

Resource Centre  
Policy Branch  
Dept. of Minerals & Energy



ROYALTIES AND STATISTICS BRANCH

**STATISTICAL DIGEST OF  
MINERAL PRODUCTION  
1987/88**



DEPARTMENT OF MINES  
WESTERN AUSTRALIA

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MINERAL PRODUCTION  
1987/88

COMPILED BY:

ROYALTIES AND STATISTICS BRANCH

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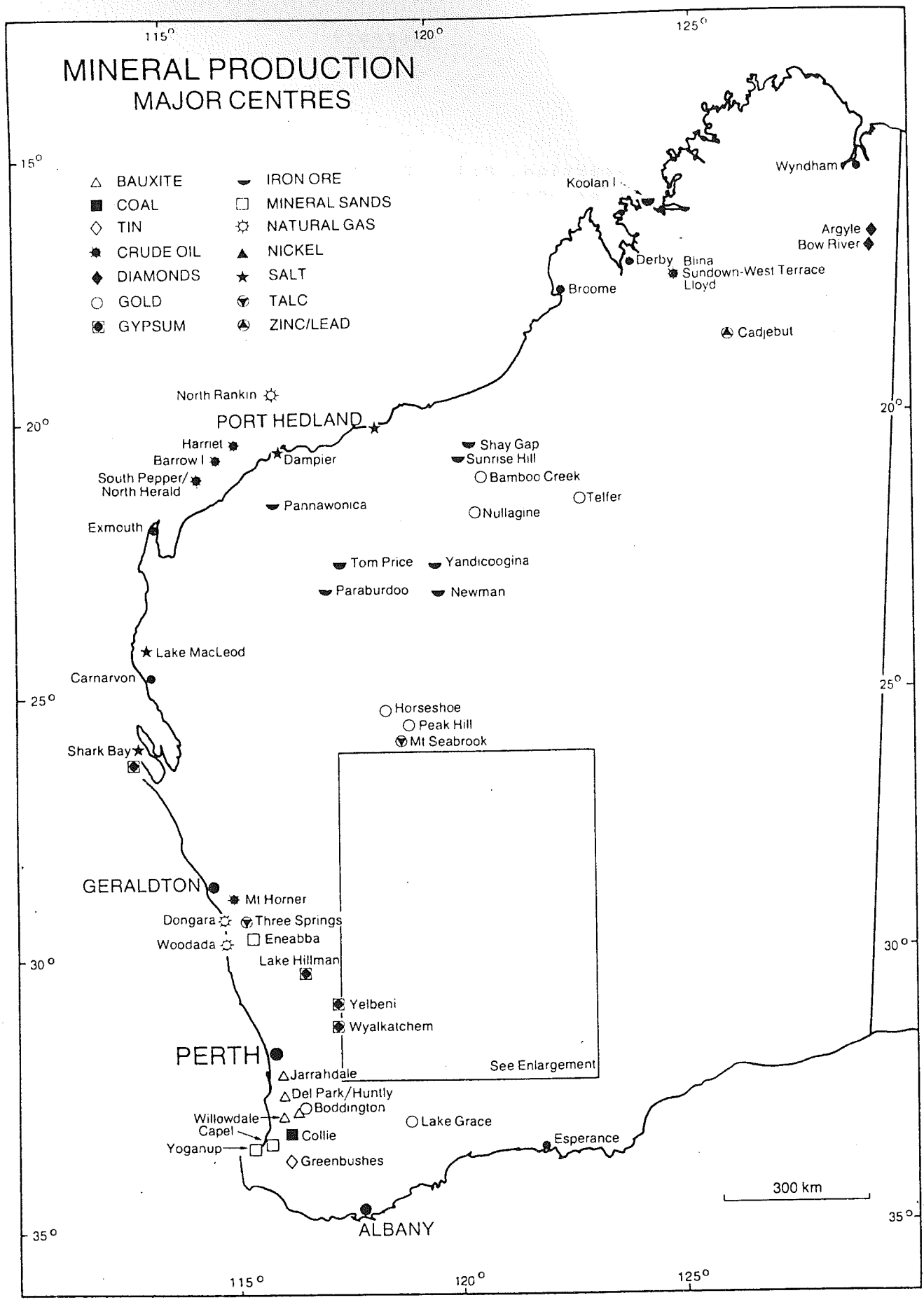
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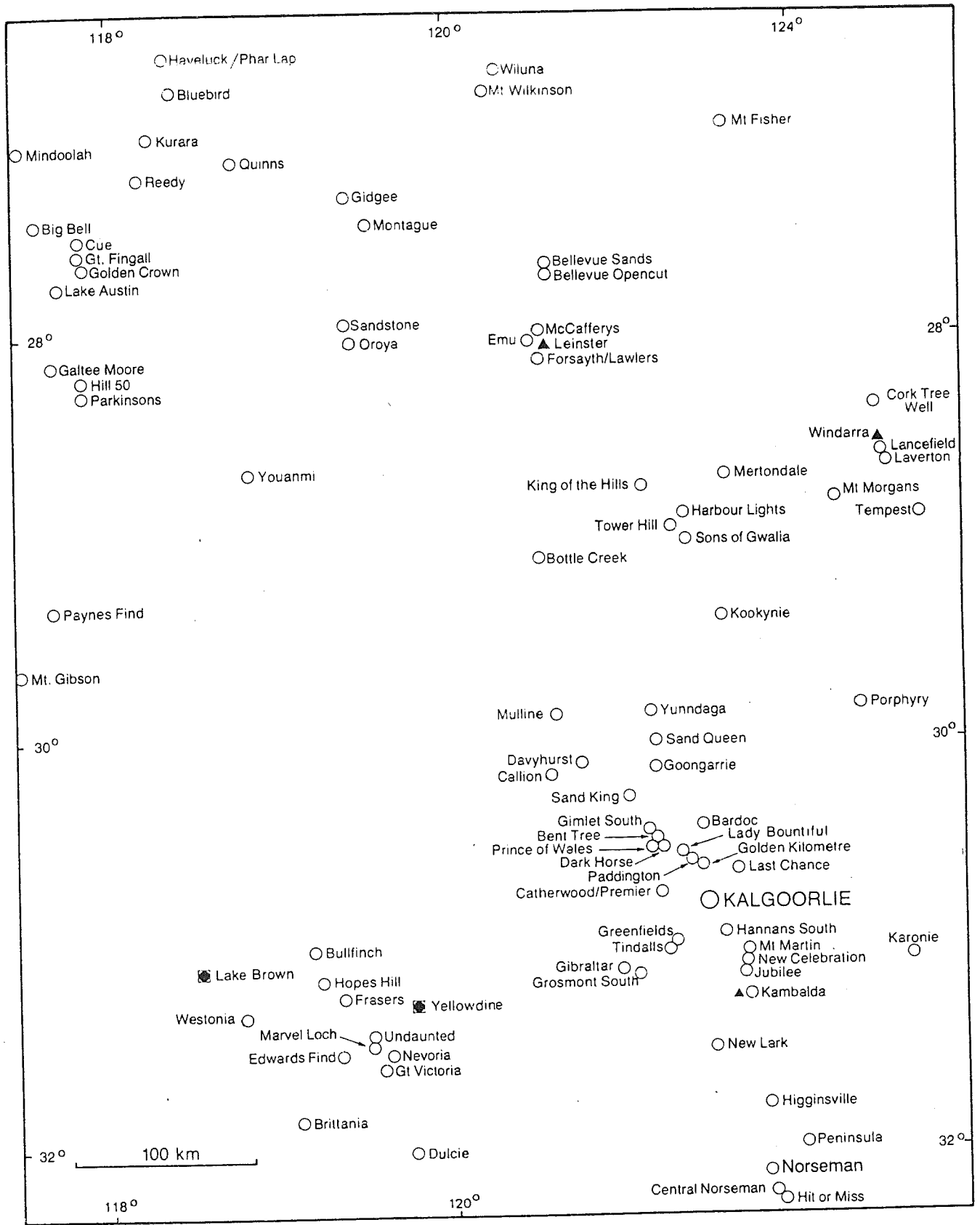
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# MINERAL PRODUCTION MAJOR CENTRES

- |             |                 |
|-------------|-----------------|
| △ BAUXITE   | ☪ IRON ORE      |
| ■ COAL      | □ MINERAL SANDS |
| ◇ TIN       | ☼ NATURAL GAS   |
| ★ CRUDE OIL | ▲ NICKEL        |
| ◆ DIAMONDS  | ★ SALT          |
| ○ GOLD      | ☉ TALC          |
| ⊗ GYPSUM    | ⊗ ZINC/LEAD     |





○ GOLD

▲ NICKEL

■ GYPSUM

## WESTERN AUSTRALIA MINERAL PRODUCTION TRENDS

### OVERVIEW

The value of mineral production in Western Australia rose by \$1,089.8 million to reach \$6,945.6 million. This is only \$54.4 million short of a milestone \$7 billion and reflects a broadly based improvement across a number of mineral sectors combined with a continuing improvement in the gold industry.

Over the past few years gold has dominated the improvements in mining performance while most other sectors have tended to remain relatively quiet. In 1986/87 the value of gold production rose by \$590m while the value of all other minerals fell by \$50m this combined to result in an overall rise of \$540m to \$5,856.4m in total value.

1987/88 contrasts with this as other minerals contributed a net increase of \$545 million or 50% of the rise in the total value of production, with gold making up the other 50% of the \$1.1 billion increase.

The Western Australian mining industry is dominated by nine major mineral sectors which have consistently accounted for about 99% of the total value of mineral production. In 1986/87 three of these major sectors suffered falls in their value of production, however, in 1987/88 only the diamond sector suffered a decline in value of production.

This evidence indicates a broadly based recovery in Western Australia's mineral industry which has been achieved despite the strengthening of the Australian dollar over the period. The effects of exchange rate movements are significant and it should be noted that just a one cent change in the SA:\$US exchange rate can cause a change of about \$80m in the overall value of production.

### IRON ORE

Shipments of iron ore rose dramatically from 78mt in 1986/87 to over 95mt in 1987/88, a record for a 12 month period. However, price falls and exchange rate movements combined to limit the benefit of this strong sales performance, consequently total value rose by \$71.8m to \$1,867.2m. If 1986/87 prices and exchange rates had applied to the 1987/88 period, the value of iron ore shipments would have risen a further \$320m.

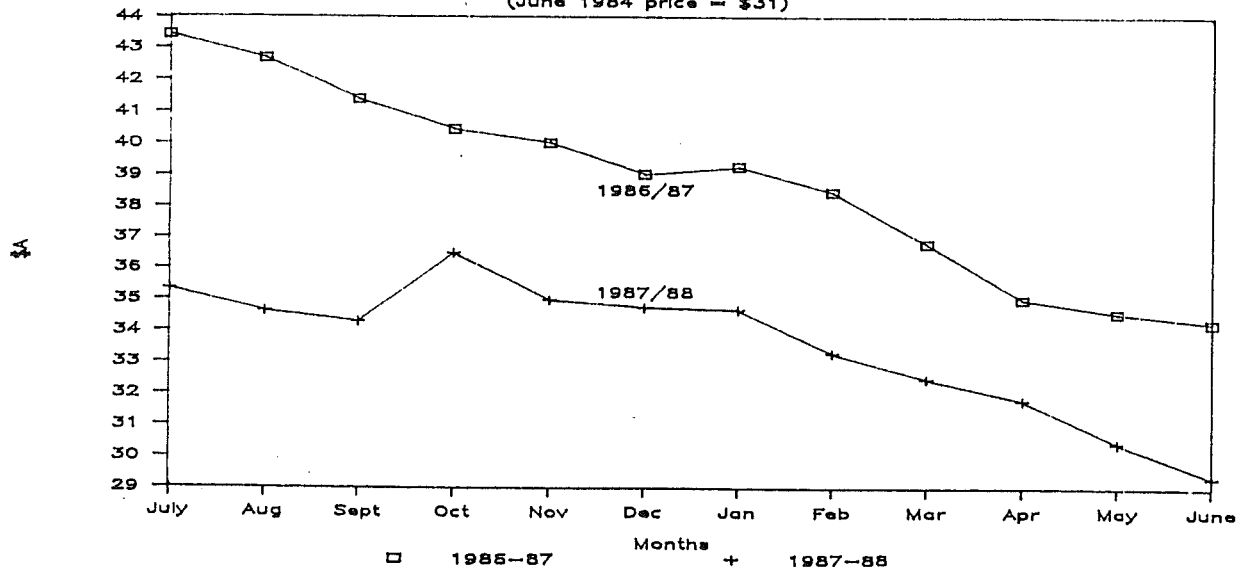
Only the B.H.P. Koolan Island mine and Goldsworthy's Shay Gap operations shipped less in 1987/88 than in 1986/87 as both mines are reaching the end of their present reserves. All other mines shipped greater tonnages with Robe River the largest improver reflecting greater productivity and more stable industrial relations. Mt Newman shipments increased by 20% and Hamersley by 16% to complete the overall strong improvement in iron ore sales.

The major factor behind the good results of the iron ore sector has been the recovery in the world steel industry. The past year has witnessed a substantial return to profitability in the world's traditional steel manufacturing areas constituting the United States, Japan and Europe as well as the continuing success of the newer steel producing nations of Asia.

The steel industry's better performance is attributed to higher prices worldwide, growing construction demand in Japan, a rebuilding of stocks in the United States and increased vehicle output in Europe. As these areas of demand become satisfied, the possibility of a slowdown in the steel industry will increase. If this eventuates it will have a consequent impact on iron ore demand. However, for the 1988/89 iron ore year, Western Australian companies have full order books and it is expected that new record tonnages could be set if these orders are fulfilled.

### IRON ORE - Price : \$A/tonne

(June 1984 price = \$31)



SOURCE: HAMERSLEY HIGH GRADE LUMP PRICES.

### GOLD

Once again the improvement in gold production has dominated the performance of the Western Australian mining industry.

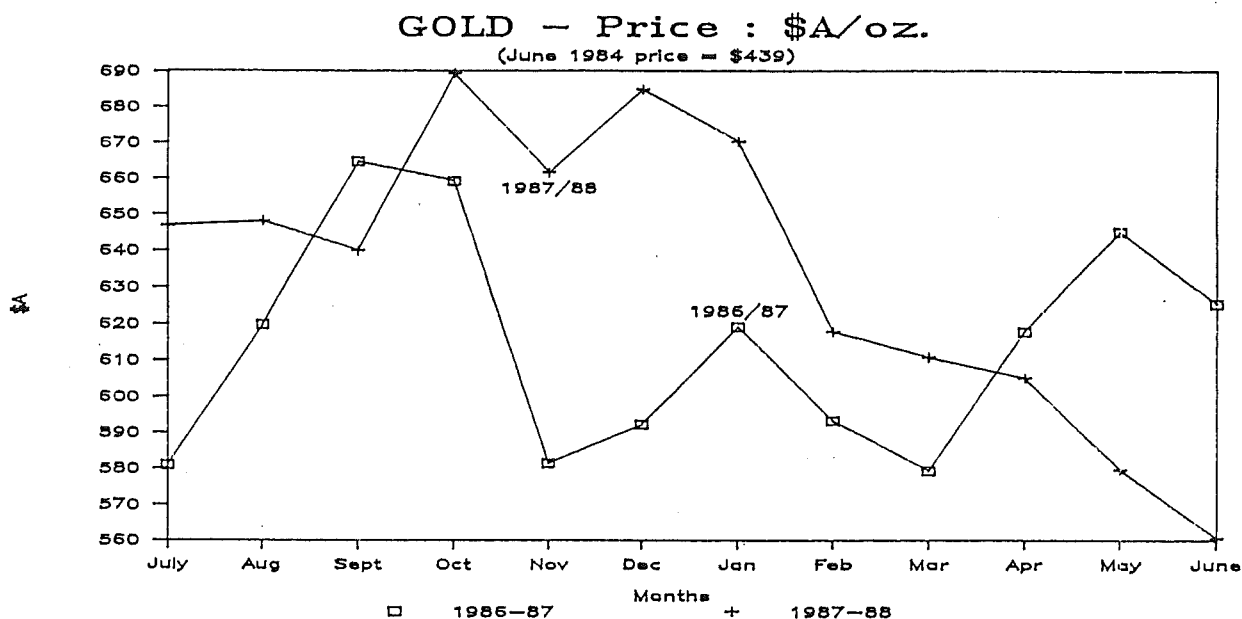
Gold production rose from 64.9 tonnes in 1986/87 to 90.5 tonnes in 1987/88, an increase of 39.5%. With the slightly higher average gold price in 1987/88 the value of production rose by 41.8% from \$1,300.1 million in 1986/87 to reach \$1,843.8 million. It is expected that by 1990 production will be exceeding 130 tonnes on an annual basis worth over \$2 billion at today's prices. If achieved this production would be more than double the record output of the gold rush era of 61 tonnes in 1903.

The structure of the Western Australian gold industry has changed significantly in this decade. In 1980 there were only three mines where individual production exceeded 10,000ozs per annum. The top 10 producers contributed 94% of the State's gold output with a combined production of 340,000ozs (10.6 tonnes).

By 1987/88 there were 67 mines where individual production exceeded 10,000ozs and the top 10 producer's total output of 1.4 million ozs (44.4 tonnes) contributed 49% of total State gold production.

The average gold price received for the year was marginally higher at \$654.68 per oz compared to \$643.93 in 1986/87. However, as can be seen below, the trend in the last half of the year was downwards. World gold markets have alternatively been buoyed and depressed as fears of global inflation rose than receded, moreover, the decline in oil prices and forward selling of gold have added to falls which for a time saw gold prices dip below US\$400 per oz.

Forward selling of gold is a recently prominent feature of the gold industry. This procedure is now widely undertaken and it protects producers from fluctuations in the price of gold by locking in a contract price for a number of years. It has been estimated that about a half of Australia's gold output is forward sold. Some producers have up to 80% of their output committed in forward sales at gold prices which range up to \$700 per oz thus guaranteeing profits while the industry's average operating costs of around \$300 per oz are maintained.



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

## ALUMINA

The upswing in the price of aluminium which commenced in the first half of 1987 has helped create improved market conditions for alumina.

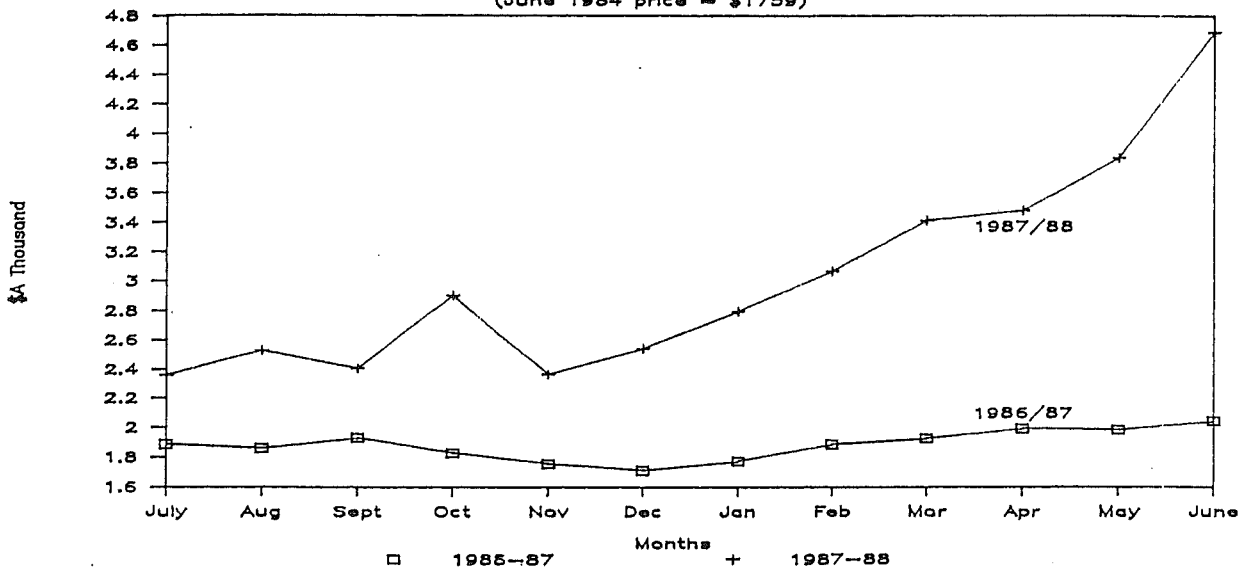
The quantity of alumina produced rose 335,000 tonnes on 1986/87 production of 5.7mt to reach 6.1mt in 1987/88.

Higher prices and the increased output combined to raise the value of alumina produced to \$1,183 million up 8.4% on the 1986/87 figure of \$1,090 million giving rise to some optimism in the W.A. alumina industry.

However, a general strengthening of the \$A against other currencies and increases in the cost of caustic soda, a major element in the processing of alumina, dampened otherwise strong gains in the alumina industry.

### ALUMINIUM - Prices : \$A/tonne

(June 1984 price = \$1759)



SOURCE: L.M.E. HIGH GRADE CASH, MONTHLY AVERAGE OF WEDNESDAY PRICES.

## PETROLEUM

The value of petroleum produced in Western Australia rose from \$630m in 1986/87 to \$790m in 1987/88 despite the declining oil price.

Condensate production rose by 80% with the value of production increasing by \$93.4m, the N.W.S. was again the major contributor.

Western Australia's crude oil production was worth \$304.4m representing a 15.8% increase over 1986/87. In 1987/88 crude oil production was up 358,000kl to 1,933,000kl a 22.7% rise on 1986/87 production.

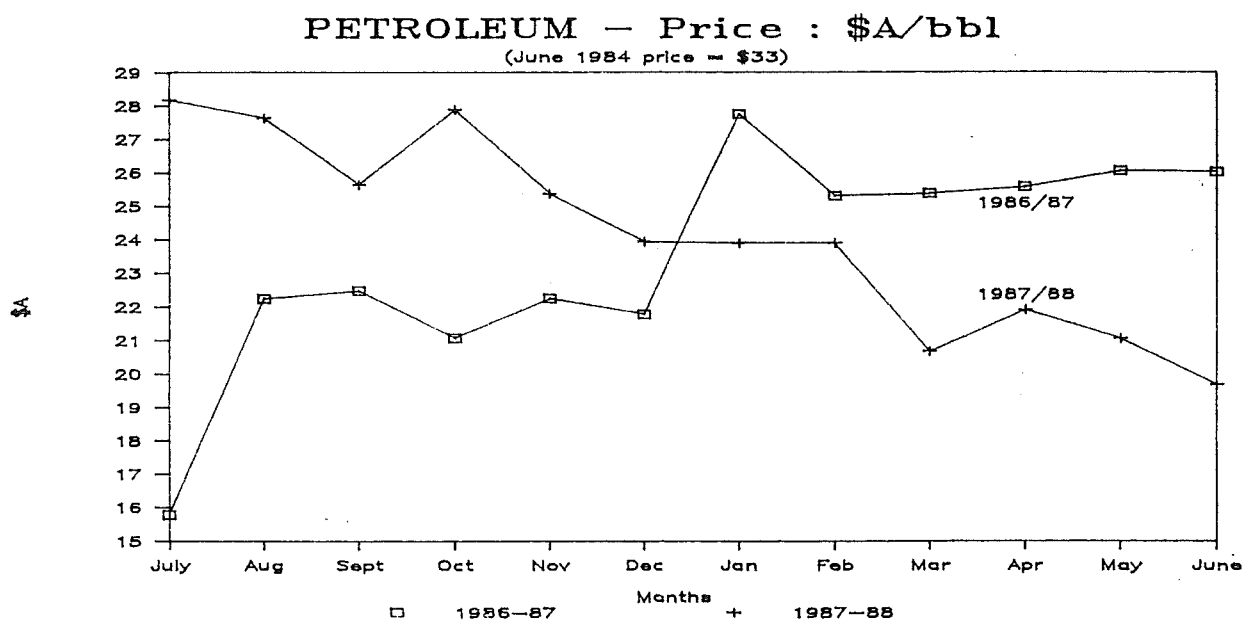
The value of natural gas produced in Western Australia rose by 15.3% or \$42.5m to reach \$320.5m in 1987/88. Average gas prices were slightly higher but the increase in value is mainly attributable to the 13.4% increase in quantity produced.

A steady fall in petroleum prices from \$28 per barrel in July 1987 to \$19.50 per barrel in June 1988 did not dampen the level of exploration or production of petroleum in Western Australia.

1987/88 saw a large increase in the level of exploration activity in Western Australia. 31 exploration wells were drilled both on and offshore, compared with only 16 wells in 1986/87.

Offshore exploration was concentrated in the Carnarvon Basin, with successful finds being recorded near Varanus Island and Thevenard Island.

Onshore exploration was accelerated in the Canning Basin where 20 wells were drilled. Two wells, West Terrace 2 and Lloyd 1 encountered geologically significant oil accumulations and they may become productive in the near future.



SOURCE: BRENT SPOT, MONTHLY AVERAGE OF WEDNESDAY PRICES.

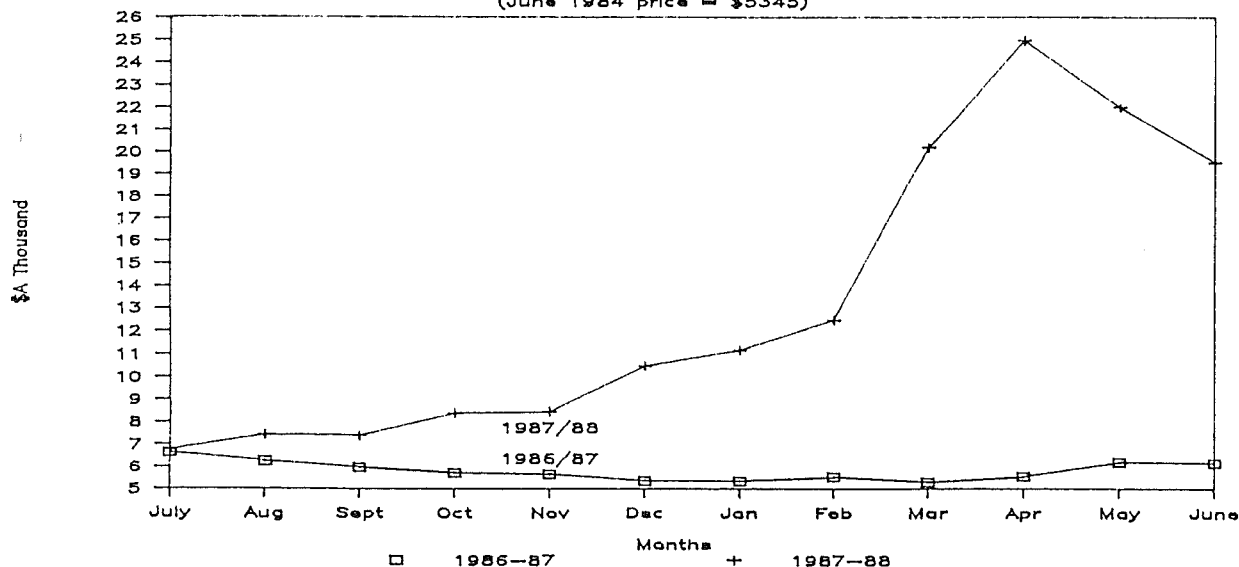
## NICKEL

Although nickel concentrate production fell to 388,964t in 1987/88 down 4% on 1986/87's production of 406,321t, the value of the concentrate produced increased a massive 48% up \$127 million to \$392 million in 1987/88 on 1986/87's value of \$265 million.

Extremely sharp price rises were recorded from February to March 1988 in response to a number of temporary supply shortages. The spectacular price rises have come after nearly five years of depressed prices and is indicative of a stronger market for future years.

### NICKEL - Prices : \$A/tonne

(June 1984 price = \$5345)



SOURCE: L.M.E. CASH, MONTHLY AVERAGE OF WEDNESDAY PRICES.

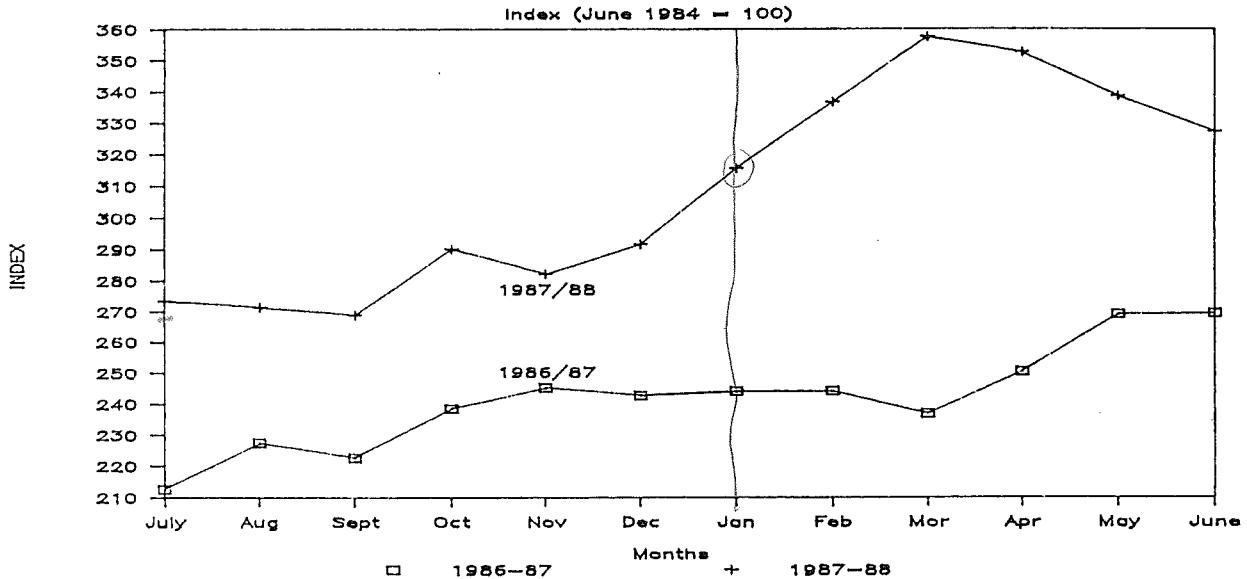
## MINERAL SANDS

Strong increases in the price of rutile and ilmemeite caused the Mineral Sands Index to rise dramatically. The value of production for mineral sands increased substantially from \$196.6 million in 1986/87 to \$223.7 million in 1987/88. The higher value of production was mainly due to higher zircon prices and increases in the quantity of upgraded ilmemeite (synthetic rutile) produced following the commissioning of two new synthetic rutile plants.

Western Australia is a significant producer of mineral sands on the world scene, producing 30% of world's ilmemeite supplies and 50% of monazite. W.A. also supplies significant quantities of rutile and zircon to world markets.

The graph below represents an index of the prices for the three major mineral sands products produced in W.A., ilmenite, rutile and zircon. It has been constructed using a weighting for the respective prices based on an average contribution to the total value of mineral sands production over the last 5 years.

### PRICE INDEX FOR MINERAL SANDS



SOURCE: LONDON PRICES, AS DETAILED IN TEXT ABOVE.

### DIAMONDS

In 1987/88 the value of diamonds produced in Western Australia was \$248.2 million, down \$35.9 million on the 1986/87 figure of \$284.1 million. However, Australia is still ranked fifth after the USSR, Botswana, South Africa and Namibia in terms of the value of diamonds produced. The decline in the value of production was caused mostly by a decrease in the quantity of diamonds produced. Production fell from 32.2M cts in 1986/87 to 30.2M cts in 1987/88 despite the Bow River Diamond project commencing during the year.

### MINERAL EXPLORATION

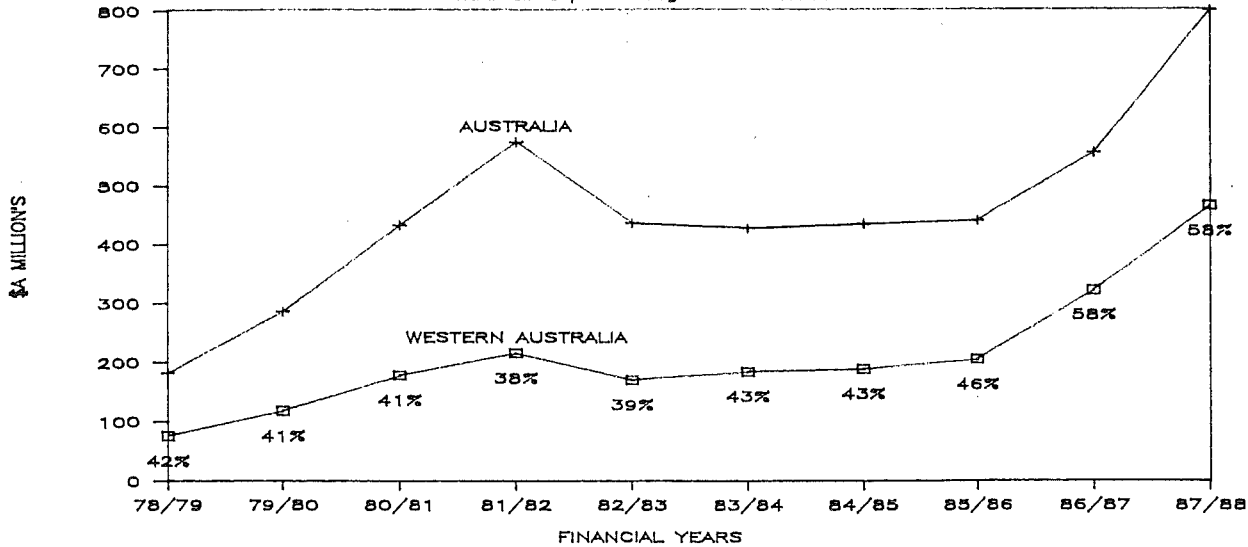
Mineral exploration expenditure in Australia for the 1987/88 financial year was at an all time high of \$799.2 million up 44% on 1986/87's figure of \$556.8 million. 58% of this or \$466.3 million was spent in Western Australia.

In 1987/88 \$360.9 million was spent on Gold exploration in Western Australia, this was approximately 80% of total exploration expenditure and represents a 50% increase on 1986/87's expenditure of \$240.3 million. Other commodities experiencing substantial increases in exploration expenditure were diamonds up 68% to \$18.1 million and Base Metals up 48% to \$40.9 million.

The graph following suggests a healthy level of exploration which is essential for the continued growth of Western Australia's mining industry.

## EXPLORATION EXPENDITURE

W.A. as a percentage of AUSTRALIA



SOURCE: AUSTRALIAN BUREAU OF STATISTICS

### SUMMARY AND OUTLOOK

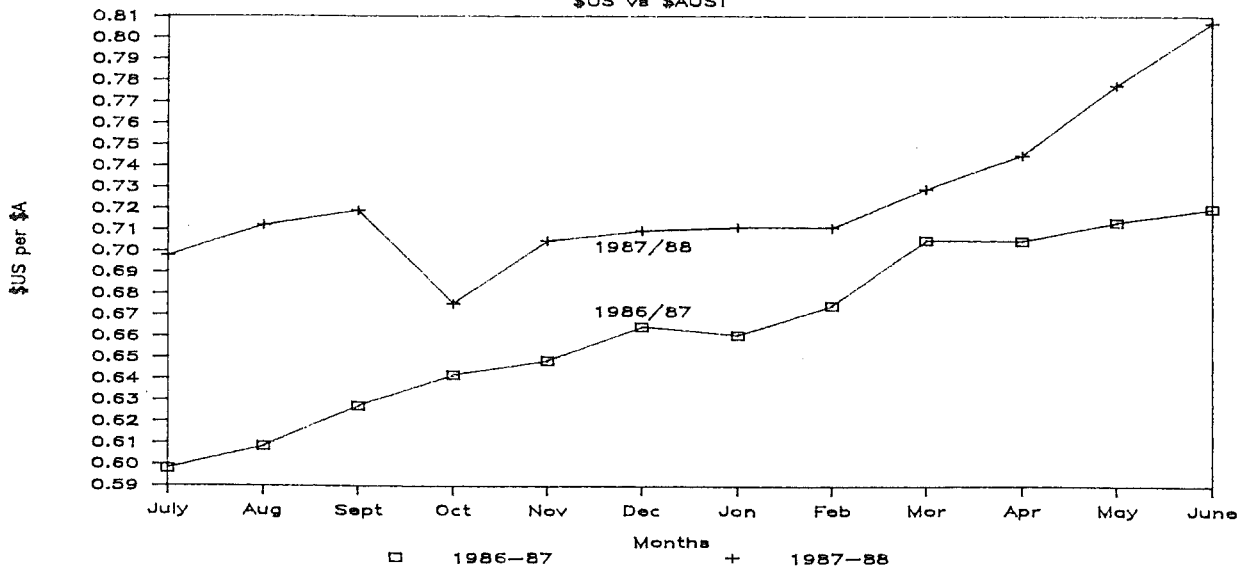
Some mineral commodity prices such as those for Alumina, Nickel and Mineral Sands rose during 1987/88. Others such as Iron Ore, Petroleum, Diamonds and Gold experienced price falls over the same period.

It can therefore be suggested that, while higher commodity prices played a significant part in the continued steady growth in the Western Australian mineral sector, increases in production were a major feature of the past year's performance. An overall 18.6% growth in the value of mineral production indicates that W A's mining companies are still very well rated by the world's major mineral buyers.

The above growth has been achieved despite a gradual improvement in the Australian dollar exchange rate, which would have been expected to decrease Australia's competitiveness against other major mineral producing countries.

### EXCHANGE RATE COMPARISON

\$US vs \$AUST



SOURCE: AUSTRALIAN FINANCIAL REVIEW, MONTHLY AVERAGE OF DAILY PRICES.

TABLE 1  
QUANTITY AND VALUE OF MINERALS 1986/87, 1987/88

| Mineral               | Unit               | 1986/87    |                         | 1987/88    |                      |
|-----------------------|--------------------|------------|-------------------------|------------|----------------------|
|                       |                    | Quantity   | Value (\$A)             | Quantity   | Value (\$A)          |
| Alumina               | t                  | 5 727 327  | 1 090 879 157           | 6 063 130  | 1 182 997 535        |
| Barytes               | t                  | -          | -                       | 9 669      | 1 160 280            |
| Building Stone        |                    |            |                         |            |                      |
| black granite         | t                  | 585        | 50 000                  | -          | -                    |
| quartz                | t                  | 1 861      | 83 755                  | 294        | 13 210               |
| Clay                  |                    |            |                         |            |                      |
| attapulgitic          | t                  | 10 458     | n.a.                    | 11 387     | n.a.                 |
| cement clay           | t                  | 23 991     | 59 969                  | 22 679     | 56 698               |
| fire clay             | t                  | 208 895    | 252 326                 | 191 184    | 381 127              |
| kaolin                | t                  | 7 460      | 241 564                 | 185        | 11 187               |
| white clay            | t                  | 72 176     | 209 528                 | 1 697      | 20 364               |
| Coal                  | t                  | 3 795 055  | 141 742 231(r)          | 3 701 942  | 150 965 157          |
| Cobalt                | t                  | 463        | 4 012 332               | 325        | 3 521 185            |
| Construction Material |                    |            |                         |            |                      |
| aggregate             | t                  | 100 816    | 581 430                 | 261 853    | 1 314 472            |
| gravel                | t                  | 22 365     | 28 965                  | 5 989      | 38 905               |
| rock                  | t                  | 116 222    | 187 560                 | 315 395    | 3 265 965            |
| sand                  | t                  | 1 271 826  | 3 786 995               | 1 618 124  | 4 602 471            |
| sandstone             | t                  | 20         | 40                      | -          | -                    |
| Copper                | t                  | 3 519      | 4 106 685               | 2 071      | 5 938 229            |
| Diamond               | ct                 | 32 164 524 | 284 094 805             | 30 218 355 | 248 202 718          |
| Diatomite             | t                  | 401        | 2 006                   | 124        | 682                  |
| Dolomite              | t                  | 243        | 3 162                   | 130        | 2 060                |
| Emerald               | g                  | 200        | 1 784                   | -          | -                    |
| Felspar               | t                  | 4 405      | 68 814                  | 9 602      | 387 558              |
| Garnet Sand           | t                  | 12 122     | 427 334                 | 17 890     | 630 044              |
| Gold                  | kg                 | 64 911     | 1 300 079 190           | 90 546     | 1 843 770 410        |
| Gypsum                | t                  | 233 404    | 2 673 698               | 99 162     | 947 660              |
| Iron Ore              | t                  | 78 026 315 | 1 678 811 297(r)        | 95 177 702 | 1 867 172 034        |
| Kyanite               | t                  | 955        | 153 220                 | 826        | 114 799              |
| Limestone             | t                  | 194 895    | 1 251 642               | 170 194    | 1 581 478            |
| Mineral Beach Sand    |                    |            |                         |            |                      |
| ilmenite              | t                  | 1 038 922  | 57 843 880(r)           | 946 494    | 63 934 291           |
| reduced ilmenite      | t                  | 53         | 13 250(r)               | -          | -                    |
| upgraded ilmenite(a)  | t                  | 61 178     | 22 899 652(r)           | 195 504    | 69 996 495           |
| leucoxene             | t                  | 12 606     | 5 140 988               | 10 882     | 4 581 114            |
| monazite              | t                  | 12 407     | 8 417 755               | 9 705      | 6 960 550            |
| rutile                | t                  | 82 462     | 46 089 968              | 85 078     | 51 168 571           |
| xenotime              | t                  | 43         | 328 846                 | -          | -                    |
| zircon                | t                  | 310 576    | 56 297 397              | 366 053    | 97 148 148           |
| Nickel Concentrate    | t                  | 406 321    | 264 726 489             | 388 964    | 391 749 276          |
| Nickel Ore            | t                  | 59 257     | 10 065 723              | -          | -                    |
| Palladium             | kg                 | 490        | 3 218 062               | 454        | 2 842 171            |
| Peat                  | t                  | 1 641      | 51 669                  | 879        | 52 794               |
| Petroleum Products    |                    |            |                         |            |                      |
| condensate            | kl                 | 512 434    | 76 464 584(r)           | 1 140 514  | 169 911 500          |
| crude oil             | kl                 | 1 574 655  | 262 843 620             | 1 932 597  | 304 355 749          |
| natural gas           | 1000m <sup>3</sup> | 3 199 165  | 277 989 304             | 3 629 175  | 320 504 994          |
| Platinum              | kg                 | 105        | 2 645 121               | 82         | 1 936 029            |
| Salt                  | t                  | 5 051 148  | 107 382 344             | 5 533 859  | 107 165 215          |
| Semi-precious Stone   |                    |            |                         |            |                      |
| amethyst              | kg                 | 51 000     | 195 500                 | 51 000     | 195 500              |
| Silica Sand           | t                  | 371 165    | 2 279 997(r)            | 402 995    | 2 985 987            |
| Silver                | kg                 | 11 160     | 1 971 953               | 12 673     | 2 295 547            |
| Spodumene             | t                  | 8 221      | 1 855 601               | 24 471     | 4 397 393            |
| Talc                  | t                  | 179 241    | n.a.                    | 169 612    | n.a.                 |
| Tantalite             | t                  | 108        | 4 224 365               | 133        | 5 676 606            |
| Tin Concentrate       | t                  | 731        | 4 882 698               | 434        | 2 855 928            |
| Vermiculite           | t                  | 819        | 16 388                  | 1 679      | 87 072               |
| Zinc Concentrate      | t                  | -          | -                       | 7 223      | 2 805 427            |
| <b>Total Value</b>    |                    |            | <b>5 855 841 549(r)</b> |            | <b>6 945 636 791</b> |

Note: (r) Revised from Previous Edition  
(a) Also known as synthetic rutile

Figure 1

### 1982/83 VALUE OF PRODUCTION

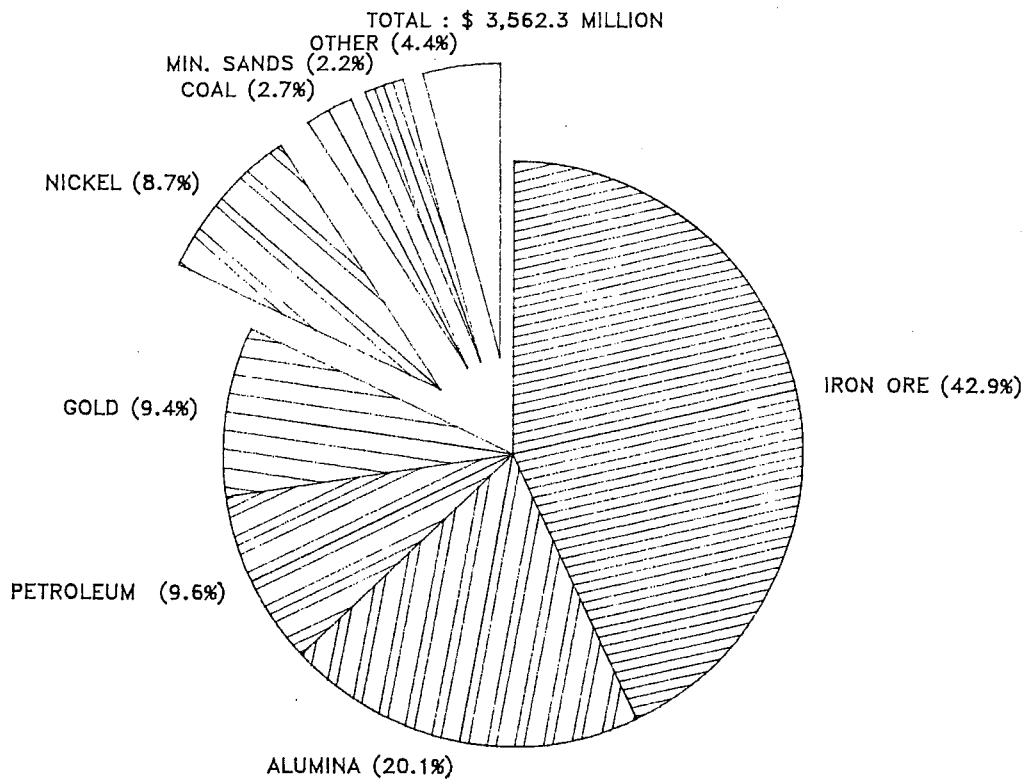


Figure 2

### 1987/88 VALUE OF PRODUCTION

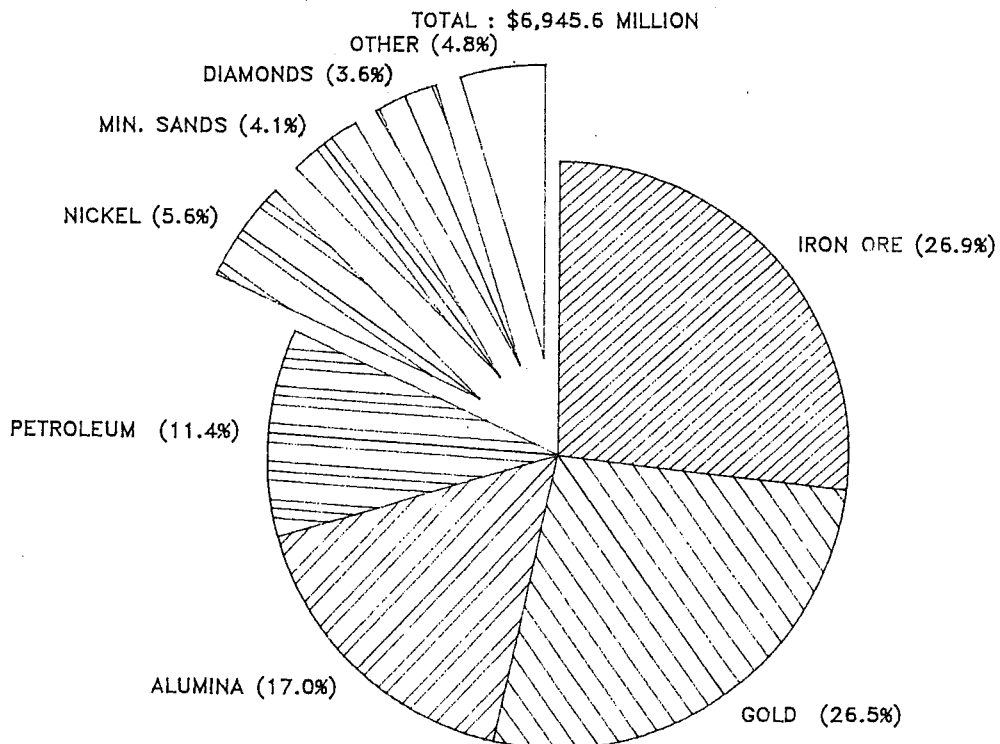


TABLE 2  
 QUANTITY AND VALUE OF MINERALS  
 SHOWING MINERAL-FIELD AND METALLIC CONTENT

| Mineral                  | Mineral-field   | Quantity<br>tonnes | Metallic<br>Content | Value (\$)    | Ref.     |
|--------------------------|-----------------|--------------------|---------------------|---------------|----------|
| Alumina ✓                | South West      | 6 063 130          |                     | 1 182 997 535 | (a)      |
| Barytes ✗                | Pilbara         | 9 669              |                     | 1 160 280     | (b)      |
| Building stone           |                 |                    |                     |               |          |
| - quartz rock ✗          | South West      | 294                |                     | 13 210        | (b)      |
| Clay ✗                   |                 |                    |                     |               |          |
| - attapulgite ✗          | South West      | 11 387             |                     | N.A.          |          |
| - cement clay ✗          | South West      | 22 679             |                     | 56 698)       |          |
| - fire clay ✗            | South West      | 191 184            |                     | 381 127)      | (b)      |
| - kaolin ✗               | Greenbushes     | 185                |                     | 11 187)       |          |
| - white clay ✗           | South West      | 1 697              |                     | 20 364)       |          |
| Coal ✗                   | Collie          | 3 701 942          |                     | 150 965 157   | (c)      |
| Cobalt ✓                 | Coolgardie      |                    | †<br>324.684        | 3 521 185     | (d), (e) |
| Construction Materials ✗ |                 |                    |                     |               |          |
| - aggregate ✗            | East Coolgardie | 227 795            |                     | 957 328       |          |
|                          | Kimberley       | 6 526              |                     | 26 104        |          |
|                          | Pilbara         | 19 447             |                     | 256 900       |          |
|                          | West Kimberley  | 8 085              |                     | 74 140        |          |
|                          |                 | 261 853            |                     | 1 314 472     |          |
| - gravel ✗               | Coolgardie      | 3 309              |                     | 16 545        |          |
|                          | West Pilbara    | 2 680              |                     | 22 360        |          |
|                          |                 | 5 989              |                     | 38 905        |          |
| - rock ✗                 | South West      | 225 339            |                     | 2 028 051     |          |
|                          | West Kimberley  | 35 892             |                     | 610 174       |          |
|                          | West Pilbara    | 54 164             |                     | 627 740       |          |
|                          |                 | 315 395            |                     | 3 265 965     |          |

| Mineral                      | Mineral-field | Quantity<br>tonnes | Metallic<br>Content | Value (\$)    | Ref.     |
|------------------------------|---------------|--------------------|---------------------|---------------|----------|
| - sand ✕                     | Coolgardie    | 24 191             |                     | 148 437       |          |
|                              | Mt Margaret   | 157                |                     | 314           |          |
|                              | Peak Hill     | 14 912             |                     | 82 376        |          |
|                              | Pilbara       | 13 302             |                     | 77 021        |          |
|                              | South West    | 1 503 767          |                     | 3 768 965     |          |
|                              | West Pilbara  | 61 795             |                     | 525 358       |          |
|                              |               | 1 618 124          |                     | 4 602 471     |          |
| Total Construction Materials |               | 2 201 361          |                     | 9 221 813     | (b)      |
|                              |               |                    | +                   |               |          |
| Copper ✓                     | Coolgardie    |                    | 2 701.496           | 5 938 229     | (d), (e) |
|                              |               |                    | ct                  |               |          |
| Diamonds ✕                   | Kimberley     |                    | 30 218 355          | 248 202 718   | (d)      |
| Diatomite ✕                  | South West    | 124                |                     | 682           | (c)      |
| Dolomite ✕                   | South West    | 130                |                     | 2 060         | (c)      |
| Felspar ✕                    | South West    | 9 602              |                     | 387 558       | (f)      |
| Garnet Sand ✓                | South West    | 17 890             |                     | 630 044       | (c), (g) |
|                              |               |                    | kg                  |               |          |
| Gold ✓                       | State-wide    | 90 545.779         |                     | 1 843 770 410 |          |
| Gypsum ✕                     | South West    | 71 396             |                     | 794 319       | (b), (c) |
|                              | Yilgarn       | 27 766             |                     | 153 341       | (b)      |
| Total Gypsum                 |               | 99 162             |                     | 947 660       |          |

| Mineral         | Mineral-field  | Quantity<br>tonnes | Metallic<br>Content | Value (\$)    | Ref. |
|-----------------|----------------|--------------------|---------------------|---------------|------|
| Av. Assay Fe %  |                |                    |                     |               |      |
| Iron Ore ✓      |                |                    |                     |               |      |
| Interstate      |                |                    |                     |               |      |
| - ore           | Peak Hill      | 3 968 418          | 65.78               | 85 326 903    |      |
|                 | West Kimberley | 1 479 040          | 66.50               | 16 266 460    |      |
|                 |                | 5 447 458          |                     | 101 593 363   |      |
| Exported        |                |                    |                     |               |      |
| - ore           | Peak Hill      | 31 163 240         | 63.00               | 667 015 810   |      |
|                 | Pilbara        | 4 111 165          | 61.67               | 77 423 343    |      |
|                 | West Pilbara   | 51 812 871         | 61.19               | 967 284 020   |      |
|                 | West Kimberley | 2 102 165          | 66.54               | 42 352 612    |      |
|                 |                | 89 189 441         |                     | 1 754 075 785 |      |
| - pellets       | West Pilbara   | 540 803            | 63.26               | 11 502 886    |      |
|                 |                | 89 730 244         |                     | 1 765 578 671 |      |
| Total Iron Ore  |                | 95 177 702         |                     | 1 867 172 034 | (d)  |
| Kyanite         | South West     | 826                |                     | 114 799       | (d)  |
| Limestone       | South West     | 126 828            |                     | 1 294 978     |      |
|                 | West Pilbara   | 43 366             |                     | 286 500       |      |
| Total Limestone |                | 170 194            |                     | 1 581 478     | (b)  |

| Mineral                   | Mineral-field   | Quantity<br>tonnes | Metallic<br>Content | Value (\$)  | Ref.     |
|---------------------------|-----------------|--------------------|---------------------|-------------|----------|
| Av. Assay $TiO_2\%$       |                 |                    |                     |             |          |
| Mineral Beach Sands       |                 |                    |                     |             |          |
| - ilmenite ✓              | South West      | 946 494            | 56.28               | 63 934 291  |          |
| - upgraded<br>ilmenite    | South West      | 195 504            | 92.00               | 69 996 495  |          |
| $TiO_2 +$                 |                 |                    |                     |             |          |
| - leucoxene ✓             | South West      | 10 882             | 9 841               | 4 581 114   |          |
| Th $O_2$ 10kg units       |                 |                    |                     |             |          |
| - monazite ✓              | South West      | 9 705              | 63 990              | 6 960 550   |          |
| $TiO_2 +$                 |                 |                    |                     |             |          |
| - rutile ✓                | South West      | 85 078             | 80 822              | 51 168 571  |          |
| $ZrO_2 +$                 |                 |                    |                     |             |          |
| - zircon ✓                | South West      | 366 053            | 239 976             | 97 148 148  |          |
| Total Mineral Beach Sands |                 |                    |                     | 293 789 169 | (d)      |
| Av. Assay Ni%             |                 |                    |                     |             |          |
| Nickel Concentrates       |                 |                    |                     |             |          |
|                           | Coolgardie      | 278 265            | 11.40               | 288 087 264 |          |
|                           | East Coolgardie | 32 573             | 11.70               | 34 630 549  |          |
|                           | Mt Margaret     | 78 126             | 9.57                | 69 031 463  |          |
| Total Nickel              |                 | 388 964            |                     | 391 749 276 | (h)      |
| kg                        |                 |                    |                     |             |          |
| Palladium ✓               | Coolgardie      |                    | 453.847             | 2 842 171   | (d), (e) |
| Peat                      | South West      | 879                |                     | 52 794      | (b)      |

| Mineral              | Mineral-field | Quantity<br>tonnes | Metallic<br>Content | Value (\$)  | Ref.     |
|----------------------|---------------|--------------------|---------------------|-------------|----------|
|                      |               | kl                 |                     |             |          |
| Petroleum            | Basin         |                    |                     |             |          |
| - condensate         | Carnarvon     | 1 139 584          |                     | 169 750 000 | (d)      |
|                      | Perth         | 930                |                     | 161 500     | (b)      |
|                      |               | 1 140 514          |                     | 169 911 500 |          |
| - crude oil          | Canning       | 41 968             |                     | 6 721 774   |          |
|                      | Carnarvon     | 1 877 143          |                     | 295 764 487 |          |
|                      | Perth         | 13 486             |                     | 1 869 488   |          |
|                      |               | 1 932 597          |                     | 304 355 749 | (d)      |
|                      |               | $m^3 10^3$         |                     |             |          |
| - natural gas        | Carnarvon     | 3 372 291          |                     | 294 385 000 | (b)      |
|                      | Perth         | 256 884            |                     | 26 119 994  | (f)      |
|                      |               | 3 629 175          |                     | 320 504 994 |          |
| Total Petroleum      |               |                    |                     | 794 772 243 |          |
|                      |               | kg                 |                     |             |          |
| Platinum ✓           | Coolgardie    |                    | 81.822              | 1 936 029   | (d), (e) |
| Salt ✗               | Gascoyne      | 1 533 398          |                     | 30 374 588  | (d)      |
|                      | Pilbara       | 2 020 062          |                     | 37 453 010  | (d)      |
|                      | South West    | 250                |                     | 6 250       | (c)      |
|                      | West Pilbara  | 1 980 149          |                     | 39 331 367  | (d)      |
| Total Salt           |               | 5 533 859          |                     | 107 165 215 |          |
| Semi-precious stones |               | t                  |                     |             |          |
| - amethyst           | Gascoyne      |                    | 51                  | 195 500     | (c)      |

| Mineral                      | Mineral-field  | Quantity<br>tonnes | Metallic<br>Content               | Value (\$)    | Ref.     |
|------------------------------|----------------|--------------------|-----------------------------------|---------------|----------|
| Silica X                     | Coolgardie     | 44 575             |                                   | 109 206       |          |
|                              | South West     | 358 420            |                                   | 2 876 781     |          |
| Total Silica                 |                | 402 995            |                                   | 2 985 987     | (d)      |
| Silver ✓                     |                |                    | kg                                |               |          |
| By-product of<br>gold mining | State-wide     |                    | 12 017.680                        | 2 088 648     |          |
|                              | Coolgardie     |                    | 655.207                           | 206 899       | (d), (e) |
| Total Silver                 |                |                    | 12 672.887                        | 2 295 547     |          |
| Spodumene ✓                  | Greenbushes    | 24 471             |                                   | 4 397 393     | (d)      |
| Talc X                       | South West     | 169 612            |                                   | N.A.          |          |
|                              |                |                    | Ta <sub>2</sub> O <sub>5</sub> kg |               |          |
| Tantalite X                  | Greenbushes    | 133                | 147 421                           | 5 676 606     | (d)      |
|                              |                |                    | Sn t                              |               |          |
| Tin ✓                        | Greenbushes    | 434                | 304                               | 2 855 928     | (d)      |
| Vermiculite X                | Phillips River | 1 679              |                                   | 87 072        | (c)      |
|                              |                |                    | Zn t                              |               |          |
| Zinc ✓                       | West Kimberley | 7 223              | 4 059                             | 2 805 427     | (d)      |
| Value of Gold                |                |                    |                                   | 1 843 770 410 |          |
| Value of other Minerals      |                |                    |                                   | 5 101 866 381 |          |
| TOTAL VALUE OF ALL MINERALS  |                |                    |                                   | 6 945 636 791 |          |

## 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 ex-mine value.
- (d) Estimated f.o.b. value.
- (e) Metallic by-product of nickel mining.
- (f) Estimated f.o.r. value.
- (g) Estimated f.o.t. value.
- (h) Estimated f.o.b. value based on the current price of nickel containing products.
- (i) Delivered value.

## UNITS AND CONVERSION FACTORS

|        |                                    |                  | Conversion factors                                   |                                 |                               |
|--------|------------------------------------|------------------|--|---------------------------------|-------------------------------|
|        | Metric unit                        | Symbol           | Imperial unit  | Multiply<br>Imperial<br>unit by | Multiply<br>metric<br>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 <sup>3</sup> )                        | 1                               |                               |
| Energy | kilojoule<br>( Typical natural gas | kj               | British thermal unit (BTU)<br>39 MJ/M <sup>3</sup> ) | 1.05506                         | 0.94781                       |
| Prefix | kilo (k)                           | 10 <sup>3</sup>  |  |                                 |                               |
|        | mega (M)                           | 10 <sup>6</sup>  |  |                                 |                               |
|        | giga (G)                           | 10 <sup>9</sup>  |  |                                 |                               |
|        | tera (T)                           | 10 <sup>12</sup> |  |                                 |                               |

**TABLE 3**  
**QUANTITY AND VALUE OF MINERALS BY LOCAL GOVERNMENT AREA**

| Mineral                | Local Government Area  | Quantity tonnes | Metallic Content | Value (\$)    | Ref.     |
|------------------------|------------------------|-----------------|------------------|---------------|----------|
| Alumina                | Boddington             | 1 074 744       |                  | 211 331 040   |          |
|                        | Harvey                 | 664 668         |                  | 129 561 885   |          |
|                        | Murray                 | 2 804 500       |                  | 546 697 625   |          |
|                        | Serpentine-Jarrahdale  | 1 519 218       |                  | 295 406 985   |          |
|                        |                        | 6 063 130       |                  | 1 182 997 535 | (a)      |
| Barytes                | East Pilbara           | 9 669           |                  | 1 160 280     | (b)      |
| Building stone         |                        |                 |                  |               |          |
| - quartz rock          | Mukinbudin             | 294             |                  | 13 210        | (b)      |
| Clay                   |                        |                 |                  |               |          |
| - attapulgitic         | Mullewa                | 11 387          |                  | N.A.          |          |
| - cement clay          | Armadale               | 22 679          |                  | 56 698)       |          |
| - fire clay            | Chittering             | 189 534         |                  | 377 827)      |          |
|                        | Victoria Plains        | 1 650           |                  | 3 300)        |          |
| - kaolin               | Bridgetown-Greenbushes | 185             |                  | 11 187)       | (b)      |
| - white clay           | Serpentine-Jarrahdale  | 1 697           |                  | 20 364)       |          |
| Total Clay             |                        | 277 132         |                  | 469 376       |          |
| Coal                   | Collie                 | 3 701 942       |                  | 150 965 157   | (c)      |
| Cobalt                 | Coolgardie             |                 | †<br>324.684     | 3 521 185     | (d), (e) |
| Construction Materials |                        |                 |                  |               |          |
| - aggregate            | Boulder                | 227 795         |                  | 957 328       |          |
|                        | Derby-West             |                 |                  |               |          |
|                        | Kimberley              | 8 085           |                  | 74 140        |          |
|                        | Port Hedland           | 19 447          |                  | 256 900       |          |
|                        | Wyndham-East           |                 |                  |               |          |
|                        | Kimberley              | 6 526           |                  | 26 104        |          |
|                        |                        | 261 853         |                  | 1 314 472     |          |
| - gravel               | Ashburton              | 900             |                  | 900           |          |
|                        | Coolgardie             | 3 309           |                  | 16 545        |          |
|                        | Roebourne              | 1 780           |                  | 21 460        |          |
|                        |                        | 5 989           |                  | 38 905        |          |

| Mineral                       | Local Government Area  | Quantity tonnes | Metallic Content | Value (\$)    | Ref.     |
|-------------------------------|------------------------|-----------------|------------------|---------------|----------|
| Construction Materials (cont) |                        |                 |                  |               |          |
| - rock                        | Broome                 | 35 892          |                  | 610 174       |          |
|                               | Cockburn               | 225 339         |                  | 2 028 051     |          |
|                               | Roebourne              | 54 164          |                  | 627 740       |          |
|                               |                        | 315 395         |                  | 3 265 965     |          |
| - sand                        | Canning                | 214 480         |                  | 312 558       |          |
|                               | Cockburn               | 1 037 610       |                  | 2 951 385     |          |
|                               | Coolgardie             | 24 191          |                  | 148 437       |          |
|                               | Dandaragan             | 1 897           |                  | 11 382        |          |
|                               | Laverton               | 157             |                  | 314           |          |
|                               | Meekatharra            | 14 912          |                  | 82 376        |          |
|                               | Northam                | 77 228          |                  | 116 370       |          |
|                               | Port Hedland           | 13 302          |                  | 77 021        |          |
|                               | Roebourne              | 61 795          |                  | 525 358       |          |
|                               | Wanneroo               | 172 552         |                  | 377 270       |          |
|                               |                        | 1 618 124       |                  | 4 602 471     |          |
| Total Construction Materials  |                        | 2 201 361       |                  | 9 221 813     | (b)      |
| †                             |                        |                 |                  |               |          |
| Copper                        | Coolgardie             |                 | 2 701,496        | 5 938 229     | (d), (e) |
| ct                            |                        |                 |                  |               |          |
| Diamonds                      | Wyndham-East Kimberley |                 | 30 218 355       | 248 202 718   | (d)      |
| Diatomite                     | Dandaragan             | 124             |                  | 682           | (c)      |
| Dolomite                      | Lake Grace             | 130             |                  | 2 060         | (c)      |
| Felspar                       | Mukinbudin             | 9 602           |                  | 387 558       | (f)      |
| Garnet Sand                   | Capel                  | 422             |                  | 186 664       | (g)      |
|                               | Northampton            | 17 468          |                  | 611 380       | (c)      |
|                               |                        | 17 890          |                  | 630 044       |          |
| kg                            |                        |                 |                  |               |          |
| Gold                          | State-wide             |                 | 90 545,779       | 1 843 770 410 |          |

| Mineral         | Local Government Area | Quantity tonnes | Metallic Content | Value (\$)    | Ref.     |
|-----------------|-----------------------|-----------------|------------------|---------------|----------|
| Gypsum          | Dalwallinu            | 28 936          |                  | 556 564       | (b), (c) |
|                 | Kellerberrin          | 1 550           |                  | 7 750         |          |
|                 | Lake Grace            | 3 028           |                  | 15 140        |          |
|                 | Merredin              | 1 039           |                  | 5 818         |          |
|                 | Narembeen             | 2 700           |                  | 16 200        |          |
|                 | Nungarin              | 28 653          |                  | 154 558       | (c)      |
|                 | Trayning              | 20 284          |                  | 113 591       |          |
|                 | Wyalkatchem           | 11 669          |                  | 68 149        |          |
|                 | Yilgarn               | 1 303           |                  | 9 890         |          |
| Total Gypsum    |                       | 99 162          |                  | 947 660       |          |
| Av. Assay Fe %  |                       |                 |                  |               |          |
| Iron Ore        |                       |                 |                  |               |          |
| Interstate      |                       |                 |                  |               |          |
| - ore           | East Pilbara          | 3 968 418       | 65.78            | 85 326 903    |          |
|                 | Derby-West            |                 |                  |               |          |
|                 | Kimberley             | 1 479 040       | 66.50            | 16 266 460    |          |
|                 |                       | 5 447 458       |                  | 101 593 363   |          |
| Exported        |                       |                 |                  |               |          |
| - ore           | Ashburton             | 51 812 871      | 61.19            | 967 284 020   |          |
|                 | Derby-West            |                 |                  |               |          |
|                 | Kimberley             | 2 102 165       | 66.54            | 42 352 612    |          |
|                 | East Pilbara          | 35 274 405      | 62.84            | 744 439 153   |          |
|                 |                       | 89 189 441      |                  | 1 754 075 785 |          |
| - pellets       | Ashburton             | 540 803         | 63.26            | 11 502 886    |          |
|                 |                       | 89 730 244      |                  | 1 765 578 671 |          |
| Total Iron Ore  |                       | 95 177 702      |                  | 1 867 172 034 | (d)      |
| Kyanite         | Carnamah              | 826             |                  | 114 799       | (d)      |
| Limestone       |                       |                 |                  |               |          |
| Limestone       | Dandaragan            | 887             |                  | 4 435         |          |
|                 | Gingin                | 15 119          |                  | 322 265       |          |
|                 | Irwin                 | 569             |                  | 2 845         |          |
|                 | Roebourne             | 4 790           |                  | 46 979        |          |
|                 | Wanneroo              | 148 829         |                  | 1 204 954     |          |
| Total Limestone |                       | 170 194         |                  | 1 581 478     | (b)      |

| Mineral                      | Local Government Area | Quantity tonnes | Metallic Content | Value (\$)  | Ref.    |
|------------------------------|-----------------------|-----------------|------------------|-------------|---------|
| Av. Assay TiO <sub>2</sub> % |                       |                 |                  |             |         |
| Mineral Beach Sands          |                       |                 |                  |             |         |
| - ilmenite                   | Capel                 | 705 233         | 54.92            | 50 159 125  |         |
|                              | Carnamah              | 241 261         | 60.26            | 13 775 166  |         |
|                              |                       | 946 494         |                  | 63 934 291  |         |
| - upgraded ilmenite          | Capel                 | 128 482         | 92.00            | 44 299 928  |         |
|                              | Carnamah              | 67 022          | 92.00            | 25 696 567  |         |
|                              |                       | 195 504         |                  | 69 996 495  |         |
| TiO <sub>2</sub> †           |                       |                 |                  |             |         |
| - leucoxene                  | Capel                 | 10 882          | 9 841            | 4 581 114   |         |
| Th O <sub>2</sub> 10kg units |                       |                 |                  |             |         |
| - monazite                   | Capel                 | 2 222           | 15 350           | 1 617 723   |         |
|                              | Carnamah              | 7 483           | 48 640           | 5 342 827   |         |
|                              |                       | 9 705           | 63 990           | 6 960 550   |         |
| TiO <sub>2</sub> †           |                       |                 |                  |             |         |
| - rutile                     | South West            | 85 078          | 80 822           | 51 168 571  |         |
| ZrO <sub>2</sub> †           |                       |                 |                  |             |         |
| - zircon                     | Capel                 | 196 153         | 58 997           | 22 611 294  |         |
|                              | Carnamah              | 259 900         | 170 979          | 74 436 854  |         |
|                              |                       | 366 053         | 239 976          | 97 148 148  |         |
| Total Mineral Beach Sands    |                       |                 |                  | 293 789 169 | (d)     |
| Av. Assay Ni%                |                       |                 |                  |             |         |
| Nickel Concentrates          |                       |                 |                  |             |         |
|                              | Boulder               | 32 573          | 11.70            | 34 630 549  |         |
|                              | Coolgardie            | 278 265         | 11.40            | 288 087 264 |         |
|                              | Laverton              | 78 126          | 9.57             | 69 031 463  |         |
| Total Nickel                 |                       | 388 964         |                  | 391 749 276 | (h)     |
| kg                           |                       |                 |                  |             |         |
| Palladium                    | Coolgardie            |                 | 453.847          | 2 842 171   | (d),(e) |
| Peat                         | Manjimup              | 879             |                  | 52 794      | (b)     |

| Mineral                        | Local Government Area | Quantity tonnes | Metallic Content | Value (\$)  | Ref.     |
|--------------------------------|-----------------------|-----------------|------------------|-------------|----------|
| kl                             |                       |                 |                  |             |          |
| Petroleum                      |                       |                 |                  |             |          |
| - condensate                   | Carnamah              | 54              |                  | 9 656       | (b)      |
|                                | Irwin                 | 876             |                  | 151 844     | (b)      |
|                                | Roebourne             | 1 139 584       |                  | 169 750 000 | (d)      |
|                                |                       | 1 140 514       |                  | 169 911 500 |          |
| -----                          |                       |                 |                  |             |          |
| - crude oil                    | Derby-West            |                 |                  |             |          |
|                                | Kimberley             | 41 968          |                  | 6 721 774   |          |
|                                | Irwin                 | 13 486          |                  | 1 869 488   |          |
|                                | Roebourne             | 1 877 143       |                  | 295 764 487 |          |
|                                | 1 932 597             |                 | 304 355 749      | (d)         |          |
| -----                          |                       |                 |                  |             |          |
| m <sup>3</sup> 10 <sup>3</sup> |                       |                 |                  |             |          |
| - natural gas                  | Carnamah              | 7 692           |                  | 440 070     | (f)      |
|                                | Irwin                 | 249 192         |                  | 25 679 924  | (f)      |
|                                | Roebourne             | 3 372 291       |                  | 294 385 000 | (b)      |
|                                |                       | 3 629 175       |                  | 320 504 994 |          |
| -----                          |                       |                 |                  |             |          |
| Total Petroleum                |                       |                 |                  | 794 772 243 |          |
| -----                          |                       |                 |                  |             |          |
| kg                             |                       |                 |                  |             |          |
| Platinum                       | Coolgardie            |                 | 81.822           | 1 936 029   | (d), (e) |
| -----                          |                       |                 |                  |             |          |
| Salt                           | Carnarvon             | 951 868         |                  | 19 821 162  | (d)      |
|                                | Lake Grace            | 250             |                  | 6 250       | (c)      |
|                                | Port Hedland          | 2 020 062       |                  | 37 453 010  | (d)      |
|                                | Roebourne             | 1 980 149       |                  | 39 331 367  | (d)      |
|                                | Shark Bay             | 581 530         |                  | 10 553 426  | (d)      |
| Total Salt                     |                       | 5 533 859       |                  | 107 165 215 |          |
| -----                          |                       |                 |                  |             |          |
| Semi-precious stones           |                       |                 |                  |             |          |
| t                              |                       |                 |                  |             |          |
| - amethyst                     | Upper Gascoyne        |                 | 51               | 195 500     | (c)      |
| -----                          |                       |                 |                  |             |          |

| Mineral                   | Local Government Area  | Quantity tonnes | Metallic Content                  | Value (\$)    | Ref.     |
|---------------------------|------------------------|-----------------|-----------------------------------|---------------|----------|
| Silica                    | Canning                | 107 908         |                                   | 1 186 988     |          |
|                           | Capel                  | 8 036           |                                   | 104 468       |          |
|                           | Cockburn               | 208 644         |                                   | 1 399 428     |          |
|                           | Coolgardie             | 44 575          |                                   | 109 206       |          |
|                           | Wanneroo               | 33 832          |                                   | 185 897       |          |
| Total Silica              |                        | 402 995         |                                   | 2 985 987     | (d)      |
| <hr/>                     |                        |                 |                                   |               |          |
| Silver                    |                        |                 | kg                                |               |          |
| By-product of gold mining | State-wide             |                 | 12 017.680                        | 2 088 648     |          |
|                           | Coolgardie             |                 | 655.207                           | 206 899       | (d), (e) |
| Total Silver              |                        |                 | 12 672.887                        | 2 295 547     |          |
| <hr/>                     |                        |                 |                                   |               |          |
| Spodumene                 | Bridgetown-Greenbushes | 24 471          |                                   | 4 397 393     | (d)      |
| <hr/>                     |                        |                 |                                   |               |          |
| Talc                      | Meekatharra            | 22 364          |                                   | N.A.          |          |
|                           | Three Springs          | 147 248         |                                   | N.A.          |          |
| Total Talc                |                        | 169 612         |                                   | N.A.          |          |
| <hr/>                     |                        |                 |                                   |               |          |
|                           |                        |                 | Ta <sub>2</sub> O <sub>5</sub> kg |               |          |
| Tantalite                 | Bridgetown-Greenbushes | 133             | 147 421                           | 5 676 606     | (d)      |
| <hr/>                     |                        |                 |                                   |               |          |
|                           |                        |                 | Sn t                              |               |          |
| Tin                       | Bridgetown-Greenbushes | 434.350         | 303.950                           | 2 855 928     | (d)      |
| <hr/>                     |                        |                 |                                   |               |          |
| Vermiculite               | Ravensthorpe           | 1 679           |                                   | 87 072        | (c)      |
| <hr/>                     |                        |                 |                                   |               |          |
|                           |                        |                 | Zn t                              |               |          |
| Zinc                      | Derby-West Kimberley   | 7 223           | 4 059                             | 2 805 427     | (d)      |
| <hr/>                     |                        |                 |                                   |               |          |
|                           |                        |                 |                                   | 1 843 770 410 |          |
|                           |                        |                 |                                   | 5 101 866 381 |          |
|                           |                        |                 |                                   | 6 945 636 791 |          |

TABLE 4  
GOLD PRODUCTION (KG) AND ORE TREATED 1987/88  
SHOWING MINERAL-FIELD AND DISTRICT

| DISTRICT<br>MINERAL-FIELD | ALLUVIAL<br>KILOGRAMS | DOLLIED<br>AND<br>SPECIMENS<br>KILOGRAMS | MILLED OR SMELTERED     |                             | TAILING<br>RETREATMENT<br>KILOGRAMS | TOTAL GOLD<br>KILOGRAMS |
|---------------------------|-----------------------|--|-------------------------|-----------------------------|-------------------------------------|-------------------------|
|                           |                       |  | ORE TREATED<br>(TONNES) | GOLD THEREFROM<br>KILOGRAMS |                                     |                         |
| KIMBERLEY                 | 24.022                | 0.049                                    | 5                       | 0.036                       | -                                   | 24.107                  |
| WEST KIMBERLEY            | -                     | -  | -                       | -                           | -                                   | -                       |
| MARBLE BAR                | 11.649                | 0.034                                    | 2 177 948               | 7 071.084                   | 77.535                              | 7 160.302               |
| NULLAGINE                 | 64.333                | 1.901                                    | 20 916                  | 274.576                     | -                                   | 340.810                 |
| PILBARA                   | 75.982                | 1.935                                    | 2 198 864               | 7 345.660                   | 77.535                              | 7 501.112               |
| WEST PILBARA              | 17.232                | 2.031                                    | -                       | -                           | -                                   | 19.263                  |
| ASHBURTON                 | 3.846                 | -  | -                       | -                           | -                                   | 3.846                   |
| GASCOYNE                  | 2.095                 | 0.677                                    | 352                     | 4.347                       | -                                   | 7.119                   |
| PEAK HILL                 | 35.569                | 3.455                                    | 296 740                 | 873.711                     | -                                   | 912.735                 |
| LAWLERS                   | 6.207                 | 0.809                                    | 1 310 020               | 3 868.822                   | 99.643                              | 3 975.481               |
| WILUNA                    | 0.067                 | -  | 1 152 423               | 3 684.961                   | 482.228                             | 4 167.256               |
| BLACK RANGE               | 1.688                 | 1.834                                    | 857 386                 | 2 957.758                   | 37.873                              | 2 999.153               |
| EAST MURCHISON            | 7.962                 | 2.643                                    | 3 319 829               | 10 511.541                  | 619.744                             | 11 141.890              |
| CUE                       | 25.690                | 0.966                                    | 282 594                 | 1 364.243                   | 15.056                              | 1 405.955               |
| MEEKATHARRA               | 5.285                 | 0.121                                    | 1 970 410               | 4 757.053                   | 3.270                               | 4 765.729               |
| DAY DAWN                  | 23.289                | 0.058                                    | 81 110                  | 1 047.827                   | 65.044                              | 1 136.218               |
| MT MAGNET                 | 17.973                | 0.160                                    | 1 005 004               | 3 490.424                   | 1.372                               | 3 509.929               |
| MURCHISON                 | 72.237                | 1.305                                    | 3 339 118               | 10 659.547                  | 84.742                              | 10 817.831              |
| YALGOO                    | 1.010                 | 0.114                                    | 699 241                 | 1 798.234                   | -                                   | 1 799.358               |
| MT MORGANS                | 4.746                 | -  | 128 491                 | 388.777                     | 2.896                               | 396.419                 |
| MT MALCOLM                | 3.160                 | 0.744                                    | 1 502 714               | 4 886.380                   | 750.362                             | 5 640.646               |
| MT MARGARET               | 10.387                | 1.475                                    | 578 458                 | 1 636.557                   | 137.826                             | 1 786.245               |
| MT MARGARET               | 18.293                | 2.219                                    | 2 209 663               | 6 911.714                   | 891.084                             | 7 823.310               |
| MENZIES                   | 0.107                 | -  | 529 763                 | 1 178.594                   | 29.294                              | 1 207.995               |
| ULARRING                  | -                     | -  | 175 069                 | 459.425                     | 14.202                              | 473.627                 |
| NIAGARA                   | 3.681                 | 0.044                                    | 8 489                   | 21.370                      | 35.787                              | 60.882                  |
| YERILLA                   | -                     | -  | 235 040                 | 685.271                     | 3.128                               | 688.399                 |
| NORTH COOLGARDIE          | 3.788                 | 0.044                                    | 948 361                 | 2 344.660                   | 82.411                              | 2 430.903               |
| BROAD ARROW               | 0.189                 | -  | 3 016 695               | 8 130.898                   | 113.507                             | 8 244.594               |

| DISTRICT<br>MINERAL-FIELD | ALLUVIAL<br>KILOGRAMS | DOLLIED<br>AND<br>SPECIMENS<br>KILOGRAMS | MILLED OR SMELTERED     |                             | TAILINGS<br>RETREATMENT<br>KILOGRAMS | TOTAL GOLD<br>KILOGRAMS |
|---------------------------|-----------------------|--|-------------------------|-----------------------------|--------------------------------------|-------------------------|
|                           |                       |  | ORE TREATED<br>(TONNES) | GOLD THEREFROM<br>KILOGRAMS |                                      |                         |
| KANOWNA                   | 0.357                 | 0.024                                    | 94 178                  | 188.857                     | 15.135                               | 204.373                 |
| KURNALPI                  | 0.864                 | -  | 189 059                 | 425.838                     | -                                    | 426.702                 |
| NE COOLGARDIE             | 1.221                 | 0.024                                    | 283 237                 | 614 695                     | 15.135                               | 631.075                 |
| EAST COOLGARDIE           | 0.987                 | 0.034                                    | 5 415 377               | 16 402.232                  | 452.050                              | 16 855.303              |
| BULONG                    | 1.693                 | -  | 56                      | 0.109                       | -                                    | 1.802                   |
| EAST COOLGARDIE           | 2.680                 | 0.034                                    | 5 415 433               | 16 402.341                  | 452.050                              | 16 857.105              |
| COOLGARDIE                | 4.570                 | -  | 2 001 002               | 5 587.578                   | 57.834                               | 5 649.982               |
| KUNANALLING               | 0.262                 | -  | 67 814                  | 170.151                     | 4.430                                | 174.843                 |
| COOLGARDIE                | 4.832                 | -  | 2 068 816               | 5 757.729                   | 62.264                               | 5 824.825               |
| YILGARN                   | 6.098                 | 0.507                                    | 3 884 904               | 6 745.423                   | 38.292                               | 6 790.320               |
| DUNDAS                    | -                     | -  | 509 668                 | 2 920.114                   | 0.105                                | 2 920.219               |
| PHILLIPS RIVER            | -                     | -  | 6 341                   | 20.229                      | -                                    | 20.229                  |
| SOUTH WEST                | -                     | -  | 2 228 402               | 6 775.938                   | -                                    | 6 775.938               |
| <b>TOTAL</b>              | <b>277.056</b>        | <b>15.037</b>                            | <b>30 425 669</b>       | <b>87 816.817</b>           | <b>2 436.869</b>                     | <b>90 545.779</b>       |

TABLE 5  
GOLD PRODUCTION (KG) AND ORE TREATED 1987/88  
SHOWING LOCAL GOVERNMENT AREA

| LOCAL<br>GOVERNMENT<br>AREA | ALLUVIAL<br>KILOGRAMS | DOLLIED<br>AND<br>SPECIMENS<br>KILOGRAMS | MILLED OR SMELTERED     |                             | TAILINGS<br>RETREATMENT<br>KILOGRAMS | TOTAL GOLD<br>KILOGRAMS |
|-----------------------------|-----------------------|--|-------------------------|-----------------------------|--------------------------------------|-------------------------|
|                             |                       |  | ORE TREATED<br>(TONNES) | GOLD THEREFROM<br>KILOGRAMS |                                      |                         |
| BODDINGTON                  | -                     | -  | 2 125 846               | 6 478.081                   | -                                    | 6 478.081               |
| BOULDER                     | -                     | -  | 8 690 116               | 25 082.827                  | 576.114                              | 25 658.941              |
| COOLGARDIE                  | -                     | -  | 2 054 276               | 5 732.532                   | 60.470                               | 5 793.002               |
| CUE                         | 55.403                | -  | 710 215                 | 3 519.478                   | 65.044                               | 3 639.925               |
| DUNDAS                      | -                     | -  | 508 308                 | 2 916.508                   | -                                    | 2 916.508               |
| EAST PILBARA                | 58.089                | -  | 2 198 856               | 7 344.075                   | 76.632                               | 7 478.796               |
| HALLS CREEK                 | 16.020                | -  | -                       | -                           | -                                    | 16.020                  |
| LAKE GRACE                  | -                     | -  | 102 556                 | 297.857                     | -                                    | 297.857                 |
| LAVERTON                    | 3.190                 | -  | 670 468                 | 1 966.232                   | 135.140                              | 2 104.562               |
| LEONORA                     | 1.002                 | -  | 2 822 956               | 8 658.984                   | 850.006                              | 9 509.992               |
| MEEKATHARRA                 | 35.370                | 3.455                                    | 2 462 514               | 5 848.673                   | -                                    | 5 887.498               |
| MENZIES                     | -                     | -  | 956 541                 | 2 394.256                   | 77.648                               | 2 471.904               |
| MT MAGNET                   | 5.925                 | -  | 1 698 483               | 5 283.378                   | -                                    | 5 289.303               |
| PORT HEDLAND                | 5.861                 | -  | -                       | -                           | -                                    | 5.861                   |
| RAVENSTHORPE                | -                     | -  | 6 143                   | 17.747                      | -                                    | 17.747                  |
| ROEBOURNE                   | 15.922                | -  | -                       | -                           | -                                    | 15.922                  |
| SANDSTONE                   | -                     | -  | 857 326                 | 2 957.623                   | 37.873                               | 2 995.496               |
| UPPER GASCOYNE              | 2.036                 | 0.641                                    | 332                     | 4.229                       | -                                    | 6.906                   |
| WESTONIA                    | -                     | -  | 724 648                 | 1 663.252                   | -                                    | 1 663.252               |
| WILUNA                      | -                     | -  | 599 029                 | 2 347.112                   | 482.228                              | 2 829.340               |
| YILGARN                     | -                     | 0.507                                    | 2 650 079               | 5 076.312                   | 31.830                               | 5 108.649               |
| OTHER                       | 78.238                | 10.434                                   | 586 977                 | 227.661                     | 43.884                               | 360.217                 |
| <b>TOTAL</b>                | <b>277.056</b>        | <b>15.037</b>                            | <b>30 425 669</b>       | <b>87 816.817</b>           | <b>2 436.869</b>                     | <b>90 545.779</b>       |

Figure 3

# WESTERN AUSTRALIAN GOLD PRODUCTION

1886-1988 (est.)

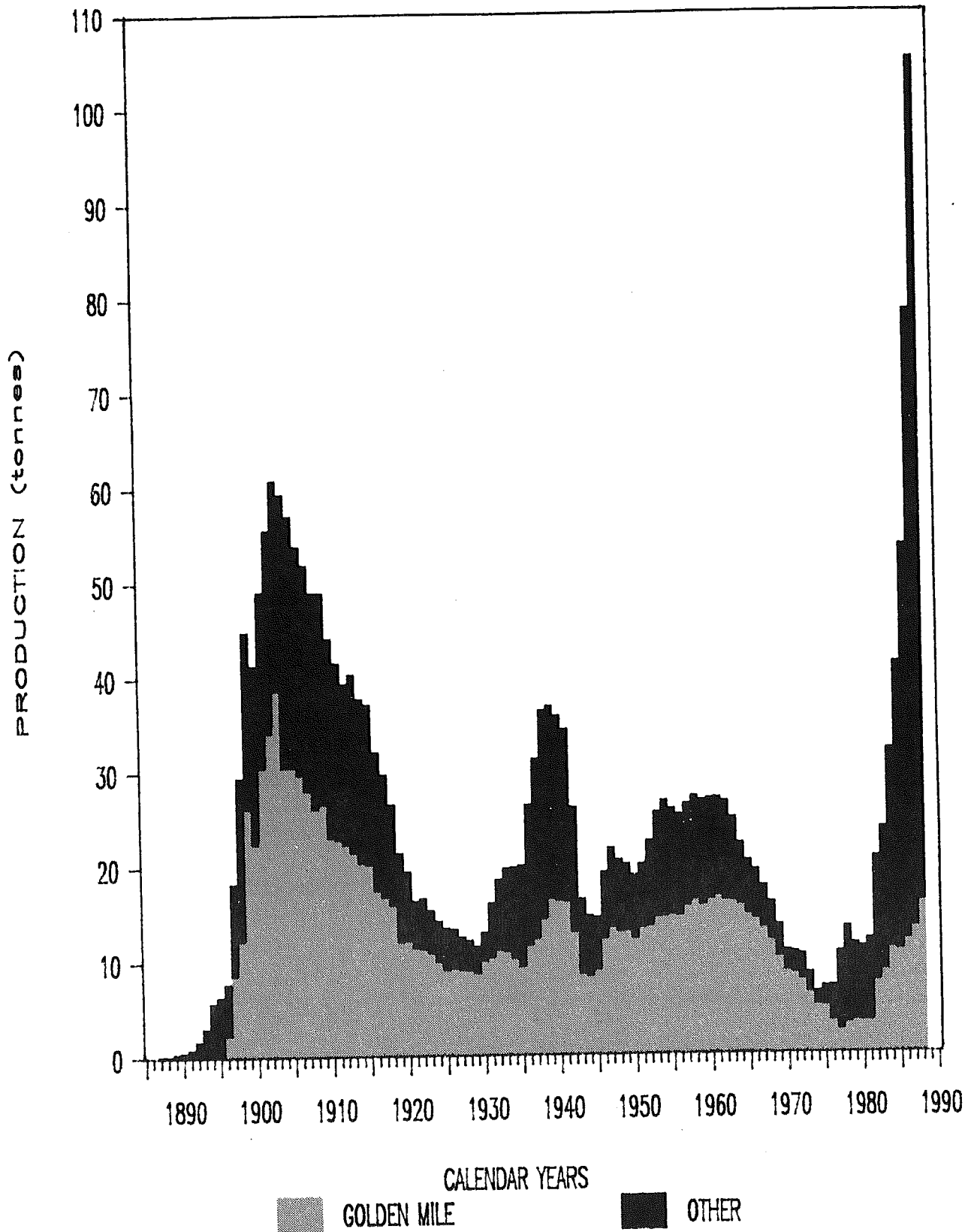


TABLE 6

## ROYALTY RECEIPTS 1986/87, 1987/88

| Mineral                | 1986/87<br>(\$A)      | 1987/88<br>(\$A)   | Value (\$A)<br>Variance | % up<br>(% down) |
|------------------------|-----------------------|--------------------|-------------------------|------------------|
| Alumina                | 10 540 225            | 12 132 983         | 1 592 758               | 15               |
| Building stone         | 823                   | 298                | (525)                   | (64)             |
| Clay                   | 153 343               | 331 800            | 178 457                 | 116              |
| Coal                   | 1 353 229             | 1 520 155          | 166 926                 | 12               |
| Cobalt                 | 56 373                | 24 772             | (31 601)                | (56)             |
| Construction materials |                       |                    |                         |                  |
| aggregate              | 19 797                | 60 578             | 40 781                  | 206              |
| gravel                 | 10 088                | 534                | (9 554)                 | (95)             |
| rock                   | 22 519                | 84 622             | 62 103                  | 276              |
| sand                   | 250 568               | 110 506            | (140 062)               | (56)             |
| sandstone              | -                     | 25                 | 25                      | n.ap.            |
| Copper                 | 143 183               | 106 883            | (36 300)                | (25)             |
| Diamond                | 13 109 395            | 12 221 752         | (887 643)               | (7)              |
| Diatomite              | 173                   | 34                 | (139)                   | (80)             |
| Dolomite               | 18                    | -                  | (18)                    | (100)            |
| Emerald                | 134                   | -                  | (134)                   | (100)            |
| Feldspar               | 3 195                 | 14 429             | 11 234                  | 352              |
| Garnet sand            | 19 230                | 32 261             | 13 031                  | 68               |
| Gold                   | 111 974               | 122 814            | 10 840                  | 10               |
| Gypsum                 | 83 998                | 31 677             | (52 321)                | (62)             |
| Iron ore               | 92 780 315            | 94 807 770         | 2 027 455               | 2                |
| Kyanite                | 5 841                 | 8 347              | 2 506                   | 43               |
| Limestone              | 90 641                | 54 029             | (36 612)                | (40)             |
| Mineral beach sands    |                       |                    |                         |                  |
| ilmenite               | 1 462 769             | 2 530 669          | 1 067 900               | 73               |
| leucosene              | 137 980               | 89 155             | (48 825)                | (35)             |
| monazite               | 252 178               | 320 669            | 68 491                  | 27               |
| rutile                 | 1 038 150             | 2 366 266          | 1 328 116               | 128              |
| xenotime               | 8 457                 | -                  | (8 457)                 | (100)            |
| zircon                 | 1 347 903             | 3 685 866          | 2 337 963               | 173              |
| Nickel                 | 4 315 281             | 3 760 762          | (554 519)               | (13)             |
| Ochre                  | 2 255                 | -                  | (2 255)                 | (100)            |
| Palladium              | 24 567                | 21 227             | (3 340)                 | (14)             |
| Peat                   | 2 740                 | 1 672              | (1 068)                 | (39)             |
| Petroleum Products     |                       |                    |                         |                  |
| condensate             | 695 164(r)            | 1 284 015          | 588 851                 | 85               |
| crude oil              | 21 917 124            | 23 818 340         | 1 901 216               | 8                |
| natural gas            | 4 801 877(r)          | 4 941 808          | 139 931                 | 3                |
| Platinum               | 24 567                | 21 227             | (3 340)                 | (14)             |
| Salt                   | 747 615               | 876 877            | 129 261                 | 17               |
| Semi-precious stones   |                       |                    |                         |                  |
| amethyst               | 6 375                 | 14 662             | 8 287                   | 130              |
| Silica sand            | 165 339               | 197 211            | 31 872                  | 19               |
| Silver                 | 87 238                | 55 446             | (31 792)                | (36)             |
| Spodumene              | 72 632                | 217 515            | 144 883                 | 199              |
| Talc                   | 88 874                | 91 994             | 3 120                   | 4                |
| Tantalite              | 109 428               | 159 774            | 50 346                  | 46               |
| Tin                    | 143 601               | 102 163            | (41 438)                | (29)             |
| Vermiculite            | 804                   | 2 402              | 1 598                   | 199              |
| Zinc Concentrate       | 78 427                | -                  | (78 427)                | (100)            |
| <b>Total value</b>     | <b>156 286 407(r)</b> | <b>166 225 989</b> | <b>9 939 582</b>        | <b>6</b>         |

Note: (r) Revised from previous edition.

Figure 4

### 1982/83 ROYALTY RECEIPTS

TOTAL : \$ 102.5 MILLION

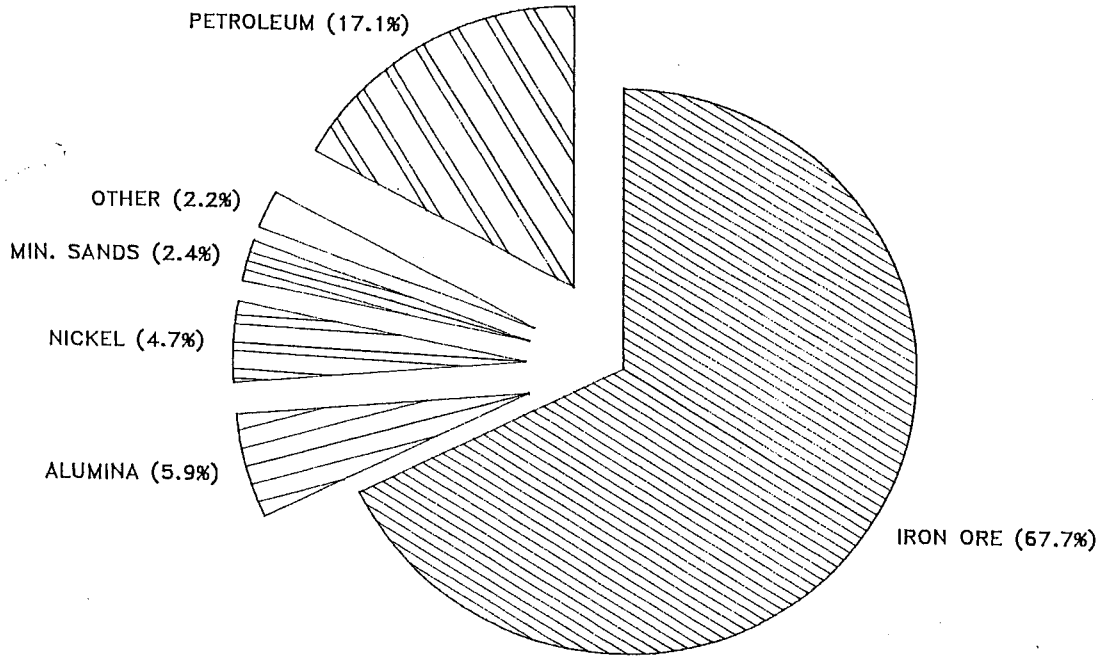


Figure 5

### 1987/88 ROYALTY RECEIPTS

TOTAL : \$ 166.2 MILLION

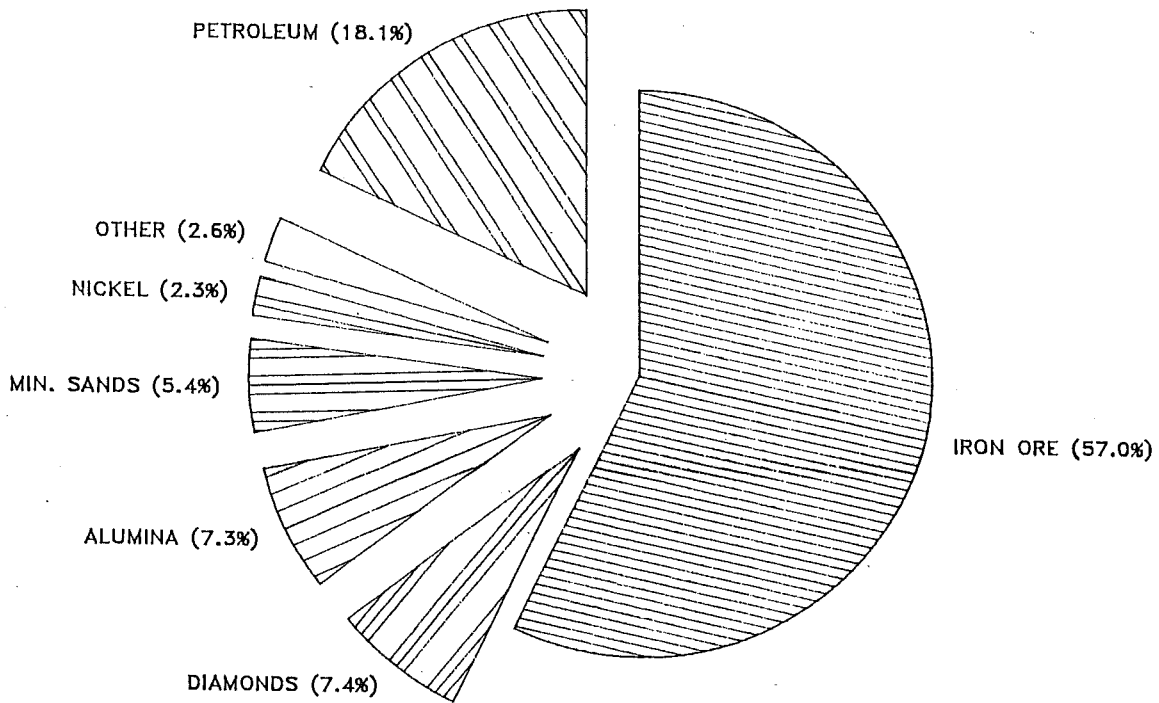


TABLE 7  
NUMBER OF PERSONS EMPLOYED IN THE WESTERN AUSTRALIAN MINING INDUSTRY  
AS AT JUNE 1988

(SOURCE: AXTAT REPORTING SYSTEM, MINING ENGINEERING DIVISION)

| MINERAL<br>COMPANY                    | LOCATION                  | 1982(a)     | 1987/88     |
|---------------------------------------|---------------------------|-------------|-------------|
| <b>ALUMINA</b>                        |                           |             |             |
| Alcoa of Australia Ltd.               | Jarrahdale/Kwinana        | 1676        | 1574        |
|                                       | Del Park/Huntley/Pinjarra | 1643        | 1683        |
|                                       | Wagerup                   | 103         | 500         |
|                                       | Administration            | 210         | 283         |
| Worsley Alumina Pty. Ltd.             | Worsley                   | -           | 876         |
|                                       |                           | <b>3632</b> | <b>4916</b> |
| <b>COAL</b>                           |                           |             |             |
| Griffin Coal Mining Co. Ltd.          | Collie                    | 421         | 493         |
| Western Collieries Ltd.               | Collie                    | 648         | 712         |
|                                       |                           | <b>1069</b> | <b>1205</b> |
| <b>COPPER-SILVER ZINC</b>             |                           |             |             |
| Seltrust Mining Corporation Pty. Ltd. | Teutonic Bore             | 148         | -           |
| <b>DIAMOND</b>                        |                           |             |             |
| Argyle Diamond Mines J.V.             | Lake Argyle               | -           | 677         |
| Freeport Bow River Properties Ltd.    | Bow River                 | -           | 60          |
|                                       |                           | -           | <b>737</b>  |
| <b>GOLD</b>                           |                           |             |             |
| AUR NL                                | Mt. Martin                | -           | 45          |
| Australian Consolidated Minerals Ltd. | Golden Crown              | -           | 92          |
|                                       | Westonia                  | -           | 219         |
|                                       | Golden Kilometre          | -           | 92          |
| Australian Mine Mgmt. Pty. Ltd.       | Norseman                  | -           | 51          |
| Australis Mining NL                   | Cork Tree Well            | -           | 40          |
| Austwhim Resources NL                 | Mt Morgans                | -           | 52          |
| BHP Minerals Ltd.                     | Gimlet South/Orban J.V.   | -           | 126         |
| Bamboo Creek J.V.                     | Bamboo Creek              | -           | 72          |
| Bardoc Gold Pty. Ltd.                 | Bardoc                    | -           | 58          |
| Barrack Mine Management               | Horseshoe                 | -           | 119         |
|                                       | Willuna                   | -           | 95          |
| Boddington Gold Project               | Boddington                | -           | 265         |
| Broken Hill Metals                    | Hopes Hill                | -           | 121         |
| Brunswick NL                          | Galtee Moore              | -           | 52          |
| Callion Mining Pty Ltd                | Callion                   | -           | 44          |
| Central Norseman Gold Corp. NL        | Norseman                  | 373         | 469         |
| Consolidated Exploration Ltd          | Lady Bountiful            | -           | 66          |
|                                       | Davyhurst                 | -           | 35          |
| Chevron Exploration Corp.             | Mt. Wilkinson             | -           | 108         |
| Cypress Minerals Aust. Co.            | Gidgee                    | -           | 74          |
| Eastmet Ltd.                          | Youanmi                   | -           | 98          |
| Edjudina Gold Mines Pty. Ltd.         | Neda/Gawler               | -           | 95          |
| Endeavour Resources Ltd.              | Bluebird/Alladin          | -           | 114         |
| Forrest Gold Pty. Ltd.                | Hannans South             | -           | 21          |
|                                       | Tower Hill                | -           | 55          |
| Forsayth NL                           | Lawlers                   | -           | 82          |
|                                       | Mt Gibson                 | -           | 108         |
| Freeport McMoran Australia Ltd.       | Karonie                   | -           | 65          |
| Gabarrintha Gold Mines                | Gabarrintha               | -           | 72          |
| Golden Valley Mines NL                | Fraser                    | -           | 51          |
| Goongarrrie Gold Mines                | Goongarrrie               | -           | 65          |
| Great Victoria Gold Ltd.              | Gt Victoria               | -           | 76          |
| Hampton Australia Ltd.                | Jubilee                   | -           | 97          |
| Harbour Lights Mining Pty. Ltd.       | Leonora                   | -           | 112         |
| Hill 50 Gold Mine NL                  | Mt. Magnet                | 167         | 260         |
| Hunter Resources Ltd.                 | Mertondale                | -           | 30          |

| MINERAL<br>COMPANY                            | LOCATION                     | 1982(a)      | 1987/88     |
|---|------------------------------|--------------|-------------|
| KLV-Kalgoorlie                                | Mt Charlotte                 | 184          | 343         |
| KLV-Fimiston                                  | Perseverance                 | 531          | 523         |
| Kia Ora Gold Corp. Ltd.                       | Marvel Lock                  | 50           | 175         |
| Kunanalling Joint Venture                     | Gibraltar                    | -            | 45          |
| Kurara J.V.                                   | Kurara                       | -            | 62          |
| Metana Minerals                               | Reedy                        | -            | 78          |
|   | Mt Magnet                    | -            | 120         |
| Mincoa NL                                     | Edwards Find                 | -            | 94          |
| Mt Percy Project                              | Mt Percy                     | -            | 71          |
| Nevoria J.V.                                  | Nevoria                      | -            | 70          |
| Newmont Holdings Pty. Ltd.                    | New Celebration              | -            | 131         |
| Norgold Ltd                                   | Bottle Creek                 | -            | 75          |
| North Kalgurli Mines Ltd.                     | Fimiston                     | 263          | 443         |
| Norseman Gold Mines NL                        | Ravensthorpe                 | -            | 74          |
| Pancontinental Gold Mining Areas<br>Pty. Ltd. | Paddington                   | -            | 143         |
| Peak Hill Resources                           | Peak Hill                    | -            | 51          |
| Queen Margaret Gold Mines                     | Bellevue                     | -            | 203         |
| Sons of Gwalla NL                             | Gwalla                       | -            | 87          |
| Sundowner Minerals NL                         | Mt Fisher                    | -            | 71          |
| Telfer Project                                | Telfer                       | 111          | 482         |
| WMC-GT. Boulder Holdings                      | Emu                          | -            | 128         |
|   | Kambalda                     | 37           | 114         |
|   | Lancefield                   | 75           | 100         |
|   | Sand King                    | 10           | 53          |
| Whim Creek Consolidated NL                    | Meekatharra                  | 32           | 155         |
| All Other Operators                           |                              | 1182         | 1257        |
| <b>TOTAL GOLD</b>                             |                              | <b>3027</b>  | <b>8844</b> |
| <b>IRON ORE</b>                               |                              |              |             |
| BHP Minerals Pty. Ltd.                        | Koolyanobbing                | 77           | -           |
|   | Kwinana                      | 418          | -           |
|   | Yamp1                        | 558          | 459         |
| Goldsworthy Mining Ltd.                       | Pilbara/Port Hedland         | 1178         | 892         |
| Hammersley Iron Pty. Ltd.                     | Tom Price-Paraburdoo/Dampier | 4041         | 2810        |
|   | Channar                      | -            | 25          |
| Mt Newman Mining Co. Ltd.                     | Newman/Port Hedland          | 3794         | 3769        |
| Robe River Mining Co. Pty. Ltd.               | Pannawonica/Cape Lambert     | 1384         | 1166        |
|   |                              | <b>11450</b> | <b>9121</b> |
| <b>MINERAL BEACH SAND</b>                     |                              |              |             |
| Allied Eneabba Pty. Ltd.                      | Eneabba                      | 204          | 363         |
| Associated Minerals Cons. Ltd.                | Capel                        | 122          | 177         |
|   | Eneabba/Narngulu             | 136          | 284         |
| Cable Sands Pty. Ltd.                         | Capel                        | 82           | 143         |
| Westralian Sands Ltd.                         | Capel                        | 139          | 388         |
|   |                              | <b>683</b>   | <b>1355</b> |
| <b>NICKEL</b>                                 |                              |              |             |
| Agnew Mining Co. Pty. Ltd.                    | Leinster                     | 288          | 20          |
| Metals Exploration Ltd.                       | Nepean                       | 175          | -           |
| Western Mining Corporation                    | Kalgoorlie                   | 364          | 324         |
|   | Kambalda                     | 1476         | 1618        |
|   | Kwinana Refinery             | 405          | 314         |
|   | Mt Windarra                  | 348          | 530         |
|   |                              | <b>3056</b>  | <b>2806</b> |
| <b>PETROLEUM PRODUCTS</b>                     |                              |              |             |
| Bond Corporation Pty. Ltd.                    | Harriet                      | -            | 79          |
| Home Energy Pty. Ltd.                         | Blina/Sundown                | -            | 4           |

(a) 1982/83 Employment statistics not available.

| MINERAL COMPANY                                  | LOCATION                         | 1982(a) | 1987/88 |
|--|----------------------------------|---------|---------|
| Barrack Energy Ltd.                              | Mt Horner                        | -       | 3       |
| Strata Oil NL                                    | Woodada                          | 45      | 4       |
| West Australian Petroleum Pty. Ltd.              | Barrow Island                    | 133     | 183     |
|  | Dongara                          | 9       | 11      |
| Woodside Offshore Petroleum Pty. Ltd.            | North Rankin A/Burruup Peninsula | 187     | 1627    |
| SALT   |                                  |         |         |
| Dampier Salt Ltd.                                | Dampier                          | 173     | 174     |
| Leslie Salt Co.                                  | Lake McLeod                      | 117     | 90      |
| Shark Bay Salt J.V.                              | Port Hedland                     | 49      | 116     |
| ZINC CONCENTRATE                                 |                                  |         |         |
| BHP Minerals Ltd                                 | Shark Bay                        | 98      | 101     |
|  | Cadjebut                         | -       | 99      |
| ALL OTHER MATERIALS<br>(Including Rock Quarries) |                                  | 683     | 481     |
| TOTAL  |                                  | 24 372  | 724     |
|  |                                  |         | 31 915  |

PRINCIPAL MINERAL PRODUCERS 1987/88 - Head office postal address, telephone number: minesite.

#### ALUMINA

Alcoa of Australia (WA) Ltd, P O Box 252, Applecross 6153, (09) 364 0111: Del Park, Huntly, 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) 732 377: North Pole.

#### BUILDING STONE - quartz

Matlock Mining N L, 1 Mill St, Perth 6000: Mukinbudin

#### CLAY - attapulgite

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

##### - cement clay

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

##### - fire clay

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

##### - kaolin

Greenbushes Tin Ltd, 91 Kensington St, East Perth 6000, (09) 325 8900: Greenbushes.

#### WHITE CLAY

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

#### COAL

Griffin Coal Mining Company Ltd, GPO Box 6474, Perth 6001, (09) 325 8155: Collie.  
Western Collieries Ltd, GPO Box X2231, Perth 6001, (09) 325 2711: Collie.

#### COBALT

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

#### CONSTRUCTION MATERIALS - aggregate

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

##### - gravel

Ivanjah Pty Ltd, P O Box 159, Kalgoorlie WA 6430, (090) 21 3961: Grosmont.  
Kane DJ, 8 Oleander Place, Wickham 6720, (091) 87 1616 : Mt Welcome.  
Pioneer Concrete (WA) Pty Ltd, 123 Burswood Rd, Victoria Park 6100, (09) 362 1100: Port Hedland, Paraburdoo.

PRINCIPAL MINERAL PRODUCERS 1987/88 - continued.

CONSTRUCTION MATERIALS (ctd) - rock

Cockburn Cement Ltd, Russell Rd, South Coogee 6166, (09) 410 1535: Coogee.  
County, B S, C/- Specified Services, Unit 3/77 Hay St, Subiaco 6005, (09) 382 4488: Yeada Station.  
Specified Services Pty Ltd, P O Box 89, West Perth 6005, (09) 321 3086: Mt Regal.

- sand

Amatek Ltd, 1 Newburn Rd, Kewdale 6104, (09) 353 3030: Gnaragarra.  
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 1535: 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.  
Specified Services Pty Ltd, Unit 3/77 Hay St, Subiaco 6008, (09) 382 4488: Maitland Stillman WJ,  
P O Box 71, Boulder WA 6432: Lake Letroy.  
The Readmix Group (WA), 75 Canning Hwy, Victoria Park 6100, (09) 470 2222: Karratha, Lake  
Raeside/Rocklea, Turner River, Warramunda Station, Warramunda Creek, Widgeemooltha.  
Tomlinson JJ, 1 Bernard St, Claremont WA 6010, (09) 384 5553: Childow  
Wreford, WB, 75B Wellard Way, Karratha, WA 6714, (091) 85 3840: Karratha.

COPPER

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

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.

Western Australian Diamond Trust, 28th Floor, Capita Centre, 197 St Georges Tce, Perth 6000, (09) 322 7935.  
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 Georges Tce, Perth 6000, (09) 322 1979:

Lissadell.

DIATOMITE

Hines, Horton and Rule, C/- 141 Robinson Street, Gingin 6503, (095) 75 2261: Gabys Peak.

DOLomite

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

FELDSPAR

Mattlock Mining NL, 1 Mill Street, Perth WA 6000, : Mukinbudin

GARNET SAND

Cable Sands P O Box 135, Bunbury 6230, (097) 21 4111 : Capel  
Target Minerals N L, P O Box 188, Geraldton 6530, (099) 23 3644: Port Gregory.

PRINCIPAL MINERAL PRODUCERS 1987/88 - 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) 242 060: Gimlet South, Ora Banda Tailings, New Gimlet West.  
Boddington, P O Box 48, Boddington 6390, (098) 838 260: 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) 4265500 : Gidgee.  
Forsyth NL & Reynolds Aust. Mines Pty Ltd, 1st Floor, 28 The Esplanade, Perth 6000, (09) 3227221: Mt. Gibson.  
Hill 50 Gold Mine N L, P O Box 83, Mt Magnet, WA 6638, (09) 634 104: 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 WA 6426, (090) 401 030: 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) 218 276: Mt Percy.  
Newmont Holdings Pty Ltd, P O Box 231, Boulder 6432, (009) 198 200: New Celebration.  
North Kalgurlli Mines Ltd, PMB 13, Kalgoorlie 6430, (090) 21 0600: North Kalgurlli, 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/-Bardack 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

Endeavour Resources Pty Ltd, 15th Floor, R & I Tower, 108 St George's Tce, Perth, 6000 (09) 324 6350: Wyalkatchem.  
Brady H B and Company Pty Ltd, P O Box 42 Bayswater 6053, (09) 279 4422: Lake Brown.  
CSR Building Materials, 21 Sheffield Rd, Welshpool 6106, (09) 451 4444: Yellowdine.  
Eaton MB & AE, PO Box 146, Narembeen 6369, (090) 64 7316, Mt. Walker.  
Fitzgerald, EM & EJ, PO Box 392, Merredin 6495, (090) 41 1146: Hines Hill.  
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) 662 045: 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, 197 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.  
Robe River Iron Associates, 9th Floor, 12-14 St George's Tce, Perth 6000, (09) 421 4747: Pannawonica.

KYANITE

Allied Eneabba Pty Ltd, 45 Stirling Highway, Nedlands 6009, (09) 386 8611: Eneabba.

LIMESTONE

Aquarius Holdings Pty Ltd, Unit 3/104 Erindale Road, Balcatta, 6021, (09) 349 6009; Wanneroo.  
 Endeavour Resources Ltd, 15th Floor, R & I Tower, 108 St George's Terrace, Perth 6000, (09) 324 6350;  
 Dandagan, Dongara.  
 Bell Basic Industries Ltd, 136-8 Great Eastern Highway, Guildford 6055, (09) 279 0000; Wanneroo.  
 Henderson Nominees Pty Ltd, 19 Rangview Road, Landsdale 6065, (09) 342 9988; Moore River.  
 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.  
 Unimil Pty Ltd, 26 Tomlinson Rd, Welshpool 6102, (09) 362 1411; Lancelin.  
 WA Limestone Co, 41 Spearwood Ave, Bibra Lake 6163, (09) 418 4440; Nowrup.

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 Highway, Belmont 6104, (09) 478 0711; Carniyya 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.

PETROLEUM - condensate

Doral Resources NL, 31 Ventnor Ave, West Perth WA 6005, (09) 481 5866; 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, Griffith Centre, 28 The Esplanade, Perth 6000, (09) 322 7355; Harriet.  
 Home Energy Company Ltd, 4th Fl, 233 Adelaide Tce, Perth 6000, (09) 325 1555; Blina.  
 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

Doral Resources NL, 31 Ventnor Ave, West Perth 6005, (09) 481 5866; Woodada.  
 West Australian Petroleum Pty Ltd, 233 Adelaide Tce, Perth 6000, (09) 325 0181; Dongara.  
 Woodside Offshore Petroleum Pty Ltd, GP0 Box D188, Perth 6000, (09) 425 1211; North Rankin.

PRINCIPAL MINERAL PRODUCERS 1987/88 - continued

PLATINUM

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

SALT

Dampier Salt Ltd, 177 St George's Tce, Perth 6000, (09) 327 2327: 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 Perth 6000, (09) 322 4811: Shark Bay.

SEMI-PRECIOUS STONES - amethyst

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

SILICA SAND

Amatek Limited, 1 Newburn Road, Kewdale 6104 (09) 353 3030: Jandakot.

Australian Glass Manufacturers Co, 35 Bailie Road, Canning Vale 6155 (09) 455 1111: Lake Gnangara.

Bell Basic Industries Ltd, 136-138 Great Eastern Highway, 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

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

SPODUMENE

Lithium Australia Ltd, 91 Kensington St, East Perth 6001, (09) 325 8900: Greenbushes.

TALC

Gwalla 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 St, East Perth 6000, (09) 325 8900: Greenbushes.

TIN

Greenbushes Tin Ltd, 91 Kensington St East Perth 6000, (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.