

01_4619

Final Report on Exploration - July 2000 to June 2001 -
EL 7/1997
Mineral Holdings Australia Proprietary Limited*
Duncan, D.McP.; Rhodes, L. EL7/1997

**EXPLORATION LICENCE 7/97
NINE MILE BEACH
KING ISLAND**

683001



**FINAL REPORT ON EXPLORATION
JULY 2000 TO JUNE 2001**



for
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MINERAL RESOURCES		
FILE REF: EL7/97 PT 1		
- 1 NOV 2001		
DOC. REF:		
OFFICER	FOR ACTION	FOR INFO
See folio 77		
RESUBMIT TO	DATE	

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22nd October 2001

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EL 7/97 – Nine Mile Beach, King Island – Final Report**ABSTRACT**

This report describes the work undertaken by Mineral Holdings Australia Pty Ltd from 1997 to 2001 on EL 7/97 in State Waters off Nine Mile Beach in NE King Island.

The licence was designed to cover the sediment accumulations of the present delta of the Sea Elephant River in the south and of a beach-parallel structure to the north thought to represent a previous delta or palaeochannel of the river or an ancient strand line of Nine Mile Beach.

The exploration target was heavy mineral sand containing rutile, ilmenite and zircon (as well as possible credits of cassiterite, gold, rare earths and platinoids). Adjacent onshore deposits at Naracoopa and Cowper Point of 25 million tonnes of 5% zircon and rutile deposits are held by Tasmanian Titanium Pty Ltd.

Grab sampling by abalone divers of active seabed sediments has detected 16% of values of combined TiO₂ and ZrO₂ in the range 0.3- 1.70% particularly in the northern Area A. These values are encouraging as they are close to the cut off grades of Eastern Australian heavy mineral deposits at 0.5- 0.8%. Occasional values in the range 0.6- 1.7% are close to the average values of rutile and zircon defined for some of the heavy mineral deposits outlined in adjacent areas on onshore King Island (e.g. East, Back Beach and Lanherne Deposits).

The program has provided additional information on sediments, structures, bedrock, vegetation and depth to the seabed. There is no preference at present for the higher metal values to be with the coarser sediments. The zone of higher values occurs in a trend parallel to the present shoreline and just inshore from the exploration targets as originally defined. These same targets remain untested at depth.

Mineral Holdings considered a bulk-sampling program using a suitable dredger or pump-equipped survey vessel in association with the testing of the Ringarooma Bay prospect in NE Tasmania.

For a variety of reasons, the marine equipment failed to materialize and in the face of the large expenditure requirement in the last year of the licence, Mineral Holdings Australia Pty Ltd decided to relinquish the tenement.

EL 7/97- Nine Mile Beach, King Island- Final Report

1.0 Introduction

EL 7/97 was granted to Mineral Holdings Australia Pty Ltd in July 1997 for 5 years to 20th June 2002 over an area of 49 sq km in State Waters off Nine Mile Beach in NE King Island (Plan 1).

The licence was designed to cover the sediment accumulations of the present delta of the Sea Elephant River in the south and of a beach-parallel structure to the north thought to represent a previous delta or palaeochannel of the river or an ancient strand line of Nine Mile Beach.

The exploration target was heavy mineral sand containing rutile, ilmenite and zircon (as well as possible credits of cassiterite, gold, rare earths and platinoids). Adjacent onshore deposits at Naracoopa and Cowper Point of 25 million tonnes of 5% zircon and rutile were planned to be developed by Australian Titanium Minerals Ltd. The deposits are now held by Tasmanian Titanium Pty Ltd.

2.0 Previous Exploration by Other Companies

A brief review of the Ocean Mining A.G. reports contained in the Mines Department, Hobart was carried out to establish if untested areas of possible heavy mineral sand deposits remained after that company's exploration effort from 1965 to 1969 in the offshore area of Sea Elephant Bay. The final report of exploration recorded that neither of the two major targets selected from survey results was adequately tested by drilling because of persistently heavy sea conditions during the cruises of the vessel Wando River. The two targets were - a major, deep, sediment- filled channel and an area described as Elephant Shoal.

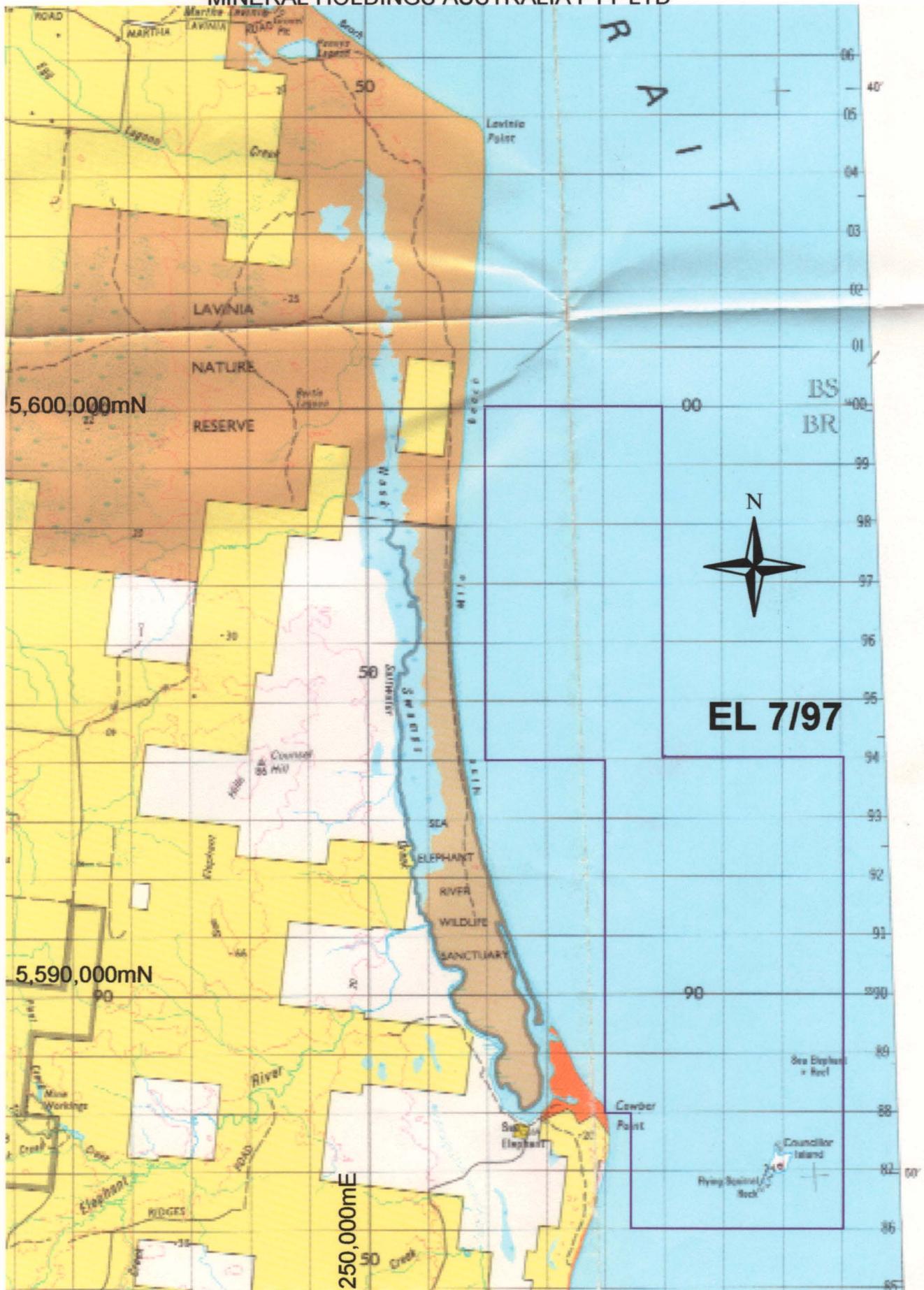
The Ocean Mining exploration consisted of bathymetric and seismic surveys followed by OMAG jetlift sampling by MV Aardvark and drilling by MV Wando River. The 4 fathom sediment thickness contour in Plan 3 outlines the sediment-filled channel off Sea Elephant Beach with three feeder channels extending from the shore, to the north an area of presumably delta sediments at the mouth of Sea Elephant River, and more northerly still a channel of sediments some 2km off the Nine Mile Beach with a seaward extension of sediments thickening to the east.

Plan 3 also shows the position of 11 drill holes relative to the areas of sediment (marked in green) thicker than 4-fathoms (24 feet). These are described in turn-

Area A- up to 72 feet thickness of sediments interpreted, structure 4 by 1km
- not tested by hole 7 on edge

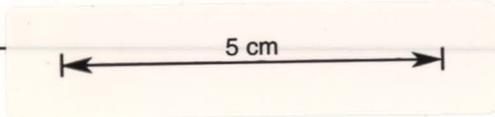
Area B- up to 60 feet thickness of sediments interpreted, delta 3 by 3km
- tested by holes 1, 2 and 3 (two on edge)

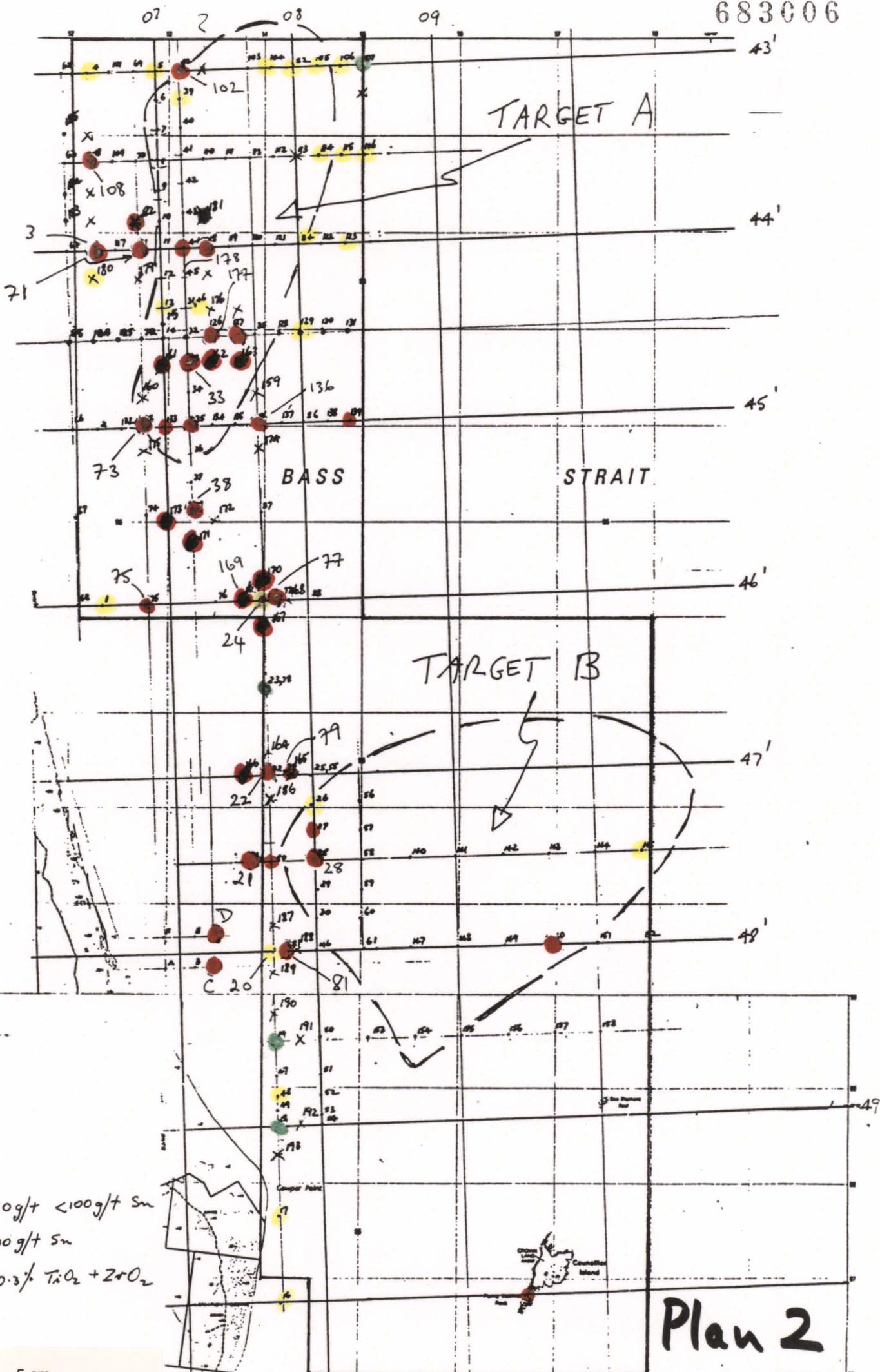
Area C- up to 84 feet thickness of sediments interpreted, main structure 10 by 2km



0 10 km

PLAN 1- Location Map EL7/97, Nine Mile Beach, King Island





TARGET A

BASS STRAIT

STRAIT

TARGET B

- >50g/t <100g/t Sn
- >100g/t Sn
- >0.3% TiO₂ + ZrO₂

5 cm

Plan 2

1:50,000



Timber Reserve	Forest	Power transmission line
Land Department: Crown Reserve	Leased or Uncommitted Crown Land	Levee or bank; Landmark area
National Parks & Wildlife Service: State Reserve, etc.	N.P. & W.S. administered Conservation Area	Landmark object; Quarry; Mine
Hydro Electric Commission	Commonwealth administered	Building/s; Church; Ruin; Drive-in
Municipality boundary	Boundary location uncertain or indefinite	Trig station; Spot elevation
Conservation Area boundary	Built-up area; National route marker	Cliff; Contour with value; Depression
Roads maintained for continuous public use	Other roads; Bridge	Lake perennial; Stream perennial
Primary road; Route number	Secondary road; Route number	Lake intermittent; Stream intermittent
Secondary road; Route number	Minor road; Route number	Swamp perennial; intermittent
Roads of restricted use or access	Vehicular track; Gate	Land subject to inundation
Walking track		Bore or well; Spring; Tank or small d.
		Breakwater; Pier; Wharf
		Wreck, exposed; Lighthouse
		Rock, bare or awash; Foreshore flat
		Reef; Rock ledge

PRODUCED by the Mapping Division, Lands Department, Hobart, 1984
 NOMENCLATURE: Topographic names on this map have been approved by the Nomenclature Board of Tasmania.
 MAP ACCURACY: The average accuracy of this map is ± 25 metres in the horizontal position of well defined detail and ± 5 metres in elevation.
 MAP RELIABILITY: Topographic information subjected to limited update Feb 1984
 PUBLIC RIGHT OF WAY: Roads or tracks on this map do not necessarily indicate a public right of way.
 CORRECTIONS: To assist in correcting future editions of this map, users noting errors and omissions are invited to write to the Director of Mapping, GPO Box 44A, Hobart, Tasmania, 7001.

LAND TENURE INDEX INFORMATION has been compiled by the Lands Department with assistance from the Forestry Commission. Land tenure is current to Jan 1984. Due to limitations of scale, some small areas of land tenure within built-up areas or of less than two hectares are not depicted. Colours are designed to indicate the prime managing authority. The indication of a particular land status does not imply right of entry or use. Boundaries of Crown land extend to low water mark. For full particulars, users are requested to consult the Registrar-General's Division or the Lands Department.

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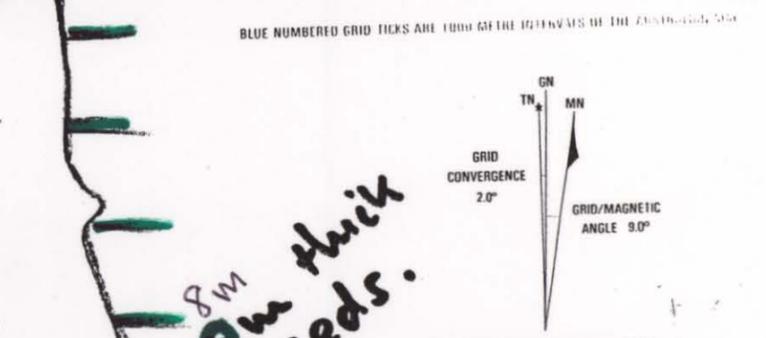
GRID ZONE DESIGNATION
 54G AND 55G

100 000 METRE
 SQUARE IDENTIFICATION

54G	55G
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IGNORE the SMALLER figures of any grid number; these are for finding the full co-ordinates. Use ONLY the LARGER figures of the grid number, example:
 41000

SAM
 1 He.
 2 Loc.
 3 Est.
 4 Loc.
 5 Est.
 SAM
 If req.
 pref.



TRUE NORTH, GRID NORTH AND MAGNETIC NORTH ARE SHOWN DIAGRAMMATICALLY FOR THE CENTRE OF THE MAP. MAGNETIC NORTH IS CORRECT FOR 1984 AND MOVES EASTERLY BY 0.1° IN ABOUT THREE YEARS.

1:100,000

8m thick seeds.

3 naut. mile limit

PLAN 3

Fig 4

HORTON DRILL RIG
 WANDA RIVER VESP

9 DRILL HOLES

683007

5 cm

- tested by holes 4, 5, 6, 8, 9, 10 and 11

Of the eleven holes drilled, only hole 9 showed elevated values of Ti and Zr (Table 2, Duncan & Rhodes, 1998). Overall, only about half of the core was recovered in the drilling. Ocean Mining concluded that, because of the sea conditions which had curtailed the planned drilling program, the potential of these areas remained largely untested for rutile, zircon and cassiterite.

The present licence was designed to cover only Areas A and B within the 3 nautical mile limit (Plan 3). Area C was omitted as it was not thought possible that the licence in Commonwealth Waters would be granted before the expected date of arrival of the dredge- the Volvox Delta. As it turned out, the dredge was not made available to the project as it was required elsewhere on work of greater priority.

3.0 Exploration by Mineral Holdings

While awaiting the availability of a suitable dredge to carry out a bulk-sampling program, it was decided to investigate the seabed with abalone divers using 15-foot boats equipped with GPS for navigation. Mineral Holdings acknowledges the work carried out by the divers- Guy Barnes, King Island and Edward Shelmerdine, Melbourne.

Grab sampling of seabed sediments was carried out initially using a jar collecting about 0.4- 0.6 kg sand (samples 1-88 and A-F) and latterly using a 0.75m long bait pump for greater depth penetration of up to 0.60m (samples 101 -191). Samples 101 to 158 were taken by bait pump and separated into top and bottom samples and analysed separately as a comparison.

Samples were collected on east-west lines 900m apart with samples every 500m in Area B closing to 250m over Area A where the target was narrower. At each sample site, a GPS location was recorded along with water depth and intermittently the type of sediment sampled and the seabed conditions.

Samples (1-30) were passed through a 5mm screen to remove pebbles or shell fragments and the resulting fine fraction analysed for tin, titanium, zirconium and tungsten using XRF fused disc methods at Temco, Bell Bay. The metal concentrations reported from the laboratory were then recalculated to give the head grades of the sediments as they lie on the sea floor. Later samples were analysed unscreened.

Ten seabed samples of sand already analysed by Temco from Ringarooma Bay and King Island were sent to Amdel for comparison in Sn, TiO₂ and ZrO₂. Whereas the Sn and Ti compared well, the Zr contents as reported by Amdel were consistently down, sometimes nearly by a factor of ten. This resulted in Temco recalibrating their XRF to produce much more sensitive zircon numbers particularly at low concentrations.

Modifications were therefore necessary to the results presented in the 1998 annual report (Duncan and Rhodes, 1998). The zircon results were too high due to the analytical error and the corrected values were presented in the last annual report (Duncan and Rhodes, 2000). It was not always possible to correct all samples as some were used up entirely in the first analysis.

Mineralogical studies were conducted on a composite sample prepared by consolidating splits of 33 seabed samples (A, B, C, D, E, F, 31-50 and 52-58) and reported in the annual report to June 2000.

No exploration was carried in the year to June 2001. Planned bulk sampling was delayed awaiting the availability of suitable dredging equipment.

4.0 Results

The complete results are presented in Tables KI 1-14 (there is no Table -11) in the Appendix of the annual report to June 2000. They are plotted on Plan 2 where they are colour-coded to reflect the various concentration classes of heavy minerals (Sn in g/t, Ti O₂ in % and Zr O₂ in %).

The TiO₂ plus ZrO₂ concentrations reach up to 1.70% with 5 samples (2% of total) over 0.6% and 39 samples in 237 (16% of total) over 0.3%. In the latter category, these values are more common in the northern area compared with the southern area (Plan 2). The highest value of 1.70% occurs just outside the EL boundary in the south and inshore.

In the north, the +0.3% values show no clear correlation with the defined target, while in the south, the values are concentrated almost entirely west of the target. They occur in a zone parallel to the present shoreline and just inshore from the defined targets.

Individually, Ti O₂ values range from 0.02% to 1.29% (average is 0.17%) and Zr O₂ values range from 0.001% to 0.409% (average is 0.037%). There is a tendency for the two values to vary sympathetically.

Tin concentrations reach 100g/t Sn in 4 samples (2%) and over 50g/t in 23 (10%) of the 237 samples. The values tend to be grouped towards the north of the northern target and on the southwestern edge of the southern target (Plan 2). The highest tin samples are different from those with the highest combined TiO₂ and ZrO₂ values.

Sizing analyses for metal contents were carried out on 6 samples. The analysis shows that there is both coarse (+600um) and very fine tin (minus 150um) present. Zircon is mostly in the fine-grained range (150-300um) and is coarser than the titanium minerals (minus 150um).

Semi quantitative analysis of the composite sample by a mineralogist at Independent Diamond Laboratories Pty Ltd gave 0.09% heavies in the following categories A (20-50%) tourmaline, rock fragments; S (1-10%) almandine, O (20 grains -1%) staurolite, F (5-20 grains) **zircon**, spinel, amphibole, biotite, epidote, kyanite and T (1-5 grains) **rutile**, **corundum** and phosphate. No diamonds or indicator minerals were seen.

5. Interpretation

Grab sampling by abalone divers of active seabed sediments has detected 16% of values of combined TiO₂ and ZrO₂ in the range 0.3- 1.70% particularly in the northern Area A. These values are encouraging as they are close to the cut off grades

of Eastern Australian heavy mineral deposits at 0.5- 0.8%. Occasional values in the range 0.6- 1.7% are close to the average values of rutile and zircon defined for some of the heavy mineral deposits outlined in adjacent areas on onshore King Island (e.g. East, Back Beach and Lanherne Deposits).

Tin values of plus 50g/t in some areas show the possibility of useful credits being available in any mineral concentrates produced.

Examination of the bottom values of the bait pump samples shows that some heavy minerals persist at depth at least within the first metre. However, these results cannot be taken as proof of significant heavy mineral grades at depth in the sediments without further drilling or bulk sampling to basement in these areas.

From the limited information to date, here is no real pattern that the higher heavy mineral values are related to either the coarse- or the fine-grained sands.

6. Conclusions

Previous exploration by Ocean Mining (Mines Dept Reports TCR 81- 1617, 81-1618 and 81-1619) has shown that areas of potential for mineral sands- particularly rutile and zircon - have been defined offshore from Naracoopa, King Island (particularly hole 9). These areas have structures containing thicker sediments which have been incompletely tested by drilling with occasional elevated values in titanium and zirconium. Onshore, another company- Tasmanian Titanium Pty Ltd- is considering an operation to develop mineral sand deposits of 25 million tonnes of 5% zircon and rutile.

The current grab sampling program on the surface of the seabed has outlined some values of heavy minerals- zircon and rutile- approaching the cut off concentrations found in established deposits in Eastern Australia. Because of the small sample size, these heavy mineral values are indications only of potential metal concentrations and require follow-up drilling or bulk sampling throughout the sediment column. The seabed sampling results provide hope that sources of heavy minerals and concentrating mechanisms were operating in the past to provide economic deposits in the target areas.

The program has provided additional information on sediments, structures, bedrock, vegetation and depth to the seabed. There is no preference at present for the higher metal values to be with the coarser sediments. The zone of higher values occurs in a trend parallel to the present shoreline and just inshore from the exploration targets as originally defined. These same targets remain untested at depth.

While waiting for joint venture participation on the substantial drilling program necessary to test the target areas to basement, Mineral Holdings considered a bulk sampling program using a suitable dredger or pump-equipped survey vessel in association with the testing of the Ringarooma Bay prospect in NE Tasmania.

For a variety of reasons, the marine equipment failed to materialize and in the face of the large expenditure requirement of \$245,000 in the last year of the licence, Mineral Holdings Australia decided to relinquish the tenement.

7.0 Environment

As this was an exploration program involving the selection of small samples using hand tools from the seabed sediments to test for the presence of heavy minerals, there is little impact on the environment and no rehabilitation is necessary.

8.0 Expenditure

The amount expended on the licence since its inception by Mineral Holdings is \$45,205.

REFERENCES

Anon. 1965. Prospectus for a Joint Offshore Mineral Exploration Program in Australia- Tasmania. Ocean Mining A.G., TCR 81-1617.

Anon. 1967. Tasmania Offshore Exploration Program. Operation Reports-March 1966 to December 1967. Ocean Mining A.G., TCR 81-1618

Anon. 1968. Tasmania Offshore Exploration Program. Operation Reports-January 1967 to December 1967. Ocean Mining A. G., TCR 81-1619

Duncan, D. McP. and Rhodes, L. 1998. Annual Report on Exploration. EL 7/97, Nine Mile Beach, King Island.

Duncan, D. McP. And Rhodes, L. 1999. Annual Report on Exploration. EL 7/97, Nine Mile Beach, King Island.

Duncan, D. McP. And Rhodes, L. 2000. Annual Report on Exploration. EL 7/97, Nine Mile Beach, King Island.