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REPORT NO 32/88

E.L. 93/87

Annual Report on Exploration Completed in the
Manana Area of King Island, Tasmania

Report Prepared for National Mineral Sands Pty. Ltd.

A. Dove
December, 1988

89-2906

SYNOPSIS

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| Tasmanian Department of Mines | |
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1. AIM

To examine and investigate the potential for further mineral sand occurrences on King Island.

2. REASON

National Mineral Sands Pty. Ltd. are currently investigating mineral sand deposits elsewhere on King Island. Within E.L. 45/86 to the north a prospective old shoreline system extends south along strike into E.L. 93/87. The recent increases in the price of mineral sand commodities, combined with technological advances, have given impetus to examination of areas previously considered to be unattractive.

3. SUMMARY & CONCLUSIONS

3.1 E.L. 93/87 covered 57 km² of land on King Island.

3.2 E.L. 93/87 is adjoined to the north and east by E.L. 45/86, also held by National Mineral Sands.

3.3 A study of aerial photographs covering the licence area was completed and is shown as Figure 1 of this report. The study revealed a number of prospective strandlines.

3.4 Although no drilling has been carried out to date, to the north near the boundary of E.L. 45/86 and 93/87 drilling has taken place over an old shoreline system.

3.5 The traverse line cross-section is shown as Figure 2 of this report, and as a guide to the expected geology of the strandline system within E.L. 93/87.

4. RECOMMENDATIONS

At an appropriate time during the evaluation programme of the East Coast of King Island, that drilling be carried out over the southern extensions of the shoreline systems within the E.L.

R E P O R T

5. INTRODUCTION

Preliminary exploration was carried out by Peter H. Stitt & Associates on behalf of National Mineral Sands Pty. Ltd. on their EL 93/87 in King Island, Tasmania.

Exploration is aimed at the testing of sands for heavy mineral sand deposits, containing economic minerals; particularly rutile, leucoxene, ilmenite (TiO₂ 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 TiO₂ 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.

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- . 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 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 and aerial photographs.

6. TENEMENT INFORMATION

Exploration Licence 93/87 is held by National Mineral Sands Pty. Ltd. It covers 57 square kilometres of land in the Land District of King Island in the vicinity of Manana.

The land comprises:

55.5 km² Private Property

1.5 km² Crown Land

The land contains:

0.3 km² Reekara Wildlife Sanctuary; Australian Heritage Act, Registered Entry.

The Exploration Licence is adjoined to the north and east by EL 45/86, also held by National Mineral Sands Pty. Ltd. This EL is also prospective for mineral sands, and strand lines present in the northern portion extend south into EL 93/87.

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7. AERIAL PHOTOGRAPHY INTERPRETATION

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

Scale: 1:42 000

Date: March/April, 1985

Run 2: Nos. 83, 84

Run 3: Nos. 56, 57, 58, 59

The interpretation map (Figure 1) 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.

The following points are noteworthy:

- . The old shorelines present to the north in EL 45/86 continue south into EL 93/87.
- . Although the strandlines appear not to be continuous throughout the EL, the area has been subjected to agricultural activities and hence the surface topographic relief has been modified.
- . The inferred linaments in the S.E. corner of the EL require further investigation as possible strand lines.

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8. DISCUSSION

Although no drilling has been carried out to date within the licence, to the north near the boundary of EL 45/86 and 93/87 drilling has taken place over the old shoreline system.

One traverse line was drilled using reverse circulation methods during April, 1988. Some of the results obtained were encouraging, however it is hoped that there may be increased concentrations along strike to the north and south over extensions of the shoreline system. The drillholes were shallow in depth, averaging 5.0 metres as shown in cross section, Figure 2. All holes bottomed on a blue-green marine clay containing fragments of limestone, indicating a seafloor, after intersecting up to 7.5 m. of sands belonging to a beach facies depositional environment.

The cross section is a guide to the expected geology of the strandline system within EL 93/87. Heavy mineral grades of up to 1% are typical for the sands belonging to the strandline beach deposits. A mineralogical examination of the heavy mineral suite has been completed on samples obtained from drilling of the strand lines about 3 km. north of EL 93/87. The mineral suite in this area is typical of the east coast King Island with:

| | |
|-----------------|-----|
| Rutile | 5% |
| Zircon | 8% |
| Ilmenite | 25% |
| Magnetite | 4% |
| Tourmaline | 39% |
| Leucoxene | 10% |
| Other silicates | 9% |

and is expected to be similar to that within EL 93/87.

009

Beneath the sand is a blue-green marine clay which contains up to 2.5% heavy minerals. A sample from about 3 km. north of EL 93/87 contains the following mineral suite:

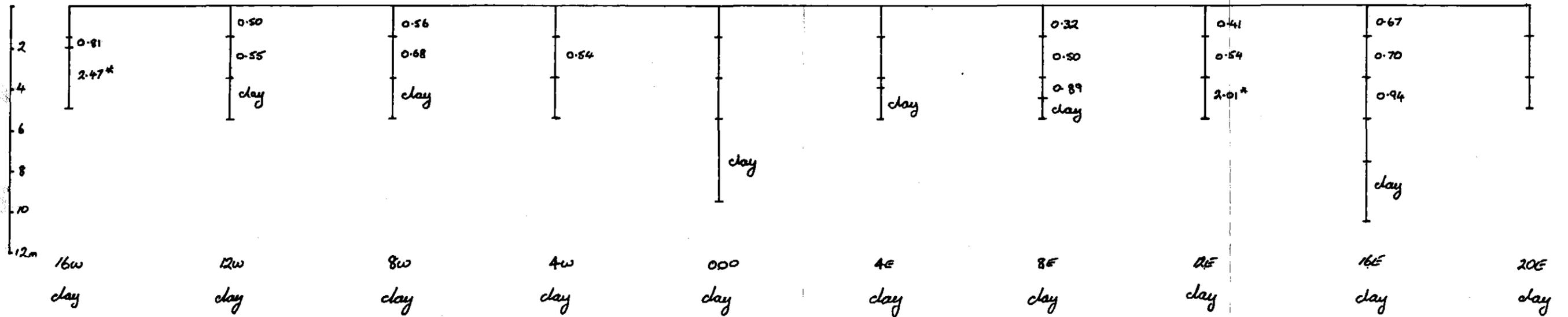
| | |
|--------------------|-----|
| Rutile | 1% |
| Zircon | <1% |
| Ilmenite | 12% |
| Magnetite | 23% |
| Tourmaline | 41% |
| Leucoxene | <1% |
| Other silicate | 6% |
| Secondary minerals | 16% |

It is expected that the clays underlying the sandy strand line deposits within EL 93/87 will contain a similar heavy mineral suite to that listed above. It is not prospective for economic concentrations of mineral sands and is typified by secondary minerals most probably of an organic origin.

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WEST

EAST

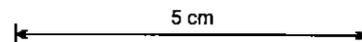


LEGEND

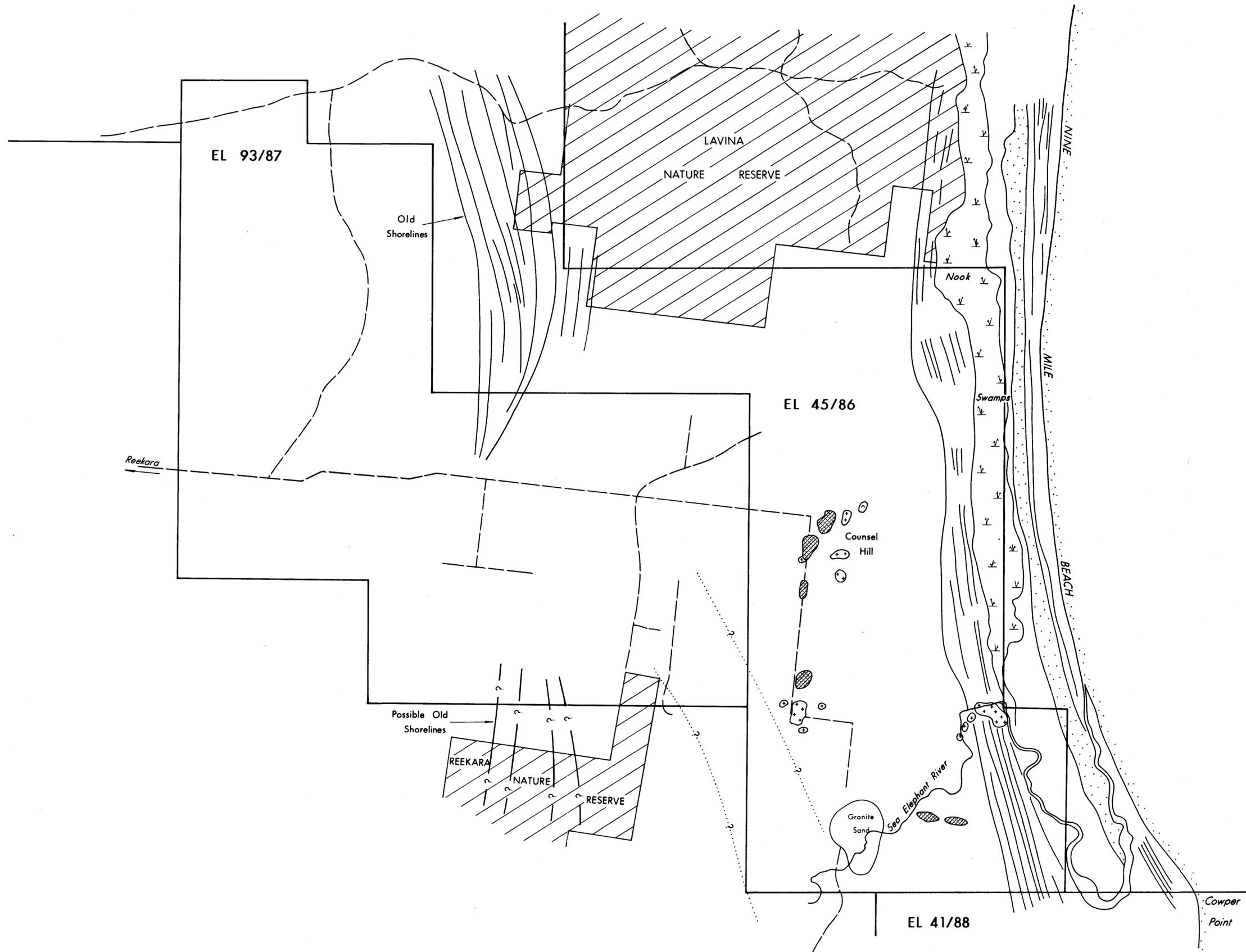
- BW DRILL HOLE NO.
- clay DESCRIPTION END HOLE
- 2.47* INTERVAL CONTAINS CLAY.

SCALE

- HORIZONTAL 1:500
- VERTICAL 1:200



| | |
|----------------------------------|-------------|
| NATIONAL MINERAL SANDS PTY. LTD. | |
| CROSS SECTION | |
| MANANA - LINE 2 | |
| Dec' 1988 | Fig. No: 2. |



LEGEND

- Aeolian Dune
- Spotted Hornfels
- Granite
- Aplite
- Quartz
- Strand Lines
- Inferred Lineament
- Track or Road
- Swamps

5 cm

SCALE 1:42 000

0 800 1600 2400 3200 4000 m.

690012

| | | |
|--|---------------|------------|
| NATIONAL MINERAL SANDS P/L | | |
| EL 93/87 | | |
| GEOLOGICAL & AIRPHOTO INTERPRETATIONS | | |
| Author: A.DOVE | Date: DEC '88 | Fig.No.: 1 |