ROYALTIES AND POLICY DEVELOPMENT DIVISION

STATISTICAL DIGEST OF MINERAL AND PETROLEUM PRODUCTION 1988–1989

DEPARTMENT OF MINES
WESTERN AUSTRALIA

STATISTICAL DIGEST OF MINERAL

AND PETROLEUM PRODUCTION

1988-89

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ABREVIATIONS, REFERENCES, UNITS AND CONVERSION FACTORS

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

ABBREVIATIONS

cons.	concentrates	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

REFERENCES

(a) Value based on the average Australian value of alumina as published by the Bureau of Mineral Resources in the Australian Mineral Industry Review.
(b) Value at works.
(c) Estimated f.o.b. value.
(d) Estimated ex-mine value.
(e) Metallic by-product of nickel mining.
(f) Estimated f.o.r. value.
(g) Estimated f.o.t. value.
(h) Value based on monthly production and average gold price of that month as supplied by Gold Producers Association.
(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.

UNITS AND CONVERSION FACTORS

				Conversion factors	
	Metric unit	Symbol	Imperial unit	Multiply imperial unit by	Multiply metric unit by
Mass	gram	g	troy (fine) ounce (oz)	31.103522	0.032151
	kilogram	kg	pound (lb)	0.453592	2.204624
	tonne	t	long ton (2240 lbs)	1.016046	0.984207
	tonne	t	short ton (2000 lbs)	0.907185	1.102311
Volume	kilolitre	kl	barrel (bbl)	6.28981	0.158987
	kilolitre	kl	cubic metre (m^3)	1	
Prefix	kilo (k)	10^3			
	mega (M)	10^6			
	giga (G)	10^9			
	tera (T)	10^{12}			

1. OVERVIEW

1.1 Review of World Economy

The 1988-1989 financial year was characterised by caution among policy makers, in both the public and private sectors. This was due to uncertainty over the effects of persisting structural problems, trade/financial imbalances and shocks associated with the world economy. The major **causes** were the inter-related fallout from the stock market crash of 1987, continuing financial market deregulation, currency fluctuations and fiscal and trade disequilibria. The universally feared **effect** was inflation.

During 1988-1989 some progress was made in the co-ordination of exchange rates but the other structural problems remained. There was tacit agreement among the industrialised nations that inflation could only be controlled by a reduction in the rate of economic growth. While varying intensities of demand management through monetary policy were favoured by Australia and its trading partners, equity and financial markets generally experienced low levels of activity.

Investment in proven mineral producers expanded steadily. The underlying strength of the slowing US economy and steady growth in Japan and East Asian markets maintained demand for Australian base metals. Bouyed by demand and medium to long term supply uncertainties, energy prices also continued to climb.

The 1988-1989 financial year ended with mixed results for the world economy. Overall the OECD nations recorded real economic growth of 4.4% over the 1987-1988 outcome. Rates of growth were, however, quite uneven reflecting the structural problems and demand management strategies employed by the individual nations. The threat of inflation persisted, particularly in the US and UK.

1.2 Review of the Australian Economy

The Australian economy continued to grow steadily during 1988-1989. The output of manufactured goods rose by a total of 8.9% over the four quarters to June. The ANZ Bank measure of job vacancies fell consistently during the same period. The consumer price index increased by 9.1% and real GDP rose by 3.3% over the year. The current account registered a steadily widening deficit over the 12 months. A persistent deficit in the trade account contributed to this outcome.

.../3

The Government's use of monetary policy to slow demand in the economy resulted in significant interest rate rises, particularly in the last two quarters. The prime rate indicator rose from 15.00% on 1 July 1988 to 19.75% on 1 July 1989.

Despite stronger prices for the majority of minerals and rural commodities, Australia experienced a deterioration in its overall terms of trade. This trend, consistent from the early 1970s, was largely attributable to the long-term tendency for commodity prices to rise more slowly than those applying to manufactured goods.

1.3 Economic Factors Affecting the Mining Industry

The main determinants of mining industry prosperity remained international market demand, the exchange rate and domestic interest rates. Industrial disputes and other supply disruptions were relatively minor factors.

The combination of high domestic interest rates, steady to rising commodity prices and a weakening $US drove the $A exchange rate to 88.9 US cents in January 1989. The $A gradually declined during the following six months to 75.5 US cents.

The relatively high $A/$US exchange rate during most of the period disadvantaged Australian miners in two ways. With most mineral traded in $US, the high Australian value price made Australian output less competitive on world markets and eroded profits by reducing the returns in $A terms. Whereas steadily rising prices over most of the year ameliorated these effects for the majority of mineral producers, gold miners suffered price falls. This contributed to a 'shake out' among gold stocks and some industry rationalisation, particularly in Western Australia. Although the profitability of mining operations was eroded by the interest rate surge, this effect on overall industry activity was moderated by the size, lead time and overall viability of many of the new projects.

Australia's economic health largely depends on the sustained export of mining and agricultural based commodities. These two broad categories represent over 80% of the nation's export receipts. In Western Australia during 1988-1989 mining, energy and mineral processing accounted for approximately 60% of the value of the State's overseas exports. This amount was about twice the contribution of agricultural exports and almost ten times that of the manufacturing sector.

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1.4 Social and Political Factors Affecting the Mining Industry

Issues which had a direct effect on industry operations include the widespread concern for the environment, occupational health, safety and welfare matters, and the imminent Federal gold tax.

To ensure continued resource development, a balance has to be maintained between development and effective environmental conservation. Without this balance future economic growth potential across all sectors, including mining, will be restricted. A mechanism whereby development conditions are established and monitored is being further refined to ensure close interaction between the Department of Mines, the Environmental Protection Authority and Conservation and Land Management.

The recent spate of mining accidents has again highlighted the constant vigilance needed by all parties to ensure that mining remains a safe and healthy working environment.

Despite vigorous opposition by both the mining industry and State Government, a gold tax is to be implemented from 1 January, 1991. Concern has been expressed in regard to the negative impact of this company tax on marginal projects, as well as its possible effect upon the investment climate in the wider gold industry. As Western Australian gold production accounts for approximately 66% of the value of the national output, there are domestic and balance of payments implications from this measure. The Federal Government believes, however, that on efficiency and equity grounds the prevailing company tax free status of the industry is unsustainable.

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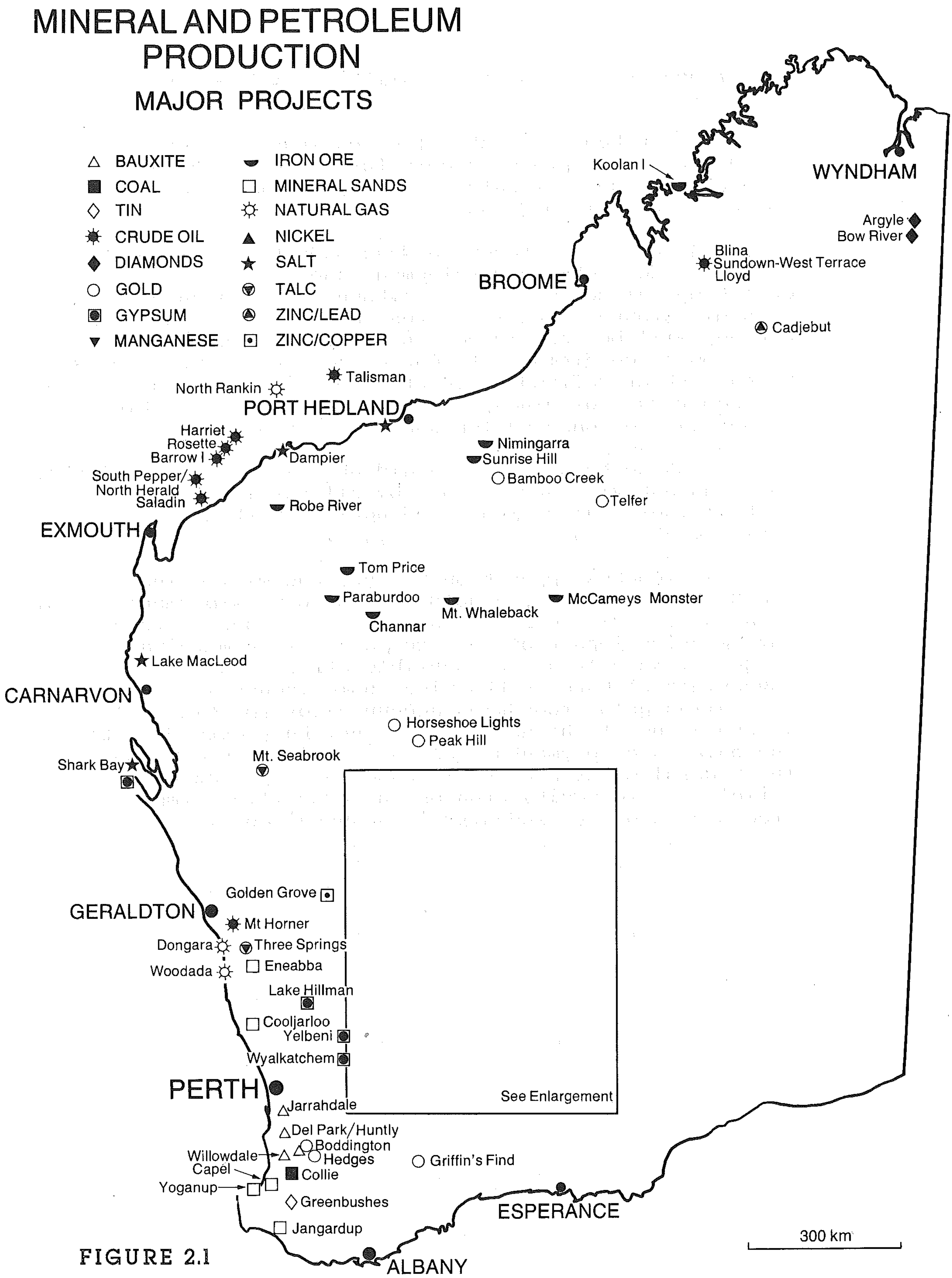
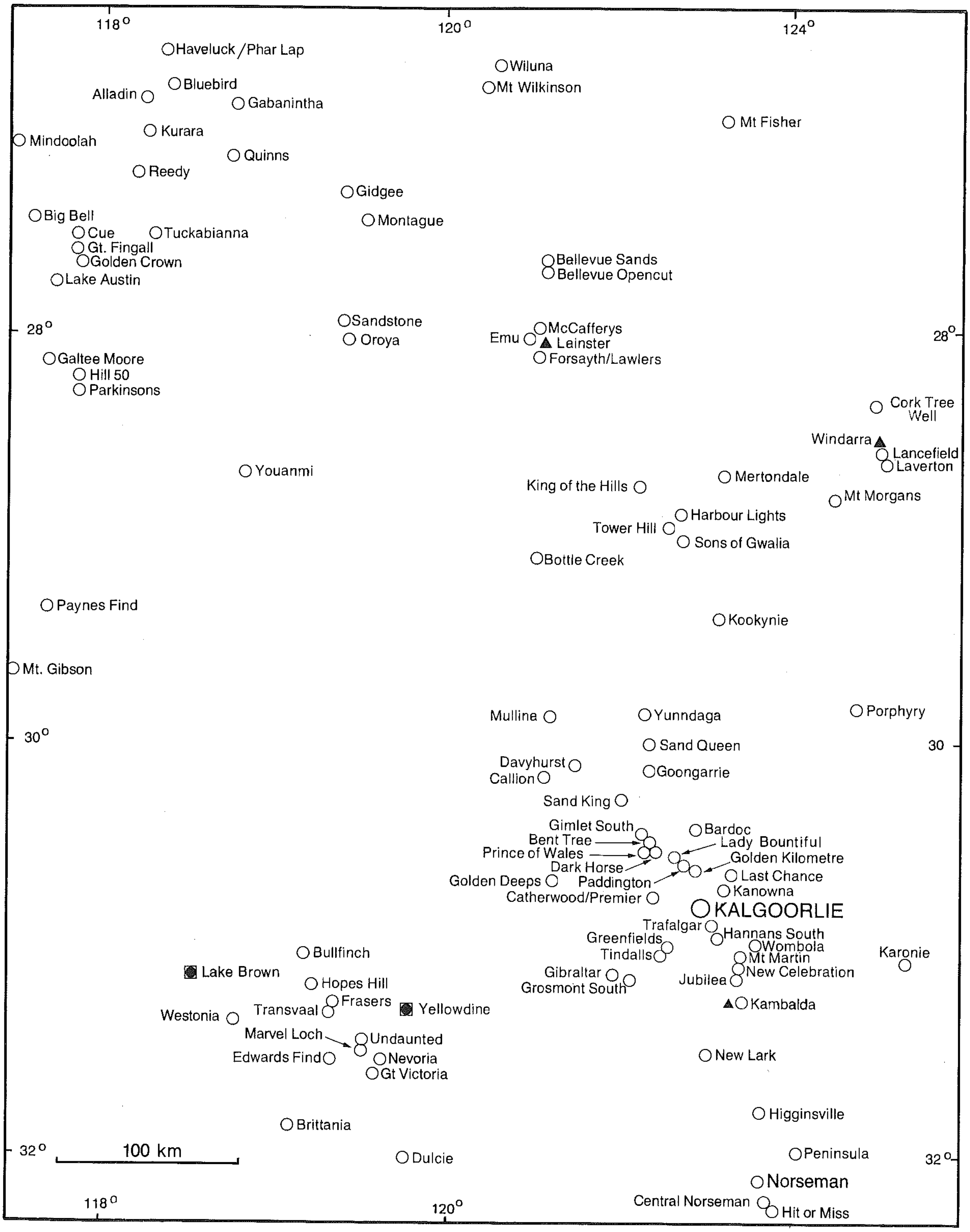

MINERAL AND PETROLEUM PRODUCTION
MAJOR PROJECTS
BAUXITE
COAL
TIN
CRUDE OIL
DIAMONDS
GOLD
GYPSUM
MANGANESE
IRON ORE
MINERAL SANDS
NATURAL GAS
NICKEL
SALT
TALC
ZINC/LEAD
ZINC/COPPER
Koolan I
WYNDHAM
Argyle
Bow River
Blina
Sundown-West Terrace
Lloyd
BROOME
Cadjebut
Talisman
North Rankin
PORT HEDLAND
Harriet
Rosette
Barrow I
Dampier
Nimingarra
Sunrise Hill
Bamboo Creek
Telfer
South Pepper/
North Herald
Saladin
Robe River
EXMOUTH
Tom Price
Paraburdoo
Mt. Whaleback
McCameys Monster
Channar
Lake MacLeod
CARNARVON
Horseshoe Lights
Peak Hill
Shark Bay
Mt. Seabrook
Golden Grove
GERALDTON
Mt Horner
Dongara
Three Springs
Eneabba
Woodada
Lake Hillman
Cooljarloo
Yelbeni
Wyalkatchem
PERTH
See Enlargement
Jarrahdale
Del Park/Huntly
Boddington
Hedges
Willowdale
Capel
Collie
Griffin's Find
Yoganup
Greenbushes
ESPERANCE
Jangardup
300 km
ALBANY

FIGURE 2.1

ENLARGEMENT (From previous page)



GOLD
NICKEL
GYPSUM

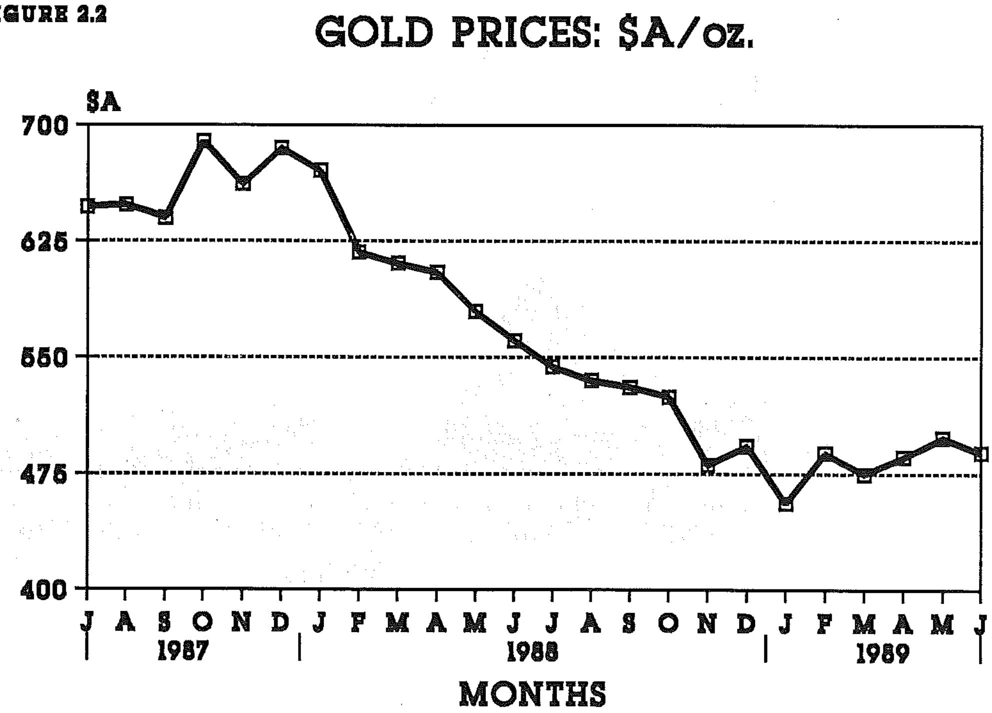
2. REVIEW OF MAJOR MINERALS AND PETROLEUM

2.1 Gold

During 1988-1989 Western Australian based operations produced 121 tonnes (t) of gold. This represented an increase of over 30% on the 1987-1988 total of 90.5 t. The value of gold production, based on the monthly average sale price at the Perth Mint, was $2.03 billion (b), a 10% increase on the 1987-1988 total of $1.85 b. The precious metal continued to move ahead of iron ore and alumina as Western Australia's most valuable export.

The average price on world markets continued to decline during the year; the supply and demand relationship being one of steady increases in capacity and output combined with a moderate demand. Demand was reduced by improving superpower relations, and the resultant relaxing of international tension, as well as the markets' perceptions that some steps were being taken by the major industrialised nations to curb inflation. The price of gold fell steadily from US$436.55 in July 1988 to US$373.00 in June 1989. Australian gold mining companies were further disadvantaged by the rapid appreciation of the $A against the $US during the first half of the financial year.

FIGURE 2.2



SOURCE: LONDON GOLD PRICE, MONTHLY AVERAGE OF WEDNESDAY PRICES.

The above effects were ameliorated by the widespread use among producers of forward markets and by a rapid decline in the $A/$US exchange rate between January and July 1989.

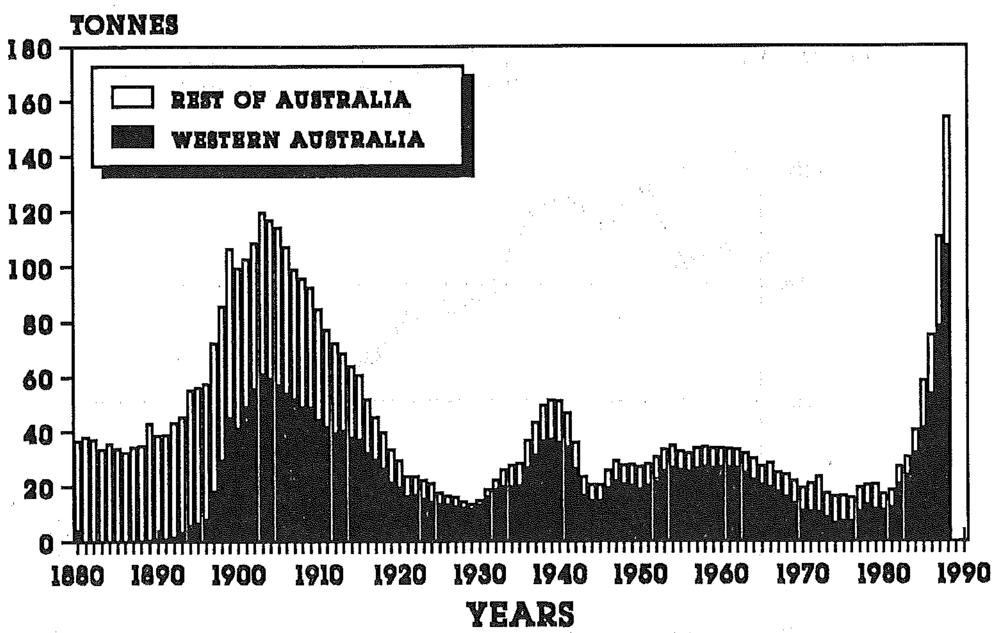
As a further response to these market conditions the industry experienced increased rationalisation and concentration of ownership. Producers seeking lower costs through economies of scale acquired larger proven low grade reserves and channelled investment into upgrading extraction technologies.

Developments during 1988 were the 'Super Pit' in Kalgoorlie and major expansions at the Boddington Gold and Telfer Projects. The massive Kaltails development at Kalgoorlie/Boulder is due to commence production in July of 1989.

The dominance of Western Australian production as a proportion of the national output has been sustained (Fig 2.3). Despite a weakening price, overall output is projected to increase again during 1989-90. The increase will be driven by the 1991 tax regime and large scale investments already 'in the pipeline'.

FIGURE 2.3

GOLD PRODUCTION



SOURCES:DEPT OF MINES WESTERN AUSTRALIA,

BMR & ABARE

2.2 Iron Ore

Iron ore production increased from 94.6 million tonnes (mt) in 1987-1988 to 99.7 mt in 1988-1989, an increase of 5.4%. During this period the value of production decreased from $1 855.7 m to $1 780.4 m. There were several factors which contributed to this outcome.

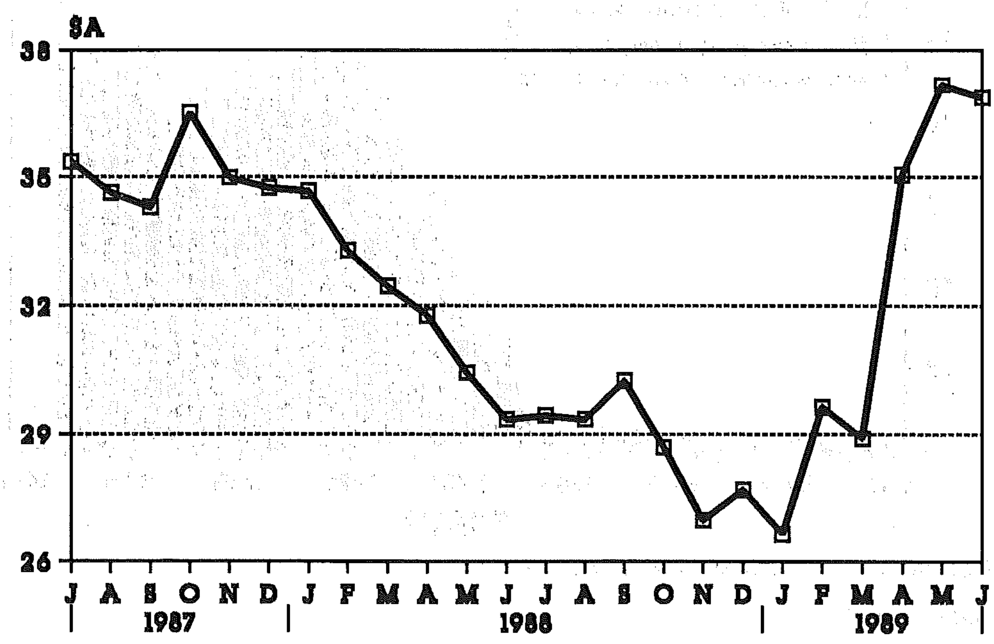
The strength of the $A against the $US (Fig 2.14) had the effect of reducing both the competitiveness and profit margins of Australian producers.

Long term price and tonnage contract negotiations with Japanese buyers were difficult and protracted. A strengthening of world demand for iron ore during the second quarter influenced these negotiations and producers were able to gain substantial price rises (15%) and enhanced tonnage commitments (Fig 2.4).

Prices were driven higher by the increases in Japanese steel production needed to fill rising export orders and social infrastructure investment.

FIGURE 2.4

IRON ORE PRICES: $A/tonne



SOURCE: HIGH GRADE LUMP ORE PRICES.

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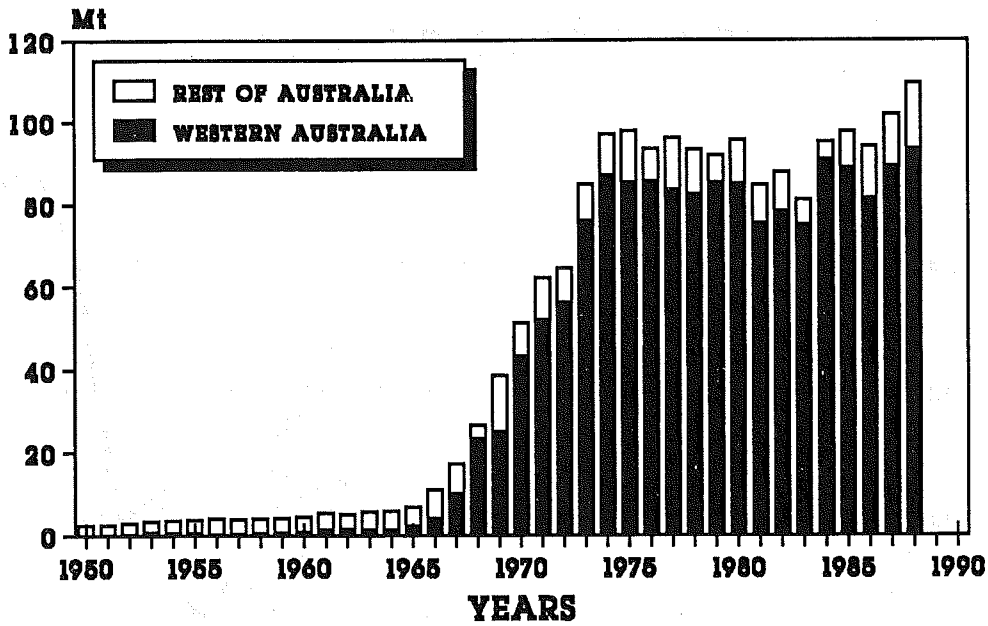
As a direct result of the long period of falling prices producers are well structured to gain from the current price rise. Productivity levels are high as a result of extensive cost minimizing restructuring.

The 12 month outlook for Western Australian iron ore producers is good. Prices have firmed and two major projects are progressing from the development to production phases. These are the Hancock Mining Ltd project of McCamey's Monster and Hamersley Mining's development of the Mount Channar deposit. Production began at McCamey's Monster, a 250 mt deposit, in the third quarter of 1988-1989. The Mount Channar project, the result of a $300 m investment by the People's Republic of China, is due to begin production in 1990.

Western Australia is by far the largest iron ore producing State in Australia (Fig 2.5). The current record year continues a trend which began in the late 1960's.

FIGURE 2.5

IRON ORE PRODUCTION



SOURCES:DEPT OF MINES WESTERN AUSTRALIA,

BMR & ABARE

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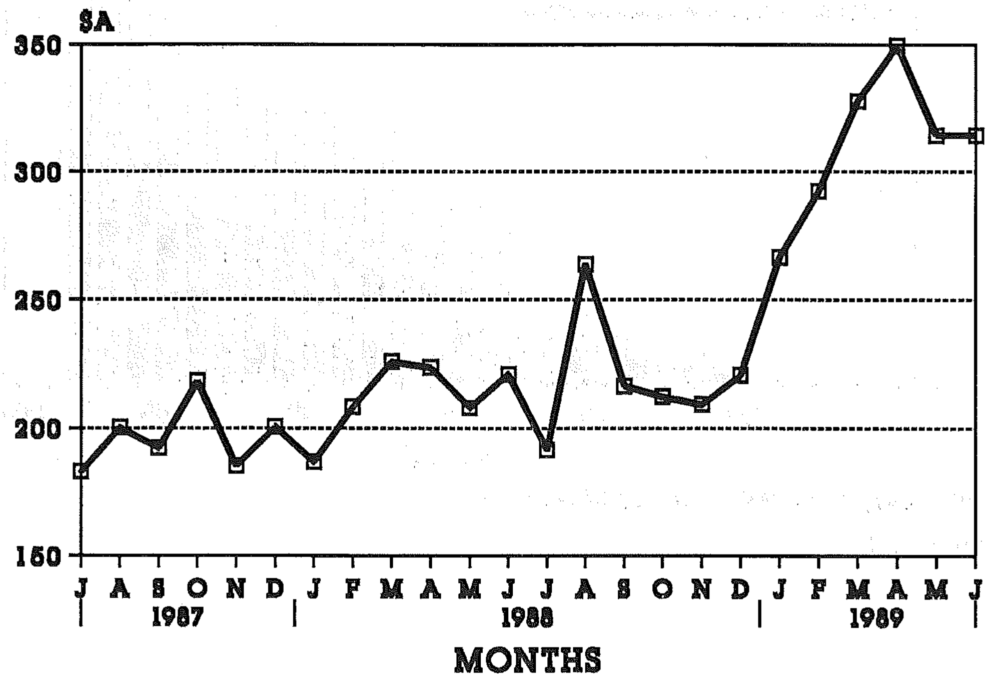
2.3 Alumina

During the financial year 6.17 mt of alumina were produced in Western Australia. This represented a marginal 1.6% increase over the 1987-1988 total of 6.03 mt. Value of production for the period was $1.62 b; the 37% increase over the 1987-1988 figure of $1.2 b reflected the stronger prevailing prices.

The LME world indicator price of aluminium drifted steadily lower during the financial year. The historic highs recorded during June 1988 were driven by low inventories and some supply disruptions. Capacity increases, some slowing of demand growth in the US and Europe and a rise in secondary aluminium production, led to a gradual expansion of stocks. This resulted in a moderation in prices for primary aluminium and some flow through to the price of alumina. This effect was muted by the nature of the world trade in alumina. Most is sold under long term contract and hence changes in the metal price have a lagged impact on those applying to alumina.

FIGURE 2.6

ALUMINA PRICES: $A/tonne



SOURCE: DERIVED FROM L.M.E. & A.B.S.

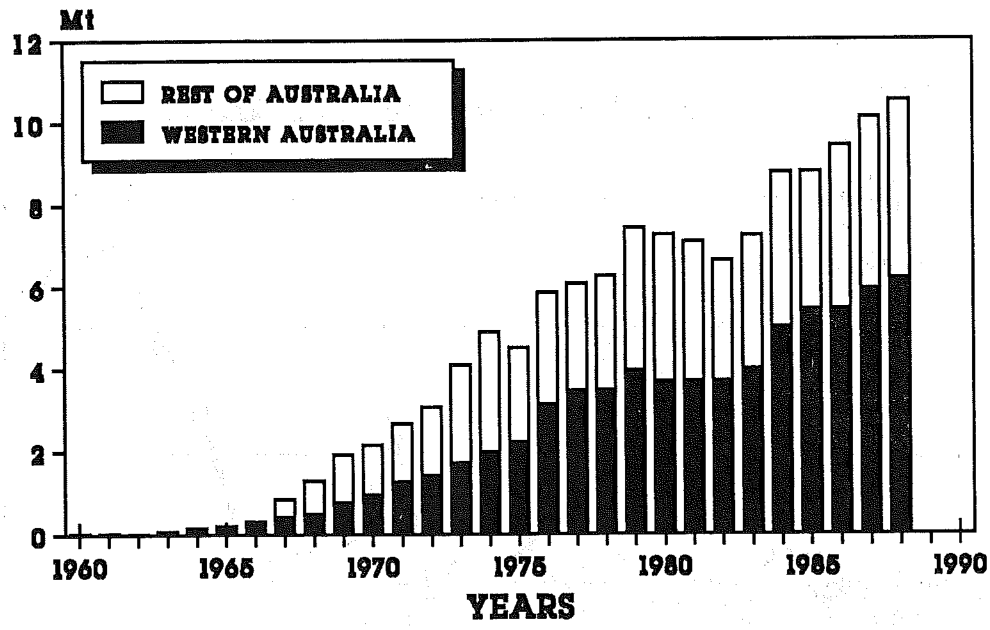
A sustained demand growth in the State's traditional markets of Japan and East Asia, driven mainly by construction and transport industry expansion, kept Western Australian producers near capacity during the year.

Planned major expansions of capacity by Alcoa and Worsley and advanced feasibility studies for an aluminium smelter at Kemerton in the South West, are strong indications of industry confidence in the long term viability of this sector.

Western Australia has maintained its position as Australia's leading alumina producing State (Fig 2.7). With imminent capacity expansions this trend should continue into the 1990's.

FIGURE 2.7

ALUMINA PRODUCTION



SOURCES:DEPT OF MINES WESTERN AUSTRALIA,

BMR & ABARE.

2.4 Petroleum

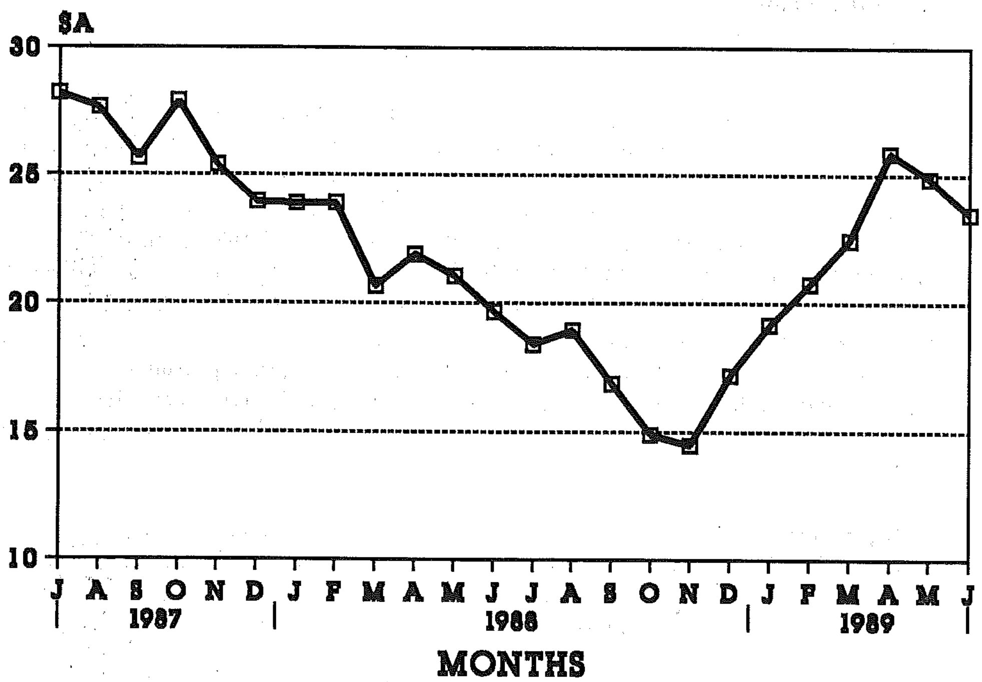
Crude oil production in Western Australia during the financial year totalled 2.2 gigalitres (GI), a 300 000 kl increase over the 1987-1988 figure. Of the State's eight producing fields Barrow Island, Harriet and Herald/Pepper accounted for approximately 97% of this total. The relatively small fields of Mount Horner, Blina, Lloyd, Dongara and Sundown/West Terrace supplied the balance.

The condensate total of 1.15 G1, a 9% increase over the 1988-1989 figure, was almost totally drawn from the North West Shelf (NWS). There was some production from the Dongara and Woodada fields.

Despite marked increases in crude oil and condensate output, the total values of production from both commodities fell from the amounts recorded in 1987- 1988. The crude oil figure decreased from $304 m to $270 m, while the condensate figure fell from $170 m to $142 m.

FIGURE 2.8

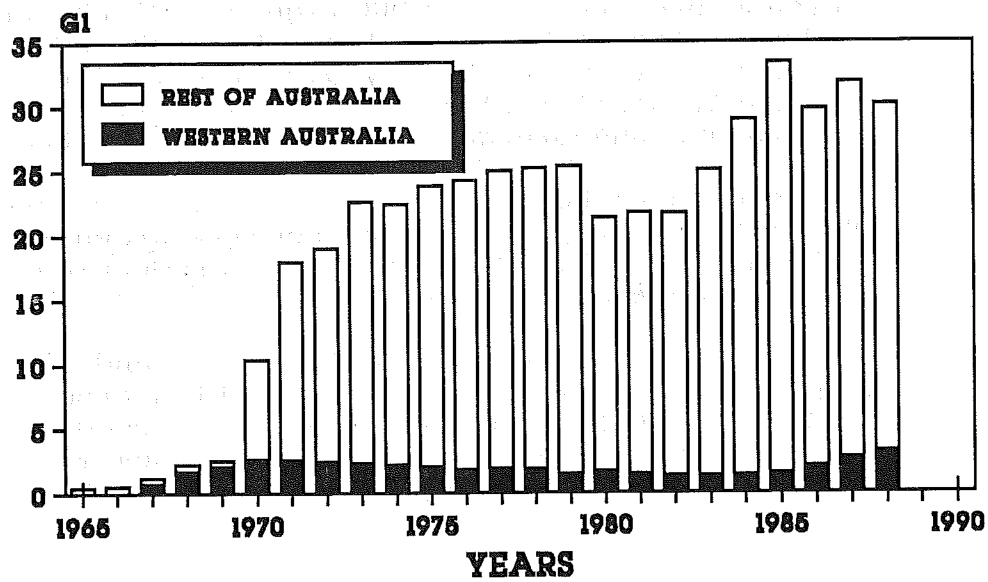
CRUDE OIL PRICES: $A/bbl



SOURCE: BRENT SPOT, MONTHLY AVERAGE.

FIGURE 2.9

PETROLEUM PRODUCTION (including CONDENSATE)



SOURCES:DEPT OF MINES WESTERN AUSTRALIA

BMR & ABARE

The relatively low oil prices experienced during much of the financial year began to rise steadily during the last two quarters. Industry analysts predict that prices will continue to strengthen over the next few years. This rise will be driven by demand rises and the supply uncertainties manifested in a resurgence in OPEC's market power as well as the maturing of established oil fields. Several new fields have been located in the Bonaparte and Carnarvon Basins. A new drilling programme has recently begun on Barrow Island, and production is due to begin on the rich Saladin field during the first quarter of 1989-1990.

While increases in crude oil and condensate output are predicted to be sustained over several years, the totals will not significantly alter Western Australia's small share of the national output (Fig 2.9).

Natural gas output from the NWS, Dongara and Woodada fields totalled 3.64 billion cubic metres in 1988- 1989. The value of this production was $284.2 m. The NWS contribution amounted to 96% of the total with output from the field increasing significantly during the year.

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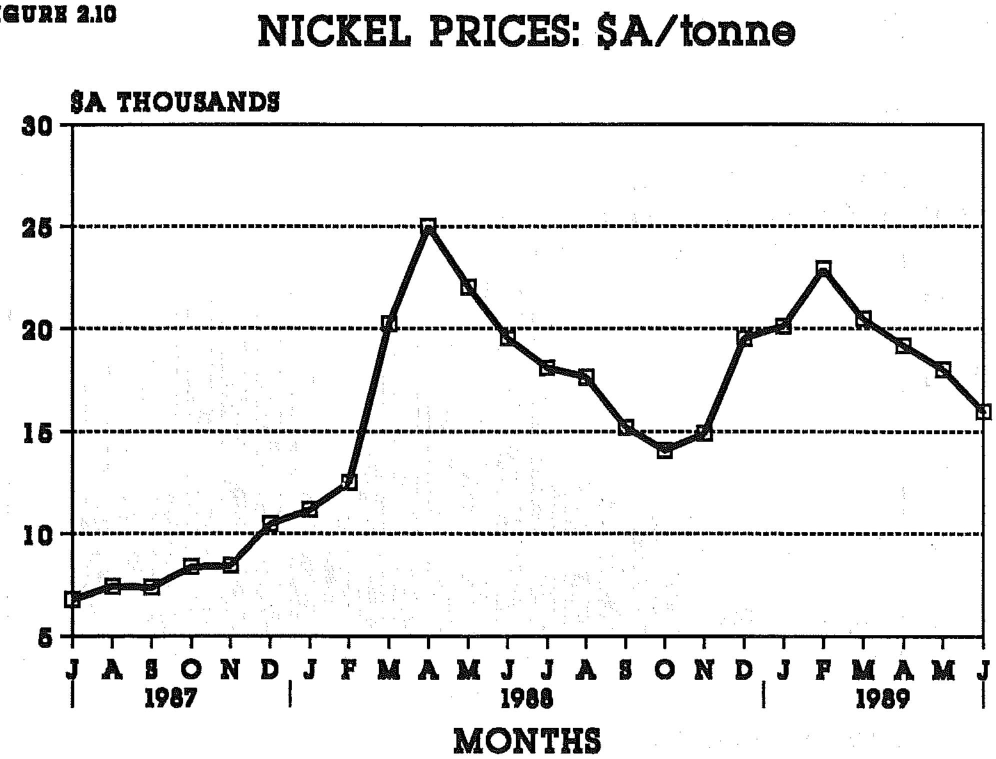
The LNG export phase of the NWS project is due to be inaugurated and shipments to Japan commence during the first quarter of 1989-1990. It is projected that deliveries to this market will reach 6 mt per year by 1994. Of the $12 b investment committed to date, $3.7 b has been expended on the Burrup Peninsular infrastructure associated with the LNG project.

Due to steadily rising energy prices, the highly prospective nature of the North West offshore area and large ongoing investment, the petroleum industry in this State is well placed to expand rapidly into the 1990s.

Nickel

The total value of the metal contained in Western Australian produced nickel concentrate rose considerably during the financial year. The increase in value of production from $392 m in 1987-88 to $634 m in the 1989 financial period, represented a 62% rise. This value increase occurred despite a small fall in production. Concentrate production fell to 353 850 t from the preceding financial year total of 388 964 t.

FIGURE 2.10



SOURCE: L.M.E CASH, MONTHLY AVERAGE.

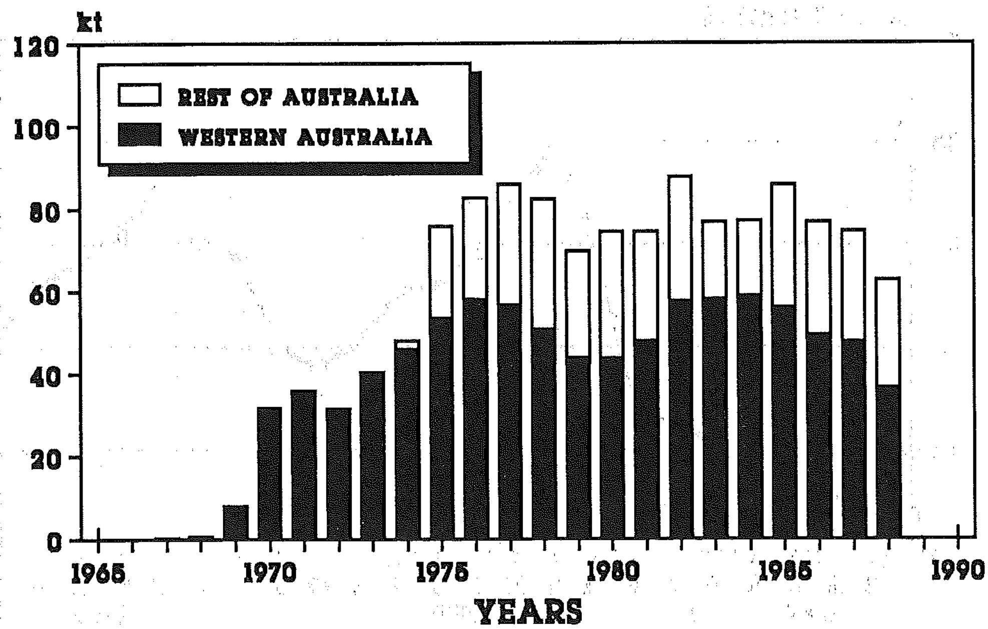
From the April 1988 peak, the world market price of the metal experienced a slight downward trend before testing the previous high point again in February 1989. Due to this sustained relatively high price Western Mining Corporation (WMC) was able to change, to advantage, their existing production strategy. As the mining and processing of lower grade ores became economically viable, this was progressively undertaken. A conservative approach was taken in expanding proven reserves and feedstocks, the rehabilitation of the Leinster mine being financed by returns from the nearby Rocky's Reward deposits. Nickel metal refining capacity at Kwinana was not increased, though production of matte from Kambalda was expanded to capitalise on the prevailing market price.

Nickel metal produced from Western Australian mines and exported in matte or fully refined form, has consistently comprised at least two thirds of the national output (Fig 2.11).

Although there has been some softening of the world nickel price during the last quarter, strong demand appears set to underpin prices into 1989-1990.

FIGURE 2.11

NICKEL PRODUCTION



SOURCES:DEPT OF MINES WESTERN AUSTRALIA,

BMR & ABARE

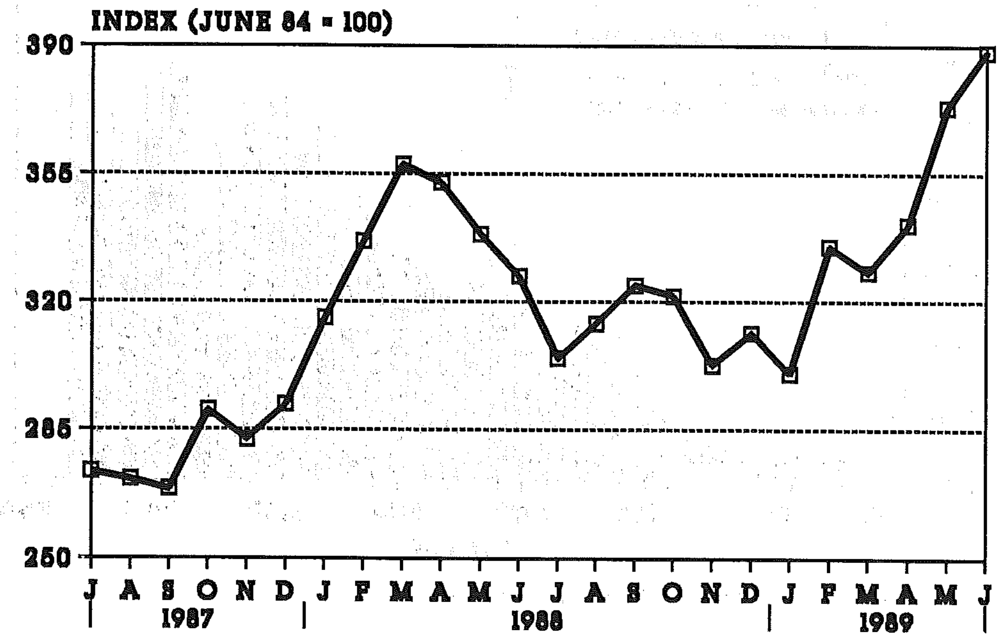
2.6 Mineral Sands

Heavy mineral sands deposits are mined mainly for their titanium and zirconium content. These include ilmenite, rutile, leucoxene and zircon. The rare earths, monazite and xenotime are also extracted and processed to yield europium, yttrium and gadolinium. A typical ex-mine composition of mineral sand concentrate contains ilmenite (73%), zircon (20%), rutile (5%), leucoxene (1%) and monazite (1%)).

The mineral sands industry in Western Australia enjoyed substantial growth during 1988-1989. The total value of production from this resource increased 33% from the 1987-88 figure of $294 m to $392 m.

Tonnages of the individual minerals produced generally rose during the four quarters (Table 2.1). The exceptions were ilmenite and zircon, production totals for each of these minerals declined by approximately 7%. The beneficiation of otherwise uneconomic ilmenite continued with output rising by 16.5% and value of production by 36.5%. Producers of rutile, ilmentite and synthetic rutile operated at capacity during 1988-89.

FIGURE 2.12 **PRICE INDEX FOR MINERAL SANDS**



SOURCE: L.M.E. CASH, MONTHLY AVERAGE.

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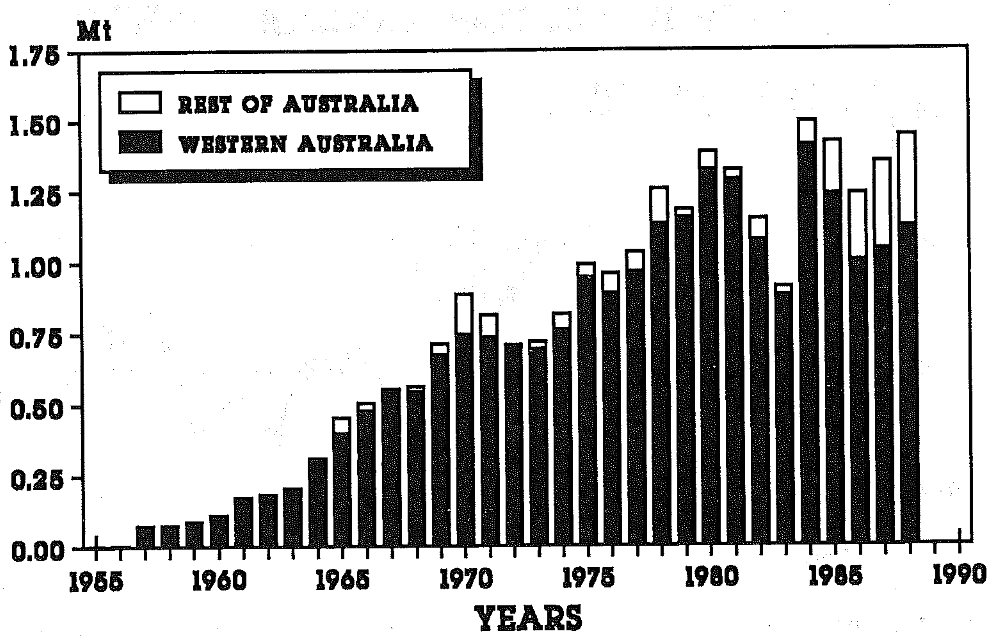
Driven by strong demand growth, prices in the contract and spot markets continued the rise which began during the preceding financial year. This increase occurred across the range of mineral sands products, with relatively modest average gains for ilmenite (15%) to record rises for zircon (80%).

The State's mineral sands industry grew considerably during the 1980's and is well placed to continue to expand into the new decade. Product demand is growing and there has been considerable investment in development and production infrustructure. The major example of this investment is the Cooljarloo project, which includes the multi-stage processing of synthetic rutile at Muchea and a pigment plant at Kwinana. The May 1989 commissioning of Z-Tech Pty Ltd's high purity zirconia plant at Rockingham will make this State the world's largest producer of zirconia powders and zirconium chemicals.

In an industry in which Australia accounts for a significant proportion of world reserves and output Western Australia is the premier mineral sands producing State (Fig 2.6).

FIGURE 2.13 **ILMENITE PRODUCTION**



SOURCES:DEPT OF MINES WESTERN AUSTRALIA,

BMR & ABARE

2.7 Diamonds

Western Australian diamond production rose from 30.2 million carats (Mct) in 1987-1988 to 36.5 Mct in 1988-1989. The $354.8 m value of production was a record, a very large rise over the preceding year's total of $248.2 m.

The Argyle Diamond Joint Venture project processed 4.8 mt of ore and won 35.9 Mct of diamonds during the period. In terms of the number of carats produced, Australia is the world leader because of this one project. On the basis of currently proven reserves the mine life is estimated at 17 years. Last year's production from the AK-1 pipe at Argyle consisted of gem quality diamonds (6%), cheap gems (39%) and industrial grade diamonds (55%).

The Bow River Joint Venture, an alluvial treatment plant 18 km from the Argyle mine, steadily increased production during the four quarters. Total tonnage processed was 1.95 mt, which yielded 505 579 carats valued at $15.36 m. The higher average carat price reflects the higher proportion of gems in the alluvial material distant from its origins in the Argyle pipe.

Most of the demand growth for diamonds in recent years has been for jewellery production. The region which generated the fastest sales growth in this market was East Asia with Japan being the major buyer.

The Central Selling Organisation (CSO), which takes 100% of Australian gem quality stones and 75% of the cheaper and industrial grade diamonds, has developed strategies to sustain the viability of the industry. One of these is the medium to long term marketing, beginning in 1989-1990, of the relatively unpopular 'brown' Kimberley diamonds. Success in this venture would add even more value to future production.

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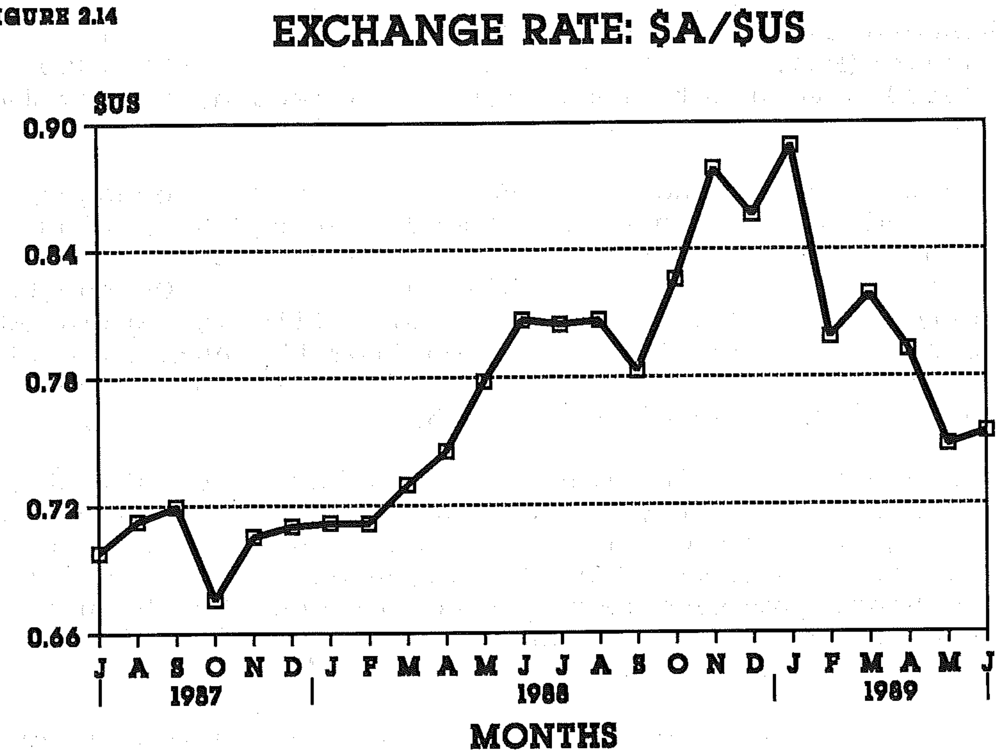
FIGURE 2.14



SOURCE: A.F.R., MONTHLY AVERAGE.

2.8 Summary & Outlook

The year saw a continuance of the steady growth of recent years in the mineral and petroleum industry. The total value of production for all minerals and petroleum products was up by 14% on the 1987-88 aggregate.

Of the major minerals, alumina and nickel were the most consistent performers. While there was a small fall in output for tonnages in the former and a marginal rise for the latter, significant gains in value of production were recorded by both. There were major gains in value and output for diamonds and gold. Gold producers overcame a steadily falling price for the metal to post a record value of production. Marginal increases in output, and relatively low prices for iron ore and the range of petroleum products, resulted in sharply lower values of production for these commodities.

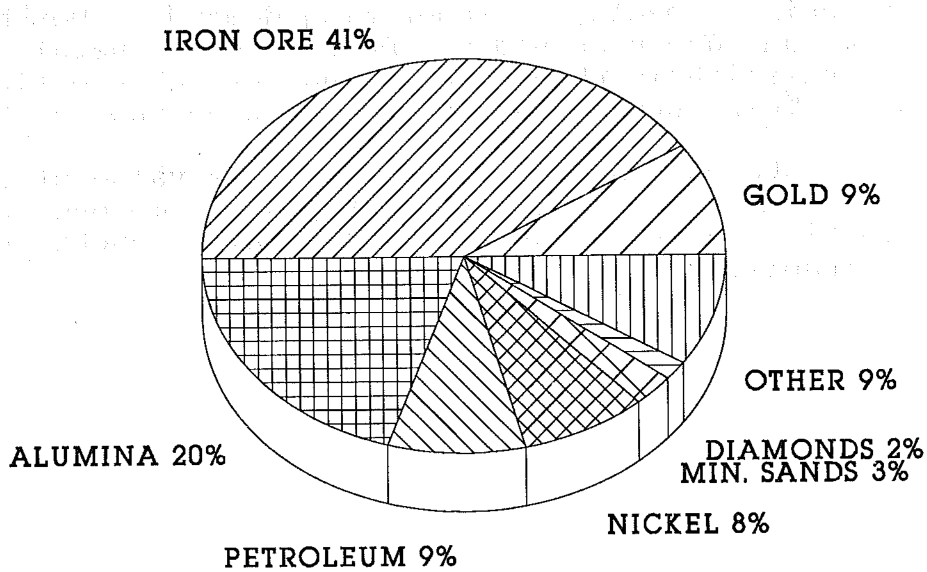
.../22

Based on current trends in the economies of Australia's major trading partners a steady expansion in the medium term for the mineral and petroleum industry appears likely. The State's producers have a comparative advantage in proven reserves, low production costs, sound infrastructure and proximity to growing Asian markets. The massive private capital investment of the past several years will translate into an increase in efficient production and downstream processing capacity. Moderating demand in North America, Europe and Japan should see most traded mineral prices falling slightly then stabilizing through the financial year. This outcome is contingent on no supply shocks.

Lower interest rates and a fall in the value of the $A, both predicted to occur in early 1990, will improve the competitiveness of Australian mineral products and boost profitability in the industry.

COMPARATIVE VALUE OF PRODUCTION

1983-84 VALUE OF PRODUCTION
TOTAL : $ 3,833.3 MILLION



1988-89 VALUE OF PRODUCTION
TOTAL : $ 7,904.4 MILLION

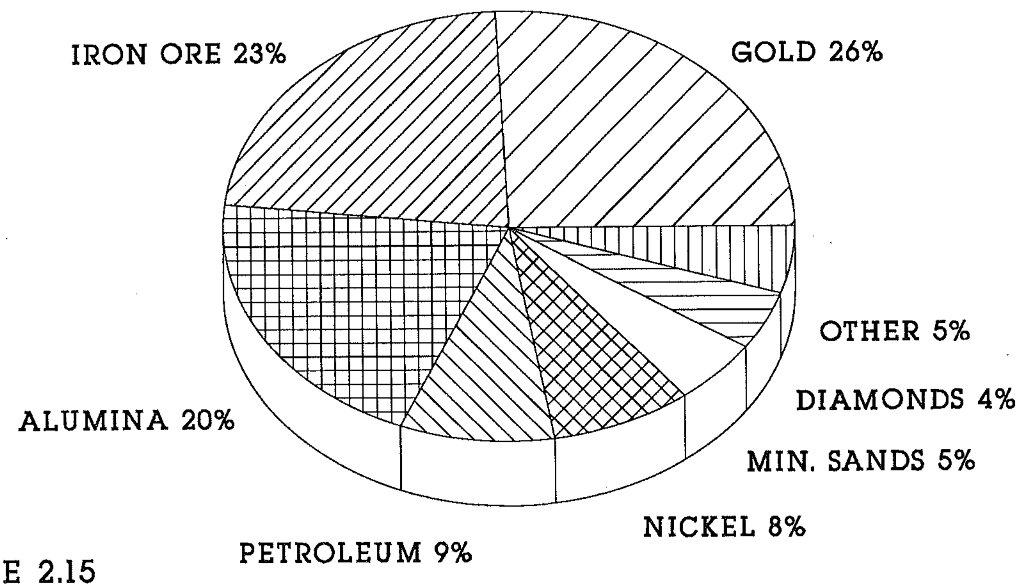


FIGURE 2.15

TABLE 2.1
QUANTITY AND VALUE OF MINERAL & PETROLEUM PRODUCTION 1987-88, 1988-89

Mineral	Unit Quantity	1987-88 Quantity	1987-88 Value ($A)	1988-89 Quantity	1988-89 Value ($A)
Alumina	t	6 063 130	1 182 997 535	6 171 962	1 619 228 331
Barytes	t	9 669	1 160 280	-	-
Building Stone					
quartz	t	294	13 210	1 088	48 977
Clay					
attapulgite	t	11 387	2 238 865	44 065	3 527 557
cement clay	t	22 679	56 698	24 007	60 020
clayshale	t	-	-	383	765
fire clay	t	191 184	381 127	171 189	205 570
kaolin	t	185	11 187	3 706	186 553
white clay	t	1 697	20 364	1 709	20 503
Coal	t	3 701 942	150 965 157	3 800 228	161 240 819
Cobalt	t	325	3 521 185	266	3 681 889
Construction Material					
aggregate	t	261 853	1 314 472	170 838	1 134 173
gravel	t	5 989	38 905	24 643	114 215
rock	t	90 056	1 237 914	180 494	1 672 350
sand	t	580 514	1 651 086	757 976	2 142 965
Copper					
by product	t	2 701	5 938 229	2 724	7 154 610
concentrate	t	-	-	42 856	21 540 578
ore	t	-	-	5 190	2 679 000
Diamond	ct	30 218 355	248 202 718	36 470 380	354 745 556
Diatomite	t	124	682	-	-
Dolomite	t	130	2 060	360	7 200
Emerald	g	-	-	1 930	2 200
Felspar	t	9 602	387 558	18 358	739 627
Gallium	kg	-	-	1 767	60 641
Garnet Sand	t	17 890	630 044	26 069	977 265
Gold	kg	90 546	1 843 770 410	120 847	2 028 283 001
Gypsum	t	99 162	947 660	165 967	1 326 387
Iron Ore					
Interstate	t	5 447 458	101 593 363	4 982 058	79 734 538
Overseas	t	89 189 441	1 754 075 785	94 700 088	1 700 675 726
Pellets	t	540 803	11 502 886	-	-
Kyanite	t	826	114 799	-	-
Lead	t	-	-	3 559	920 073
Limestone/Limesand	t	1 433 143	6 560 914	1 739 324	8 325 470
Mica	t	-	-	3 513	916 814
Mineral Beach Sand					
ilmenite	t	946 494	63 934 291	874 782	67 183 462
upgraded ilmenite (a)	t	195 504	69 996 495	227 979	95 474 088
leucoxene	t	10 882	4 581 114	18 297	7 781 578
monazite	t	9 705	6 960 550	10 133	7 445 827
rutile	t	85 078	51 168 571	100 484	62 491 492
xenotime	t	-	-	20	105 840
zircon	t	366 053	97 148 148	340 140	151 609 319
Nickel Concentrate	t	388 964	391 749 276	353 850	633 839 033
Palladium	kg	454	2 842 171	280	1 622 806
Peat	t	879	52 794	1 338	78 504
Petroleum Products					
condensate	kl	1 140 514	169 911 500	1 154 116	141 799 395
crude oil	kl	1 932 597	304 355 749	2 198 943	269 860 578
natural gas	'000m^3	3 629 175	320 504 994	3 642 292	284 641 291
Platinum	kg	82	1 936 029	70	1 504 088
Salt	t	5 533 859	107 165 215	6 023 426	106 705 667
Semi-precious Stone					
amethyst	kg	51 000	195 500	41 064	198 426
zebra stone	t	-	-	1 260	12 600
Silica Sand	t	402 995	2 985 987	364 453	3 051 841
Silver	kg	12 673	2 295 547	30 426	4 362 975
Spodumene	t	24 471	4 397 393	32 812	5 742 022
Talc	t	169 612	12 695 341	195 307	14 991 613
Tantalite	t	133	5 676 606	548	13 352 435
Tin Concentrate	t	434	2 855 928	365	2 253 656
Vermiculite	t	1 679	87 072	651	114 410
Zinc Concentrate	t	7 223	2 805 427	50 988	26 786 585
Total Value			6 945 636 791		7 904 362 634

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

(r) Revised from Previous Edition
(a) Also known as synthetic rutile
(b) Estimate

TABLE 3.1
QUANTITY AND VALUE OF MINERALS BY LOCAL GOVERNMENT AREA

Mineral	Local Government Area	Quantity tonnes	Metallic Content	Value ($)	Ref.
Alumina	Boddington	1 059 421		263 767 028	
	Harvey	729 665		194 080 644	
	Murray	2 870 766		760 441 534	
	Serpentine-Jarrahdale	1 512 110		400 939 125	
Total Alumina		6 171 962		1 619 228 331	(a)
Building stone					
- quartz rock	Mukinbudin	1 088		48 977	(b)
Clay					
- attapulgite	Mullewa	44 065		3 527 557	(c)
- cement clay	Armadale	24 007		60 020	(b),(1)
- clayshale	Collie	383		765	(b),(1)
- fire clay	Chittering	171 009		205 210	(b),(1)
	Victoria Plains	180		360	
- kaolin	Bridgetown-Greenbushes	3 706		186 553	(b)
- white clay	Serpentine-Jarrahdale	1 709		20 503	(b),(1)
Total Clay		245 059		4 000 968	
Coal	Collie	3 800 228		161 240 819	(c)
Cobalt	Coolgardie		Co t 266.165	3 681 889	(d), (e)
Construction Materials					(b), (1)
- aggregate	Derby-West Kimberley	4 863		43 288	
	Kalgoorlie-Boulder	121 345		509 648	
	Halls Creek	1 340		13 400	
	Port Hedland	39 981		554 601	
	Wyndham-East Kimberley	3 309		13 236	
		170 838		1 134 173	
- gravel	Broome	4 250		21 250	
	Coolgardie	4 777		23 885	
	Kalamunda	5 316		26 580	
	Port Hedland	10 300		42 500	
		24 643		114 215	

Mineral	Local Government Area	Quantity tonnes	Metallic Content	Value ($)	Ref.
Construction Materials (cont)					
- rock	Broome	125 343		1 006 545	
	Exmouth	900		9 000	
	Roebourne	54 251		656 805	
		180 494		1 672 350	
- sand	Broome	39 003		206 937	
	Canning	379 992		575 229	
	Coolgardie	80 222		409 835	
	Dandaragan	4 384		4 384	
	Gingin	20 167		120 999	
	Leonora	3 592		22 482	
	Meekatharra	87 370		438 566	
	Menzies	1 363		6 815	
	Northam	67 924		91 070	
	Port Hedland	14 249		77 548	
	Roebourne	8 758		51 964	
	Swan	42 109		131 339	
	Wanneroo	8 843		5 527	
		757 976		2 142 695	
Total Construction Materials		1 133 951		5 063 433	(b),(1)
			Cu t		
Copper					
- by product	Coolgardie		2 724.391	7 154 610	(c),(e)
- concentrates	Meekatharra	27 549.90	6 210.272	16 231 404)	
	East Pilbara	15 306.55	3 317.418	5 309 174)	
- ore	Meekatharra	5 190.00	830.460	2 679 000)	(c)
Total Copper			13 082.541	31 374 188	
			ct		
Diamonds	Wyndham-East Kimberley		36 470 380	354 745 556	(c)
Dolomite	Lake Grace	360		7 200	(d)
			Grams		
Emerald	Menzies		1 930	2 200	(b)
Felspar	Mukinbudin	5 393		245 156	
	Port Hedland	12 965		494 471	
Total Felspar		18 358		739 627	(f)

Mineral	Local Government Area	Quantity tonnes	Metallic Content	Value ($)	Ref.
		kgs			
Gallium	Murray	1 767		60 641	(b)
Garnet Sand	Capel	1 203		54 371	(g)
	Northampton	24 866		922 894	(d)
Total Garnet Sand		26 069		977 265	
Gem, Semi-precious and Ornamental stones			kg		
- amethyst	Upper Gascoyne		41 064	198 426	(d)
			t		
- zebra rock	Wyndham - Esat Kimberley		1 260	12 600	(c)
				211 026	
			Au kg		
Gold	Boddington		14 644.959	245 800 001	
	Coolgardie		8 035.836	134 879 920	
	Cue		3 939.064	66 112 988	
	Dundas		3 277.318	55 006 287	
	East Pilbara		9 581.394	160 813 473	
	Halls Creek		34.089	572 149	
	Kalgoorlie-Boulder		31 376.452	526 620 241	
	Kondinin		0.127	2 136	
	Lake Grace		343.187	5 760 033	
	Laverton		3 014.869	50 601 361	
	Leonora		11 583.088	194 409 763	
	Meekatharra		7 924.777	133 008 926	
	Menzies		4 821.391	80 921 892	
	Mt Magnet		4 230.175	70 998 977	
	Port Hedland		6.036	101 310	
	Ravensthorpe		115.010	1 930 314	
	Roebourne		13.441	225 589	
	Sandstone		3 250.564	54 557 250	
	Upper Gascoyne		8.586	144 110	
	Westonia		1 760.250	29 543 910	
	West Pilbara		2.471	41 479	
	Wiluna		3 388.366	56 870 099	
	Yalgoo		1 896.021	31 822 693	
	Yilgarn		7 599.238	127 545 103	
	Total Gold		120 846.710	2 028 283 001	(h)

Mineral	Local Government Area	Quantity tonnes	Metallic Content	Value ($)	Ref.
Gypsum	Carnamah	7 353		73 530	(d)
	Dalwallinu	56 234		691 273 (b),	(c)
	Esperance	5 550		33 893)	
	Kellerberrin	12 730		62 080)	
	Koorda	5 000		25 000)	
	Lake Grace	8 707		43 533)	
	Merredin	3 575		10 625)	
	Nungarin	30 162		170 700)	(c)
	Trayning	11 711		65 586)	
	Wyalkatchem	24 445		146 667)	
	Wongan-Ballidu	500		3 500)	
Total Gypsum		165 967		1 326 387	
			Av. Assay Fe %		
Iron Ore					
Interstate					
- ore	Ashburton	642 712	60.07	9 939 242	
	Derby-West Kimberley	1 658 865	66.32	18 250 495	
	East Pilbara	2 680 481	63.91	51 544 801	
		4 982 058		79 734 538	
Exported					
- ore	Ashburton	62 219 414	60.25	1 107 657 542	
	Derby-West Kimberley	2 274 719	66.64	38 254 070	
	East Pilbara	30 205 955	62.15	554 764 114	
		94 700 888		1 700 675 726	
Total Iron Ore		99 682 146		1 780 410 264	(c)
			Pb t		
Lead	Derby-West Kimberley	3 559	2 431	920 073	(c)
Limesand/ Limestone	Cockburn	1 495 218		5 994 560	
	Dandaragan	4 338		26 028	
	Exmouth	2 305		23 050	
	Gingin	21 092		287 177	
	Irwin	224		1 344	
	Manjimup	5 662		56 620	
	Plantagenet	400		75 500	
	Roebourne	1 041		5 713	
	Wanneroo	209 044		1 855 478	
Total Limestone		1 739 324		8 325 470	(b),(1)

Mineral	Local Government Area	Quantity tonnes	Metallic Content	Value ($)	Ref.
Mica	Pilbara	3 513		916 814	(d)
			Av. Assay TiO_2%		
Mineral Beach Sands					
- ilmenite	Capel	648 042	54.44	28 501 618	
	Carnamah	226 740	60.00	38 681 844	
		874 782		67 183 462	
- upgraded ilmenite	Capel	140 538	92.00	21 426 344	
	Carnamah	87 441	92.00	74 047 744	
		183 499		95 474 088	
			TiO_2 t		
- leucoxene	Capel	18 297	16 699	7 781 578	
			ThO_2 10kg units		
- monazite	Capel	2 364	14 177	1 760 009	
	Carnamah	7 769	50 499	5 685 818	
		10 133	64 676	7 445 827	
			TiO_2 t		
- rutile	Carnamah	100 484	96 793	62 491 492	
			Y_2O_3 kg		
- xenotime	Capel	20	6 400	105 840	
			ZrO_2 t		
- zircon	Capel	78 038	50 725	32 010 817	
	Carnamah	262 102	181 568	119 598 502	
		340 140	232 293	151 609 319	
Total Mineral Beach Sands				392 091 606	(c)
			Av. Assay Ni%		
Nickel Concentrates					
	Kalgoorlie-Boulder	26 777	11.51	49 977 810	
	Coolgardie	287 438	11.10	528 187 676	
	Laverton	39 635	8.25	55 673 547	
Total Nickel		353 850		633 839 033	(i)

Mineral	Local Government Area	Quantity tonnes	Metallic Content	Value ($)	Ref.
			kg		
Palladium	Coolgardie		279.661	1 622 806	(c),(e)
Peat	Manjimup	1 338		78 504	(b)
		kl			
Petroleum					
- condensate	Carnamah	286		44 671	(b)
	Irwin	532		79 156	(b)
	Roebourne	1 153 298		141 675 568	(c)
		1 154 116		141 799 395	
- crude oil	Derby-West Kimberley	22 511		1 484 807	
	Irwin	16 550		1 642 315	
	Roebourne	2 159 882		266 733 456	
		2 198 943		269 860 578	(c)
		$m^3 10^3$			
- natural gas	Carnamah	25 262		1 580 437	(j)
	Irwin	116 123		11 394 987	(j)
	Roebourne	3 500 907		271 665 867	(b)
		3 642 292		284 641 291	
Total Petroleum				696 301 264	
			Pt kg		
Platinum	Coolgardie		69.814	1 504 088	(c),(e)
Salt	Carnarvon	1 320 782		25 514 087	(c)
	Port Hedland	1 937 673		32 484 350	(c)
	Roebourne	2 117 312		37 632 826	(c)
	Shark Bay	647 272		11 049 764	(c)
	Wyalkatchem	387		24 640	(d)
Total Salt		6 023 426		106 705 667	

Mineral	Local Government Area	Quantity tonnes	Metallic Content	Value ($)	Ref.
Silica	Canning	166 541		1 831 951	
	Cockburn	129 559		834 178	
	Coolgardie	17 307		42 402	
	Gingin	5 100		56 100	
	Gosnells	8 000		88 000	
	Wanneroo	37 946		199 210	
Total Silica		364 453		3 051 841	(c)
Silver			Ag kg		
By-product of gold mining	State-wide		18 732.589	2 056 262	(b)
	Coolgardie		318.789	151 965	(c),(e)
	East Pilbara		352.273	57 219	(c),(k)
	Meekatharra		11 022.172	2 097 529	(c),(k)
Total Silver			30 425.823	4 362 975	
Spodumene	Bridgetown-Greenbushes	32 812		5 742 022	(c)
Talc	Meekatharra	37 652		3 955 734	
	Three Springs	157 655		11 035 879	
Total Talc		195 307		14 991 613	(d)
			Ta_2O_5 kg		
Tantalite	Bridgetown-Greenbushes	548	118 436	13 066 421	
	East Pilbara	-	5 337	286 014	
		548	123 773	13 352 435	(c)
			Sn t		
Tin	Bridgetown-Greenbushes	365	252	2 199 656	
	Pilbara	-	5	54 000	
		365	257	2 253 656	(c)
Vermiculite	Ravensthorpe	651		114 410	(d)
			Zn t		
Zinc	Derby-West Kimberley	50 988	28 799	26 786 585	(c)
	Value of other Minerals			5 876 079 633	
	Value of Gold			2 028 283 001	
	TOTAL VALUE OF ALL MINERALS			7 904 362 634	

TABLE 4.1
QUANTITY, VALUE & METALLIC CONTENT OF MINERAL & PETROLEUM PRODUCTION BY MINERAL FIELD

Mineral	Mineral-field	Quantity tonnes	Metallic Content	Value ($)	Ref.
Alumina	South West	6 171 962		1 619 228 331	(a)
Building stone					
- quartz rock	South West	1 088		48 977	(b)
Clay					
- attapulgite	South West	44 065		3 527 557	(c)
- cement clay	South West	24 007		60 020	(b),(1)
- clayshale	South West	383		765	(b),(1)
- fire clay	South West	171 189		205 570	(b),(1)
- kaolin	Greenbushes	3 706		186 553	(b)
- white clay	South West	1 709		20 503	(b),(1)
Total Clay		245 059		4 000 968	
Coal	Collie	3 800 228		161 240 819	(c)
Cobalt	Coolgardie		Co t 266.165	3 681 889	(d),(e)
Construction Materials					
- aggregate	East Coolgardie	121 345		509 648	
	Kimberley	4 649		26 636	
	Pilbara	39 981		554 601	
	West Kimberley	4 863		43 288	
		170 838		1 134 173	
- gravel	Coolgardie	4 777		23 885	
	Pilbara	10 300		42 500	
	South West	5 316		26 580	
	West Kimberley	4 250		21 250	
		24 643		114 215	
- rock	Ashburton	900		9 000	
	West Kimberley	125 343		1 006 545	
	West Pilbara	54 251		656 805	
		180 494		1 672 350	

Mineral	Mineral-Field	Quantity tonnes	Metallic Content	Value ($)	Ref.
Construction Materials (cont)					
- sand	Coolgardie	80 222		409 835	
	Mt Margaret	3 592		22 482	
	North Colgardie	1 363		6 815	
	Peak Hill	87 370		438 566	
	Pilbara	14 249		77 548	
	South West	523 419		928 548	
	West Kimberley	39 003		206 937	
	West Pilbara	8 758		51 964	
		757 976		2 142 695	
Total Construction Materials		1 133 951		5 063 433	(b),(1)
			Cu t		
Copper					
- by product	Coolgardie		2 724.391	7 154 610	(d),(e)
- concentrates	Peak Hill	27 549.90	6 210.272	16 231 404)	
	Pilbara	15 306.55	3 317.418	5 309 174)	(c)
- ore	Peak Hill	5 190.00	830.460	2 679 000)	
Total Copper			13 082.541	31 374 188	
			ct		
Diamonds	Kimberley		36 470 380	354 745 556	(c)
Dolomite	South West	360		7 200	(d)
			Grams		
Emerald	North Coolgardie		1 930	2 200	(b)
Felspar	Pilbara	12 965		494 471	
	South West	5 393		245 156	
		18 358		739 627	(f)
			kg		
Gallium	South West		1 767	60 641	(b)
Garnet Sand	South West	26 069		977 265	(d),(g)

Mineral	Mineral-Field	Quantity tonnes	Metallic Content	Value ($)	Ref.
Gem, Semi-precious & Ornamental stones			kg		
- amethyst	Gascoyne		41 064	198 426	(c)
- zebra stone	Kimberley		1 260	12 600	(d)
				211 026	
			Au kg		
Gold	Kimberley		23.084	387 440	
	Pilbara		10 116.728	169 798 478	
	West Pilbara		18.536	311 107	
	Ashburton		1.722	28 902	
	Gascoyne		4.016	67 404	
	Peak Hill		1 779.380	29 864 993	
	East Murchison		13 801.322	231 640 454	
	Murchison		14 080.736	236 330 120	
	Yalgoo		1 780.736	29 891 714	
	Mt Margaret		8 376.150	140 584 735	
	North Coolgardie		5 412.424	90 841 756	
	Broad Arrow		10 841.536	181 963 606	
	North East Coolgardie		1 100.586	18 472 161	
	East Coolgardie		19 530.408	327 797 046	
	Coolgardie		8 759.734	147 022 783	
	Yilgarn		10 481.180	175 915 416	
	Dundas		3 105.372	52 120 353	
	Phillips River		168.722	2 831 819	
	South West		11 464.102	192 412 712	
	Total Gold		120 846.710	2 028 283 001	(h)
Gypsum	Dundas	5 550		33 893	(c)
	South West	131 160		1 138 049	(b),(c)
	Yilgarn	29 257		154 445	(c)
Total Gypsum		165 967		1 326 387	
			Av. Assay Fe %		
Iron Ore					
Interstate					
- ore	Peak Hill	2 506 448	64.00	47 547 453	
	Pilbara	174 033	62.55	3 997 348	
	West Pilbara	642 712	59.58	9 939 242	
	West Kimberley	1 658 865	66.32	18 250 495	
		4 982 058		79 734 538	

Mineral	Mineral-Field	Quantity tonnes	Metallic Content	Value ($)	Ref.
Iron Ore (Cont.)					
Exported					
- ore	Peak Hill	24 899 504	62.51	465 357 318	
	Pilbara	5 306 451	61.79	89 406 796	
	West Pilbara	62 219 414	61.58	1 107 657 542	
	West Kimberley	2 274 719	66.64	38 254 070	
		94 700 088		1 700 675 726	
Total Iron Ore		99 682 146		1 780 410 264	(c)
Lead	West Kimberley	3 559	Pbt 2 431	920 073	(c)
Limesand/ Limestone	Ashburton	2 305		23 050	
	South West	1 735 978		8 296 707	
	West Pilbara	1 041		5 713	
		1 739 324		8 325 470	(b)(1)
Mica	Pilbara	3 513		916 814	(d)
			Av. Assay TiO_2%		
Mineral Beach Sands					
- ilmenite	South West	874 782	55.81	67 183 462	
- upgraded ilmenite	South West	227 979	92.00	95 474 088	
			TiO_2 t		
- leucoxene	South West	18 297	16 699	7 781 578	
			ThO_2 10kg units		
- monazite	South West	10 133	64 676	7 445 827	
			TiO_2 t		
- rutile	South West	100 484	96 793	62 491 492	
			Y_2O_3kg		
- Xenotime	South West	20	6 400	105 840	
			ZrO_2 t		
- zircon	South West	304 140	232 293	151 609 319	
Total Mineral Beach Sands				392 091 606	(c)

Mineral	Mineral-Field	Quantity tonnes	Metallic Content	Value ($)	Ref.
			Av. Assay Ni%		
Nickel Concentrates					
	Coolgardie	287 438	11.10	528 187 676	
	East Coolgardie	26 777	11.51	49 977 810	
	Mt Margaret	39 635	8.25	55 673 547	
		353 850		633 839 033	(i)
			Pd kg		
Palladium	Coolgardie		279.661	1 622 806	(c),(e)
Peat	South West	1 338		78 504	(b)
		kl			
Petroleum	Basin				
- condensate	Carnarvon	1 153 298		141 675 568	(c)
	Perth	818		123 827	(b)
		1 154 116		141 799 395	
- crude oil	Canning	22 511		1 484 807	
	Carnarvon	2 159 882		266 733 456	
	Perth	16 550		1 642 315	
		2 198 943		269 860 578	(c)
		$m^3 10^3$			
- natural gas	Carnarvon	3 500 907		271 665 867	(b)
	Perth	141 385		12 975 424	(j)
		3 642 292		284 641 291	
Total Petroleum				696 301 264	
			Pt kg		
Platinum	Coolgardie		69.814	1 504 088	(c),(e)
Salt	Gascoyne	1 968 054		36 563 851	(c)
	Pilbara	1 937 673		32 484 350	(c)
	South West	387		24 640	(d)
	West Pilbara	2 117 312		37 632 826	(c)
		6 023 426		106 705 667	
Silica	Coolgardie	17 307		42 402	
	South West	347 146		3 009 439	
		364 453		3 051 841	(c)

Mineral	Mineral-Field	Quantity tonnes	Metallic Content	Value ($)	Ref.
Silver			Ag kg		
- By-product of copper mining	Peak Hill		11 022.172	2 097 529	(c),(k)
	Pilbara		352.273	57 219	(c),(k)
			11 374.445	2 154 748	
- By-product of gold mining	State-wide		18 732.589	2 056 262	(b)
- By-product of nickel mining	Coolgardie		318.789	151 965	(c),(e)
Total Silver			30 425.823	4 362 975	
Spodumene	Greenbushes	32 812		5 742 022	(c)
Talc	Peak Hill	37 652		3 955 734	
	South West	157 655		11 035 879	
		195 307		14 991 613	(d)
			Ta_2O_5 kg		
Tantalite	Greenbushes	547.99	118 436	13 066 421	
	Pilbara	-	5 337	286 014	
		547.99	123 773	13 352 435	(c)
			Sn t		
Tin	Greenbushes	365	252	2 199 656	
	Pilbara	-	5	54 000	
		365	257	2 253 656	(c)
Vermiculite	Phillips River	651		114 410	(d)
			Zn t		
Zinc	West Kimberley	50 988	28 799	26 786 585	(c)

Value of other Minerals	5 876 079 633
Value of Gold	2 028 283 001
TOTAL VALUE OF ALL MINERALS	7 904 362 634

5. EMPLOYMENT IN WA MINING AND PETROLEUM INDUSTRIES

The mining and petroleum industries continued to make a significant contribution to Western Australian employment growth, particularly during the last half of the financial year. Between January and June overall direct employment in exploration, development and production grew by 7%. The reported June 1989 figure of 34 376 represented a marked increase over the December 1988 total of 32 143.

Full time employment rose in each mineral sector, several projects exhibited greater than average growth. The Boddington Gold Project, Alcoa of Australia at Jarrahdale and Kwinana, and Western Mining Corporation's Leinster nickel mine were examples of the latter.

The mining industry has a high capital intensity, a characteristic which enhances the traditionally high skill levels of its workforce. This combination of capital intensity and specialisation has resulted in high productivity achievements which in turn have enabled lower costs of production and relatively high wages. Lower unit production costs are of critical importance as the Australian industry must be competitive in selling into world markets. Production costs also directly effect the profitability necessary to attract capital investment. The characteristically large scale of Western Australian mining projects makes foreign based capital and technology essential.

The high productivity levels achieved in the Western Australian mining industry have lifted the overall productivity performance of the Western Australian workforce. As revealed in a recently published study from Murdoch University the aforementioned trend has raised the State's level of labour productivity to well above the national average.

Due to predictions of relatively stable mineral prices and the long lead time/mine life of the many projects under development, employment in the industry appears likely to remain strong through 1990.

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TABLE 5.1
NUMBER OF PERSONS EMPLOYED IN THE WESTERN AUSTRALIAN MINERALS & PETROLEUM INDUSTRIES
AS AT JUNE 1989

(SOURCE: AXTAT REPORTING SYSTEM, MINING ENGINEERING DIVISION)

MINERAL COMPANY	LOCATION	1984/85	1988/89
ALUMINA			
Alcoa of Australia Ltd	Jarrahdale/Kwinana	1 582	2 006
	Del Park-Huntley/Pinjarra	1 656	1 780
	Wagerup	451	644
Worsley Alumina Pty Ltd	Worsley	746	963
		4 435	**5 393**
COAL			
Griffin Coal Mining Co Ltd	Collie	478	552
Western Colleries Ltd	Collie	696	719
		1 174	**1 271**
COPPER-SILVER ZINC			
Seltrust Mining Corporation Pty Ltd	Teutonic Bore	**119**	-
DIAMOND			
Argyle Diamond Mines J.V.	Lake Argyle	174	729
Freeport Bow River Properties Ltd	Bow River	-	95
		174	**824**
GOLD			
Aur NL	Mt Martin	-	76
Australian Consolidated Minerals Ltd	Golden Crown	-	75
	Westonia	-	120
Australian Mine Mgmt Pty Ltd	Golden Kilometre	-	111
Australmin Pacific Ltd	Tuckabianna	-	77
Australis Mining NL	Norseman	34	-
Austwhim Resources NL	Mt Morgans	-	97
	Tower Hill	-	77
Aztec Mining Co Ltd	Bounty	-	80
BHP Minerals Ltd	Gimlet South/Orban J.V.	-	85
Bamboo Creek J.V.	Bamboo Creek	98	73
Bardoc Gold Pty Ltd	Bardoc	-	31
Barrack Mine Management	Horseshoe	28	140
	Wiluna	20	124
Big Bell J.V.	Big Bell	-	232
Boddington Gold Project	Boddington	-	496
Broken Hill Metals	Hopes Hill	-	151
Brunswick NL	Galtee Moore	-	52
Burmine Ltd	Copperhead	-	66
Callion Mining Pty Ltd	Callion	-	54
Central Norseman Gold Corp NL	Norseman	430	384
Consolidated Exploration Ltd	Lady Bountiful	-	41
	Davyhurst	-	67
Chevron Exploration Corp	Mt Wilkinson	-	61
Cypress Minerals Aust Co	Gidgee	-	103
Eastmet Ltd	Youanmi	-	122
Edjudina Gold Mines Pty Ltd	Neda/Gawler	72	35
Endeavour Resources Ltd	Bluebird/Alladin	-	129
Forsayth NL	Lawlers	-	95
	Mt Gibson	-	143
Freeport McMoran Australia Ltd	Karonie	-	52
Gabanintha Gold Mines	Gabanintha	-	70
Golden Valley Mines NL	Fraser/Radio Mill	-	85
Great Victoria Gold Ltd	Gt Victoria	26	99
Hampton Australia Ltd	Jubliee	-	81

MINERAL COMPANY	LOCATION	1984/85	1988/89
PETROLEUM PRODUCTS			
Bond Corporation Pty Ltd	Harriet/Rosette	-	80
Eromanga Energy Ltd	Blina/Sundown/Lloyd	-	2
Barrack Energy Ltd	Mt Horner	-	3
Consolidated Gas Pty Ltd	Woodada	7	6
West Australian Petroleum Pty Ltd	Barrow Island	179	165
	Dongara	9	10
Western Mining Corp Ltd	North Herald/South Pepper	-	27
Woodside Offshore Petroleum Pty Ltd	North Rankin A/Burrup Peninsula	1 070	1 381
Total		**1 265**	**1 674**
SALT			
Dampier Salt Ltd	Dampier	210	179
	Lake McLeod	101	99
Leslie Salt Co	Port Hedland	55	112
Shark Bay Salt J.V.	Shark Bay	145	92
Total		**511**	**482**
ZINC-COPPER			
Murchison Zinc Co Pty Ltd	Golden Grove	-	99
ZINC-LEAD			
BHP Minerals Ltd	Cadjebut	-	154
ALL OTHER MATERIALS (Including Rock Quarries)		598	881
TOTAL INDUSTRY EMPLOYMENT		26 293	34 376

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6. MINERAL AND PETROLEUM ROYALTIES

Under the Australian Constitution the ownership of most of the minerals and petroleum within the boundaries of Western Australia are vested in the State Government. Under State legislation the transfer of mineral rights to private developers involves a payment to the community by way of a royalty. The exploration of the State's gold resources on which no royalty is paid, is the major exception to this regime.

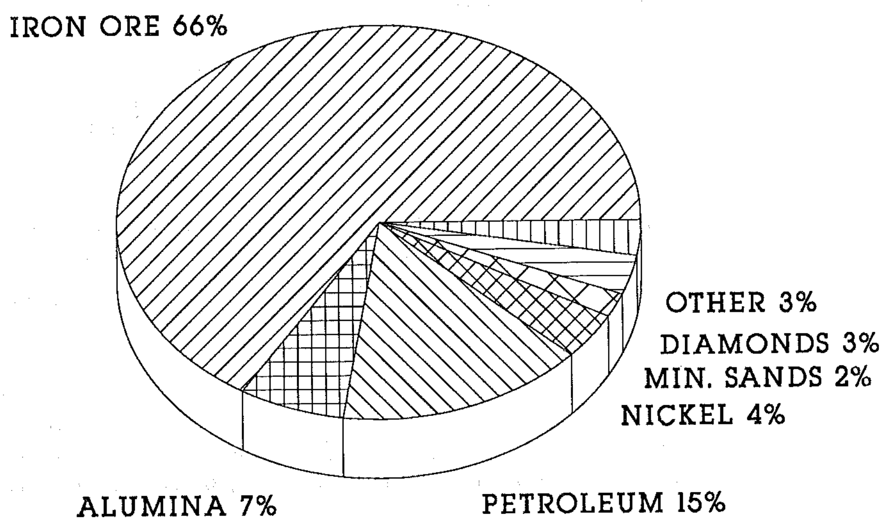
The current system of mainly gross output and value royalties has developed over many years. The last major review of the Western Australian royalty system was in 1984.

The Royalties and Policy Development Division of the Department of Mines administers the collection of mineral and petroleum royalties and verifies payments made to the Commonwealth.

It is Departmental policy to ensure an adequate return to the community for the transfer of its natural resources whilst maintaining an environment favourable to long term investment in efficient industry operations.

COMPARATIVE ROYALTY RECEIPTS

1983-84 ROYALTY RECEIPTS
TOTAL : $ 118.1 MILLION



1988-89 ROYALTY RECEIPTS
TOTAL : $ 176.0 MILLION

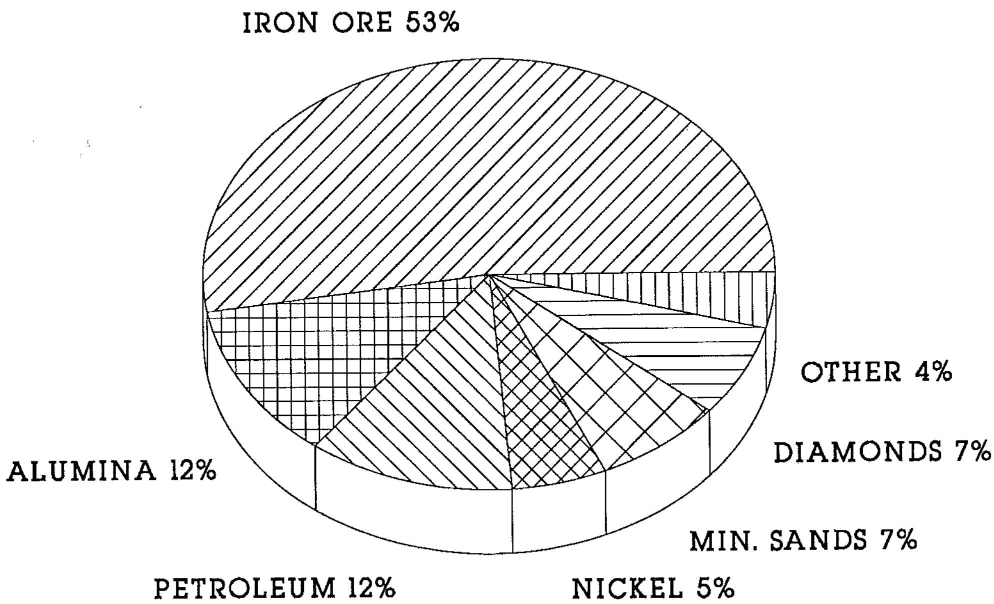


FIGURE 6.1

TABLE 6.1
ROYALTY RECEIPTS 1987-88, 1988-89

Mineral	1987-88 ($A)	1988-89 ($A)	Value ($A) Variance	% up (% down)
Alumina	12 132 982.56	20 797 429.97	8 664 447.41	71
Building stone	297.60	432.94	135.34	45
Clay	331 799.81	124 514.20	(207 285.61)	(62)
Coal	1 520 154.96	1 683 307.75	163 152.79	11
Cobalt	24 772.46	73 857.83	49 085.37	198
Construction materials				
aggregate	60 578.10	61 439.70	861.60	1
gravel	534.00	7 537.80	7 003.80	1 312
rock	84 621.57	60 591.46	(24 030.11)	(28)
sand	110 506.06	196 408.42	85 902.36	78
sandstone	25.00	-	(25.00)	(100)
Copper	106 882.96	1 466 901.31	1 360 018.35	1 272
Diamond	12 221 752.13	12 055 670.43	(166 081.70)	(1)
Diatomite	34.10	-	(34.10)	(100)
Dolomite	-	39.00	39.00	n.ap.
Emerald	-	165.00	165.00	n.ap.
Feldspar	14 429.35	40 128.28	25 698.93	178
Garnet sand	32 261.25	45 270.22	13 008.97	40
Gold	122 814.36	219 610.41	96 796.05	79
Gypsum	31 677.28	44 948.55	13 271.27	42
Iron ore	94 807 770.36	92 722 782.67	(2 084 987.69)	(2)
Kyanite	8 346.59	-	(8 346.59)	(100)
Limestone	54 029.05	103 808.71	49 779.66	92
Mica	-	18 129.46	18 129.46	n.ap.
Mineral beach sands				
ilmenite	2 530 668.61	3 505 728.24	975 059.63	39
leucoxene	89 154.58	152 358.84	63 204.26	71
monazite	320 669.30	350 230.95	29 561.65	9
rutile	2 366 265.93	2 622 307.52	256 041.59	11
zircon	3 685 865.78	6 324 381.30	2 638 515.52	72
Nickel	3 760 761.64	9 523 120.87	5 762 359.23	153
Palladium	21 227.25	18 248.10	(2 979.15)	(14)
Peat	1 672.05	2 535.02	862.97	52
Petroleum Products				
condensate	1 284 015.57	1 126 652.24	(157 363.33)	(12)
crude oil	23 818 340.12	16 309 160.89	(7 509 179.23)	(32)
natural gas	4 941 807.69	3 143 794.05	(1 798 013.64)	(36)
Platinum	21 227.25	18 248.10	(2 979.15)	(14)
Salt	876 876.51	1 057 214.07	180 337.56	21
Semi-precious stones				
amethyst	14 662.50	21 444.41	6 781.91	46
beryl	-	40.00	40.00	n.ap.
zebra rock	-	490.00	490.00	n.ap.
Silica sand	197 210.61	208 488.68	11 278.07	6
Silver	55 445.54	144 965.78	89 520.24	161
Spodumene	217 514.56	355 611.41	138 096.85	63
Talc	91 993.90	94 048.21	2 054.31	2
Tantalite	159 773.87	166 197.13	6 423.26	4
Tin	102 163.36	53 080.01	(49 083.35)	(48)
Vermiculite	2 402.40	16 534.07	14 131.67	588
Zinc Concentrate	-	1 105 668.33	1 105 668.33	n.ap.
Total value	166 225 988.57	176 043 522.33	9 817 533.76	6

Note: **All Royalty Receipts above are only those paid to Consolidated Revenue Fund**
(r) Revised from previous edition

7.

PRINCIPAL MINERAL PRODUCERS 1988-89 - Head office postal address, telephone number: minesite.

ALUMINA

Alcoa of Australia (WA) Ltd, P O Box 252, Applecross 6153, (09) 364 0111: Del Park, Jarrahdale, Willowdale.
Worsley Alumina Pty Ltd, P O Box 344, Collie 6225, (097) 34 3022: Boddington.

BARYTES

Dresser Minerals Int. Inc., P O Box 441, Port Hedland 6721, (091) 73 2377: North Pole.

BUILDING STONE - quartz

Commercial Minerals Ltd, 26 Tomlinson Road, Welshpool 6106, (09) 362 1411: Munkinbudin

CLAY - attapulgite

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

- cement clay

Bell Basic Industries Ltd, 136-138 Great Eastern Hwy, South Guildford 6055, (09) 279 0000: Armadale.

- clayshale

Western Colleries, 75 Canning Hwy, Victoria Park 6100, (09) 361 8911: Collie.

- fire clay

Clackline Ltd, 45 Richardson St, West Perth 6005, (09) 322 7788: Piawanning.
Midland Brick Company Ltd, Bassett Road, Middle Swan 6056, (09) 274 5522: Bullsbrook.

- kaolin

Greenbushes Tin Ltd, 91 Kensington St, East Perth 6004, (09) 325 8900: Greenbushes.

WHITE CLAY

Bristile Ltd, 212 Adelaide Tce, Perth 6000, (09) 325 7299: Jarrahdale.

COAL

Griffin Coal Mining Company Ltd, 28 The Esplanade, Perth 6000, (09) 325 8155: Collie.
Western Collieries Ltd, 75 Canning Hwy, Victoria Park 6100, (09) 361 8911: Collie.

COBALT

Western Mining Corporation Ltd, 191 Great Eastern Hwy, Belmont 6104, (09) 478 0711: Kambalda.

CONSTRUCTION MATERIALS - aggregate

Calsil Ltd, 5 Mill Street, Perth 6000, (09) 321 8552: Port Hedland.
The Readymix Group WA, 75 Canning Hwy, Victoria Park 6100, (09) 470 2222: Berrangi Creek, Boodardie, Boulder, Karratha, Oscar Range.
Woodhead JL, 407 Packsaddle Road, Kununurra 6743, (091) 81 1472 : Kununurra.

- gravel

PRINCIPAL MINERAL PRODUCERS 1988-89 - continued.

CONSTRUCTION MATERIALS - rock

Cockburn Cement Ltd, Russell Rd, South Coogee 6166, (09) 410 1533: Coogee.
County, B S, C/- Specified Services, Unit 3/77 Hay St, Subiaco 6008, (09) 382 4488: Yeeda Station.
Specified Services Pty Ltd, 77 Hay Street, Subiaco 6008, (09) 382 4488: Mt Regal.

- sand

Amatek Ltd, 1 Newburn Rd, Kewdale 6104, (09) 353 3030: Jandakot.
Bebech M, P & Y, 167 East Road, Wanneroo 6055: Gnangarra.
Calsil Ltd, P O Box 7214, Cloisters Square, Perth 6000, (09) 321 8552: Port Hedland.
Cockburn Cement Ltd, Russell Rd, South Coogee 6166, (09) 410 1533: Cockburn Sound.
Cottiers Pty Ltd, P O Box 311, Port Hedland 6721, (09) 72 1553: Port Hedland.
Drew, M, P O Box 55, Cervantes 6511, (095) 45 7018: Cervantes.
Hastie, J W, Lot 117 Coolgardie Rd, Kalgoorlie 6430, (090) 21 3961: Coolgardie.
Marathon Roofing Pty Ltd, P O Box 5, Willetton 6155, (09) 455 1488: Jandakot.
North D E, PO Box 207, Roebourne 6718, (091) 82 1081: Point Samson.
Pioneer Concrete (WA) Pty Ltd, 123 Burswood Road, Victoria Park 6100, (09) 362 1100: Paraburdoo.
PS Connolly Enterprises Pty Ltd (T/A Broome Crete), 19 Haynes Street, Broome 6725, (091) 92 1753: Waterbank Station.
Rule J K & G F, Lot 141 Robinson Street, Gingin 6503: Lancelin.
Specified Services Pty Ltd, Unit 3/77 Hay St, Subiaco 6008, (09) 382 4488: Maitland.
Stillman WJ, PO Box 71, Boulder WA 6432: Lake Lefroy.
The Readymix Group (WA), 75 Canning Hwy, Victoria Park 6100, (09) 470 2222: Newman, Turner River, Warrambie Station, Warrawanda Creek, Widgiemooltha.
Tirad Pty Ltd, PO Box 126, Boulder 6432: Coolgardie.
Tomlinson JJ, 1 Bernard St, Claremont WA 6010, (09) 384 5553: Chidlow.

COPPER

Western Mining Corporation Ltd, 191 Great Eastern Hwy, Belmont 6104, (09) 478 0711: Kambalda.

COPPER CONCENTRATES

Horseshoe Lights Gold Pty Ltd, 614 Newcastle Street, Leederville 6007, (09) 427 6222: Horseshoe.
Newmont Aust Ltd, Level 18 AMP Tower, 535 Bourke Street, Melbourne Victoria 3000, (03) 629 5191: Telfer.

DIAMOND

Argyle Diamond Mines Pty Ltd, 2 Kings Park Rd, West Perth 6005, (09) 482 1188: Argyle.
- Ashton Mining Limited)
  AO (Aust) Pty Ltd) 4th Floor, 441 St Kilda Rd, Melbourne Victoria 3004 (03) 267 5500.
  Tanaust Pty Ltd)

Capricorn Diamond Pty Ltd, 2 Kings Park Rd, West Perth 6005, (09) 482 1188: Argyle.
West Australian Diamond Trust, 28th Floor, Capita Centre, 197 St George's Tce, Perth 6000, (09) 322 7933.
Freeport Bow River Properties Ltd, 22nd Floor, 360 Collins Rd, Melbourne Victoria 3004, (03) 602 4811: Lissadell.
Gem Exploration and Minerals Pty Ltd, 9th Floor, 220 St George's Tce, Perth 6000, (09) 322 1979: Lissadell.

DOLOMITE

Green K&P, P O Box 31, Newdegate 6355, (098) 71 1547 : Lake Magenta.

FELDSPAR

Commercial Minerals Ltd, 26 Tomlinson Road, Welshpool 6106, (09) 362 1411: Mukinbudin.
Pilbara Mica Corporation Pty Ltd, PO Box 301, Bridgetown 6255, (097) 61 7518: Pinpingarra

GARNET SAND

Cable Sands P O Box 133, Bunbury 6230, (097) 21 4111 : Capel.
Target Minerals N L, P O Box 188, Geraldton 6530, (099) 23 3644: Port Gregory.

PRINCIPAL MINERAL PRODUCERS 1988-89 - continued

GOLD

Australian Consolidated Minerals Ltd, C/- GPO Box X2201, Perth WA 6001, (09) 325 7755: Golden Crown, Westonia.
BHP Minerals, 240 Hay St, Kalgoorlie 6430, (090) 24 2060: Gimlet South, Ora Banda Tailings, New Gimlet West. Boddington, P O Box 48, Boddington 6390, (098) 83 8260: Boddington.
Central Norseman Gold Corporation N L, P O Box 56, Norseman 6443, (090) 39 1101: Central Norseman.
Consolidated Exploration Ltd, P O Box 86, Fimiston 6433, (090) 91 2660: Davyhurst, Lady Bountiful.
East Murchison Mining Pty Ltd, GPO Box C130, Perth, (09) 426 5500 : Gidgee.
Forsayth NL & Reynolds Aust. Mines Pty Ltd, 1st Floor, 28 The Esplanade, Perth 6000, (09) 322 7221: Mt. Gibson.
Hill 50 Gold Mine N L, P O Box 83, Mt Magnet, 6638, (09) 63 4104: Hill 50.
Kalgoorlie Mining Associates, P O Box 105, Fimiston 6433, (090) 21 3411: Fimiston, Mt Charlotte.
Kia Ora Gold Corporation NL, PO Box 78, Southern Cross 6426, (090) 40 1030: Marvel Loch.
Metana Minerals NL, P O Box 792, Cloverdale 6105, (09) 277 9944 : Creedy, Parkinson, St George, Paris.
Mt Percy Gold Project, PO Box 489, Kalgoorlie 6430, (090) 21 8276: Mt Percy.
Newmont Holdings Pty Ltd, P O Box 231, Boulder 6432, (009) 19 8200: New Celebration.
North Kalgurli Mines Ltd, PMB 13, Kalgoorlie 6430, (090) 21 0600: North Kalgurli, Paringa.
Pancontinental Goldmining Areas Pty Ltd, P O Box 1161, Kalgoorlie 6430, (090) 24 2000: Paddington.
Sons of Gwalia Ltd, P O Box 669, West Perth 6005, (09) 481 1988: Sons of Gwalia.
Western Mining Corporation Ltd, P O Box 80, Belmont 6104, (09) 478 0711: Emu, Gt Boulder, Kambalda, Lancefield, Sand King.
Western Alluvials Pty Ltd, C/-Barrack Mine Management, 614 Newcastle St, Leederville 6107 (09) 328 8200: Wiluna Goldmine, Wiluna Dumps.
Whim Creek Consolidated N L, P O Box 144, West Perth 6005, (09) 325 5855: Haveluck/Phar Lap.

GYPSUM

Bywaters L P, PO Box 2, Kalannie 6468: North Goodlands.
Brady H B and Company Pty Ltd, P O Box 42 Bayswater 6053, (09) 279 4422: Lake Brown.
Downie AJ, PO Box 160, Koorda 6475: Korda.
Eaton MB & AE, PO Box 146, Narembeen 6369, (090) 64 7316: Mt. Walker.
Endeavour Resources Pty Ltd, 15th Floor, R & I Tower, 108 St Georges Terrace, Perth 6000, (09) 324 6350: Wyalkatchem.
Fitzgerald, EM & EJ, PO Box 392, Merredin 6495, (090) 41 1146: Hines Hill.
Green D B, PO Box 51, Carnamah 6517: Carnamah.
Hewson A R & K J, RMB 252, Lake Camm (via Newdegate) 6355: Lake Camm.
Kidman G, PO Box 69, Newdegate 6355, (098) 71 6044: Varley.
Lake Hillman Mining PL, P O Box 46, Kalannie 6468, (09) 66 2045: Lake Hillman.
McAndrew Mining, C/- Post Office, Yelbeni 6487, : Yelbeni.
Nixon P F and R S, P O Box 49, Kalannie 6468, (09) 66 2045: Lake Hillman.
Pustkuchen, JV & Enright, North Baandee via Dooklakine 6411, (090) 44 4032: Hines Hill.
Swan Portland Cement Ltd, Burswood Rd, Rivervale 6103, (09) 361 8822: Lake Hillman.

IRON ORE

BHP Utah Minerals Int., 123 Kewdale Rd, Kewdale 6105, (09) 353 3822: Cockatoo Island, Koolan Island.
Goldsworthy Mining Ltd, 197 St George's Tce, Perth 6000, (09) 322 1788: Shay Gap.
Hamersley Iron Pty Ltd, 191 St George's Tce, Perth 6000, (09) 327 2327: Mt Tom Price.
Mt Newman Mining Company Pty Ltd, 200 St George's Tce, Perth 6000, (09) 320 4666: Newman, Yandicoogina.
Robe River Iron Associates, 9th Floor, 12-14 St George's Tce, Perth 6000, (09) 421 4747: Pannawonica.

LIMESTONE

Aquarius Holdings Pty Ltd, Unit 3/104 Erindale Road, Balcatta 6021, (09) 349 6009: Wanneroo.
Commercial Minerals Ltd, 26 Tomlinson Road, Welshpool 6102, (09) 362 1411: Lancelin.
Endeavour Resources Ltd, 15th Floor, R & I Tower, 108 St George's Terrace, Perth 6000, (09) 324 6350: Gingin, Yanchep.
Henderson Nominees Pty Ltd, 19 Rangeview Road, Landsdale 6065, (09) 342 9988: Moore River.
Jackson Bros., PO Box 40, Pemberton 6260, (097) 76 1206: Pt D'Entrecasteaux.
Specified Services Pty Ltd, Unit 3/77 Hay St, West Perth 6005, (09) 382 4488: Cleaverville.
Swan Portland Cement Ltd, P O Box 78, Rivervale 6103, (09) 361 8822: Wanneroo.
WA Limestone Co, 41 Spearwood Ave, Bibra Lake 6163, (09) 418 4440: Nowerup.

PRINCIPAL MINERAL PRODUCERS 1988-89 - continued

MICA

Pilbara Mica Corporation Pty Ltd, PO Box 301, Bridgetown 6255, (097) 61 7518: Pippingarra.

MINERAL BEACH SANDS

Allied Eneabba Ltd, 45 Stirling Highway, Nedlands 6009, (09) 389 1222: Eneabba.
Associated Minerals Consolidated Ltd, 45 Stirling Highway, Nedlands 6009, (09) 389 1222: Capel, Eneabba.
Cable Sands Pty Ltd, P O Box 133, Bunbury 6230, (097) 21 4111: Capel.
Westralian Sands Pty Ltd, P O Box 96, Capel 6271, (097) 27 2002: Boyanup, North Capel, Yoganup.

NICKEL

Western Mining Corporation Ltd, 191 Great Eastern Hwy, Belmont 6104, (09) 478 0711: Carnilya Hill, Kambalda, Windarra.

PALLADIUM

Western Mining Corporation Ltd, 191 Great Eastern Hwy, Belmont 6104 (09) 478 0711: Kambalda.

PEAT

Magnet Industries, 665 Welshpool Rd, Wattle Grove 6107, (09) 453 6777: Manjimup.
Phillips I M & W D, C/- RMB 133 Deeside Mail Service, Manjimup 6258, (097) 69 1050: Lake Muir.

PETROLEUM - condensate

Consolidated Gas Pty Ltd, 2nd Floor Hamden House, 174 Hamden Road, Nedlands 6009, (09) 389 8344: Woodada.
West Australian Petroleum Pty Ltd, 233 Adelaide Tce, Perth 6000, (09) 325 0181: Barrow Island, Dongara.
Woodside Offshore Petroleum Pty Ltd, 1 Adelaide Tce, Perth 6000, (09) 224 4111: North Rankin.

- crude oil

Barrack Energy Ltd, 262 St George's Tce, Perth 6000, (09) 322 2288: Mt Horner.
Bond Corporation Pty Ltd, Griffin Centre, 28 The Esplanade, Perth 6000, (09) 322 7355: Harriet, Rosette.
Home Energy Company Ltd, 4th Fl, 233 Adelaide Tce, Perth 6000, (09) 325 1555: Blina, Lloyd, Sundown, West Terrace.
West Australian Petroleum Pty Ltd, 1 Adelaide Tce, Perth 6000, (09) 325 0181: Barrow Island, Dongara,
Western Mining Corporation Ltd, 233 Adelaide Tce, Perth 6000, (09) 425 4444: Herald/Pepper.

- natural gas

Consolidated Gas Pty Ltd, 2nd Floor Hamden House, 174 Hamden Road, Nedlands 6009, (09) 389 8344: Woodada.
West Australian Petroleum Pty Ltd, 233 Adelaide Tce, Perth 6000, (09) 325 0181: Dongara.
Woodside Offshore Petroleum Pty Ltd, GPO Box D188, Perth 6001, (09) 425 1211: North Rankin.

PLATINUM

Western Mining Corporation Ltd, 191 Great Eastern Hwy, Belmont 6104, (09) 478 0711: Kambalda.

SALT

Dampier Salt Operations Ltd, 191 St George's Tce, Perth 6000, (09) 327 2299: Dampier, Lake MacLeod.
Leslie Salt Company, 44 St George's Tce, Perth 6000, (09) 325 4888: Port Hedland.
Shark Bay Salt Joint Venture, 22 Mount St, Perth 6000, (09) 322 4811: Useless Loop

SEMI-PRECIOUS STONES - amethyst

Soklich Trading Company, Lot 326 Dale Place, Orange Grove 6109, (09) 459 1449: Gascoyne.

PRINCIPAL MINERAL PRODUCERS 1988-89 - continued

SILICA SAND

Amatek Limited, 1 Newburn Road, Kewdale 6104, (09) 353 3030: Canningvale, Eclipse Hill, Jandakot.
Australian Glass Manufacturers Co, 35 Baille Road, Canning Vale 6155, (09) 455 1111: Lake Gnangara.
Bell Basic Industries Ltd, 136-138 Great Eastern Hwy, Guildford 6055, (09) 279 0000: Jandakot.
The Readymix Group (WA), 75 Canning Hwy, Victoria Park 6100, (09) 470 2222: Jandakot.
Western Mining Corporation Ltd, 191 Great Eastern Highway, Belmont 6104, (09) 478 0711: Mt Burges.

SILVER

Horseshoe Lights Gold Pty Ltd, 614 Newcastle Street, Leederville 6007, (09) 427 6222: Horseshoe.
Western Mining Corporation Ltd, 191 Great Eastern Highway, Belmont 6104, (09) 478 0711: Kambalda.
Newmont Aust Pty Ltd, Level 18 AMP Tower, 535 Bourke Street, Melbourne Victoria 3000, (03) 629 5191: Telfer.

SPODUMENE

Lithium Australia Ltd, 91 Kensington St, East Perth 6004, (09) 325 1966: Greenbushes.

TALC

Gwalia Minerals NL, 38 Parliament Place, West Perth 6005, (09) 481 0023: Mt Seabrook.
Western Mining Corporation Ltd, P O Box 116, Three Springs 6519, (099) 54 5047: Three Springs.

TANTALITE

Greenbushes Tin Ltd, 91 Kensington Street, East Perth 6004, (09) 325 8900: Greenbushes.

TIN

Greenbushes Tin Ltd, 91 Kensington Street, East Perth 6004, (09) 325 8900: Greenbushes.

VERMICULITE

Vermiculite Industries Pty Ltd, 15 Spencer Street, Jandakot 6164: Young River.

ZINC

BHP Minerals Ltd, Level 8, Forrest Centre, 221 St George's Tce, Perth 6000, (09) 426 5800: Cadjebut.

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