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REPORT NO 3/88

EL 44/86 TASMANIA

Annual Report on Exploration Completed in  
South-Western King Island to 11/4/88

Prepared for National Mineral Sands Pty. Ltd.

A. Dove  
G. Lee  
April, 1988

**OPEN FILE**

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DISTRIBUTION

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## SYNOPSIS

1. AIM

To investigate the potential for mineral sand occurrences in the southern and western areas of King Island.

2. REASON

During the past two years the demand for mineral sand products has outstripped the supply available from current production areas. As a consequence significant price rises have occurred in the mineral sand commodities - rutile, leucoxene, ilmenite (all  $TiO_2$  raw materials), zircon and monazite.

King Island has a previous history of mineral sand production from the Naracoopa area on the east coast.

3. SUMMARY & CONCLUSIONS

- 3.1 EL 44/86 covers 103 km<sup>2</sup> in the south-western coastal areas of King Island.
- 3.2 Previous work was undertaken in the area of Big Lake during the late 1960's, however the drill hole traverse lines were not ideally located with respect to the trend of sand deposition in the area.
- 3.3 A study of aerial photographs covering the licence area was completed and is shown as Figure 2 of this report.
- 3.4 Field investigation concentrated on surveying and drilling 46 hand auger and case sludged holes on 3 traverse lines.
- 3.5 Selected samples from each traverse line were subject to laboratory heavy mineral separation.

- 3.6 Heavy mineral contents are shown in Table 1.
- 3.7 Mineralogical study of the heavy minerals is recorded in Table 2.
- 3.8 The Big Lake area is the most promising area within the EL. Although heavy mineral contents are sub-economic the mineralogy is higher in rutile, zircon and leucoxene than other areas examined and is comparable to Naracoopa.
- 3.9 The Badger Box drill hole tested shows mineral concentrations towards the bottom of the drill hole which may represent buried strandlines, however the mineral suite is still low in rutile and zircon.

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4. RECOMMENDATIONS

That all future work be carried out on the strandline sand deposits to the north of Big Lake.

## R E P O R T

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5. INTRODUCTION

A preliminary exploration programme was carried out by Peter H. Stitt & Associates Pty. Ltd., on behalf of National Mineral Sands Pty. Ltd. (formerly Butlers No. 27 Pty. Ltd.) on their EL 44/86, in King Island, Tasmania. The object of the programme was to test prospective areas for economic deposits of mineral sand, particularly rutile, zircon, ilmenite and monazite.

The initial programme was based on the study of topographic maps and aerial photographs, and consisted of hand drilling a number of regular spaced holes along three traverse lines.

6. TENEMENT INFORMATION

Exploration Licence 44/86 is held by National Mineral Sands and covers an area of 103 square kilometres in the south-western corner of King Island, see Figure 1.

The area comprises 16 km<sup>2</sup> of Crown Land, 85 km<sup>2</sup> of private property and 2 km<sup>2</sup> of the Seal Rocks Conservation Area (proposed State Reserve). An area of 4 km<sup>2</sup> was excluded from the original application as it was public reserve.

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7. PREVIOUS WORK

Exploration activities were carried out in the Seal Bay area EL 13/66 in September 1968 by Kenneth McMahon and Partners for Naracoopa Rutile Limited.

Fifty-five holes were drilled at various spacings north and south of Big Lake and across the neck of the Stokes Point Peninsula. A further nine holes were drilled to the east of Big Lake during December, 1968.

In October 1969 a further 168 holes were drilled along a series of lines heading north-west from Big Lake and Colliers Swamp, and south from Colliers Swamp. The assay results were not encouraging, although the north-west trending line from Big Lake had the most promise.

It was suggested that Big Lake was formerly part of Seal Bay and that concentrations of heavy mineral probably occur in old strandlines similar to those found inland from Cowper Point.

The orientation of many drill traverse lines in the Big Lake area was parallel to the old shore lines, and not ideally orientated to intercept mineralisation.

8. AERIAL PHOTOGRAPHY INTERPRETATION

Aerial photograph interpretation using the most recently available black and white photography from Tasmap was carried out over the EL. The photography is at a scale of 1:42,000 (approx) and dated as follows:

King Island

March/April, 1985

The maps prepared show sufficient geographic features to enable locating using the 1:100,000 topographic series. Distortion between photographs has created some problems in preparing these composites and is reflected by variation in the angle and length of some tenement boundaries.

The most prospective area for minerals are the strandlines developed around Seal Bay and Big Lake in the south-west of the island (see Figure 2).

The balance of the tenement covers aeolian dunes which for the most part overlie Precambrian granites and metamorphics which outcrop along the present-day shoreline. This is particularly noticeable along the western coast, south of Currie. The aeolian dunes may, however, overlie older beach deposits which may contain strandlines with heavy mineral concentrations.

9. FIELD INVESTIGATIONS

9.1 Survey

Drill holes where possible have been located along straight traverse lines running nearly perpendicular to the strike of the strandlines or the coastline. Where possible the traverse lines have been located along existing roads and tracks in order to minimise disturbance and allow ease of access during the reconnaissance stage.

Three traverse lines designated Big Lake (B.L), Seal Bay (S.B.) and Badger Box (B.B.) were drilled within the exploration licence (see Figure 2).

The survey of the drill holes was by tape, compass and abney hand level. Holes were spaced 40 metres apart along traverse lines at Big Lake and Seal Bay, and 100 metres apart along the Badger Box Traverse.

9.2 Drilling

All drilling in the current programme has been by hand augering and hand operated cased sludging. The drilling was carried out using a Tasmanian field crew, with a total of 46 holes and 385.9m. drilled for 387 samples.

Samples were collected at 1 metre intervals and bagged. The hand sludged samples were weighed in the field so that the drilling crew could maintain a check on weight variation per metre drilled and take steps to remain within acceptable limits.

Holes were drilled to a maximum depth of 10 metres, however most holes finished shallower, due to basement, calcrete or indurated layers, or difficult drilling.

A brief descriptive log is prepared for each drill hole and where relevant includes heavy mineral assay data. These borehole logs are presented in Appendix 1 of this report.

### 9.3 Traverse Line Summaries

#### Big Lake Traverse:

Traverse extended 400 metres - incorporating 10 drill holes. The number of holes was less than we would have liked, however dense vegetation prevented access. Traces of heavy mineral were detected in the more southern holes, BL 12S and BL 16S.

#### Seal Bay Traverse:

Traverse extended 465 metres, incorporating 12 drill holes. Heavy mineral traces were detected over most of the line, with the greatest quantities found in holes SB 0 and SB 12, situated inland from the beach.

#### Badger Box Traverse:

Traverse extended 2300m. incorporating 24 drill holes. Most samples contained only calcareous sand. However encouraging heavy mineral concentrations were found in holes BB 120 and BB 160, which penetrated the underlying dune systems and may represent strandlines beneath aeolian dunes.

10. LABORATORY INVESTIGATION

Those samples that have been assayed for heavy minerals during this period were treated by the Tasmanian Mines Department, Metallurgical Laboratories, Launceston, using the procedure outlined below.

1. Dry samples as received.
2. Weigh and record weight.
3. Screen on a coarse sieve (say 2 mm.) to break up agglomerated lumps.
4. Riffle split approximately 100 gm working sample.
5. Re-pack balance of sample.
6. Weigh working sample.
7. Screen on 600 micron sieve (or coarser sieve as directed) and weigh plus 600 micron fraction.
8. Using TBE, separate heavy minerals.
9. Dry and weigh heavy minerals.
10. Calculate heavy minerals as a percentage of the sample weighed in Step 6 above.
11. Package heavies for despatch.

Results are reported in Appendix 2.

The heavy minerals for each interval have been bulked together to form one composite sample for each drill hole. Mineralogical analysis was carried out on a number of these samples by Applied Petrographic Services, Sydney, N.S.W.

The method adopted for mineralogical study was:

1. Magnetically separate the heavy concentrate into:
  - . hand magnetics
  - . 0.5 amp Frantz magnetics
  - . 1.0 amp Frantz magnetics
  - . 1.6 amp Frantz magnetics
  - . 1.6 amp Frantz non-magnetics

using a Frantz magnetic separator with forward slope of  $20^{\circ}$ .  
and side tilt of  $12.5^{\circ}$ .

2. Weigh each magnetic fraction.
3. Optically identify mineral grains and point count a minimum 400 points for each magnetic fraction.

This is discussed in Chapter 11, and the detailed mineralogical analyses are presented in Appendix 3 of this report.

TABLE 1

## Tabulation of Heavy Mineral Grades

Depth (metres)	Heavy Mineral Grades			
	BL 12N	BL 16S	SB 12	BB 160
0-1	0.41	0.5	0.1	0.3
1-2	0.64	0.4	0.1	0.2
2-3	0.35	0.3	0.1	0.4
3-4	0.53	0.3	0.1	0.3
4-5	0.47	0.2	0.1	0.4
5-6	-	0.3	0.1	0.6
6-7	-	0.4	0.2	0.9
7-8	-	-	0.5	0.9
8-9	-	-	-	-
9.10	-	-	-	-
Average Grade	0.48	0.34	0.16	0.5

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TABLE 2

## Comparison of Mineralogy

MINERAL	BL 16S	SB 12	BB 160
MAGNETITE	11	5	18
ILMENITE	29	6	23
GARNET	10	11	10
TOURMALINE	12	10	21
RUTILE	6	1	4
ZIRCON	10	1	2
STAUROLITE	1	2	1
PYROXENE	3	35	1
AMPHIBOLE	1	1	1
OLIVINE	-	3	1
EPIDOTE/ZOISITE	1	1	2
ALUMINO-SILICATES	3	2	3
LEUCOXENE	9	1	7
QUARTZ	4	1	1
SHELL	-	7	1
ROCK FRAGS/COMPOSITES	3	13	7
MICA/CHLORITE	1	2	1
SULPHIDES	-	1	-
APATITE	-	-	-
CASSITERITE	-	-	1
MONAZITE	<1	<1	<1
SCHEELITE	-	<1	-
AVERAGE GRADE H.M.	0.39	0.16	0.5

## 11. RESULTS AND DISCUSSION

To date four drill holes selected because they contained visible heavy mineral and representing some of the higher grade material have been analysed from the traverse lines; two from Big Lake and one each from Seal Bay and Badger Box. This has been done to give an idea of the grades and detail on mineralogy in the areas.

The Big Lake traverse is by far the most promising area, with the two holes assayed, BL 12N and BL 16S, having fairly constant grades for each interval (see Table 1). The average grades for each hole are 0.48% and 0.34% respectively.

As shown in Table 2, 25% of the heavy mineral in BL 16S is made up of rutile, zircon and leucoxene, which is significantly greater than drill holes SB 12 and BB 160.

The Seal Bay drill hole (SB 120) has very little mineral present in the top six metres, but at the water table the grades increase to 0.5% (see Table 1). However the average grade for the drill holes is low at 0.16%.

The mineralogy of SB 12 is dominated by pyroxenes and rock fragments representing weathered bedrock material. Rutile, zircon and leucoxene only constitute 3% of the total mineral (see Table 2).

The Badger Box drill hole (BB 160) shows consistent grades of about 0.3% for the top five metres, with an increase up to 0.9% for the remaining three metres (see Table 1). This possibly represents an older beach deposit containing strandlines with heavy mineral concentrations, underlying the more recent aeolian dunes. The average grade for the drill hole is 0.5%.

The mineralogy of BB 160 is dominated by a typical mature detrital suite of magnetite, ilmenite, garnet and tourmaline; with rutile, zircon and leucoxene

only representing 11% of the total heavy mineral concentration (see Table 2). The concentration of such a detrital heavy mineral suite again points to the possibility of older beach concentrations of mineral. However the low content of the economically important minerals: rutile, zircon and leucoxene makes the area less attractive as an exploration target.

12. PROPOSED EXPLORATION

All future exploration activities are proposed only to take place in and around the Big Lake area. Subsequently most of the EL will be relinquished with approximately 30 km<sup>2</sup> remaining.

The Big Lake area appears to be the most attractive, even though at present the grades are sub-economic. The mineralogy however is similar to that of Naracoopa, so it is hoped with future work that higher grade mineralization can be found to make the area economic.

The accompanying exploration licence renewal application shows the area to be retained for further exploration.

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APPENDIX 1

## Drill Hole Descriptive Logs

Traverse lines drilled:

Big Lake: - B.L.

Seal Bay: - S.B.

Badger Box: - B.B.

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BIG LAKE

LINE NO: 1 HOLE NO: BLO

LOGGED BY: ANDREW DOVE

DATE DRILLED: 7.7.87

021

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to fine, dark grey then white.			
1 - 2		SAND, medium to fine grained, white.			
2 - 3		SAND, coarse grained, dark brown. STARTED SLUDGING			
3 - 4	2.5	Dark brown, indurated coarse SAND.			
4 - 5	3.75	AS ABOVE			
5 - 6m.	3.75	AS ABOVE, SAND, however becoming coarser.			
6 - 7	4	SAND, very coarse grained, greyish-brown.			
7 - 8	4.75	AS ABOVE, but grain size becoming coarser.			
8 - 8.8	2.5	Very coarse SAND to granules, fine silty fraction containing mica.  END OF HOLE on pebble base 8.8 m.			

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CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BIG LAKE

LINE NO: 1

HOLE NO: BL 4N

LOGGED BY: ANDREW DOVE

DATE DRILLED: 7.7.87

022

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine-medium grained, dark grey then white.			
1 - 2		SAND, medium to fine, white.			
2 - 3		SAND, medium to coarse grained, light grey. STARTED SLUDGING			
3 - 4	3.25	SAND, dark grey, medium grained, contains a lot of organics, slightly indurated.			
4 - 5	5.5	AS ABOVE			
5 - 6	5.0	AS ABOVE - becoming coarser.			
6 - 7	5.75	Brownish-grey, very coarse SAND.			
7 - 8	4.75	AS ABOVE - becoming granular.  END OF HOLE at granular base 8m.			

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CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BIG LAKE

LINE NO: 1 HOLE NO: BL 8N

LOGGED BY: ANDREW DOVE

DATE DRILLED: 7.7.87

0233

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine-medium grained, light grey.			
1 - 2		SAND, fine-medium grained, white.			
2 - 3		SAND, fine-medium grained - white then dark brown, indurated.  STARTED SLUDGING			
3 - 4		SAND, medium grained, dark brown, indurated.			
4 - 5		AS ABOVE, but coarse.			
5 - 6		AS ABOVE			
6 - 7		SAND, coarse to very coarse, light grey, occasional granules.			
7 - 8		AS ABOVE, with pebbles  END OF HOLE, pebble base 8m.			

18

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CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BIG LAKE

LINE NO: 1 HOLE NO: BL 12N

LOGGED BY: ANDREW DOVE

DATE DRILLED: 7/7/87

034

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine-medium grained, dark grey then white.		5.3	0.41
1 - 2		SAND, fine-medium grained, white.		1.26	0.64
2 - 3		AS ABOVE.		5.7	0.35
3 - 4		SAND, fine-medium grained, dark grey, slightly indurated.		1.68	0.53
		STARTED SLUDGING			
4 - 5	2.5	SAND, medium grained, dark grey, indurated.		1.9	0.47
		END OF HOLE, mud. 5m.			
		Average			0.48

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CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BIG LAKE

LINE NO: 1 HOLE NO: BL 16N

LOGGED BY: ANDREW DOVE

DATE DRILLED: 7/7/87

0235

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine-medium grained, light grey then white.			
1 - 2		SAND, fine-medium grained, white.			
2 - 3		SAND, fine-medium grained, white then dark grey - contains organics.			
3 - 4		SAND, medium grained, dark grey, indurated.			
		STARTED SLUDGING			
4 - 5	3.5	AS ABOVE			
5 - 6	3.0	AS ABOVE			
6 - 7	#.@%	AS ABOVE becoming coarser			
		END OF HOLE. Mud. 7m.			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BIG LAKE

LINE NO: 1 HOLE NO: BL 20N

LOGGED BY: ANDREW DOVE

DATE DRILLED: 7/7/87

026

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine-medium, dark grey then white.			
1 - 2		SAND, fine-medium, white.			
2 - 3		SAND, fine-medium, dark brown.			
3 - 4		AS ABOVE, slightly indurated.  STARTED SLUDGING			
4 - 5	3.5	SAND, medium grained, dark grey, indurated.			
5 - 6	4.25	AS ABOVE.			
6 - 7	4.0	AS ABOVE, becoming coarser.			
		END OF HOLE. Mud. 7.0m.			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BIG LAKE

LINE NO: 1 HOLE NO: BL 4S

LOGGED BY: ANDREW DOVE

DATE DRILLED: 8/7/87

037

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark brown then light grey			
1 - 2		SAND, fine grained, light grey.			
2 - 3		AS ABOVE			
3 - 4		SAND, fine grained, dark grey, slightly indurated.			
4 - 5		AS ABOVE			
		STARTED SLUDGING			
5 - 6	4.5 kg.	AS ABOVE but coarser.			
6 - 7	3.5	AS ABOVE			
7 - 8	4.5	SAND, coarse to very coarse, dark grey.			
8 - 9	4.5	SAND, coarse to very coarse, dark grey.			
		END OF HOLE, very coarse sand pebbles 9.0m.			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BIG LAKE

LINE NO: 1 HOLE NO: BL 8S

LOGGED BY: ANDREW DOVE

DATE DRILLED: 8/7/87

0238

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey.			
1 - 2		SAND, fine to medium, light grey to white.			
2 - 3		SAND, fine to medium, light greyish to white. STARTED SLUDGING			
3 - 4	4.0	SAND, medium grained, dark grey, indurated.			
4 - 5	3.0	AS ABOVE			
5 - 6	3.0	AS ABOVE			
6 - 7	5.75	AS ABOVE			
7 - 8	4.25	SAND, dark grey, coarse with some granules.  end of hole. Granules, 8.0m.			

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CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BIG LAKE

LINE NO: 1 HOLE NO: BL 12S

LOGGED BY: ANDREW DOVE

DATE DRILLED: 8/7/87

029

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to fine dark brown then white.			
1 - 2		SAND, medium to fine, greyish-brown.			
2 - 3		SAND, medium to fine, brownish-grey. STARTED SLUDGING			
3 - 4	2.75	SAND, medium grained, light grey.			
4 - 5	2.5	SAND, medium grained, dark grey.			
5 - 6	3.75	AS ABOVE but coarser. Medium-coarse.			
6 - 7	4.0	AS ABOVE			
7 - 8	6.5	Coarse grained SAND, with some PEBBLES, black MUD at base.  END OF HOLE, black mud. 8m.			

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0300

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BIG LAKE

LINE NO: 1 HOLE NO: BL 16 S

LOGGED BY: ANDREW DOVE

DATE DRILLED: 8/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to fine, dark brown then white.		1.5	0.5
1 - 2		SAND, medium to fine white with trace of H.M.		0.3	0.4
		STARTED SLUDGING			
2 - 3.2	4.0	SAND, medium grained, dark grey, brown, contains a lot of organics.		0.9	0.3
3.2 - 4.0	2.75	AS ABOVE		3.2	0.3
4 - 5	4.0	SAND, medium-coarse grained, dark grey, contains a lot of organics.		13.1	0.2
5 - 6	3.5	SAND, coarse grained, medium grey.		16.3	0.3
6 - 7	4.25	Coarse SAND, grading to PEBBLES at base. Grey colour, trace of H.M. including garnet and trace of biotite.		41.9	0.4
		END OF HOLE, pebbles. 7.1m.			
		Average			0.34

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CLIENT: NATIONAL MINERAL SANDS  
 AREA: KING ISLAND - SEAL BAY  
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 44/86  
 LINE NO: 1 HOLE NO: SB 0  
 DATE DRILLED: 8.7.87

Interval (m)	Wet Wt. (kg)	Description	% Slime	%+1000 um	% H.M.
0 - 1		SAND, medium grained, greyish-orange, fine shell, grey colour due to organics.			
1 - 2		SAND, medium to coarse grained, amber. Abundant shell.  STARTED SLUDGING			
2 - 3	2.5	SAND, amber, medium grained, calcrete.			
3 - 4	4.5	SAND, fine grained, yellow H.M. visible (>1%)			
4 - 5	4.25	SAND, fine grained, pale yellow, H.M. visible.			
5 - 6	3.0	AS ABOVE. H.M. visible.			
6 - 7	3.5	SAND, coarse grained, pale yellow. H.M. visible, shell fragments abundant.			
7 - 8	4.25	AS ABOVE but coarser.			
8 - 9	4.25	AS ABOVE but paler colour (cream).			
9 - 10	3.75	SAND, fine, abundant shell, white, visible H.M.			
		END OF HOLE			

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CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - SEAL BAY

LINE NO: 1 HOLE NO: SB 4

LOGGED BY: ANDREW DOVE

DATE DRILLED: 8.7.87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine-medium grained, dark grey.  STARTED SLUDGING			
1 - 2	3.75	SAND, medium grained, light brown, shell fragments. Calcrete nodules.			
2 - 3	2.5	SAND, medium grained, cream, mostly shell fragments, H.M. visible			
3 - 4	4.0	AS ABOVE			
4 - 5	4.75	AS ABOVE			
5 - 6	4.25	AS ABOVE			
6 - 7	5.5	AS ABOVE, shell becoming coarser			
7 - 8	5.0	AS ABOVE			
8 - 9	5.5	SAND, fine, cream, fine and coarse shell and occasional pebbles.			
9 - 10	4.75	AS ABOVE but no pebbles.  END OF HOLE, coarse shell.			

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CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - SEAL BAY

LINE NO: 1 HOLE NO: SB 8

LOGGED BY: ANDREW DOVE

DATE DRILLED: 9/7/87

033

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium grained, orange-brown, contains organics.			
1 - 2		SAND, medium grained, amber, abundant coarse shell fragments.			
2 - 3		AS ABOVE.			
3 - 4		AS ABOVE.			
4 - 5		AS ABOVE  STARTED SLUDGING			
5 - 6	3.5	AS ABOVE. H.M. present.			
6 - 7	4.5	AS ABOVE - colour changing to grey at base. Organics present. H.M. visible.			
7 - 8	3.5	SAND, medium, grey with fine and coarse shell, old B horizon.			
8 - 9	4.5	SHELL fragment, mostly fine dominant, with light grey fine sand.  END OF HOLE. Difficult drilling.			

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800033

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - SEAL BAY

LINE NO: 1 HOLE NO: SB 12

LOGGED BY: ANDREW DOVE

DATE DRILLED: 9/7/87

034

Interval (m)	Wet Wt. (kg)	Description	% Slime	%+1000 um	% H.M.
0 - 1		SAND, medium grained, greyish orange, abundant shell fragments.		1.1	0.1
1 - 2		SAND, medium grained, amber, abundant shell fragments.		1.1	0.1
2 - 3		AS ABOVE		0.5	0.1
3 - 4		AS ABOVE		0.5	0.1
4 - 5		AS ABOVE		0.9	0.1
5 - 6		AS ABOVE		1.1	0.1
6 - 7		AS ABOVE		0.8	0.2
		STARTED SLUDGING			
7 - 8	4.5	AS ABOVE, H.M. present (>1%)	9.4	1.7	0.5
		END OF HOLE, difficult drilling.			
		Average			0.16

29

800036

035

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - SEAL BAY

LINE NO: 1 HOLE NO: SB 16

LOGGED BY: ANDREW DOVE

DATE DRILLED: 9/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, coarse grained, greyish-orange, abundant shell.			
1 - 2		AS ABOVE but orange colour.			
2 - 3		AS ABOVE			
		STARTED SLUDGING			
3 - 4	4.0	SAND, medium grained, light grey, abundant shell fragments.			
4 - 5	3.75	SAND, medium grained, no shell, some clay, greyish-yellow, H.M. trace.			
5 - 6	4.25	SAND, fine grained, cream, rich in fine shell. H.M. trace.			
6 - 7	4.25	AS ABOVE. H.M. trace.			
7 - 8	5.0	AS ABOVE, H.M. Trace			
8 - 9	4.25	AS ABOVE, H.M. Trace			
9 - 10	5.0	AS ABOVE, H.M. Trace			
		END OF HOLE 10m.			

30

800037

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - SEAL BAY

LINE NO: 1 HOLE NO: SB 20

LOGGED BY: ANDREW DOVE

DATE DRILLED: 9/7/87

036

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium grained, greyish-orange, abundant shell.			
1 - 2		SAND, medium grained, amber, abundant shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE with occasional pebbles and coarse shell. Organic layer - dark brown.			
6 - 7		SAND, medium to fine grained, pale brown, shell free; with clay matrix.			
7 - 7.7		SAND, medium grained, abundant shell. Clayey layer 7.0 - 7.20m. contained fine mineral Calcrete. Stopped drilling at 7.7m.			
		END OF HOLE 7.7m.			

31

800038

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - SEAL BAY

LINE NO: 1 HOLE NO: SB 24

LOGGED BY: ANDREW DOVE

DATE DRILLED: 9/7/87

037

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, coarse grained, greyish-orange, abundant shell.			
1 - 2		SAND, medium grained, amber, abundant shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
% _ %.*		SAND, medium to coarser, amber, abundant fine and coarse shell, occasional pebbles. Traces of H.M., carbonate matrix.			
		END OF HOLE. Difficult drilling.			
		5.8m. hard base - probably calcrete layer			

32

800039

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - SEAL BAY

LINE NO: 1 HOLE NO: SB 28

LOGGED BY: ANDREW DOVE

DATE DRILLED: 9/7/87

038

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium grained, greyish-orange, abundant fine shell.			
1 - 2		SAND, medium grained, amber, abundant fine shell.			
2 - 3		AS ABOVE, contains some organics.			
3 - 4		SAND, medium grained, amber, abundant fine shell - some H.M.			
4 - 5		AS ABOVE, some H.M.			
5 - 6		SAND, medium grained, lgith grey-brown, contains organics, old B horizon			
6 - 7		SAND, medium grained, amber, abundant shell.			
7 - 8		AS ABOVE, becoming coarser. Occasional pebbles, H.M. traces.  STARTED SLUDGING			
8 - 9	4.25	SAND, medium to coarse grained, amber, H.M. traces. Occasional pebbles, abundant coarse shell.			
9 - 10	3.5	AS ABOVE - fine/coarse shell layers. Pebble base. Cream colour.  END OF HOLE 10m. Pebbles.			

33

800010

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - SEAL BAY

LINE NO: 1 HOLE NO: SB 32

LOGGED BY: ANDREW DOVE

DATE DRILLED: 9/7/87

0.39

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to coarse, light grey-amber. Abundant shell.			
1 - 2		AS ABOVE			
2 - 3		AS ABOVE, some H.M. becoming coarser at base.			
3 - 4		AS ABOVE, becoming finer			
4 - 5		AS ABOVE some H.M.			
5 - 6		AS ABOVE, has indurated layer - dark brown organic and hard.			
6 - 7		SAND, medium grained, slightly organic, amber, shell fragments.			
7 - 8		AS ABOVE - becoming coarser. H.M. trace.			
8 - 9		AS ABOVE, shell, becoming coarser. Some H.M.			
		END OF HOLE. Coarse sand 9.0m.			

34

800011

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - SEAL BAY

LINE NO: 1      HOLE NO: SB 36

LOGGED BY: ANDREW DOVE

DATE DRILLED: 9/7/87

040

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to coarse, light grey, abundant shell fragments			
1 - 2		AS ABOVE - pale brown.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE. Traces H.M.			
4 - 5		AS ABOVE, occasional pebbles. Trace H.M.			
5 - 5.7		AS ABOVE, very coarse shell. Some H.M.			
		END OF HOLE 5.7m. Didn't bother to sludge.			

35

800042

CLIENT: NATIONAL MINERAL SANDS  
 AREA: KING ISLAND - SEAL BAY  
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 44/86  
 LINE NO: 1 HOLE NO: SB 40  
 DATE DRILLED: 9/7/87

041

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium, dark grey then amber. Fine shell fragments.			
1 - 2		SAND, medium grained, amber, organic material present, abundant shell.			
2 - 3		SAND, medium grained, light grey, abundant fine shell. Trace H.M.			
3 - 4		AS ABOVE - traces H.M.			
4 - 5		AS ABOVE, trace H.M.			
5 - 6		AS ABOVE: Trace H.M. shell becoming coarser.			
6 - 7		AS ABOVE, traces H.M. Some very coarse shell.  END OF HOLE 7.0m. Didn't sludge			

36

800043

CLIENT: NATIONAL MINERAL SANDS

AREA: KING ISLAND - SEAL BAY

LOGGED BY: ANDREW DOVE

TITLE NO: EL 44/86

LINE NO: 1      HOLE NO: SB 44

DATE DRILLED: 9/7/87

042

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine-medium grained, light grey, abundant fine shell. Minor traces H.M.			
1 - 2		AS ABOVE			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE			
6 - 7		AS ABOVE			
		END OF HOLE 7.0m.			

37

800044

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BADGER BOX CREEK

LINE NO: 1      HOLE NO: BB 0

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

043

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, grey, medium to coarse grained, abundant shell.  END OF HOLE 1m. Basement			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BADGER BOX CREEK

LINE NO: 1 HOLE NO: BB 10

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

044

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine grained, grey, abundant fine shell.			
1 - 2		SAND, fine grained, grey then white, abundant fine shell.			
2 - 3		SAND, fine grained, white with occasional grey, abundant fine shell.			
3 - 4		SAND, fine to medium grained, white, abundant fine shell.			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE			
6 - 7		SAND, fine to medium grained, brown, slightly indurated, abundant fine shell.			
7 - 8		AS ABOVE			
8 - 9		AS ABOVE			
( _ LO)		AS ABOVE, becoming more indurated.			
		END OF HOLE 1.0 metres			

39

800046

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BADGER BOX CREEK

LINE NO: 1 HOLE NO: BB 20

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

045

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine grained, dark grey then amber			
1 - 2		SAND, fine to medium grained, amber, abundant fine shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE, slightly organic.			
6 - 7		AS ABOVE			
7 - 8		AS ABOVE, BECOMING SLIGHTLY COARSER.			
8 - 9		AS ABOVE, SHELL BECOMING COARSE.			
( _ LO		AS ABOVE, grey.			
		END OF HOLE 10.00 m.			

40

800047

0110

41

800048

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BADGER BOX CREEK

LINE NO: 1 HOLE NO: BB 30

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine grained, dark grey then slightly amber.			
1 - 2		SAND, fine to medium grained, amber, abundant fine shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
		STARTED SLUDGING			
5 - 6	3.5	SAND, coarse grained, amber to brown, coarse shell.			
6 - 7	3.5	AS ABOVE becoming grey.			
		END OF HOLE 7.0m. Gravel			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BADGER BOX CREEK

LINE NO: 1 HOLE NO: BB 40

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

047

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine grained, dark grey then amber. Abundant fine shell.			
1 - 2		SAND, fine to medium grained, amber. Abundant fine shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
% - c		AS ABOVE			
		END OF HOLE 6.0m. Rock			

42

800049

CLIENT: NATIONAL MINERAL SANDS  
 AREA: KING ISLAND - BADGER BOX CREEK  
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 44/86  
 LINE NO: 1 HOLE NO: BB 50  
 DATE DRILLED: 19/7/87

018

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey, slightly amber.			
1 - 2		SAND, fine to medium grained, amber. Slightly organic, abundant fine shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE			
6 - 7		AS ABOVE, slightly coarser.			
7 - 8		AS ABOVE. H.M. traces			
		STARTED SLUDGING			
8 - 9		SAND, fine to medium grained, light grey, coarse shell fragments.			
9 - 10	3.0	AS ABOVE, shell not as coarse, went through dark grey indurated layer.			
		END OF HOLE 10.0m.			

43

800050

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BADGER BOX CREEK

LINE NO: 1 HOLE NO: BB 60

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

049

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then light brown.			
1 - 2		SAND, fine grained, brown, fine shell fragments.			
2 - 3		SAND, fine to medium grained, amber, abundant fine shell			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE, slightly organic.			
6 - 7		AS ABOVE			
7 - 8		AS ABOVE			
8 - 9		AS ABOVE			
9 - 10		AS ABOVE			
		END OF HOLE 10.0m.			

44

800051

CLIENT: NATIONAL MINERAL SANDS  
 AREA: KING ISLAND - BADGER BOX CREEK  
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 44/86  
 LINE NO: 1 HOLE NO: BB 70  
 DATE DRILLED: 19/7/87

050

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then amber. Abundant fine shell.			
1 - 2		SAND, fine to medium grained, amber. Abundant fine shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE			
6 - 7		AS ABOVE, slightly organic.			
7 - 8		AS ABOVE			
8 - 9		AS ABOVE			
9.00		AS ABOVE, no organics.			
		END OF HOLE 10.0 m.			

45

300069

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BADGER BOX CREEK

LINE NO: 1 HOLE NO: BB 80

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

051

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then amber			
1 - 2		SAND, fine to medium grained, amber. Abundant fine shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE, slightly organic.			
5 - 6		AS ABOVE			
6 - 7		AS ABOVE			
7 - 8		AS ABOVE			
8 - 9		AS ABOVE			
9 - 10		AS ABOVE			
		END OF HOLE 10.0m.			

46

800053

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BADGER BOX CREEK

LINE NO: 1 HOLE NO: BB 90

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

052

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, amber, slightly organic, abundant fine shell.			
1 - 2		SAND, fine to medium, amber, abundant fine shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE			
6 - 7		AS ABOVE			
7 - 8		AS ABOVE, slightly organic.			
8 - 9		AS ABOVE			
9 - 10		AS ABOVE			
		END OF HOLE 10.0m.			

47

800054

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BADGER BOX CREEK

LINE NO: 1 HOLE NO: BB 100

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

053

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium, dark grey			
1 - 2		SAND, fine to medium grained, dark grey then amber, abundant fine shell.			
2 - 3		SAND, fine to medium grained, amber. Abundant fine shell.			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE			
6 - 7		AS ABOVE			
7 - 8		AS ABOVE			
8 - 9		AS ABOVE			
9 - 10		AS ABOVE			
END OF HOLE 10.0m.					

48

800053

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BADGER BOX CREEK

LINE NO: 1 HOLE NO: BB 110

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

057A

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then amber. Abundant fine shell.			
1 - 2		SAND, fine to medium grained, amber. Abundant fine shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE			
6 - 7		AS ABOVE			
7 - 8		SAND, fine to medium grained, amber. Abundant fine shell, then went through dark grey indurated layer, then back to white sand.			
8 - 9		SAND, fine to medium grained, amber, abundant fine shell.			
		END OF HOLE 9.0m. Didn't Sludge			

CLIENT: NATIONAL MINERAL SANDS  
 AREA: KING ISLAND - BADGER BOX CREEK  
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 44/86  
 LINE NO: 1 HOLE NO: BB 120  
 DATE DRILLED: 19/7/87

055

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, amber. Slightly organic. abundant fine shell.			
1 - 2		SAND, fine to medium grained, amber. Abundant fine shell.			
2 - 3		AS ABOVE, slight organic			
3 - 4		AS ABOVE, went through a calcrete layer.			
4 - 5		SAND, fine to medium grained, dark brown then amber, then white. ABundant fine shell.			
5 - 6		SAND, medium to coarse grained, light grey, some fine shell.  STARTED SLUDGING			
6 - 7	3.00	SAND, fine to coarse grained, (>1%) H.M. present			
7 - 8	AS ABOVE	H.M. present (>1%)			
		END OF HOLE Calcrete			

50

800057

CLIENT: NATIONAL MINERAL SANDS  
 AREA: KING ISLAND - BADGER BOX CREEK  
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 44/86  
 LINE NO: 1 HOLE NO: BB 130  
 DATE DRILLED: 19/7/87

056

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then amber. Abundant fine shell.			
1 - 2		SAND, fine to medium grained, amber. Abundant fine shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE			
6 - 7		AS ABOVE			
7 - 8		AS ABOVE then dark brown, indurated.			
8 - 9		SAND, medium to coarse grained, brown then amber, abundant shell.			
9 - 10		SAND, medium to coarse, dark brown, indurated. Abundant shell.			
		END OF HOLE 10.0m. Indurated			

51

800058

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BADGER BOX CREEK

LINE NO: 1 HOLE NO: BB 140

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

057

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then amber. Abundant shell.			
1 - 2		SAND, fine to medium grained, amber, abundant shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		SAND, fine to medium grained, amber then dark grey, slightly indurated. Abundant fine shell.			
6 - 7		AS ABOVE			
7 - 8		SAND, fine to medium grained. Amber then brown, abundant shell.			
8 - 9		SAND, fine to medium grained, brown, indurated. Abundant shell			
END OF HOLE 9.0m.					

52

800039

058

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BADGER BOX CREEK

LINE NO: 1 HOLE NO: BB 150

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then amber, abundant shell.			
1 - 2		SAND, fine to medium grained, amber, slightly organic, abundant shell.			
2 - 3		SAND, fine to medium grained, amber, abundant fine shell.			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE, becoming slightly brown.			
5 - 6		SAND, fine to medium grained, amber, then dark grey. Slightly indurated, abundant fine shell.			
6 - 7		SAND, fine to medium grained, amber, abundant fine shell.			
7 - 8		SAND, fine to medium grained, dark grey then brown.			
8 - 9		AS ABOVE. Indurated.			
9 - 10		AS ABOVE			
		END OF HOLE 10.0m.			

53

800060

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

059

AREA: KING ISLAND - BADGER BOX CREEK

LINE NO: 1 HOLE NO: BB 160

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	%+1000 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then amber. Abundant fine shell.		1.2	0.3
1 - 2		SAND, fine to medium grained, amber, abundant fine shell.		0.6	0.2
2 - 3		AS ABOVE.		0.6	0.4
3 - 4		SAND, fine to medium grained, amber then dark grey, abundant fine shell.		6.7	0.3
4 - 5		SAND, fine to medium grained, amber with slight dark grey layers fine to coarse shell.		3.7	0.4
5 - 6		AS ABOVE		2.3	0.6
6 - 7		SAND, fine to medium grained, tan. Abundant fine shell. H.M. present (>1%).		<u>%+ 600 um</u> 4.9	0.9
		STARTED SLUDGING			
7 - 8	3.0	AS ABOVE, H.M. present (>1%).		3.0	0.9
		END OF HOLE 8.0m. .Clay.			
		Average			0.5

54

300001

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BADGER BOX CREEK

LINE NO: 1 HOLE NO: BB 170

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

080

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then slightly amber. ABundant fine shell.			
1 - 2		SAND, fine to medium grained, amber, abundant fine shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE - becoming dark brown.			
6 - 7		SAND, fine to medium grained, brown to tan, abundant fine shell			
7 - 8		SAND, fine to medium grained, tan to brown, indurated. ABundant fine shell.			
8 - 9		AS ABOVE			
		END OF HOLE 9.0m. Clay			

55

800062

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BADGER BOX CREEK

LINE NO: 1 HOLE NO: BB 180

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

1901

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then amber. ABundant fine shell			
1 - 2		SAND, fine to medium grained, amber. Abundant fine shell.			
2.3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE			
6 - 7		AS ABOVE			
& _ *		AS ABOVE			
8 - 9		AS ABOVE			
9 - 10		AS ABOVE			
		END OF HOLE 10.0m.			

56

800063

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BADGER BOX CREEK

LINE NO: 1 HOLE NO: BB 190

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

002

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then amber, abundant fine shell.			
1 - 2		SAND, fine to medium grained, amber. Abundant fine shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE			
6 - 7		AS ABOVE, with occasional dark brown layers. Slightly indurated.			
7 - 8		SAND, fine to medium grained, amber. Abundant fine shell.			
8 - 9		AS ABOVE			
9 - 10		AS ABOVE. Slightly organic. END OF HOLE 10.0.m.			

57

800064

CLIENT: NATIONAL MINERAL SANDS  
 AREA: KING ISLAND - BADGER BOX CREEK  
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 44/86  
 LINE NO: 1 HOLE NO: BB 200  
 DATE DRILLED: 19/7/87

003

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then amber. Abundant fine shell.			
1 - 2		SAND, fine to medium grained, amber. Abundant fine shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE, slightly organic.			
5 - 6		AS ABOVE			
6 - 7		SAND, fine to medium grained, amber. Abundant fine shell.			
7 - 8		AS ABOVE			
8 - 9		AS ABOVE			
9 - 10		AS ABOVE			
		END OF HOLE 10.0m.			

58

800065

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

AREA: KING ISLAND - BADGER BOX CREEK

LINE NO: 1 HOLE NO: BB 210

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

064

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then amber. Abundant fine shell.			
1 - 2		SAND, fine to medium grained, amber. Abundant fine shell.			
2 - 3		SAND, fine to medium grained, amber then dark brown. Abundant fine shell.			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE, went through dark brown layer.			
6 - 7		SAND, fine to medium grained, dark brown to red, abundant fine shell, slightly indurated			
7 - 8		AS ABOVE then white sand.			
8 - 9		SAND, medium grained white, some fine shell fragments.  END OF HOLE 9.0m.			

59

800066

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 44/86

005

AREA: KING ISLAND - BADGER BOX CREEK

LINE NO: 1 HOLE NO: BB 220

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, reddish grey. Slightly indurated. Some fine shell.			
1 - 2		SAND, medium to coarse grained, reddish brown. slightly indurated.			
2 - 3		SAND, fine to medium grained, light brown then white, abundant fine shell.			
3 - 4		SAND, fine to medium grained, white. Abundant fine shell.			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE			
6 - 6.3		AS ABOVE			
		END OF HOLE 6.3m. rock			

60

800067

CLIENT: NATIONAL MINERAL SANDS  
 AREA: KING ISLAND - BADGER BOX CREEK  
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 44/86  
 LINE NO: 1 HOLE NO: BB 230  
 DATE DRILLED: 19/7/87

066

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained. Dark grey then amber. Abundant fine shell.			
1 - 2		SAND, fine to medium grained. Amber. Abundant fine shell.			
2 - 3		AS ABOVE - slightly organic.			
3 - 4		AS ABOVE			
4 - 5		SAND, fine to medium grained. Amber. ABundant fine shell.			
5 - 6		AS ABOVE			
6 - 7		AS ABOVE, slightly organic.			
		END OF HOLE 7.0m. Rock			

61

800068

APPENDIX 2

Results of Laboratory Heavy Mineral Separations

068

63

## DEPARTMENT OF MINES—TASMANIA

800070



## TELEPHONES:

Metallurgical Research .....	} 44 2431-2 (2 lines)
Laboratory .....	
Mines Inspection .....	
Explosives & Inflammable Liquids	

TELEX 58764

LAUNCESTON OFFICES  
287 WELLINGTON STREET  
SOUTH LAUNCESTON 7249

1st October 1987

Peter Stitt & Assoc Pty Ltd,  
5th Floor  
York House,  
32 York Street  
Sydney 2000 N.S.W.

Reg. Nos 875055-68 875139-53  
875185-201 875269-82

Dear Sir,

Please find below results of samples submitted to this laboratory. for Heavy Liquid separations.

<u>Reg. No</u>	<u>Description</u>	<u>+ 600 <math>\mu</math>m %</u>	<u>% Heavy Mineral</u>
<del>875055</del>	<del>M.L. 0 0 - 1</del>	<del>3.1</del>	<del>0.4</del>
<del>056</del>	<del>1 - 2</del>	<del>6.6</del>	<del>4.2</del>
<del>057</del>	<del>2 - 3</del>	<del>4.8</del>	<del>0.5</del>
<del>058</del>	<del>3 - 4</del>	<del>17.3</del>	<del>0.1</del>
<del>059</del>	<del>Lf 32 0 - 1</del>	<del>9.0</del>	<del>0.2</del>
<del>060</del>	<del>1 - 2</del>	<del>23.2</del>	<del>0.2</del>
<del>061</del>	<del>2 - 3</del>	<del>26.3</del>	<del>0.2</del>
		<u>+ 1.00 mm</u>	
<del>875062</del>	<del>3 - 4</del>	<del>1.5</del>	<del>0.2</del>
<del>063</del>	<del>4 - 5</del>	<del>0.9</del>	<del>0.2</del>
<del>064</del>	<del>5 - 6</del>	<del>0.4</del>	<del>0.1</del>
<del>065</del>	<del>6 - 7</del>	<del>0.4</del>	<del>0.2</del>
<del>066</del>	<del>7 - 8</del>	<del>1.3</del>	<del>0.2</del>
<del>067</del>	<del>8 - 9</del>	<del>0.5</del>	<del>0.2</del>
<del>068</del>	<del>9 - 10</del>	<del>0.5</del>	<del>0.2</del>
<u>875139</u>	<u>BB 160</u>	<u>1.2</u>	<u>0.3</u>
140	1 - 2	0.6	0.2
141	2 - 3	0.6	0.4
142	3 - 4	6.7	0.3
143	4 - 5	3.7	0.4
144	5 - 6	2.3	0.6

069

<u>Reg. No</u>	<u>Description</u>	<u>+600 <math>\mu</math>m %</u>	<u>% Heavy Mineral</u>
875145 BB 160	6 - 7	4.9	0.9
146	7 - 8	3.0	0.9
<del>147 M 56</del>	<del>0 - 1</del>	<del>2.7</del>	<del>0.6</del>
148	1 - 2	3.7	0.4
149	2 - 3	11.5	0.4
150	3 - 4	11.3	0.4
151	4 - 4.56	11.2	0.9
152 M 60	0 - 1	2.1	0.5
<del>153</del>	<del>1 - 2</del>	<del>1.4</del>	<del>0.5</del>

		<u>+ 1.00 mm</u>	
875185 SB 12	0 - 1	1.1	0.1
186	1 - 2	1.1	0.1
187	2 - 3	0.5	0.1
188	3 - 4	0.5	0.1
189	4 - 5	0.9	0.1
190	5 - 6	1.1	0.1
191	6 - 7	0.8	0.2
192*	7 - 8	1.7	0.5

\* 9.4% Slime

		<u>+600 <math>\mu</math>m %</u>	
<del>875193 YR 16</del>	<del>0 - 1</del>	<del>0.2</del>	<del>0.5</del>
194	1 - 2	0.0	0.5
195	2 - 3	0.0	0.4
196	3 - 4	0.1	0.5
197	4 - 5	0.0	0.6
198	5 - 6	1.0	0.6
199	6 - 7	0.8	0.6
200	7 - 8	13.4	0.6
<del>201</del>	<del>8 - 9</del>	<del>23.9</del>	<del>1.3</del>

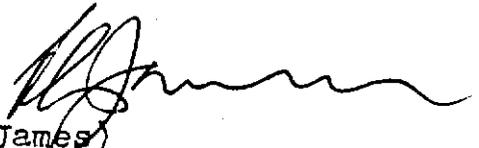
875269 BL 160 S	0 - 1	1.5	0.5
270	1 - 2	0.3	0.4
271	2 - 3.2	0.9	0.3
272	3.2 - 4	3.2	0.3
273	4 - 5	13.1	0.2
274	5 - 6	16.3	0.3
275	6 - 7	41.9	0.4
<del>276 SE 16</del>	<del>0 - 1</del>	<del>0.4</del>	<del>0.2</del>
277	1 - 2	0.2	0.3
278	2 - 3	4.0	0.3
279	3 - 4	16.8	0.3

070

800072

<u>Reg. No</u>	<u>Description</u>	<u>+ 1.00 mm</u>	<u>% Heavy Mineral</u>
875280	SE 16 4 - 5	10.6	0.1
281	5 - 6	19.8	0.3
282	6 - 7	8.7	2.3

Yours faithfully



(P.L. James)

Acting Chief Chemist & Metallurgist

Analyses by  .....

APPENDIX 3

## Mineralogical Study of Heavy Mineral Concentrates

## Samples examined;

Composite of Big Lake hole BL 16 S, 0-7m.

Composite of Seal Bay hole SB 12, 0-8m.

Composite of Badger Box hole BB 160, 0-8m.

# APPLIED PETROGRAPHIC SERVICES

SPECIALIZING IN PETROGRAPHIC ANALYSIS OF GEOLOGICAL AND INDUSTRIAL SAMPLES

P.O. Box 257  
Strawberry Hills  
Sydney, N.S.W. 2012

20 Holdsworth Street  
Newtown  
Sydney, N.S.W. 2042

Phone: (02) 516 4808  
(02) 909 8741

CLIENT: Peter H. Stitt & Assoc. Pty Ltd.

DATE: 30.11.87

SAMPLE DETAILS: BL 16 S, D - 7 Composite (APS 106/10)

APS JOB NO.: M 106

MINERAL	TOTAL	HAND MAGS.	0.5A MAG	1.0A MAG	1.6A MAG	1.6A NON-MAG
MAGNETITE	11	64	-	-	-	-
ILMENITE	29	-	55	44	-	-
GARNET	10	16	45	6	2	1
TOURMALINE	12	7	1	14	58	1
RUTILE	6	-	-	5	8	20
ZIRCON	10	2	1	11	1	24
STAUROLITE	1	1	1	-	1	-
PYROXENE	3	1	-	4	14	-
AMPHIBOLE	1	1	-	1	-	-
OLIVINE	-	-	-	-	-	-
EPIDOTE/ ZOISITE	1	1	-	-	-	-
ALUMINO SILICATES	3	2	-	2	2	12
LEUCOXENE	9	3	-	9	6	21
QUARTZ	4	1	-	3	1	16
SHELL	-	-	-	-	-	-
ROCK FRAGS/ COMPOSITES	3	2	-	2	9	6
MICA/CHLORITE	1	-	1	1	-	-
SULPHIDES	-	-	-	-	-	-
APATITE	-	-	-	-	-	-
CASSITERITE	-	-	-	-	-	-
MONAZITE	<1	<1	<1	<1	<1	<1
SCHEELITE	-	-	-	-	-	-
NO. OF POINTS		536	562	469	513	505
WEIGHT	2.34g	0.42g	0.17g	1.34g	0.12g	0.29g
%	100	18	7	58	5	12

073

68

800075

# APPLIED PETROGRAPHIC SERVICES

SPECIALIZING IN PETROGRAPHIC ANALYSIS OF GEOLOGICAL AND INDUSTRIAL SAMPLES

P.O. Box 257  
Strawberry Hills  
Sydney, N.S.W. 2012

20 Holdsworth Street  
Newtown  
Sydney, N.S.W. 2042

Phone: (02) 516 4808  
(02) 909 8741

CLIENT: Peter H. Stitt & Assoc. Pty Ltd.

DATE: 30.11.87

SAMPLE DETAILS: SB 12, D - 8 Composite (APS 106/8)

APS JOB NO.: M 106

MINERAL	TOTAL	HAND MAGS.	0.5A MAG	1.0A MAG	1.6A MAG	1.6A NON-MAG
MAGNETITE	5	39	-	-	-	-
ILMENITE	6	-	10	9	-	-
GARNET	11	16	73	4	1	-
TOURMALINE	10	9	6	13	9	2
RUTILE	1	-	-	-	1	11
ZIRCON	1	1	-	1	-	12
STAUROLITE	2	1	-	3	1	-
PYROXENE	35	19	2	44	68	-
AMPHIBOLE	1	1	1	1	-	-
OLIVINE	3	2	1	5	1	-
EPIDOTE/ ALUMINO SILICATES	1	-	1	1	1	-
LEUCOXENE	2	1	1	1	5	9
QUARTZ	1	-	-	1	2	4
SHELL	7	1	1	2	1	9
ROCK FRAGS/ COMPOSITES	1	-	-	1	1	9
MICA/CHLORITE	2	1	1	1	1	1
SULPHIDES	1	1	-	-	-	-
APATITE	-	-	-	-	-	-
CASSITERITE	-	-	-	-	-	-
MONAZITE	<1	<1	<1	<1	<1	<1
SCHEELITE	<1	-	-	-	-	<1
NO. OF POINTS		351	500	531	518	520
WEIGHT	1.38g	0.16g	0.12g	0.81g	0.14g	0.15g
%	100	11	9	59	10	11

07A

# APPLIED PETROGRAPHIC SERVICES

SPECIALIZING IN PETROGRAPHIC ANALYSIS OF GEOLOGICAL AND INDUSTRIAL SAMPLES

P.O. Box 257  
Strawberry Hills  
Sydney, N.S.W. 2012

20 Holdsworth Street  
Newtown  
Sydney, N.S.W. 2042

Phone: (02) 516 4808  
(02) 909 8741

CLIENT: Peter H. Stitt & Assoc. Pty Ltd.

DATE: 30.11.87

SAMPLE DETAILS: BB 160, 0 - 8 Composite (APS 106/5)

APS JOB NO.: M 106

MINERAL	TOTAL	HAND MAGS.	0.5A MAG	1.0A MAG	1.6A MAG	1.6A NON-MAG
MAGNETITE	18	83	-	-	-	-
ILMENITE	23	-	54	42	-	-
GARNET	10	6	42	10	1	1
TOURMALINE	21	3	2	24	37	1
RUTILE	4	-	-	-	15	20
ZIRCON	2	1	-	1	3	37
STAUROLITE	1	1	1	1	-	-
PYROXENE	1	1	1	1	4	-
AMPHIBOLE	1	1	1	-	-	-
OLIVINE	1	-	-	1	-	-
EPIDOTE/ ZOBISITE	2	-	1	-	7	-
ALUMINO SILICATES	3	-	-	-	10	9
LEUCOXENE	7	2	1	6	13	17
QUARTZ	1	1	1	2	1	11
SHELL	1	-	-	1	1	3
ROCK FRAGS/ COMPOSITES	7	3	1	12	9	2
MICA/CHLORITE	1	-	1	-	-	-
SULPHIDES	-	-	-	-	-	-
APATITE	-	-	-	-	-	-
CASSITERITE	1	-	-	-	-	1
MONAZITE	<1	<1	<1	<1	<1	<1
SCHEELITE	-	-	-	-	-	-
NO. OF POINTS		522	554	400	566	519
WEIGHT	3.54g	0.76g	0.38g	1.40g	0.20g	0.80g
%	100	21	11	39	6	23

075

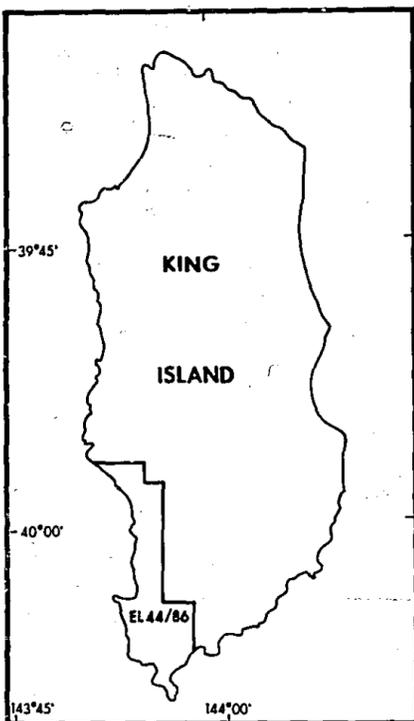


CURRIE

EL 44/86

BADGER BOX TRVERSE

5575000mN



Pearshope Lagoon

BIG LAKE TRVERSE

Big Lake

SEAL BAY TRVERSE

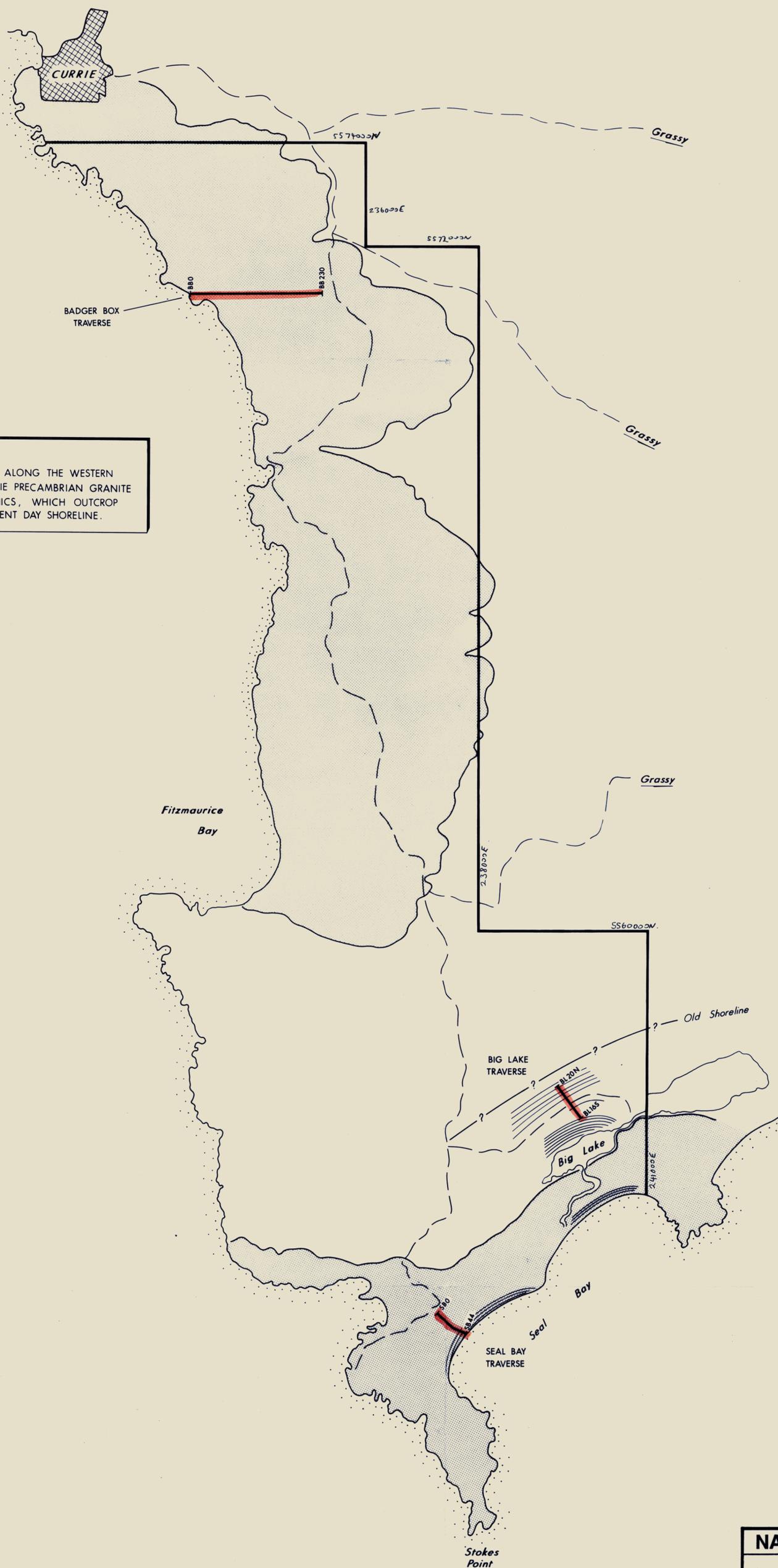
N

SCALE 1:50 000



NATIONAL MINERAL SANDS	
EL. 44/86 - TASMANIA	
LOCATION MAP	
88-2790	
	Fig. 1

750000mE



**NOTE:-**  
 AEOLIAN DUNES ALONG THE WESTERN COASTLINE OVERLIE PRECAMBRIAN GRANITE AND METAMORPHICS, WHICH OUTCROP ALONG THE PRESENT DAY SHORELINE.

OCEAN  
 SOUTHERN



- LEGEND**
- Photo Interpretation, Inland Margin of Sand. Aeolian Dunes.
  - Strandline Sand Deposits.
  - Track / Road

5 cm

SCALE 1:42 000  
 0 800 1600 2400 3200 4000 m.

<b>NATIONAL MINERAL SANDS</b>	
EL 44/86 TASMANIA	
AIR PHOTO INTERPRETATION	
KING ISLAND (SOUTH)	
800077	88-2790
Author: G. LEE	Date: FEB '88
Figure: 2	