTAL HEAVY MINERAL SANDS	9,317,506.91	8,325,674.69	(991,832.22)	(11)
INDUSTRIAL PEGMATITE MINERALS				
Felspar	45,806.43	82,823.88	37,017.45	81
IRON ORE	157,695,037.63	139,440,648.63	(18,254,389.00)	(12)
LIMESAND-LIMESTONE-DOLOMITE				
Dolomite	0.00	186.20	186.20	n.ap.
Limesand-Limestone	208,204.90	383,752.53	175,547.63	84
TOTAL LIMESAND-LIMESTONE-DOLOMITE	208,204.90	383,938.73	175,733.83	84
MANGANESE	1,864,582.00	2,040,289.00	175,707.00	9
NICKEL				
Cobalt by-product	239,568.04	575,241.30	335,673.26	140
Nickel	8,157,046.09	10,872,022.58	2,714,976.49	33
Palladium by-product	29,207.72	66,513.54	37,305.82	128
Platinum by-product	22,490.47	22,947.37	456.90	2
TOTAL NICKEL INDUSTRY	8,448,312.32	11,536,724.79	3,088,412.47	37
PEAT	2,406.17	1,934.06	(472.11)	(20)
PETROLEUM				
Condensate	4,176,998.90	7,665,311.57	3,488,312.67	84
Liquified Natural Gas	11,793,657.02	25,941,709.85	14,148,052.83	120
Natural gas	8,078,800.51	12,249,146.54	4,170,346.03	52
Oil	53,836,100.43	38,338,639.05	(15,497,461.38)	(29)
TOTAL PETROLEUM	77,885,556.86	84,194,807.02	6,309,250.15	8

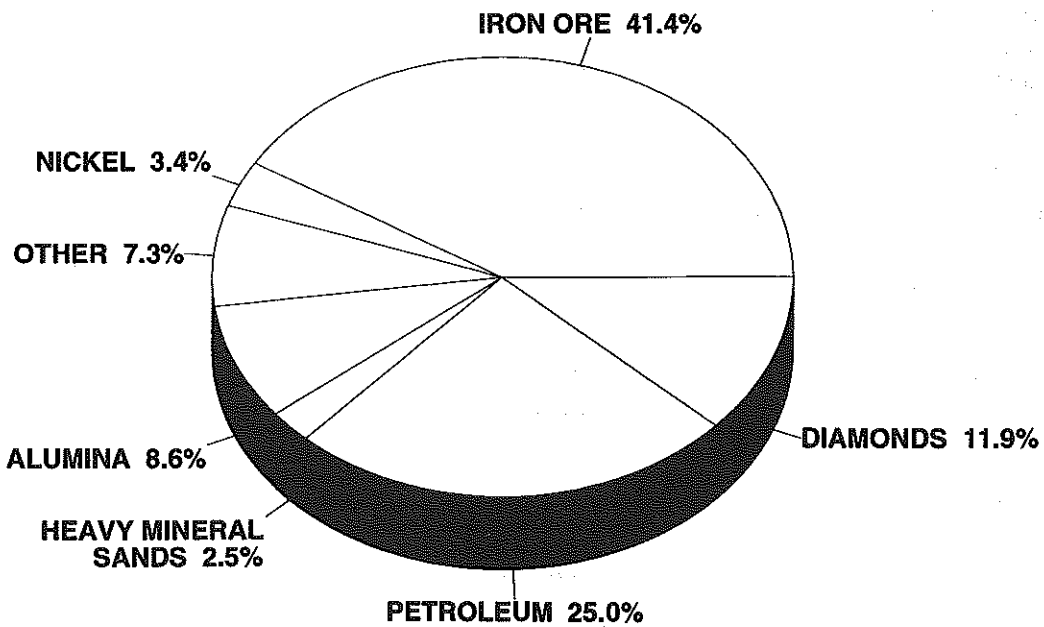
Mineral	ROYALTY RECEIPTS			
	1993 \$A	1994 \$A	1994 GROWTH \$A	%
SALT	1,459,270.37	1,370,295.11	(88,975.26)	(6)
SILICA SAND	239,602.26	316,160.68	76,558.42	32
SILVER	302,284.26	364,204.99	61,920.73	20
TALC	76,792.50	60,181.00	(16,611.50)	(22)
TIN-TANTALUM-LITHIUM				
Spodumene	451,044.24	433,310.27	(17,733.97)	(4)
Tantalite	508,921.06	392,660.70	(116,260.36)	(23)
Tin	26,407.04	42,034.45	15,627.41	59
TOTAL TIN-TANTALUM-LITHIUM	986,372.34	868,005.42	(118,366.92)	(12)
VERMICULITE	931.72	0.00	(931.72)	(100)
TOTAL ROYALTY RECEIPTS	348,631,804.23	336,963,411.49	(11,668,392.74)	(3)
IRON ORE ADDITIONAL RENTAL	25,164,840.85	25,392,184.66	227,343.81	1
TOTAL REVENUE	373,796,645.08	362,355,596.15	(11,441,048.93)	(3)

COMPARATIVE ROYALTY RECEIPTS

1989 TOTAL : \$176.0 MILLION



1994 TOTAL : \$337.0 MILLION



Source: WA Treasury

Figure 6.1

TABLE 7.1 PERSONS EMPLOYED IN THE W.A. MINERALS & PETROLEUM INDUSTRIES AS AT DECEMBER 31, 1994

MINERAL\Company	LOCATION	1993	1994
BASE METALS			
Murchison Zinc Co. Pty Ltd	Golden Grove	226	236
Sebminco NL	Horseshoe Lights	106	0
Western Metals NL	Cadjebut	153	142
Western Mining Corporation Ltd	Nifty	147	114
TOTAL BASE METALS		832	492
BAUXITE - ALUMINA			
Alcoa of Australia Ltd	Del Park-Huntley	321	315
	Jarrahdale	281	264
	Kwinana	1,621	1,727
	Pinjarra	1,319	1,390
	Wagerup	844	606
	Willow Dale	181	187
Australian Fused Materials Pty Ltd	East Rockingham	28	54
Worsley Alumina Pty Ltd	Boddington	150	137
	Worsley	957	1,001
TOTAL BAUXITE - ALUMINA		5,702	5,681
COAL			
Griffin Coal Mining Co. Ltd	Chicken Creek	72	0
	Muja	399	368
	Central Services	75	28
Western Collieries Ltd	Western #2	141	0
	Western #5	90	367
	Western #6	303	0
TOTAL COAL		1,080	783
DIAMOND			
Argyle Diamond Mines Pty Ltd	Lake Argyle	1,079	1,135
Poseidon Ltd	Bow River	108	121
Triad Minerals NL	Phillips Range	3	0
TOTAL DIAMOND		1,190	1,256
GOLD			
Australian Resources & Mining Co. NL	Gidgee	69	99
	Mt McLure	120	41
	Bounty	407	239
Aztec Mining Co Ltd	Copperhead	100	126
Burmine Ltd	Copperhead	100	126
Central Norseman Gold Corp. NL	Central Norseman	240	285
Coolgardie Gold NL	Greenfield	146	128
Consolidated Resources NL	Nevoria	67	120
Dominion Mining Ltd	Bannockburn	130	135
	Labouchere/Nathans	101	0
	Meekatharra	174	184
Goldfen Ltd	Mt Morgans	186	234
	Three Mile Hill	231	208
	Jubilee	118	129
Gold Mines of Kalgoorlie Ltd	Jubilee	118	129
Great Central Mines NL	Bronzewing	0	175
Hedges Gold Pty Ltd	Hedges	96	93
Kalgoorlie Consolidated Gold Mines Pty Ltd	Kalgoorlie	1,511	1,355

TABLE 7.1 PERSONS EMPLOYED IN THE W.A. MINERALS & PETROLEUM INDUSTRIES AS AT DECEMBER 31, 1994

MINERAL\Company	LOCATION	1993	1994
GOLD (cont)			
Gold Mines of Australia Ltd	Reedy	105	124
	Youanmi	17	103
Mining Corporation of Australia Ltd	Mt Pleasant	161	157
Mt Burgess Goldmining Co. NL	Butcher Well	86	0
Newcrest Mining Ltd	Gimlet South	189	196
	New Celebration	453	349
	Telfer	675	711
North Gold (WA) Ltd	Peak Hill	49	80
	Kanowna Belle	140	181
Pancontinental Pty Ltd	Kundana	91	167
	Paddington	175	210
Pleaser Pacific Pty Ltd	Granny Smith	193	319
Plutonic Operations Ltd	Bellevue	155	131
	Derlot	46	66
	Lawlers	139	128
	Plutonic	228	211
Poseidon Ltd	Big Bell	110	334
	Golden Crown	65	78
	Kaltails	98	103
Ramsgate Resources Ltd	Mt Monger	97	87
Reynolds Australia Metals Ltd	Mt Gibson	126	136
	Yilgarn	270	255
Samantha Gold NL	Higginsville	105	132
	Hopes Hill	98	44
Sons of Gwalia NL	Barnicoat	0	61
	Sons of Gwalia	187	207
St. Barbara Mines Ltd	Meekatharra	234	309
Western Mining Corporation Ltd	Emu	116	176
	Kambalda\St. Ives	795	714
	Lancefield	207	114
	Mt Magnet	420	360
Westgold Resources NL	Tuckabienna	70	133
Wituna Mines Ltd	Wituna	210	203
Worsley Alumina Pty Ltd	Boddington	322	500
Yilgarn Star Pty Ltd	Yilgarn Star	113	229
	All Other Operators	1,626(r)	1,025
TOTAL GOLD		11,865	11,884
HEAVY MINERAL SANDS			
Cable Sands Pty Ltd	Bunbury	269	297
RGC Mineral Sands Pty Ltd	Cepel	195	221
	Eneabba	321	335
	Narngulu	245	216
TiWest Pty Ltd	Chandala	143	148
	Cooljarloo	104	112
Westralian Sands Ltd	Cepel	338	363
	All Other Operators	25	32
TOTAL HEAVY MINERAL SANDS		1,640	1,724
IRON ORE			
BHP Iron Ore (Goldsworthy) Ltd	Finucane Island	263	330
	Nimingarra	87	0

TABLE 7.1 PERSONS EMPLOYED IN THE W.A. MINERALS & PETROLEUM INDUSTRIES AS AT DECEMBER 31, 1994

MINERAL\Company	LOCATION	1993	1994	
IRON ORE (cont)				
BHP Iron ore (Goldsworthy) Ltd	Railways	74	61	
	Yerrie	90	119	
BHP Iron Ore (Jimblebar) Ltd	Jimblebar	50	69	
BHP Iron Ore (Yandicoogina) Ltd	Yandicoogina	100	107	
BHP Iron Ore Ltd	Mt Whaleback	1,425	1,421	
	Nelson Point	647	608	
	Orebody 25	64	83	
	Railways	461	429	
BHP Minerals Ltd	Yampi	81	0	
Hamersley Iron Pty Ltd	Brockman	84	81	
	Dampier Port Operations	474	699	
	Hismelt - Kwinana	110	141	
	Merendoo	2	150	
	Paraburdoo/Channer	616	768	
	Railways	544	423	
	Tom Price	835	767	
Kooyanobbing Iron Pty Ltd	Cockatoo Island	0	4	
	Kooyanobbing	0	36	
Roba River Mining Co. Pty Ltd	Cape Lambert	325	362	
	Pannawonica	281	242	
	Railways	90	90	
TOTAL IRON ORE		6,703	6,990	
NICKEL				
Outokumpu Australia Ltd	Forrestena	182	195	
Western Mining Corporation Ltd	Kalgoorlie Nickel Smelter	367	365	
	Kambalda/Blair	1,673	1,138	
	Kwinana Refinery	544	441	
	Leinster	566	587	
	Mt Keith	526	443	
TOTAL NICKEL		3,858	3,169	
PETROLEUM PRODUCTS				
Ampolex Ltd	Wandoo	63	63	
BHP Petrolaum (Australia) Pty Ltd	Griffin & Gas Plant	47	61	
Discovery Petrolaum Ltd	Mt Horner	24	24	
Hadson Energy Ltd	Harriet/Rosatta	122	122	
Minora Resources NL	Bilina/Lloyd/Sundown/West Terrace	2	2	
West Aust Petrolaum Pty Ltd	North West Area/Dongara	371	371	
Westam Mining Corp. Ltd	North Herald/South Pepper/Chervil	28	28	
Woodside Offshore Pet. Pty Ltd	North Rankin A/Burrup Paninsula	682	682	
	All Other Operators	16	16	
TOTAL PETROLEUM PRODUCTS		1,355	1,369	
SALT				
Cargill Salt Co.	Port Hedland	117	107	
Dampier Salt Ltd	Dampier	169	223	
	Leka MacLeod	108	119	
Shark Bay Salt JV	Useless Loop	53	71	
	Other	10	10	
TOTAL SALT		457	530	
ALL OTHER MATERIALS (including Rock Quarries)		916	1,040	
TOTAL		35,398	34,898	

(Sources: Mining Operations Division; Policy & Planning Division)

8.1 PRINCIPAL MINERAL & PETROLEUM PRODUCERS 1994, address, telephone number: mineaite

BASE METALS**Copper**

Murchison Zinc Co. Pty Ltd, c/o Normandy Poseidon Ltd, 100 Hutt St, Adelaide, S.A., (08) 303 1700: Golden Grove.

Newcrest Mining Ltd, 600 St Kilda Rd, Melbourne Vic, 3004, (03) 522 5333: Telfer.

Western Mining Corp. Ltd, 250 St Georges Terrace, Perth 6000, (09) 442 2000: Nifty, Kambalda.

Worsely Alumina Pty Ltd, PO Box 50, Boddington, WA 6390, (097) 34 8311: Boddington.

Lead - Zinc

Murchison Zinc Co. Pty Ltd, c/o Normandy Poseidon Ltd, 100 Hutt St, Adelaide 5000, S.A., (08) 303 1700: Golden Grove.

Westmet Minerals NL, 40 The Esplanade Perth 6000, (09) 481 2555: Cadjabut.

BAUXITE - ALUMINA**Alumina**

Alcoa of Australia (WA) Ltd, cnr Davey & Mermion Sts Booregon 6154, (09) 316 5111: Dal Park, Jarrehdale, Willowdale.

Worsley Alumina Pty Ltd, PO Box 50, Boddington WA 6390, (098) 83 8005: Boddington.

CLAY**Attapulgit**

Mallina Holdings Ltd, 249 Stirling Hwy, Claramont 6010, (09) 384 7077: Lake Nerramyme.

Clay Shele

Western Collieries Ltd, 40 The Esplanade, Perth 6000, (09) 327 4511: Collie.

Kaolin

Gwalia Consolidated Ltd, 16 Parliament Pl, West Perth 6005, (09) 481 1988: Greenbushes.

White Clay

Pilsley Investments Pty Ltd, Locked Bag 100, Midland 6056, (09) 250 2111: Middle Swen.

COAL

Griffin Coal Mining Co. Ltd, 28 The Esplanade, Perth 6000, (09) 325 8155: Collie.

Western Collieries Ltd, 40 The Esplanade, Perth 6000, (09) 327 4511: Collie.

CONSTRUCTION MATERIALS**Aggregate**

The Readymix Group (WA), 75 Canning Hwy, Victoria Park 6100, (09) 472 2000: Boodarrle, Boulder, Oscar Range.

Gravel

Vinci and Sons Pty Ltd, Lot 3 Pickering Brook Rd, Pickering Brook 6076, (09) 293 8295: Pickering Brook.

Rock

County B.S., c/o Pioneer Concrete, 123 Burswood Rd, Victoria Park 6100, (09) 311 8811: Yeeds Station.

8.1 PRINCIPAL MINERAL & PETROLEUM PRODUCERS 1994, address, telephone number: minesite

CONSTRUCTION MATERIALS (cont)**Sand**

Amatek Ltd, 1 Newburn Rd, Kewdale 6104, (09) 353 3030: Gnangarra, Jandakot.

Pioneer Concrete, 123 Burswood Rd, Victoria Park 6100, (09) 311 8811: Coolgardie.

The Readymix Group (WA), 75 Canning Hwy, Victoria Park 6100, (09) 472 2000: Comet Vale, Maitland, Nickol Bay, Pinnacles, Rocklea, Sandy Creek, Sullivan's Creek, Turner River, Warrawanda Creek, Widgiemooltha.

DIAMOND

Argyle Diamond Mines, 2 Kings Park Rd, West Perth 6005, (09) 482 1166: Argyle.

Poseidon Bow River Diamond Mines Ltd, 100 Hutt St, Adelaide, S.A., (08) 303 1700: Bow River.

DIMENSION STONE**Black Granite**

Fraser Range Granite NL, 164 Burswood Rd., Victoria Park 6010, (09) 470 4487: Mt Malcolm.

Quartz Rock

Commercial Minerals Ltd, 26 Tomlinson Rd, Welshpool 6106, (09) 362 1411: Mukinbudin.

GEM, SEMI-PRECIOUS & ORNAMENTAL STONE**Chrysoprase**

Gembank Ltd, 158 Mill Point Rd, South Perth 6151, (09) 474 3165: Yerilla.

GOLD

Aurora Gold Ltd, 24 Outram St, West Perth 6005, (09) 476 2666: Bardoc-Davyhurst, Harbour Lights-Mertondale, Laverton.

Australian Resources & Mining Co. NL, 20 Berry St, North Sydney, NSW 2060, (02) 955 1722: Gidgee, Mt McClure.

Bounty Gold Mine Pty Ltd, Forrestania via Southern Cross 6426, (090) 39 4422: Forrestania-Bounty.

Burmine Ltd, Copperhead Mine, Bullfinch 6484, (090) 49 5066: Frasers, Copperhead.

Centaur Mining and Exploration Ltd, 580 St Kilda Rd, Melbourne Vic. 3004, (03) 276 7888: Lady Bountiful Extended.

Central Norseman Gold Corp. NL, PO Box 56, Norseman 6443, (090) 39 1101: Central Norseman.

Coolgardie Gold NL, 55b Bayley St, Coolgardie 6429, (090) 26 6132: Bayley's Reward-Greenfields.

Croesus Mining NL, 39 Porter St, Kalgoorlie 6430, (090) 91 2222: Binduli, Hannen South, Mystery Mint.

Delta Gold NL, Yarri Rd Kanowna via Kalgoorlie 6430, (090) 91 4922: Kanowna Belle.

Dominion Mining Ltd, 10 Richardson St, West Perth 6005, (09) 426 6400: Bannockburn, Gabanintha, Jupiter, Labouchara - Nathans, Meekatharra, Mt Morgans.

Eltin Minerals Pty Ltd, PMB 31, Kalgoorlie 6430, (090) 21 4844: Grasmont.

Gold Mines of Australia Ltd, 161 Great Eastern Hwy, Belmont 6104, (09) 479 0222: Reedy, Youenmi.

Gold Mines of Kalgoorlie Ltd, 100 Hutt St, Adelaide, S.A., (08) 236 1700: Jubilee.

Hedges Gold Pty Ltd, Williams Rd, Boddington 6390, (09) 538 4512: Hedges.

Herald Resources Ltd, 45 Richardson St, West Perth 6005, (09) 322 2788: Gum Creek-Montegua, Sandstone, Three Mile Hill.

Kalgoorlie Consolidated Gold Mines Pty Ltd, Firmiston, Kalgoorlie 6430, (090) 22 1100: Super Pit, Mt Charlotte, Mt Percy.

8.1 PRINCIPAL MINERAL & PETROLEUM PRODUCERS 1994, address, telephone number: minesite**GOLD (cont)**

- Metall Mining Corp of Aust Pty Ltd, cnr Throssall & Forrest Sts. Kalgoorlie 6430, (090) 21 1766: Round Dam, West Black Flag.
- Mining Corporation of Australia Ltd, 32 Lane St, Kalgoorlie 6430, (090) 21 5144: Mt Pleasant-Golden Kilometre.
- Mt Edon Gold Mines (Aust) NL, 30 Ledger Rd, Balcatta 6021, (09) 345 1588: Tarmoole-King Of The Hills.
- Mt Burgess Gold Mining Co NL, 533 Hay St Perth 6000, (09) 221 1777, Butcher Well - Yundamindera.
- Newcrest Mining Ltd, 179 Gt Eastern Hwy, Belmont 6401, (09) 270 7070: New Celebration, Ora Banda, Orban JV, Telfer.
- North Broken Hill-Peko Ltd, 476 St Kilda Rd, Melbourne Vic 3004, (03) 829 0000: Peak Hill.
- Orion Resources NL, 42 Ardross St, Applacross 6153, (09) 364 8355: Burbidge-Great Victoria, Yilgarn Star.
- Pancontinental Mining Ltd, PO Box 1161, Kalgoorlie 6430, (090) 24 2000: Kundena, Paddington.
- Placer Pacific Ltd, PO Box 33, Laverton WA 6440, (090) 31 3111: Granny Smith.
- Plutonic Resources Ltd, PMB 46 Meekatharra 6642, (09) 370 8201: Darlot, Lawlars, Plutonic, Sir Samuel-Bellevue.
- Poseidon Gold Ltd, 100 Hutt St, Adelaide S.A., (08) 303 1700: Big Ball, Golden Crown, Kaitails.
- Ramsgate Resources Ltd, 229 Stirling Highway, Claremont 6010, (09) 383 4321: Grace Darling, Mt Monger-Randalls.
- Resolute Resources Ltd, 28 The Esplanade, Perth 6000, (09) 321 4011: Marymia Hill.
- Reynolds Australia Metals Ltd, 28 The Esplanade, Perth 6000, (09) 322 2313: Cornishman, Frances Furness, Marvel Loch-Southern Cross, Mt Gibson.
- Samantha Gold NL, 28 The Esplanade, Perth 6000, (09) 481 5288: Glendowar, Higginsville, Hopes Hill-Corinthia.
- St Barbara Mines Ltd, Gt Northern Highway, Meekatharra 6642, (099) 81 8111: Bluebird.
- Sons of Gwalia NL, 16 Parliament Pl, West Perth 6005, (09) 481 1988: Barnicoat, Sons of Gwalia.
- Western Mining Corp. Ltd, 250 St Georges Terrace, Perth 6000, (09) 442 2000: Emu-Leinster, Hill 50-Mt Magnet, Kambalda-St Ivas, Lancafield.
- Westgold Resources NL, 108 St Georges' Tce, Perth 6000, (09) 324 2877: Tuckebianna
- Wiluna Mines Ltd, 10 Ord St West Perth 6005, (09) 481 2050: Jundee, Wiluna.
- Worsley Alumina Pty Ltd, PO Box 48, Boddington 6390, (098) 83 8260: Boddington.

GYP SUM

- H.B. Brady & Co. Pty Ltd, PO Box 42, Bayswater 6053, (09) 279 4422: Lake Brown.
- Lake Hillman Mining Pty Ltd, Kalannie 6468, (096) 66 2045: Lake Hillman.
- Swan Portland Cement Ltd, Burswood Rd, Rivervale 6103, (09) 361 8822: Lake Hillman.
- Westdeen Holdings Pty Ltd, 7 Armstrong Rd, Applacross 6153, (09) 364 4951: Lake Cowcowing.

HEAVY MINERAL SANDS**Garnet Sand**

- Target Minerals NL, PO Box 188, Geraldton 6530, (099) 23 3644: Port Gregory.

Ilmenite, Rutile, Zircon, Leucosene & Monazite

- Cable Sands (WA) Pty Ltd, PO Box 133, Bunbury 6230, (097) 21 4111: Busseton, Jangardup, Waroona.
- RGC Mineral Sands, PO Box 62, Geraldton 6530, (090) 64 2245: Capel, Eneabba North, Eneabba West, Narngulu.
- TiWest Pty Ltd, 1 Brodie Hall Dve, Bentley 6102, (09) 365 1390: Cooljarloo, Chandala.
- Westralian Sands Ltd, PO Box 96, Capel 6271, (097) 27 2002: Yoganup, Yoganup Extended.

8.1 PRINCIPAL MINERAL & PETROLEUM PRODUCERS 1994, address, telephone number: minesite**INDUSTRIAL PEGMATITE MINERALS****Felspar**

Commercial Minerals Ltd, 26 Tomlinson Rd, Welshpool 6106, (09) 362 1411: Mukinbudin, Pippingarra.

IRON ORE

BHP Iron Ore (Goldsworthy) Ltd, 200 St George's Tce, Perth 6000, (09) 320 4444: Nimingarra, Yarrie.

BHP Iron Ore (Jimblebar) Ltd, 200 St George's Tce, Perth 6000, (09) 320 4444: Jimblebar.

BHP Iron Ore Ltd, 200 St George's Tce, Perth 6000, (09) 320 4444: Newman, Yandicoogina.

IRON ORE (cont)

Channar Mining Pty Ltd, 152 St George's Tce, Perth 6000, (09) 327 2327: Channar.

Hemersley Iron Pty Ltd, 152 St George's Tce, Perth 6000, (09) 327 2327: Brockman, Marendoo, Tom Price, Paraburdoo.

Koolyanobbing Iron Pty Ltd, 56 Adelaide Tce, Perth WA 6000, (09) 268 3388: Cockatoo Island, Koolyanobbing.

Robe River Iron Associates, 12 St George's Tce, Perth 6000, (09) 421 4747: Pennawonica.

LIMESAND - LIMESTONE

Cockburn Cement Ltd, Russell Rd, South Coogee 6166, (09) 411 1000: Cockburn Sound, Coogee.

Limestone Building Blocks Co. Pty Ltd, Hopkins Rd, Carabooda 6033, (09) 407 5005: Nowerup.

Loongana Lime Pty Ltd, PO Box 808, Kalgoorlie 6430, (090) 21 8055: Loongene.

Swan Portland Cement Ltd, Burswood Rd, Rivervale 6103, (09) 361 8822: Wenneroo.

Westdeen Holdings Pty Ltd, 7 Armstrong Rd, Applecross 6153, (09) 364 4951: Dandaragen, Gingin, Irwin, Yanchee.

NICKEL

Outokumpu Australia Pty Ltd, 141 Burswood Rd., Burswood 6100, (09) 472 3144: Forrestania

Western Mining Corp. Ltd, 250 St Georges Terrace, Perth 6000, (09) 442 2000: Blair, Carnilya Hill, Kambalda, Leinster, Mt Keith.

PEAT

Peat Resources of Australia Pty Ltd, 665 Welshpool Rd, Wattle Grove 6107, (09) 453 7777: Manjimup.

PETROLEUM

Ampolex Ltd, 250 St George's Tce, Perth 6000, (09) 429 3200: Wandoo

Apache Energy Ltd, 256 St Georges' Tce, Perth WA 6000, (09) 422 7222: Campbell, Harriet, Rosette, Sinbed & Tanami.

BHP Petroleum Pty Ltd, 221 St Georges Tce, Perth 6000, (09) 426 5600: Griffin

Consolidated Gas Pty Ltd, 174 Hamden Rd, Nedlands 6009, (09) 389 8344: Woodada.

Discovery Petroleum NL, 31 Ventnor Ave, West Perth WA, 6005, (09) 480 4100: Mt Horner.

Doral Resources NL, 250 St George's Tce, Perth 6000, (09) 481 5866: Tubridgi.

Santos Ltd, 39 Grenfell St, Adelaide SA 5001, (08) 224 7162: Bliana, Boundery, Lloyd, Sundown, West Terrace.

Sagasco Resources Ltd, 60 Hindmarsh Sq, Adelaide SA 5000, (08) 235 3737: Beharra Springs.

West Aust. Petroleum Pty Ltd (WAPET), QV1, 250 St Georges Tce, Perth 6000, (09) 263 8000: Berrow Island, Cowle, Crest,

8.1 PRINCIPAL MINERAL & PETROLEUM PRODUCERS 1994, address, telephone number: minesite**PETROLEUM (cont)**

Dongara, Mondera, Roller-Skate, Saledin, Yammaderry.

Western Mining Corp. Ltd, 250 St Georges Terrace, Perth 6000, (09) 442 2000: Chervil, North Herald, South Pepper, Airlie Island.

Woodside Offshore Pet. Pty Ltd, 1 Adelaide Tce, Perth 6000, (09) 224 4111: Cossak/Wanaea, Goodwyn, North Rankin.

SALT

Cargill Australia Ltd, PO Box 420, Port Hedland 6721, (091) 40 1255: Port Hedland.

Dampier Salt (Operations) Pty Ltd, 177A St George's Tce, Perth 6000, (09) 327 2299: Dampier, Lake Macleod.

Shark Bay Salt Joint Venture, 22 Mount St, Perth 6000, (09) 322 4811: Useless Loop.

WA Salt Koolyanobbing Pty Ltd, Cockburn Rd, Hamilton Hill 6163, (09) 430 5495: Lake Deborah East, Pink Lake.

SILICA - SILICA SAND**Silica**

Simcoa Operations Pty Ltd, P.O. Box 1389, Bunbury 6230, (097) 912 588: Dalaroo.

SILICA - SILICA SAND (cont)**Silice Sand**

ACI Operations Pty Ltd, 35 Baille Rd, Canning Vale 6155, (09) 455 1111: Lake Gnengara.

Amatek Ltd, 1 Newburn Rd, Kewdale 6104, (09) 353 3030: Jandakot, Gnengere.

Boral Resources WA Ltd, 136-138 Gt Eastern Hwy, South Guildford 6055, (09) 279 0000: Jandakot.

The Readymix Group (WA), 75 Canning Hwy, Victoria Park 6100, (09) 472 2000: Jandakot.

Western Mining Corp. Ltd, 250 St Georges Terrace, Perth 6000, (09) 442 2000: Mt Burgess.

TALC

Gwalia Minerals NL, 16 Parliament Pl, West Perth 6005, (09) 481 1988: Mt Seabrook.

Western Mining Corp. Ltd, PO Box 116, Three Springs 6519, (099) 54 5047: Three Springs.

TIN - TANTALUM - LITHIUM**Spodumene**

Lithium Australia Ltd, 16 Parliament Pl, West Perth 6005, (09) 481 1988: Greenbushes.

Tantalite - Tin

Goldrim Mining Australia Ltd, 317 Hunter St, Newcastle NSW 2300, (049) 29 2433: Wodgina.

Gwalia Consolidated Ltd, 16 Parliament Place, West Perth 6005, (09) 481 1988: Greenbushes.

Pan West Tantalum Pty Ltd, Gateway, 1 Macquarie Place, Sydney NSW 2000, (02) 256 2000: Wodgina.