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**BHP  
Minerals**

**Exploration Department**

The Exploration Department is a part of the New Business Development Division of BHP Minerals which is a Business Group of The Broken Hill Proprietary Company Limited A C N 004 028 077



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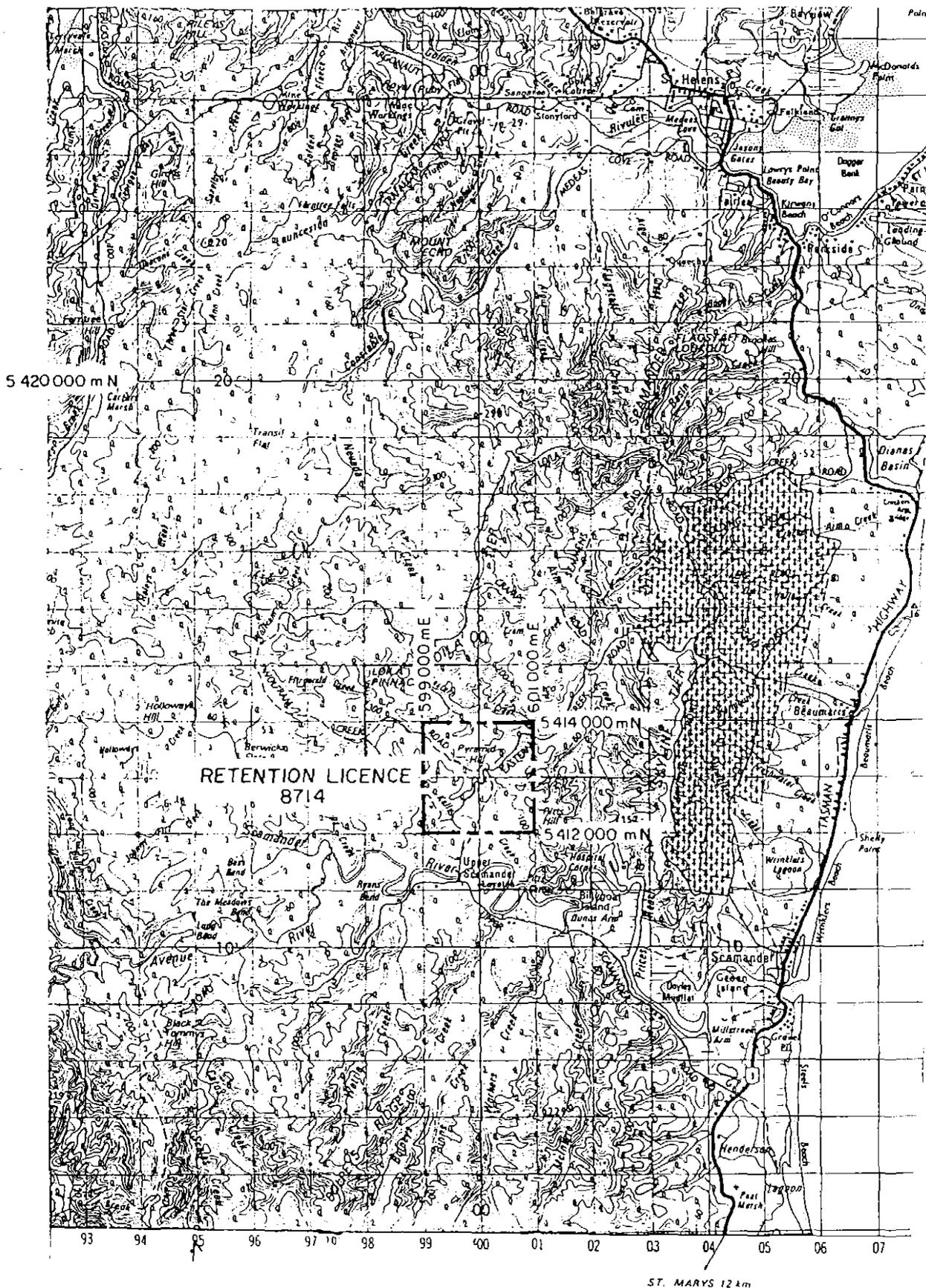
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TABLE

1. RESOURCES ESTIMATES

600000 mE



RETENTION LICENCE  
8714

5 cm

Scale 1:100,000

FIGURE 1



This map is photo copied from GEORGES BAY 1:100000  
topo. map.

Centre: Melbourne
Date: Jan. 1989

THE BROKEN HILL PROPRIETARY CO. LTD.  
RETENTION LICENCE 8714 - SCAMANDER, TAS.  
LOCATION MAP

Project No: T61Q
Drawing No: A4-2463

032004

## 1. INTRODUCTION

Retention Licence 8714 (Scamander) was granted to BHP in March, 1988 for an initial period of three years and was renewed for a further three year period on 8th March 1991.

The Licence covers an area of 4 square kilometres encompassing the Great Pyramid tin deposit near Scamander in northeast Tasmania (Fig. 1.). The area of RL 8714 previously comprised part of Exploration Licence 10/80 which was granted to BHP in 1980 and subsequently (1983) incorporated into Exploration Licence 12/78 (granted to BHP in 1978).

Following initial exploration by BHP, the Great Pyramid-Scamander area was investigated under the terms of a joint venture with Billiton Australia from August 1982 to June 1986. Billiton acted as Manager of the JV during this period and carried out a resource estimate as a prelude to economic assessment of the deposit and to provide a comparison with previous estimates by Paringa/Aberfoyle in 1969-74 and BHP in 1981 (see Hall & Wright, 1984; Hall & Carter, 1986). The most recent estimate based on all available data is that of Hall & Wright (op. cit.) who calculated a "probable" in-situ geological resource of 3.13 million tonnes at a grade of 0.22% Sn.

Following the withdrawal of Billiton from the Joint Venture in 1986, BHP made an application in August, 1987, for a Retention Licence covering the Great Pyramid deposit. The licence was granted on 9 March 1988. This report outlines activity on RL 8714 between March 1990 and February 1991.

## 2. GEOLOGY AND MINERALISATION

Host rocks to the mineralisation are the Lower Devonian Mathinna Beds, a sequence of sandstones, siltstones and shales showing turbidite structures.

The Mathinna Beds are intruded by a suite of granitic rocks of Upper Devonian age that represent the southernmost extension of the Blue Tier Batholith. Projections from the main granite massif are postulated to underlie the prospects of the Scamander area at depth. A long, narrow vertical dyke of predominantly granodiorite porphyry extends southwards along Scamander Tier. Tertiary and Quaternary sediments are exposed near the coast.

NW - trending regional folding is dominant, with upright axial planes. Extensive faulting occurs on a similar trend. These fault zones are generally several metres wide, comprising many sub-parallel, steeply dipping fractures. The mineralised lodes that fill fractures in the Mathinna Beds, however, generally trend NE, but with a wide spread of orientation, dipping 60 - 70° NW usually perpendicular to bedding. These veins probably represent tensional fractures related to the regional folding.

Most mineral occurrences consist of small, discontinuous hydrothermal quartz veins with minor sulfides, wolframite and fluorite in addition to cassiterites. A regional mineralogical zonation is evident with W and Sn mineralisation occurring in the west, Cu deposits in the central part of the area and Ag-Pb-Zn deposits in the east.

A comprehensive account of the geology of the deposit can be found in Hine and Goode (1980).

### 3. PREVIOUS EXPLORATION

Exploration by BHP and BHP-Billiton was continuous from 1978 to 1986 and involved an expenditure in excess of \$1.5 million. Initial geological, geophysical and geochemical investigations were followed by several drilling programs and, ultimately, by bulk sampling and metallurgical test work. This work has been summarized previously and will not be redescribed here; the reader is referred particularly to the reports by Hine & Goode (1980), Hall & Carter (1986) and references therein. The final work carried out on the property included a resource assessment by Hall & Carter (op. cit.).

### 4. RESOURCE ESTIMATES

Table 1 summarizes the estimates that have been made for the resource contained within the well-drilled portion of the Great Pyramid mineralized zone. The Billiton (1986) estimate is regarded as the most rigorous but it was emphasized by Hall & Carter (1986) that, although the tonnage is fairly well defined, the grade is known with only very low levels of confidence (cut-off grade used was 0.1% Sn). Additional resource estimates have been calculated using different cut-off grades and/or only some of the drillhole data. For example, Hall & Carter (1986) reported a high grade resource of 0.31 mt @0.46% Sn in South Block (0.2% Sn cut-off grade) and Kaleta (1983) suggested a resource of 2.8 mt @ 0.23% Sn based on only the Aberfoyle-Paringa "H" Series percussion drillholes, using 0.1% Sn cut-off. The presently available total potential resource estimates (i.e. indicated plus inferred) are also highly variable, e.g. 8.3 mt @ 0.19% Sn (BHP, 1981) as against 2.5 mt at undefined grade in addition to the 3.1 mt resource of Hall & Carter (1986).

**TABLE 1:**  
**RESOURCE ESTIMATES FOR THE GREAT PYRAMID TIN DEPOSIT**

Company	Year	Indicated in-situ Reserves		Method of Estimation
		Tonnage (mt)	Grade (%)	
Paringa-Aberfoyle	1969-1974	4.0	0.30	Based on cross-sections.
BHP	1981	4.1	0.22	Triangulation based on levels to level 90.
BHP	1981	3.3	0.26	Rectangular, based on 170 level only, with correction applied to all levels.
Billiton	1986	3.1	0.22	Prismoidal envelope.

## 5. PRESENT WORK

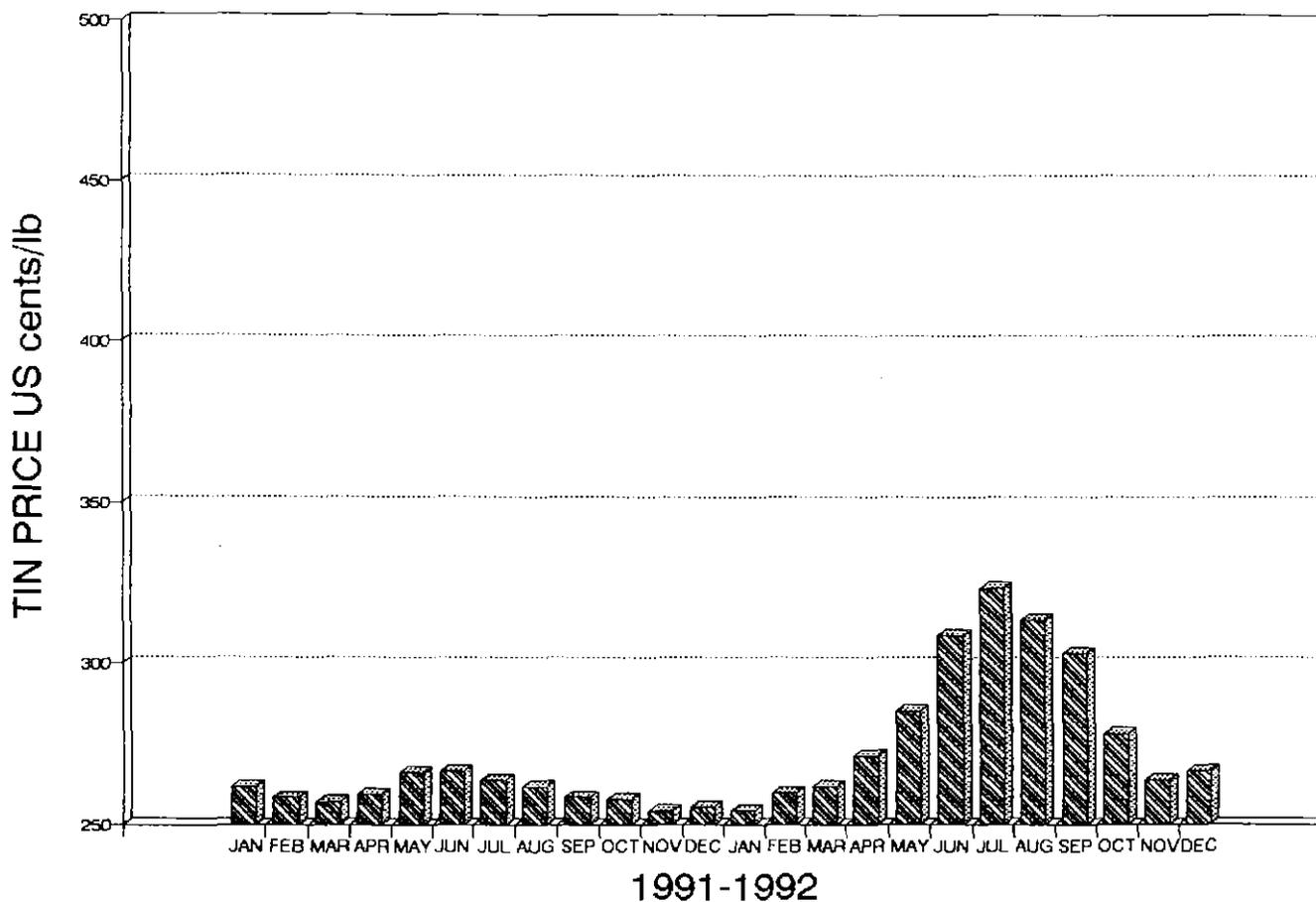
Work carried out during this reporting period consisted of ongoing assessment of developments in the international tin market and monitoring of the Australian Dollar price of tin. Although BHP Minerals made it known, during the reporting period, that we were amenable to exploration farm in proposals, no expressions of interest were received from potential joint venture partners. No field work was undertaken.

As discussed in previous annual reports for RL 8714 (Windrim, 1989, Wilde, 1990, Gregory, 1991), the viability of the Great Pyramid deposit as a mining operation depends on a substantial increase in the price of tin over its 1986-1988 level, neglecting capital costs. Early 1989 saw a marked rise in the tin price to a three year high of US\$4.90/lb in May reflecting depletion in overhanging tin stocks. The increase was however, short-lived and price dropped steadily during the later half of 1989 to end the year at \$3.21/lb. In 1990 a low of US\$2.82/lb was reported in February (Amlot, 1990), with further market weakening forcing quotations towards a record low at just under US\$2.50/lb, although the overall price averaged US\$2.76 in real dollar terms for 1990 (Shaw, 1991).

1991 saw the average prices drop to US\$2.54/lb which is less than half the average of 1985, when the tin crisis began, and only one quarter of the real price peaks of the late 1970's (Shaw 1992). In 1992 there were some signs of a recovery led by Brazilian production and export cut backs; brought about by producers trying to inflate prices by cutting their output. Prices peaked at US \$3.23/lb in July before retreating to US\$2.66/lb in December 1992 (Figure 2).

## AVERAGE TIN PRICE US CENTS/LB 1991-92

(SOURCE: Minmet Information Services)

6. OUTLOOK

Although most international tin market analysts had forecast that the global tin scene would resume 'normality' towards the end of the 1980's, this has yet to be realised.

Few, if any, tin mining operations were profitable in full cost terms at 1991 - 1992 price levels and the extended period of depressed quotations has forced the industry to undertake severe cutbacks (Shaw 1992).

The market will continue to be dominated by over-supply with the economic recession having further impact on the consumption of tin.

7. FUTURE PROGRAM

Given current market conditions, any further work on the Great Pyramid deposit remains unjustified. Expressions of interest in the property will be sought. Should the market show signs of a sustained recovery to price levels which allow economic exploitation of the deposit.

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\* Unless stated otherwise, all references are, or form part of, unpublished reports submitted to the Department of Mines, Tasmania.