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E.L. 43/87 Tasmania

Annual Report on Exploration Completed in the  
Cape Portland - Musselroe Bay Area  
of  
North-Eastern Tasmania

Report Prepared for  
Bach Holdings Pty. Ltd. and Pennant Holdings Ltd.

**OPEN FILE**

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March, 1989

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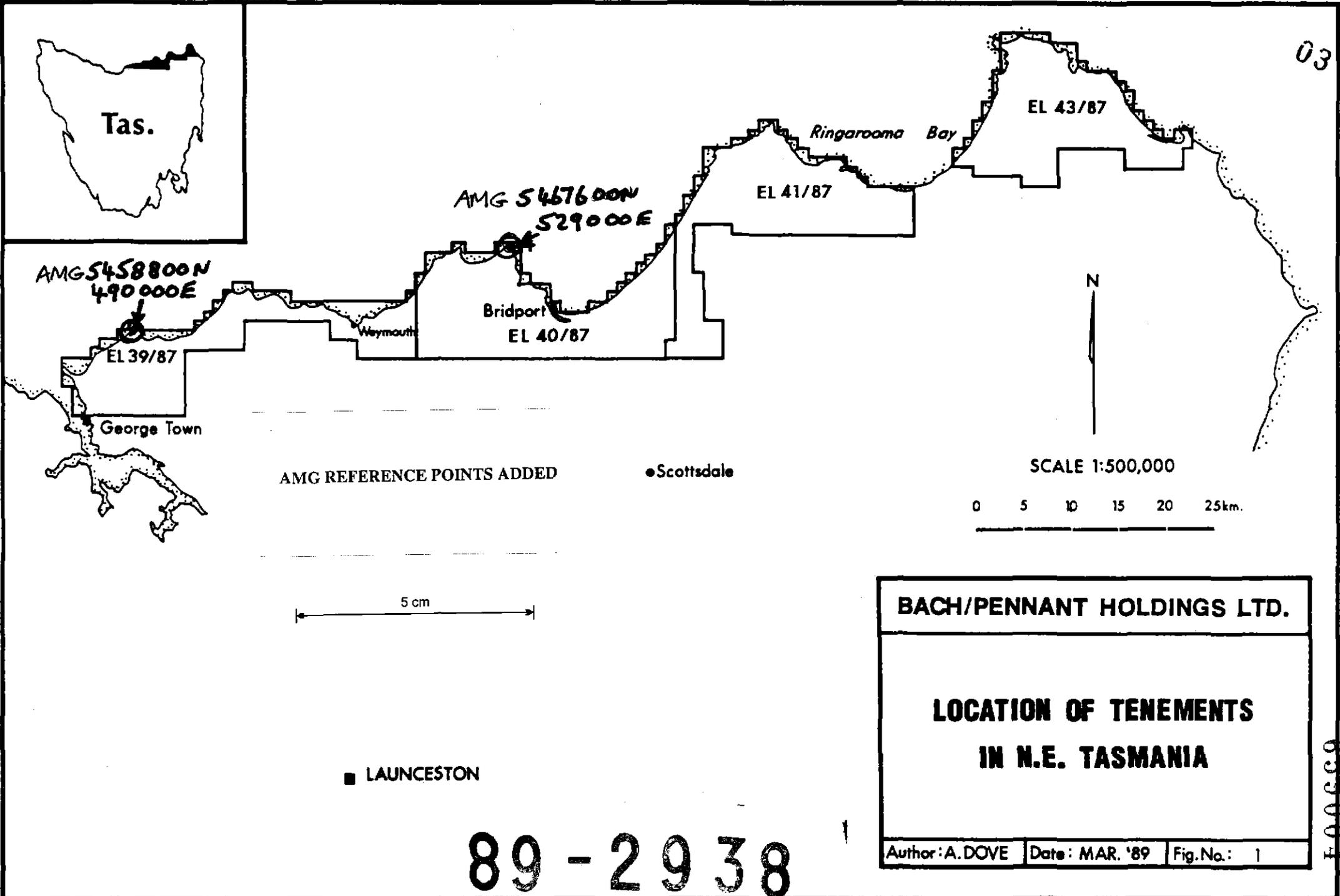
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**BACH/PENNANT HOLDINGS LTD.**

**LOCATION OF TENEMENTS  
IN N.E. TASMANIA**

Author: A. DOVE | Date: MAR. '89 | Fig. No.: 1

89 - 2938

FOCUS

## S Y N O P S I S

1. AIM

To examine the Tasmanian north-east coast between Cape Portland and Musselroe Bay for economic heavy mineral sand occurrences.

2. REASON

Recent increases in the price of mineral sand commodities, particularly rutile and zircon, has been caused by shortages of supply. Price rises combined with technological advances have given impetus to examination of areas previously considered to be unattractive.

Parts of E.L. 43/87 have previously been examined, however much of this work was of a reconnaissance nature and was restricted to the occurrences of tin.

3. SUMMARY & CONCLUSIONS

- 3.1 Exploration Licence 43/87 covers an area of 200 km<sup>2</sup> in the Cape Portland, Musselroe Bay area of north eastern Tasmania.
- 3.2 Previous work by Blacklow has indicated heavy mineral concentrations containing tin to the south east of Musselroe Point within the licence area.
- 3.3 Rutile, zircon and a chrome bearing ilmenite were also recognised in this area, although problems are associated with interpreting the results reported.
- 3.4 Minsands examined the Boobyalla Beach area east of Ringarooma Bay and encountered heavy mineral grades generally less than 0.5% as a result of hand augering to water table.
- 3.5 An air photo interpretation study was carried out over the area covered by this licence.
- 3.6 Exploration targets identified were a large aeolian dune to the east of Boobyalla Beach; a dune and strand line system at Little Musselroe Bay;

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sand flats and dunes near Great Musselroe Bay.

3.7 Examination of heavy mineral concentrate obtained during reconnaissance investigation of the area indicated the presence of rutile and zircon at levels between 5 - 15%.

4. RECOMMENDATIONS

An initial reconnaissance sampling programme should be undertaken with one traverse line through the dunes inland from Boobyalla Beach and a second traverse line in the Musselroe Bay area.

## R E P O R T

5. INTRODUCTION

Preliminary exploration was carried out by Peter H. Stitt & Associates Pty. Ltd. on behalf of Bach Holdings Pty. Ltd. on their E.L. 43/87 located on the north-east coast of Tasmania.

Exploration is aimed at the testing of sands for heavy mineral sand deposits, containing economic minerals; particularly rutile, leucoxene, ilmenite ( $TiO_2$  raw materials), zircon and monazite.

During the past three years the world market has been dominated by a short fall in supply to meet the demand, particularly for  $TiO_2$  pigment minerals, zircon and rare earth heavy minerals. As a consequence the price for these minerals has risen to historically high levels. Predictions for the future supply and price of titanium and zirconium raw materials is one of buoyancy.

Recent advances in technology and understanding of heavy mineral deposits has caused a re-evaluation of prospective areas. Chief points of advancement are:

- . Lower grade deposits are now economic.
- . Exploration methods have been developed particularly with regard to quantitative assessment of low grade areas.
- . Mineralogical determinations have seen the employment of the scanning electron microscope to identify minerals difficult to optically identify; particularly distinguishing black rutile from other black opaque minerals and identification of rare earth element minerals.
- . Mining technology has advanced, for example in dredging and dredge cutters, to lower costs and to make difficult areas now mineable.
- . Metallurgical treatment has seen the development of new spirals with higher throughput and suited to lower grade ore. Magnetic separators are now capable of more finely tuned separations to upgrade ilmenite

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and chromite products which have been rejected in the past.

- . Overall efficiency of the industry has advanced in order to meet market requirements.

The initial programme was based on the study of topographic maps, aerial photographs and previous work.

In addition to this exploration licence the Company holds E.Ls 39/87, 40/87 and 41/87. These four exploration licences cover most of the coastal strip from the Tamar Estuary in the west to Musselroe Point in the east.

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6. TENEMENT INFORMATION

Exploration Licence 43/87 was issued to Bach Holdings Pty. Ltd. and Minproc Mining (Tasmania) Pty. Ltd. It covers an area of 200 km<sup>2</sup> of the north eastern coastal area of Tasmania in the Land District of Dorset between Cape Portland in the west and Musselroe Point in the east. The licence location is shown in Figure 1.

The area comprises: 35.8 km<sup>2</sup> Crown Land  
164 km<sup>2</sup> Private Property  
and excludes: 15.1 km<sup>2</sup> Crown Reserves  
0.1 km<sup>2</sup> Mt. William National Park.

The area includes part of the Cape Portland Wildlife Sanctuary (part of which is an Australian Heritage Registered Entry) and the Musselroe Point Area Australian Heritage Interim Listing.

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7. PREVIOUS WORK

A review of available literature and reports of past exploration work was completed for the coastal areas from the Tamar River mouth in the west to Musselroe Point in the east. Information summarised in this section covers all of the four (4) exploration licences held by the Company.

In 1965 B.H.P. reported occurrences of cassiterite in several areas along the coastline in the north eastern part of the State.

Between February, 1966 and March, 1967, Ocean Mining A.G., conducted an intensive exploration programme for alluvial tin, rutile and zircon in Bass Strait, off the north coast of Tasmania.

An evaluation of the results of the programme indicated several areas of potential interest and one in particular, Ringarooma Bay, showed considerable promise. Ringarooma Bay and several other potential targets were subjected to further exploration.

The report (Ocean Mining 1969) indicated reserves within Ringarooma Bay of 23 million m<sup>3</sup> (30 million yds<sup>3</sup>) containing 148 gm/m<sup>3</sup> (4oz/yd<sup>3</sup>) of tin metal; equivalent to 0.009% Sn in raw sand. Zircon indicated to be present at 0.014% of raw sand and rutile 0.006%; after conversion from the quoted ounces/yd<sup>3</sup>. Significant ilmenite content was noted, but contained chromium contents between 0.1 and 0.3%. Traces of gold and minor monazite occur. These deposits were identified as occurring in old alluvial deposits (Pleistocene interglacials) filling the old Ringarooma River course which is now off shore and below modern sea level.

Planet Gold Ltd. (McMahon 1968) during 1967 examined an area from Low Head on the Tamar entrance to Stony Head as part of a more extensive

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programme including areas west of the Tamar. Eight (8) of the holes drilled are within E1 39/87, the locations are shown on Figure 2. Three (3) of these eight (8) holes, all located on or near the present day beaches, contained greater than 1% heavy mineral as tabulated below:

PLANET GOLD DRILLHOLES CONTAINING >1% HEAVY MINERAL

| <u>Hole</u> | <u>Depth (m)</u> | <u>% Heavy Mineral</u> |
|-------------|------------------|------------------------|
| 25S         | 0 - 1.5          | 1.45                   |
|             | 1.5 - 3.0        | 0.98                   |
|             | 3.0 - 4.5        | 1.82                   |
|             | 4.5 - 5.8        | 1.05                   |
|             |                  | 1.34% Average          |
| 30S         | 0 - 1.5          | 1.05                   |
|             | 1.5 - 3.0        | 1.11                   |
|             | 3.0 - 4.0        | 0.93                   |
|             |                  | 1.04% Average          |
| 34S         | 0 - 1.5          | 1.42                   |
|             | 1.5 - 3.0        | 3.28                   |
|             | 3.0 - 4.5        | 2.36                   |
|             | 4.5 - 5.6        | 1.92                   |
|             | 2.27% Average    |                        |

Mineralogy results are not given for individual drill holes but are stated overall as:- "The mineral fractions were mineralogically examined and found to contain only 6 - 8% rutile, traces of zircon, and 7½ to 16½ % ilmenite, with the balance being mainly amphiboles, garnet, topaz-andalusite, tourmaline and iron oxides."

B.M.I. Mining (Kociumbas 1971) examined an area east of Bridport, the exact location of which is not apparent from their map. Holes were drilled on four (4) lines spaced 800m. (½ mile) apart and at right angles to the beach, with the holes spaced at 122m. (400 ft.) intervals. In all twenty three (23) holes were drilled.

Samples were panned to give approximately the same quantity for each interval. Insufficient data is recorded to fully assess the results. However, the following trends appear from information available:-

Ilmenite in raw sand generally < 0.1%  
 Rutile " " " " < 0.02%  
 Zircon " " " " < 0.05%

Monazite and leucoxene were observed along with traces of cassiterite and gold. The results also indicate an overall trend of decreasing heavy mineral content towards the north east.

The S.F.L.W.L. Syndicate (Lockhart 1972) carried out investigations along the coastal areas between Weymouth and Bridport between 1970 and 1972. Reported are summary results for bulk composite samples tested. A summary of results is tabulated below:-

S.F.L.W.L. SYNDICATE HEAVY MINERAL CONTENTS

| <u>Area</u>                         | <u>Line</u> | <u>Depth (m)</u> | <u>Average % H.M.</u> |
|-------------------------------------|-------------|------------------|-----------------------|
| East Double Sandy Point             | SCI         | 0 - 9.0 (max)    | 0.55                  |
| Noland Bay (Little Pipers River)    | NB3         | 0 - 1.5          | 1.40                  |
|                                     |             | 1.5 - 4.5        | 0.93                  |
| Anderson Bay (Great Forester River) | WH          | 0 - 4.5 (max)    | 0.28                  |
|                                     | WH          | 0 - 7.5          | 0.77                  |

The location of these traverses is shown on Figure 2 of the Report for EL 40/87.

Mineralogy of the heavy mineral suite is given as:

Rutile 8.00%  
 Ilmenite 25.35%  
 Zircon 12.10%  
 Magnetite 2.30%  
 Others 51.23%  
 Leucoxene 1.02%

No comment is made as to the origin of the sample subjected to mineralogical examination.

Maps accompanying the S.F.L.W.L. Syndicate Report indicate that additional drilling was carried out in the West Sandy Point area, but no results are stated.

In 1975 an exploration licence was granted south of Musselroe Point to C.C.J. Blacklow. The objective of exploration was to find silica sand in the -20 +30 mesh size of high quality and sufficient quantity, and also any other mineral sands of commercial value.

Blacklow (1983) reporting on the work has shown that interesting heavy mineral grades occur on the beach to the south of Musselroe Point. The beach width varies from 20 to 26 metres wide and was drilled by auger on 5 traverse lines orientated perpendicular to the coast line. Individual hole depths ranged between 1.1m. (3.5ft.) and 2.1m. (7.0ft.) Heavy mineral grades for the traverse lines ranged from 1.4% to 4.2%, with tin values of 0.004% to 0.065% in the raw sand.

While Blacklow mentions rutile and zircon as being present along with tin he does not indicate how the "recoverable grades" stated were determined. Furthermore he states: "..... the ilmenite present in the H.M. assemblage was quoted as containing 0.65% CrO ....." No mention is made about the ilmenite quantity.

The licence was held to at least November, 1982, but due to delays in renewal, and objections by the Australian Conservation Foundation, and the Department of Mines, the granting of mining lease was denied for tin. A Miners Right and Easement Licence was kept current in case sample lots of silica sand were required by potential customers.

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In 1976 Minsands Exploration Pty. Ltd. was granted an exploration licence in the vicinity of Ringarooma Bay (Benussi 1976). The objective of the company was to carry out exploratory drilling with the view of locating economic deposits of mineralised sand to the east of Boobyalla Beach. A total of 80 holes were drilled using a hand auger with holes terminating at the water table. They concluded that the mineralization was of too low a grade to be of any economic value. While heavy mineral grades are typically less than 0.5%, the evaluation failed to test sand deposits beneath the water table. As well the mineralogical study was based on XRF determinations on which "several problems were encountered".

8. AERIAL PHOTOGRAPHY INTERPRETATION

Aerial photograph interpretation using the most recently available black and white photography from the Tasmania Department of Lands was carried out over the E.L. Details are as follows:

- Scale: 1:42 000
- Date: 18.10.84
- Run 2: Nos. 137, 138, 139
- Run 3: Nos. 115, 116, 117, 118, 119, 120, 121
- Run 4: Nos. 103, 104, 105

The interpretation map (Figure 2) shows sufficient geographic features to enable location using the 1:100,000 topographic series. Distortion between photographs created some problems in preparing the composite and is reflected by variation in the angle and the length of some tenement boundaries shown.

The following points are noteworthy:

- . The large Aeolian sand cover to the east of the tenement, north of Boobyalla River, is controlled by dominant westerly winds.
- . On the north east coast at Little Musselroe Bay a refracted wave strandline system occurs.
- . Dominant sand flats with some accumulations occur around Great Musselroe Bay.
- . The Cape Portland Wildlife Sanctuary is excluded from the licence, however minor strandline development occurs to the west of Lanoma Point.
- . Areas which are not designated are otherwise basement.

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9. HEAVY MINERAL TESTWORK

Two samples of surface concentrations of heavy minerals were collected during a reconnaissance trip to E.L. 43/87 in December, 1988. The samples were collected from Little Musselroe Bay and the north end of Boobyalla Beach, and were submitted for heavy mineral determination and semi-quantitative modal analysis.

Quantitative heavy mineral separation (by heavy liquid sink - float) was carried out with the following results:

| SAMPLE NO & LOCATION       | HEAVY MINERAL PERCENT |
|----------------------------|-----------------------|
| 6. Little Musselroe Bay    | 32.6                  |
| 7. Nth end Boobyalla Beach | 0.1                   |

The heavy mineral fractions were bulked together with samples from E.L.s 39/87, 40/87 and 41/87 and the heavy mineral fractions examined optically. They were found to contain high topaz with a combined rutile and zircon fraction of between 5 to 15 percent. Other potential economic minerals such as ilmenite were present in the range of 5 to 15 percent. Chromite in the range of 5 to 15 percent and monazite in the range 0.05 to 0.5 percent. Cassiterite, a mineral likely to be associated with topaz was not detected, however no effort was made at this preliminary stage to examine the concentrates for cassiterite.

10. DISCUSSION

The Air Photo Interpretation Report in section 8 of this Report has outlined three prospective targets with large sand tonnages. These being:

- . Aeolian dunes east of Boobyalla Beach.
- . The dunes and strand line systems developed around Little Musselroe Bay and the northern end of Great Musselroe Bay.
- . The sandy flats and dunes on the eastern end of Musselroe Bay and in the vicinity of Musselroe Point.

There are additional small sand bodies along the coastal strips particularly in the vicinity of Cape Portland where some minor strand line developments are noted.

A reasonable large sand body inland from Lenons Beach forms part of the Cape Portland Wildlife Sanctuary and is not considered an exploration target, due to the restricted activity allowed in this area.

Previous workers, particularly Blacklow (1983) have intersected heavy mineral grades of 1 - 2% in the Musselroe Point area of the licence.

Work in the aeolian dunes east of Boobyalla Beach, Benussi (1976) has intersected grades generally less than 0.5% in a hand auger programme where holes terminate at the water table. This work in the Boobyalla Beach area failed to test for deeper strand line concentrations which may represent buried beaches covered by aeolian dunes.

The limited mineralogy work within the licence has indicated the presence of ilmenite with high  $Cr_2O_3$  levels. Tin and gold have also been noted with appreciable tin values in some areas. Although the recent mineralogy work from samples collected by the writer in 1988

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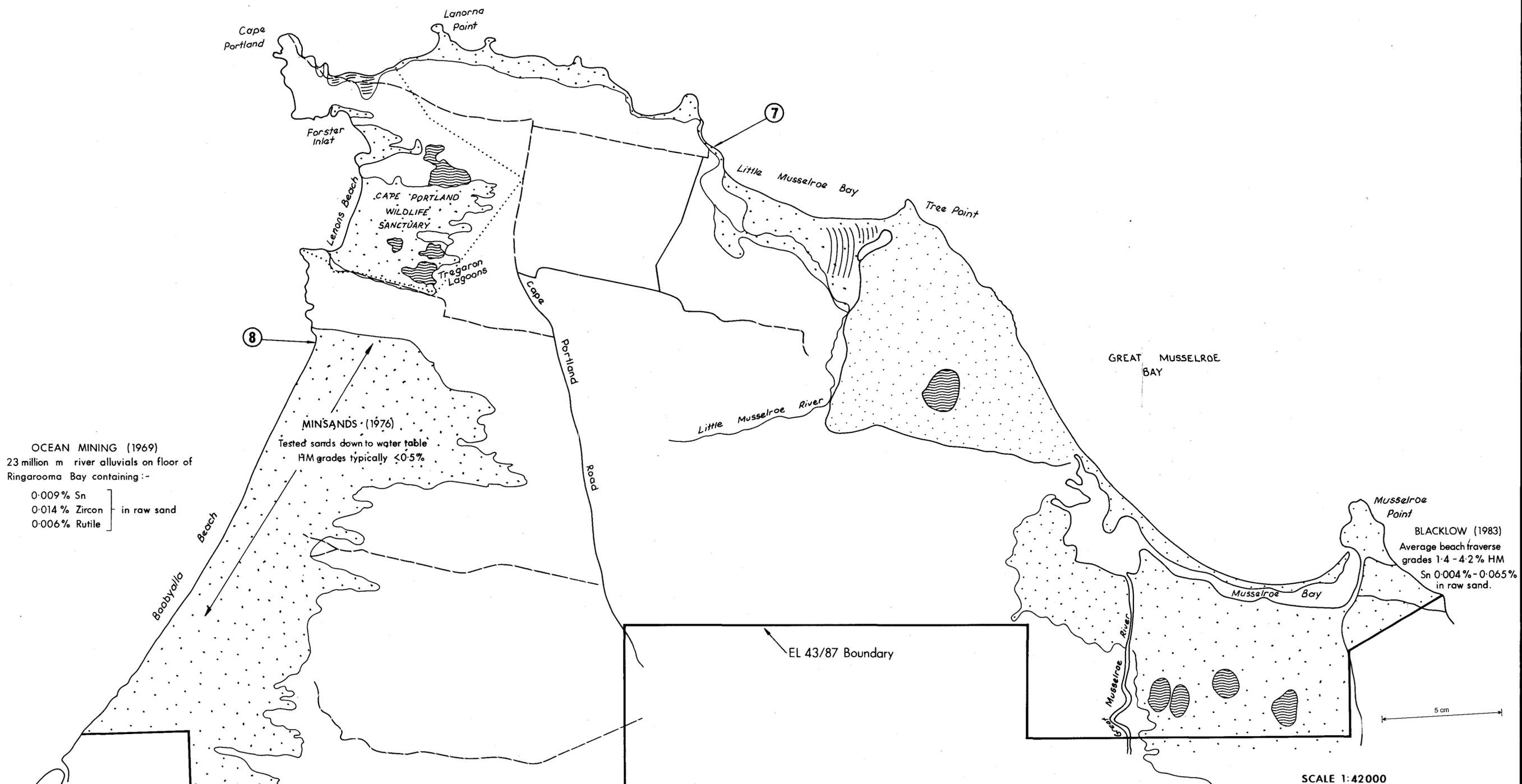
did not test for tin, the presence of rutile and zircon were noted with 9% rutile and 6.5% zircon in a composite sample derived from material obtained to the east of this exploration licence. A composite sample contained material from Little Musselroe Bay as a major component and contained rutile and zircon between 5 - 15%. Significant topaz contents were noted in all samples and support work previously carried out by McMahon in 1968.

From information currently available it would appear that the exploration licence is prospective for a heavy mineral suite and contains rutile, zircon, cassiterite and minor gold. Ilmenite and chromite may be saleable if these minerals are separable, since the Cr<sub>2</sub>O<sub>3</sub> level of an unbeneficiated ilmenite concentrate is too high to be marketable.

Exploration work should proceed with a reconnaissance drilling programme focusing on two of the larger sand bodies within the licence, these being the aeolian dunes inland from Boobyalla Beach and the sand body on the northern end of Great Musselroe Bay and extending to Little Musselroe Bay. One traverse line with drill holes spaced at 40 metre intervals has been previously proposed for these two areas.

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**LEGEND**

-  Dunes
-  Strand Lines
-  Lake
-  Road
-  Road or track

**6** 1988 SAMPLING SITE

**BACH/PENNANT HOLDINGS LTD.**

EL 43/87 TASMANIA

**AIR PHOTO INTERPRETATION  
 CAPE PORTLAND -  
 MUSSELROE BAY**

Author: A.DOVE Date: JAN '89 Fig. No: 2