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Petroleum and Minerals Review Conference
18 - 19 March 1987

Minerals Sands Industry Review:

Speaking notes and figures

by

R Towner

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SPEAKING NOTES

PETROLEUM & MINERAL REVIEW CONFERENCE 1987

MINERAL SANDS INDUSTRY REVIEW

ROY TOWNER

Mr Chairman, Ladies and Gentlemen.

The Mineral sands industry is one of the few resource industries experiencing strong market conditions. Prices of all mineral sands commodities increased in 1986 even in real terms and further price increases are anticipated in 1987 and 1988.

In this talk I will briefly review 1986 in terms of production, trade, prices, mining and processing developments, and the present state of our resources, as well as present some thoughts on the outlook for 1987.

Despite firming markets, and full utilisation of plant capacity, total production of mineral sand concentrates combined - rutile, ilmenite, zircon and monazite - is on a downward trend because grades of ore are declining, especially for zircon and monazite - as can be seen in this slide.

SLIDE 1

- ilmenite production fell by 8%
- zircon fell by 13%.

Rutile production was much the same in 1986 as the previous year despite a 25% price rise.

Monazite production (not shown in this slide, but the figures are in your Preliminary Annual Summary in your satchels) fell by about 45% in 1986.

As might be expected, the total quantity of concentrates exported also fell. Notwithstanding this state of affairs, mineral sands export earnings increased from \$225 million in 1985 to \$248 million in 1986 due to price increases, particularly for rutile and zircon.

The price increases of recent years for the mineral sand commodities (particularly the titanium minerals - rutile and ilmenite) is being sustained by demand for TiO_2 pigment, particularly from overseas. The manufacture of titanium dioxide pigment accounts for about 95% of world mine production of rutile and ilmenite. Only about 4% of rutile production goes to the making of titanium metal.

Demand for pigment in turn comes mainly from the automobile and construction sectors both of which consume a lot of paint.

Zircon is used mainly in refractories, ceramics and as foundry sand. Demand for zircon in the ceramics industries has firmed.

Most of the world's pigment plants are now operating in excess of their rated capacity.

The supply of the raw materials, rutile and ilmenite has not increased substantially. Consequently, prices for these commodities increased in 1986 as can be seen in the above slide.

Slide 2: [show rutile and ilmenite slides - side by side]

Prices shown in these slides are spot price-quotations which are recorded by the Industrial Minerals Magazine.

As can be seen from these slides, the current dollar price for rutile more than doubled from the mid-1983 low price of \$270/t to about \$630/t in late 1986; similarly, spot prices for ilmenite also doubled from around \$35/t in mid-1983 to \$75/t in 1986.

SLIDE 3

The story for zircon is similar.

[Return slide 3 (RHS) back to Slide 2 (RHS)]

Now let us take a brief look at these prices in real terms: price trends in real or constant dollars terms are shown on the same slides. The figures attached to the abstract (p93 and p94) in your handout, shows current dollar and constant dollar over a longer time span, (1968-1986).

At constant (1968) dollar, prices for rutile and zircon are at their highest level since the late 1960's apart from the price's boom of the 1974-75. The constant dollar price for ilmenite is at its highest level since the late 1960's.

The scenario of recent years of sustained demand, reduced supply, and rising prices saw in 1986 not only consumers looking for supplies, and producers trying to increase their production, but also changes in the Australian mineral sands industry.

These changes, some of which began over 2 years ago revolved around a rationalisation of existing producers and their operations, the entry of new players some of which are reassessing previously worked areas and others that are looking at new areas/provinces, as well as an encouraging trend towards further downstream processing of the concentrate.

I will now quickly review these changes that have taken place: firstly on the mining and exploration side.

Slide 4A, 4B

In Western Australia, the acquisition of Allied Eneabba by Renison Gold-fields Consolidated has enabled rationalisation of the mining operations in the Eneabba region, thereby extending the economic life of this area.

South of Eneabba TiO₂ Corporation, a new player, is continuing to evaluate the Cooljarloo-Jurien Bay mineral sand deposit. When this company begins production in a couple of years, it will be the first company to enter into the mineral sands industry since 1974.

In Queensland, Consolidated Rutile Ltd the leading producer of rutile and zircon, is now producing a low chrome ilmenite from ilmenite stocks accumulated over the last 20 years when this material was commercially unsuitable for pigment production.

Further north at Byfield, a large heavy mineral sand deposit is under reinvestigation by R&Z Mines Ltd to determine its size and mineral composition with a view to mining sometime in the early 1990's.

Mineral Deposits Ltd are working on an Environmental Impact Statement for the Agnes Water area.

In NSW, Mineral Deposits Ltd has commenced mining of a new lease near Tea Gardens, north of Newcastle, the first new mining lease granted for many years.

As previously mentioned, numerous applications for leases both onshore and offshore have been applied for during the year.

In Victoria, CRA Ltd, another new player, is evaluating its mineral sand prospect near Horsham, in the Murray Basin. If successful, this will be a new province for heavy mineral sands.

In South Australia, as we heard this morning, leases for heavy minerals sands have been taken out along the western margin of the Murray Basin.

Let me now turn to the processing side of the industry.

With resources of rutile - the preferred material for pigment manufacture - dwindling, and the commercial incentive to maximise return on the remaining resources, the Australian mineral sands industry is clearly moving towards further processing.

The commissioning of 2 synthetic rutile plants in Western Australia will increase Australia's synthetic rutile capacity four-fold to 272 000 t/year, making us the leading SR producer in the world. Most of this new production of synthetic rutile will be exported. The selling of this higher-valued product will increase export earnings.

Australia, which has produced large quantities of unprocessed zircon for export, is moving into zirconia production. In 1985, Z Tech Pty Ltd was formed with the aim of commercialising the manufacture of zirconia in Australia. In 1986, Australia's international position as a zirconia supplier was strengthened by ICI's acquisition of the US-based zirconia operation of Ferro Corporation, situated at Bow, New Hampshire, USA. This plant has a capacity of 1000 t/year of zirconia powder.

The value-added by zircon processing will vary depending on the purity of final product. However, the value will be in excess of 20 times. The quantity of zirconia currently producted in the world is about 20-25 000 t/year, but only about 10 000 t/year is produced from zircon. Hence demand for zircon for zirconia manufacture is unlikely to add to the overall total zircon demand, at least in the short term.

In the field of rare earths, the French company Rhone-Poulenc announced its intention to construct a plant to extract rare earth oxides from monazite concentrates, to be in operation by late 1989, and Currumbin Minerals Ltd is also considering the possibility of building a small plant to produce rare earth oxides from monazite.

If both these projects proceed, they will add appreciably to export earnings, though the quantity of monazite exported will be reduced considerably.

Turning briefly to resources - the life blood of any mineral industry. A detailed summary of the economic demonstrated and inferred resources is in your handouts. These figures do not include the Byfield area or CRA's Horsham deposits (both of which are currently under investigation).

Slide 4A - RHS

In Queensland, the only resources available for mining are the high dunes on North Stradbroke Island. Large quantities of low grade ore also occur on Fraser Island, Moreton Island, and along the central Queensland coast but, because of environmental legislation, these areas are not available for mining. The exception is the areas at Byfield, and Agnes Water.

In New South Wales, the bulk of economic demonstrated resources available for mining are located between Port Stephens and Newcastle. Currently, these resources are being mined - in the Tomago area, Tea Gardens, and Stockton areas, all just north of Newcastle.

As in Queensland, extensive areas of both economic and subeconomic resources particularly in northern and central NSW are currently unavailable for mining because of environmental constraints.

Slide 4B - LHS

In Western Australia, the bulk of economic resources are located in two areas: the Capel-Bunbury district south of Perth, and the Eneabba region, north of Perth. Between them these two areas contain all of Australia's resources of ilmenite currently used for pigment production. The Eneabba region also contains some 30% of Australia's EDR of rutile, about 40% of zircon resources, and about 60% of Australia's monazite resources.

The figures shown in your handouts include frozen resources on the East Coast. About 50% of known East Coast resources are currently unavailable. In current dollar prices, this material has an export value of about \$3 to 3.5 billion dollars.

Apart from these alluvial deposits, Australia also has extensive resources of titanium in hardrock titaniferous magnetite deposits. Estimates by Mr Roger Pratt of BMR indicate a resource of about 50 Mt of contained titanium, most of it in the subeconomic inferred category. In the longer term these could well replace or supplement Australia's diminishing known placer resources of titanium minerals.

Several hardrock deposits are also potential sources of rare earths which could succeed placer monazite. These include the Olympic Dam copper-uranium-gold deposit, which contains bastnaesite and florencite in very fine grained form, several uranium deposits in the Mary Kathleen area in Queensland, the alkaline igneous hardrock deposit at Brockman, and the Cummins Range and Mount Weld deposits, all in Western Australia.

At present, Australia has no known alternative resources of zircon.

LIGHTS ON - SLIDES OFF

Ladies and Gentlemen,

there is an atmosphere of optimism concerning the short to medium term outlook for the Australian mineral sands industry.

Rutile will continue to be a source of raw material for pigment production for many years to come. Production in the short term is likely to be in the range 220-230 000 t/year. Prices are expected to remain firm because of sustained demand and the limited supply, both in Australia and world wide. The availability of large quantities of good quality synthetic rutile from this year onwards will place a slight damper on the price of rutile prices. Synthetic rutile is a ready substitute for rutile in the chloride process for pigment manufacture.

Australia's combined output of SR and rutile will ensure that it will remain the world's leading supplier of high grade titanium dioxide feed-stock to the pigment industry for at least the next decade.

Over the next year or two, there will be less low-grade TiO_2 ilmenite available for sulphate process pigment manufacturers. Some of the world's

current sulphate pigment producers will continue to use raw ilmenite feed-stock as long as they can economically dispose of waste product. Other sulphate-producers will modify their plants to accommodate the use of titanium slag which is also produced from ilmenite. The production of slag (by overseas companies) is expected to substantially increase in the 1990's. Consequently, the price for ilmenite is also expected to remain firm in the short term, but could fall slightly in the 1990's with increased use of titanium slag.

The outlook for zircon appears good especially in the ceramics and refractories markets. With the production and export of zircon in Australia expected to decline in the short term because of declining grades, prices are likely to rise in the short term.

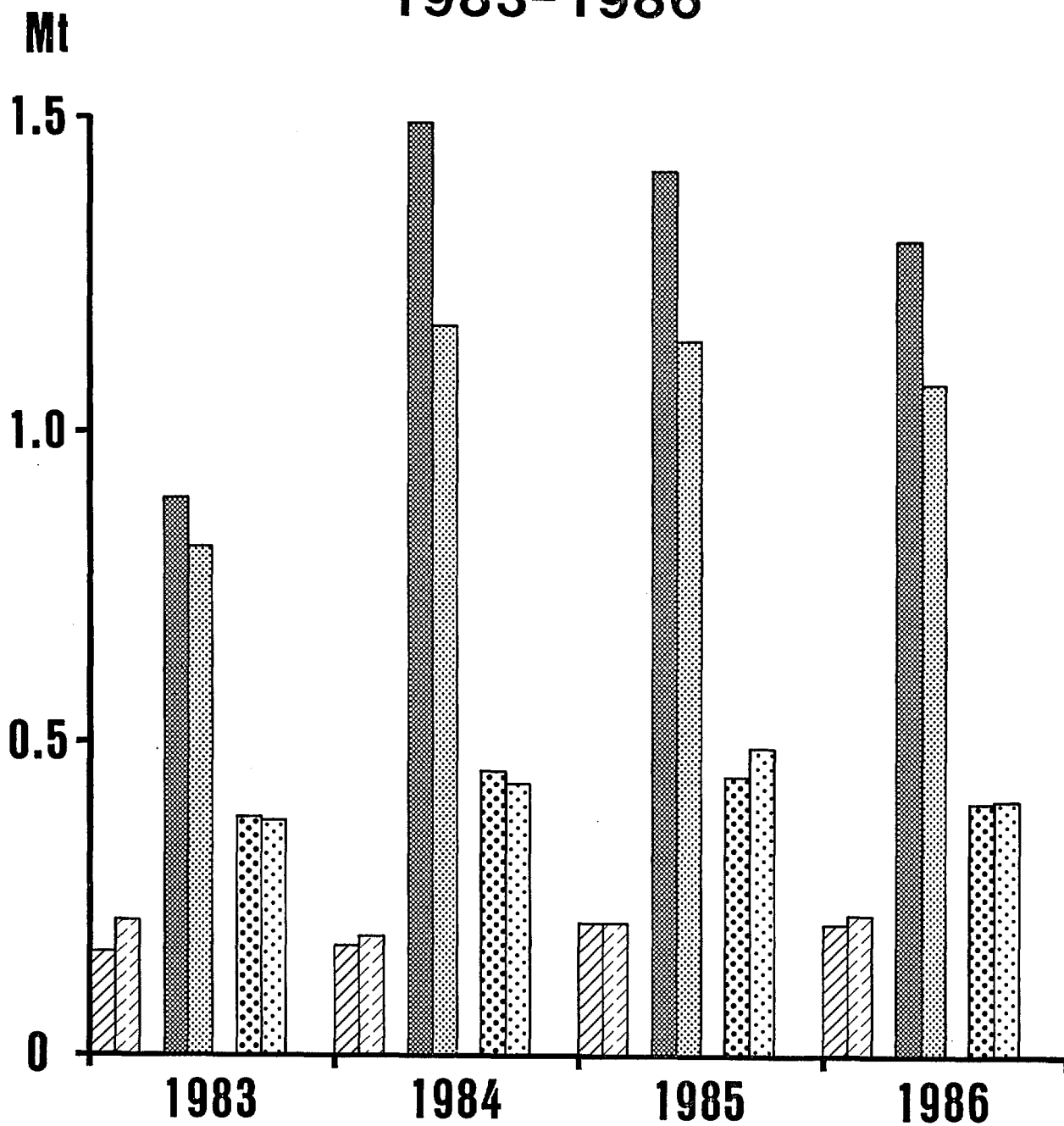
Australia's known economic demonstrated resources of heavy mineral sands at current production rates will be nearing exhaustion in about 20 years. Ore grades are declining - especially for zircon and monazite - but the possibility of new operations commencing in the 1990's and perhaps the thawing out of some of the East Coast resources could change this resource life scenario.

In summary, the outlook for Australia is to remain a major supplier of mineral sands concentrates for the next two decades. There will be an increasing emphasis on exports of more highly processed products such as synthetic rutile. Ilmenite exports could decrease as some domestic output is diverted to the SR plants. Zircon exports will also decrease. Monazite exports by 1990 may virtually cease, depending on the level of domestic processing achieved.

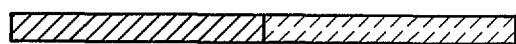
Nevertheless, export earnings from the mineral sands sector will increase appreciably because of the higher levels of processing.

Thank you.

MINERAL SANDS - PRODUCTION & EXPORTS 1983-1986



PRODUCTION EXPORTS



RUTILE



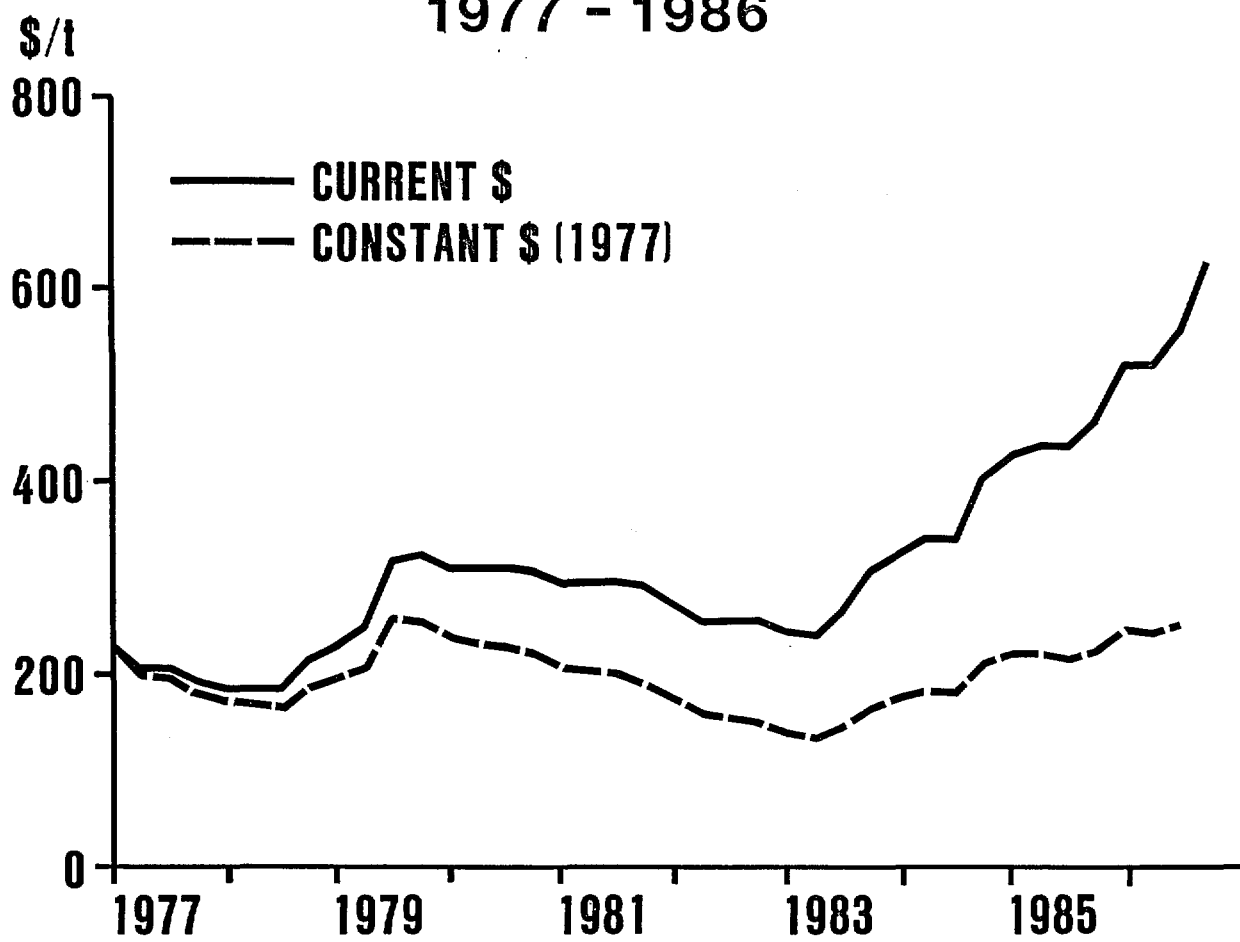
ILMENITE



ZIRCON

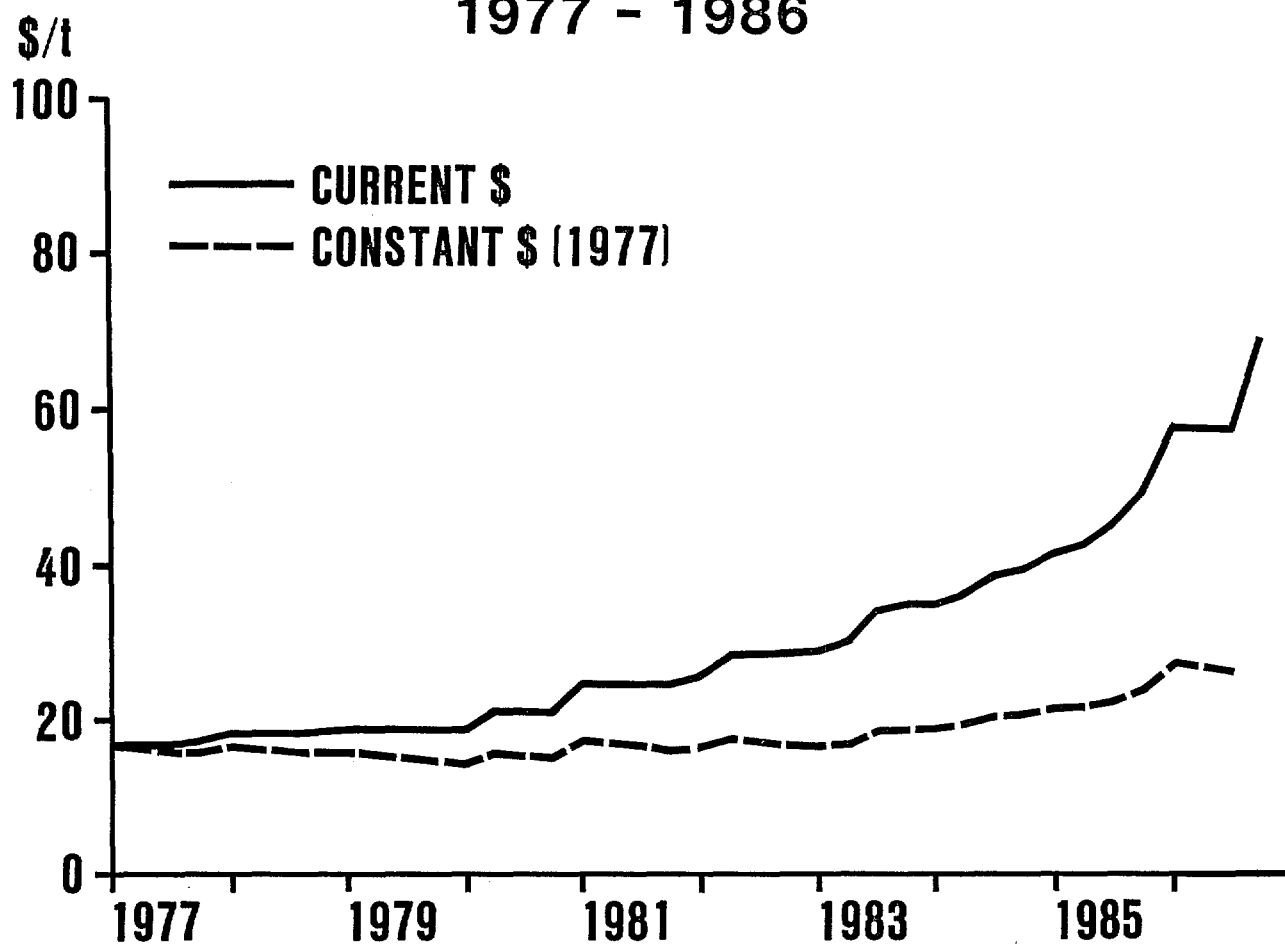
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RUTILE - QUARTERLY PRICES 1977 - 1986



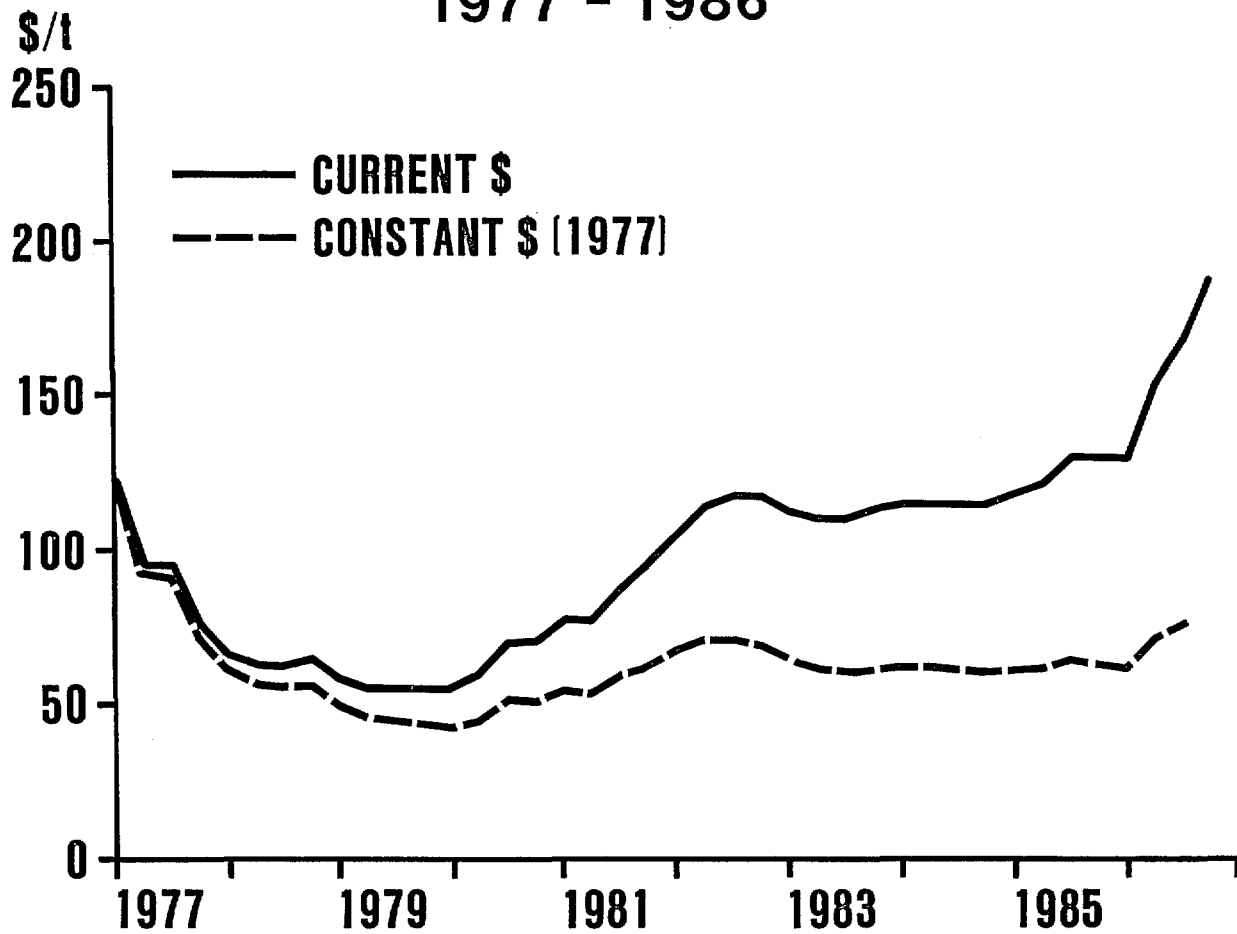
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ILMENITE - QUARTERLY PRICES 1977 - 1986



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ZIRCON - QUARTERLY PRICES 1977 - 1986



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